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Kristoffer Mousten Hansen

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L'UNIVERSITE D'ANGERS

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Par

Kristoffer MOUSTEN HANSEN

Monetary Systems and Industrial Organization: The Case of Agriculture

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RÉSUMÉ

Cette thèse traite de l'importance des systèmes monétaires pour le développement de l'agriculture. Nous examinons d'abord l'ordre libre de la production monétaire, puis nous expliquons en détail la forme et le développement de l'économie agricole dans ces conditions. Nous analysons la demande de produits agricoles ainsi que la nature et l'importance des facteurs de production dans l'agriculture. Nous examinons aussi comment les caractéristiques propres à l'agriculture déterminent les dimensions optimales des entreprises agricoles et quels changements l'épargne et l'investissement nets entraînent dans la structure de production agricole.

Sur cette base, nous examinons ensuite l'importance de l'interventionnisme monétaire. Il existe une importante littérature sur la financiarisation, que nous examinons de manière critique.

Nous montrons comment la création d'argent par le système bancaire moderne est la cause fondamentale de ce processus financier. Nous examinons ensuite les conséquences de ce processus sur l'organisation de l'agriculture. Le processus connu sous le nom de "tapis roulant agricole" est expliqué en référence aux investissements alimentés par le crédit bancaire.

Ensuite, nous appliquons notre théorie à quelques cas historiques : l'un sous l'étalon-or classique et l'autre dans les développements européens de l'après-guerre. Nous voyons clairement comment la création monétaire par les banques et de la monnaie fiduciaire émise par les gouvernements provoque les processus de déformation analysés dans les chapitres précédents.

mots-clés : systèmes monétaires, économie agricole, financiarisation, interventionnisme

ABSTRACT

This thesis deals with the importance of monetary interventionism for the development of agriculture. We examine first the free market order of money production and then give a detailed account of how the agricultural economy looks under these conditions. In particular, the demand for agricultural products and the nature and importance of economic land and of the other factors of production in agriculture is analyzed. We also examine how features specific to agriculture determine the optimal firm size and how net savings and investment lead to changes in the agricultural structure of production.

With this background, we then go on to examine the importance of monetary interventionism. There is a large literature on financialisation which we examine critically, and we show how money creation through the banking system is the fundamental cause of this process. We then discuss what consequences this has for agricultural organization.

The process known as the "agricultural treadmill" is explained with reference to credit-fuelled investment.

In the final chapters we apply our theoretical framework to some historical cases: one under the classical gold standard and the other European developments in the post-war era. We see clearly here how it is the combination of money creation by banks and fiat money issued by governments that causes the processes of distortion analysed in the previous chapters.

In the conclusion we suggest some possible remedies to the systemic distortions.

keywords : monetary systems, interventionism, agricultural economics, financialisation

Monetary Systems and Industrial Organization: The Case of Agriculture

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0. Introduction

0.1. General introduction

Agricultural economics and monetary theory are seldom studied together, but live their lives as two separate but equal parts of economic science. However, in an economy based on division of labour and interpersonal exchange, money necessarily enters into all economic relations, including in the agricultural sector. The strict separation is therefore not really tenable, unless one assumes neutrality of money, that is, that changes in monetary affairs do not affect the “real” economy.

While a fruitful assumption for some purposes, it becomes a hindrance to economic analysis if the neutrality of money, and hence its separation from the study of the economy in all its interrelations, becomes the unquestioned foundation of all work in economics. We cannot, at the end of the day, study agricultural markets simply by looking at the interplay of the forces of supply and demand on agricultural product markets. Supply and demand is always supply of and demand for whatever good is traded on the market in question *in exchange for money*. Changes in the production of money therefore necessarily have repercussions for the “real” economy, as new money reaches some parts of the economy first and changes the patterns of production and distribution of wealth.

This is true also for the structure of agriculture – the size of farms, the composition of farm capital and the sources of financing. Our contention in this dissertation is that changing the way money enters the economy can lead to fundamental changes in the structure of agriculture, and has in fact led to such changes. If money is produced in the form of commodity money – historically, silver and gold – this results in a distinct organization of agriculture, and if money is created in the financial system through credit expansion, the result is a very different organization of agriculture. Our task is to explain why that is and to explain the chain of causation from money creation to agricultural organization.

This is not simply a theoretical exercise divorced from empirical reality. The organization of farming has changed in fundamental ways in recent decades in practically all capitalistic countries. Whereas up until the beginning of the 20th century agriculture was characterized by small- and medium-sized farms almost always owned and managed as family farms, nowadays farms typically control hundreds of hectares of farmland if not more, and corporate forms of ownership are gaining ground. The family farm is increasingly simply a romantic memory. This might simply be taken to be the consequence of capitalistic agriculture: finally, as the last sector of the economy, farming is now made efficient and organized in a capitalistic fashion suitable for industrial society. However,

history soon puts the lie to this simple explanation. Already in the 19th century, and much earlier in some countries,¹ European farmers were producing for markets in capitalistic fashion. Even so, there is no indication that simply producing for markets led to structural changes in agriculture. The predominance of the family farm was not challenged by capitalism and market society. Hence, to explain the structural changes in agriculture, we have to look elsewhere.

0.2. Literature and motivation

0.2.1. Literature

As already indicated, the literature on agricultural and monetary economics rarely intersect. Monetary influences are generally neglected in theorizing about agriculture. This means that there is a real lacuna in the literature when it comes to monetary systems and their relations to agricultural organization.

The classical economists generally treated all of economic science in their works without separating out the field of monetary theory. Richard Cantillon ([1755] 2010) is today best known for his description of the effects of new money entering the economy, but he also devoted plenty of space to describing agricultural relations. He even described how the incomes of agriculturalists are affected by an inflow of new money (ibid., 156-57). A. R. J. Turgot (2011), writing in the 1760s and 70s, also considered both agricultural and monetary questions, but he made no explicit connections between the two fields.

Adam Smith ([1776] 1904) and David Ricardo ([1819] 1951) both treat of land and money, but again make not connections between the two. We owe Ricardo for his theory of differential rent and the phrase “original and indestructible powers” of the soil as an explanation for the value of land, but his monetary reflections do not connect to his theory of rent. J. B. Say ([1803] 1971) has the most extensive discussion of the origins and nature of money among the classical economists, but there is no account of how the emergence and production of money might affect land prices or the structure of agriculture. The same is true of J. S. Mill’s ([1848] 2006) *Principles of Political Economy*.

In general, the same can be said for marginal and neoclassical economists: there are many interesting *obiter dicta* relating to agriculture in the *Principles* of Menger ([1871] 2007) and

¹ While this is not a historical study, it is worth pointing out that any period characterized by the use of money and a high degree of commerce was invariably also characterized by commercial farming, whether in ancient or medieval times.

Marshall ([1890] 1920), but a systematic account is lacking, let alone a connection agricultural structure and the monetary order.

When we come to modern economics, attention is generally paid to the importance of finance in agriculture. This is important, as money is generally produced through the financial system in the modern economy. An early example is Horton (1957), who found that in the U.S. the need for outside financing tends to rise with the size of farms. A report published by the OECD early on highlighted the relationship between external debt and changes in the form of increased indebtedness and a change in agricultural technique (Organisation for Economic Co-operation and Development, Committee for Agriculture 1970). Barry and Robison (2001) also notes the importance of debt in financing American agriculture. While studies have connected agriculture to financial markets and the international business cycle (Bruno, Büyükkahin, and Robe 2017) and the role of banking in 20th century French agriculture has been noted (Gueslin 1988), the importance of money creation is neglected: the emphasis here is on credit policy and interventions in the form of subsidized lending to farming. Pasour (1990, 194; Pasour and Rucker 2005, 254) also emphasizes the role of subsidized credit in American agriculture but again neglects the role of money creation by banks. Monetary policy and its impact on European agriculture is examined by Tavéra (1999), who considers the role of the interest rate channel, and how monetary interventions can influence the real interest rate in the short term.

Among works dealing with the general history of agriculture in the 20th century, both European (B. Gardner 1996) and American (B. L. Gardner 2002; J. F. Hart 2003), there is general recognition of the role of technological development in driving structural changes. This focus seems to derive from Cochrane (1958), but is itself not really explained. The increased use of external financing is taken to be a response to the need for new capital goods embodying new technologies, not itself a driver of change. The change is assumed to be exogenous to economic life and thus beyond explanation by economic science.

The literature on financialisation is a flourishing field, as it tries to grapple with the evident rise in the role of financial institutions and markets. While the analyses presented in this literature are flawed by a virtually total ignorance of the role of money creation in the financial system, they recognize that financialisation is a real phenomenon in agriculture as in the rest of the economy (Breger Bush 2012; Russi 2013; Fairbairn 2020).

There is also a large literature on the practical management of farms, beginning at least in the 1920s (Holmes 1928) and spanning practical handbooks up to the present day (Kay, Edwards, and Duffy

2016). These textbooks increasingly emphasize the role of financial management, but also the ubiquitous presence of risks in agriculture. Allen and Lueck's (1998; 2002) work emphasizes the role of risk in explaining farm structure, specifically in explaining the predominance of smaller farms: these are better at shouldering the great diversity of risks in agriculture.

0.2.2. Motivation

From the foregoing brief review it should be clear that there is an opening in the literature for studies connecting agriculture and monetary factors. While the role of finance in modern agriculture is acknowledged, the possible importance of changes to monetary institutions in driving financialisation is left unexamined, and structural changes are explained mainly as the result of technological change, which is taken to be exogenous to the economics of agriculture. The interplay of agricultural and monetary economics is practically unexamined, and the possible role of money production in driving structural change completely ignored.

This dissertation fills this gap. To fully understand the determinants of agricultural organization, we need to draw in monetary institutions and the effects of money creation on the production structure of the economy. If it is acknowledged that the channels through which money enters the economy have a real influence on the distribution of incomes and the profitability of different lines of production, then it should not be surprising that different sectors of the economy might expand or contract as the flow of money changes. However, our thesis goes further than this: it is not simply that the flow of money leads to more or less being produced in different sectors, but that the flow of money has consequences for the organization of farming. Specifically, it matters a great deal that money is principally created through the financial system. This privileges debt in the financing of agriculture and leads to a change in what kind of capital goods farmers invest in (Pasour 1990, 194), which in turn have important consequences for the profitability and scale of farming. Thus, both the financial structure and the real structure of farming is changed by the flow of new money.

0.3. Approach

The theoretical analysis we want to undertake requires us to contrast a natural order of money production, that is, the monetary order as it would be in the absence of government intervention, with interventionist monetary systems. We then must trace the impact and consequences of each for the agricultural sector. However, this presents us with a problem: there is no empirical data on such a natural order and its consequences for the rest of the economy, much less for agriculture. It is therefore impossible for us to assert clear quantitative relations. We must limit ourselves to more

general, qualitative, but nevertheless true conclusions, i.e., to establishing the core theoretical truths as we discover them.

The method proposed by the Austrian School of economics lends itself well to this kind of theoretical analysis. This is especially true of the tradition traced from Menger (2007) through Böhm-Bawerk ([1884] 1959a; [1889] 1959b) to Mises ([1949] 1998) and Rothbard ([1962] 2009) and their modern epigones. This tradition has also been called causal-realist economics to emphasize the search for causal laws explaining real phenomena, and can be seen as a continuation and systematization of the approach of the classical economists (Hoppe [1995] 2007a, 10–12). Menger’s (2007, 51) opening statement in his *Principles* is programmatic for the causal-realist approach: “All things are subject to the law of cause and effect. This great principle knows no exception, and we should search in vain in the realm of experience for an example to the contrary.”

The Austrian method of economics consider social and economic phenomena as resulting from the basic principle of human action (Mises 1998, 11). From this basic principle, Austrians attempt to deduce the laws governing the formation of prices and the emergence of social institutions such as money. The Austrian method is thus aprioristic in the sense that we can formulate and prove the laws of economics prior to any historical or empirical data. Indeed, we need the concepts elaborated by economic theory in order to make sense of historical data (Mises [1957] 2007). We can understand human action only by looking at the meaning and purpose each actor attributes to his actions and at the value he attributes to the external objects he uses as means to achieve his ends (Hayek 1952, 26–28). Economic laws are thus not subject to empirical verification or falsification: rather, they are counterfactual laws (Hülsmann 2003a), stating, for instance, that an increase in the money supply will raise prices higher than they would otherwise have been. An empirical investigation showing that in a given historical episode the increase in the money supply was not accompanied by a rise in prices does not disprove this, since some other factor must have caused a change in prices in the opposite direction. E.g., the demand for money may have increased, or an increase in productivity led to a greater supply of goods, driving prices down. The counterfactual in that case would then be a situation of lower prices were it not for the greater stock of money.²

Causal-realist or Austrian economics has been defended by Mises ([1933] 2003; 1962)³ within the framework of Kantian philosophy and by Rothbard (1957) based on Aristotelian-Thomistic philosophy. Also, building on the Aristotelian tradition, Long (2006) has explained the Austrian approach as using non-precise abstractions as opposed to the precise abstractions of mainstream

2 Rothbard (1963) in his work on the Great Depression argued that this was the case in the U.S. in the 1920s.

3 But see Hülsmann’s (2003c) comments on a possible Aristotelian basis for Mises’ philosophy. See Gordon ([1994] 2020) and Smith (1994, chap. 10) for background on the philosophy of the Austrians.

positivist economics. This means that Austrians do not reduce man to simple one-dimensional utility-maximizers like the *homo economicus* of legend. Rather, the counterfactual, non-precise approach enables us to apply economic reasoning directly to the real world without limiting and unrealistic assumptions.

The choice of the verbal-logical method of the Austrians should not be construed as a total rejection of the mathematical approach more current in the modern economic mainstream.⁴ However, the questions we want to answer and the concatenation of causes we attempt to trace can better be expressed and understood in the Austrian framework. There is not necessarily a quantitative difference between the rate of money production on a commodity standard and on a fiat standard, but we still see radically different consequences of the two ways of producing money. This could not, in principle, be shown in a quantitative study. Hence, while we hold the Austrian school to provide a superior explanation of economic reality in general, for the goals we have set for the present study it provides the only viable method. We will of course still draw freely on both the mainstream literature and other heterodox schools, as there is plenty of insights to be found there.

Mises is best known for his work in monetary theory (Mises [1912] 1953), where he succeeded in analysing money in terms of marginal utility, and for his proof that socialism as a system of organized social production is impossible (Mises [1920] 1990a; [1922] 1981). However, he also wrote extensive critiques of economic policy (Mises [1929] 2011a; [1940] 2011b; [1944] 2011c) and *Human Action* contains extensive discussions on the formation of prices and capital. Rothbard followed Mises in dealing with both “macroeconomic” subjects like money and interest while also analysing microeconomic questions in great detail. His *Man, Economy, and State* is a testament to this, as Rothbard here unites the theory of money and interest with production theory and traces it all back to the underlying laws of economics. The present dissertation can thus also be read as a small attempt to further this tradition, as we use causal-realist economics in analysing the mundane matters of agricultural prices, finance and farm structure and the important causal influence exerted by money production. Rather than being exclusively about such vague concepts as institutions or knowledge, our contention is that this kind of mundane economics is precisely where the Austrian School shines (P. G. Klein 2008).

4 But see Wiśniewski (2014, 42–47) for a recent summary of Austrian critiques of the problems in neoclassical method.

0.4. Outline

Before we can examine the influence of the modern monetary system on agricultural organization, we first need to understand how the natural market order would evolve and the place of agriculture within it. Chapter 1 deals with money production in the absence of intervention and explains the laws governing commodity money production and the consequences of inflation under these conditions. Chapter 2 deals with the basics of the agricultural economics, describing the special conditions facing agriculture, both on the side of the factors of production and on the side of demand for agricultural products. Of special importance is the role of land in agriculture and the role played by Engel's law.

Chapter 3 goes on to describe the agricultural firm, that is, the farm. We synthesize Allen and Lueck's risk-based study with the focus on uncertainty in the Austrian literature on entrepreneurship and find that there are good reasons for the dominance of smaller farms, where the owner can oversee production himself. Chapter 4 examines how agriculture and its organization fares under changing conditions, focusing on the case of the progressing economy. We find that the reorganization necessitated by a greater availability of capital and a more productive economy does not lead to concentration and a tendency toward large-scale agriculture. Rather, farmers will tend to respond to such changes by reorganizing production internally on their farms, shifting to longer production processes and changing output to higher-quality products not subject to Engel's law.

Chapter 5 introduces the second half of the dissertation by first considering farming, finance and monetary institutions in general terms. Chapter 6 goes on to a detailed examination of the idea of financialisation and its relevance for agricultural organization. Our main theoretical conclusions about the impact of financialisation on agriculture are spelled out in chapter 7. In chapter 8 we examine the historical case of Danish agriculture under the classical gold standard, c. 1870-1914. In this period there was some credit expansion, but the basic money was still gold. We examine what influence, if any, did the production of bank money have on Danish agriculture. Then in chapter 9 we consider the case of post-war European agriculture. This is the capstone to the thesis, as it is in this period we see the most fundamental changes. By drawing on the theories elaborated in previous chapters, we show how the abolition of the gold standard is the main driver in the process of fundamental change that has been ongoing since 1945. Finally, we conclude with a summary of our findings and their limitations.

1. The Natural Order of Money Production

1.1. Introduction

The standard way to proceed in economic theory is usually to first lay out the “real” factors determining the phenomena under investigation, and then only later introduce money and monetary policies. This approach is generally based on the assumption that money is neutral, that only real factors determine economic reality and that money is merely a veil cast over and disguising this reality.⁵ Mill’s famous dictum to this effect (Mill 2006 book III, ch. VII), “that there cannot, in short, be intrinsically a more insignificant thing, in the economy of society, than money” sums up the approach nicely.

We will proceed in a different manner, as we see the distinction between real and monetary factors as more of a hindrance to economic analysis than a help. This is so not only because money is not neutral (Mises 1990b) and changes on the side of money always has consequences for “real” factors, but also and especially because we cannot analyse the relations between different parts of the economy and different actors in the economy except through the medium of monetary exchanges and prices. The study of catallactics, the part of economic science that deals with action in a society based on market exchange and the use of money, must take full account of money from the outset. In a barter economy we cannot analyse the different components of income, for instance, and determine how much is due to each factor of production: we can only judge it in terms of the general categories of income and costs. Even estimating profit and loss becomes impossible except as purely psychic phenomena.

How each of the different factors of production contribute to the product and how much of its value we can charge to interest and how much to profit, all this we cannot differentiate except through the medium of money prices. We may have certain ideas about the economic relations existing in agriculture and what its characteristics are, but we can only move on from a general and impressionistic account if we analyse the economics of agriculture in monetary terms. As Mises (1998, 232) put it:

The evolution of capitalist economic calculation was the necessary condition for the establishment of a systematic and logically coherent science of human action. Praxeology and economics have a definite place in the evolution of human history and in the process of

5 See (Patinkin and Steiger 1989) for a history of the terminology of money as a veil.

scientific research. They could only emerge when acting man had succeeded in creating methods of thinking that made it possible to calculate his actions.

Focusing on real factors under the veil of nominal values is therefore misleading at best. Only with economic calculation in terms of money could capitalist economy emerge and only by integrating money from the beginning can we elaborate a catallactic understanding of agriculture. Doing so is a necessary first step in tracing the consequences of changes in the monetary system on agricultural enterprises and the agricultural sector of the economy as a whole.

Catallactics is always focused on money and the nexus of exchange, as there literally is no such thing as real variables apart from their expressions in money prices and other market phenomena. “The sphere of the ‘purely economic’ is nothing more and nothing less than the sphere of money calculation” (Mises 1981, 108). Just like the socialist planner would be unable to plan rationally in the absence of market exchange and money (Mises 1990a), so the economist would be blind if he ignored money and money prices in a quest for real variables. We need to think in terms of money from the outset in order to understand the formation of prices for consumer goods and factors of production, the role of economic calculation in the valuation of goods, and to give a satisfactory explanation of the role of the firm in a market economy. It is therefore necessary to proceed first with an account of the place of money and its functions and the supply and demand for money in a pure or unhampered market economy.

We will begin with an examination of what we may call the natural or free-market system of money production. This serves as a baseline to which the various interventionist monetary systems can be compared. The natural monetary order is the one that would develop solely as a result of human actors’ free actions based on respect for property rights and recognition of the higher productivity under the division of labour. In short, it is the natural way of producing and using money in a purely free market and the kind of money and order that would naturally develop in a free society based on the universal respect for property rights. While the term natural has obvious normative connotations, as the good can be defined as the perfection or actuation of a thing’s natural end (Veatch 1962, 200–202), here we mean it simply as a descriptive term. In this we follow Hoppe’s (2013, 21–30) usage in his first elaboration of the “natural position” regarding rights and ownership: it is simply meant to denote the system of property rights – or in our case, monetary institutions – which would develop organically absent any violent interventions in the social order. We may use the gold standard as a short-hand for the natural order of monetary institutions from time to time, simply in order to avoid confusing circumlocutions. Some form of commodity money is the most likely outcome of the unhampered market process, and the gold standard was the

monetary system in recent history that came closest to the natural order of money production, as it involved only a minimum of intervention. We will also discuss the role of banking and finance in the natural system and how these institutions influence the money supply and the value of and demand for money, and how banking and finance may in turn be influenced by the production of money. As we shall see, financial considerations are an important if neglected part of agricultural economics, especially so in systems of fiat money and bank-created money.

The point of analysing the natural order is not that it is applicable to any current or historical case, as all actual monetary systems have always been subjected to some degree of interventionism. Rather, we elaborate the description of a natural monetary order in order to have a benchmark to which we can compare the results of the interventionist systems. In Hayek's famous, if usually misquoted phrase, before we can explain why things go wrong, we must first explain why they should ever go right (Hayek 1948a, 34).⁶

Many scholars have examined how a natural monetary order would develop and function as far back as the contributions of Cantillon ([1755] 2010) and Say ([1803] 1971). Among modern economists, Menger ([1871] 2007) was the first to give a complete account of money's development in the free market, an account that Mises ([1912] 1953) developed and perfected. After Mises, the main theorists of natural, pure market money have been Rothbard, White, Salerno and Hülsmann (Rothbard 2009; 2008; White 1999; Salerno 2010; Hülsmann 2008a), although it should be noted that these economists do not agree in all essentials, especially when it comes to the knotty question of the role of banking and fiduciary media. Others have also touched on how free-market money would function, in elaborating proposals for reform (Rothbard 2005; Paul and Lehrman 1982) or in considering specific monetary institutions such as the gold standard (Skousen 1996; Salsman 1995; H. F. Sennholz 1975a; 1985). However, none have so far examined what influence monetary fluctuations under a natural order would have specifically on the agricultural sector.

1.2. The free-market or natural production of money

In a free market where production and exchange is based on property rights and there are no specially privileged institutions in charge of producing and distributing money, money will necessarily be commodity money and is produced by entrepreneurs in the market just like all other commodities. Menger (2007; 2009) showed how money emerged gradually in the market to overcome the problems of barter, specifically the problem of double coincidence of wants. The most

⁶ The precise quote is: "before we can explain why people commit mistakes, we must first explain why they should ever be right" and deals more narrowly with questions of equilibrium analysis.

marketable commodities are gradually selected for use as media of exchange, as first a few enterprising individuals, then others imitating them, realize that they can better achieve their ends by exchanging their goods first for a more marketable good, and only then for the good that they really want. In this way the more marketable goods emerge as media of exchange, and gradually one or two among these goods would be selected as the most commonly used media of exchange – money. We cannot say conclusively as a matter of theory which commodity would be selected, but historically, the precious metals gold and silver emerged as the monetary commodities. Gold has all the qualities desirable in a monetary commodity: it has widespread demand for its non-monetary uses and hence high value per unit weight, it is very divisible and malleable and can thus be used in exchanges of all sizes, and it is very durable and does not spoil. For simplicity's sake, we will therefore assume that gold is the free market money (on all this, see White 1999, 1–25).

The purchasing power of money is regulated by the demand for money and the supply of money. Demand for money is always demand to hold, it is demand to keep in one's cash balance (Mises 1998, 399, 414). Several factors influence this demand: the actor's expected exchanges in the foreseeable future and the opportunity cost of holding money, i.e., the alternative investments he could have made with it are important factors, but at its core, demand for money is grounded in uncertainty (Mises 1998, 414; Hoppe 2012; Rothbard 2009, 264–65; Braun 2014, chap. 15). Since the actor does not know exactly when or how much he will have to pay in the future, he keeps a certain amount of money on hand to be prepared for all eventualities. Unforeseen outlays – costs – and profit opportunities both add to this uncertainty. An actor who was completely certain about the dates and amounts of his money income and his money expenditures would never keep any cash on hand but rather invest it as soon as he got any money in claims and assets that matured just as he needed to make his payments.

The demand for money is therefore determined by people's felt uncertainty. If they are more certain, they will reduce their cash balances and invest or spend more on consumption, drawing down their cash balances. A reduction in the degree of felt uncertainty may also induce market actors to invest in what Mises calls secondary media of exchange, i.e., very marketable or liquid claims and commodities, such as bonds or jewellery (Mises 1998, 459–61). Such assets can serve as partial substitutes for money, as people expect to be able to realise them, i.e., exchange them for money, without delay and little cost, but can nevertheless profit from interest payments on bonds or appreciation of assets while they hold them. If for some reason people become more uncertain about the future, they will again increase their cash balances, reduce consumption and investment expenditure and shift their liquid holdings out of secondary media of exchange and into money.

Technological and institutional changes also influence the demand to hold money. Improved payments technology may make it easier to use the money in one's bank account, and this greater ease makes any given sum of money more efficient, as it increases its "turnover". Custom regarding regular payments such as wages, interest, or dividends also influences the demand for money. The more regular and frequent such payments are, the less money will the members of society, on average, have to hold in their cash balances (Rothbard 2008, 60–63). Greater frequency and certainty of payment, the use of clearing systems and secondary media of exchange all serve to economize the use of money and therefore reduce the demand for money. All these devices and developments are, however, only secondary in determining the demand and purchasing power of money: they can only lower the demand for money, they cannot eliminate it.

In general, money obeys the law of demand: increased demand for money will increase its purchasing power, and reduced demand will reduce its purchasing power.

Thus demand for money motivates people to hold the total stock of money in existence, but it also stimulates additional production of money. As in all other branches of production, the law of costs will hold (H. F. Sennholz 1975b, 47–48; Hülsmann 2003d, 39–40): over time, the costs of production will tend to equal the selling price, as entrepreneurs bid for factors of production and raise factor prices until the return to capital is the same in all branches of production. In other words, gold will only be produced and added to the stock of money if this is the use of resources dictated by consumer demand. Factors of production will only be employed in gold mining and the minting of monetary gold if the profits expected from such employment outweigh their opportunity costs. If not, entrepreneurs will shift factors of production away from gold production to some other, more profitable use. A situation is conceivable in which gold mining does not result in any additions to the stock of money, if all the newly mined gold is used for industrial and consumptive purposes.

Monetary use of gold therefore carries an opportunity cost of using it in other employments, and the stock of gold for monetary use will only increase if this use is preferred to its opportunity cost. Absent changes on the demand or supply side, the purchasing power of money will tend toward a level at which all the newly produced gold will go to productive and consumptive uses (White 1999, 31–33). In a changing economy, however, there will continually be net changes in the stock of monetary gold. Specifically, an expanding or progressing economy will lead to a net inflow of gold to monetary uses, as the higher output of goods and services tend to lower prices, which is the same as increasing the purchasing power of money. This, in turn, increases the profitability of money production, as the factors of production are now relatively cheaper. Over the long run there

will be a tendency for money production to follow changes in productivity, which explains the remarkable stability of the purchasing power of gold over the centuries (cf. Jastram 1977). Some periods see rapid economic expansion usually followed by a period of increased money production, as for instance the decades immediately preceding World War 1 (Rueff 1972, 45; the indices of gold production compiled by Jastram 1977 seem to bear out this judgment).

There are continually changes in the money relation, the demand for and supply of money (Mises 1998, 427). If demand for money increases, this will exert a downward pressure on the price structure. Such pressure will not be uniform, as there is no general level of prices on which it acts. Rather, specific prices will tend to fall as it is always specific individuals who raise their demand for money. They will curtail their purchases in order to increase their cash balances and supply greater amounts of goods and more services. The changes in the price structure will depend on exactly whose demand for money has gone up. The increased demand for money will raise the purchasing power of money – the inverse of falling prices – and tend to stimulate the production of gold and the flow of gold from non-monetary uses into cash holdings. This flow will continue until the price structure is back in equilibrium and there are no longer any profits to be reaped by increased money production. In this way, while price adjustments alone are sufficient to at all times equate the stock of money and the demand for money (Rothbard 2008, chap. 3), money production in a natural order can “smooth out” the necessary adjustments.

A fall in the demand for money has the opposite effect. As the purchasing power of money falls prices rise and gold will flow from cash holdings to non-monetary uses, where it can now be more profitably used. Thus following a fall in the demand for money the stock of gold used for monetary purposes will tend to shrink, until the purchasing power of money has fallen to a new equilibrium that corresponds to the changed demand for money (White 1999, 34–35).

Changes on the supply side will have similar effects, as an increase in the production of gold, due, e.g., to the introduction of a new cost-saving device, will lead to inflows into cash balances, reducing the purchasing power of money and increasing prices, until the price structure has adjusted to the change in conditions. The causation should be clear enough: at the outset, people have the amount of money in their cash balances that correspond to their valuations given current prices. Then an increase in the productivity of gold mines means that the owners of these mines and their workers have a greater amount of money to spend, and they therefore proceed to bid for more goods and services, increasing the prices of these and the cash holdings of the providers of these goods and services. Since the providers’ valuation of cash has not changed and the price structure has not changed either, they now have more cash on their hands than they want to have. They in turn will

turn around and spend their new money, until the marginal utility of their cash balances again just outweigh the marginal utility of the goods and services they could buy for their money. This too will result in an upward pressure on prices, and we thus have two causes that will lead to a reduced purchasing power of money: one directly, the flow of new money through the economy; and the other indirectly, through the changing price structure, as some individuals may discover that prices have changed even before they have received any extra monetary income. They may recognize that prices are moving upward and expect their money to lose more purchasing power than it has already lost.⁷ They will therefore change their valuation of their marginal monetary unit. In other words, they may act speculatively and reduce their cash holdings in anticipation of a lower purchasing power, thus acting to bring it about. Both causes thus contribute to adjusting the purchasing power of money to the new conditions of supply and demand.

As in the case of falling demand for money, an increased supply of the monetary commodity may increase the profitability of using it for non-monetary purposes. As the purchasing power of money falls, the prices of jewelry and other services using gold (e.g., dentistry) may increase relative to the purchasing power of money and gold may flow into these uses, halting the decline in the purchasing power of money sooner than it otherwise would have been halted and stabilizing it at a higher level than otherwise. Since it is not given that prices rise equally, when and how much gold will flow into non-monetary uses depends on the specific circumstances of each case.

It is possible to modify this theory in various ways to account for all possible scenarios that might occur in a free market. Thus, for instance, it is possible to conceive of a commodity money that has no non-monetary uses (Rothbard 2009, 275). In this case, all money production would flow into cash holding and there would be no drain of gold into non-monetary uses. The adjustment to changes in the supply of money would in this case exclusively take the form of changes to the price structure. It is also possible to imagine a case where no new money whatever is produced. In this case changes in the demand for money would again lead exclusively to changes to the price structure. The most probable case, however, is the one where there is also a non-monetary use for the money commodity, which is why we have dedicated the bulk of our analysis to this case (the other cases can easily be explained in the framework developed by Rothbard 2008). The existence

⁷ It should be clear in all this that for each individual actor the subjective purchasing power of money is different, and this for two reasons: first, because each individual's judgment regarding the value of money is bound to differ; and secondly, because the array of prices each individual bases his judgment on is different. It is not the general price level or the full array of money prices that a person considers in evaluating money. Rather, it is the prices of those goods and services he is interested in acquiring that matters. Cf. Mises (1953, 97): "The subjective estimates of individuals are the basis of the economic valuation of money just as of that of other goods [...] Nevertheless, while the utility of other goods depends on certain external facts [...] and certain internal facts [...] the subjective value of money is conditioned by its objective *exchange*-value, i.e., by a characteristic that falls within the scope of economics."

of non-monetary demand for the money commodity creates a “bottom” under the purchasing power of the commodity in question, and this added safety will tend to make it more desirable to hold as money than other commodities with no non-monetary sources of demand (Hülsmann 2003d, 39; 1996).

1.3. Secondary media of exchange or quasi-money

We have already alluded to the existence of what Mises (1998, 459–63) termed secondary media of exchange and Rothbard (2009, 826–27) called quasi-money. These are partial substitutes to holding money, but not in the sense of “money substitute” used in the theory of money and banking. Rather, quasi-money are commodities and claims high in marketability, and which can therefore be held by market actors who wish to economize on the need to hold cash. The markets for quasi-money are very liquid, so they can always be exchanged for money again when needed. We may also describe them by saying that they have a high degree of “moneyness” (Horwitz 1990) although such terminology risks confusion.

Since the marketability of quasi-money must always be less than that of money, the demand for them is likely to be slight. Only if some return can be expected from holding them – in the form of interest on bonds or appreciation of assets – will market actors hold secondary media of exchange. However, since the natural order is likely to be deflationary and the purchasing power of money likely to increase, the return to quasi-money has to be measured against the likely appreciation of money proper. If money is of high quality (cf. Bagus 2009; 2015b on the quality of money) it is therefore unlikely that there will be much demand for quasi-money. The free market is likely to produce high-quality money, and secondary media of exchange, while a free-market phenomenon, will be more prominent in interventionist systems producing depreciating money of low quality.

1.4. Banking in a free-market money order

In the contemporary economy, banking is closely interwoven with changes in the money supply, as the granting of credit under the institutions of fractional reserve banking increases the supply of money, specifically of fiduciary media. However, banking and credit intermediation as such need have no special connection to the monetary system. ‘It is not – as so often is still maintained – the “granting of credit” but the issuing of fiduciary media which causes those effects on prices, wages, and interest rates, which banking theory has to deal with’ (Mises 1990c, 64). The question therefore

is whether the existence of fiduciary media and of fractional reserve banking is a necessary part of the natural order of money production.

It is a peculiarity of money that fully secure claims to money redeemable on demand – money substitutes – can provide all the monetary services yielded by money in the narrow sense. In Mises's words (1953, 267–68):

The fact that is peculiar to money alone is not that mature and secure claims to money are as highly valued in commerce as the sums of money to which they refer, but rather that such claims are complete substitutes for money, and, as such, are able to fulfill all the functions of money in those markets in which their essential characteristics of maturity and security are recognized. It is this circumstance that makes it possible to issue more of this sort of substitute than the issuer is always in a position to convert. And so the fiduciary medium comes into being in addition to the money-certificate.

Money substitutes, whether simply money certificates or fiduciary media, are usually provided by banks in the form of bank notes or demand deposits. The existence of money substitutes, however, does not necessarily require special treatment. If they are fully backed by money in the narrow sense, the existence of money substitutes is immaterial for the theory of money, as they do not increase the money supply but merely change the form under which money is exchanged. This is why Mises's distinction between money certificates – fully backed money substitutes – and fiduciary media – money substitutes not backed by money proper – is crucial. The issuance of fiduciary media clearly adds to the money supply and therefore needs special treatment. Could fiduciary media come into existence in the absence of any special intervention by the state in the market?

We may take Mises's (1953, 440) position as our starting point: in the free market, banking must be subject 'to the rule of common law and the commercial codes that oblige everybody to perform contracts in full faithfulness to the pledged word.' The question then is, what exactly does this entail? The free banking theorists (White 1995; Selgin 1988; Dowd 1993; Selgin and White 1996) find no contradiction between the free market and the issuance and use of fiduciary media. According to them, the legality of fiduciary media can be justified by implicit or explicit option clauses, or by positing informed consent on the part of the banks' customers. Fractional reserve banking issuing fiduciary media is to this school of thought is therefore not a problem but rather an elegant solution to the problem of variations in the demand for money that might in its absence cause economic chaos.

Free-banking theory has been opposed both on the grounds that fiduciary media violate property rights and because they lead to economic distortions (Rothbard 2005; 1992; 2008; Hoppe 2006a; Huerta de Soto 2020; Salerno 2010). Unbacked money substitutes are considered ethically problematic and incompatible with property rights, as creating fiduciary media is seen as issuing legal titles to more money than the bank has in its reserves. In addition, rather than solving the supposed problem of disequilibrating variations in the demand for money, creating fiduciary media is seen as necessarily introducing distortions in the economy. Such credit expansion influences the purchasing power of money and, redistributes wealth to the early receivers of newly-created fiduciary media and, if it enters financial markets early in the process, lowers the rate of interest below its natural level leading to unsustainable investment patterns. These consequences are generally recognised as the Cantillon effect and the problem of business cycles (Sieroń 2019).

To the possibility of options clauses and similar legal techniques succeeding in getting around the charge of fraud, it has been objected that such callable loans are not at all the same as true money titles (Hülsmann 2003b). Being mere promises to pay, they are inherently more uncertain than titles to money, and as such they would trade at a discount to money, and thus they would not, on the free market, form part of the money supply. It is true that the legal character of a claim is secondary in an economic understanding of its nature: if people treat a legal claim as equivalent to the money it is a claim on, it is properly classed as a fiduciary medium, no matter what the legal rights possession of the claim conveys. But this does not mean, in our estimation, that callable loans as such are permanent additions to the money supply. Two considerations lead us to this conclusion:

First, one man's callable loan is not equivalent to another man's since all men and institutions are not equally trustworthy, and claims on different persons would therefore have to be valued independently. Selgin (1988, 109) recognizes the role of trust in accepting fiduciary media, but only to the extent that one kind of medium (notes) may be preferred to another. His and White's (Selgin and White 1987, 445–46) suggestion that note-brokers would ensure par acceptance by accepting unfamiliar notes from the public fails to address our point, since trust in the issuing bank is here simply assumed. Elsewhere, Selgin (1993, 353, 362) claims that uncertainty about the safety of fiduciary media would not lead to discounting of notes, even going so far as to consider it a superior substitute for gold. While money certificates can in some ways be a less costly way of holding money – for instance, if there are economies of scale in the storage and safe-keeping of precious metals – there is little reason to think that the cost-saving outweighs the risk of loss in the case of fiduciary media. Even if some people consider the risks worth it, this is not enough to establish par acceptance of callable loans, so long as merchants are free to discriminate between different means

of payment. Hülsmann (2004a, 40) presents one case where fiduciary media are, in fact, superior substitutes, namely when government debases the coinage and forces market actors to accept debased coins at their nominal value. This “fiat equivalence” brings Gresham’s law into play and leads to constant variations in the money supply and using fiduciary media can in this scenario guard against losses. It is, however, a result of government intervention and thus not descriptive of monetary developments in the free market order.

Second, even should we grant that some people may for short periods of time accept such unsecured callable loans as money substitutes, there is something inherently suspect in a person or institution trying to pass off claims on himself or itself as equivalent to money. Such notes would only be fiduciary media if people judged them of equal value to money, but they would only so judge them if they also judge them to be instantly redeemable. But they would only truly be instantly redeemable if the issuing institution had money in reserve to redeem them – and if that was the case, why would it try to pay only with loans instead of money or money certificates? Customers of a bank might be able to settle accounts with other customers of the same bank, and they might in this way be able to use these claims in their “intra-bank dealings”. The circle of people accepting claims on the bank as money substitutes – what Mises (1998, 431) calls the bank’s clientele in his discussion of fractional reserve banking – is unlikely to grow beyond its own customers, precisely because people recognise the uncertainty inherent in a mere claim. The bank’s clientele will thus not grow beyond its own customers, severely limiting its ability to issue fiduciary media (granting that the callable loans in this example can be characterised as such). Mises (1998, 435) explains this severe limitation well:

A bank can never issue more money-substitutes than its clients can keep in their cash holdings, The individual client can never keep a larger portion of his total cash holding in money-substitutes than that corresponding to the proportion of his turnover with other clients of his bank to his total turnover...

A lot of nonsense has been written about a perverse predilection of the public for banknotes issued by dubious banks. The truth is that, except for small groups of businessmen who were able to distinguish between good and bad banks, banknotes were always looked upon with distrust. It was the special charters which the governments granted to privileged banks that slowly made these suspicions disappear. The often advanced argument that small banknotes come into the hands of poor and ignorant people who cannot distinguish between good and bad notes cannot be taken seriously. The poorer the recipient of a banknote is and the less familiar he is with bank affairs, the more quickly will he spend the note and the more

quickly will it return, by way of retail and wholesale trade, to the issuing bank or to people conversant with banking conditions.

While more could be said on the intricacies of this debate, Hülsmann's (2003b) argument seems to us conclusive. In a free market, it would be possible for fiduciary media to emerge, but they would never gain widespread use as they could only exist based on entrepreneurial error: mistaking a mere claim to money for a secure money title or money proper (Hansen 2021). The money supply would therefore consist of money, money certificates fully backed by money in reserve – and only ephemerally fiduciary media. There might be a widespread use of loans and bills of exchange from trustworthy institutions and individuals, but while these might appear similar to fiduciary media, as they are negotiable credit instruments, they would not form part of the money supply. Rather, these are the usual instruments for facilitating trade while economizing on the need to transport money hither and whither. There might also be a small demand to hold some bonds and other loans as quasi-money (see the discussion above p. 12 and following). Such demand for secondary media of exchange in an advanced economy constitutes no special problem for monetary theory. It will have two consequences: highly marketable bonds and claims will have an additional demand due to their higher marketability and this will translate into higher prices and lower yields; and less money proper will be demanded, reducing the demand for money and hence the purchasing power of money. Since as we saw above that uncertainty is the ultimate cause for all money demand, we can say that the more certain conditions are, the more will individuals economize on their cash balances and move their wealth into secondary media of exchange. Conversely, should conditions for some reason become more uncertain, the use of secondary media of exchange would decline as the demand for money increased. However, since the market is likely to settle on a high-quality money in the evolution of the monetary order, the demand for quasi-money will be low. And should some new commodity be discovered to better serve the needs of market actors – should it be judged to be of higher quality than current money – the switch to the higher quality money can easily occur.

Thus, under free-market conditions, not only should we expect something like Bagehot's (1877, 67–68) natural system of banking to prevail, with many smaller banking institutions each “standing on its own bottom.” We also expect the amount of fiduciary media issued to be minimal. The ephemeral character of fiduciary media means that there will be no systematic tendency to their widespread use. On the other hand, we cannot rule out the possibility of local and temporary cases of issues of fiduciary media, and these could lead to the consequences described by the theory of the business cycle. Such cycles would, however, in the natural monetary order be based on entrepreneurial error and not be an institutional feature of the system.

1.5. Inflation and deflation

As inflation is an important consequence of monetary interventionism, it is necessary to make a few brief remarks on the subject of inflation and deflation in the natural order of money production. It is important to note that two definitions of inflation and deflation are used: monetary inflation (deflation) signifies an increase (decrease) in the supply of money; and price inflation (deflation), signifies a general rise (fall) in prices. The changing meaning of these terms can easily lead to confusion, and they are in any case not very precise. Indeed, Mises (1998, 420) regarded the terms inflation and deflation as ‘lacking the categorical precision of required for praxeological, economic, and catallactic concepts.’ One should therefore be extra careful when applying this terminology.⁸

When it comes to monetary inflation, not much needs to be added to what has already been said above about the effects of changes in the money relation. Indeed, if we accept Rothbard’s (2009, 990) definition of inflation as “the process of issuing money beyond any increase in the stock of specie” then no inflation can occur in the natural monetary order, as the production of commodity money is expressly excluded. Monetary deflation too is not of any significance beyond what has already been stated above. It is perhaps possible to imagine situations where the stock of money declines – for instance, when a Spanish galleon with a load of silver was lost at sea – but these situations are not of any real importance.

The case of price inflation is a little different, as it is strictly speaking a possibility under the natural monetary order. A fall in the demand for money will lead to an increase in money prices. Holding the stock of money and the demand for money constant, a decline in the amount of goods and services offered in exchange would lead to an increase of their prices. Price inflation would thus be a clear indication of economic stagnation and decline. A declining population is another possible scenario that would entail price inflation, as not only would there be fewer productive workers around, but those who remained would also produce less, since the division of labour would be less extensive. A falling population would thus lower both the demand for money and the amount of goods and services offered in exchange for money.

Most scenarios of economic decline and virtually all of any historical importance are, however, cases of government intervention in the working of the free market. We will return to a discussion of interventionism and the monetary order in later chapters.

8 Mises elsewhere (1953, 231–41) gives a strictly scientific definition of the concepts inflation and deflation as an increase (decrease) in the quantity of money not offset by a corresponding increase (decrease) in the demand for money, so that a fall (rise) in the objective exchange-value of money, i.e., its purchasing power, must result. Mises does not think much is gained by insisting on only using the terms in this strict sense, so long as confusion is avoided.

1.5.1. Price deflation in the natural order

Unlike inflation, price deflation is likely to be prevalent in the natural order of money production, specifically, *cash-building* deflation and *growth* deflation (Salerno 2003; Bagus 2015a, 35–67). Cash-building deflation can be seen as the inverse of increased demand for money, as that is simply what cash-building is. While uncertainty is the ultimate cause of demand for money as we explained above, changes in the demand for money are not exclusively explained by changes in the felt uncertainty of acting individuals. Bagus (2015a, 43–49) breaks the demand for money down into the following categories: demand for the money commodity in non-monetary use; exchange demand for money; wealth storage demand for money; and speculative demand for money. Here we will concentrate on the two latter categories.

The precious metals serve as very good stores of value, as they are practically indestructible and the primary marketability of commodity money means that one can always be certain of exchanging one's money with no loss. Additionally, the amount of money produced every year is small and is in the long-term a consequence of the demand for money more than of changes on the supply side. We can therefore expect the purchasing power of commodity money to be stable if not rising slightly over the long term – as has been born out by empirical investigations (Jastram 1977). All this means that money will have an important role as a store of value and that there will be a higher demand to hold money for this reason. Prices will therefore be lower than otherwise due to this higher demand, but we cannot say more than that. The decision to “store value” in money depends on many other factors: the rate of time preference, the degree of felt uncertainty, the availability of alternative investment possibilities, so changes in wealth-storage demand are better seen as integral to changes in these other factors determining economic change. More generally, while “store of value” is one of the traditional functions of money, it might more correctly be subsumed under the category of reservation demand for money as spelled out by Rothbard (2009, 755–62) and Salerno (2015).

Speculative demand for money, as with all speculative demand, is derivative of more fundamental demand (Rothbard 2009, 130–37, 768–71): either entrepreneurs perceive a discrepancy between the current price and demand and supply and act to adjust this discrepancy; or they judge that the data of the market will change in the not-too distant future in such a way that a change in price will follow. By acting now to move the price in the correct direction, entrepreneurs expect to profit. As in all other cases of speculation, correct judgments are rewarded with profits and errors are punished with losses and therefore speedily corrected. For instance, an entrepreneur may judge that the demand for money is going to fall and he therefore reduces his money-balances and invests in other goods – secondary media of exchange, financial assets, factors of production, or whatever the

case may be. If his judgment is correct, he will profit because he bought these goods before their prices rose. His action also serves to speed up the adjustment of prices to the new demand for money. If he was in error, if the demand for money did not fall but perhaps on the contrary rose, he will have made a loss: the goods he invested in will not have appreciated, if the demand for money rose they may in fact have fallen in price. In any case, our unlucky entrepreneur will face the cost of divesting himself of unwanted goods which will cause him some loss. Even if he is able to sell them at his purchase prices – which is doubtful, as there is generally a spread between bid and ask prices – he has still suffered the loss of the opportunities foregone due to his unsuccessful speculation.

Speculative demand is not very important in the natural monetary order under a regime of commodity money (Bagus 2015a, 49). The reason is that money production is relatively stable and predictable in such an order, and there are good theoretical reasons why we should expect it to be so, as we saw above: there is little reason to expect sudden changes on the supply side – supply “shocks” – and the demand for money is also generally predictable, thus removing the main reasons for speculating on changes in the value of money.

Growth deflation is the price deflation that occurs due to a growing economy, that is, an economy where the amount of good and services produced increases over time (Bagus 2015a, 35). This growth means that money prices are lower than they otherwise would have been. As Philipp Bagus points out, economic growth is ultimately the result of the entrepreneurial function (ibid., 37), as it is only through creative human action that anything gets produced. Bagus lists three different paths through which growth may occur: 1) innovations; 2) an increase in the division of labour or in population; 3) savings and capital accumulation. We will however not here go into a disquisition on the processes of economic growth, a topic we will discuss extensively in chapter 4. Growth deflation may have different effects on different sectors of the economy. Let us briefly examine what will happen to the prices paid to the factors of production if the prices of final products decline. This depends on the specific data of each case. It is not necessary, for instance, that wages of labour fall: ‘If the supply of labor is fixed, money or “nominal” wages will remain constant while “real” wage rates rise to reflect the increase in the marginal productivity of and employers’ demand for labor as the purchasing power of every dollar earned rises with the decline in consumer prices’ (Salerno 2003, 85). This does not mean that the relative wages of different kinds of labour will not change, they surely will, as not all production processes are going to be affected in the same way by the factors causing economic growth. Some will contract while others expand, and labourers will move to their most value-productive employments. It is still true to say, however, that real wages will increase, as labour is the non-specific factor *par excellence*. Movements of labour between

different employments will ensure that no one's wage permanently declines due to economic growth.

Growth-induced price deflation is also likely to induce an increase in the production of money. The greater availability of factors of production and the higher purchasing power of money means that miners can profit from increasing their output. Another way of putting it is to say that the exchange demand for money has increased and this will eventually call forth a greater supply. This has been explained above.

We will examine the processes of economic development and growth deflation in more detail in a later chapter. Strictly speaking, economic growth is not a matter of the monetary order, except to the extent that we can say that the natural order of money production is the monetary order most conducive to sustainable economic growth and that we should therefore expect this kind of price deflation in the natural order.

1.6. Conclusion

This concludes our brief survey of the natural order of money production. To sum up, under this system, money will be supplied by production in the free market and its production will be constrained by the same factors as constrain the supply of all other goods: market demand and the law of costs. There will be a relatively high demand to hold money as a store of value, since it seems highly probable that its purchasing power will be stable if not increasing slightly. In an advanced monetary economy, there will probably also arise a demand for secondary media of exchange to economize on the need to hold money, but this demand will be slight if the money is of good quality. Such secondary media do not, however, constitute an addition to the money supply, as they are not money substitutes. Finally, secular price deflation due to economic growth will very probably mark the natural order of money production.

As was said at the beginning of this chapter, we chose to elaborate monetary theory up front because it is not possible to discuss the problems of value and productivity or to describe the market economy, except in the most general terms, unless we have recourse to monetary terms. In the next chapter we will turn to the task of discussing the details of the economics of agriculture in depth.

2. The Economics of Agriculture

2.1. Introduction

Before we can examine the influence of different monetary regimes and interventions on the structure of agriculture, we must first describe the agricultural sector of the economy. In this chapter, we will consider the basic principles of economics as they apply to agriculture, before moving on to discussing the organization of agriculture in the next chapter. Specifically, the question we must consider is what are the special characteristics of agriculture that makes this sector different from other parts of the economy. What are the ends pursued in agriculture, i.e., the goods produced? And what are the factors of production specific to agricultural production, and are they essentially different from factors specific to other production processes?

While there are many journals dedicated to agricultural economics and many textbooks on the subject as well as many monographs dealing with specific questions, these basic questions are virtually never raised in the literature. In general, the literature restricts itself to note the close technological relationship between agriculture and land, a relationship that has certain implications for the structure of farms, the possibility of scale economies, and the need for financing. The theoretical implications are generally not explored in depth, however. Chang (1949) has some useful hints on the technical relation to land in his study of agriculture and industrialization, and Geman (2015) provides a useful overview of the financial institutions and services specific to farming. The OECD (1970) gives some indications about what causes might drive demand for financial services in agriculture. However, the OECD's emphasis on specific risks in agriculture is misguided, as it neglects the availability of good, comparatively safe collateral in farming. Allen and Lueck (1998; 2002), on the contrary, has produced a valuable and detailed study on the role of risk in farm structure and management which is an inspiration to our discussion of the agricultural firm in chapter 3.

Since there are no extensive theoretical discussions of the structure of the agricultural sector in the literature, this chapter and the next will aim to provide just that. Both works in general economics from Smith and Ricardo on and the specialized literature dealing with agricultural economics contain many important insights. Our work here will therefore be an attempt to bring these elements together in a synthesis in a causal-realist framework. Our one precursor in this endeavour is the

almost forgotten Austrian economist Schullern zu Schrattenhofen (1889; 1911; 1924), whose neglected works has provided key insights.

Agriculture as a sector of the economy cannot be as strictly defined as a scientific term. We can, however, give a pretty good description of what is generally meant by agriculture by looking, first, at the kind of goods produced in this sector; and secondly, by looking at whether there are any factors of production specific to agriculture, or at least factors used to a greater extent here than elsewhere. In other words, by investigating what are the ends pursued by agricultural activity and what are the means used to reach those ends. Agriculture is primarily concerned with the production of basic goods – primarily different kinds of food, but also fibres and some other raw materials (e.g., rubber). Economically, we can understand such goods as being of the highest necessity and placed at or very close to the top of most people’s value scales. This is especially so for basic foodstuffs: *primum vivere, deinde philosophare*. Before man can satisfy his higher needs, he first has to make sure that he will survive the immediate future. What this means for the demand for agricultural products and the agricultural sector will be investigated later in this chapter.

Among the different classes of factors of production – land, labour, and capital in the sense of intermediate goods (Hayek 2009, 58) – we will focus especially on land, as under conditions of settled agriculture, this is the key factor of production for agriculture. Of the different factors used, land is most specific to its uses in agriculture, although it should be stressed that specificity is almost always a question of degree. Some produced factors of production are also purely specific, but as capital goods are continually used up and the capital reinvested, this specificity is mitigated. The owners of the factors of production can reinvest their capital in other factors of production as their current capital equipment is used up, should they so desire.

Land, or rather “the original and indestructible powers of the soil” in Ricardo’s famous phrase (Ricardo 1951, 67), has usually been considered a factor unique to agricultural production, and the rent concept that flows from Ricardo’s conception of land, focusing on differential rent, has pride of place in the literature. This rent concept has been developed both in a Neo-Ricardian (Sraffa 1960, chap. 11) and in a Misesian framework (Reisman 1990). Other economists, principally von Thünen (1966) and Lössch (1954), have focused on the location and transport aspects of land and land rent.

While Ricardo’s theory of rent deserves pride of place as the first attempt to define the economic good “land”, we will not, however, proceed in his footsteps. While the early criticisms of Ricardo by Bastiat (1996, chaps 9, 13) and his follower de Fontenay (1854) are marred by the shortcomings of Bastiat’s theory of value, and like Leroy-Beaulieu (1883) they rely too much on the empirical

investigations of the American economist Henry C. Carey in their refutation of Ricardo, the problems inherent in Ricardian differential rent theory are still insurmountable. For one thing, how can there be, as there must be in this system, a class of land that earns zero rent? A factor of production that earns no income would not be considered a factor of production at all. Land that earns no rent is not an economic good, it is rather a general precondition of any activity that there is a place to stand to carry it out, but so long as land is not scarce, so long as no part of the product depends on control over a specific parcel of land, so long will land not count as a factor of production any more than air or the rays of the sun.

The preceding sentence indicates the proper approach to the description of the economic character of land and of agriculture generally: the Austrian theory of subjective value and marginal utility that trace the value of the factors of production to their contribution to the final product. This is not to say that we can simply assimilate the class of factors “land” to one general class of means of production without further ado. We must distinguish and discuss, in turn, land before it is turned to human use and after, the difference between submarginal and supra-marginal land, and the rent of marginal land. It is also necessary to contrast land to the other factors of production, capital goods and human labour. Once this is done, we can proceed to a general description of the use of land in agriculture.

The plan of the chapter, then, is as follows: First, we will discuss at the special characteristics of agricultural outputs, whether these goods differ in any appreciable way from the goods produced in other sectors and if so in what this difference consists. We then turn to examine the means employed in agriculture and especially the nature and role of land. We then briefly consider the complementary factors of production, labour and capital goods, before we turn to present an integrated view of the capital or production structure of the economy as a whole and the place of agriculture within it.

2.2. The ends: Agricultural products

The goal of agricultural production is usually what may be termed basic goods. These consist primarily of different kinds of food, but also fibres and some raw materials for industrial use are produced on farms. Some luxuries too are agricultural in origin: various delicacies, for instance, such as high-quality furs, exotic fruits, and so on. What is and what is not considered luxuries depend on the general wealth of a given society. Thus, white bread may be considered a staple in a more advanced, more capitalistic society, while it is a luxury under more primitive conditions. Animal products, too, may be considered luxuries, as the production of most meats and processed dairy products are more time-consuming and capital-intensive than grain products. Nevertheless, it

seems a fair generalization to say that the great majority of agricultural activity is devoted to the production of more basic goods, not luxuries.

These outputs are not necessarily exclusive to agricultural production. Close substitutes exist in other fields, as for instance fishing and hunting may provide for some of the same basic needs. These are, however, of very secondary importance to agriculture in these respects. Agriculture is much more productive and thus much more important in fulfilling these needs than both hunting and fishing, although advances in aquaculture has opened the way for more intensive fish production. The reason for this superiority may briefly be stated as the fact that private ownership of the factors of production is possible – or has at least been accepted – in agriculture (Deininger and Feder 2001, 290; Denman and Prodan 1972; Hornbeck 2010), and that therefore the division of labour and economic calculation is possible here to a vastly greater extent. The rise of aquaculture in recent decades indicates that the same increase in productivity is possible in the production of fish and related goods also, and that the primary necessity is the ability to appropriate regions of the seas as private property and thereby being able to treat it as economic land (Block and Nelson 2015).

There is a degree both of substitutability and complementarity between agricultural goods. They are substitutable insofar as they serve the same basic end or range of closely related ends. This is true especially of food production. Here the decision between which good to produce will be determined by the valuation of the consumers. Higher-quality will be preferred to lower-quality foodstuffs, and only a higher price, indicating that they will have to forego more of other goods, will make consumers prefer the lower-quality kind. Thus, for instance, we may assume as a general fact that most meat consumers prefer beef to pork, and only the higher price of beef leads people to substitute pork for beef.

Agricultural outputs are complementary as they can often be produced using the same inputs or in close connection on the same farm, perhaps at different seasons of the year. More importantly, different outputs can provide important inputs to other production processes as a by-product. Thus, animal husbandry in general and stock-raising in particular may provide fertilizer for corn-growing fields, improving wheat yields, and straw from corn-growing may be used for animals. Insofar as these outputs are complementary to each other, they will naturally be more valuable. A higher-quality good that would not be produced based solely on its expected market value may well be produced, since the additional output of other goods may justify its production. It is also possible that lower-quality goods may be turned entirely to use as inputs for higher-quality goods. In this

way, the different outputs can be considered partially or wholly as higher-order inputs in agricultural production.

In calling agricultural products basic goods we mean to indicate that they cover needs that are generally very highly ranked on most people's value scales. As we said above, *primum vivere, deinde philosophare* – first one must eat, then he can concern himself with higher ends. At the same time, these basic needs are not endless. On the contrary, they are very soon satisfied. We can best see this by first considering a single person in isolation.

Crusoe alone on his island will be concerned with, first of all, surviving. If he is not, after all, his life will be very brief, and we need not concern ourselves any further with his story. In order to survive, then, the primary goals must be to secure sources of food, water and shelter. Yet once he has secured a supply of food, he will most probably realise that he has other ends he wants to satisfy. He may of course simply want to eat food of better quality and, e.g., search for sources of meat instead of berries. But even in this case it is clear that, once he has sufficient quantities of food of the desired quality available, any further additions to his supply will not be that valuable to him. He will not be willing to give up very much to secure them, as the uses to which he can put the extra food are very far down on his value scale. In other words, while they are of supreme importance to his continued existence, beyond a certain point very soon reached, Crusoe's demand for agricultural products turns inelastic. The price he has to pay, i.e., what he has to give in exchange for additional units of food (Mises 1998, 97), will have to fall very far before he will increase his demand.

The same is true also in a society of many persons. People would not have a high demand for additional quantities of foodstuffs beyond a certain point that is very quickly reached. They would prefer higher-quality food or other, non-agricultural goods to additional units of the kind of foodstuffs they are already consuming. While agriculture is thus a sector of primary importance, as the economy expands beyond supplying the most basic need, it will very quickly shrink as a proportion of the economy as a whole. It will not be economic to expand the production of food, neither for the economy as a whole, since people demand different goods, nor for the agriculturalists, since they face generally inelastic demand curves and expanded production would therefore mean smaller revenues for them. Instead, expansion is bound to take the form of either improvements in the quality of agricultural products or the liberation of some factors of production to other uses as productivity per factor increases.

Agricultural products are then what is normally called necessary or inferior goods: goods the consumption of which increase less than proportionately to an increase in income (D. D. Friedman 1986, 47–49; Ekelund, Ressler, and Tollison 2006, 59–61). Their consumption may even decline, as consumers can now afford superior substitutes, although this is generally not the case with agriculture on the sectoral level: superior substitutes will still be agricultural products, so increased income will mean a change in the production on the farms, not a reduction in agricultural output. For instance, more meat generally and beef in particular may be demanded as people become wealthier, while consumption of cereals decline.

The tendency of the proportion of income spent on food to go down as income increases was first discovered by the German statistician Ernst Engel in 1857. Engel proposed the following law of consumption (translation by Stigler 1954, 98): “The poorer a family, the greater the proportion of its total expenditure that must be devoted to the provision of food.” To Engel this law was only a datum of history, that is, an induction from experience. More investigation was needed in order to see whether it held generally or was only peculiar to the specific cases he had examined. Yet as we have seen from our own investigation of the problem in the preceding paragraphs, the tendency of spending on food to decline relative to spending on other consumer goods as income increases is really nothing else than a special application of the law of value. Once the acting individual has the means he needs to achieve his most basic ends – staying alive – he will devote his effort and resources to other ends. Since food is generally a means to this basic end, it is therefore natural that increased income will primarily be spent on means – goods – used to achieve other ends. These ends can be complementary to the basic end. For instance, eating beef may both achieve the purposes of staying alive, improving one’s health, and generating pleasure. Higher-quality agricultural outputs such as beef can thus serve multiple ends at the same time. As each person and society as a whole grows more wealthy, higher-quality goods will naturally displace lower-quality, more basic goods.⁹

This explanation of Engel’s law is similar to one advanced by the Italian Post-Keynesian economist Paolo Leon. After restating the law, he goes on to generalize it (Leon 1967, 43): “Consumers, after they have satisfied primary needs, however they are defined, can, with a rise in income, satisfy non-

9 Note that quality is here and throughout meant in a praxeological sense: a good is of higher quality if the acting individual judges that it can help him achieve his end better or help him achieve more ends at the same time. Higher-quality goods will naturally be valued more highly than low quality goods. The actor would naturally always choose the highest-quality good available to him. If the cost of acquiring two goods, one of higher and one of lower quality, is the same, the actor will naturally prefer the higher-quality goods. Engel’s law does not contradict this, it simply brings considerations of cost into the picture.

essential needs or, at least, needs which are less essential than the primary ones.” He then goes on to argue, as we have just done, that the law is derived from the basic law of value (ibid., 44):

Engel's law is an expression of the fundamental postulate of economic science – the foundation of the principle of decreasing marginal utility – that needs and commodities can be classified by degree of "importance" (utility, preference, etc.).

Or as we would say, goods can be ordered on a value scale from most to least valuable, according to the importance the actor attaches to the end they can help him achieve. Agricultural outputs are necessary goods insofar as their consumption only increases slightly with income, i.e., their demand curves are inelastic; and they are inferior goods insofar as they are displaced by other goods as income increases. But these other goods are themselves most likely agricultural outputs, they are simply more costly to produce.¹⁰

Again, our preceding discussion helps explain the empirical studies which established Bennett's law (Bennett 1941; Timmer, Falcon, and Pearson 1983, 56–60): the starchy staple ratio, i.e., the proportion of calories the individual gets from basic staples such as potatoes or rice, declines as household incomes increase. Or to put it in our terms: higher-quality farm outputs are preferred to lower-quality goods once consumers become wealthy enough to demand them. It is always an empirical question which kinds of foods are considered staples and which luxuries. This partly depends on cultural predispositions: some cultures may consider meats high-quality, others may emphasize seafood. We have throughout used meat and beef as our go-to example of high-quality foods, since this has generally been the opinion in most European and western countries. Engel's law and Bennett's law will be important to keep in mind when we turn to a fuller discussion of economic change and development as it pertains to agriculture.

We can therefore conclude that agriculture is of primary importance, but that it is also mostly engaged in what Menger termed the lower orders of production (Menger 2009, 56–67). Menger conceived of production as taking place in stages or orders, from the lowest order, where goods ready for consumption are produced, through higher orders, where inputs needed for production in lower orders are produced. Ultimately, all the orders of production exist for the purpose of producing consumer goods, and higher-order production is only valuable to the extent that it contributes to this goal. Since agriculture produces goods to fulfil basic or primary needs, it is clear that its product must quickly reach the consumer. This does not mean that it is by definition always

¹⁰ Looked at in isolation, the demand curve for every good will at some point become very inelastic as supply increases, since the marginal value of an additional unit will be very low. What we have said here is simply that this point is sooner reached in the case of agricultural goods.

engaged in *lowest-order* production. If we define the lowest stage as the stage where the good is exchanged for money for the last time,¹¹ it is clear that many stages can intervene between agriculture and the final consumer. Especially as agriculture becomes more capitalistic along with the rest of the economy, it is bound to “move up” the stages of production, as more processes are introduced between the production of the physical goods and their delivery to the consumers (packaging, distribution, and so on). The substitution of higher-quality for lower-quality will also mean a shift to higher-order production. Agriculture will always, however, be relatively close to the first order of production.

We will have more to say on the orders of production and the place of agriculture in the economy once we have analysed the factors of production of especial importance to agricultural production: land and the complementary factors, labour and capital goods.

2.3. The means: Land as an economic good

Classical economics erred when it assigned to land a distinct place in its theoretical scheme. Land is, in the economic sense, a factor of production, and the laws determining the formation of the prices of land are the same that determine the formation of the prices of the other factors of production. All peculiarities of the economic teachings concerning land refer to some peculiarities of the data involved.

- Ludwig von Mises (1998, 633).

Carl Menger (2007, 52) theorized that four conditions are necessary for anything to become a good:

1. A human need;
2. The thing must have such properties as render it capable of being brought into a causal with the satisfaction of this need;
3. Human knowledge of this causal connection;
4. Sufficient command of the thing to direct it to the satisfaction of the need.

To this he added the distinction between goods that can serve human needs directly and those that can serve human needs only indirectly, the distinction between first order and higher-order goods already mentioned. What is necessary for the existence of the goods-character of a thing is the causal connection between the thing and the satisfaction of human wants, but not necessarily a direct connection (Menger 2007, 57). We value and desire goods only for the services they may render us, and we only pay a price for any good because of the services it will yield (Böhm-Bawerk 1959a, 1:149). Only insofar as the things in question are scarce, that is, human demand for them

¹¹ This is not strictly correct, since a good only becomes a consumer good once it is used in the final act of consumption, but it is the best and most useful definition for the purposes of analysing the market economy.

outstrip supply, will anything have economic goods-character. This is so since if the thing was available in greater quantities than were required for satisfying our needs, no one unit of the thing would be necessary for our satisfaction and the marginal unit would therefore carry no utility to man (Menger 2007, 116). As Hülsmann (2003c, xxxvi–xxxvii) has stressed, the Austrian value theory has to be understood as a trilateral relationship between a human being and two economic goods – valuation always means a man preferring one good to another. Menger’s criteria for what grants a thing goods-character therefore has to be refined. As Mises (2003, 185) wrote in his critique of Menger’s and Böhm-Bawerk value theory, all that matters is “the *opinion* of the economizing individuals that the thing is capable of satisfying their wants” (italics in original).

What makes a thing an economic good is thus clear: scarcity and perceived usefulness for at least one person’s ends. Before we can examine the economic character of land, however, we must first find a definition that covers exactly what we mean by “land” in economic science. We have already mentioned Ricardo’s definition of land as “the original and indestructible powers of the soil.” This definition is not adequate, for the simple reason that it is not exhaustive – it is too specific to the field of agriculture and does not account for other uses of land. Marshall’s definition of land as natural agents, “all free gifts of nature, such as mines, fisheries, etc., which yield income” (Marshall 1920, 66) seems better but is too imprecise. Marshall’s changed definition later in his *Principles* of land as fixed quantities of utilities over whose supply man has no control (Marshall 1920, 120) is not much better, as it assumes that the supply of land is necessarily fixed – a proposition that we shall have occasion to challenge below. The father of land economics, Richard T. Ely, at one point defines the unique characteristic of land as physical space and land economics then as the science which deals with the utilization of space, that is, the earth’s surface (Ely and Wehrwein 1940, vi). At another point, however, he seems to suggest that there are many more indestructible and unproducible elements in land, only to go on to suggest that there is no sharp distinction between land and capital (Ely et al. 1925, 403–4). Ely’s definitions too, therefore, we have to discard. Henry George defined land as the whole material universe outside man himself, but that definition would include all that we call capital goods in the definition of land, a conclusion that George himself recoiled from (George 1953, 12).

The Austrian economists have taken different approaches in their discussions of land. Menger did not give an explicit definition, but limited himself to emphasize that the same laws govern the value of land as of all other goods, but that there were some special characteristics of land, namely relatively fixity of supply, fixed situation for each unit, and an extraordinary variety of grades (Menger 2007, 165, 169). Böhm-Bawerk for his part separated land from capital on a series of

theoretical and pragmatic grounds – it is immovable, a gift of nature and not produced by labour, it is the basis of agriculture, a branch of production with many qualities peculiar to it, land rents tend to rise as economic development progresses while interest rates tend to fall (Böhm-Bawerk 1959b, 2:48). Schullern zu Schrattenhofen, a student of Böhm-Bawerk who was the first to treat the question of land and land rent from the viewpoint of marginal utility, defined land (or the natural factor, as he called it) as the useful matter, forces, and properties of the surface, interior and atmosphere surrounding the earth. In short, economic land is those parts of nature that man finds useful for his satisfaction and which does not exist in quantities greater than needed to satisfy his requirements (Schullern zu Schrattenhofen 1889, 12–13). Robert Murphy’s recent definition of land as producer goods that are the direct gift of nature is of a piece with this early Austrian’s, but includes both permanent and depletable resources (Murphy 2015, 47).

The best definition, however, is still the one offered by Mises: land is the nonhuman original factor of production (Mises 1998, 634; cf. Rothbard 2009, 10). We should perhaps clarify that the term “land” designates the class or category of nonhuman original factors, since land is not a homogeneous factor, but this is clearly implied in Mises’ discussion of land. This definition is preferable because it includes everything we would want to consider, all parts of the world that might conceivably be or become economic goods, while it excludes those factors – the produced factors of production and human labour – we want to exclude. It is also consonant with one of the earliest definitions of land, namely Cantillon’s: to Cantillon, land is the source or matter from which goods are produced, while labour provides the form for their production (Cantillon 2010, 21). Cantillon’s definition is worth stating alongside Mises’s, since it points to the main difference between land and labour: human action is necessary to make land productive, while land furnishes the exterior elements for labour, that is, man’s actions.

It should be emphasized that original factors are not simply given: they have to be discovered, or rather their possible use as a means to an end has to be discovered through entrepreneurial action (Simon 1996; Deegen and Hostettler 2014, 21–22), and the factor then has to be brought under control and appropriated in some sense (Hoppe 2001, 9–15; Hyde 2012). Only by becoming private property, by an act of appropriation of some kind, does physical land – or any other resource – become an economic good.

2.3.1. The original factor before it enters production

Let us consider land as an original factor before an entrepreneur appropriates it and employs it in his production process. A few more distinctions need to be made before we can advance beyond this

stage. Mises's definition of land as the nonhuman original factors of production includes both depletable and permanent resources as well as fixed and mobile goods. Now, *sub specie aeternitatis* it may plausibly be claimed that there is no such thing as a permanent or fixed good. Everything at some point changes in position, everything ultimately dissolves. Permanence like infinity is beyond man (Böhm-Bawerk 1959b, 2:335). This is quite true, but it does not mean that the categories of permanent and fixed are useless for economic science. What matters is the nature of a good from the point of view of acting man. From his viewpoint, it is obvious that some things are permanent and fixed and others not – a Roman bridge or medieval cathedral are usually considered permanent and fixed, while an ice cream or a glass of beer are mobile and quickly consumed or used-up goods.

While the distinction between permanent and fleeting is quite commonsensical, we need to pursue it one step further. Whether a good is considered permanent or not by acting man depends on its productive life compared to the plans of the actor. As Hayek (2009, 51–52) put it:

The main point to be kept in mind is that what matters is not permanency in any absolute sense, but the opinion of the economic subject as to whether particular resources at his command will last throughout the period in which he is interested (be it his lifetime or a longer period), or whether they will be exhausted or used up earlier than this.

Goods that will continue to yield services beyond the time for which man plans no matter how he uses them now are, then, to him permanent goods (ibid., 52). Ground land is clearly permanent in this sense, since it will continue to exist long after the time all people realistically plan for. Even in those rare cases where land is expected to disappear at some point in the future – say, if people were convinced that the land area of Holland was to be submerged by the rising sea – this does not automatically mean that it will no longer be considered permanent. If land is expected to disappear in 100 years, but people only take account of the uses it will render for the next 50 years, it will still be considered a permanent source of useful services and valued as such, since its lifetime goes beyond the period that economizing actors are interested in.

The flip side of this is that goods we would not normally consider permanent might very well to some people be so considered. Animals such as dogs or cattle, for instance, which may have a useful life of 10-12 years might be considered permanent, if man only plans for the next 5 years. In the extreme case we can conceive of a man who does not look beyond his current consumption at all and considers all the features of his environment as permanently given with no view to future or later uses – although it would be difficult to conceive of the actions of such a being as really human actions at all.

The more man takes account of the future in his actions and the longer he accordingly extends his plans into the future, the fewer will be the goods he will consider as permanent. As he extends his planning horizon, part of his planning will have to do with how to improve the longevity of goods or to find replacements or alternatives to them, as he increasingly values their scarce future uses as well as their present enjoyment. Ground land, land as standing room, will, as the planning horizon extends, tend to be the only permanent good. This does not mean that ground land is homogeneous (Ely and Wehrwein 1940, 48). Its mere location may confer value upon it (Seldon 2005, 395–96), and the climate and permanent features of the composition of the soil that are not degraded in use may differ from one parcel of land to the next. Even were we to postulate a world of completely homogeneous land, man would still value the pieces of land differently, if only by their distance from himself and the consequent cost to him to reach and use the different specific plots of land. That nature provides goods of very different kinds and qualities unevenly spread throughout the world is a fact that greatly accelerates interpersonal exchange and the division of labour (Mises 1998, 156–57), but it is not a necessary precondition for it. Were all plots of land to be equally useful, there would still arise interpersonal exchange as men each devoted their own lands to production of different consumers' or producers' goods and so came to specialize in different kinds of production (Block, Hansen, and Klein 2007).

Ground land, land as an economic good, then, is the permanent, nonhuman original factor. Yet it is necessary to realize, as we shall see, that in an advanced economy, the factor land is often indistinguishable from produced factors of production except for its permanence (This was realized already by Fetter 1915, 442ff; Rothbard 2009, 483–84 makes permanence the source of the specific net rent of land). It is the fact of its permanence that gives rise to land's specific character, not its origin as a part of nature untouched by man. This point has been most clearly articulated by Rothbard (2009, 483–84), building on Mises' definition:

Whether or not a piece of land is “originally” pure land is in fact economically immaterial, so long as whatever alterations have been made are permanent – or rather, so long as these alterations do not have to be reproduced or replaced. Land that has been irrigated by canals or altered through the chopping down of forests has become a present, permanent *given*. Because it is a present given, not worn out in the process of production, and not needing to be replaced, it becomes a *land* factor under our definition.

The permanence of land is always, to reiterate, from the point of view of acting man, never in some objective, impartial sense.

2.3.2. Land in productive use, its rent and value

Land becomes an economic good the moment man realizes that control of a specific piece of land has causal relevance for his production plans. Land may be a good in Menger's sense, or perhaps rather a general condition of production before it becomes a strictly economic good. No one specific parcel of land is necessary for the activities of the hunter or the fisherman, and even such relatively advanced societies as pastoral and nomadic tribes may not consider land an economic good. It may even be that the land may be considered to have economic goods-character as a consumption good before it is considered for productive use (This seems to have been the case with the ancient Scythians. Cf. Herodotus 1996, bk. IV). We will discuss what implications land used as a consumption good has below.

When land is first turned to productive use, man realizes that control of a given piece of land for the duration of the production period is necessary if he is to produce a greater or more valuable product (Schullern zu Schrattenhofen 1889, 16, 40). It may be that land is still abundant and that it is virtually costless to appropriate and turn it to productive use, but the piece of land so used must still be considered an economic good distinct from the general supply of land, at least for the period of production. Will it earn a rent like other factors of production? If it is really an economic good, it must. But in a scenario where there is still a large supply of land available to be appropriated, there is a clear limit to its rent: namely, the costs of abandoning it and the capital goods that have been irretrievably united to it and the costs of acquiring another piece of land instead and spending the time and labour necessary to make it suitable for production by improving it with the requisite capital goods (this is, in essence, Bastiat's argument - the landowner earns rent only insofar as he spares others the labour of cultivating new land. 1996, 258–59).

What lands will be cultivated first – will it be the most fertile, as Ricardo asserted? Only if we understand fertility in an economic sense and not as biological fertility. That is, that land will be cultivated first which yields the highest valued product at the lowest cost. There are two reasons why this means that biologically fertile lands may not be cultivated first: (1) the total value of the product of a fertile piece of land will be higher than a less fertile, but due to the law of diminishing marginal utility it need not be much higher; (2) it is an empirical fact that fertile lands often require much larger inputs of capital goods and labor – the soil is heavier, so it takes more effort to plow, there are more shrubs and other vegetation that needs to be cleared before the land can be cultivated, and so on. This means that the net product of the biologically more fertile land may be less than that of the biologically more infertile land (de Fontenay 1854, 47), and that is without

taking account of the fact that the complementary capital goods needed to work the fertile soils may be lacking, especially in a primitive or pioneer setting.

One of the main components of rent is locational rent. Closeness to the market for one's product means that one can cut down on transport costs, and this saving is clearly imputable to the location of production. In Lösch's terminology, the market for agricultural products is punctiform in the form of a town (Lösch 1954, 5, 68). The rent of land will then be derived from the value of the product at the point of sale minus the transport costs from the farm (von Thünen 1966, 24). The locational rent of land is in fact precisely analogous to urban rent in Wieser's discussion (von Wieser 1960): locational rent depends on the distance to the town centre where the market is located. Wieser discusses rent in terms of residential rent and the rent of land used by urban businesses: residential rent is determined by the value attributed to living in certain quarters and suburbs, while urban business rents are determined by the value of doing business in a certain location. Wieser describes a pattern of rising rents as one approaches the city centre as well as local "domes" above high-value suburbs (1960, 59, 65). The difference between urban rent and agricultural rent is that in agriculture the main centre is determined by the location of the market, while the local domes are determined by the quality of the soil that makes it useful for especially valuable production and which may make cultivation easier, i.e., less costly in terms of labour and complementary capital goods. As a matter of fact, lands yielding such a quality or intensity rent (von Wieser 1960, 55) are not distributed in neat clusters surrounding the main market – they may be located far from the main market and surrounded by land of low quality, even submarginal land. We may use one of Bastiat's favourite examples, the Burgundy vineyard Clos-Vougeot to illustrate the point: it is located far from Paris, the main market, but it still earns a high rent, simply because such a large part of the value of the product can be imputed to it, even allowing for transport costs (Bastiat 1996, 355–57).

We should not maintain the fiction first employed by Thünen of postulating only one market for agricultural products. There are indeed many markets, and the farmer-entrepreneur will sell his product in the market paying the highest price, which will tend to be the market with the lowest transport costs from his farm. All these markets will of course be linked together in a world market and prices for goods will tend to be uniform throughout all markets, allowing always for variations in transport costs, as we must always remember that it is the price of the good at the point of consumption that determines the cost structure (Rothbard 2009, 617–22).

These are then the general facts that cause land to yield rent and have economic value. We still need to consider how the part of the product imputed to land is determined and how the capitalized value

of land is arrived at, something that can only be done in the setting of a monetary economy, as this is the precondition for economic calculation (Mises 1998, chap. 13; Schullern zu Schrattenhofen 1889, 27). While we will not yet consider money as an element of change in the economy, all discussion of rent, wages, capital values and so on implies the existence of a money economy that makes it possible to reduce all magnitudes to a common denominator.

Arthur Seldon in his article on economic rent (2005, 217–18) defined it as the surplus above opportunity cost. With this definition, however, rent becomes the same as profit in the changing economy and pure interest in the evenly rotating economy, making rent simply the general term standing for all net income. Yet if we assume a completely specific factor, one that has no alternative use and hence no opportunity cost, Seldon’s definition leads us to conclude that the whole surplus from its use is economic rent. While Seldon’s discussion of rent is stimulating, his rent concept is ultimately defective. It is descended from neoclassical reasoning, and partakes of the errors that stem from ideas about rent and quasi-rents originally proposed by Marshall. Instead, following Mises (1998, 521) who described rent as a “general catallactic phenomenon”, we will accept Rothbard’s (2009, 488) definition of rent as “the unit price of the services of any good”. The income to any factor is its rent, whether we are discussing wages – the rental price of labour – or the hire of machines and other capital goods or the income due to land (see also Fetter 1915, 160–65).

Land has often been assumed to be a completely specific factor, although that assumption is not strictly true, since whether land is specific depends on the way we frame the question. Most agricultural land is specific to agriculture, in the sense that there is no demand for its use for residences or for industrial sites. However, this is so only because agricultural employment of this land is much more profitable than non-agricultural alternatives. Most land employed in agriculture is completely specific to that employment, residential land to that use, forest lands to that use and so on, only because the expected rents earned that way are much greater than in alternative employments. Specificity, in other words, is here only a relative concept. It follows that some land is less specific and that there is a margin of land where only small changes in the expected value of the output will lead to a change in the use of land, from agriculture to forestry, for instance (Deegen and Halbritter 2018). If demand for forest products increases, then forest revenue increases and more factors of production will be demanded. Thus agricultural land with an alternative use as forest land will be shifted into that use, as foresters are willing to pay a higher rent for the land than farmers. This non-agricultural use can be considered the opportunity cost of the land. If the expected land yield is not considered more valuable by the owner than the alternative use, then the land will be switched to this alternative use (the alternative may, and most often is, an alternative

agricultural employment, as when a farmer changes from one crop to another, or from cropland to pastures.) To understand the determinants of land allocation, we must consider what causes the rent of a plot of land, its marginal utility and how this is connected to its productive employment.

As it happens, Schullern zu Schrattenhofen (1889), who gave the first and most thorough analysis of the marginal utility of land, does so precisely by treating land as a specific factor. By first analysing what income is due to the complementary factors, labour and capital,¹² he is able to isolate the value of the contribution of the specific factor, land. The method used is simply to determine the income of each factor that has an alternative use. Since they have alternative uses, they will also earn a revenue in these uses, and the revenue they earn in agricultural employment will therefore have to be at least equal to the alternative revenue. In this way, Schullern succeeds in isolating the rent of land from not only the wages of labourers and the income to capital (in the sense as noted in the introduction to this chapter of intermediary goods), but also from the farmer's own implied wages and the implied rent of the capital that the farmer himself supplies (Schullern zu Schrattenhofen 1889, 90–91). In brief, Schullern determined the net income due to land by treating it as the specific factor and then showing how to find the income due to a specific factor of production when the other factors are non-specific and can earn an income from alternative uses.

The rent of land, then, is determined in the same way as the income of all other factors: by looking at the revenue of the product foregone by the loss of one unit of land in a given production process. The revenue lost by the decline in the amount of the final product caused by the loss of the marginal unit of a factor is the marginal value imputed to that factor (Rothbard 2009, 455–63). That land itself is not necessarily completely specific – indeed, it probably rarely is – does not change the theory. It simply means that the value of land should not always be considered the residual after the value of the other factors has been determined, but that its own alternative uses – the opportunity cost of using it in this specific employment – should also be considered. Even in situations where the land factor appears specific, it will most often be possible to convert it to some other use. Take a vineyard, for instance: it is clearly a factor specific to the production of wine, and cannot, unlike the capital goods and labourers employed in wine production, very easily be shifted to other production lines. The cost of such a shift would be very high, even abstracting from the capital loss. However, it can be transferred to other uses. If the best alternative use – the one expected to generate the highest revenue – is cereal farming, the opportunity cost of the vineyard can be estimated as the

12 Schullern does not distinguish clearly between capital, capital goods, and loan or finance capital i.e., loans and other advances, although he generally means the latter. This equivocation, however, is not a problem for his theoretical exposition, if it is read along the lines of Rothbard's later theory of rent and production, of which Schullern can be seen as a precocious if flawed forerunner.

expected revenue from growing crops minus the direct costs of transforming the vineyard into a field – removing the vinestocks, their roots and so on. Land factors will therefore, just like all other factors, be allocated to their most profitable use based on considerations of opportunity costs. However, it is still true that, while agricultural land has alternative uses, it must still be considered the (most) specific factor in all these uses. It is an empirical fact that there is a narrow range of uses available for land. Even in the case of some other factor produced factor of production being more specific, the factors of production used to produce *that* factor were less specific. But land is never produced except for when it was first brought into use.¹³ Therefore, land can virtually always be considered the specific factor for purposes of economic analysis.

2.3.3. Capitalization of land

When treating of durable goods, we must distinguish between their rent – the revenue they generate – and the interest due to the capital they embody. The sources of these returns are different: rent is due to the productivity of the good in question, specifically, the marginal revenue that can be imputed to one unit of the factor, as detailed above; while interest as such has nothing to do with physical productivity per se. The source of interest is the fact of temporality: man is a temporal being, and as such always prefers the satisfaction of his ends sooner rather than later (Herbener 2011, 14–15). All his actions are guided by this basic fact. If a man chooses an action later rather than sooner, he demonstrates that the value of the action in the future is greater than its value in the present, even when the discount of the future is applied. Whenever a man acts, his actions are guided by his preferences, when he chooses between ends to pursue and the means to use in their pursuit; and always also by time preference, when he decides on the temporal aspect, according to his own time preference. All these factors are integrated in the judgments of value that guide action to the expected highest satisfaction of ends.

Market exchanges integrates the temporal aspect of individual action for society (cf. Rothbard 2009, chap. 6). Entrepreneurs pay each factor the monetary value of its contribution to production. If this payment is made before the revenue from the sale of the product is received, then it is discounted due to time preference. The rate of discount is simply the value spread between control over goods in the present and the future. This is the time preference or pure rate of interest, and it will always enter into exchanges between present and future money (Herbener 2011, 15). There may be other

13 The case of two land factors cooperating in the production of a good does not contradict this. Either we must consider the two factors really one factor and then they will be priced as such, or one of them is less specific than the other and has at least one alternative use and thus carries a different opportunity cost. In that case, we can speak of two land factors and the one that carries the higher opportunity cost will also earn a higher rent in its current use. Note that this distinction is again purely economic: it does not matter if there are physical differences between two pieces of land: if these differences do not impinge on the land's usefulness, it will still only be one factor, not two.

components that add to the rate of interest in loan markets – e.g., perceived risk or an inflation premium – but the pure rate of interest will always remain, and there will always be a spread between present and future value. Interest itself, ordinary interest as Mises called it, is simply the higher valuation of the present use of a good over its future use. It is not a price itself, but a ratio between prices (Mises 1998, 521, 523). As such, while interest is always present, it can only be isolated and seen in a monetary economy, where the estimated money prices of future goods can be compared to the prices of the present goods used in their production. Hülsmann’s (2002, 87) definition of ordinary interest as “the fundamental spread between the value of an end and the value of the means that serve to attain this end” is not, in our opinion, in conflict with the pure time preference theory of interest, but we would stray too far from our objective if we attempted to solve this debate in the present work.¹⁴

Capitalization of durable goods follows immediately from this. Present goods that are expected to generate future revenue will have their prices determined by discounting the future money revenues by the rate of interest to obtain the equivalent amount of present money. In other words, the present value of a good will be the sum of the money rents accruing to it over its working life discounted to the present (Böhm-Bawerk 1959b, 2:289). In this way, the rate of interest will tend toward uniformity as the spread between present outlays on producer goods and future income from sale of the product will tend to equalize in all the various firms and production processes.

To illustrate, let us first consider the case of a durable but non-permanent producer’s good. Let us stipulate a rate of interest of 5% per year and that the employment of one unit of the good yields a gross rent of f . 100^{15} at the end of each year for the next 6 years (This example is taken from Böhm-Bawerk 1959b, 2:327–29, 453). The rent for each year will be discounted to the present by the rate

14 The harmony of these theories can be proven if we consider the basic nature of time and change. Specifically, starting out from Aristotle’s definition of time (Physics IV. 10-14; Aristotle 1984, 1:372) as a kind of “number of motion in respect of ‘before’ and ‘after’”, it will be possible to show how the basics of human action implies change and hence, temporal existence. This point was also emphasized by Mises: “The concepts of change and time are inseparably linked together. Action aims at change and is therefore in the temporal order” (Mises 1998, 99). The value spread between means and ends – Hülsmann’s definition of ordinary interest – can only come into being if means are actually exchanged for or transformed into ends, which implies change, which again implies temporal duration on the Aristotelian theory of time. And temporal duration between the means presently available and future goods (the end these means serve to achieve) is precisely what gives rise to interest in the pure time preference theory of interest. On the praxeological understanding of time in general, see Mises (1998, 99–104; 1962, 34–38).

15 We will in this part of the dissertation express money in terms of florins for two reasons: 1) Since we are dealing with the natural order of money production it would confuse matters to introduce currencies such as the dollar or the euro, as these are fiat currencies and the quintessence of interventionist monetary systems. On the other hand, we do not agree with Rothbard’s approach of expressing money in terms of gold ounces (Rothbard 2009, 196–98; 2008, 8–11), as there is a legitimate role for coinage and coins of different names in the natural order. These are simply guarantees of the quality and weight of the coin and have historically always been in use (Hülsmann 2008a, 35–38); 2) We use the florin specifically because it was the name of the first gold coin struck in Europe in the Middle Ages, in 1252 in Florence, and it very quickly became widely used in trade and as a unit of account. It was also the basic Austrian currency unit until the reform of 1892, and it thus seems a fitting choice for a dissertation drawing mainly on Austrian-school economists.

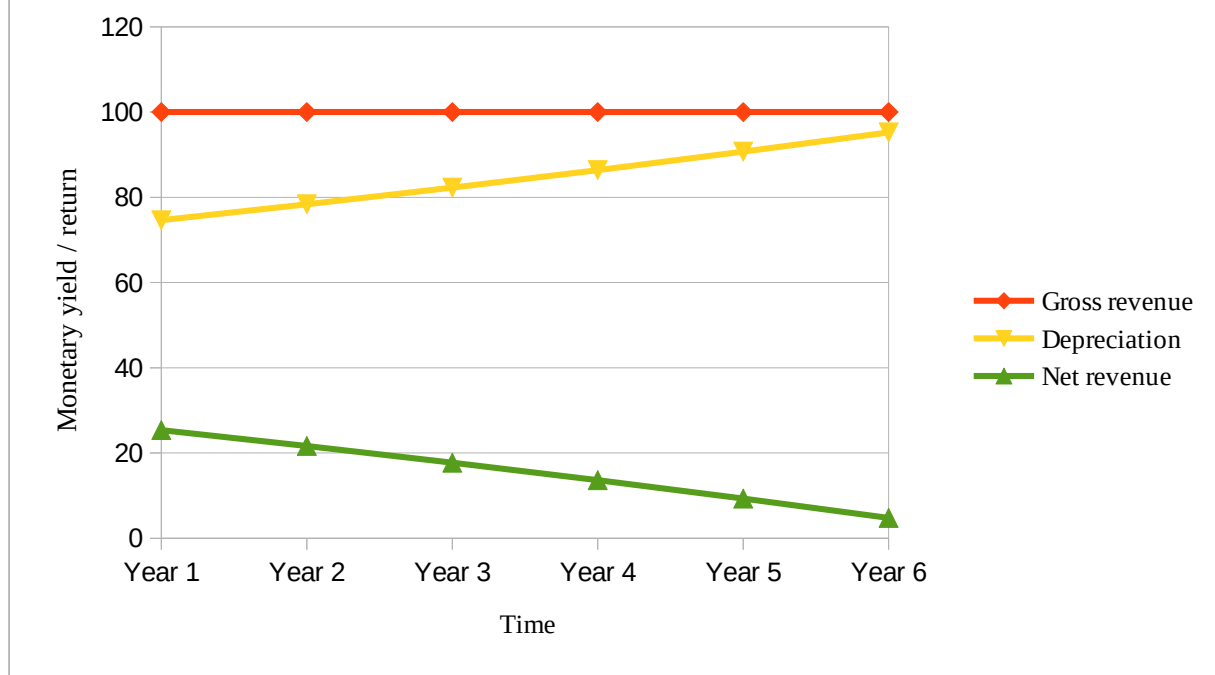
of interest. The present value of the good will be $f. 95.23 + 90.70 + 86.38 + 82.27 + 78.35 + 74.62 = f. 507.55$ at the beginning of the first year (we simplify Böhm-Bawerk's example by stipulating that the rent is earned at the end of each year instead of the beginning). Calculating present values of capital goods can be simplified by using the following equation:

$$\frac{1 - (1+i)^{-n}}{i} * MVP$$

Where i is the rate of interest, n is the number of years the good will remain serviceable, and MVP is the marginal value product, that is, that part of the marginal revenue that can be imputed to this particular factor (Rothbard 2009, 456).

At the end of the first year, the gross revenue or yield will be $f. 100$. However, this will not be the net return to the asset owner, since the good will be worth less at the end of the year, as it now is one year closer to being depleted and used up. How much will the asset have depreciated? Not by the whole amount of gross rent, and not by the discount of this year's rent from the beginning of the year, i.e., $f. 95.23$. Rather, since the uses of the good are interchangeable, it will be the value of the use the farthest removed in time that will be written off, as this is the least valuable use in the present. This means that the asset will depreciate by $f. 74.62$ after the first year, leaving a net rent or yield of $f. 25.38$. This net rent will equal the rate of ordinary interest, which we can easily see as $25.38/507.55 \times 100$ is 5 percent. A capitalist who invested in the asset specified here would, then, have made a return of 5 percent after one year. In fact, he would make a return of 5 percent every year, since the net rent will decline as the asset depreciates more, as it is now uses nearer in time that will have to be given up. The relationship between gross rent, depreciation and net rent is illustrated in figure 1. At the end of the sixth year, the asset will be used up and the rate of interest will simply be the ratio between the gross rent of $f. 100$ and the depreciation quota, which will be $f. 95.23$ in the final year of serviceability of the asset. This too will simply result in a return of 5 percent, that is, in ordinary interest.

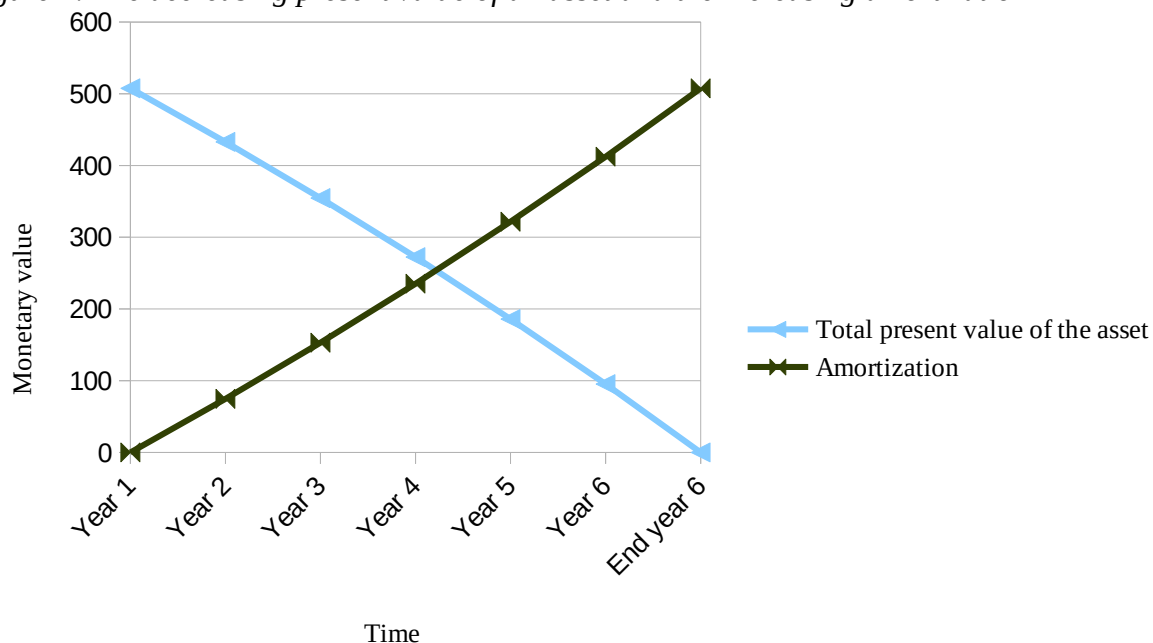
Figure 1: The relation between gross rent, depreciation, and net rent



Now, it does not matter for the reality of depreciation how the entrepreneur chooses to take account of it. He may have an amortization account dedicated to the asset in question, or he may simply summarize all his depreciation expenses in one line item of his accounts. It is also possible, of course, that he does not take account of depreciation, but this would mean that he consumes his capital. It would be a mistake to think that amortization is simply a way to allocate funds for the repurchase of a similar asset once the current one is used up. In the living, changing world, it is quite probable that the same kind of asset is no longer available, or that it no longer fits into the business plans of the entrepreneur. Depreciation and amortization is simply a way for the businessman to keep track of his invested capital, of calculating whether he has made a profit or a loss on the use of his equipment. It is a means for the entrepreneur of ensuring a constant income stream, not of setting aside money for the purchase of exactly the same kind of asset once it has worn out (Hayek 2009, 298, 300–305).

It may still be illuminating to compare the depreciating value of the asset over time with the increasing amortization account (see figure 2 below).

Figure 2: The decreasing present value of an asset and the increasing amortization



It is immediately apparent that amortization is just the inverse of the present value of the asset. At the beginning of year 1, the asset is completely new and unused and, consequently, has not depreciated. However, as it is used up, the value of the asset declines and the amortization fund increases, until, at the end of year 6, the asset yields its final monetary revenue and is used up, while enough capital has now accumulated in the amortization account to offset the purchase price of the asset completely. The capitalist is left after 6 years with as much capital as he set out with, under whatever form he may have invested it in the meantime, and has earned a net return of 5 percent every year on his investment in this specific good.

So much for durable goods. The peculiar character of land is, of course, that it is not simply durable but a permanent factor of production and hence a permanent source of rent (or interest payments, depending on how we look at it). The capitalized value of land is the present value of all future uses. This has been known by most economists from Cantillon on, even if they did not examine the question in detail. The problem is, if the capitalized value of land is the sum of all future uses, why is it not infinitely high? The answer here, as in the case of durable goods examined above, is that the capitalized value of a land factor is the present value of all future uses *discounted to the present*.

Insofar as land is permanent, the embodiment of the indestructible powers of the soil in Ricardo’s phrase, it does not depreciate – there are no future uses that have to be given up by using a piece of land in the present. Often, however, too intensive use of land in one year depletes its fertility for the next year, at least temporarily. Insofar as this is the case, the “powers of the soil” may be permanent,

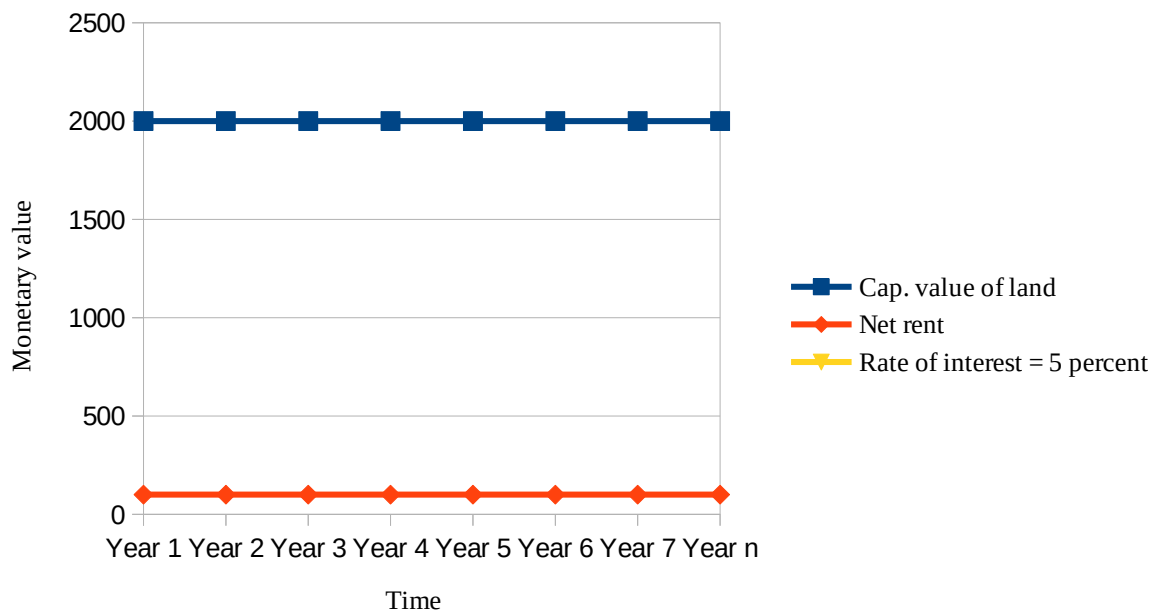
but not indestructible, as a too intense cultivation will reduce future productivity and hence future monetary returns. Temporary depletion may be unavoidable, but it does not necessarily imply permanent loss of productive capacity. Rather, practices such as letting land lie fallow every other or every third year, or rotating between intensive crops such as cereal and more extensive crops, or crops that return nutrients to the soil, are all attempts to overcome and mitigate the problems of soil erosion and exhaustion. In modern times, artificial fertilizer too is used for this purpose. We cannot assume that such practices will always prove successful in maintaining the quality of the land, but not because it is impossible; rather, because it is too costly (Halbritter and Deegen 2011). This will especially be the case in a colonial setting where there is plenty of new land to be appropriated at a relatively low cost. In such an environment, the entrepreneurs will often reinvest their capital in clearing new land rather than in maintaining the quality of the land they already own.

Where new land is scarce or costly to come by, more resources will be invested in maintaining the land. Ultimately, the choices of the entrepreneurs are determined by the costs involved: how much present income (the physical yield times its market price) will they have to sacrifice to ensure future returns? And what are these future returns worth in the present? Time preference and the rate of ordinary interest are the determinants of how far into the future the entrepreneurs will look. They will be interested in maintaining their income stream in the future and will invest in maintaining the soil in the present so long as the costs of doing so do not outweigh the present value of the future income they expect in return. If the costs of maintaining the present quality of the land outweigh the benefits, we can expect the land to deteriorate, until the quality of the land has deteriorated somewhat and reached a level commensurate with the time preference of the capitalist-entrepreneurs. In effect, capital has been consumed because time preferences were too high to allow for maintenance of higher yields in the distant future. Conversely, if land can be improved at a cost lower than the benefits to be expected from it, present output will be lower than it could be even allowing for a constant output through time. Capital will be accumulated in the form of improvements to the land, until the cost of improving the land outweighs the benefit. A higher capitalized value of land results.

We have here in essence the distinction between gross and net saving. There must almost always be some gross saving to maintain the present capital value of a factor of production (Hayek 1935, 37–49; Rothbard 2009, 390–402), and usually the values involved here are much higher than are reflected in present consumption. Net saving and dissaving, on the other hand, are elements of the changing economy. We will examine these in depth in chapter 4.

In the gross yield of any land factor then, there must be made some allowance for investment to maintain its quality through time. But there is always also a net component to the yield from a given piece of land, and this land rent will be equal to the interest payment on capital invested in the land (cf. Rothbard 2009, 493–95).

Figure 3: The relation between rent or MVP and the capitalized value of a land factor



Let us assume a land factor yielding a product each year worth f . 100 and an interest rate of 5% (Böhm-Bawerk 1959b, 2:335–37). The capitalized value of land will be 20 times the annual rent, or f . 2000. This can easily be seen algebraically, if we refer back to the equation on page 43. The longer-lived a factor of production is, the higher will be the value of n and the closer the capitalized value of an asset will be to equal the MVP divided by the rate of interest. In the case of land, a permanent good, the capitalized value will simply equal the marginal value product divided by the rate of interest. No one will pay a higher price, since that would result in returns below the rate of ordinary interest, and no one will sell at a lower price since they would be better off holding on to the land. The capitalized value of land is thus directly determined by the prevailing rate of interest, which is the exclusive determinant of the ratio between rent or MVP and the capitalized value. This is graphically illustrated in Figure 3.

2.3.4. What determines what is considered marginal land?

No factor of production yields its product unaided. There must always be at least two factors cooperating in any production process, where they are joined together in order to yield some product or service. It is often assumed that all land is in productive use and that the stock of land is

fixed (Samuelson 1980, 526). Rothbard works from this assumption, contrasting a general market for land use, where the supply is fixed, with markets for specific uses of land, where the supply of such specific uses is not fixed (Rothbard 2009, 568. But note that Rothbard, p. 567 states that since labor is scarcer and nonspecific, there will always be unused land).

It is, however, almost never the case that the supply of land is fixed – this is a case of confusing the fact of physical scarcity of a resource with catallactic scarcity (Mahoney 2002), scarcity in terms of present availability for human needs. This point was made by George Reisman with general reference to all natural resources. From a strictly physical perspective, the supply of natural resources – and land – may be finite, but for all practical purposes, the merely physical stock of natural resources is infinite. The problem of scarcity from an economic point of view is strictly one of usability, accessibility, and cost (Reisman 1990, 63–64).

It is true that the supply of land in a given location is usually fixed – that is, land for some particular uses has a completely fixed supply. Even so, the use of such lands can be intensified (von Wieser 1960, 56) to get as much value from them as possible with the use of additional labourers and capital goods and more land can be devoted to this particular use. The markets for land-use, like all other markets, are connected. Land, understood as standing room (Fetter was the first to define part of the function of land as ‘standing room.’ 1915, 117) in a given location, can indeed be produced, as already Frank Fetter remarked: one acre of ground land may yield 60 acres of office space by the construction of skyscrapers, and draining of swamps and landfills have added much land to already densely settled cities like New York and Boston (Fetter 1915, 133, 444, 453).

The same cause determines both the more-or-less intensive use of current land and whether new land will be brought into productive use: the marginal yield expected from its use. A capitalist-entrepreneur who has to decide where to invest his funds is concerned with earning the highest profits possible. At the very least, he will not invest in projects that promise to return less than the pure rate of interest. He will therefore invest in virgin land if and only if the expected return from this investment is higher than other possible investment projects, or at the very least if it is higher than the pure rate of interest. If we assume that the costs of labour and capital outlays are given to him, this means that only land that yields the pure rate of interest above the labour and capital outlays needed to cultivate it will be put to use (Turgot 2011, 57–58). Turgot’s statement of this principle, although more than 200 years old, is still correct: “If the interest is at 5 per cent all uncleared land whose produce would not yield 5 per cent over and above the replacement of the advances, and the recompense of the care of the cultivator, would remain uncultivated” (ibid., 58). It might be thought that this statement is wrong, since appropriating new land will yield not only the

present rent, but also windfall gains to the appropriator in the form of the capital value of the land. However, this supposed windfall does not change the fact that the land in question is submarginal. Suppose that an entrepreneur had to buy the piece of land in question instead of appropriating it. If he pays the full capital value as set by the net rent and the discount factor, and again supposing the cost of labour and other outlays given to him, he would still end up earning a return below the pure rate of interest. His return on the land itself, the ratio between its capital value and rent, will be equal to the rate of interest, it is true, but if we take account of his operating expenses, this will not be so.

A similar argument has been developed in the case of forests and the margin of forest use and ownership (Hyde 2012). The value of forests decreases as they become less accessible, and as the costs of using it increases, the more extensive will be the forest production. If the costs are too high, the forest or land will simply be left unowned – it is too expensive to cultivate it, even if it could produce some positive revenue.

An example may serve to make the above reasoning more clear. Suppose that the annual gross product that could be produced with the use of a unit of uncleared land is expected to sell for $f.$ 1,000. At an interest rate of 5 percent per year, supposing the period of production to be one year, the highest price payable to the annual services of the needed complementary factors would be $f.$ 952.38, since such an annual investment would result in a return of 5 percent. If the price of the complementary factors were higher than that, it would not be profitable to make the investment in virgin land. Let us suppose that the investor must pay $f.$ 980 for the complementary factors each year and a lump sum for appropriating the piece of land. The net rent of his new land will then be $f.$ 20, and if we assume a capitalized value of $f.$ 400, his return on the landed property will be 5 percent. However, his yearly return will only be 2 percent – or indeed less than that, if we consider that his capital invested in land might earn a higher return elsewhere. Now, if it is costless to maintain his new land, and if the farmer can possibly convert it to some more extensive use that does not require an unacceptably high annual outlay, then it might be a permanent addition to the stock of economic land. It will still be the case, however, that the capital invested in appropriating the land could have been more profitable invested elsewhere, even if the cost of appropriation was less than $f.$ 400.

The ordinary rate of interest, then, determines not just the time structure and the time horizon of production, it also determines which present possible investment projects, in new lands as well as

old, will be considered profitable.¹⁶ This does not mean that only a lowering of the pure rate of interest can cause entrepreneurs to put previously idle land into use. An increase in savings unrelated to changes in the interest rate can (Hülsmann 2008b), provided the complementary capital goods and labourers are available and the expected rent of land is high enough, lead entrepreneurs to widen the structure of production by investing in cultivating new land. An increase in population can also make it profitable to cultivate previously submarginal land. We will return to analyse how such changes influence land use and agriculture in chapter 4, for now it is enough to have established this basic point: land is never the limiting factor, as there are always idle lands available for use. The limiting factor is the scarcity of the complementary capital goods and of the human labour needed to turn land to profitable use, and it is always a comparison of the expected yield from clearing new lands with the expected yield from other potential investment projects that determines what lands will be brought into cultivation.

2.3.5. Is land simply capital?

Our definition of economic land as the permanent (from the point of view of the economic actor) nonhuman original factor plus the permanent (again from the point of view of the actor) produced means of production is clearly unsatisfactory from a scientific point of view. Some economists have seen this and chosen to simply assimilate the category of land to that of capital. Among these are Philip Wicksteed (1910, 365: ‘The distinction between land and capital is obviously arbitrary’), Frank Fetter (1915, 120: ‘We take the original stuff of which everything is composed, whether arable field or house or watch-spring, as we find it in nature’), Frederic Benham (1960, 102), who advocated a division of factors of production into man and his environment, with a corresponding division of incomes into incomes from work and incomes from property, and Ludwig Lachmann (1956. Lachmann, however, never explicitly denies the distinction between land and capital). Even Bastiat (1996, 222–23, 236–37, 248, 253) can be interpreted to suggest that land is simply a special kind of capital good. There are indeed good reasons for considering land one kind of capital good among others with only some accidental distinctions. The rent and value of all factors of production are determined by the same laws of value and the return to all durable factors will tend to conform to the rate of pure interest. And yet there are reasons to pause before accepting this position, no matter the authority of the economists advocating it.

16 It is a fact that institutional barriers prevent the appropriation and use of much unused land in the present day. This is true of the great unsettled landmasses of America and Siberia as well as the seas. At the most, it means that the supply of land in many places should be treated as *de facto* fixed.

In the first place, those characteristics that are, admittedly, common to land and capital goods, are all implied in the Mengerian genus of higher-order economic goods. To assimilate them therefore simply means making capital goods synonymous with higher-order goods. Secondly, we thereby lose the distinction between the produced factors of production and the original, nonhuman factors. But this distinction is necessary if we are to make sense of the structure of production and the extension of production over as yet uncultivated lands. If the produced factors of production are reducible to the original factors we need to be able to distinguish two different kinds of original factors. Human labour is clearly one of these factors, but it cannot be the only one. If it was, man could create the entire economic apparatus *ex nihilo* – a proposition at odds with both the empirical facts and logic.

Finally, the definition of land as the permanent factors of production clearly highlights a distinct contrast with the other capital goods – namely, that land is eminently durable and does not have to be reproduced and in this way earn a pure rent without any deductions since there are no backward imputations of revenue. “Whether a piece of land is ‘originally’ pure land is in fact economically immaterial, so long as whatever alterations have been made are permanent – or rather so long as these alterations do not have to be reproduced or replaced” (Lewin 1999, 108). It may also be true that there is a larger ‘social’ component in the formation of the value of land, since this is in large part due to a favourable location and not any action on the part of the landowner. This is simply the obverse of the fact that land is not produced and therefore earns a net rent. But it does not mean that land is not productive and that the landowner does not serve a productive function. Only by allocating land to its most productive uses will the landowner continue to earn rent (Rothbard 1997, 298), if he fails to do this, he will suffer losses in the form of submarginal rents and capital losses.

The literature thus operates with two complementary concepts of land: the nonhuman original factor of production as distinct from the produced factors, and the permanent, non-reproducible factors that have a permanent capital value¹⁷ as opposed to the temporary capital goods that are used up in production. Whenever we want to describe the economy in all its interrelations, these distinctions are important. It is necessary too, for the description of the stages of production of the economy, to distinguish land from reproducible capital goods. For the acting individual too it may be of importance to know what is land – unowned, nonhuman original factors – as opposed to owned assets.

17 So long, of course, as the value of their uses have not changed and are not expected to change within the relevant time frame.

Yet it is important always to maintain a correct concept of capital to guide our investigation. Böhm-Bawerk, who originated the stages-of-production description of the economy, had a perhaps too objective conception of what “capital” is (Endres 1987), which led to his emphasis on the distinctions between land and capital (and between social and private capital). In contrast, Menger operated with a more realistic capital concept, based on the every-day usage of entrepreneurs (Braun 2015), and one which Mises took over in *Human Action* (1998, 262). To him, capital is “the sum of the money equivalent of all assets minus the sum of the money equivalent of all liabilities as dedicated at a definite date to the conduct of the operations of a definite business unit.”

We will therefore use the concept “capital” in what follows to refer to the monetary equivalent of all the assets that form part of a given farm or commercial unit. This will be necessary not only in order to conform to actual usage by the entrepreneurs – a usage that may, after all, be erroneous – but because this usage best conforms to the character of the problems of production and finance involved in agriculture. The composition of the capital goods and the great proportion of capital fixed in the form of permanent land factors is precisely one of the main characteristics of agricultural production.

2.3.6. Land as a consumption good

Land can be used for consumption as well as production. This in itself is not a controversial or even very interesting fact (Schullern zu Schrattenhofen 1889, 75–76; Wicksteed 1910, 290; Mises 1998, 638–39; Ely and Wehrwein 1940, 24). Whether any given physical thing is considered a consumer good or a higher-order good always depends on the valuation of the economic subject and the use he intends to make of it. Insofar as land is purely a consumer good its price will be determined like that of all other consumer goods: by the subjective valuations of the consumers, in accordance with the law of consumer action in the market economy: the consumer “will spend money on each particular good until the marginal utility of adding a unit of the good ceases to be greater than the marginal utility that its money price on the market has for him” (Rothbard 2009, 281).

It is necessary to note, however, that the same piece of land can at the same time serve both as a consumption good and as a production good. A meadow can be used both for picnics and grazing, a forest both for pleasure riding and commercial lumbering, and so on. A farmstead taken all together is both a home and a commercial enterprise (Lösch 1954, 99 speculated that the separation residences and places of work was nearly complete by his time, with even Texan ranchers spending their weekends in Houston. This process is not, however, completed and many ranches and farms are still combined homes and workplaces). This obviously complicates the calculation of the rental

and capital value of land as a higher-order good. With the progress of civilization and the greater use of money and hence of economic calculation, it becomes possible to separate out the value of different uses united in one good – but only if there are independent markets for these uses where their prices can be established. Today there are markets for almost all conceivable consumer goods, and it is not too complicated to calculate the implied value of a private residence of a farm.

The difficulty is that the direct enjoyment of farmland and of “private residence integrated with a farm” is not necessarily the same consumers’ good as a “private residence” pure and simple or as the enjoyment of other kinds of land. All sorts of romantic notions may be attached to a rural life in close communion with nature and to a traditional life that is deeply connected to agricultural pursuits. Ideas about the myth of the soil (Mises 1998, 640–41. Note Mises’ cynical appraisal of the role played by this notion. While he is no doubt correct that it is used in the rhetoric of special-interest groups, this does not mean that it is not an idea genuinely held by some landowners) or social status connected to owning land (Ely and Wehrwein 1940, 100–101) or being an independent farmer-entrepreneur (Schullern zu Schrattenhofen 1924, 35) may all contribute to make farmland and a farm-residence consumers’ goods that cannot be differentiated from the farm and its assets as a purely productive firm. The existence of this consumption component within the firm can only be explicitly seen in the willingness of farmers to accept a lower rate of return on his capital than is current in other sectors of the economy. And even this cannot be assumed as self-evident evidence for the existence of the consumption component – only after a process of analysis and understanding can the outsider estimate whether the lower return after all possible implied wages, rents, and benefits have been separated from the net revenue of the agricultural firm are due to entrepreneurial error and must be counted as a loss, or whether they are indeed a cost component reflecting the subjective use value of the land and other assets used in production. Due to the very nature of the issue – the analysis of income-components in the absence of a market for these – the resulting estimate can never be precise but only proximate, dependent as it is on the analyst’s understanding of the attitude of the entrepreneur in question (on ‘specific understanding’ and its role in history as well as everyday life, see: Mises 1998, 57–58; 2007, 264ff).

While the enjoyment of agricultural land for consumption uses may seem archaic, recent empirical work has indicated that it still plays an important role on farmers’ value scale. Generally, two distinct kinds of consumption are derived from the ownership of land and farming in general (Howley 2015): the first is the kind of social environment and lifestyle benefits that arise from farming; the second is the enjoyment of farm labour *per se*. While Howley’s study was limited to County Offaly in Ireland, it clearly indicates that there is still a consumption component to farming

and landownership in a modern economy with commercialized farming, although it may have shifted from the direct consumption of the goods produced on the land to the purely psychic profit of living and working on the land.

While it thus must be accepted that agricultural land to this day is valued both as a factor of production and as a consumers good, it is not immediately clear how this affects the price of land, or if it is necessarily reflected in the net return to land. It might seem intuitive that the desirability of land for consumption is an independent source of demand and that we simply add the various sources of demand together, with the result being a higher demand schedule for land and consequently a higher price for owning land. That is, the rent of land will be unaffected, determined solely by its marginal revenue product, but the capitalized value of a unit of land will include a “consumption premium” in addition to the discounted future MVPs leading to a lower return on capital invested in land. This conclusion is unwarranted, however. In the land market as everywhere else, the price is determined by the marginal bid (Böhm-Bawerk 1959b, vol. 2, bk. IV; Rothbard 2009, 106ff, 137–42). That is to say, only if the marginal buyer includes a consumption premium in the price he is willing to pay will the consumption value of farmland become apparent in the price.

This does not mean that the subjective consumption component of land is unimportant in agricultural markets, even though it is not necessarily reflected in prices. In general, we may conclude that landowners have a higher reservation demand for land due to the consumption value of owning land. They will therefore need more inducement than simply the opportunity of monetary profit to decide to sell their land. The result of this will likely be a lower turnover of farms and land than we should expect on narrowly ‘economic’ grounds. Only extraordinary offers way above the market price could persuade owners to sell, or they might sell if compelled to do so in order to satisfy creditors. But under normal circumstances we should not expect a brisk trade in land. Where land has a significant consumption component, the main transactions will probably be forced sales in bankruptcies, inheritances, and occasional exchanges to optimize the allocation of land between farms. In societies where no consumption component attaches to land turnover of land and farms is bound to be more brisk.

In other words, we cannot conclude *a priori* that the fact that land is a consumer good as well as a factor of production has any bearing on its price. Only empirical inquiry guided by praxeological reasoning can establish these facts. In general, however, it seems a plausible conclusion that agricultural land is mainly priced according to its contributions in production. This was the conclusion of Allen’s (1988) study of the price of land in England in the seventeenth and eighteenth century: the apparent below-market return on land was due to the perceived greater security of

investment in land and the expected appreciation of rents and land values over time, as well as the avoidance of legal and other costs associated with riskier investments such as mortgages. Since it is generally true that land is a more secure investment, we should generally expect Allen's results to hold for other countries and periods – although this by no means indicates that we will never find contrary instances. For instance, while it was true of the period that Allen studied that land ownership was a safer and less costly investment than mortgages, this is not a general principle. It depends on the general legal and economic institutions of a given society whether this is so – how costly it is to register a mortgage, how easy it is to enforce it and so on. It should also be pointed out that landownership in England at this time did not necessarily mean active farming: to many if not most, it meant letting out the land for fixed terms in exchange for a cash rent, making the land owner in effect a kind of financial institution akin to a provider of mortgage credit (Denman 1957). In other countries, mortgage bonds may be less costly than direct investment in land, for those only interested in so-called passive investment. We will leave for chapter 5 the detailed investigation into the role of finance in landownership and farming.

We have now discussed the question of the economic character of land adequately. Throughout we have kept in mind that economic science deals only incidentally with the natural characteristics of goods. The factors of production are always treated from the point of view of the theory of value and of price imputation (Mises 1981, 295). This is as true of the class of factors “economic land” as well as of the other classes. The peculiar character of land is only a special manifestation of the general laws of value and time preference (Böhm-Bawerk 1959b, 2:336).

2.4. The means: Labour and capital goods

Having considered economic land and its role in agriculture in great detail, we also have to analyse the complementary factors of production: labour and capital goods. We can, however, do this more briefly. Paradoxically, these factors can be considered both less and more specific than agricultural land. Less specific insofar as they are generally easier to shift to other uses, but more specific insofar as labourers can be trained to perform very specialized tasks and capital goods can be produced that fit very specific uses and only those uses.

2.4.1. Labour

If we consider labour first, it is generally true that labourers are the most non-specific factors of production and that they can most easily shift to other occupations. This is emphatically not due to labourers being one big homogeneous mass, all with the same skills and productive capabilities.

Rather, the markets for the various labour services are all connected, and it is this tight connexion between markets which establishes the nonspecific character of labour. In Mises's words (1998, 590),

A uniform type of labor or a general rate of wages do not exist. Labor is very different in quality, and each kind of labor renders specific services. [...] Between the appraisal of the performance of a surgeon and that of a stevedore there is no direct connection. But indirectly each sector of the labor market is connected with all other sectors. [...] There prevails a continuous tendency for workers to shift from their branch to other similar occupations in which conditions seem to offer better opportunities. Thus finally every change in demand or supply in one sector affects all other sectors indirectly. All groups indirectly compete with each other. If more men enter the medical profession, men are withdrawn from kindred occupations who again are replaced by an inflow of people from other branches and so on. In this sense there exists a connexion between all occupational groups however different the requirements in each of them may be.

Thus, any changes in the agricultural sector are bound to have more drastic effects on the supply of labour factors than on land, as the supply curves of labour factors for various uses is generally very flat (Rothbard 2009, 572–73). An increase in marginal value productivity of labour due to increased demand for agricultural products will, for instance, lead to an inflow of labourers, as these factors are much easier to shift than land factors. Conversely, declining value productivity will lead to an outflow of labourers, as workers shift to other employments that are now more value-productive.

At the same time, labourers can be very specific to certain tasks, either through native ability or training. Training for a specific job necessarily means that the labourer in question considers his investment worthwhile and that the eventual wage rate he will command will outweigh the cost of training, both in terms of direct monetary outlays and efforts in training and so on, but also in terms of the opportunity cost of the wage rate he could have commanded during his training period. We can consider this a kind of “human capital” (Becker 1962; 1975) although the analogy with capital goods is far from perfect. It is perhaps better to simply speak of differences in labourers' productivity and wages due to differences in their acquired skills (Mises 1998, 619–20). Clearly, workers with more “human capital” are also more specific to their chosen occupations. This means that they cannot as easily shift to other jobs without significant wage reductions, and that any reductions in their value productivity will be reflected in lower wages for the specific labourers. Conversely, increases in demand for their product will be reflected in increases in their wages. Only in the long run, as new labourers decide which occupations to train for, will changes in the wages of

specific labour factors be reflected in the supply of labourers and will wages tend to be equal in the various occupations, due allowance being made for differences in the costs of training.

Agricultural labourers are generally not highly trained specialists, and they therefore generally do not command much higher wages in agricultural employment than in alternative sectors. It is not very costly to train for agricultural work compared to other employments, and it is therefore not very costly to leave agricultural work for other jobs when the wage rate falls, nor to find work in agriculture when the agricultural wage rises. We should therefore expect a very mobile agricultural workforce, if it were not for one crucial distinction from most other sectors of the job market: namely, that a large proportion of workers in agriculture have familial connections to their place of work. It might be thought that as economies progress a declining share of work will be carried out in family units, but when it comes to farming this is emphatically not the case. As late as 2018, farm work was predominantly a family activity across Europe (Cook 2018, 25). This suggests that farmers and farm workers are not as willing to quit their occupations as one would think based on narrowly economic considerations. This should not surprise us given what has already been said above in the section on land as a consumption good: if there is a consumption component to farming, clearly the “consumers” of it must be the farmer and the other workers. Thus, the implied wages of the farmer and his family will often include the direct consumption of the work itself. This means that they will be willing to work for less than the market wage rate and that they will be more unwilling to leave their employment. The non-family workers may also share in the consumption component of farm work, but most probably not to the same degree, since they do not have the same tie to that specific farm.

2.4.2. Capital goods

As in other sectors, agricultural capital goods assume a vast array of different forms. They can be more or less durable, and more or less specific to different uses. For instance, seed grain are completely specific, not only to growing crops, but to sowing and growing one specific crop. If this use is no longer valued, if for instance the farmer has invested in seed for wheat but then changes his mind about growing wheat, then the purely specific seed becomes worthless to him. Other, more durable capital goods are also very specific to agriculture. Agricultural implements and machines such as ploughs, harrows and seeders cannot be switched to other uses. They have to be used in tilling the soil, but are still less specific than the seed that has to be used for one specific crop. Fertilizer too is a factor of production specific to growing crops of one kind or another, but is still less specific than the above-mentioned machines, since it can be used on perennial crops and in

greenhouses and orchards and the like. Tractors too are a kind of agricultural capital good that is not necessarily that specific. Tractors are designed to be very versatile and useful in most farm work, not simply in tilling the soil.

These capital goods are clearly very specific to their agricultural uses, some more than others. Their market value, like that of all other factors of production, depends on their marginal value product. If the price of the product declines or is expected to decline, the value of the factors too will fall, and if the expected price of the product increases, so will the rents and capital values of the capital goods. Those goods that are more versatile, such as tractors, will be shifted to other employments in case of falling MVPs in agricultural use, mitigating the fall in their value. Purely specific capital goods, on the other hand, will simply fall in value, as the farmer-entrepreneurs have no alternative uses for them. Perishable goods such as seed grain might be used up quickly or simply destroyed if the fall in value is steep enough, i.e., if the specific production process they can contribute to is abandoned. More durable capital goods will be withdrawn from the uses that are now less valuable, but they need not immediately be put to their second-best use. They might be put in storage to await more profitable uses in the future. The farmer determines what to do in this case based on his appraisal of the value of their second-best present use vs. a future use of higher value discounted to the present. Some capital goods might be used in the present without detracting from their ability to render further uses in the future. Others, such as artificial fertilizer for instance, can only be used once, and here the trade-off between the value of the present use and the discounted value of the future use is all-important in guiding decision-making.

The primary effect of changes in demand for specific agricultural capital goods is a change in their rents and prices. Increased demand due to an increase in the profits entrepreneurs expect to be able to realize with the help of these goods will lead to an increase in their prices. Decreased demand will lead to a fall. However, the change in the prices of the capital goods also changes the profitability of producing them. The entrepreneurs in the higher stages of production producing these will therefore change their production plans when the prices of their output changes. If they expect increased prices to last, they will invest more in producing the specific capital goods, increasing their supply and leading to a new equilibrium where the profitability of this kind of production is not greater than other kinds. This increased investment will have repercussions up the production structure on the higher stages, as factors of production are shifted to the now more valuable production. The exact same thing happens in reverse when there is a fall in the demand for and the prices of agricultural capital goods. The producers of these will restrict their production to a

point where they no longer make any losses, and by doing so factors of production in the higher stages will be liberated to other uses.

Thus, the supply of capital goods responds to changes in prices, if only after a short delay. Of course, entrepreneurs will try to foresee changes in demand and adjust their production ahead of time. If they do so successfully, the whole structure of production all the way up through the higher stages will smoothly adjust to changes in demand for the capital goods of the lower stages, changes whose ultimate origin are changes in the prices paid for consumer goods.

A kind of agricultural capital goods we have not discussed yet are what we may call biological capital goods: animals and plants. Economically, they are not that different from the machines discussed above except on two points: 1) they are usually themselves farm products and 2) they often have multiple important functions in agriculture, both in producing output and in maintaining and improving other capital goods on the farm. Furthermore, they may also be inputs to agricultural production on the farm, as for instance the farmer himself grows the grain he needs to feed his pigs or cattle. In that case, the grain is an intermediary product, a capital good used to produce the final output. Since there is often an external market for such inputs (grain, corn, fodder beets, silage and forage of different kinds), it makes sense to talk of vertical integration of multiple stages within the farm.

The multiple uses that can be made of farm products will increase the desirability of these in production. Often these products will have a primary purpose, and expected gain from this use is great enough that it would be produced and employed even were the secondary uses non-existent. The derived or secondary uses of them will simply add to their desirability, increasing the expected profit. For instance, a cattle farmer may raise cattle because he estimates that the selling price of the cattle will allow him to make a clear profit from supplying the market with beef. That the manure generated also allows him to increase the fertility of the soil free of charge is simply an added bonus. Another farmer may sow clover as a nitrogen-fixer to improve his soil; only as an afterthought does he collect the clover and use it as forage. However, once the farmer becomes aware of all the uses he can make of his various biological capital goods he will naturally plan thereafter and appraise the value of his capital goods accordingly. He will then take account of grazing his cattle in such a way that they not only produce the best beef at the lowest cost possible, he will also plan the grazing in order to improve the lands that would most benefit from it. In this way, the cattle becomes a means both to procure the primary output beef (or steeds ready for slaughter, to be precise, since that is the final output the farmer or rancher usually sell) and a means to increase the capital value of the farmland.

The multiple uses made of such capital goods can also sometimes explain the decision to produce inputs for further production on the farm itself, as for instance is most prominently the case with various kinds of animal fodder. The added transport cost may itself be enough to dissuade the farmer from buying these inputs on the market, but he must also take into account the possibility of multiple simultaneous uses of the goods as just explained. Vertical integration of production makes it possible for him to get the most out of the inputs used, as their very production have beneficial side effects, as in the examples of cattle (generation of manure where its needed) and clover and other nitrogen-fixers (production of forage and soil improvement). We may borrow Lachmann's (1956) term and say that not only do capital goods have multiple specificities, these specificities may, especially in the case of agricultural capital goods, be complementary. Such capital goods can fulfil multiple functions at the same time without detracting from their productivity in any one use.

2.5. Agriculture in the structure of production

Having analysed the special characteristics of the producer goods (land, labour, and capital goods) used in agricultural production, we now turn to look at how the agricultural sector fits into the overall structure of production. There is a long tradition in Austrian economics of conceiving of the capital structure in terms of lower and higher stages. The distinction was first introduced by Carl Menger (2007, 56), who defined goods of the first order as “goods that serve our needs directly”. Goods of the second order are then those goods needed to produce goods of the first order, goods of the third order are those needed to produce goods of the second order, and so on. All goods thus derive their goods-character from their ability to serve human needs – those of the first order directly, and those of the higher orders indirectly.

The higher-order goods, being more distant in time from final consumption, are necessarily less valuable than lower-order goods. This follows from the law of time preference. A capitalist will only invest in a production process if he expects to earn more by selling the output at the conclusion of production than he had to pay for the capital goods at the beginning. Since there must be such a value spread between the stages of production, the higher stages become less and less valuable in the aggregate (although any individual capital good or land factor used in a higher stage may be more valuable than an individual producer good used in a lower stage), the further removed they are in time from the point of final consumption.

To be clear, when we speak of the value of higher-order goods, we always mean their monetary value: what they can sell for on the market. Only first-order goods are valued directly for their subjective use-value, the value of all higher-order goods – capital goods, land and labour factors – is

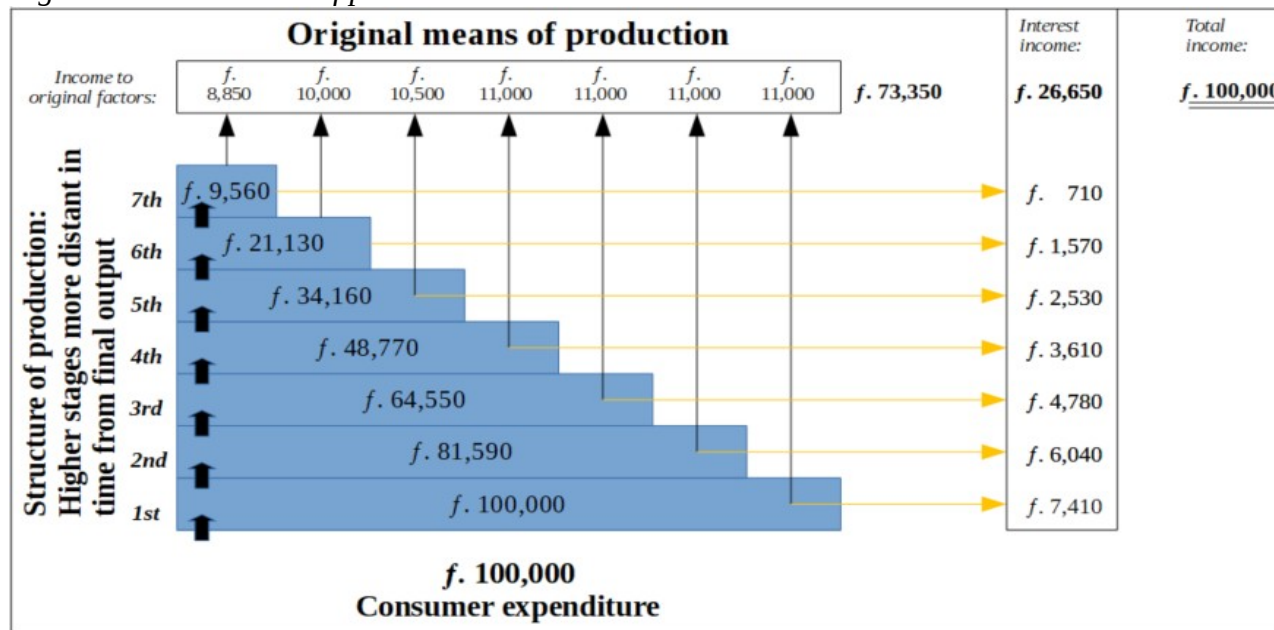
appraised according to their expected contribution in bringing about first-order or consumer goods. That is to say, the acting individual *appraises* a factor of production according to the price he expects will be paid for the product (Mises 1998, 328–29, 330ff). Each individual factor is then valued according to its marginal value product (MVP), that is, the value of its contribution in bringing about the product. And since the factors of production are always removed in time from the appearance of the product when they are first acquired, the capitalist-entrepreneurs engaged in production always only pay the *discounted* MVP, or DMVP, for the factors (cf. Rothbard 2009, chap. 7 for a detailed analysis). Hence, the higher stages always are less valuable than the lower stages, since each stage is discounted by the rate of interest.

This relationship has been graphically represented in various ways. Böhm-Bawerk used concentric circles to represent the relation between the stages of production, with the centre of the circle being the highest stage and the outer-most circle being the lowest (Böhm-Bawerk 1959b, 2:106–7). The more popular representation – and to us the clearest and most useful – is the triangular structure that Hayek (1935, 39, 44) introduced in *Prices and Production*. Earlier economists, in particular Jevons ([1871] 1888, chap. 7) and Wicksell (1935, 1:151–60), had used similar diagrams, but not with the same clarity derived from the full apparatus of Austrian capital theory. Rothbard (2009, 335, 369, 391, 519) made extensive use of the Hayekian triangle in elaborating his production theory, and Garrison (2001, 47–50) has used the triangle to explain Austrian capital theory to modern macroeconomists. Huerta de Soto (2020, 293, 360) has also used Hayekian diagrams to great effect in his analysis of the capital structure and business cycles.

In order to show the place of agriculture in the structure of production, we will elaborate the basic diagram in the form first introduced by Hayek and elaborated by Rothbard and Huerta de Soto (see figure 2.4). We have time on the vertical axis and value (appraised market value) on the horizontal axis. At the bottom is the expected expenditure of consumers. This expenditure is the basis for the appraisal of all the capitalists in the different stages of production. It is important to note that this diagram only depicts the evenly rotating economy (ERE), that is to say, a situation where there is no change in the data and no uncertainty about the outcome and profitability of production (Mises 1998, 245–51). We are thus abstracting from change and the role of entrepreneurial profit completely. We are also assuming total plan coordination and complete integration of the plans of the capitalists (Kirzner 1966, 120–21) – that is, no one bids away factors from competing uses, since that would lead to the need for adjustment and the emergence of loss and profits. All the production plans of the individual capitalists harmonize with each other. Consequently, each capitalist only earns the pure rate of interest, which is by definition what he would earn in the ERE.

There is also no entrepreneurial component to the incomes of the original factors: they earn exactly their DMVPs, no more and no less. The ERE is not a construct it is possible to think through to its logical conclusion. This is most evident from the fact that we must assume the capitalists to have a sum of money at their disposal to effect their expenditures before they receive their incomes. Since no one would hold money in a changeless economy (Mises 1998, 249–50), this is clearly a contradiction. Yet while it is important to keep this in mind, it does not invalidate the truths we can glean from the diagram.

Figure 4: The structure of production in the ERE



It is important to realise that the diagram only depicts one moment in time. The numbers on the bars show the capital values (stock) of the capital goods, land, and money in each stage of production, not the expenditure on inputs and incomes to factors (flow). All the numbers therefore refer to expected incomes, not to actual payments as they occur through time. It must also be stressed that the diagram only shows the market value of the capital structure – it does not show how much is produced, only the valuation of the consumers of the expected output of consumer goods as expressed in their monetary demand and the expected market value of the higher-order goods based on the capitalists' appraisal of the prices of the lower-order goods they expect to produce with the factors of production currently available to them.

In figure 4 we have assumed a structure of production of seven stages, each of equal duration, so the rate of discount is the same for all stages. We have also assumed consumer expenditure of *f.* 100,000 and a pure rate of interest of roughly 8 percent. The capitalists of the first order expect gross revenues of *f.* 100,000, so they are willing to pay up to that amount, discounted by the rate of

interest, for the services of factors of production – capital goods, land, and labour factors. The golden arrows depict the expected flow of interest income to capitalists, while the black arrows show the expected flow of income to original factors. Fat black arrows indicate the expected expenditure on higher-order capital goods in each stage. The number in each bar is the expected aggregate expenditure on output of that stage, that is, the aggregate DMVPs. The division between expenditure on capital goods and original factors in the diagram is somewhat arbitrary. All we can say for certain is that the expenditure on capital goods in each higher stage must be lower than in the stage just beneath it. But it is conceivable that the lowest stage employ a much greater proportion of original factors than depicted.

As we can see from figure 4, net income and consumer expenditure equals each other, as we should expect them to in the ERE. We can, however, also see that the value of the capital structure is much greater than net income. This is as it should be, since the interest income to the capitalists is only the rate of interest on their investments. Far more capital is devoted to maintaining the structure of production than income is generated (Skousen 1990). In our example, gross savings and investments amounts to *f.* 333,110 as this is the total of capitalists' expenditures. Since total interest earnings is *f.* 26,650, this means that they have earned eight percent interest, again what we would expect, since that is what we assumed the pure rate of interest to be. Capital can be considered, from the point of view of the capitalists, a "permanent" source of income, but only if the capitalists restrict their consumption to the net interest return. Any change in the proportion between capital and income necessarily introduces change in the structure of production and either leads to net saving and capital accumulation or to capital consumption (Hayek 2009, 298, 302–3).

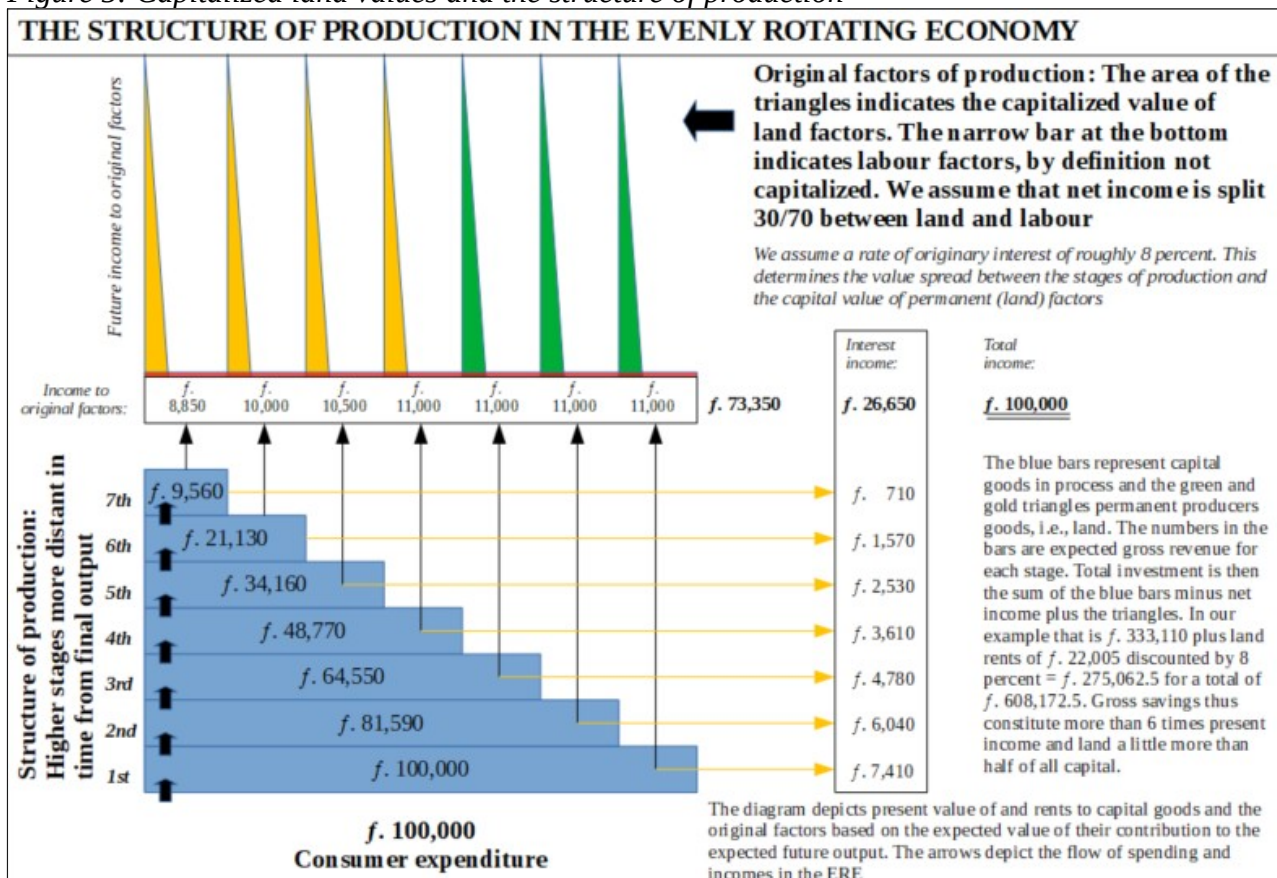
One problem with this standard depiction of the structure of production is that it amalgamates the original factors of production: there is no distinction made between labourers and land factors, although there are some important differences in reality. Most significantly, land factors can be sold as well as rented, and therefore have a capital value.¹⁸ The choice between how much use the landowner wants to "squeeze out" of his land now versus preserve for future use is no different from the choice facing the capitalist owning a durable capital good. In both cases, it is a question of balancing present income against preserving capital values. But in that case, if we want to get a handle on the capital value of the production structure, if we want to clearly see how capital is

18 Slaves, it is true, can be bought and sold, but we exclude considerations of slavery here. Not from any ethical concern, but simply because slaves to our mind are not "true" labour factors: rather, their economic role is better understood as a form of capital good or land factor. Not only in terms of the prices paid for slave labour, but also as regards the employment of it. "If one treats men like cattle, one cannot squeeze out of them more than cattle-like performances." (Mises 1998, 626).

allocated across different production processes and asset classes, we need to include the capitalized value of land.

In figure 5 we have tried to do that. It is happily easy to do, since, as we previously established, the capital value of a land factor is simply its present rent divided by the interest rate. If we assume that 30 percent of income to original factors go to landowners, then it is relatively simple to establish that the capitalized value of land is *f.* 275,062.50. The landowners are thus in the exact same position as the capitalists owning capital goods: their income's relation to their capital is determined by the rate of interest. The rent of ground land is "largely interest return on investment, just as in any other business" and in the ERE the rent of land is completely "capitalized and transformed into interest return." (Rothbard 2009, 528, 559). A landowner, in other words, is practically indistinguishable from any other kind of capitalist. This should not come as a surprise, since people in the real world do not distinguish between investing their capital in economic land vs. durable capital goods. Investment is guided by the wish for monetary income and conservation of capital. The distinction between land and capital goods, while important for economic theory, is of little help in guiding such investment decisions.

Figure 5: Capitalized land values and the structure of production



We have reproduced the structure of production from figure 4 in figure 5, but now we distinguish clearly between land factors and labour. For simplicity's sake we have assumed that there is the same ratio of land to labour in each stage of production, with 30 percent of net income going to landowners and 70 percent to labourers. Wages cannot be capitalized, so there is no more to say about labour – the wages of labour are not reflected in the capital structure, even though a labourer may plan his contribution to production over time and may plan his life according to the wage he expects to be able to earn in the future. In the ERE, of course, he will know exactly how much he will earn in the future. But it is perhaps expedient to emphasise that the distinction between labourers, landowners and capitalists is merely functional, just as the distinction between producer and consumer. The same person can fulfil all of these functions, and under conditions of uncertainty, labourers will guard against loss of future income through saving and investing under various forms – including buying real estate. Again, we are not here dealing with fixed classes of persons, but merely with functional distinctions.

The triangles added on top of the line showing incomes to original factors depict the capital value of land in each stage. Their surface area is equal to the capital value of the land factors. Every future use is discounted by the rate of interest, until we get so far into the future that the next use is no longer taken into account.¹⁹ The total area of the triangles and the blue bars thus represent the total capital value of all the non-human producer goods in the economy, that is, it depicts the total capital structure, not only the capital embodied in capital goods.

We can now depict the place of agriculture in the structure of production. Since agriculture is generally concentrated in lower-stage production processes, we have shown this by colouring the land triangles contributing to the three lowest stages green. There are clearly other goods produced in these stages than agriculture, and there may be several more stages between agricultural production and the final consumer – although these stages cannot, due to the perishable nature of many agricultural products, be of very long duration – but in order to keep things simple, we have assumed that agricultural production takes place in the three lowest stages. Thus, for instance, cereal production in temperate climates occupies roughly one year. Assuming each stage is one year, we may then say that it is in the first order of production. Other products are of longer duration: dairy products are very perishable and must be delivered to the consumer almost immediately, placing that too in the lowest stage – but the necessary inputs take years to produce. Not only the necessary machinery, but also the specific biological capital goods – the cattle – are

¹⁹ This graphical presentation is only an approximation, since the hypotenuse should curve inward at a slope determined by the rate of interest. However, such niceties are immaterial for the purposes of showing the capital structure of the economy.

years in the making. In order to have a steady stream of output, the dairy farmer will therefore have to plan for a continuous replacement of his herd, either by raising the cattle himself (vertical integration) or by buying cows from suppliers. These suppliers too will have to buy or produce the necessary inputs (prize cows and bulls for breeding etc.) in order to maintain a steady flow of output. Looking at a single cow in isolation, and abstracting from all non-agricultural inputs as well as from the provision of fodder, the period of production from start to finish is close to 3 years – from conception until she starts giving milk after her first calving.

While it is easiest to conceive of farming in the lowest stage, higher-stage farming focused on producing inputs is also an important part of the production structure, as we just saw in the example of cattle breeding. Not only may farmers specialise in providing input for other farmers (breeding, producing fodder and the like), they may also specialise in producing inputs for non-agricultural industries – for instance, cotton or rubber plantations or, more recently, marijuana. There are clearly many more interconnections in the economy than can be depicted in a two-dimensional diagram. Our attempt to place agriculture within the structure of production should therefore not be interpreted too strictly, and the diagram is certainly not a complete map of the capital structure.

2.6. Conclusion

The discussion in this chapter has served to elucidate the special character of the agricultural sector, and its organization in broad terms. It is a branch of production, or part of the economy, with certain peculiar facets. These spring mostly from the fact that an unusually large amount of economic land, fixed and permanent factors of production, is used in agriculture. One important consequence of this fact is the large sums of capital sunk in land by agricultural enterprises (P. J. Barry and Ellinger 2012). Farming is therefore an illiquid business relative to other sectors, but it is also a relatively safe investment for external financing, precisely because of the high capital value represented by land.

Another important aspect is the character of the goods produced in agriculture. As we saw, not only are these generally lower-order goods relative to the output of other sectors, they are also basic goods, the demand for which soon turn inelastic.

These facts together cause investment and economic development to have a peculiar character in the agricultural sector, and they create special conditions and needs for external financing, both points to be explored in later chapters. In the next chapter we will go on to discuss the special character of the organization agriculture in depth.

3. The Organization of Agriculture

3.1. Introduction

The goal of this chapter is to describe the economic organization of agriculture. While our main interest is in the catallactic organization of agriculture, i.e., agriculture within the market economy, we will first make some brief remarks on other possible institutions. These should all be understood as possible developments of agriculture in the absence of coercive government intervention in society. The role of the division of labour will also be highlighted, as well as the special physical factors that limit its extent in agriculture.

When we turn to the catallactic organization of agriculture, the theory of the farm one might say, we will first lay out the main lines of the general theory of entrepreneurship and of the firm. In our conception, these fields are tightly connected, and we will endeavour to show why this is so. While the Austrian approach to entrepreneurship is generally well-received, it is important to remember that there are crucial differences in the conception of the entrepreneur of different Austrians economists. Most, notably, we can distinguish the Kirznerian and the Rothbardian entrepreneur. There are also elements of the transaction cost approach to the firm that we can integrate into our own theory.

We will then apply this theory to the field of agriculture and examine whether the economic reality here leads to special firm structures. In the previous chapter we investigated the specific economic features of agriculture. Most notably, we found that a disproportionate amount of the original factor *land* is needed, that the demand for agricultural goods may be relatively fixed, and that the production of goods for exchange may be integrated with the production of goods and services for direct use by the farmer to a higher degree than in other sectors. While we do not anticipate that we need to modify the theory in view of these facts, we do need to consider how the general functions of entrepreneurship and firm organization are expressed under these special circumstances.

Finally, we will briefly discuss the question of various farm sizes and changes in these. Since our investigation leads to the conclusion that relatively small farms are superior, the trend toward concentration in agriculture needs to be explained. While this is, as we will argue in a later chapter, a key consequence of monetary interventionism, some remarks are cogent in this chapter, as there are also natural causes leading in variations in both the physical and economic scale of farms.

3.2. The organization of agriculture – a bird’s eye view

Before turning to a detailed analysis of the catallactic organization of agriculture on the farm level, we will here present some brief remarks on the general structure of agriculture.

3.2.1. Pastoral agriculture

It is possible to have production that does not use land as an economic good. Primitive hunters and fishermen do not use land in the economic sense and neither do nomadic pastoralists. Such people, where and when they exist, may have some degree of society and civilization based on cooperation and exchange. But there is little scope or need for developing the economics of these societies. Nowhere today, and very rarely historically, have such social organization been of any importance. It is only with settled agriculture and the use of land as an economic good that any great degree of civilized society emerges. It is, however, important to stress that nomadic pastoralism differs essentially from modern animal husbandry and ranching. The difference is that even these ‘extensive’ uses of land are still land use in the economic sense and land is therefore to modern ranchers an economic good. ‘Extensive use’ is, in fact, a bit of a misnomer – these uses are precisely as intensive as are economically feasible. Land devoted to extensive use is just as much an economic good as land devoted to intensive use and it will under developed conditions earn a rent and have a capitalized value according to the laws of economics. A hectare in extensive use is, however, likely to earn a lower MVP than a hectare in intensive use.

The distinction between intensive and extensive use concerns how much capital is devoted to the cultivation of a given piece of land, or rather how great a capital the land represents to the entrepreneur. As such, it cannot be made before the advent of economic calculation based on money, since only once the actor can calculate can he compare the costs and yields of different production processes and of the factors used in them. Under nomadic conditions land is not an economic good, and it is only when the economic goods-character of land is realized that acting men advance to settled agriculture based on the use of economic land, however intensive or extensive such use may later be judged.

3.2.2. Settled agriculture

As we just stated, settled agriculture means treating land as an *economic* good and not simply as part of the environment. Realizing the causal relevance of specific pieces of land for production, man acts to assert his control of the land and to actually bring it into causal relation with his ends –

to make it his own, to take it into his own exclusive domain.²⁰ It has even been said that private property first arose out of the realization of the economic character of land (Schullern zu Schrattenhofen 1911, 78).

When land becomes a man's property, he begins to care for maintaining its quality. At first, this concern may only be for the immediate period of production, but depending on his time preference and his ability to maintain control over the land, acting man will also be concerned with maintaining the land's ability to render future uses. This concern can at first only take the form of a subjective judgment of the relevance of these future uses and will therefore differ markedly from individual to individual (Böhm-Bawerk 1959b, 2:272), as we assume that indirect exchange and money has as not yet developed. In the absence of money, inter-temporal comparisons of value have to be strictly personal, as the development of a time market depends on the existence of money.

Be that as it may, the productive use of land lifts society out of a life that may be termed parasitical on nature (Hoppe 2015, 26). Even where land was not really treated as a durable good, since its fertility was depleted after a few years (C. Clark and Haswell 1967, 35), settled agriculture still meant an accumulation of productive goods beyond what was previously possible. That 'cut and burn' was the most widely practised form of agriculture for a while may simply have been caused by the comparative costs: it was considered less costly to abandon depleted lands and appropriate new lands than to expend the labour and complementary goods necessary to maintain the fertility of the soil. Yet as techniques improved and more long-sighted land uses proved superior, permanent settlement and permanent land use became more common. Control of land gradually led to improvements in its quality as man learned how better to use it, and so its yield increased over time. As well, more land was demanded as increased productivity led to increased populations, so groups that were early adopters of agriculture would tend to spread out from their initial economic land of origins, a process reflected in the linguistic record (Renfrew 1996).

3.2.3. Organization

The above postulate amounts to saying that the productivity of land depends on how its possession or its ownership is organized. It is quite possible that some societies chose a communistic or dictatorial way of allocating and managing land. In a society that has not yet developed the means needed for economic calculation, the main objection to public ownership – the impossibility of

²⁰ We do not mean to imply that what happened historically was that land was suddenly viewed as an economic good by all humans. In economic science, there are no intermediary steps between a thing being a good and not being a good. It is a matter of historical record that the change to settled agriculture was gradual, a matter of historical evolution, as more and more people realized the goods-character of land. On this see Harris (1996, 4).

economic calculation without private ownership of the means of production – obviously does not hold. But there is still reason to think that communism and central control will both prove inadequate for the economic use of land.

Communism, the equal access for all persons to a scarce resource, will quickly lead to overuse of said resource: if no one has exclusive control of specific pieces of economic land, no one has an interest in optimizing the use of the resource over time, of limiting supply of its services in the present in exchange for future uses. The tragedy of the commons ensues (Hardin 1968), as everybody scrambles to get as much out of publicly owned resources as possible as quickly as possible. In effect, communism in land without any means of curbing individual use will mean that land is not considered an economic good at all.

Only if individual actors have some degree of exclusive control can they actually manage a scarce resource, as only if a right of private property is recognized in the land can men act also for the long term. Elinor Ostrom (1990, chap. 3) has described how various institutions can limit the overuse of communal resources, and Schullern zu Schrattenhofen (1889, 129) suggested that communal land use can be possible, if the people owning the land can agree on how to manage the land and distribute the product. Even these more informal modes of governance assume exclusive control vested in a limited group, however, which is the essence of ownership. Once individual ownership is recognized, acting men will be able to recognize the advantages from division of labour and engage in voluntary exchanges. “Property should be in a certain sense common, but, as a general rule, private; for, when everyone has a distinct interest, men will not complain of one another, and they will make more progress, because everyone will be attending to his own business” (Aristotle, *The Politics* 1263a25-9. 1984, 1:2004).

The opposite extreme from land as an unowned common resource, the situation of one dictatorial leader deciding on all land uses, may not be quite as bad as the complete lack of ownership and control over a resource, since it at least it avoids the problem of tragedy of the commons. But productive use will be stifled by the fact that there is only one entrepreneur directing production, only one will act (Mises 1998, 691–92). There is only one active mind allocating economic land to productive use and only one man’s knowledge and perspective is brought to bear on the basic economic problem (on the problem of knowledge, see Hayek 1948b). This severely limits the possibilities both for elimination of errors in allocation and of discovery of new and better ways to use the centrally controlled factor. As men learn by imitating the most successful individuals

(Menger 1985, 151–59; 2007, 261),²¹ there is little scope for learning and for developing institutions of good stewardship over resources if there is only one individual to imitate when it comes to land use. There is also little chance of knowing if the dictator is actually good or bad at allocating land, if there are no other landowners to compare him to.

There can then be little doubt that private ownership of land as well as of the other higher-order goods is more economical than the alternatives, i.e., it leads to a better, more efficient and less wasteful use of scarce resources. Yet even the private owner comes up against all the problems of allocating resources in the absence monetary calculation. He has obviously no trouble in assessing the value of consumer goods to himself, and if the production structure is not too complicated, he can make rough imputations of these values to the factors of production. But this is far from the precise calculations of cost accounting. Especially land, a factor that may cooperate in the production of many future goods, can only be evaluated in a very general way. This naturally makes land a very illiquid asset, that is, one that it is especially hard to transfer in a barter economy. Transfers within the family may therefore be the only exchanges possible involving land (Firth 1964, 24). There are two reasons for this: first, if land is transferred only within the family, its use may not be totally lost to the original possessor should he discover that he still needs it. And secondly, should it prove that the land is worth much more – is capable of producing more – than the original possessor thought, he will presumably not mind too much that it is a member of his own family that benefits from his error.

It should perhaps once again be emphasized that we are not talking about early or primitive times, but about all settled agriculture in the absence of social division of labour and monetary exchange. Henri Pirenne (1958, 1:75–86, esp. 79ff) has given a fascinating description of how self-sufficient domains were established as the market economy of the late Roman Empire disappeared. In the absence of money and indirect exchange, only family ties and similar loyalties can be the basis for any sort of durable economic organization.

3.2.4. Limits of markets with direct exchange

While our investigation focuses on agriculture within the market economy and hence within the nexus of monetary exchange, for completeness' sake and also to provide a contrast, we will here and in the following section briefly touch on conditions of production in the absence of money.

21 Cf. Hoppe (2015, 87): “Most people (...) can at best only imitate, more or less perfectly, what other, brighter people have invented before them.”

There is a limited scope for interpersonal exchange in the absence of indirect exchange. But it is limited to cases where one party to the exchange values the use-value of the other party's good higher than the use of the good he himself brings to the exchange and the other party's valuation is the reverse (Menger 2007, 258; 2009, 19–20; Mises 1953, 42). We have already touched on the problems of exchanging land under these conditions. The number of exchanges that can be carried out are very limited, and especially so when the parties to the exchange have to judge the subjective use-values of durable and permanent goods. This is not to say that such exchanges cannot occur. Böhm-Bawerk pointed out that the estimations of the present value of future services of goods will be very capricious and non-uniform in the absence of economic calculation (Böhm-Bawerk 1959b, 2:272), depending as they will only on the subjective time preference of each estimating individual. This means that some people will be so indifferent to the future uses of their land and other durable goods that they will be willing to exchange it for just a few consumption goods, while others will have a very high estimation of future uses of durable goods and be willing to surrender much current consumption for it. Such exchanges will be few and far between, however, and there will not emerge anything like a market price. Each exchange will be heterogeneous, and the exchange ratios will be constantly shifting, depending only on the subjective valuations of the goods exchanged.

3.2.5. Limits of planning and organization in the absence of economic calculation

There are thus very narrow limits to the possibility of rational planning and organization of production in the absence of monetary calculation. While the factors of production will be considered valuable, any sort of appraisal based on expected prices will be impossible. The physical product due to the marginal unit may be calculated, should the entrepreneur so wish, but there is little use for such calculation. The most one can achieve is to ensure that one has combined the factors to achieve the highest possible amount of product (Fetter 1915, 131–32; Mises 1998, 127–30), with a given production process. But the value of the product and the value of the factors are still matters only of subjective judgment for each individual actor with no possibility of numerical expression. It is therefore impossible to discover what the opportunity costs of the chosen production process are and to know if one has used the scarce factors of production in the best way possible.

All cooperation and distribution must therefore remain a matter of men's subjective judgments. The size of enterprises will be limited solely by technological considerations, that is, by the size

necessary to ensure the optimal technological use of the least divisible factor. This factor may be land, but it is possible that other, complementary factors are the limit. Domesticated animals, for instance, may require a given extent of land to maintain themselves and may in turn be able to deliver manure for only so much agricultural land. Whatever the facts on the ground, there will be an optimal combination of the factors of production and this combination will determine what is the most productive size of the establishment (Mises 1981, 329) – even if it is only in terms of physical productivity.

A society containing several landowners will also be more productive than one where land is controlled by only one person. This is so because more minds will be applied to solve the problems of land use and agricultural production, and we can therefore expect that better methods will be invented and applied more quickly leading to higher physical productivity, and that institutions conducive to good stewardship may develop over time. This does not mean, however, that everybody should necessarily be a landowner. While the division of labour cannot progress far in the absence of indirect exchange, there very probably will still be a need for agricultural labourers, specialists and other professions, dependent on what proves to be the optimal technological size of the agricultural establishment, and on what other sectors will be profitable in the absence of indirect exchange.

3.3. Catallactic organization: entrepreneurship and the firm

In order to understand the organization of farming within the market economy, we will first review the general theory of the firm. Studies of the firm generally start from Ronald Coase's article on the nature of the firm (Coase 1937). The Austrian approach which is our main inspiration is, however, much more recent: As late as the early 90's, one of its main modern proponents could still say that there was no Austrian theory of the firm (Foss 1994). The firm had up to then mainly been treated as a question of transaction costs by, e.g., neo-institutional economists (Williamson 1967; 1979), although these were sometimes quite sympathetic to Austrian themes (Williamson 1991). Taking their cue from Coase, these economists focused on transaction costs as the *explanans* for the existence of the firm: Because it is not costless to engage in market transactions, it is more profitable to organize some production hierarchically, inside a firm.

In a sense, this is fully compatible with the Austrian approach.²² Murray Rothbard found Coase's paper on the nature of the firm very stimulating, and used it as the starting point for his own theorizing on the subject (Rothbard 2009, 613; 2011b). However, transaction costs cannot be the

²² But see Hülsmann (2004b) for a critique of the concept of transaction costs.

whole explanation. While they may explain concentration of assets in sectors or periods with high or important transaction costs, they cannot by themselves explain the existence of firms or what the limits to the size of the firm are. This was precisely Rothbard's contribution to the theory of the firm: he generalized the Misesian argument about the impossibility of economic calculation under socialism to any case where there is no market for the product. If a firm expands to such an extent that the market for its factors of production disappears, it will create an island of "calculational chaos" in the market economy. It becomes impossible for it to rationally guide production in the absence of factor markets, leading to a steep rise in costs to the firm.

The transaction cost approach is quite correct when it focuses on the question of ownership of resources and contracting as important aspects (O. D. Hart 1995), but it falls down when, at least by implication, it assumes that in the absence of transaction costs, there would be no firms (cf. Deirdre N. McCloskey 1998 for an interesting take on the 'so-called Coase theorem').

It is here that the specifically Austrian theory enters the picture. Production does not simply take place automatically, resulting in outputs and incomes for the factor owners. It must be brought about by actors consciously aiming at specific ends with limited means under uncertainty. If they succeed, they earn profits, and if they fail, they suffer losses. It is the function of the entrepreneurs to bear this uncertainty, guiding production and the economy toward an unknown future (Mises 1998, 253–56). This sort of uncertainty is inherent in all human action, but we can abstract the entrepreneurial function from the factors of production and see the importance of it in guiding the economy. Demsetz (1997, 3) suggests that uncertainty cannot be a source of profit if we want to say that profits guide resource allocation, because uncertainty is unpredictable and therefore cannot be a rational guide to resource allocation. This misunderstands the meaning of uncertainty: uncertainty does not mean that we do not know anything about the future, we do know some things – that the laws of nature will be the same, for instance. Rather, uncertainty means that we cannot make quantitative predictions about the future course of events. We have to make judgments based on our understanding and evaluation of the possible factors influencing future events (Hoppe 1997). The fact that we have imperfect knowledge about the different factors determining the course of events means that the future is indeed unpredictable in a strong sense, but it does not mean that we cannot attempt to make limited predictions and try to foresee how future conditions will be. Entrepreneurial ability consists precisely in good judgment about the uncertain future (Kirzner 1992, 26–27): actions informed by good, that is correct, judgment will invariably lead to better outcomes than actions informed by bad judgment.

The central role of uncertainty does not mean, however, that we can think of the entrepreneur as a disembodied uncertainty-bearer and opportunity seeker. Israel Kirzner in his elaboration of the price system does exactly this, explicitly separating the class of entrepreneurs from that of the resource owners (Kirzner 1963, 16–18). This conception of the entrepreneur as a free unencumbered agent alert to profit opportunities is not without its problems. It is difficult to see, for instance, how such an entrepreneur could ever suffer losses: if he simply borrows money from capitalists to hire factors of production, expecting to earn a profit on the final product, what will happen if the profit does not materialize, and the product can only be sold at a loss? It will not be the entrepreneur who suffers, since he by definition has no assets at stake, so it will have to be either the capitalists or the owners of the factors of production. But in that case, it is hard to see how exactly the entrepreneur can be said to bear the uncertainty inherent in production (but see Sautet 2018 for a recent defense of Kirznerian entrepreneurship). Rather, it is the capitalists who lend him the money who made a judgment about an uncertain future, specifically about investing in the abilities of the entrepreneur in earning monetary revenues as compared to other possible uses of their property. More generally, there can be no activity, no using scarce means to achieve ends, without at least some property; it is impossible to realize a judgment on the market without becoming a capitalist, and it is impossible to be a “pure” capitalist who does not exercise some judgment. (on all this, see Hülsmann 1997, 33).

What is needed is to connect the function of entrepreneurship to control and ownership over assets. That is, instead of considering simply the function of entrepreneur or the entrepreneur as a disembodied alert seeker after profit opportunities, we need to consider him as a fully integrated part of the economy with “skin in the game”, to use a current expression. This is why Rothbard was careful in describing the entrepreneur as the capitalist-entrepreneur, to highlight the importance of asset ownership and ultimate control to carry out the entrepreneurial function.

The entrepreneur, then, is an asset owner who has to exercise judgment about future conditions under uncertainty (Knight 1921; P. G. Klein 2010; Foss and Klein 2012; Foss, Klein, and Bjørnskov 2019; Hülsmann 1997). He is the person who is ultimately responsible for a given production or organization and who is the residual claimant of its product. Because he is responsible, he will have to bear eventual losses; and because he is the residual claimant, he will earn any eventual profits. The factors that are hired to work in the firm are secured their contractual payment and the entrepreneurial component in their incomes are therefore minimized as far as possible, while the entrepreneur invests in and leads the production, and in this way risks losses, but he also has a claim to future profits.

Naturally, this entrepreneurial function is not exercised in a vacuum: its exercise consists precisely in bringing together labourers and factor owners, reconciling and uniting their different goals and skills. The resulting organization is, as Pascal Salin has it, a set of contracts between labourers, capitalists, suppliers and customers (Salin 2000, 125–37; 2002). As such, Coase’s problem is not really a problem at all: there is not a dichotomy between organization within a firm and exchange on the market to mirror the distinction between a socialist and a free market economy. Coase assumes that the firm is a non-market organization engaged in planning, but this is not so: the firm is a market system, a system of contracts (Salin 2002, 16; cf. Hoppe 2006c, 255–57). As such, it is by its very nature integrated into the price system and the entrepreneur can bring the powerful tools of economic calculation to bear when planning his enterprise. There must, after all, still be some directing intelligence when production is carried on in the market – capitalists, labourers, and land owners do not automatically combine and produce a product. These combinations must be consciously brought about by purposeful action, and it is precisely this that the entrepreneurs accomplish in firms: they bring together factor owners and capitalists to produce a product that they imagine they will be able to sell at a profit in the future. Creating and organizing firms are simply part of the market process, it is not something that happens outside the market (Mathews 1998).

One possible objection to this explanation of the existence of the firm and the role of the entrepreneur in it is that you cannot “own” a set of contracts. This is true, but besides the point. What the owner of the firm owns is not simply physical property, but rather the rights to the stream of future goods produced by the firm once he has honoured his contracts (Salin 2000, 129). This future revenue is embodied in physical property, which in turn is valuable to the extent that controlling it results in future revenue. The entrepreneur’s capital is always embodied in a given set of capital goods (Mises 1998, 500) which are expected to eventually yield a profit. The entrepreneur is necessarily the residual claimant (Alchian and Demsetz 1972): entrepreneurial profits are what is left over once the legal claims of the contracting parties has been satisfied – and entrepreneurial losses result should the firm’s revenue not be enough to cover all contractual claims.

This also shows why the entrepreneur must be not only the person guiding production, but also why he must be invested himself in the enterprise. After all, if a capitalist lends the entrepreneur the money to start a firm, he will need some security for his loan beyond the uncertain income from the sale of a not yet existing future product. The only form of security he can have would be if the entrepreneur was himself invested heavily in the firm, so there would be a fund out of which to pay a good portion of the contractual claims, even should the venture prove a failure. To the extent that the capitalist does not have this kind of security, he will himself take on some of the aspects of

entrepreneurship, as his future return will become tinged with uncertainty, and he will become more like a part-owner than a lender. In practice, all capitalists who invest in firms will be entrepreneurs, since their return on investment is never 100 per cent secure. When outcomes seem more certain and their position vis-à-vis the entrepreneur is more secure – for instance, because they have good collateral against their loans and easy recourse in case of default – capitalists can take a more passive approach and the entrepreneurial action needed on their part is minimized. The same holds for labourers and other factor owners who contract with the entrepreneur: under normal circumstances, their position may be deemed very secure, and they can expect simply to be paid for their services according to the terms of their agreement. However, there is even here also always an entrepreneurial component: a situation may arise where it is impossible for the entrepreneur to honour his contractual obligations and the labourers are then in a position where their contractual claims against him are worthless. They, too run the risk of suffering entrepreneurial losses, in the sense that they risk supplying a service for which they will not be paid. Only if labourers were always paid ahead of time before they started working could we say that there were no aspects of uncertainty in labour wages.

Rothbard, in his discussion of factor incomes, touches on the possible rents to ultimate decision-making (Rothbard 2009, chap. 9, esp. pp. 598-603). In the evenly rotating economy, it will still be necessary to carry out decisions – what Rothbard calls the ownership function. The skill with which each businessman executes this function is different from every other businessman, and since it cannot be formally taught, there will remain an array of “ownership rents” in the evenly rotating economy (ERE), relative to the skill of each individual businessman. It is clear that this ownership function is part and parcel of the role of the entrepreneur in organizing firms as we have just described it. The question whether there will truly remain such a residual in the ERE can be safely left to one side for now (but see Salerno 2018), as we are not concerned here with that point of pure theory. We only bring it up here to once again underscore the importance of decision-making ability to the entrepreneur and to the organization of business firms. This is an important part of what Salin has called the genius of the entrepreneur (Salin 2000, 130).

A note should be added about Per Bylund’s recent take on entrepreneurship and the firm (Bylund 2011; 2015; 2016): While he partly agrees with the theory we have presented above – seeing the firm as a contractual nexus between the entrepreneur and the factors of production, organized in a structure of production to carry out the entrepreneur’s vision – he especially emphasizes the importance of the division of labour. Entrepreneurs make possible a greater physical productivity, because they provide an environment that accommodates greater specialization and a higher degree

of the division of labour through what he calls higher density, i.e., closer connections and better communication among the factors of production. Indeed, to Bylund the firm simply is the temporary institution the entrepreneur uses to facilitate a production process that is more intensive in its division of labour than what is possible at that point in time in the market (2016, 83–84). The firm is “an implemented production process that utilizes extra-market specialization and is thereby distinct from the existing market” (ibid., p. 96).

This is not the place for a full critique of Professor Bylund’s theory, but on two points in particular we cannot agree with him: firstly, his theory leads to the conclusion that firms are simply a temporary phenomenon. They are created to implement a new production process and facilitate a more intensive division of labour. Once the new process has been imitated by other entrepreneurs and fully assimilated into the market, the pioneering firm will dissolve back into the market again, as it no longer has any reason for existence (ibid., p. 103-5). The problem is that firms are much more enduring in reality: while firms prosper and decline, there does not seem to be a tendency for them to disappear. Professor Bylund acknowledges this and suggests that his theory simply supplies the economic function of the firm and that real-life firms may differ to the degree they are defined using non-economic means (ibid., p. 159-162). In our view, the economic firm is a much more permanent fixture in the market economy than this implies and it’s function is not exclusively to implement new production processes.

Secondly, authority and hierarchy, rightly understood, are central to our understanding of the firm, a point that Bylund denies (Bylund 2016, 95). This may be a disagreement over terminology. We certainly do not think that the entrepreneur can simply order labourers about as he sees fit. Yet the point of his hiring factors of production at all is to produce a future product. This surely entails directing how said product is to be created, how precisely the factors are to combine in order to produce it, when and where production takes place and so on. This is the extent of his authority and it is based solely on his contractual agreements with the owners of the hired factors of production. Their owners voluntarily accept his authority and direction and accept a subordinate position within the firm. But both the entrepreneur’s authority and the labourers’ subordination rests on voluntary agreements and only last so long as all parties agree to it.

More fundamentally, Bylund along with most other writers on the subject accept the stark Coasean dichotomy between firm and market. This is despite his own intimations that this dichotomy is not tenable and not compatible with Austrian theory (Bylund 2014; 2016, 14). Yet the firm is not an alternative, non-market form of economic organization, but intimately connected with the wider market economy (cf. Mathews 1998).

The definition of the firm we will advance and use is closely related to the basic facts of human action. We can define the essence of any human organization as the purposefully arranged activities, by one person or several combined, using scarce means in order to achieve a specific end. This end must either be maintained through time or be regularly reproduced in order for organizations to arise. Such organizations are what we may call praxeological organizations. This definition is derived from Hayek's distinction between spontaneous order, or *kosmos*, and organization, or *taxis* (Hayek 1973, 35–54). The spontaneous order is one where there is no explicit common purpose of its members, whereas the opposite is true of an organization: the defining feature of an organization is precisely that it has been expressly set up and serves an explicit purpose, as opposed to a *kosmos*, which grows naturally out of human action, but without having been part of any one person's intentions in acting (ibid., 36–39).²³

Not all human actions are organized in this sense, however. Many actions are rather casual, so no plans are made for their repetition under organized forms; or the conditions that lead to their occurrence are very rare, so such planning is impossible. Other actions, that appear to be organized, simply follow the rules of evolved institutions and are part of a spontaneous order. The clearest example of this is still the market order or great society. Here, human action is not ordered according to a common set of ends (as it would be in an organization), but follows ordered patterns that evolve from the basic institutions of the law of property, tort, and contract (Hayek 1976, 107–32, esp. 108–9). A common set of weight and measures, a common medium of exchange, a common language even are all examples of evolved, spontaneous orders (cf. Menger 1985, 146).

The conditions necessary for institutions and organizations to arise may be summarized as order or stability: order in the external world, so planning for the future is possible; and at least somewhat stable preferences, so it makes sense to organize repeated actions. Many actions clearly take place under organized conditions – the household and family, churches, cultural associations, clubs – but it is an empirical question whether at a given time and in a given place we are observing organized action or not. While we may give a clear definition of organization, interpreting action in the real world is always a question of what Mises called specific understanding or thymology (Mises 2007, 265–66, 271–74): it is a matter of understanding the motivation and intentions behind the actions, and of judging whether they form a pattern united by a common purpose, or only appear to do so. Thymology deals with the mental activities of men that determine their actions (Mises 1962, 47–48). Praxeological organization such as we have defined it here is an outcome of the judgments made by man, and it is therefore always a judgment based on thymological insight when we say that

23 Cf. North (1991), on the role of institutions, although he sometimes conflates Hayek's *taxis* and *kosmos* in his account of the evolution of institutions.

an organization exists or existed. Often, these judgments may be easy to make: for instance, households or firms are usually easily recognized as such. At other times, there is much more uncertainty about the correct interpretation of events.

It should hopefully be clear from all this that our concept of praxeological organization is closely connected to the concepts of purpose and ownership. What sets a specific organization apart is its purpose and the specific means used to attain it, and what unites its members is their agreement in purpose and their common ownership – to different degrees – of the means used to pursue it. The possible variations in membership and purposes and the configuration of means are almost endless, but our formal praxeological definition encompasses all of them.

The firm is simply a special case of the praxeological organization operating within the cash nexus. We may call it the catallactic organization: it is the purposefully arranged activities, by one man or several combined, using scarce means in order to achieve a specific end – namely, monetary profit (cf. the contrast between ‘household’ and ‘firm’ in Boulding 1966, 301–2). What is special about the firm is the focus on monetary profits which clearly situates the firm in the market economy. While other organizations are devoted to the provision and use of final consumer goods, by definition always outside the market, the purpose of firms is to organize the acquisition of money with which to acquire consumer goods. By definition, then, firms are entirely dependent on the emergence of indirect exchange and the money economy: we cannot conceive of organizations devoted to indirect exchange before there is a society based on indirect exchange, after all. What distinguishes one firm from another, and one kind of firm from others, is the kind of assets they use and the kind of products they offer on the market in exchange for money. Every firm is unique in that it is always devoted to solving problems that arises in local, specialized activities (Foss 1997).

This definition of the firm meshes well with Mises’s definition of capital: “Capital is the sum of the money equivalent of all assets minus the sum of the money equivalent of all liabilities as dedicated at a definite date to the conduct of the operations of a definite business unit.” (Mises 1998, 262). Indeed, to Mises, capital only makes sense as “a category of acting within the market economy” (ibid., p. 264) by entrepreneurs aiming at monetary profits. The owner or owners of a given firm want to generate profits by supplying the market with a specific good or service using the goods available to him. These goods may simply be a sum of money he uses to hire labourers and other factors for the duration of the production process. The future profit he wishes to achieve is unknown and uncertain – he may estimate what it will be, but he cannot know it. His aim is always to secure the largest possible spread between the prices he has to pay for factors of production and the profits he expects to realize, once he can sell the final product. At each step of the way, then, he can make

use, within the firm, of monetary calculation based on the prices he expects to pay for factors of production and the monetary revenue he expects to earn from selling the final product (see the extended discussion above on land vs. capital from p. 50 on).

The entrepreneur clearly must own the firm – he must be the one who claims the final product and the profits it generates. The definition of the owner as the residual claimant is therefore correct: he only profits if there is anything left over after all contractual claims has been satisfied, and if there is not anything left, or if he didn't earn enough to satisfy all claims, he made a loss.²⁴ While some uncertainty always attaches to all action, it is clear that the owners of firms are the principal bearers of uncertainty. The very point of entering an employment contract, hiring out a capital good or lending out money is to earn a revenue while minimizing uncertainty. Labourers and capitalists can never completely escape uncertainty, but it is narrowly circumscribed by these means.

We may envision a firm set up by an entrepreneur. His main capital consists in a sum of money out of which he pays the labourers periodically as they work on the final product. The labourers are in this scenario certain of their wage no matter what the outcome of the process. Even should the final product fail to find any market at all they will still have been paid their wages. Should the firm prove a failure altogether and labourers and capitalists have unsatisfied claims against it, they can presumably litigate to force the entrepreneur to satisfy these claims – either out of funds he had kept outside the firm or out of his future income. The owner is not only the residual claimant, he is also on the line for all claims against the firm. In the case of limited liability corporations there may not be recourse to a personal claim against the entrepreneur, it is true, but the corporation can still be forced to satisfy all claims and the entrepreneur will lose all his invested capital before any of the hired labourers or capitalists will lose any of their claims.

The stark contrast between the owner-entrepreneur on the one hand, concerned with the purpose and profit of the firm, and the labourers and factor owners on the other hand, who are only concerned with fulfilling their contracts and receiving their contractual revenues, is in reality often more blurred. Barnard in his interesting early study of the executive (Barnard 1938) describes how one key function of the executive is to formulate and instil the purpose of the organization into his subordinates. Workers very often come to identify with the firm and want it to succeed, not only to secure their own future income – although that is part of it. Many also attach importance to having meaningful jobs and seeing a purpose in their work beyond their own monetary income. One important aspect of firm ownership may thus be motivating the workforce and encouraging a

²⁴ To be precise, he made a loss if his net return as a proportion of the capital invested was less than his opportunity cost, usually in a market setting indicated by the rate of interest on the safest class of loans.

“proprietary” attitude to the firm on the part of labourers. Such an attitude may both lessen the disutility of labour and make the individual labourer more reluctant to change his job.

While we have so far implicitly been speaking in terms of a single owner-entrepreneur, there are no problems with envisioning more than one owner of a given firm. Anything from partnerships to joint-stock companies to cooperatives of different kinds (Hansmann 1996) can be encompassed in our definition of the firm. Once there is more than one entrepreneur, agreement on ends and the deployment of means must be arrived at somehow. Many of these tasks can be delegated to directors and executives, and the (prospective) stockholders in a company will then buy or sell their ownership share based on whether they agree with the strategies chosen and decisions made by the executives (cf. Foss and Klein’s (2012) discussion about delegated judgment.) In simple partnerships it might not be as easy for the owners to leave as it is for the stockholders. The partner who wants to leave will have to find someone to take over his share, or the firm will simply have to be liquidated. It is much more costly to leave such a firm. At the outset, there are therefore significant uncertainties with entering into a partnership. Just because there is agreement now on how to organize business and what the medium- and long-term goals of the firm should be, this does not mean that this agreement will last into the future. Entering into a partnership with another entrepreneur is clearly itself an entrepreneurial decision, and it depends on the individual’s understanding and insight into his prospective partner’s character and psychology whether it will be successful.

More generally, we should not be afraid to say that entrepreneurship and ownership of firms can be a collective pursuit, provided we don’t reify the collective. It is always only individuals who act and pursue ends, even if they do so together. There is a growing literature on collective entrepreneurship that emphasizes both the possibility of the phenomenon and the prerequisites for its success (Mourdoukoutas 1999; Burrell and Cook 2009): agreement on the goals, mutual solidarity, commitment to and pride in the organization (Yan and Sorenson 2003, 38). These factors go a long way toward explaining the enduring success of family firms. These are not simply holdovers from a pre-capitalistic era: taking a long, multi-generational view may lead to the long-term success of the family firm and improved conservation of resources, while intra-family solidarity means that the owners are more willing to invest their capital in the firm and that there are larger incentives for settling possible disagreements between the owners. There are clear affinities between this view and Elinor Ostrom’s (1990; 2002; Schlager and Ostrom 1992) perspective on communal property: collectives of various types can overcome the problems of free-riding and public property provided their plans and incentives align. This is true for larger groups managing common-pool resources and

a fortiori also true of family firms, where not only are explicit motives and financial incentives aligned, disagreements over the use of resources are set against a backdrop of greater solidarity. This increases the incentives to resolve disagreements and increases the costs of failing to do so, as not only may the firm suffer if conflicts are not resolved peacefully, so might the family.

Armed with this brief sketch of an entrepreneurial theory of the firm, we can now turn to the problem of the theory of the farm. What can we say about agricultural enterprises specifically?

3.4. The theory of the firm and the theory of the farm

The main factors that differentiate farming from other enterprises are, to recapitulate, the greater proportion of land used; the relatively higher importance of Engel's and Bennett's law in the demand for farm products; and the fact that the farmer can to some extent supply his own needs out of his production. However, there are also limits to the division of labour and the size of agricultural establishments in a market economy (Marshall 1920, 242), as we shall see. The limits to the gains from division of labour in farming were already well-known to the classical economists (Mill 2006, 130; Say 1971, 96). Mises (Mises 1981, 328–29) has described the problem very lucidly: the fact that agricultural production has to take place across a large geographic area and across various seasons throughout the year restricts the possibilities for specialization and division of labour. Every enlargement of an agricultural establishment increases the difficulties for dividing labour that spring from distance (*ibid.*). This is evidently true: the sort of “density” within in the firm that Bylund emphasizes is usually not possible on the farm, and the diversity of functions (D. W. Allen and Lueck 2002) and the need for entrepreneurial decision-making over a wide range of resources means that the farmer will have to integrate managerial and labour functions himself, further restricting the possibilities of specialization. C. L. Holmes pointed to the strict limits to the division of labour imposed by the kind of activity required in agricultural production as far back as 1928: a great variety of functions had to be performed throughout the year, depending on the seasons and various biological processes, and no man can be engaged in just one of these functions on a farm for an extended period of time (Holmes 1928, 40–41):

The most fundamental [limit to division of labour] is the peculiar seasonal nature of agricultural production and the consequent lack of continuous operations. Almost every line of endeavor on the farm must depend either on the swing of the seasons or upon the periodic nature of some biological process. [...] In no case can a man be put to a single specific task and be kept at it uninterruptedly for a month or a year as is true in the factory.

Allen and Lueck (2002, 16, 167–68) in their approach to the theory of the farm emphasize the importance of seasonality and timeliness costs as a limit on specialization in agriculture. Various tasks have to be performed at certain specific periods and the farmer therefore cannot devote himself to specializing in them. Added to this is the element of exogenous shocks: while summer follows spring every year, the weather may still vary considerably from one year to the next. The farmer therefore has to be on hand to be able to perform the necessary tasks in a timely manner. This is not limited to cases of weather, as Allen and Lueck see the same pattern in livestock production: there are also high timeliness costs involved with breeding and especially birthing cattle and similar animals, processes that are still mostly natural and beyond human control.

3.4.1. Agricultural risk and uncertainty

The problem of seasonality and timeliness identified by Allen and Lueck is very important, but it is not merely a source of a special kind of costs. Rather, we see seasonality and timeliness as sources of uncertainty for agricultural production. This uncertainty is bound up with particular production process and some specific assets – notably, agricultural land and livestock – and it is in their use and in judging when and how to exploit them that timeliness is important. The farmer needs to be in direct control, and there is a limit to what he can control and decide on directly. This need for control, for ownership and responsibility, in effect sets clear boundaries for the size of the agricultural firm (O. D. Hart 1995, 3–7, 29).

Seasonality is thus not principally a hindrance to specialization. This is perhaps best seen in the fact that all these tasks that have to be performed in a timely manner are themselves performed by specialists: county agents, consultants, reapers, veterinary surgeons and so on, who are employed collectively by many farmers. The individual farmer will still have to have some knowledge of these specialized professions, if only to know when to call on the specialist, i.e., in order to exercise his own entrepreneurial judgment efficiently. And this goes to the core of the matter: seasonality or timeliness means that uncertainty and hence the need for entrepreneurial judgment is pervasive in agricultural enterprises to a greater extent than in other industries, and consequently there is a greater demand for the owner's attention to the details of production (cf. Menger 2007, 69–71 for a brilliant short exposition of the importance of uncertainty in production). One of the main goals of acting is to reduce case-probable risks and increase the factors of success (Hülsmann 2018), but in the case of agricultural enterprises, so far a lot of uncertainties, i.e., case-probable risks, have proven to be beyond the control of man (cf. Mises 1998, 107–13; Knight 1921).

It may be argued that seasons and timeliness are not sources of uncertainty, but of risk, and hence requires the attention of insurance agents and not of uncertainty-bearing entrepreneurs. While it is true that we lack specific information about *this* year and its seasons or *this* cow and how she will calve, we know in general when, on average, the different seasons will fall, and we have general knowledge about how cows calve and how many will need human intervention and how many will miscarry. In other words, these are instances of what Mises called class probability (1998, 107; cf. Hoppe 2007b): while we know nothing about this specific entity except that it is a member of the general class of entities, we know everything about the behaviour of the whole class. Seasonality and timeliness are sources of costs, but costs that can be foreseen and incorporated into the entrepreneur's plans and cost structure. These costs become fixed costs in the industry and can, in principle, be mitigated through insurance (Knight 1921, 212–13).

This argument is, however, entirely wrong. It is true that any given year is part of the greater class of years and that the seasons will follow the generally known pattern. But this knowledge is of little help to the farmer: he does not know if the year to come will be an average year, or a median year, or an outlier: how this year will turn out and how the seasons will fall is necessarily unknown to the farmer, and he will have to exercise his judgment in planning his actions based on his necessarily imperfect knowledge of the year to come. The uncertainty the farmer-entrepreneur faces here is a case of what Mises termed case probability (1998, 110): we only know some of the factors determining the outcome of a given event: there are other factors of which we know nothing. The farmer knows the general rhythm of the seasons, but not which dates will be the optimal dates for the various tasks this year. A stockbreeder may have a good knowledge of the statistics of calving, but the knowledge crucial to him is about this specific case and his judgment as to the likelihood of possible outcomes. Mises made this point clear:

There are, of course, many instances in which men try to forecast a particular future event on the basis of their knowledge about the behavior of the class. A doctor may determine the chances for the full recovery of his patient if he knows that 70 per cent of those afflicted with the same disease recover. If he expresses his judgment correctly, he will not say more than that the probability of recovery is 0.7, that is, that out of ten patients not more than three on the average die. All such predictions about external events, i.e., events in the field of the natural sciences, are of this character. *They are in fact not forecasts about the issue of the case in question, but statements about the frequency of the various possible outcomes.* They are based either on statistical information or simply on the rough estimate of the frequency derived from nonstatistical experience. (ibid., my italics.)

The farmer is obviously helped by knowing what some of the of possible outcomes are, but he still has to deal with the uncertain future in his decision-making about his own specific resources, be it his livestock or his farmland, and he has no certainty as to the outcome of his action in this specific case. Historical statistics, along with knowledge about technical possibilities and judgments as to the availability and price of inputs needed for various possible courses of action, all may be of assistance in forming the farmer’s judgment. Ultimately, however, man’s conscious action is always directed by understanding and this is not reducible to merely technical or statistical knowledge (Mises 1962, 48; Hoppe 1997, 74). Only in the cases where a man has complete knowledge of possible actions and outcomes could we say that he was not dealing with uncertainty, but insurable risk.

Packard, Clark and Klein (2017) have laid out a very interesting taxonomy of uncertainties that will help us make our point. They relate the difference between uncertainty and risk to set theory. In any decision, there are always two sets: a set of options and a set of outcomes. One set enumerates the various possible actions in a given situation and the other enumerates the possible outcomes. A closed set means that we can enumerate all the possible states, while an open set means that we cannot do that. If probability is to exist, both sets have to be closed, but if just one of them is open, that is, if we cannot enumerate all the possible members of it, risk calculations are not possible. If the set of options is closed but the set of outcomes is open, we deal with environmental uncertainty; if the set of outcomes is closed but the set of options is open, we deal with creative uncertainty; and if both sets are open, we deal with absolute uncertainty (see table 1).

Table 1 – A typology of uncertainty (source: Packard, Clark and Klein (2017), figure 1)

		Set of outcomes	
		<i>Closed</i>	<i>Open</i>
Set of options	<i>Closed</i>	Risk/ambiguity E.g., insurance, gambling	Environmental uncertainty E.g., make or buy decision
	<i>Open</i>	Creative uncertainty E.g., find a solution to a given problem	Absolute uncertainty E.g., commercialization of radically new technologies

How does this apply to farming? A recent review (Komarek, De Pinto, and Smith 2020) examined the literature on agricultural risk and found that scholars have discussed five broad categories of risk in farming: production, market, institution, personal, and financial. Some of these risks can be understood as insurable, class probable events and thus does not pose a special problem; they are simply a source predictable costs. In an open-ended universe, however, other risks fall into the

uncertainty category: financial and personal risks mainly do so, and so does uninsurable production risk.

Our contention is that we can categorize most of these risks as environmental uncertainty. While the farmer has a limited set of options to choose from and his choices obviously has some effect on how his production turns out, the production process is still to a great extent subject to natural forces that are both partly unknown and uncontrollable. This means that the set of possible outcomes must be open, since the farmer simply does not know what forces beyond his control will impact his business. He deals with complex phenomena such as climate, complex biological processes and animal psychology that he has very little control over.

Having to deal with environmental uncertainty can partly explain what may otherwise look like inefficient ownership patterns. Donald McCloskey (1975; 1989; 1991) has argued that the open field system which predominated through much of European history, and in which farmers would own scattered plots across many fields, can be seen as one way of mitigating uncertainty. Heavy rains, droughts, hailstorms and the like are unpredictable and can have extremely destructive local effects. Since small differences in local geography can expose particular fields to certain disasters – flooding in lowlands, for instance – it is a prudent risk-mitigating mechanism to spread out one's fields instead of concentrating them in one locale. This may impair productivity, but reduces risk and felt uncertainty. However, while plausible, this theory has been challenged by recent empirical work focusing on Swedist agriculture in the 18th and 19th century (Nyström 2019): While scattering of plots did reduce environmental risks somewhat, the loss in productivity more than made up for these gains. Indeed, the consolidation of lands around the homestead after land reforms may in fact have enabled farmers to weather environmental disasters better, as they could now take better care of their crops in emergencies. Enclosures and the consequent changes in land management and land improvement therefore lowered agricultural risks (ibid., 194).²⁵

The existence of modern crop insurance schemes are not a contradiction of the inherently uncertain character of agricultural production: these are all government-sponsored schemes and are, in fact, simply disguised subsidies to agriculture (OECD 2019).

25 We would suggest that the open field system was not a naturally evolved market institution, but rather an imposition due to coercive intervention in the agricultural sector, specifically as regards the extraction of rents and taxes by the ruling elite. Risk mitigation was a by-product of these interventions, as farmers adapted institutions forced upon them in the most rational way. The analysis of the open field system and its history is however outside the scope of our dissertation. Cf. Dyer, Thoen, and Williamson (2018) for a recent overview.

3.4.2. Limits to agricultural specialization

We should be careful not to put too much emphasis on the limits to specialization. Specialized labour and services can be mediated through the market instead of being integrated on each individual farm. The division of labour will take place between firms rather than within each separate firm, and specialized enterprises serve a large number of farms by concentrating on supplying these services. Holmes (1928, 41; cf. Mill 2006, 143) called this “cooperative specialization”, where many farmers collectively, as it were, hire specialists to perform specific tasks. With expanding markets and increasing capital accumulation, more and more functions have become subject to specialization throughout the 20th century, just as Holmes predicted they would. For instance, modern agriculture makes use of large combines to reap the harvest. These may be too expensive to buy and operate for the individual farmer, so instead companies that specialize in operating these and other like equipment are hired each harvest to do the work. The importance of veterinary surgeons have also expanded, as medical advances have made new services available to the farmer. But the same solution to the problem of specialization was also found in less technologically advanced times: harvesting by scythe was much more productive than using a sickle, but it was also a specialized skill, so each year specialists were hired for the harvest. The blacksmith would shoe horses for many farmers, the miller would grind the grain of a whole community and so on. In the modern world farmers have often organized both output markets and agricultural suppliers on cooperative models (Hansmann 1996), allowing them a degree of control over adjacent fields in the supply chain.

Whether such specialized enterprises are possible in the market will depend mainly on the demand for them and specifically whether the marginal revenue product of the specialized labourers is high enough to attract workers and to keep them during the off-season. Also, if possible, such specialized firms may integrate more functions to maintain their revenue and payment to workers also during the off-season, e.g., by integrating the work specific to each season. Especially since an array of capital goods specific to agriculture are needed for most of the work throughout the year, we should expect specialized firms to set up with these specific assets and employing the labour specialized in carrying out these functions. In this way division of labour through the market is made possible and the specialized factors – labourers and specific assets alike – are used to the optimal extent.

Since agriculture uses a greater proportion of land – permanent capital goods than other sectors, it follows that the capitalized value of firms will tend to be larger here. As a consequence, larger outlays are necessary for the farmer to set up a new farm. This problem can and is to some extent overcome by not buying land but simply renting it. However, most farmers still prefer to own most

of the land they use: in the United States, farmers have consistently rented between 30 and 40 percent of their farmland over the past century 1910-2012 (National Agricultural Statistics Service 2018 table 9.8). The same holds true in Europe although proportions vary from country to country. For instance, in Denmark the proportion of rented land is about 40 percent, although the proportion has steadily increased over the past 40 years. In chapter 5 below we will describe in detail how Danish agriculture expanded and modernized during the period of the gold standard, 1870-1910, without changing the basic structure of ownership of land. As we will argue later, it is precisely due to monetary interventionism in the last half century that ownership of land has become more concentrated, both in physical terms and in terms of its capital value. Even so, the basic pattern of widespread landownership still persists, despite this tendency to concentration in recent decades.

These averages of course hide great variations – some farmers own practically no land and others own all the land they use. The preponderance of ownership over rent may have a few different possible explanations. By owning the land the farmer is able to capture the value of improvements to land that result from his use of it. He may also prefer to have complete control over the land, rather than having to renegotiate contracts every year, or every 3 or 5 five years. If the farmer does not own the land, he may not be able to know how much he can produce from one year to the next, and land ownership is thus necessary to reduce this uncertainty. Finally, it may also simply be that most farmers subjectively value land ownership and would invest in land even were there no purely economic gains to be had from such ownership.

That demand for agricultural products is generally stable does not mean that the agricultural firm is conservative or changeless. There is, first of all, a variety of different products that can be produced with almost the same inputs on the farm – different types of grain, for instance. Deciding which to produce and in what quantities, or whether to shift from a focus on growing grains to livestock are all integral to the entrepreneurial function carried out on the farm. Furthermore, while demand is stable, the technological possibilities are always changing, as are the opportunity costs and hence profitability of the different possible inputs for the same product. We should therefore expect change and innovation on the farm to be more focused on inputs and producing productivity rather than on inventing and introducing new products. This is borne out by historical experience: wheat has always been the main grain in Europe, but farming has changed much over time and the productivity of wheat-growing farms has increased many-fold due to scientific advances and technological change (Standage 2009). Productivity in the US, for instance, increased by almost a factor of 3 from 1920 to 1997 – from 13.8 bushels per acre to 37.5 (D. W. Allen and Lueck 2002, 19, table 2.2). This is not to say that innovation in products does not occur, but rather that it is less

important than innovation in techniques. Recent product innovations are the successful introduction of buffaloes in animal breeding or the marketing of more high-value products such as grass-fed beef and milk or organic products. But when such innovations are compared to technological changes such as artificial fertilizers or pesticides that increase productivity, it should be clear that agricultural innovation is focused on improving techniques.

That farmers can make direct use of their own products is a fact that is of decreasing relevance. It is not a realistic alternative for most farmers to hold their products off the markets nowadays: this might have been possible when most farmers only produced a few barrels of grain every year or only had a few heads of cattle. Virtually the whole product of all farms is nowadays offered on the market and farms are completely commercial. At most, we can say that the farmer can supply some of the needs of his household directly. This may amount to some savings for the household budget, but not much. However, this does not mean that there is no longer any direct use value from farming. A lot of what is counted as farms in official statistics are these days clearly not commercial farms according to our definition. In the United States, for instance, 49.9 percent of farms in 2017 had sales of less than \$10,000 (National Agricultural Statistics Service 2018 table 9.3), and in Europe almost 40 percent of farms (4 million out of 10.5 million) had an output evaluated at below €2,000 (Cook 2019, 18). These farms are, at most, part-time enterprises which the owners value primarily for their direct uses, perhaps due to romantic notions about the simple life in the countryside. In the modern American context, it is probably only farms grossing more than \$250,000 per year in sales that we should consider full-time commercial enterprises (J. F. Hart 2003, 4). This view is reinforced by the fact that if we measure the distribution of farmland in the U. S., we find that nowadays most cropland is on farms of at least 1,100 acres (MacDonald, Korb, and Hoppe 2013).

3.4.3. Limits to farm size

What are the limits to the size of the farm? We have already cited Rothbard's extension of Mises's argument about the impossibility of economic calculation under socialism to the case of complete vertical integration in the market economy. As external prices for the intermediate goods disappear, it becomes more and more difficult for the entrepreneur to guide production to a profitable outcome. Islands of calculational chaos grow, and profitable production will in the end become completely impossible. The British economist Donald R. Denman formulated the law of proprietary magnitudes analogous to this argument, dealing specifically with what he called "proprietary land units": organizations of (rights to) land united for some specific purpose. The law states that the optimum

size of proprietary land units changes inversely with the intensity of human activity on the land within the sanctions of its property rights (Denman 1967; Denman and Prodano 1972, 128). The more intensive the activity, the more exacting will be the task of planning for it, so the smaller will the optimum size be. It is easy for one man to efficiently manage 200 acres of sheepwalk – not so with 200 acres in the centre of a modern city. The owner will therefore delegate or alienate rights if he cannot himself plan efficiently for their best use.

Unfortunately, Denman did not explicitly connect his law with the problems of economic calculation identified by Mises and it is therefore not always clear in Denman's exposition why hired managers cannot overcome the problem. Yet we can easily see that Denman's law is entirely congruous with Mises's point about the importance of calculation: we only have to consistently reformulate it in terms of ownership instead of management. A proprietary land unit – or a farm, which is clearly one possible example of it – can be so big that the owner cannot clearly allocate the different parts of it to their most highly valued use. This is especially so where one unit has multiple uses and can yield a variety of products. The sheepwalk, after all, has only one use and one that does not take much planning. But an intensive farm with many concurrent production processes, e.g., growing wheat, raising pigs, producing milk, is very different. It inevitably takes much more skill and effort from the farmer to allocate his assets between these different uses than it does on the more extensively farmed ranch, and his operations will therefore have to be on a smaller scale if he is to manage them efficiently.

Note that this problem is in real, not value terms: the smaller, more intensively utilized farm may constitute a larger capital than the more extensive farm or it may not. Nor should we think the limit to the efficient size of farms completely set in stone: it depends above all else on the entrepreneurial ability and energy of the farmer and this may vary greatly from person to person. However, we can say that there must be decreasing returns to ownership, so to speak, beyond a given point: for any given entrepreneur, there is a point where, if he adds more resources to his enterprise, he will not be able to exercise his judgment as efficiently as he previously could over the smaller enterprise. The ever-present problems of uncertainty in farming, as discussed above, means that the need for entrepreneurial judgment is more acute and that even skilled farmer-entrepreneurs will therefore tend to be very restricted in how large an enterprise they can profitably run. In some sectors, this tendency may be counteracted by a tendency toward economies of scale, but in agriculture there is no tendency for economies of scale on larger farms with many employees over family farms or single proprietorships. The idea that large-scale farming is more efficient is a notion derived from Marxist literature (e.g., Marx 1967, chap. 25; Kautsky 1899; Lenin 1964), while studies have shown

that there are, in reality, constant or decreasing returns to scale in farming (Tomich, Kilby, and Johnston 1995, 114–15, 121; cf. Mill 2006, 142–52) once we get beyond the size manageable by a single owner-entrepreneur and his family (Benham 1960, 122).

The maximum efficient size of the farm is then set in accordance with Denman's law of proprietary magnitudes, rightly understood. Can we say anything about the minimum size? This too will be set in accordance with the law, as the entrepreneurs all adjust their farms to the extent of their entrepreneurial abilities. Some entrepreneurs will have to divest themselves of some of their assets, as they prove less able than their peers. If their output is consistently worse in quality or quantity, the estimated value of their assets will decline and their competitors will bid them away until the operations of the less capable farmers have been reduced to a size they can operate efficiently. It might be that that size is smaller than what is technologically necessary for running a farm, in which case the farmer will have to give up his own operations and either sell or rent out his land to more skilled entrepreneurs. It might also be that the size a given entrepreneur can manage is too small to provide him with an adequate revenue. What this revenue is can be assessed by looking at the individual farmer-entrepreneur's opportunity cost: if what he gives up by operating the farm is worth more to him than the revenue from the farm, he will prefer to sell up and devote himself fully to the more profitable endeavours. Insofar as only monetary rewards enter into these considerations, the hard limit will be set by the wage he could earn elsewhere plus the interest his invested capital could earn elsewhere. Obviously, other than purely monetary considerations motivate men, and it might be that the farmer might prefer to continue in that occupation simply because he prefers that kind of work and being his own man on his own land to other, better-paid types of work and investments.

The actual size of farms will depend on the degree of uncertainty and the possibilities for specialization, as laid out in the previous sections. These two factors will together mean that there are no advantages to large-scale farming, as the most efficient enterprises will tend to be on a small scale. The limits to specialization restrict the gains from larger concentration of agricultural capital in fewer hands and the greater degree of uncertainty requires the owner-entrepreneur to be more attentive to his productive assets. The evolution of farming in a free-market order will therefore tend to be along lines of small farms where the owner can oversee most of what goes on himself. Small-scale agriculture is therefore not the sign of economic retardation or of a country being "under-developed"; as we shall see in chapter 8, capitalistic farming under the gold standard, despite its interventionist aspects, boomed while not deviating from this basic structure. Large-scale

land ownership, on the other hand, is not a natural development of the free economy (Mises 1981, 335):

Nowhere and at no time has the large scale ownership of land come into being through the working of economic forces in the market. It is the result of military and political effort. Founded by violence, it has been upheld by violence and that alone. As soon as the latifundia are drawn into the sphere of market transactions they begin to crumble, until at last they disappear completely. Neither at their formation nor in their maintenance have economic causes operated. The great landed fortunes did not arise through the economic superiority of large scale ownership, but through violent annexation outside the area of trade.

3.5. The varying scale of agriculture

That said, one possible objection to the theory of the farm elaborated here is the historical fact that the scale of farms is much different from one country to the next and from one historical period to the next. For instance, there has been a clear tendency in the United States for the past century or more toward larger and larger farms in terms of acreage (B. L. Gardner 2002; Cochrane 1993; J. F. Hart 2003). Is this not in clear contradiction of the theory, since there must be some economic causes operating driving this process?

The historical variation in the scale of agriculture can be a result of natural economic changes leading to greater agricultural productivity. We here refer to the discussion of economic change and the role of capital accumulation below, pp. 115-120: increased saving and capital accumulation necessarily means that the value of farm output per acre also changes. If the MVP of a unit of land goes down, notwithstanding the importance of uncertainty-bearing laid out in this chapter, the farmer will have to increase his holdings in some way, or find some other way to increase the profitability of his farm, in order to keep operating a viable farm. If per acre revenue goes down, then the minimum size of farms has to increase, as explained above.

It is important that we always distinguish between real terms and value terms. In real terms, there has unquestionably been a tendency toward larger acreage per farm in the course of the 20th century but this tendency is by no means necessary, and can only partly be explained in terms of economic progress as described more fully below: the increasing physical productivity of agriculture due to capital accumulation and the increasing division of capital, and consequently the lower DMVPs of agricultural inputs. Increased capital formation and investment in agriculture and technological

innovation have led to much higher yields in physical terms. Increased supply, in turn, means lower prices and a lower revenue to be distributed among the factors of production, especially so if we remember the importance of Engel's law elaborated in chapter 2. Since land is the factor specific to agricultural production, it follows that the bulk of the decrease in revenue will be attributed to it (Rothbard 2009, chap. 5). We are therefore in the seemingly paradoxical situation that the DMVP per acre has fallen, while physical productivity has increased enormously. Since we saw above that the minimum size of the farm was set by the farmer's opportunity cost, it is clear that in an era of constantly rising productivity and falling net revenue to the individual farm, the individual farmer will have to constantly adapt to these changing conditions in order to keep his farm profitable. One possible way of adapting is to increase the scale of his exploitation in the hope that he can in this way save on costs. As we shall see below, this is by no means the only or even the most probable way. It is however possible, which is why we mention it here.

The second and most important cause leading to concentration and larger agricultural enterprises is, we contend, interventionism in the monetary sphere. This is the subject of later chapters. Briefly, monetary interventionism distorts the relative profitability of land ownership and thereby warps the structure of ownership. The natural evolution of the progressing economy by no means leads to concentration of land ownership on fewer and bigger farms: in a free-market order under commodity money, the response of farmers to this kind of change will more probably be to become more capitalistic, that is, to invest a higher proportion of their capital in capital goods instead of in land. Only by examining the effects of monetary interventionism, the process known as financialisation, and especially the role of credit expansion and fiat money, can we understand what causes this kind of concentration and change in the structure of agriculture.²⁶

That said, the differences in size of farms between regions and countries are explainable to large degree by focusing on the conditions and productivity of farming in different countries and regions. In the United States, for instance, there are marked differences in the size of farms between the eastern and the western part of the country. Western farms are on average more than three times larger than eastern farms in terms of acreage, while the value of their sales were only about 50 percent higher (J. F. Hart 2003, 8; National Agricultural Statistics Service 2018 table 9.6). The reason for the difference is the different climactic conditions in the west, which causes agricultural productivity to be much lower there than in the more fertile eastern half of the United States. If we

26 Other kinds of interventionism might play a role in determining farm size, but only monetary interventionism has a systematic influence. Subsidies for specific crops, for instance, may influence production decisions and lead to higher capitalized farm values, meaning that farms may become harder to finance, but there is no necessary connection between these changes and an increase in farm size.

want to put it in terms of net rent or DMVP per acre, the DMVP on cropland is simply too low in the west to support a farmer on the same acreage as would constitute a viable farm in the east. Similarly, in a country like Japan, the very small average size of farms is to be explained by the high net rent of land. Land is extremely scarce in Japan and is much more valuable, and farms there are consequently much smaller in terms of acreage. The minimum size of a commercial farm recorded in Japan is only 0.3 hectares (Statistics Bureau, Ministry of Internal Affairs and Communications 2019, 55–57).

3.6. Conclusion

We have here tried to formulate a theory of the firm and apply it to the case of farming. Our conception of the firm is not new, but grows out of the Austrian literature on entrepreneurship and organization. The size of individual farms is principally determined by the problems of specialization, uncertainty, entrepreneurial ability and oversight, and Denman's law of proprietary magnitudes, which we have argued is closely connected to the problems of economic calculation and entrepreneurship.

Our conclusion is that these causes acting together put very narrow limits on how large a farm can be efficiently managed. The predominance of small-size family farming throughout most of the world is not a result of backwardness or an irrational organization of agriculture. Rather, it is the most resilient structure of agriculture, as it allows many individual farmers to bring their specific understanding and other entrepreneurial talents to bear on the problem of uncertain production processes. Variations in the physical and economic conditions of farming explain the differences in the scale of farming in different countries – most notably the larger stock of agricultural land in North America. However, the rise of large-scale farming in recent decades seem to contradict our conclusions. This contradiction is only apparent; as we shall see in later chapters, this process must be understood as largely caused by monetary interventionism.

4. Agriculture in the Changing Economy

4.1. Introduction

After having discussed in detail the economic characteristics of agriculture, we now turn to the question of how different economic changes affect the agricultural sector. It is necessary to do this to complete our theoretical analysis, as it is not enough to give a snapshot of a theoretical equilibrium such as the ERE which the real economy never reaches. The real world is always changing, and we need to show that our theory can explain these changes and their effects.

We will consider four kinds of changes in the economy which we consider the most relevant, although not necessarily the only possible kinds of changes. The four kinds are:

- 1) An increase in population;
- 2) Technological change;
- 3) An increase in voluntary saving;
- 4) Changes in the money relation.

We will generally limit ourselves to the case of the progressing economy, that is, we will not spend time, for instance, on the case of a decline in savings or a fall in population. The consequences of such changes can pretty well be understood by simply reversing the account of changes in the progressing economy (Huerta de Soto 2020, 344), and are in any case of less interest to our purposes. Some important questions to keep in mind throughout is how the structure and relative importance of agriculture may change, and whether farmers are as capable of adapting to changing conditions as are entrepreneurs in other sectors. Schultz (1951) pointed to the falling importance of agricultural land as a part of farm capital in the 19th and 20th century, and we will have to look at what conclusions can be drawn on this topic. For now suffice it to say that we find his explanation – technological development and changing consumer demand – inadequate. Coutsoumaris (1956), with special reference to Greece, has suggested that agriculture is incapable of adapting and developing in the absence of external financing. In this chapter we will largely avoid the role of external finance in facilitating change, but simply assume that farmers can finance necessary investments out of previous money savings. The question of finance will be dealt with in chapter 5. We will also briefly touch on possible changes to what Hoppe (2013, 27–28) has called the

character structure, i.e., the moral composition of society, especially possible changes in foresight and time preferences and how these affect agriculture and land use.

One important category of change we do not consider is what may be called institutional change. That is, changes such as the introduction of property rights in land or the abolition of barriers to trade or entrepreneurial action. Some interesting work has been done in this direction in the field of agriculture,²⁷ but while institutional change is important in understanding historical development, it is not really germane to our purposes here. What we want to analyse is what influence changes in the data in the free-market or natural order has on the agricultural sector, not how changing institutions toward or away from it affects the economy. Institutional change is really a question of introducing or removing impediments to entrepreneurial action, ownership and exchange. The economic changes that spring from institutional change will fall into one of the categories we investigate in the body of the text. This is why Julian Simon (1996, 106) said that the biggest problem agriculture faces is “not natural disaster, but politics” – if only politicians would get out of the way and let the market economy work, Simon argued, there would be no problems supplying food to a rapidly growing population, as acting men would solve the problem through entrepreneurial action by clearing new land, inventing new technologies, and extending the structure of production.²⁸

We will proceed by analysing the four kinds of changes in turn in the order listed above, always with special reference to agriculture.

4.2. Population and agriculture

An increase in population has two related effects: it increases the demand for goods, that is, it raises or shifts the demand curve to the right, and it increases the supply of labour. We will examine both together, as their effects are tightly connected.

As we argued when discussing Engel’s law in section 2.2, agriculture is mainly focused on producing foodstuffs that must be considered very highly ranked on most people’s value scale. They will first satisfy their demand for food before moving on to other needs. On the other hand, the requirement for basic sustenance is usually very quickly met, so that any additional quantities of such basic goods will be ranked comparatively low on most people’s value scale. The demand schedule and demand curve will therefore be very elastic far to the left on the curve, or when there are comparatively few quantities available, but it will very quickly become inelastic when the most

27 See, e.g., the interesting study by Hornbeck (2010), and the classic article by Anderson and Hill (1975).

28 Simon (1996, 106–26) is a good, brief discussion of the effect of institutional changes on agriculture.

basic needs are met. Since further uses of the same foodstuff will be ranked comparatively low, the consumers will be unwilling to surrender much in exchange for additional quantities.

When population increases the demand for food is likely to go up disproportionately, since the additional human beings will have to be fed. The demand curve for food shifts to the left, and since supply will usually lag behind (Simon 1996, 418), the price will increase. This rise in the price will make agricultural production more profitable, and the factors specific to agriculture, land and specific capital goods, will increase in value while the complementary factors of production will be bid away from alternative uses to increase agricultural output. The composition of the supply of consumer goods will then change, as more basic goods (such as housing, clothing, etc., along with food) will be produced and the production of less urgently demanded luxuries will be curtailed.

This change in demand does not happen in isolation. An increase in population also means an increase in labour,²⁹ and the addition of labourers to the economy will help the transformation of the economy under way, as they ease the move of labour toward agriculture. At the same time, the increase in the number of labourers mean that their marginal physical productivity in every use decreases, and hence the wage rates will fall. The fall in the wage rate and the rise in the rent of land now makes it profitable to bring into cultivation land that was previously considered submarginal (see the discussion in section 2.3.4: What determines what is considered marginal land, pp. 47 – 50). Farmers will devote labour and the necessary complementary factors to clearing and reclaiming new land in order to increase their output. An increase in population has the effect of bringing new land into use, although clearing and making the new land ready for cultivation will usually take some time. The supply of food will therefore lag behind the demand for it, but it will eventually catch up (Boserup 1975, 257–61; 1965; Simon 1996, 106, 134).

This is true also in locations – settlements, regions, countries – where the land is either fully used, or the unused land is so poor or so costly to use that it is not possible to bring it under cultivation. In the short run, the land already in use will be cultivated more intensively, but there will also be an increasing pressure to find virgin lands farther away. The more intensively cultivated land is bound to yield less per extra man-hour expended on it due to the law of returns. Intensification may therefore also mean a change in output, for instance away from cattle, that require more land, toward cereal crops. Such changes reduce the value of the output from agriculture, and they especially lead to a fall in the wage rate, since more labour is expended on the same amount of land and the marginal productivity of labour therefore falls, while the rent of land increases. It is

29 By labour we mean not simply the narrow category of wage earners, but more generally all human activity for productive purposes. Increased labour may in this way mean more family members working the same farm, for instance. The wage rate for such labour may often be implicit, but it is no less real for this reason.

therefore less attractive for labourers to remain in the same location. Or to put it differently, the opportunity cost of emigrating to new lands has declined, while the higher rents and capital values of land makes it more attractive to clear and settle new lands, as the higher rents mean that less land will be considered submarginal. Hence, more people will decide to emigrate and colonize new regions. The colonization of Europe, east and west, during the Middle Ages is an example of this process. As population increased, the pressure on the old settlements became too big and settlers moved out to found new villages (Postan 1973, 12–17). The “medieval agricultural revolution” (Duby 1954) was a period of both population growth and rapid colonization of vast new tracts of land (Koebner 1966).

Population growth is not something given external to human action, however. Malthus’ principle of population has too often been misunderstood as a law that bound mankind to always be living at the subsistence level, or to at least only escape doing so for brief periods of time (cf. G. Clark 2007, 17–38 for a recent statement of the ‘Malthusian’ position). Malthus’ principle, that the potential increase of population is an exponential function, is true enough; but it is, as Mises pointed out, simply a biological law that holds true for all animals. Man alone is not necessarily bound by it (Mises 1998, 663–65), as he is capable of transcending merely animal desires, since he is, in Bastiat’s formulation, a spiritual and intelligent being (Bastiat 1996, 412–42). This is the essence of what Malthus called moral restraint (Malthus 1826, bk. 4, chaps 1–2): the acting individual is capable of judging how many children he can rear in what he considers acceptable conditions, and he can plan his live accordingly. That is, population will tend to increase not to a level set by the means of subsistence, but by what Bastiat, following Say, terms the means of existence (Bastiat 1996, 431). Bastiat is emphatic on this point, as he sees the mastering of the impulse to procreate as an important part of economic progress and as tightly bound up with capitalism and a free society: what is needed is foresight of the consequences of one’s actions, and this is taught to each individual through participation in production and exchange as well as through moral and intellectual instruction (ibid., 440-1). Indeed, Bastiat goes so far as to argue that the distinctions between classes can to a great extent be explained by differences in the foresight of the members of each class. In more modern terminology, we might talk of differences in time preferences.³⁰ Malthus’ remarks on the behaviour of Germanic tribes in the iron age clearly illustrate that the problem of population is, its core, about foresight and time preference (Malthus 1826, bk. 1, chap. 6):

30 Mises notes in a footnote elsewhere (1998, 485) that time preference is inherent in the behaviour of all living things. What is distinct about man is that with him time preference is not instinctual but the outcome of a conscious process of valuation. This distinction seems at the heart of the difference between animals and plants subject to the principle of population and human beings not so subject.

They [the Germanic tribes] abandoned their immense forests to the exercise of hunting, employed in pasturage the most considerable part of their lands, bestowed on the small remainder a rude and careless cultivation, and when the return of famine severely admonished them of the insufficiency of their scanty resources (...) instead of clearing their forests, draining their swamps, and rendering their soil fit to support an extended population, they found it more congenial to their martial habits and impatient dispositions, “to go in quest of food, of plunder, or of glory,” in other countries.

In other words, the barbarian tribes inhabiting Germany and other lands outside the Roman Empire were forced every few generations or so to unleash a fresh wave of attackers into Roman territory because they refused to act with adequate foresight and exercise the moral or praxeological restraint necessary for sustainable population growth in their situation.

These considerations show that population growth is not an external shock to society, and we need to modify our previous presentation of its effects on the economy and agriculture accordingly. Farmers and other entrepreneurs will see that population growth is happening before the full force of it is felt on prices. They will act speculatively to increase the supply of food and the other commodities they expect to rise in demand as a result of population increase, and they may prepare and even begin the clearing of new land to fully utilize the new labour factors they expect to appear in the near future. Similarly, as prospective parents, they will only increase their family if they think the means of production will be adequate to the needs of their expanded family. People can misjudge the state of affairs, it is true; they can be bad entrepreneurs when it comes to family planning, so to speak, but those who make good judgements in these matters will tend to prosper in comparison to those that don't. Imitation of success will tend to spread successful habits which lead to rates of population growth that are best suited to the circumstances. The desire for children will tend to be curbed or stimulated by the greater or lesser cost of cultivating new land and thus of increasing the food supply.

Population growth also naturally leads to an increase in the total stock of capital, or a maintenance of the capital per worker ratio.³¹ The new members of society will most likely adopt the culture and mental attitudes of their elders and therefore the same preferences as regards present versus future

31 It is obviously a matter of definition whether this form of increased savings should be considered under the general heading of the progressing economy, and we would be just as happy to include it in our discussion on increased savings below. Since it stems from population growth, however, we chose to include it here. Mises (1998, 292, 252) at one point defines the progressing economy as “an economy in which the per capita quota of capital invested is increasing” while at another point he includes population growth under the heading. Rothbard (2009, 524, 532n) defines a progressing economy as simply any economy with increasing gross investment.

consumption, keeping the social rate of time preference stable.³² One form of this saving will take the form of clearing new land already mentioned; it may also take the form of producing the complementary capital goods to eventually work the new lands that the settlers clear. Depending on how we define net saving, this process might be thought to be better explained in the section on voluntary saving. It is clear that the total amount of gross savings has increased, after all. However, there is not a lengthening of the structure of production, as the increase in savings merely accommodates the entry of new individuals into the structure of production without a change in the time preferences of individuals. While we are thus dealing with an expanding structure of production, it is not lengthening or deepening, but rather simply “widening.” That is, instead of lengthening the period of production, new investment projects of the same length are undertaken, increasing output without changing the proportion between future and present consumption (Hülsmann 2008b, 24). This is so because we are dealing with an increase in both the supply of and the demand for present goods, the two aspects of an increasing population. This kind of expansion can perhaps best be conceived of as a kind of secular growth (Salerno 2001).

All that said, it should be made clear that, while we have to treat the different kinds of change separately, they are really interdependent: changes in population may affect time preferences, a growing population and higher savings increase the possibilities of new technological discoveries and the profitable use of new technologies, and so on.

The outcome of the process of population growth taken in isolation will be that the production of agricultural output per capita will tend to be constant and that the proportion of workers dedicated to it likewise (Boserup 1981, 200–201). In the short run money wages will fall and the prices of consumer goods will rise, while in the long run both money wages and prices of consumer goods will fall, as there is now both an increased supply of labour and an increased supply of consumer goods. To the extent that acting man anticipates these changes, the long-run consequences will be brought about that much faster. In any event, the relation between money wages and prices – real wages – will be somewhat constant. Or it would be, if it were not for the fact that the increase in population in addition to an increase in the labour force also necessarily means an intensification of the division of labour.³³

32 A recent study (Fouka and Schläpfer 2020) suggests that high-yielding agricultural economies over time helped develop a stronger work ethic. While we find much to disagree with in the paper, that children tend to learn the cultural mores and attitudes of their parents in a setting where material incentives support the parents’ culture appears like an obvious truism. What is missing from the paper is attention to the role of time preference and capital accumulation and to prudent action, from our point of view much more fundamental to understanding economic and social evolution.

33 The increase in land factors can also cause increased “division of land” analogous to Lachmann’s “division of capital” but this will be much more limited. Lachmann (1956, 79–80) highlighted the fact that capital accumulation would take the form of a more complex capital structure, not simply a multiplication of existing capital goods and

4.2.1. The division of labour

The fact that cooperative action between individuals is more productive than when each works for himself in isolation is the basis of society and exchange. While Bastiat clearly recognized that increased productivity from division of labour is the basis of exchange and society (Bastiat 1996, 71–72), Mises was the first to prove this point conclusively: by generalizing the Ricardian law of comparative advantage he showed that a greater product results when individuals specialize in separate tasks and exchange the products, even when one of the parties to the exchange was less productive in all production processes in absolute terms (Mises 1998, 158–60).

Since this is true of two individuals engaging in cooperative action, it will also be true when more people join in society. There is no upper limit to how many people can participate in the division of labour. Tasks will be divided and sub-divided as the number of labourers increases, and this will in itself, in the absence of any addition to the stock of capital goods or land factors, increase productivity. Per Bylund has given a very engaging account of how entrepreneurs establish firms to further “deepen” the division of labour and specialization beyond the current state of the market (Bylund 2016, 42–45, 83). By increasing the amount of labour services on other the price of each labour service falls, which will stimulate labour-intensive processes of production, and an increasing population will therefore be a stimulus to the kind of entrepreneurship Bylund envisages. It is however, impossible to say anything a priori about just how productive a further intensification of the division of labour will be: it is something that has to be discovered through practice and hence fundamentally within the sphere of entrepreneurship. Bastiat waxed eloquent on the gains to be derived from increasing population, as “a larger oncoming generation is in itself a better and more basic kind of division of labor; it represents a new degree of the excess of productive capacities over wants” allowing both a further expansion of population and a rising standard of living (Bastiat 1996, 566). Unfortunately, the few fragments Bastiat wrote on this subject does not amount to a proof of his proposition. We do not think it is possible to say how much productivity will increase due to the more intensive division of labour, but it is certain that it will increase. It might simply mitigate the falling marginal productivity of labour factors, or it might rise so much that marginal productivity increases in some employments.³⁴ Whatever the case may be in any given

that this would counteract the tendency to decreasing returns. In this case, however, we are dealing with an increase in the amount of land, and while land is certainly not homogeneous, there is not the same scope for variation in its use as there is in newly-produced capital goods. There is however some scope, and the process we have analysed may well be accompanied by a tendency to more specialized production on different land plots.

34 Let us suppose that a labourer is engaged in some activity producing a good, where his contribution yields the marginal product x quantity of the good. Now population increases and a second labour factor is engaged in the same production process. We know from the law of returns that the marginal product of labour in this production must now be $y < x$ since all factors are always engaged in the range of diminishing returns. Now suppose that the workers or their employers experiment with dividing the work into even more specialized tasks, so that the first

situation, there clearly are dynamic effects from a further intensification of the division of labour, and these may very well lead to increased productivity in agriculture, freeing up labour factors for the non-agricultural sector. We therefore have to modify our conclusion from the previous section and say that an increase in population can, in the long run, lead to a lower proportion of labour being employed in agriculture.

One of the dynamic factors that flow from the division of labour is what has been called the division of knowledge (Hayek 1948a, 50–55; cf. Mises 1981, 101). As the division of labour progresses, each worker becomes ever more specialized in his own narrow field. In one sense his knowledge diminishes, as he is only directly interested in a smaller part of the total social structure of production and exchange. But in another sense it increases, as he now has an opportunity to deepen his knowledge in a narrower field. This is not to be taken simply to mean that he can achieve a higher degree of technical expertise in his work. This is certainly true, but specialist training usually requires an investment of time and resources in schooling or an apprenticeship and a postponement of work and income, that is, net investment, which we are explicitly not considering in this section. Rather, the knowledge in question is what Hayek termed local and tacit knowledge, knowledge about how to make the most of the situation with given technical knowledge in a given situation. We can perhaps call it a kind of Kirznerian alertness, as it is clearly related to entrepreneurship. It is local knowledge about how best to respond to change and to take advantage of new opportunities.

Increased familiarity with a specialized production process is however also an important effect of the division of labour which may have further dynamic consequences, as Adam Smith (1904, bk. 1, chap. 1) clearly saw:

[T]he invention of all those machines by which labour is so much facilitated and abridged, seems to have been originally owing to the division of labour. Men are much more likely to discover easier and readier methods of attaining any object, when the whole attention of their minds is directed towards that single object, than when it is dissipated among a great variety of things. But in consequence of the division of labour, the whole of every man's attention comes naturally to be directed towards some one very simple object. It is naturally to be expected, therefore, that some one or other of those who are employed in each particular branch of labour should soon find out easier and readier methods of performing their own particular work, wherever the nature of it admits of such improvement.

worker supplies a new input to the second who in turn produces the final good. Since specialization is more productive, we know that the quantity of product due to the new process is higher than y , but we cannot know if it will be higher than x . On this see von Strigl ([1934] 2000, 46–52, 86).

This naturally brings us to the question of technological change and improvement in agriculture.

4.3. Technological change and agriculture

Technological improvement in agriculture may seem to be paradoxical. If agricultural producers in general face an inelastic demand curve, then improving production technologies, meaning that given inputs will produce more output, seems to be self-defeating: a larger output will after all lead to smaller total revenues. Inventive entrepreneurs are much more likely to focus their efforts in other sectors, it would seem, where improved production techniques would bring greater aggregate revenues.

At the same time, it is clear that agriculture historically has undergone significant technological change as invention after invention was introduced. While a few of these came from outside the sector, most were endogenous: they were created and championed by farmers themselves. Jacob Schmookler in his work on the economics of technological change has collected a plethora of information on agricultural inventions during the last two centuries (Schmookler 1966, appendix), H. John Habakkuk has detailed the history of American and British technological development, showing how a great deal of mental effort was expended on agricultural inventions (Habakkuk 1962). Indeed, the Industrial Revolution was preceded by the so-called Agricultural Revolution (Kealey 1996, 47–59), as technological improvement greatly increased agricultural productivity in the 18th century.

In order to understand the process of technological change in agriculture we can first try to conceive of a situation where all of a sudden, the angel Gabriel secretly informs each and every farmer about a revolutionizing new invention that allows him to double his output of potatoes without using any additional inputs.³⁵ All farmers will then immediately proceed to double output, leading to a doubling of output in the aggregate. What will happen?

Let us assume aggregate sales initially were 10,000 tons of potatoes at a price of $f. 10$ per ton, yielding total revenues of $f. 100,000$. Since the demand for potatoes is inelastic, the price will fall more than proportionately to the increase in supply. Let us suppose the price falls to 1/3 of the initial price, $f. 3.33$. Then, if aggregate revenue for all potato growers were initially $f. 100,000$, a doubling of output to 20,000 tons will result in a drop of aggregate revenue to $f. 66,667.67$ – a clear loss for the potato growers. At the same time, the rest of society is awash in potatoes, and the

35 This example draws heavily on Reisman (1990, 562–68).

purchasing power of their money will increase, as they can now buy more potatoes.³⁶ New uses of potatoes will also be found, as it is now possible to experiment with them at lower cost. For instance, industrial uses for potato starch may be developed.

The fall in revenue to potato farmers means that their opportunity costs are now higher than their profits. The potato farmers will therefore restrict production in the only way they can: lay off workers, sell capital goods specific to potatoes, convert their potato land to other uses or completely give up potato farming. The liberated factors will seek employment across the rest of the economy, where they expect the highest revenue. For instance, laid off workers might be skilled potato technicians who can find employment at close to their former wages in the new industrial processes using potatoes, or they might be unskilled workers and seek employment across the production structure. At the same time, the price of the factors of production specific to potato production will fall to reflect their lower MVP. This will in turn make the production of additional capital goods specific to potato farming less profitable, and this production will therefore also be curtailed, liberating factors to other uses that are now more value-productive.

It will naturally be the marginal producers who will restrict production the most – i.e., those producers who before the change were the marginal producers, since they must now clearly be submarginal and operate below cost. Potato production will continue to decline until the remaining producers are as well off as they were before. Since they can grow double the amount of potatoes with the same inputs, they will break even when the price of potatoes rises to half its initial level, $f. 5$ per ton. We cannot say at what level of supply this will happen, except that it will be somewhere between the initial level of output and double the initial level. We may simply assume that production will be restricted until 15,000 tons of potatoes are produced in a given period, at which point the price rises to $f. 5$. Then the remaining potato producers earn an aggregate revenue of $f. 75,000$, that is, $\frac{3}{4}$ of initial aggregate revenues, while potato production has fallen to a level 50 percent higher than the initial level. The lower aggregate revenue can be distributed in any number of ways across the potato farmers: it is possible that the same number of farmers are still engaged in potato production, and that they have simply diversified part of their production. It is also possible that the number of potato farmers fall more than proportionately to the eventual fall in revenues, if for instance there was a large number of small-scale, high-cost producers. Referring back to chapter

36 The purchasing power of money is really a subjective concept, for while it depends on the objective purchasing power, that is, the array of prices, it is only the prices of those goods that the individuals in question are interested in acquiring that are relevant to his value judgement. Since the potato farmers are not in the market for potatoes (they can presumably help themselves at lower cost directly from their own supply), the price of potatoes does not enter into their evaluation of money. True, the price of potatoes will only be of minor importance in evaluating money in an advanced economy, but it will still play a role.

3 on the theory of agricultural firms, we can say that farms will tend to be of middling size and often quite diversified. This would suggest that the decline in the number of potato producers – as opposed to the amounts produced – is quite restricted. At the same time, some lands are more suitable for potatoes than others, and the less-suited land factors will probably be converted to some other use: since they are less specific to potatoes, they carry a smaller potato-specific rent and are therefore the lands it is least costly to convert to some other use.

These considerations explain how potato production – or any farm-production facing an inelastic demand curve – will respond to sudden increases in productivity from new, more efficient technologies, but we still need to explain the process of innovation internal to agriculture. After all, in the scenario just sketched the farmers were more or less back where they started with the same revenue from potatoes after a lot of costly bother adapting the production structure. Absent the angel Gabriel, why would farmers ever consider innovating, since they get all the trouble while the rest of society gains all the benefit?

The solution is that such increases do not happen all at once across the entire agricultural sector. Rather, they happen piecemeal, as first one farmer and then another experiments with new methods of production, new seed varieties, new machines and so on. Once a profitable invention is found, it will not simply spread across the economy, however: there are costs involved with simply abandoning old equipment and investing in new (Mises 1998, 503–5). Earlier investments exert a conservative influence on current production decisions.

Let us suppose, for instance, that an individual farmer experiments with a new variety of potatoes he hopes will yield much more. Once he harvests the potatoes, he discovers to his great joy that his experiment was wildly successful and that yields have double. Since his share of the market is quite small, a doubling of his harvest does not amount to much; but let us suppose that he supplies one percent of the market. Then a doubling of his harvest represents an increase of only one percent of total output. While the price may still fall more than proportionately, the farmer who pioneered the new seed variety will still virtually double his revenues, and what little fall there is in aggregate revenue will fall on someone else. During the next season, he will probably try to repeat his success or even try to improve upon it. His extraordinary profits from the previous year may have been invested in extending his potato cultivation, and some other farmers may decide to emulate him and also plant the new variety. Let us suppose that the pioneering farmers were responsible for 20 percent of output before the new seed variety was introduced. The other farmers are more conservative, or simply not sure that it was the new variety that caused the increase in output. However, the second season also brings success to the pioneers: yields of the new variety are again

double and total potato output increases by twenty percent while the price falls appreciably now, say 40 percent. The pioneers, however, still profit: they have double the amount of potatoes to sell, which even at such a low price means an increase in revenue of 20 percent – in our example, any expansion of production will be profitable, so long as the price falls by less than 50 percent. The other potato farmers, on the other hand, now suffer substantial losses, as their revenues are 40 percent lower than what they expected them to be. At this point, the marginal producers will probably decide to quit the industry, others will curtail potato production, and the rest will adopt the new method.

Thus, after a few seasons, a pioneering new invention will be adopted, even though it leads to lower aggregate revenue. The key point is that some individuals profit from pioneering and imitating new methods, while those who find it too costly drop out of this line of production. In the potato example, there are no costs to switching to the new variety, but under different circumstances it is possible, even highly probable, for older methods of production to persist. It is costly to scrap factors of production and reconstruct production processes along new lines, and so long as the profits from doing so immediately are not greater than these costs, so long will the older production process continue in use. It may be that the cost of the most modern machines are simply too high, or that it will be too costly to adapt the rest of the production structure to them. For instance, tractors and combine harvesters were first constructed for use on the great plains in America. They may be completely unsuited for use in hilly or mountainous country, and it may be too costly to adapt the terrain to them in other countries, e.g., where fields have been surrounded by hedges and walls. It is therefore natural that the introduction of tractors would be slower in such countries.

Technological improvement in agriculture will naturally take place where it promises to be most profitable. When it comes to products facing an inelastic demand, this means they will be concentrated in reducing the use of costly inputs rather than in increasing output. This is the result Habakkuk (1962) arrived at in his study of technology: since labour was scarce in America, and land plentiful, technological improvement there usually took the form labour-saving devices that allowed each labourer to work as much land as possible. This, for instance, is why tractors came into widespread use in America much earlier than in Europe (Bairoch 1999, 64–66).

A second form of innovation in agriculture is what we may term product innovation: the attempt to come up with new products or improve existing products to increase demand for them. A simple example may be technologies to produce, store and ship more highly-valued products such as meat and butter. Some of the technologies involved, e.g., refrigeration, are outside the sphere of what we

may call agriculture proper, but as we shall see in our historical case study, innovation in both fields were important and closely tied to agricultural development.

We also should not discount simple output-increasing technological developments. Improvements in seed selection and animal breeding are varieties of this: breeding cattle that yield more milk, for instance, can best be understood from the point of view of production as a technological improvement. However, the fact that demand is generally more elastic in other sectors means that there are greater profits to be realized from technological inventions that increase output in those fields. Inventive effort will therefore tend to be comparatively more concentrated in fields other than agriculture. We should not make too much of this suggestion, however: the distinction between a cost-saving and an output-increasing invention is somewhat arbitrary, since we in both cases are dealing with changes that lead to a higher amount of output per unit of input.

A very important form of invention is what we may call capital-preserving or land-preserving inventions. When the German chemist Justus von Liebig, the father of organic chemistry, published important works on chemistry in agriculture in the 1840s this raised a lot of attention, and not simply because farmers became aware of the possibilities of chemical fertilizers. Rather, concern was raised that too intensive methods of production – in particular, producing wheat and other cereals continually on the same land with few rest periods – could deplete the soil, despite appearances of continually healthy crops. While a great deal of experience had already been acquired since the Middle Ages and especially since the agricultural revolution in the 18th century on topics such as fallowing, crop rotation, and so on, a great deal was now invested in developing and disseminating a more scientific understanding of soil conservation.

From an economic point of view, the role of inventions in this field, from crop rotation to soil chemistry, is to maintain the capital value of land. A too intensive cultivation in the present could deplete the land's fertility and thus impair its future ability to yield a crop. To be sure, more traditional practices had aimed at the same goal, but in a less certain manner: through scientific analysis of soil and plants, it might be possible to pinpoint exactly what the key attributes of land are and what is needed to maintain or reconstitute the land in an optimal condition. By improving crop rotation and distribution of fertilizer and by adding lime to optimize the pH of land, one could not only improve present yields, but also get a better hold on maintaining the land's long-term value.

These considerations, however, lead us into considerations of savings and investment, as it is usually necessary to invest heavily to carry out this kind of technical improvement. Lowering

present yields through less intensive cultivation and adoption of improved crop rotations, which may not give a valuable output in the first years, is clearly a kind of saving, as present income is lowered below what it could have been in order to maintain or raise capital values. Indeed, Mises (1998, 513) identified any form of improvement to the production process that increases output without investing more capital goods or lengthening the structure of production as a source of net saving. Since all the kinds of technological improvement we have discussed in this section falls into this category, it is high time to turn to the key topic of savings and economic growth.

4.4. Increased savings and agriculture

The explanation of the process of economic change due to an increase in voluntary saving is a core subject of Austrian capital theory. Notable expositions have been made by Hayek (1935; 2009), Rothbard (2009, chap. 8), Garrison (2001) and Huerta de Soto (2020, 266–346). We will here build on this theory and consider how any special circumstances in agriculture may change the general conclusions of the theory.

4.4.1. Voluntary savings and economic growth

At any given point in time there is a given proportion between present consumption and saving (future consumption), both for each individual and in the aggregate. The structure of production will adapt to this proportion through the entrepreneurial activity of human actors, tending toward a position where there is just enough gross saving to maintain the current capital structure while securing a constant flow of present goods. Spending on consumption will equal net incomes of all factors, and net returns to capitalists will conform to the pure rate of interest, as the price spread between all the stages of production will tend to become equal. In the absence of any change, there will be a tendency for constant spending on consumer goods to result in a constant flow of revenues up through the stages of production and ultimately to the original factors, as the economy approaches equilibrium.

What happens if now the valuation between future and present consumption changes in the aggregate, specifically if future consumption is now relatively more highly valued than it was before? In this situation, individuals will restrict their spending on present consumption and increase their spending on investment. The prices of lower-order goods will fall, as there is now a lower monetary demand, while at the same time the prices of higher-order goods will rise, as the new savers seeking investment opportunities will bid up the prices of factors of production, resulting in a general narrowing of price margins (Hayek 1935, 75–76). Savers will especially seek

investment opportunities in the stages farthest from consumption, as the price-spread between factor prices and expected output will fall slower here than in the stages closest to consumption. New stages of production will also be formed even more distant in time from consumption than the previous farthest stages. This has become profitable due to the lower price-spreads – lower interest rates, and is furthermore necessary to satisfy the increased demand for investment opportunities.

In conjunction with the changing price structure, there will be change in the allocation of the factors of production and in their relative prices. The more non-specific or versatile factors will be reallocated to new, now more profitable uses. Especially will factors migrate from the lower orders to the higher orders of production. Since labourers, taken as a class, is the most non-specific factor there is, the downward pressure on wages in the lowest stages will very quickly translate into a movement of labour into higher stages. This does not mean that labourers will move directly from the most depressed industries to the newly-formed highest-order stages, however. There is some specificity of labour, as time is needed to retrain and not everyone is equally skilled or talented. There may furthermore be great subjective disutility for labourers in moving to the new stages – for instance, the new industries may be in very distant countries. However, the markets for all the different kinds of labour of varying specificity are connected. There will be a gradual migration of labour out of occupations where the wage is now depressed, and into adjacent industries where their talents can be put to use at a higher wage without too much need to for retraining. Skilled labourers will thus probably move just one or two stages, but this will then cause a downward pressure on wages in their new occupation, displacing workers already engaged there. These will then in turn move on to another occupation, as their now lower value-productivity reduces the opportunity cost of seeking employment elsewhere. Unskilled workers are more versatile, and they will be more willing to immediately relocate from the lowest stage to the highest.

Specific factors of production will be affected in a different way, since they cannot be reallocated, or can only be reallocated at a higher cost and after some time. The value of specific factors in the lower stages will fall, as the value of their product has fallen. If they are reproducible capital goods, their production will also be curtailed, until the lower supply has raised prices sufficiently and re-established a positive price-spread between output prices and the factors producing the specific factors sufficient to reward investment in their production. Durable goods specific to the lower stages will probably suffer a fall in capital value, as their lower marginal revenue products outweigh a capital gain due to the lower rate of interest. The case of permanent factors, that is, land, is more ambiguous. Land too will have a lower marginal revenue product in the lower stages of production and as a consequence rents to land will fall. This will translate into downward pressure on land

prices, but the falling interest rate means a lower rate of discount, which will cause an upward pressure on land prices. Since the two effects of increased saving acts in opposite directions, we cannot say anything for certain about the eventual effect on land prices in the lower stages.

The prices of factors specific to the higher stages will tend to increase, as there is a higher monetary demand for them due to the increase in savings seeking investment opportunities. This will lead to an increase in their production, as entrepreneurs now perceive profit opportunities in expanding the production of these specific factors; indeed, industries in the new highest-order stages may have been founded to supply the increased demand for specific factors. The capital value of durable factors specific to the higher stages will definitely increase, as both the fall in the interest rate and the increase in monetary demand for their services act in this direction. The same is true for land factors too. The process of voluntary saving may stimulate entrepreneurs to search for new land factors – mines, rare natural resources, and so on – in hitherto unsettled regions of the world, as the increasing land values means that there are now great potential gains to be made from finding and bringing new economic land into production. This follows from the principle determining the line between submarginal and supramarginal land described above in section 2.3.4. The same will be true for land specific to the lower stages, if the upward pressure on land values outweigh the downward pressure. In all cases, however, land factors specific to the higher stages will always rise more in value than will lower-stage land factors, and new land factors will tend to be searched for or created in the higher stages.

The change in the price structure and the narrowing of price margins will be gradual, but there is one medium where the ultimate effect will be seen almost immediately: the rate of interest on loans (Hayek 1935, 84). Hayek's argument to this effect is lacking, however. He bases it on the assumption that new funds available for investment have to pass through the loan market in order to find profitable investment, and that the rate of interest falls simply due to the higher supply of loanable funds. However, there is no reason to suppose that increased savings has to pass through the loan market. While it is true that the new savings need to be channelled into production, this can take place without an increase in the supply of loans. Savers might invest in financial assets in the secondary market, for instance, driving up the price of bonds and other securities, or they might buy stock in publicly traded companies. They may also invest directly in profitable enterprises, and there is no reason to suppose that this might not be an important form of investment. In a progressing economy of this kind, there is every reason to suppose that investment opportunities will be widespread in the economy and that the savers will not face too many search costs. Net investment might therefore also take the form of taking an equity position in a company, for

instance by becoming a passive or dormant partner in a promising firm.³⁷ The only case Hayek considers, where the saver invests directly in his own enterprise, is also a possibility, although probably usually of minor importance, as Hayek suggests.

The loan rate of interest will still be the first indicator of the new pure rate of interest, however, and we therefore agree with Hayek's conclusion that it serves as a guide to decision-making entrepreneurs. As savers invest directly in firms and capital goods in the ways suggested above, lenders who simply try to find new borrowers as their loans are repaid at maturity will find that there is less demand at the prevailing rate of interest: publicly traded companies can issue shares instead to meet the increasing demand for investment opportunities, and private companies will have to weigh the costs of borrowing in the loan market against the possibilities of direct investment. Lenders will therefore have to reduce rates, and since the loan market reflects the general time market as such, whereas specific investments occur in definite sections of the structure of production, where the expected rate of return is subject to specific influences in addition to time preference, the loan rate will be a reflection of the pure rate of interest and will quickly fall to the new, lower rate – even if no new savings flow into the loan market at all. Indeed, it is possible that savers will positively shun the loan market, as there are by definition plenty of profitable investment opportunities yielding returns above the pure rate of interest as long as the production structure is lengthening and changing. Once these dry up, savings may seek back to the loan market, as this may be the safest form of investing at the pure rate of interest. The result then is that the economy has expanded with the loan market playing no role at all in the expansion.

How exactly voluntary savings will flow into the production structure we cannot know a priori, but the above arguments suggest that direct investment by the savers may be a significant channel. It is still true that the loan rate of interest is an important signpost, however, as it is the simplest indicator to the entrepreneurs of whether their plans will be profitable or not. It is the clearest benchmark with which they can contrast their expected returns.

The outcome of the process of savings-generated growth can be summarized in the following three points:

1. The savings-consumption proportion has changed permanently, as there is now a higher total amount of money spent on investment in each period, while the amount spent on consumer goods has fallen. This means that the structure of production becomes narrower, as the

³⁷ This kind of investment with limited liability probably first arose with the evolution of the medieval *commenda* (R. Harris 2019, 130–70). They are still in use in related forms in different jurisdictions: French *sociétés en commandite*, German *Kommanditgesellschaften*, Danish *kommanditselskaber*, English and American limited partnerships.

amount spent on each stage of production is necessarily smaller than before, and it means that the structure of production is extended backwards in time, as new, higher-order stages of production are added. It also means that the rate of interest, the price spread or margin between the different stages of production, is lower than it was before. A corollary of this point is that the capital value of durable goods and land factors has increased as the rate of discount has fallen. While it is still true that the absolute capital value of some durable goods close to consumption will have fallen due to their lower rent, the ratio of capital value to present is necessarily higher, as the future incomes they embody are now more valuable (Huerta de Soto 2020, 325–26).

2. As the new production processes mature, output will increase above what it was before the increase in savings. Not only will more capital goods be produced, but new kinds of goods will be produced, allowing for new, more productive combinations of inputs and the use of new technologies. The increasing number of capital goods and their greater variety means that there is a more intense “division of capital” making the capital structure more complex (Lachmann 1956, 79–81; Böhm-Bawerk 1959b, vol. 2, bk. 2, chap. 2), which in turn leads to higher returns per input (Strigl 2000, 86). Furthermore, the new, more capitalistic structure of production may also allow for the production of new goods that could not be produced before with the shorter processes. The longer processes of production are therefore clearly more value productive.
3. Since less monetary demand confronts a greater supply of consumer goods, money prices per unit of consumer good will fall greatly. Since the marginal productivity of each factor has increased, and especially since the marginal productivity of the original factor labour has increased, the fall in the rents to the factors of production will be less drastic than the fall in consumer goods prices. In particular, the fall in the wage rate will be minor, and it might in fact not fall at all (Salerno 2003, 84–85). We cannot determine whether capitalists will receive a higher or smaller net income than before, for while the interest rate has fallen, leading to a smaller return on capital, the increase in savings means a larger capital structure and a larger aggregate capital value for all capitalists (insofar as that kind of aggregation makes sense at all). This would indicate a higher net income, and we can therefore not say for certain what the final distribution of net income might be (Huerta de Soto 2020, 344n). However, the price deflation due to the increase in output will certainly outstrip any fall in nominal wages, and the result will be a money wage and interest return of far greater purchasing power (Bagus 2015a, 35–37; Hülsmann 2003d, 51–52).

This short description of the process of voluntary saving follows the orthodox Austrian account in all essentials. We now turn to see how the agricultural sector in particular is changed during this process.

4.4.2. Net savings and agriculture

The fall in demand for consumer goods will have some effect on agriculture, as it must be considered a sector belonging to the lower stages of the production structure. Food is not brought directly from the farm to the dinner table, as many stages intervene between the farmer and the ultimate consumer. This is true today, as a lot of food arrives in a highly processed or finished stage, but it is only less true for earlier times to a minor degree. Flour is a highly-refined product, after all, and grain requires a lot of extra work before it can be milled, packed and shipped to the housewives.

Be that as it may, it is certainly true that agriculture must be considered a comparatively lower stage in the structure of production. However, the fact that the primary agricultural products – foodstuffs – are what we have called basic goods somewhat lessens the impact of the fall in monetary demand. Consumers will generally cut back on luxuries in order to save more, not so much on basic goods. While we could imagine a situation where the whole impact of the fall in demand falls on luxuries, it is more probable that some of it falls on agriculture, as there are some marginal uses that could be saved. The consumption of bread may remain stable, but the consumption of cake may decline, for instance.

The fall in demand will be especially felt on the prices of the specific factor, which in the case of agriculture above all means land. Rents of agricultural land will therefore decline, a tendency that is reinforced by the migration of non-specific, complementary factors away from agriculture and the lower production of capital goods specific to current agricultural production. In particular, labourers will leave agriculture for better employment elsewhere. The smaller supply of labourers and other complementary factors means that total output falls, and perhaps more importantly, that the share of output that can be imputed to land falls. This is so since the smaller supply of labourers mean that the marginal physical productivity of the remaining labourers is higher and that, consequently, the MVP of labour in agriculture must be a greater share of the value of total output. Land rents will therefore decline more than proportionately to the fall in output. Marginal lands will tend to be abandoned, as the complementary factors needed to work them are not available at acceptable prices.

At the same time as rents of land fall, the rate of discount will fall, reflecting the fall in the pure rate of interest. This will set in motion an opposite tendency, as the margin of economic land is moved

according to the principle examined in detail above in section 2.3. Land that was previously considered submarginal will therefore now be considered profitable to use. This may or may not completely counteract the tendency set in motion by a fall in the rent of land, and more land may be put to productive use. It is also important to realize that the lower rate of discount is a clear indication to the farmer that future uses of the factor have increased in value relative to present use. The farmer will therefore act in order to preserve capital values and increase future returns to land (cf. Mises 1998, 634–36).

Such action can take two basic forms: the farmer can decrease present use and output of his land and work on land improvement that was not economic before, but which now, because the farmer expects a capital gain to result from it, has become profitable. It may also be that the capital goods needed for such improvement were not available before at low enough prices – for instance, he may wish to drain his land better, but the pipes and other implements necessary and the machines needed to carry out the work were unavailable. More fundamentally, the needed labour factors were earlier more profitable employed in present production. Now that wages have fallen, the opportunity cost of using labour in improving land has fallen and the farmer may shift labour factors – including of course his own labour – to this use. In other words, internally on the farm we have a shift from the lower stages (work on present production) to the higher stages (work on maintaining and improving the land and other durable and permanent factors).

The farmer may also focus on land use that preserves the land's fertility for a longer period of time. This can mean less intensive cultivation, more attention to crop rotation, better use of fertilizer, natural and artificial, and so on. More attention may also be paid to the scientific researches mentioned in the section on technological change, and the farmer may spend time – his own labour – becoming more familiar with these, or he may hire expert consultants to help him plan the optimal use of his land over time.

The second form such action can take is work on lengthening the agricultural production structure in order that future yields and incomes become higher. This may mean trying out new methods of producing the usual output at lower cost, for instance by experimenting with new seed varieties, or it may mean introducing the production of a new, more costly agricultural product, but in all cases involves shifting land factors to a higher stage of production. Since the rent of land has fallen, the cost of such uncertain experimentation will be lower in terms of income foregone. The example of experimenting potato farmers we used above comes to mind again: it is precisely in circumstances such as these, when there is more capital available and lower opportunity costs in the experimental use of land, that new, uncertain technologies may be tried out. More fundamental changes to the

production structure are also possible, precisely because the cost of change in terms of present income foregone has fallen. New uses of land may very well be tried that in effect transforms it into a higher-order good, an input in a longer, more complex process of production than it was used in before. If we want to illustrate it with the diagram on page 62, the triangles far to the right becomes narrower and those more to the left becomes wider, as land factors are shifted from lower to higher stages of production.

An example may make this point clear. Let us imagine a grain farmer who is in the situation just depicted. His income has fallen, and the implicit rent to his land especially so. He may be in a position where he rents some land. Assuming that he can renegotiate the contract in the short term, the lower explicit rent he pays will make it apparent that the cost of using land has fallen. However, the process does not really depend on whether the farmer pays any explicit rents or owns all the land he works himself. In order to maintain capital values and to secure future returns, he decides to change his production structure and his output. His focus was previously on producing grain, but he decides now to shift to cattle farming. This shift requires some additional net investment up front: he needs to buy the animals, he needs to fit out the stables, and so on. We need not worry how the farmer finances these initial outlays – he may borrow the money or sell a half-share in the farm, or he may finance them out of his own savings. Looking back to what was said in chapter 3 on farm organization, the investing farmer may also be able to draw on familial resources, as close relatives who identify closely with the farmer and the future of the farm might be willing to invest. They will have a clear advantage over external investors, as they have more familiarity with the possibilities in the farm assets and the abilities of the farmer. They may also be willing to take a longer view than a lender intend on regular money payments on his loans, and this too will give this informal kind of financing an edge in an expanding economy.

For now, let us assume that the farmer-entrepreneur finances his investments by simply drawing down his bank account.³⁸ At any given point in time, entrepreneurs have some of their capital invested in cash balances and secondary media of exchange, precisely to allow them to respond to changing circumstances. The farmer in our example simply exchanges capital in the form of money for specific capital goods.

The farmer begins the work of transforming the rest of his farm to production that is complementary to cattle raising. Instead of sowing wheat and similar grains, he lays out his land with fodder crops

38 This is tantamount to a temporary fall in the farmer's demand for money and might therefore best be considered in the next section on monetary changes, but we have included it here to highlight the fact that money too is a capital good to the individual entrepreneur: it is a fund or reserve of purchasing power the individual saves up and it yields him availability, that is, the knowledge that he can meet unforeseen demands without having to worry about financing (Hutt 1956; cf. Mises 1953, 86–90; 1990c). As in the case of the farmer in our example.

for his animals. Since marginal land is now cheap – indeed, available for the asking if it has fallen to submarginal status – the farmer may invest in marginal lands that yield too little in terms of grain and similar current outputs, but which he can therefore transform into pastures at little cost except the seed and labour he puts into it. After a few years, it is clear that – if the farmer was correct in his judgement as to the profitability of cattle breeding – the farm has been transformed into a more profitable, more capitalistic enterprise with a longer production structure. Output has changed into something more highly valued by the consumer – in our case, butter and beef – but which could not be produced before since the complementary factors of production were not available, or not available at economic prices. The farmer now enjoys a steady income from his land worked in a more capitalistic manner, and he can reconstitute his cash reserves that he originally drew on in order to finance his investment.

In summary, the consequences of a period of net saving and investment for agriculture are: less labour available for farming, as labourers are bid away to other, expanding sectors; more capital goods available per farm and remaining labourer; a fall in the rent of land, which may lead to some land factors becoming submarginal; a fall in the rate of interest lowers the margin of what land can economically be used, which may or may not completely offset the consequences of the decline in rent. Agriculture becomes less labour-intensive and more capital-intensive, with less labourers and more capital per unit of land, while the proportion of farmers' capital invested in land is likely to decline.

The two forms of adaptation we have sketched out are in fact complementary and in a sense simply different ways of looking at the same thing. In both cases, present income was reduced in order to increase or preserve capital values, and in both cases future income increased above what it otherwise would have been. This does not simply mean that land values have increased again, however: to the contrary, land as a proportion of agricultural capital will have fallen: in order to carry out their more capitalistic production processes, farmers will have to invest more in capital goods and spend more effort on maintaining these goods – cattle have to be kept well-fed and healthy, fences have to be maintained, but so does drainage systems that may otherwise look like they were an integral part of land. Hayek's description of how factors of production are distributed across different stages of production depending on the rate of discount (1935, 80–83) clearly applies to the changed use of agricultural land factors we have described here. The future uses of land can be considered, in effect, higher-order goods in stages farther away in time from final consumption, and it is therefore natural that, when the rate of discount falls, the uses of land farther away in time becomes more valuable. The complementary factors of production will therefore shift away from

current production – the lowest stage of land use – to future production – higher stages of land use – in the way described above.

Theodore Schultz has pointed out the declining importance of land in capitalistic agriculture, but he argued it was simply the result of “new and better production possibilities and of the path of community choice in relation to these gains” in other words, that the primary factor behind this change was technological development making investment of capital in agriculture profitable (Schultz 1951, 725, 738–40). However, we see from our analysis that the driving force behind this change is increased saving and increased availability of capital goods. As the rest of the economy becomes more capitalistic, agriculture does too.

It may be thought that this result will be detrimental to the foresight and long-term view of farmer-entrepreneurs. Where previously they were mainly focused on farming and maintaining the land, now they have to work with a higher proportion of circulating or short-term capital. Will this not force their focus away from long-term maintenance and toward short-term profits, sacrificing land and nature to capital? Such a result would indeed be detrimental to the long-run prosperity of farmers and society alike, but it is completely contrary to reality. More capitalistic agriculture based on voluntary saving is precisely more focused on the long run, more focused on securing and maintaining land values. That land is a smaller proportion of a farmer’s total capital under more capitalistic processes of production does not, after all, mean that it is not still a major proportion of his capital. Nor should it be forgotten that most of the capital investment as we explained above is precisely in maintaining land and making it more productive. Even in our cattle example where the focus was not on improving the land, one important side effect was increased land-maintenance, as submarginal land was converted into pastures.

The old way of expressing land prices in terms of so or so many years purchase can perhaps help us see this point. If land is discounted by five percent – the pure rate of interest at the time – then people would express the price of land – its capital value – as 20 years’ purchase, since at that rate of discount the sales price would be equal to the net rent of 20 years. If then the pure rate of interest fell to four percent due to a lowering of time preferences, the price of land would be 25 years’ purchase. This does not mean that we should think of landowners’ and farmers’ time horizon as simply a function of the interest rate, but it shows that the lower the rate of time preference, the longer into the future will people plan.

An individual’s personal rate of time preference is obviously not a function of the rate of interest, indeed, the fact that a person is a property owner and a capitalist at any point in time indicates that

his rate of time preference is lower than the marginal rate of time preference. There is an array of time preferences in society, as each individual's judgement in this matter is shaped by many individual factors: his upbringing, cultural influences, convictions, long-term plans, character traits such as constancy, prudence, foresight, and so on. Some people even attempt to provide for their descendants long after their own death (Mises 1998, 496). The importance of the rate of interest lies elsewhere: it is an index of the availability of savings and capital goods in the future. Persons with very long time horizons who attempt to plan a century ahead are still limited by the fact that they are depended on the availability of complementary factors of production. In order to secure future returns it is not enough to simply abstain from present consumption or present use of a good. It must be maintained through time, and complementary factors are necessary for this. The interest rate indicates what the optimal time horizon is, how long into the future there are capital goods available for the work of maintenance. Any rational plan of capital maintenance must take the interest rate into account. Increased saving and a concomitant fall in the rate of interest therefore both makes more capital available for investment and extends the time horizon for which actors can rationally plan.

4.5. Changes in the money relation and agriculture

We have so far only incidentally touched upon monetary considerations in this chapter. We have seen that the three kinds of change we have considered – population growth, technological development, and voluntary saving – all results in a higher output of goods and services. Intuitively, it should be clear that this will cause a price deflation, as we have already indicated, but we need to consider the causal sequence that brings this about, as it only happens through the medium of money and changes in the money relation. We will therefore first consider the process of changes in demand for money originating from changes in the economy, then consider changes in supply of money, before finally considering possible changes in the demand to hold and the quality of money.

4.5.1. Change in demand for money

The money relation, it will be recalled (see chapter 1), is the supply of and demand for money. While the ultimate determination of monetary demand is the individuals' wish to hold money in their cash balance – demand to hold or post-income demand – another important factor to consider is the pre-income or exchange demand for money. This demand is constituted by the supply of all factors of production and consumer goods offered on the market (Rothbard 2009, 756–59). Since the supply of some or all goods and factors has increased as a result of the changes we considered,

so has the exchange demand for money. With a given stock of money, this means that the purchasing power of money has to increase, and since the PPM is simply the inverse of the array of consumer prices, these have to fall. Thus, price deflation necessarily follows on any kind of change in the data of the market that leads to an increased output.

Our analysis does not end here, however. For as a consequence of the higher PPM, the demand to hold money will fall somewhat. The demand to hold is not a demand to hold a given number of physical units of the currency, it is a demand to command a given purchasing power. Since this demand has not been affected by the changing prices, people will necessarily want to decrease their cash balances (Rothbard 2009, 760). For instance, if a person before the increase in PPM judged that a holding of 10,000 florins was adequate for his needs, then he will want to decrease this amount after the increase in PPM. If PPM has doubled, he will only want to hold 5,000 florins, for instance. This decreased demand to hold will somewhat counteract the tendency to a fall in prices, but it cannot outweigh it.

An important function of holding money in one's cash balance is that it affords one the opportunity to respond to unforeseen changes in the economy. With cash ready at hand one can both respond to suddenly erupting crises and invest in unforeseen profit opportunities. An expanding, changing economy is filled with both crises and investment opportunities, and it is therefore natural that acting individuals will draw on their cash balances to respond to these changes. In our example of changing investment in agriculture, net investment was financed in this way precisely to highlight this fact. As conditions settle down, there will be a tendency for entrepreneurs and factor owners to again increase their cash balances in order to be ready for the next unforeseen change. However, since prices have fallen and PPM is greater, they will not increase their cash balances as much in physical terms but only until they command what they deem an acceptable level of purchasing power. The fall in reservation demand is thus smoothly integrated into the process of change. The processes of changing exchange demand and demand to hold of money will act out concurrently: increased investment (decreased demand to hold) spurs production, which after a period of time results in increased output of goods and services. As this increased output comes on the market exchange demand for money increases, while at the same time, entrepreneurs start building up their cash reserves again out of increased revenues. As prices settle at their new levels, the entrepreneurs and factor owners will have acquired the cash balances with the desired purchasing power without necessarily first "over-shooting" their demand. It is possible that some men might modify their demand to hold, of course. Perhaps they were caught off their guard by the changing economy and

want to be better prepared for any future changes. But this is a change in the data of the market and does not affect the process of changing demand for money.

This line of reasoning, *mutatis mutandis*, also fits a retrogressing economy. Thus instead of a rise in the exchange demand for money, there will be a fall, and instead of a fall in the demand to hold there will be a rise. The outcome will be higher prices and a lower PPM and more money units held in cash balances.

4.5.2. Change in the supply of money

Increased demand for money can also spur changes in the stock of money, as a higher PPM means that money production has become more profitable. How will this affect the economy and in particular agriculture?

We can be somewhat brief here as we already dealt with this topic in chapters 1 and 2. Money production will tend to be stimulated by the falling prices and the monetary commodity will be converted from non-monetary uses into money, as the opportunity cost of the non-monetary uses has now increased. There will tend to be a lag between the beginning of the process of expansion and the appearance of profit opportunities in the realm of money production. However, the stock of money will eventually increase until any additions of the money commodity to the money supply will be less than its opportunity cost, either in terms of non-monetary uses of the commodity or in terms of the factors of production needed.

A second source of an increasing money stock is falling costs of production in gold mining and other stages of money production. This can take place through any of the avenues of change mentioned above, but no matter what brings it about, new money will be added to the stock of money until the supply is again constrained by the law of costs and the higher value of gold in alternative, non-monetary uses.

How the inflow of new money into the economy depends entirely on who receives it first and who last. Or more precisely, everyone whose selling prices increase before their buying prices benefit, and everyone whose buying prices increase before their selling prices lose. The result is both a temporary redistribution of incomes and a permanent change to the structure of demand and the price structure (Rothbard 2009, 812, 814–15). The same changes will happen in reverse if the stock of money decreased for some reason. It should be clear that even in a period of general price deflation and increased exchange demand for money, this process will still occur, although it will be more or less hidden.

How these changes in the supply of money spread through the economy depend on the specific data of each case. We can however suggest what the probable influence on the agricultural sector will be in a progressing economy. The holders of new money will want to increase their purchases of the additional consumer goods they rank the highest and invest their money in the projects they deem the most profitable. Since these projects will tend to be located in the higher stages of production, this is where the additional monetary demand will tend to go, and since agriculture, as we have argued, must be considered to belong to the lower stages, farmers will tend to be disadvantaged by the inflow of new money in the production structure. At the same time, the new money going into consumption are likely to be spent disproportionately on luxuries. Those farms that are focused on more basic needs such as grain will tend to lose out, while farmers supplying higher-quality or more prestigious goods will benefit. Ranchers and winemakers can perhaps be counted among these, as well as the suppliers of more exotic goods.

While changes originating on the side of money are often seen as a disturbing element, in this case at least they act in concordance with the changes in demand for consumer goods and the structure of production analysed above. This does not happen by necessity, however. We can imagine a case, for instance, where the gold miners are all very poor and therefore spend most of the new money on food and other necessities, or a case where the gold miners have a particular interest in farming, despite the higher number of profitable investment opportunities in other sectors. In whatever way the new money is spent into the economy, they always supply a real demand, as an addition to the stock of money, in the given circumstances, was more highly valued by the members of society than the production of some other good.

As in the case of demand for money, this analysis of an increase of the stock of money can also be reversed to describe what will happen should the stock of money fall. Prices will tend to fall and people whose buying prices fall faster than their selling prices will benefit while people whose selling prices fall faster than their buying prices will lose out. How the price structure changes depends on where the money first disappears. Here we cannot say anything more definite than that. Since money will be made out of very durable commodities, gold and silver most likely, a fall in the stock of money is, in any event, very unlikely.

4.5.3. Change in the quality of money and the demand to hold

So far we have only briefly touched on changes to the demand to hold. As we discussed in chapter 1, the demand for money to hold rests fundamentally on the owners' uncertainty. Not much can be said about it beyond this. Changes in demand for money to hold can arise from changes in actors'

assessment of how uncertain conditions are and from changes in the quality of money, i.e., changes in its ability to alleviate felt uncertainty. Let us examine each briefly in turn.

Many variables enter into each person's judgement as to the uncertainty of conditions. Periods of rapid change, for instance, are more generally more uncertain than more tranquil periods. Different people weigh different variables when assessing the situation. Some might for instance be more concerned about the possible risk of earthquakes than others, or be more frightened of nuclear war than others. Uncertainty stems not simply from these grand considerations, however. More important is day-to-day questions, such as: will I lose my job? What are the risks that I will have to pay for some emergency medicine in the near future? Will I have to pay for repairs on my car? And so on. More positive factors also influence the degree of felt uncertainty, principally concerning possibilities for buying desirable consumer goods in the near future or discovering profitable investment opportunities. We have already discussed how entrepreneurs may invest in cash balances in order to be able to quickly respond to the negative and positive consequences of a change in the data and what the consequences of this investment is (cf. Mises 1998, 518–19; Hayek 1934, 164; Hutt 1956).

Changes in how uncertain conditions are judged to be will rise or lower the amount of money – in terms of purchasing power – that is held in people's cash balance. If conditions are judged to improve, to become more certain, individuals will shift their wealth out of cash and buy goods and services and may also acquire more secondary media of exchange. This means that prices will rise and PPM will fall, but we cannot say much about how the price structure will change. We only know that people will invest in the units of goods of marginal value on their value scales until they have reduced their cash balance to a level they deem satisfactory. If people become more uncertain about the future, they will invest in additions to their cash balance and the opposite process will take place, with falling prices and rising PPM. Again we cannot say anything about how prices will change except that people will restrict purchases of units of goods of marginal value on their value scales until they are again satisfied with the amount in their cash balance.

Change in the quality of money can also affect the demand for money (cf. Bagus 2009; 2015b on the concept of quality of money). Any deterioration in the important attributes of the money commodity will decrease its quality and lessen its attractiveness for money holders. The most important attribute next to its marketability is its purchasing power: high-quality money will have a stable or increasing purchasing power, since this means that people can hold onto it for a long time without having to worry whether it will command the purchasing power they want once they eventually have to use it. It has to be a good store of value, in other words. If the quality of money

falls, if for instance constant or increasing additions to the supply of money lead to price inflation, people's faith in their money's quality may fall, and eventually it will fall if the price inflation becomes a constant feature. Since they can no longer count on their money having the same value in the future, people will reduce their cash balances. However, a fall in the quality of money is independent of changes in people's felt uncertainty. This means that they would still prefer to have the same amount of purchasing power available, and they will therefore seek for substitutes for money. This can be the secondary media of exchange, provided that they are better stores of value than the inflationary money commodity. In general, we can say that people will seek for substitutes whose price rises as fast as or faster than the rate of inflation, and which can be sold for money at little cost when and as needed. Such a deterioration of money's quality is extremely unlikely under free-market conditions and private production of commodity money, however.

It should be clear from what we have said so far that an economy undergoing secular growth will tend to have a higher-quality money, as the price-deflationary tendencies will tend to act ahead of additions to the money supply. Lower-quality money can result from a retrogressing economy, since price inflation will appear for a time. These tendencies are transitory, however, and only last until the purchasing power of money has adjusted to the change in condition. The most probable situation is one of high-quality money with a stable or slightly rising purchasing power. The only conceivable case of a long-term fall in the quality of money is if some invention is made which reduces the cost of production of the money commodity to a negligible amount, making money production virtually costless. Quality reduction is however an important aspect of money production in interventionist orders, so we will have more to say on the topic in a later chapter.

4.6. Conclusion

We have in this chapter investigated the place of agriculture in the changing economy, especially the progressing economy, and how monetary and real factors affect farmers and their farms. We can now conclude the following.

In a progressing economy the role of agriculture will tend to decline relative to the rest of the production structure: new investment will mainly focus on the higher stages of economy and lead to increased production of non-farm goods. This should not surprise us, since agriculture mainly produces goods to supply basic needs. Economic progress should therefore mean increased availability of non-agricultural consumer goods. The only exception to this rule would be a society that experienced population growth but no net investment.

At the same time, we saw how increased savings led to changes within the agricultural sector. Factors of production would tend to shift to the higher stages and agricultural production would become more capital intensive, as more complementary factors of production and new capital goods were invested to increase or maintain capital values and change production to more valuable output. At the same time, as the rent from land factors in lower stages fall while the rate of interest increases, more land would be shifted to higher-order uses, and, depending on the specific data of the case, previously submarginal land would be put to productive use. Cultivation of land would in general become more focused on maintaining long-term output and capital values. Capital accumulation and more capitalistic methods of production thus naturally lead to a fall in the proportion of land in the total of farm capital, although this can be offset by the appropriation of new land factors.

There was no systematic change to farm structure from any of the kinds of changes we examined. Apart from becoming more capitalistic when voluntary savings increase, there proved to be no reason to suspect that change led to either concentration or dispersal of land or other capital. While we have only incidentally touched on the role of loans and external finance in this chapter, there has been no reason to suggest a special dependence on credit markets for financing. Indeed, we saw that we could just as well conclude that net savings would lead to a smaller role for credit markets in the economy, as direct investment would be more profitable in a progressing economy. However, as changes in the capital structure was key in all the processes of change examined, the sources of new capital and methods of rearranging capital are clearly important for guiding the development of agriculture. Chapters 5 and 6 will deal in depth with the questions of finance.

The character structure of society was also changed. Farmer-entrepreneurs and all other actors would tend to become more focused on the long-term and display more foresight as a result of increased savings. This is not simply because they would change their value judgements, but because certain behaviours and character traits would be rewarded by the changing incentives. In particular, persons who displayed more foresight and had lower time preferences proved especially well-placed to benefit from the changing production structure. At the same time, the increased availability of complementary factors of production made new kinds of capital and land maintenance possible, and the fall in the interest and the related emergence of a price structure longer into the future made it easier if not to say possible to rationally plan action and the use of one's property longer into the future.

It is also important to underscore the possibility of the different kinds of changes we have considered mutually stimulating each other, leading to further dynamic change. Thus, increase in

savings may stimulate higher population growth, as there is an increase in real wages and in the flow of future consumer goods. Technological innovations, themselves stimulated by more people specializing in their own tasks and the greater availability of capital goods may in turn make further investments profitable, stimulating savings. Perhaps most significantly, the character structure will change, as people will emulate those persons who have proven to be most successful. Foresight, good judgement, and long-term rational action have all been rewarded (in the aggregate; there can very well have been entrepreneurial errors committed by people with these character traits as well) and will therefore be emulated, as will the more general world-view of the people who especially display these traits. This is also true in the field of population growth: those who have better-planned their greater offspring will have benefited without severe reductions in their standard of living, while those who have planned this aspect of their lives more poorly will suffer from a reduced standard of living.³⁹ The natural order in this way fosters the growth of what Wilhelm Röpke (1960, 130) called a *nobilitas naturalis*, a natural elite

that forms and is willingly and respectfully recognized as the apex of a social pyramid hierarchically structured by performance (...) an elite deriving its title solely from supreme performance and peerless moral example and invested with the moral dignity of such a life.⁴⁰

We found no clear-cut deleterious impact of changes in the money relation on agriculture, or the rest of the economy for that matter. This is not because money is neutral, but because in the free-market order its production is subject to the same economic laws that the production of all other goods is. This will not be the case under interventionist orders, the subject-matter of later chapters.

39 Hülsmann (1999) suggests that some religions, for instance, and especially Christianity, is complementary to rational discourse and action. If that is so, then Christian attitudes will clearly be conducive to long-term secular success, and become attractive for purely worldly reasons. Bastiat (1996, 427–31) makes similar positive claims on behalf of Christian sexual morality.

40 Bastiat (1996, 440) too made the point that a free society and progressive capital accumulation would lead to the growth and spread of the beneficial norms of a small elite.

5. Agriculture, Finance, and Money

5.1. Introduction

We have so far not dealt with the financial sector and its relation to agriculture. This is an important issue, as modern interventionist monetary systems to a great extent create money through the banking system. It is therefore important to consider financing in agriculture under commodity money. We have already examined the most basic case of financing in section 4.4.2: Net savings and agriculture in chapter 4, when we simply assumed investment would take place out of accumulated cash balances. As we shall see, other means of financing are possible, although this kind of self-financing is likely to be prominent.

Finance essentially means providing the means needed to reach an end. In the market economy, it virtually always takes the form of advancing the capital (in the form of money, a present good) needed to produce (more valuable) future goods. As such, we can distinguish between self-financing out of present income or accumulated cash reserves on the one hand and external financing, borrowing from other persons, on the other. Although it is this latter kind of financing people usually think of when referring to finance, even in the contemporary financialised world there is a lot of self-financing. Every time a businessman pays his employees out of present revenues, he is, in effect, engaging in self-financing, as he advances the means needed to produce future goods.⁴¹

We will first examine the various needs and sources of finance in agriculture. These can basically be divided into two categories: short-term and long-term needs. Short-term needs for financing are derived from the infrequency of income streams in many types of farming. The typical case would be the farmer who sells his product once a year after the harvest. Since his expenditures are likely to be much more evenly spread over the year, this will create a mismatch between income and expenditures. One possibility is that the farmer simply saves in cash and draws down his cash balance between harvests, but he could also use external finance to supply his needs for short-term working capital. Long-term needs for financing arise from the nature of farming highlighted in chapter 2. The substantial amounts of land factors used in farming mean that a lot of fixed capital is bound up in land, and the amount of capital needed to acquire a working farm is therefore greater

41 A secondary demand for finance comes from the wish to economize on the need to move money back and forth by means of bills of exchange and similar credit. See Heilperin (1939, 118–21) and Cantillon (2010) for classic discussions. For present purposes, we can simply assume this to be a subsidiary of short-term finance.

than other businesses yielding a comparable income. Again, the farmer-to-be could save up the entire sum needed, but alternative sources of finance may be available to him.

What the sources of external finance for agriculture under the natural order of money production may be is highly speculative; we have found virtually no discussions of agricultural finance from eras and countries where significant monetary interventionism in the form of credit expansion was unknown. Nevertheless, we venture a few general remarks as to the sources and significance of external finance under these circumstances.

We then turn to examine the consequences of credit expansion and fiat money for agricultural finance. This introduces the more empirical chapters that follow, which examine some historical case studies of agriculture under the classical gold standard and in the post-war fiat-money order. As such, the remarks in this section are far from a complete discussion of the possible permutations of monetary interventionism. We focus narrowly on describing the systems that have actually existed and which are of most relevance for modern questions of agriculture and finance. As we will see, fiat money and credit expansion has not only led to a change in the sources of financing, although this change is impossible to quantify, since the counterfactual is unknown; it has also changed the structure of agricultural production substantially.

5.2. Agriculture and finance

We can divide the possible demand for external financing into short-term and long-term needs, or we may say that he needs to finance his working capital as well as his fixed capital.

5.2.1. Short-term finance in agriculture

The relative low frequency of income payments is the principal short-term cause of demands for credit in agriculture. This is not a universal truth, as it depends on what line of production the farmer is in. Dairy farmers have a near-constant stream of income while cereal farmers – in temperate zones where only one harvest is possible per year – receive virtually all their income for the year once per year. In the reality of mixed farming, the same farmer is engaged both in some kinds of production yielding frequent income payments such as dairy farming or hog raising, and other kinds yielding less frequent income such as growing wheat. In this case, the farmer might conceivably finance all his outlays out of present income, although it is likely to prove insufficient.

In order to finance their expenditures throughout the year, farmers would then have to maintain large cash balances, i.e., invest a sizeable proportion of their capital in holding money.

Alternatively, external finance can cover farm expenditures until harvest time, when the farmer can settle his accounts. Such credit can take three basic forms: credit from his suppliers, advances from the farmer's buyers, or loans from third parties. Such third parties could be banks providing the farmer with overdraft facilities, but we will not introduce banking just yet. If we accept Sir John Hicks' (1989, 56) definition of a bank as a company that accepts deposits, discounts bills and make advances (out of deposits) to its customers, banking is bound up with money creation through the extension of credit. However, it is quite conceivable that other lenders would exist in the absence of a money-creating banking system. For now, we're simply confining ourselves to the question of financial intermediation, leaving the complications introduced by credit expansion for later.

How would the farmer decide on what source of financing to rely on for his short-term needs? The decision would depend on a comparison of the interest or yield foregone in keeping a large cash balance versus the interest he would have to pay on credit from the three sources. Since money creation is ruled out for now, the rate of interest would depend on the supply of real savings and consist of the pure rate of interest plus a risk premium specific to the lenders' appraisal of the farmer's credit. The farmer will then choose external financing, if the expected yield from investing the capital he would otherwise have to keep in cash balances outweighs the costs of borrowing. However, under a commodity money order, the money is likely to be of high quality, as described in chapter 1. Price deflation and thereby slow appreciation of money is likely to be the order of the day, and under these circumstances the farmer's valuation of cash holding will be higher. A higher degree of cash holding is therefore likely to be acceptable to the farmer, as to all individuals in such a world, and the demands for short-term credit will as a result be lower, if there will be any such demand at all. Self-financing is likely to dominate: "If the real return on holding money increases, so will self-financed investment over a significant range of investment opportunities" (McKinnon 1973, 60). Instead of being standard practice, short-term credit will more likely be an emergency measure.

Will this lower degree of external finance lead to less investment or a less flexible and adaptable agricultural structure? Looked at from one angle, it might seem so, since the proportion of capital invested in money – in idle capital, in Mill's (1909, bk. 3, chap. 11, § 2) phrase – will be greater. However, money is not simply idle, it provides its owner the service of readily available purchasing power (Hutt 1956). An individual who holds more money will, it is true, invest less in other assets, but he will also be more resilient in the face of adversity. Sudden unforeseen shocks and challenges would not result in serious disturbances to the farmer's production, beyond what disruption the shock itself constituted, that is. The farmer would simply be able to draw more on his accumulated

cash balance to weather the storm, although that might later require him to borrow short term, if he wanted to reconstitute his cash balance before his expected time of income payment. That his balance sheet was unencumbered by loans would itself make him a more attractive borrower. Greater cash balances and less systematic reliance on outside financing for short-term needs would make both the individual farmer and the agricultural sector as a whole more resilient, and adverse events would be less likely to cause widespread crises or distress.

5.2.2. Long-term finance in agriculture

The importance of owning land for the agricultural enterprise means that farmers have a greater challenge than other enterprises in financing their firms. Since the capitalized value of farms will be greater than other enterprises with comparable revenues but which use land factors less intensively, it will be more expensive to acquire a working farm than some other kind of business. Owners of loanable funds will realize that farmer-entrepreneurs control very capital-intensive firms that are, at the same time, peculiarly illiquid (P. J. Barry and Ellinger 2012, 8) although of high value.⁴² That is to say, they are illiquid in the sense that a greater proportion of fixed capital is needed for a given amount of income. It is a reasonable expectation that such a capital structure should lead to a higher proportion of debt financing (O. D. Hart 1995, 141).

Land, however, except for marginal land, is also good security for loans. Losses from failed production decisions or the failure of crops will not wipe out the value of the land – its future capacity to produce is not diminished by such losses. So long as the loans secured on land are small, that is, only a fraction of its market value, even dramatic changes in the data of the market leading to great reductions in farm revenues and hence in the capitalized value of land do not jeopardize the loans so secured. This means that the risk or entrepreneurial component in lending secured on land is very small, and we should expect there to be a ready supply of credit secured on land. Mortgage holders are also likely to take a hands-off approach: so long as the contract is honoured and mortgage payments are made on time, the farmer is left alone to carry on his business. The mortgage-holder is content to let the farmer carry on his business as he sees fit secure in the knowledge that the security for the mortgage is very good. Of course, variations are possible: very risky loans may be secured on land, if the farmer raises funds in this way for his entrepreneurial investments, and in this case the mortgagee or bank might take a more active interest in the operations of the farm.

42 This is contrary to Keynes' (1936, 241–42) proposition that a high liquidity premium attaches to land. Cf. Hazlitt's (2007, 247) critique on this point.

This, however, does not mean that external long-term financing of land will always be needed or sought. It is not impossible to save up the funds needed to buy land or whole farms, it will simply take a little longer. Furthermore, many trades of farm and farmland are made between family members, most typically when parents sell to children. Family loyalty will likely ensure that informal and easy terms will be possible. Instead of parents selling the farm outright, they may in effect lend some of the capital needed to finance the purchase in return for a priority or first lien mortgage on the farm that is gradually paid out or transferred to their other heirs. Similarly, in cases of inheritance, the farm may be split among the heirs or, what is more likely assuming the farm is a going concern, it will be transferred to one heir and the coheirs will get a claim or priority in the farm that is gradually paid out. In the event that the heirs cannot agree, outside financing may be necessary to allow one heir to buy out the others. This necessity is by no means general but rather restricted to such special cases.

Long-term credit would likely be decentralized and peer-to-peer rather than centralized around financial institutions. Such institutions would only have an advantage if there were secondary markets in which standardized securities could be sold. As we shall see in chapter 8, this did happen historically, seemingly disconnected from any kind of monetary interventionism.

In a decentralized credit market, intermediaries or brokers would match savers with borrowers, a fact that is well-attested in history (Hoffman, Postel-Vinay, and Rosenthal 2019). Unfortunately, this kind of credit is very hard to quantify, since the historical periods when such financial institutions were prevalent did not produce complete records of all financial transactions, or when they did these have not yet been fully investigated. Hoffman, Postel-Vinay, and Rosenthal (2019, 3) in their study of the French credit market in the 18th and 19th centuries suggest that the stock of debt as a percentage of GDP fluctuated around 20 percent with a high of 27.2 percent in 1840. All uncertainties about these magnitudes aside, two generalizations about the French case seem safe:

1. While there was a thriving credit market with notaries acting as intermediaries, this was clearly a secondary source of finance: 20 percent of GDP is an even smaller fraction of the capital available to the farmers.
2. There was no systematic tendency toward a change in the level of indebtedness. There seems to have been a stable demand for credit, and this in the face of positive capital formation (Grantham 1996).

This finding contradicts the notion that the expansion of credit markets is necessary for economic development (Levine 1997; Beck and Levine 2018). However, this should not surprise us, since the

introduction and expansion of credit markets is virtually always synonymous with credit expansion. While banks and other intermediaries may help reduce search and transaction costs and thereby help allocate capital more efficiently, a point that has not yet been proven, it thus also leads to monetary disorders. In general, it reduces the quality of money by making the money supply more elastic as it expands with the flow of new loans. This is important since, as Ronald McKinnon (1973, 63) has pointed out, there is a positive relation between the quality of money – or the real return on holding money, in his terms – and the quality of the capital stock. Since inflation reduces the return on holding money, the result of inflationary institutions will be a systematic reduction in the quality of money and the quality of the capital stock.

Since quality is a subjective term, we need to make clear exactly what is meant. Clearly, the farmer will always act and invest in a rational and purposeful manner in his pursuit of psychical and monetary gain. However, when he cannot reliably save in the form of cash, he will engage in plain saving and have larger stocks of various inputs than otherwise, or he might invest in durable consumer goods. He may buy more land, although he can only employ additional land factors in a suboptimal way. Alternatively, he may purchase financial assets. However, all these investment patterns make the farmer less productive and less resilient than he otherwise would be. He will be less productive since his combination of capital goods no longer follows the pattern of what would be most productive but is in part determined by what the farmer thinks will best preserve purchasing power. And he will be less resilient, because his stocks of productive factors, while helpful in situations calling for their specific services, are useless when the emergency is in some other part of his production structure. Had the farmer simply maintained a higher cash balance, he would have been able to employ his capital much more efficiently to deal with the emergency by hiring the required help or buying the needed capital goods. Instead, he will have to borrow the funds for these purposes.

5.3. Agriculture and credit expansion

As money is never neutral, it would be a mistake to think that money production exerts no influence on the structure of the economy. Money is by its very nature a dynamic agent in the economy (Mises 1990b, 74), and as such changes in both the supply of and the demand for money necessarily cause changes in economic relations across society. We have in section 4.5: Changes in the money relation and agriculture, pp. 120-125, examined the effects of changes in the money relation and found that there were no systematic distortions introduced when only commodity money was in use. However, when money creation becomes tied to the financial system, this changes. Through the

process known as the Cantillon effect (Sieroń 2019), the first receivers of new money benefit while later receivers lose out. When money is created through the financial system, the benefits are concentrated in finance and in those sectors of the economy with the easiest access to finance.

The process of credit expansion by the banking system is one main channel through which money is created in the interventionist system. It virtually always rests on special privileges granted to banks, as they otherwise would not be able to convince their customers that claims on the bank are good money substitutes (Hülsmann 2003b). Banks take in deposit and advance loans to their customers, creating new money by granting credit (Hicks 1989; Yeager 1997). The exact process of credit expansion has been examined in great detail (Mises 1953; Huerta de Soto 2020) but is not of primary concern here. What concerns us are the consequences for the structure of farming. However, the exact details depend on the institutional setup in each specific case, and we will therefore leave the bulk of the discussion for later chapters. For now, we will only describe the effects in the most general terms that are always applicable.

When banks extend circulation credit *ex nihilo*, they can engage in financial dealings virtually costlessly, since the money they loan out literally did not exist before the loan was made. In this way, they can lend at less than the market rate of interest, making loan financing more attractive than it otherwise would have been. It now seems reasonable for more people to borrow money instead of self-financing, since they don't have to pay the market rate of interest. Farmers who would otherwise principally use their own funds for their working capital will increasingly switch to loans. It makes sense to economize on money now, since the gains from holding money over lending is less.

This tendency is reinforced by another consequence of fractional reserve banking. In order to be able to extend credit, banks need some reserves in the form of deposits. They will therefore try to attract new depositors to increase their reserves, most prominently by paying interest on deposits and by facilitating easier access to the money on deposit. When banks pay interest on deposits, the idea of saving in cash makes even less sense to the farmer. He may be sceptical of banking, but as the institution gains ground, those who use banks clearly benefit more than the die-hard cash hoarders. The money in the bank is just as valuable as hoarded money and it earns interest. It will therefore be reasonable for farmers to keep more and more of their money in the form of bank deposits. In order to earn interest and more easily gain access to the other payment services offered by the bank.

These two processes are in practice not independent of each other; it might be that the bank as a precondition of granting credit requires the borrower to keep his money on deposit, further extending the bank's ability to grant new credit, and it is in any case easier for the borrower to do so. There is thus a twofold transformation of the farmers' assets: 1) they increasingly finance short-term or working capital out of short-term loans from their bank, rather than by holding larger cash balances; 2) what money they do hold will increasingly take the form of bank deposits, since these are often more expedient or less costly to spend.

A farmer's balance sheet will therefore change in the following way: there will be a decline in equity, as he takes on liabilities to finance his working capital, and the proportion of money among his assets fall, as he can now draw on lines of credit from the bank instead of holding cash. All this is perfectly rational from the point of view of the farmer, but the systemic consequences are contrary to his interests. He is now dependent on the bank both for a line of credit to finance his working capital and for access to his own funds. However, in a crisis situation, such as is bound to emerge due to the business cycle set in motion by bank credit expansion, the bank is likely to cut back on its credit. It finds that it has overextended its resources and needs to restrict its loans. The funds the farmer thought were available to him to finance his ongoing concern thus disappears or are only available at a much higher rate of interest. Similarly, the funds he had on deposit with the bank may not be available to him. He thought they were just as good as gold, but as a liability of the bank, it is clear that they may be temporarily frozen, as the bank tries to extricate itself from the crisis, or they may evaporate if the bank goes under. Bank liabilities are in reality never as secure as money proper and trusting it turns out to have been a mistake (Hansen 2021).

The results are that the agricultural sector as a whole becomes more dependent on the financial system and less resilient, that is, less able to ward off unforeseen challenges out of the farmers' own resources. On the contrary, a crisis situation will see the farmer even more dependent on the banking system, or if the crisis is a financial crisis, he may have no resources to fall back on.

5.4. Conclusion

These brief remarks serve as an introduction to the next chapters, where we will examine historical episodes of monetary interventionism in more detail. We have seen here that there is no special requirement for financing in agriculture, despite the large capitalized values concerned. Mortgage financing plays some role, but economic theory indicates that this role would be strictly subordinate in commodity-money regime, since the high real return on money will lead most investment to be financed out of monetary savings.

In the following chapters, we will consider first an episode under the classical gold standard, and then the more recent experience of European agriculture in the post-war monetary system.

6. Monetary Interventionism and the Financialisation of Agriculture

6.1. Introduction

Monetary interventionism can take many forms, from simple legal tender laws and monopolistic control of mints (Hülsmann 2004a), over privileges for banks issuing money-substitutes (Huerta de Soto 1998), to complete control of the money supply in a fiat money regime. A complete enumeration of all possible interventionist regimes would, however, take us too far from the topic of our inquiries.⁴³ Instead, in this chapter we will focus on the today most relevant form of monetary interventionist: a fiat money regime controlled by the central bank coupled with money substitutes provided by private banks in the form of bank liabilities (banknotes and deposits). While such bank money are provided competitively (Selgin 1988), they rest on a foundation of legal privilege and central-bank support in the case of financial trouble for the banks, whose liabilities circulate as fiduciary media. Therefore, despite appearances, it falls into the category of monetary interventionism. The competitive, free-market production of money – with whatever banking and financial institutions might evolve under such settings (see the discussion in section 1.4, pp. 16-21) – is the true benchmark for comparison.

The outlines of a monetary system of fractional reserve banking based on fiat money will here be presented for comparison with competitively produced commodity money. Throughout the emphasis will be on the effects on agriculture, rather than on the consequences for the whole economy. There are some basic differences from the competitive order that bears emphasis from the outset. In a fiat money system, there is a tendency toward permanent price inflation, which adds an incentive for people to go into debt rather than hold money (Hülsmann 2016). In general, people with assets that can serve as good collateral for loans will benefit from this process, as asset prices will increase. Houseowners is one group who clearly benefits, and we may landowners. The non-neutrality of money creation must also be emphasized (Cantillon 2010; Sieroń 2019). Early receivers of new money benefits at the expense of later receivers. With fractional reserve banking, money is primarily created by banks and therefore banks and their customers are the primary beneficiaries of money creation and the economy is reoriented towards the banking sector.

43 An earlier version of this chapter did include such a complete enumeration. Overzealous in obeying the suggestions of my doctoral supervisor, this discussion was scrapped *in toto* and the present chapter substituted for it. Hence the somewhat abrupt jump to discussion of fiat money and financialisation.

One of the key long-term consequences of the fiat money system on agriculture and the economy in general is the process known as financialisation. There is a burgeoning literature describing the processes and effects of financialisation, both in general and with respect to agriculture in particular (Fairbairn 2020), which we will review critically in this chapter. This literature is generally critical of the way the modern financial system works, most often depicting it as a way of skewing the distribution of incomes in favour of a financial elite (Krippner 2012) and in the process rendering the economic system more fragile. As we shall see, however, these writers rarely pay attention to the possible role of different systems of money production in explaining the development of modern finance, a blind spot they share, paradoxically perhaps, with the mainstream approach to financial markets and institutions.

By focusing on the role of money creation, we can also see how the process of financialisation began long before the early 1980s, when it is usually assumed to start – and clearly does so, if we focus narrowly on financial markets. However, the connected process known as the “agricultural treadmill” (Cochrane 1958; Russi 2013) began much earlier, in the late 1940s, and its cause too is to be found in the greater scope for credit expansion in the monetary system set up after the Second World War. Not only does money creation by the banking system lead to greater reliance on bank credit for capital, it also systematically changes investment patterns.

In order to explain the increasing role of financial markets and institutions in the modern economy and what consequences this has for the organization of agriculture, we need to examine how the causal connection between money creation and credit expansion systematically favours debt over alternative ways of acquiring capital. Contrary to how mainstream accounts of the financial system portrays matters, banks are not simply credit intermediaries. Rather, due to the institution of fractional reserve banking and the widespread acceptance of fiduciary media, they create money in the very act of lending. Whereas writers on financialisation are usually very critical of the role of finance, the more mainstream textbooks (Mishkin 2019; Cecchetti and Schoenholtz 2017) consider financial intermediation through credit markets and banking a crucial element of a well-developed economy. However, the mainstream literature too has a blind spot when it comes to how the production of money impacts the financial system. We will therefore provide a somewhat detailed account of the “hierarchy” of financial assets and especially of the place of demand deposits – virtually the only form fiduciary media takes in the modern world – in this hierarchy in order to show the consequences of money creation through the financial system.

First however, we need to provide a definition of finance and financial assets. Finance, probably etymologically from the French *fin* or Latin *finis* meaning end, means the provision of the means for

an end. Its usage is restricted to the catallactic sphere, so the end finance aim at is monetary revenue or yield. Financial assets are simply the individual assets used for this end. In this widest sense, “financial assets” is coterminous with “economic goods,” insofar as these are producer goods and not consumer goods. However, finance does not deal with the physical aspects of goods, only with titles or claims that are sources of revenues precisely because they are titles and claims to economic goods used in production.⁴⁴ The proper sense of financial assets is therefore all titles and claims to economic goods from which a revenue can be derived, whether it be a property right (equity) or a form of loan. More narrowly, finance refers to loans, whether they be bonds or direct loans or overdraft or similar liabilities. Financial assets is thus what secures an entrepreneur control over the economic goods needed for his production plans.

Any description of financial markets and financialisation in the modern economy that does not take account of the influence of the production of money is lacking, and it is therefore crucial to understand the place of demand deposits in the financial system, since they are also a crucial component of the supply of money. The literature on free banking (Selgin 1988; White 1999) and the Austrian literature on money and banking (Rothbard 2008; Huerta de Soto 2020) go a long way to explain the interrelations between finance and money creation. These works are a necessary complement and correction to current theories of financialisation, as the absence of a clear understanding of the links between money production and the financial system necessarily leads to an erroneous understanding of the processes involved in financialisation and its effects on the real economy.

6.2. Financial markets and institutions

Before going on to discuss monetary interventionism and financialisation, let us first briefly consider how the financial system works according to some of the most popular textbooks (Cecchetti and Schoenholtz 2017; Mishkin and Eakins 2018; Mishkin 2019). Financial markets serve to channel funds from people who have no productive use for them to those who do. In doing this, they promote economic efficiency and growth (Mishkin and Eakins 2018, 42, 57).

Important in the modern financial system are especially financial institutions that intermediate between lenders and borrowers. Again, the standard account is purely in terms of economic efficiency: banks and other intermediaries pool savings and reduce transaction costs, diversify risk for savers, and overcome the problems of asymmetric information and adverse selection (Mishkin

⁴⁴ If it were somehow possible to amalgamate all the balance sheets of all persons and companies in society, so claims and obligations would net out on the asset side, the net sum of financial assets would constitute the liability or passive side of the amalgamated balance sheet.

and Eakins 2018, 176–87; Cecchetti and Schoenholtz 2017, 275–81). In doing so, again, they greatly enhance economic efficiency and speed up economic growth, as capital is allocated to the most important uses. This also explains why financial intermediaries have such an outsized role in the economy, being the source of far more than half of all external funds of major developed economies (Mishkin and Eakins 2018, 176).

On the other hand it seems premature to assume that the role of financial institutions is the *sine qua non* of a well-functioning economy. Over the period 1970-1994, in fact, over 80 percent of all investment by businesses in the U.S. and the UK was financed through internal funds, not loans (Cecchetti and Schoenholtz 2017, 291). However, the role of financial markets and institutions should perhaps not be measured by the total amounts lent, but rather by their role in securing funding on the margin to entrepreneurs. To explore this issue, we will review the main ideas on the relation between finance and economic development in the next section.

6.2.1. Finance and economic development

The importance of well-functioning financial institutions for economic development is agreed upon among most economists and historians dealing with the subject. One early example of the general importance of finance is Schumpeter's *Theory of Economic Development* ([1911] 1949). While it is most famous for Schumpeter's depiction of the innovating entrepreneur, a crucial element in his theory is the extension of credit by bankers to entrepreneurs. In the absence of credit creation, the Schumpeterian entrepreneur cannot get off the ground. Among the classic works on finance and economic development Gerschenkron (1962, 11–16) emphasizes the role of the *Credit Immobilier* for industrial development in France in the second half of the 19th century, as well as the many banks erected across the European continent in imitation of it. Rondo Cameron and his co-authors, in their classic study of the role of banking in industrialization (Cameron et al. 1967), find that banks played an important role both as depositaries – pooling savings – and as financial intermediaries. Interestingly, they often found that mortgage credit, especially in Germany, and not commercial bank credit was important for industrial investment in the first half of the 19th century, as entrepreneurs could use real estate as security for industrial loans (ibid., 176). Raymond Goldsmith's (1969) study of *Financial Structure and Development* looked at the record from 35 countries over the century 1860-1960. While he clearly established that financial markets and institutions grow in size – up to a point, at least – he shrinks back from concluding that bigger, more efficient financial markets caused economic development. McKinnon (1973), finally, examines the role of capital markets for development, but unlike the previous works, he also explores the

importance of monetary factors for economic development and in relation to the importance of financial institutions.

More recently, Levine (1997; 2005) has argued that the development of finance is important for economic growth, precisely for the reasons given in the textbooks: by alleviating transaction and information costs, financial systems facilitate the efficient allocation of resources across time and space. This in turn boosts economic growth through capital accumulation and technological innovation (Levine 1997, 691). In a Schumpeterian model, where economic growth depends on entrepreneurs producing technological innovations, it has been shown that economic growth ultimately depends on the innovative financiers who sponsor the entrepreneurs (Laeven, Levine, and Michalopoulos 2015; Aghion, Howitt, and Levine 2018; cf. Aghion and Howitt 1992). Several studies have also been made in recent years (Demirgüç-Kunt and Levine 2001a; Beck and Levine 2018) that all seem to confirm the positive role of finance in economic growth. Financial development, concludes the editors of one of these volumes (Demirgüç-Kunt and Levine 2001b, 11), “tends to accelerate economic growth, facilitate new firm formation, ease firm access to external financing, and boost firm growth” and while the structure of the financial system – whether it is bank-based or market-based – is irrelevant, financial development matters for economic success (ibid., 12). A report by the World Bank also claims “a clear causal link [from a well-developed financial system] to growth, macroeconomic stability, and poverty reduction” (World Bank 2001, 32).

There are some important problems in this literature. First, only McKinnon examines the role of money at any length – indeed, monetary factors seem to generally be ignored in this literature. Levine (1997, 702) simply considers it the role of finance to provide a medium of exchange, since highly specialized production would be impossible in its absence. It is true that financial institutions in the modern economy supply the basic medium of exchange for most transactions in the form of bank checking accounts, but it is question-begging to assume that this must be so. For the longest part of modern history, the medium of exchange was not provided by the financial system, and even today transactions in physical cash are in no meaningful sense dependent on financial intermediaries. As we saw in chapter 1, money arose as a market institution with no connection to the financial system. The role of money and of money production is thus a major blind spot in the literature on finance and development. This is problematic since the major financial players in the modern system are also privileged with the ability of creating money through the process of granting credit.

Another problematic point is that it is questionable to what extent it is really as clear-cut that economic growth depends on a well-functioning financial system with well-developed banks. France has typically been depicted as slow to industrialize precisely because modern banking was a late arrival in France, but recent historical work has shown that this was not the case (Hoffman, Postel-Vinay, and Rosenthal 2019). There was a well-functioning network of notaries in France in the 18th and 19th centuries that efficiently matched lenders and borrowers. These notaries functioned mainly as brokers, not intermediaries, and while the total volume of credit was not great – some 20 percent of GDP – this was not due to prohibitive transaction or information costs. For many decades after the advent of modern banking in France, notaries continued to be important credit brokers, and they would surely have been displaced if banks were significantly more efficient than they were. It was only after the first World War that government regulations effectively ended the role of notaries as brokers. If this is so, it is hard to support the argument that financial intermediaries were essential for economic development, in France or elsewhere. Perhaps the real reason for the growth of financial institutions should be seen in their money-creating function, not in the need for intermediaries.⁴⁵

6.3. Seigniorage and the financial system

To understand the role of finance in the modern economy and the process of financialisation, we need to understand the relationship between monetary interventionism and the modern financial system. The most basic intervention in the sphere of money is the establishment of a monopoly on the production of money, whether a commodity money or paper money. The economic effect of such a monopoly is the extraction of monopoly rents, called seigniorage (White 1999, chap. 7; Selgin and White 1999). The production of money becomes more expensive than otherwise and substitutes – coins produced by rival mints, foreign coins – are suppressed in order to protect the monopoly.

This basic form of seigniorage has no effects on the financial system.⁴⁶ However, in the modern system of fractional reserve banking, the process of money creation and hence the earning of seigniorage has to a large extent been internalized by the banks. As Mises (1953, 265) put it (*my italics*):

If a creditor is able to confer a loan by issuing claims which are payable on demand, then the granting of the credit is bound up with no economic sacrifice for him. *He could confer*

45 See also the studies in (Lorenzini, Lorandini, and Coffman 2018).

46 But see Hülsmann (2004a, 39–40).

credit in this form free of charge, if we disregard the technical costs that may be involved in the issue of notes and the like. Whether he is paid immediately in money or only receives claims at first, which do not fall due until later, remains a matter of indifference to him.

This form of credit, which Mises termed circulation credit, does not depend on previous saving on the part of the banker or on him receiving deposits which he can then lend out. In other words, he is not a financial intermediary but creates the money he lends out in the very act of lending it. A recent paper from the Bank of England (McLeay, Radia, and Thomas 2014) which gained some notoriety made the same basic point: banks do not depend on deposits for extending credit, rather they create fiduciary media when they extend credit and lend out money that simply did not exist previously. Thomas Mayer (2017, chap. 2) makes the same point.

The mere existence of fractional reserve banking does not mean that banks are extracting seigniorage. It is only when new credits are granted and the volume of debt and fiduciary media expands that we can talk of a form of seigniorage, although White (1999, 143) denies that there is any seigniorage involved at all in banking. However, it is true to say that there is not the same simple kind of seigniorage involved. When a commodity money monopolist recalls the old coinage for re-minting and issues a new coinage containing ten percent less silver, he reaps the profit of this reduction. However, a bank cannot reap seigniorage profits in the same unilateral manner by increasing its amount of fiduciary media outstanding. It needs first of all to ensure that its fiduciary media are acceptable money substitutes to the public, since as soon as they lose faith in the bank, they will attempt to turn their notes or demand deposits into basic money or into the fiduciary media of another, more trusted bank. This process of brand extinction (Salerno 2012) is the ultimate limit on any bank's ability to increase its issue of fiduciary media.

However, there is another limit, or rather precondition, for the creation of fiduciary media in the banking system and hence for the creation of seigniorage income for the banks. The banks need to induce borrowers to borrow from them. They need to appear as a more appealing source of financing to entrepreneurs in search of capital for their endeavours. The most direct and obvious way is to reduce the rate of interest at which entrepreneurs can borrow from them. Easier credit terms are also possible, as well as the provision of cheap overdraft facilities, reduction in fees on financial services and so on. However, this means that banks in the process of credit expansion subsidize the borrowing entrepreneurs and in effect share the seigniorage profits with them.

Through credit expansion, bank lending increasingly replaces other sources of credit and capital, whether in the form of personal savings or other loans. If we look at figure 6 on p. 149, we can say

that we have advanced down the higher branches of the financial tree, equity and direct loans, to more indirect forms of lending. Seen narrowly from the individual entrepreneur's point of view, it is now rational to rely on bank credit to a greater extent, although his free choice is conditioned by the fact that fiduciary media are issued and held as money, itself a result of intervention and privileged banking (Hansen 2021). By issuing new fiduciary media, banks attract more business to themselves as well as increasing the money supply – in fact, only because they increase the money supply. Jacob Viner ([1937] 1965, 238) described how this was well-understood in the great English banking debates of the nineteenth century:

The banking school were right in insisting that the volume of bank credit was dependent on the willingness of businessmen to borrow, as well as on the willingness of banks to lend. But the willingness of business men to borrow depended on their anticipations of the trend of business, on the interest rate, and on their anticipations as to the willingness of the banks, in case of need, to renew loans upon their maturity. The banks, by lowering their interest rates, or consciously or unconsciously lowering their credit standards, could place more loans, and the increase of loans, by increasing prices and physical volumes of sales, would in turn increase the willingness of businessmen to borrow.⁴⁷

Viner's description applies to the reality facing agriculturalists in a monetary system built on fiduciary media. Capital is increasingly supplied by banks, and although this gives the appearance of greater availability of capital, it also means that investment is funnelled into those lines that are acceptable to banks. Since banks want to stay liquid to keep the faith of their depositors, they are reluctant to lend for long-term projects that do not promise a positive cash flow in the near future. This means that agricultural investments will shift from the kind of long-term rearrangements and improvements we described in section 4.4.2: Net savings and agriculture, and will instead go to capital goods and new technologies improving present productivity.

The false impression of greater availability of capital and the malinvestments that stem from the practice of credit expansion has been elucidated in the literature on the Austrian or monetary theory of the business cycle. What we want to emphasize here is how the greater use of bank credit systematically deforms the economy in other ways. Specifically, it leads to a greater reliance on external credit over equity or self-financing, and is thus at the root of the process of financialisation; and it leads to the impression that more capital is available and thus to greater investment in capital goods without the necessary previous reduction in consumption. This leads to the “technological treadmill,” as farmers use bank credit to invest in capital goods that match the time horizon of the

47 I thank Mr. Philipp Ruijjs for this reference.

loan. However, bank loans are almost always short-term loans, of a few years' duration at most. This means that the farmer invests in expanding current production instead of retooling into more value-productive lines of production, as we saw in chap. 4 would be the consequence of real savings-induced growth. This is completely rational behaviour on the farmer's part, as the data of the market, under the systematic influence of continued credit expansion, suggest that this is the optimal production pattern.

6.4. A framework for understanding the role of deposits

One important point that is generally glossed over in the mainstream depiction of the modern financial system is the role of money and monetary policy in shaping financial markets and institutions. To be sure, there are long chapters on money, central banking and monetary policy in the main textbooks, but the focus is on describing the role of these institutions and how they work. The possible economic consequences of money production – in particular how the process of money production may systematically alter the relative importance of different financial institutions and markets – are not analysed. This is an important oversight, as the production of money is an inherent feature of modern financial institutions that is too often neglected by both mainstream authors and, as we shall see, by the writers on financialisation (for instance, in describing the role of commercial banks, they are said to simply supply liquidity (Cecchetti and Schoenholtz 2017, 277)).

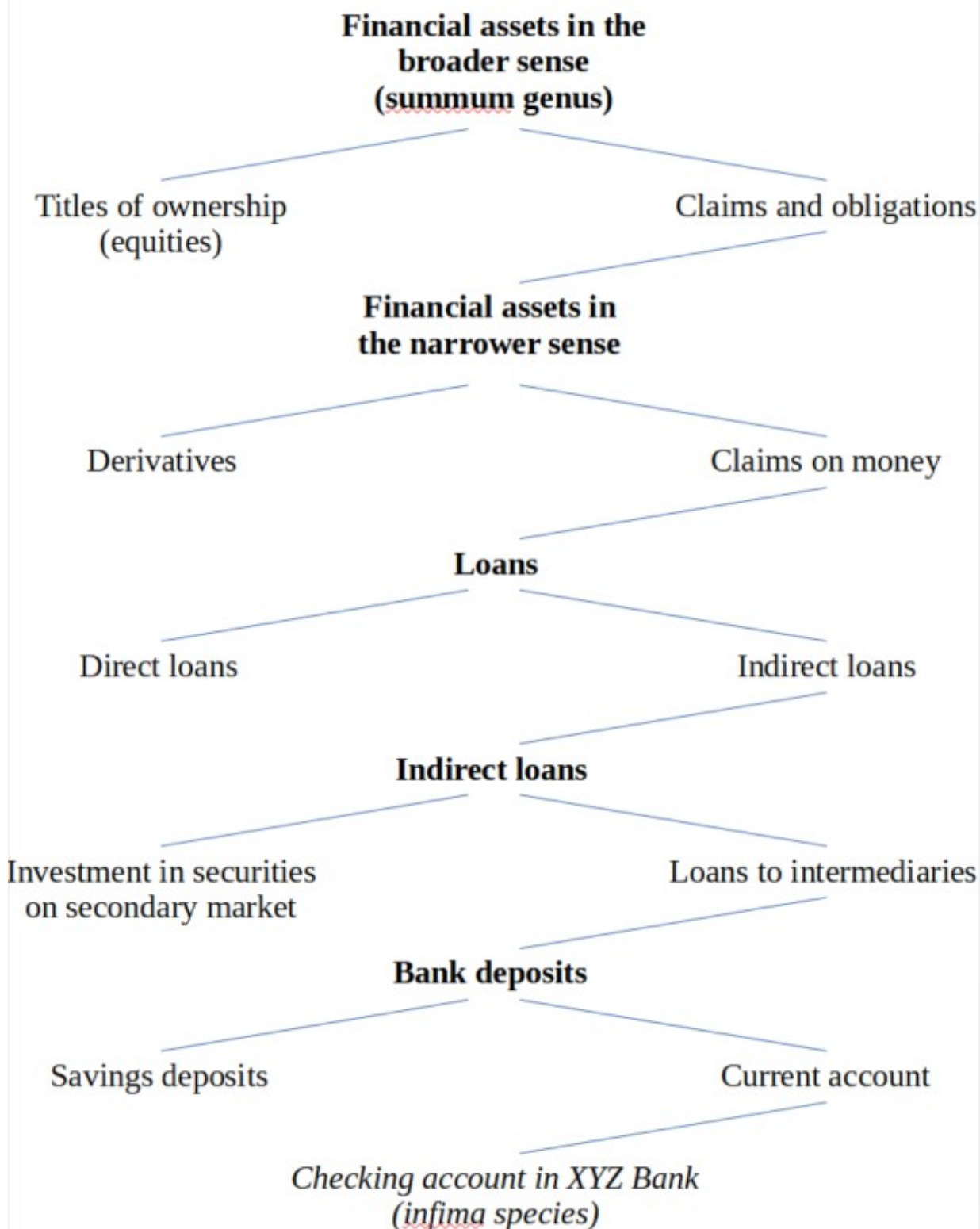
In modern economies, one of the main ways new money is produced is through the creation of new demand deposits by the banks. Such deposits are claims on banks that are seen as fully secure and can therefore be used in transactions instead of money: they are fiduciary media, that is, exchange media whose use depends on people trusting the banks honouring their promises to pay (Mises 1953, 50–59). So long as these claims are trusted, they form part of the money supply. The very fact that these claims exist and can be created at will by banks greatly skews financial markets – and the economy as a whole – and increases the importance of banks and other financial intermediaries in the economy. The process of financialisation has as one of its main causes the ability of banks to create deposits at will, an ability that is greatly enhanced in a fiat money system.

In order to bring out the importance of money production through bank credit for the financial system and the process of financialisation, we need to understand the relations between the different kinds of financial assets and especially between demand deposits and other assets. In order to do this, we have constructed the following diagram on p. 149 which depicts the hierarchy of financial assets and specifically the place of redeemable deposits in that hierarchy. The diagram is in the form of the Porphyrian tree known from classical logic (Joyce 1908, 121–30; Oderberg 2007, 92–105)

and shows the place and specific nature of bank deposits. The tree goes from the most general class (the *summum genus*) to the most specific (the *infima species*).

Figure 6: Hierarchy of financial assets

PORPHYRIAN TREE OF FINANCIAL ASSETS



It would be possible to construct similar diagrams for all other kinds of financial assets, and the diagram should not be construed to imply that a higher branch is always somehow “better” or closer to the “real” economy than lower branches or the infima species. However, it is undoubtedly true that the holder of indirect loans has a more limited interest in the underlying property than a person owning equity, and what the diagram is intended to convey is the limited and remote way in which claims originated by bank lending lead to a real interest by the holders of said claims in the underlying property.

The most general definition of financial assets would be rights and claims to property. In this the class of financial assets is really coextensive with all exchangeable goods. That is to say, any claim or title to any good would fall under our definition. We only ever really exchange rights to goods when we buy and sell, even in the most everyday market transaction: in the supermarket, when a person pays for his goods, it is the right of ownership over said goods he acquires, a right he values because it secures his command over the goods themselves. When we speak of financial assets, we do not generally include all economic goods, but mean only something like those rights, claims, etc., that are regularly exchanged on financial markets or bought and sold by financial institutions, or more narrowly, still, we can define financial assets as claims to property that generate an income. This is in line with the standard definition of a security or financial instrument as “a claim on the issuer’s future income or assets” (Mishkin and Eakins 2018, 42).

The genus of financial assets can be divided into titles of ownership and loans, claims and obligations, that is, rights to the property that are less than rights of ownership. Titles of ownership make the holder (part-)owner of the underlying property in question. He thus shares in the profits and losses that accrue from the property, i.e., he is the residual claimant in the terminology of modern economics, although it should be stressed that he is also the residual obligee in the case of default, a point we explored in chapter 3, esp. pp. 83-90. He also has a right to (co-)determine the use of the property as its (co-)owner, including to what extent non-commercial considerations should influence its employment. There can be graduations between the owners, as between senior partners and junior partners, holders of preferred and common stock and so on, and thus a hierarchy of owners is possible. In a big corporation controlled by the holders of preferred stock, for instance, the holders of common stock will only have a minimal share in the direction of the corporation, including how profits are distributed among the owners.

The genus of claims and obligations we may term financial assets in the narrower sense.⁴⁸ These claims, in turn, can be divided between claims on money and claims on non-monetary assets. Claims on non-monetary assets contain most if not all of what are termed derivatives: futures contracts, call and put options, and so on. Claims on money are usually termed loans and are claims to a specific sum or sums of money falling due at some future date or dates. There are thus no right of ownership or direction over the person (in the case of unsecured, personal loans), company or corporation in question who owe the loan, although an important creditor may – informally or in a contract annexed to the loan – acquire some say in the direction of business. The holders of loans and obligations are likely to be mainly interested in ensuring payment of interest and principal above all other considerations.

Loans can be further subdivided into direct loans and indirect loans. A direct loan makes the lender directly interested in the company to which he has lent money. Such a lender is in many ways in the same position as the holder of common stock. He is, for the duration of the loan, fully invested in the success of the enterprise, since he can only recover the principal lent at the end of the loan's duration.⁴⁹ If one investor lends a company a considerable portion of its capital, he may in some ways be considered a junior partner in the company, despite his lack of any formal titles of ownership. Yet such control is purely informal, and rests on the possibility of the lender not renewing the loan when it falls due and the inability of the debtor to find some alternative means of financing. We must therefore here respectfully part company with Rothbard (2009, 437–39) when he says that creditors are as much owners of a corporation as are the stockholders, since their rights to the corporation's assets do not, in fact, amount to rights of direction and decision-making. Similarly, while there is some truth to Mises' (1998, 536) claim that “[t]he creditor is always a virtual partner of the debtor or a virtual owner of the pledged and mortgaged property”, we need to stress the word virtually, since rights of ownership are specifically not transferred by a loan.

In fact, the advantage of loans is precisely that they are not titles of ownership, but rather claims on specific payments of money on determined dates. While the creditor may thus lose out if the enterprise turns out to be exceptionally profitable, he is at the same time secured from having to pay should it suffer losses, while he at all times has a right to a certain income from the loan. If the borrower has posted collateral, the lender may also have an easy way of reclaiming his principal in

48 Although it should be remembered that the stock market – the market for standardized titles of ownership – is also an important financial market.

49 We are for purposes of simplicity not considering negotiable instruments as direct loans, although they must originate as such.

case of default. Loans are, therefore, a way of investing while reducing the uncertainty one is exposed to, although this uncertainty can never be eliminated.

Indirect loans in turn can again be divided into investment in bonds on secondary markets and lending to financial intermediaries. Bonds, it is true, in principle originate as a direct loan to the issuer, but when they are bought and sold in secondary markets, this direct link is broken. Loans to financial intermediaries we generally call bank deposits, although institutions that are not called banks can also accept such deposits. The great advantage to the lender or depositor here is that he does not have to worry about finding suitable investment opportunities but can leave that to the bank. He is only interested in the rate of interest paid on his deposit, how long the duration of the loan is, and how quickly the principal can be paid out before term in case of need. Banks can be a useful form of saving for those who do not have the expertise to invest directly themselves, or whose incomes are too low for doing so, for instance because the costs of drawing up a loan contract would swallow all the profits and more on a small loan.

Financial intermediation is also profitable for the banks and can help allocate capital efficiently (Mishkin and Eakins 2018, 179–87). By pooling the savings of many small investors and allocating their capital over a wide range of investments selected by the help of experts, they can spread the risks of investment and allocate capital to where it is most profitably employed. Banks thus invest in all the different kinds of financial assets described here. However, this is only part of the explanation for the success of banking and does not, in our view, explain their dominance in the current financial system, a point we will explore below in chapter 9. This brings us to the final division on the tree: between savings deposits, where the principal is only available to the depositor after a set term; and current account deposits, where the depositor has instant access to the principal.

Savings deposits need no further explanation. The depositor fully surrenders the money to the bank for the duration of the loan and only gets back his principal at the end of the agreed period. Current account deposits, on the other hand, are fully available to the depositors. He can draw checks on them and transfer money from them, despite the fact that the bank usually lends out all but a fraction of the funds deposited in current accounts. Such claims on banks in effect constitute part of the money supply as fiduciary media. The mechanism of how this works – the system of fractional reserve banking – is well understood among economists since the time of Fisher and Mises (Fisher 1922 [1911]; Mises 1953 [1912]) and we will not go into a detailed description of it here (Selgin 1988; White 1999, chap. 3). Only two points will be made for now:

First, that fractional reserve banking creates an inherently weak link in the financial system, since it in effect multiplies claims to the same goods (money). The banks will always have to foresee how much the depositors will draw on their accounts. If they simply send money to other banks, interbank clearing can settle the claims and minimize the net flow of money between the banks. An individual bank may expand its credit too aggressively and find that there is a net outflow. It can cover this shortfall by borrowing from other banks, but what if there is a net outflow from the system as a whole, that is, if depositors decide they would rather hold physical cash than claims on the banks? In this case the banks would have to violently contract their loans to meet the demands of their depositors or go under. In other words, the banks need to forecast the future demands of their depositors perfectly if the system of credit is to be preserved.

Second, since the banks do not need to keep full reserves for the current accounts of their customers, they can create new money in the process of granting new credits, as explained in the section above p. 144 on the role of seigniorage in the financial system. Money creation through credit expansion is essentially costless. All the bank needs in order to create new money is to find someone willing to borrow money from it. This is normally relatively easy, as the banks are in a position to undercut the rate on loans offered by other lenders. Hence, potential borrowers will tend to shift to bank loans and people who were otherwise not interested in borrowing will, faced with the lower interest rate, enter the market as borrowers.

This process of money creation through credit expansion means, first of all, that there is an increased demand for current account deposits. More people will want to hold current account balances as opposed to holding cash or other non-bank assets. Secondly, the process of credit expansion increases the demand for other financial assets, and as a consequence, more of these assets will be “produced”. That is to say, since the interest rate on loans is lower due to the existence of bank credit, more people will choose to borrow money rather than own equity or invest through more informal and direct channels. In this way, fractional reserve banking skews the financial structure not only in favour of banks, but in favour of loans and securities that can be used as collateral for loans as opposed to titles of ownership and direct loans. Or to put it differently: The Cantillon effect from creating new money via bank loans systematically favours the financial system at the expense of the rest of the economy (Sieroń 2019). As a result, more and more capital will be supplied through the financial system and especially through the banks.

The “agricultural treadmill” must also be understood as a consequence of the increasing role of credit expansion. By inducing farmers to finance their operations and investments through bank borrowing, the farmers get the impression that more capital is available for investment in short-term

capital goods than is really the case. Such investment leads to increased physical productivity in whatever the farmer is currently producing and investing in. In chap. 4 we saw how capital accumulation would induce farmers to change to longer, more highly valued production processes, but this is not the case when an increase in bank credit is the source of new investment. Such credit needs to be financed and paid back within a relatively brief period, and it is therefore more sensible to expand current production rather than retool for longer processes. Furthermore, as farmers demand more capital goods of a certain kind that allow them to increase productivity, the supply of agricultural capital goods will also change. More capital will go into research and development of methods for increasing physical productivity in current production, rather than into higher-quality outputs, for instance.

We will return to this theme in chapter 9, where we examine post-war European agriculture. The agricultural treadmill, driven by credit expansion, is a crucial element in understanding the changing structure of European agriculture in this period.

6.5. Financialisation

The literature addressing the process of financialisation – broadly, the increasing importance of financial assets, markets and institutions relative to the real economy since the 1970s – is quite recent. An early precursor may be Hilferding’s *Finance Capital* ([1910] 1981), which analysed the growing importance of banks and finance in the late 19th and early 20th centuries. From our point of view, which stresses the importance of the monetary system, Hilferding’s work is very unsatisfactory. Although he opens with a long discussion of the role of money in the economy, Hilferding ultimately does not establish a connection between money and finance capital. While he calls Law and Pereire the pioneers of credit (*ibid.*, 180), there is no mention of the role of fiduciary media and credit expansion in the banking schemes which these men led. Instead, Hilferding ultimately only offers Hegelian dialectic (*ibid.*, 226) – bank capital is the negation of usurers’ capital and is itself negated by finance capital – and the orthodox Marxist doctrine on the tendency toward concentration and monopolies under capitalism (*ibid.*, 227-235). More recent attempts (Hudson 2010; Durand 2017) have tried to connect the Marxist notion of “fictitious capital” (Marx 1967, vol. 3 chaps. 25, 29) with financialisation, but they too are deficient in their focus on finance to the exclusion of the monetary system. Compound interest by itself will not by itself cause a process of increased indebtedness and financialisation, circumstances that favour debt financing over direct investment or self-financing are necessary.

This more rigidly Marxist approach as exemplified by Sweezy (1994) fails to explain much; on this account, financialisation is simply the outcome of the lack of investment opportunities in the real economy. Tomlinson's entry on finance capital (Tomlinson 1987) for the *New Palgrave Dictionary of Economics* is more stimulating, as he suggests that a study of the modern economy would have to focus on "the conditions of existence of the credit-giving criteria employed by financial institutions, and how these structured the forms of calculation used by firms in their deployment of means of production." More recently, Zoninsein (2011) has used Hilferding's work to explain the development of international financial markets and "financial globalization" after the end of the gold standard with the collapse of the Bretton Woods system. However, on his reading this development should be seen as flowing from the rise of economic and financial liberalization to the new hegemonic ideology undergirding the international power of the U.S. (ibid., 295-298). The engagement with the monetary system is thus entirely superficial and Zoninsein does not consider the deeper changes to monetary and financial institutions that flows from abandoning the gold standard entirely.⁵⁰ However, his attempt to cast the phenomenon of financial globalisation in terms of Hilferding's theory of imperialism as the policy of finance capital does echo a more fruitful, if perhaps less-well known, attempt along the same lines by Hans-Hermann Hoppe (2006b). Since Hoppe is entirely free of the system of Marxist economics, his formulation of the thesis is in our opinion much more successful. But this is a side issue not germane to our own investigation.

Another inspiration to modern treatments of financialisation can be found in the voluminous output of Immanuel Wallerstein. This is not so much in terms of specific points dealing with modern financial markets since Wallerstein (2004; cf. 2011 [1974] for his classic work that initiated the field of world-systems analysis) does not (to my knowledge) deal with this topic, but talk rather in terms of his over-all approach, so called world-system analysis. This broad approach, emphasizing changes in power and ideology and taking a grand view of the world as a whole rather than being bogged down in specifics, can be a fruitful stimulation precisely to avoid losing a sense of the economy and society as an integrated whole. However, it can also lead to frustratingly vague generalizations and sweeping claims (e.g., that financial liberalization followed from the hegemony of neoliberal ideology) that display a sovereign disregard for historical and economic reality. This is only partly due to the admittedly ambitious goals of this kind of social analysis; a more serious flaw is Wallerstein's theoretical dependence on flawed quasi-Marxist assumptions, for instance that the world system is characterised by a capitalist core controlling a dependent periphery and the stress laid on the importance of monopoly capital.

⁵⁰ It is a curious contradiction that Zoninsein (2011, 294) can approvingly cite a description of the Bretton Woods system as "embedded liberalism" before going on to describe its breakup as liberalization.

Giovanni Arrighi ([1994] 2002) is an example of a world-systems theorist whose work has inspired writers on financialisation. Another important early inspiration for the financialisation literature is Eric Helleiner's (1994) interpretation of the rise of global finance and financial liberalization, although Helleiner is not a world-systems theorist but rather came out of the tradition of international political economy founded by Susan Strange.

A clear statement of what is meant by financialisation is that it is the increasing importance of financial motives, financial actors, financial markets and financial institutions in the operation of economies (Epstein 2005; Isakson 2014, 750). Or more succinctly, financialisation means “the growing importance of financial activities as a source of profits in the economy.” (Krippner 2012, 27). Explicitly citing Arrighi, Krippner (2005, 174) in an earlier work defines financialisation as “a pattern of accumulation in which profits accrue primarily through financial channels rather than through trade and commodity production.” An important point made by Krippner is that in order to identify the process of financialisation, we need to look at not what is produced in an economy, but where profits are generated (ibid., 175). There is thus general agreement on what constitutes financialisation.

Greta Krippner provides a thorough account of financialisation of the U.S. economy in the period 1950-2001. By clearly showing how profits are increasingly generated through financial channels, she first of all establishes that financialisation is a real phenomenon (Krippner 2005, 199). One way of estimating the rise of finance is by looking at the proportion of financial sector profits of total profits. This proportion ranged between 10-15 percent in the 50s and 60s and rose to approximately 30 percent after the mid-80s and peaked at 40 percent in 2001 (Krippner 2012, 28). This estimate, Krippner persuasively argues, is in fact an understatement, since it does not take account of higher compensation in the financial sector nor of the growing importance of financial activities as a source of revenue for nonfinancial firms. Significantly, Krippner (2012, 52–55) clearly identifies credit expansion and interest rate volatility as an important cause of the growth of financial profits, but she does not link this phenomenon to changes in the monetary system. Although she does later discuss the Bretton Woods system and provide a detailed overview of U.S. monetary policy from the late 1970s on (Krippner 2012, 88–92, 106–37), the important change in the monetary system with the end of the Bretton Woods System in 1971 – the abandonment of any link, however tenuous, to gold as the monetary commodity – is not emphasized.

Thomas Palley (2007) approaches the topic of financialisation from a Post-Keynesian perspective. He sees the defining feature of financialisation in the U.S. as the increase in the volume of debt (ibid., 6). In the Post-Keynesian view, debt transfers income from high marginal propensity to spend

debtors to lower marginal propensity to spend creditors, a process that, on this view, generates business cycles. There is also a growing consensus in the Post-Keynesian literature that examines the effects of financialisation on long-term growth. The increase in profit shares, shift in income away from workers and lower retained profits of corporations – all seen as consequences of financialisation – are concluded to cause a decline in the long-run growth rate (ibid., 17).

Palley stresses the growing importance of debt financing and the declining share of workers' wages in total income,⁵¹ but there is little recognition of any possible influences from changes in the monetary system on these trends. In his later book on the topic (Palley 2013), Palley describes financialisation as financial neoliberalism. Neoliberalism is described as the “ideology of elite interests, and it serves to shift economic power and income from labor to capital” (ibid., 5). Where neoliberalism idealizes markets, financial neoliberalism singles out financial markets and gives them an especially elevated status: they are held up as clearing continuously, providing liquidity and financial prices are supposed to embody all economically relevant information. They are also given a special role in the allocation of savings and capital (ibid., 1-2). Financialisation on this account set in about 1979, when neoliberalism displaced Keynesianism as the dominant economic ideology.

We might question the reduction of neoclassical economics to simply an ideology justifying financial interests, although we agree with Palley's critical attitude to the usual hosannas sung over the alleged blessings of financial markets. His engagement with the monetary side of financialisation is thorough (Palley 2013, chaps 4–5), although he analyses the effects of debt creation in a Post Keynesian framework derived from Kalecki (1937) and Minsky ([1982] 2016), with some inspiration from Fisher's debt deflation theory (Fisher 1933). While the resulting emphasis on debt as a driver of the business cycle is correct,⁵² the importance of money creation by banks through credit expansion is only briefly mentioned (Palley 2013, 77–80), and there is no argument given for why money creation and credit expansion should have been boosted from the late 1970s on. Yes, financialisation may have increased debt levels and the elasticity of the money supply (ibid., 100) – but why? Presumably, elites were always interested in increasing their incomes and control of the economy, so why did they only turn to financialisation to do so by the late 1970s?

While there is thus some diversity in the analysis of financialisation, there are also points of general agreement. The basic definitions of financialisation used are in broad agreement and correspond to a real phenomenon: the rising importance of financial markets and institutions from the 1970s on.

51 The stagnation of U.S. wages has been much debated, although empirical studies (cf. Lin and Tomaskovic-Devey 2013; Van Arnum and Naples 2013; Brill et al. 2017) indicate that there may be something to this thesis.

52 This statement on our part should, of course, not be taken as an endorsement of the Post Keynesian theory of business cycles. A critique of business cycle theories or of Post Keynesianism is however beyond the scope of our dissertation, beyond what has been said above pp. 134-136.

There is also agreement on the general time period concerned, and the importance of debt is generally acknowledged. The great lacuna in the literature is the lack of a consistent theory of the importance of the monetary system. While both Palley and Krippner refer to the creation of money, their theoretical framework does not allow for a clear understanding of the importance of a shift from a monetary system based on gold to one with no constraints on the issuance of money by central banks and banks. While we agree with the emphasis on financial deregulation, this can only be understood in conjunction with the basic change in the monetary system and as a way of guiding monetary inflation into financial markets. It may be the outcome of neoliberal ideology and elite interests, but that is a matter of historical enquiry into why these changes were adopted and does not explain the consequences of the policies.

6.6. The financialisation of agriculture

After this general overview of financialisation, we turn to the literature dealing specifically with agriculture. Here we can group the studies under three headings: the growth of agricultural commodity derivatives markets, the financialisation of land, and financialisation and the technological treadmill. As we shall see, the same weakness we identified in the general literature on financialisation is repeated here, viz., the monetary system is not considered as an important source of the processes identified and analysed.

The literature dealing specifically with agriculture is more recent than the more general studies of financialisation, perhaps not unconnected to the fact that the financialisation of agriculture only gathered steam in the 21st century. There is for instance no mention of farmland in Leyshon and Thrift's (2007) paper on the capitalization of everything, despite them devoting plenty of space to the capitalization of ground rents. Perhaps the first explicit connection between agriculture and financialisation is Burch and Lawrence (2009). They see financialisation behind the general transformation of the food system, from farmers to supermarkets. Drawing on the key works discussed above, they too see the root of financialisation in a neoliberal takeover as the dominant ideology around 1980 (ibid., 269-270), which led to policies that fostered the growth of the financial sector (Lawrence, Sippel, and Burch 2015, 310). They single out both investment in farmland and in agricultural commodity derivatives markets as avenues of financialisation (Burch and Lawrence 2009, 271, 273; cf. Clapp, Isakson, and Visser 2017). The main driver of these changes, they argue, is deregulation and technological change (Lawrence, Sippel, and Burch 2015, 311–12). Speculation is one key driver in the financialisation of agriculture, specifically: the possibility to book profits from increasing land values (ibid., 313).

Russi (2013) considers financialisation of agriculture as the displacement of a “peasant logic” by a rural economy now governed purely by market relations, and other scholars (Sippel, Larder, and Lawrence 2017, 252) have traced the growth of “financial logic” to the 1980s in the context of timberland purchases by financial actors.

Clapp (2012, 125–57) gives an overview of the financialisation of agriculture, investigating the role of derivatives markets in driving food price volatility after 2007 and discussing “land grabbing” in the global south in terms of financialisation. Again the discussion is cast in terms of neoliberalism and deregulation causing expansion of financial markets, but Clapp also includes an interesting perspective in her discussion when she refers to growing “distancing”, both physical and mental, as an important consequence of the process (Clapp 2012, 1–2, 155–56; cf. 2014).

6.6.1. The growth of agricultural commodity derivatives markets

Breger Bush (2012) examines the case of derivatives markets as an instance of financialisation of agriculture with special emphasis on coffee production in the global South. The volume of contracts traded on derivatives exchanges are many times the quantity of actually existing agricultural commodities, as most of the contracts (futures, options and so on) are settled in cash or by offsetting trades. Agricultural derivatives are used both by agricultural actors to hedge their production decisions and by financial actors, as it is a good way of gaining exposure to and profiting from agricultural markets. The role of financial actors in agricultural derivatives markets has increased especially since the financial crisis of 2007 when investors turned to commodity futures and other derivatives as safer investments than more traditional financial and real estate holdings (ibid., 26–28). The claim that there was a boom in commodity futures boom driven by speculators in 2007-8 – or any boom at all, for that matter – has however been challenged on empirical grounds (Irwin and Sanders 2010; 2011).

This empirical challenge is however weakened somewhat when we remember that Irwin and Sanders only investigate the role of index funds in creating a bubble (Irwin and Sanders 2012, 390–91). Since financialisation of agriculture is not simply about the role of index funds in commodity futures markets, all that can be concluded is that these were not instrumental in driving the boom – to the extent there was one – not that financialisation did not cause a commodity futures boom in 2007-8. Indeed, Ghosh et al (2012) argue that increased liquidity in commodity futures markets caused increased volatility in spot prices for agricultural commodities. This is counter to the generally accepted position that derivatives trading aids price discovery and provides information for actors in the underlying real economy. Since futures prices are used to guide production

decisions, it is clear that erroneous future prices would lead to erroneous production decisions. Central to the argument is that speculation in futures markets prices drove up spot prices of agricultural commodities (Ghosh 2010, 79) and then drove them down again, in short increased price volatility (Clapp and Helleiner 2012, 189). Unfortunately, what is missing from Ghosh et al's account and from the literature on financialisation in general is a clear description of the causation that led futures prices to be decoupled from the underlying economic reality. Drawing on Minsky, Shiller and Keynes they simply claim that traders can be irrational. Yet why should they be irrational all at the same time and in the same way? That is, why should they all overestimate prices rather than equally overestimating and underestimating it? This cluster of errors is left unexplained (cf. also Spratt 2013 for a critique of the rationality of speculation in agricultural futures along the same lines), and the counterargument that market fundamentals are still pre-eminent (Bruno, Büyüksahin, and Robe 2017) is not without its merits. However, it is not denied by authors emphasizing financialisation that any divergence between market fundamentals and futures – between the true prices and the speculative price – must be temporary. Any long-term divergence will give rise to profit opportunities from arbitrage, the question at hand is whether there are short-term divergences and if so, what causes them.

Breger Bush (2012, 29ff.) gives 3 reasons why derivatives markets have expanded explosively over the past 30 years: 1) widespread trade and financial liberalization since the 1970s; 2) technological developments in pricing and structuring derivatives products and platforms; 3) promotion of derivatives exchanges and risk hedging by governments, business, and international organisations. Of the three reasons the first is in our estimation the most significant; technological developments – Breger Bush singles out information technologies – may have reduced the cost of dealing in financial derivatives and promotion may have increased knowledge of derivatives, while sponsorship and promotion by the IMF and the World Bank may have reduced costs of introducing exchanges in third world countries, but these causes seem secondary to the main impetus from liberalization in her account. This is contrary to Irwin and Sanders (Irwin and Sanders 2012, 377–78), who argue that technological change – the change to electronic trading in the mid-2000s – drove the growth of commodity futures markets. While technological change is important, it is questionable whether it can be considered exogenous to the market to the extent that Irwin and Sanders do. The technological and financial innovation – electronic trading, rise of ETFs and so on – were not simply stumbled upon by accident, but themselves products of exchanges and other entrepreneurs trying to profit from growing demand for financial products. Hence, on this point

Breger Bush's focus on institutional changes is more plausible than a purely technological explanation.

Breger Bush's (2012, 29–33) discussion of liberalization as it pertains to derivatives is however not without problems. It is easy to see her point that financial liberalization has increased the capacity of financial markets and institutions to supply derivatives, although it is questionable whether the deregulation of finance during the 80s can really be called liberalization, if by this is meant a return to a system based exclusively on private property rights and freedom of contract.

Her case for the increasing demand for derivatives is on much shakier grounds. It may be true that governments stepped back as “risk managers” when they intervened less to, e.g., prop up commodity prices; but the main argument for increased demand for derivatives in Breger Bush's account is that increased market volatility followed from liberalization, and that derivatives became the main tool for hedging market risks. The problem here is that we would not expect market liberalization to produce more volatile markets but rather the opposite. By allowing free trade and speculation in commodities and in derivatives based on commodities, commodity prices should quickly and smoothly move toward their “true” or equilibrium price, as speculators profit from arbitraging away any discrepancies in a process of price discovery. The result is less market volatility and primary producers' market and price risk is reduced (cf. Rothbard 2009, 130–37, 249–51). There is no clear account in Breger Bush's exposition of why modern derivatives markets should contradict this conclusion of economic theory. To the extent that there is a decoupling of prices of agricultural commodities from economic fundamentals through the greater use of derivatives (cf. also Isakson 2015; 2014 and the studies cited above), then Breger Bush's explanation is inadequate, since this crucial link in the causal chain is missing. The same is true for other authors explicitly following in her footsteps, such as Isakson (2014, 760), or those explaining the failure of price discovery in the futures markets along similar lines such as Spratt (2013).

There is, however, one significant point in the discussion of liberalization and derivatives that indicates what we believe to be a more fruitful understanding of the drivers of financialisation. Echoing Zoninsein (2011), the abandonment of the gold standard in 1971 is seen as a key development, but in terms of liberalization of the foreign exchange market (Breger Bush 2012, 30). Pegged exchanges – whether to gold or the dollar – are in this analysis a form of public insurance, and their abandonment after 1971 lead to increased market volatility and provided the impetus behind the launch of financial futures and especially foreign exchange derivatives. That these consequences followed from abandoning the last vestiges of the gold standard, and that modern foreign exchange markets are more volatile than in the immediate post-war era are both certainly

true, but it is erroneous to conceive of this development as liberalization, if the term is meant to indicate greater respect for property rights and less government interference in markets. Rather, the opposite is the case: the breakup of Bretton Woods meant that all limits on government control of the money supply and issue of new money were given up. Hence, the increased market volatility in this case is clearly a result of greater government interference in currency markets in the form of monetary inflation and the growth of derivatives markets was simply a way of compensating for this increased risk. Unfortunately, Breger Bush does not investigate the possibility of fiat money inflation being a contributing cause to the growth of derivatives market. Leaving out the role of the monetary system creates an explanatory hole in her otherwise stimulating and informative discussion of coffee production and derivatives. This is specially evident the discussion of how speculation in coffee derivatives increases price volatility (Breger Bush 2012, 144–48).

6.6.2. Financialisation of land

There are both some general studies on the processes of financialisation of landownership and a growing body of case studies. Cotula (2012) mentions the role of finance briefly as contributing to the investment boom in farmland, while Ouma (2014) calls attention to the importance of looking at finance in connection with the concentration of landownership. Gunnoe (2014) examines the role of institutional investors in landownership in the U.S. from a Marxist viewpoint. Fairbairn's (2014) detailed analysis of the intersection of finance and farmland depicts land as “a productive asset that moonlights as a financial asset” (ibid., 3), i.e., it is owned both for its return from use in production and as a financial asset held for capital gains, or speculative, purposes. Fairbairn also identifies a trend to increased securitization of land, as land is transformed into more liquid claims and titles that can easily be traded on financial markets (ibid., 15-16).

There are a slew of case studies dealing with the financialisation of land. Desmarais et al (2015; 2017) consider the case of Saskatchewan farmland, and Magnan (2012; 2015) and Somerville and Magnan (2015) also investigate the Canadian experience. Magnan (2015) compares the financialisation in Canada and Australia and notes that institutional differences matter. Specifically, the prohibition on foreigners owning land in Canada has slowed down the process of financialisation compared to Australia. Sippel, Larder and Lawrence (2017) examine some consequences of institutional investors buying up Australian land: such investors are more short-term, they are often out of touch and not as connected to the local community – they are willing to sell at the first opportunity of making a profit. Ducastel and Anseeuw (2018) examines the case of South Africa. Here too they find that the mindset and time horizon of financial investors differs

markedly from the independent commercial farmers they are buying out. The investors have a shorter time horizon, not more than 10-12 years, and they only take into account the financial rationale of farm development and management, while the farmers view their farms from an economic as well as cultural perspective.

Magnan (2015, 9) especially spells out the findings of the other studies: the commercial success of financialised farming is often mixed. Corporate farming is too complex, and complicated decision-making structures make them less responsive to time-sensitive decisions. They also have a short-term orientation, as managers have to consistently meet benchmarks and investors have a low tolerance for the volatility inherent in agriculture. Family farms by contrast tend to have a longer time horizon, and tend to be able to better withstand hard times. Their leaner structure means that decision-making is also more efficient. Given our examination of widespread uncertainty in farming in chapter 3, this should not surprise us.

Other detailed studies on financialisation and farmland cover California and Oregon in the U.S. (Mittal and Moore 2014; Horst 2019), and a book-length report on land grabbing in Europe (Franco and Borrás 2013). Some of the authors of the aforementioned report also give a shorter sketch of the process in Europe (van der Ploeg, Franco, and Borrás 2015), and most recently a study examines the case of financialisation of land in Slovakia (Lindbloom 2018). The European report is problematic as it too quickly turns to normative judgments and political solutions, but it nevertheless presents many interesting facts. Unfortunately, the role of financialisation, while acknowledged, is not, to our mind, adequately emphasized. The same is true for the American studies, although there is also here a solid factual basis to build on.

This is by no means an exhaustive review of case studies, but enough for our purposes here. They are unanimous in showing that patterns of landownership are changing in recent years, and that the role of financial institutions and markets are growing in this sector as well, particularly since the financial crisis of 2008. However, it is necessary to be cautious in interpreting these studies and the more general literature on financialisation of agriculture. It is easy to get the impression that this is a very recent phenomenon, essentially confined to the 21st century. But one suspects that this may be a superficial interpretation. After all, if the process of financialisation has been ongoing since the late 1970s, so why did it only affect agriculture at this late date? If we are correct in our thesis that changes in the monetary system are the real driver of financialisation, then it is possible that the process also affected agriculture from this early date via a non-financial channel. That is, if corporations were prohibited from owning farmland and if there were strict limits and rules governing mortgage-backed securities and other lending to agriculture, then monetary changes

could not lead to financialisation, but it could effect some of the changes that have so far in the literature been identified as deriving from financialisation, e.g., land concentration, higher land prices, and so on.

It is important in this context to remember that there is nothing new about aggressive investment and speculation in farmland. This has been a returning occurrence in capitalist countries, for instance in the early 19th century in the U.S. (Cochrane 1993, 46–55)⁵³ and in Denmark around 1800 (Falbe-Hansen 1888; 1889; Olsen 1962). That it now takes a new form – securitization, corporate ownership and so on – should not necessarily lead us to believe that it is an essentially new phenomenon. This is not to deny the importance of financialisation in driving a process of land concentration, but rather a note of caution. What changed in the 2000s was perhaps not the underlying factors that gave rise to financialisation, but rather rules and regulations that made it easier for financial actors to invest directly in farmland, although the importance of the financial crisis of 2008 in spurring investment in land should not be dismissed (Fairbairn 2020, 6–7). In this sense the emphasis on deregulation is correct, but if we are correct in our analysis of European post-war agriculture in chapter 9, the fundamental process driving changes in agriculture were already at work long before.

6.6.3. Financialisation and the technological treadmill

An important effect of financialisation in agriculture is the rise of what has been called the technological or agricultural treadmill. The concept was first introduced by Willard Cochrane (1958, 85–110), who described the future of farming as a race between aggregate demand – population growth – and aggregate supply – technological progress. If aggregate supply outpaced aggregate demand, this would give rise to the treadmill dynamic. The basic idea in this dynamic is that farmers in modern agriculture turn to technology-intensive, monocultural techniques to expand production when prices are high. However, as a consequence of expanded production, prices fall, farmers' revenues collapse, and even more intensive cultivation with new technology is necessary for farmers to stay afloat. And then the cycle starts over (Lang and Heasman 2004, 147–48; Russi 2013, 57ff.).

A key unspoken assumption behind the theory as it has been presented so far is that lower prices lead to lower revenues for the farmers despite their higher output. In other words, farmers must face an inelastic demand curve for their product, as they indeed do per our explanation of Engel's law in

53 Significantly, Rothbard ([1962] 2007) in his study of the American panic of 1819 repeatedly refers to the role of land speculators.

chapter 2. This argument is brought out clearly in a study concerning ‘growth-inducing distress’ and ‘distress-inducing growth’ in South India (Vakulabharanam 2005)⁵⁴. Building on the work in international trade theory by Bhagwati (1958; 1968; Bhagwati, Panagariya, and Srinivasan 2003, 369–80; cf. Pryor 2007), the importance of the constraint of an inelastic demand curve is here recognized. When production is expanded under this condition, the result is immiserizing growth, *pace* Bhagwati: more is produced but social welfare is reduced. However, it is not clear why farmers should behave in this way – why expand production of one kind of good if the result is lower profits? While demand curves cannot be known with certainty, they can be estimated, and it seems unlikely that farmers would be unable to do so, especially after repeated crises.

One possible answer could be that their land is purely specific to the production of one kind of crop, and they therefore have no choice in the matter, if they want to expand production. This possibility is however ruled out by the data: most farmland is not purely specific and in the Indian case study (Vakulabharanam 2005, 992) the farmers had only recently converted production to the non-food grain crops in question. Therefore, they were not forced to expand in this and only this line of production, and since the goal of increased production is increased profits, there is no reason why they should blindly expand current production. Even in the case where a land factor is purely specific, why should new investment necessarily take the form of a more intensive use of this factor? Farmers are free to diversify and invest in other lines of production or to invest their money.

There are, it seems, only two possible answers to the problem of the agricultural treadmill: either the farmers are repeatedly fooled into believing that demand for their goods is not really inelastic; or they expect that their costs will decline even more than their total revenues, so that their net revenues – profits – increase. Yet again we have to ask: why should farmers repeatedly and for extended periods of time make the same error?

The role of finance is important in understanding this phenomenon and is recognized as such. Farmers are dependent upon credit markets and have to make regular payments to their creditors, and in the South Indian case one can see creditors’ incomes increasing while peasants’ welfare – i.e., consumption levels in this context – declines (Vakulabharanam 2005, 993). Yet the same question must be repeated here: why do peasants keep expanding production that is dependent on credit for capital-intensive inputs, when this seemingly only impoverishes them? While the credit markets in the Indian case suggests the role of financialisation in driving the process, this possibility is not explored further. And although Russi (2013, 58, 81) treats of the connection at length, it is in

54 This paper is based on the author’s doctoral dissertation (Vakulabharanam 2004) which I have not been able to track down.

too general a way, talking about the displacement of “peasant logic” and the “aggressive expansion of financial metrics.” While these are important ideas when we look at the overall sociology of farming, they do not tell us much about the processes by which financialisation gives rise to the agricultural treadmill.

Happily, we hope to have closed this explanatory gap by showing the role of the monetary system in this process. Systemic distortions in the realm of money lead to all the effects examined in the literature reviewed here under the general heading of financialisation. The data of each historic episode determine exactly how these distortions come about, although in general we can say that it is always a question of monetary interventionism, specifically of injecting money into the economy and thereby skewing the structure of production and falsifying entrepreneurial calculations. Usually this process takes the form of credit expansion by a fractional reserve banking system, but direct creation and distribution of fiat money by the government, so-called helicopter money (M. Friedman 1969), is also possible.

6.7. Financialisation and the evaporation of the substance of property

So far, we have only considered the financialisation of agriculture in narrowly “economic” or catallactic terms, i.e., only with reference to the sphere of life dominated by monetary exchanges. However, inflation and interventions in the monetary system in general also have more far-reaching or general effects, distorting not only prices and the production structure, but also social and cultural norms. It even affects the notion of property itself and the value people place on being owners. We can say that inflation is a form of expropriation, since it reduces people’s purchasing power and redistributes it to those who receive the new money first, but this is merely speaking metaphorically – inflation does not by itself interfere with the integrity or security of property rights.⁵⁵ Yet, as we shall see, inflation fundamentally distorts people’s conception of property, leading to deleterious effects far beyond the narrowly economic sphere.

The literature dealing with the broader cultural and social consequences of inflation is quite recent. Mises (1998, 574) dealt briefly with the psychological impact of credit expansion, Hülsmann (2008a, 175–91; 2016) has examined how inflation distorts society, while Salerno (2013) and Cantor (1994) have analysed how inflation, especially hyperinflation, affects human personality.

⁵⁵ The issuance of fiduciary media can be a direct violation of property rights, if it takes the form of multiple claims or titles of ownership to the same amount of money. Cf. Huerta de Soto (2020, 4–10) and Hoppe (2006a).

Our argument proceeds along the lines already charted by Hülsmann and Salerno,⁵⁶ but we will have to look elsewhere to fully explain the point about expropriation and property. Schumpeter has formulated some keen insights that, if transplanted from his system, can hopefully tell us something about the wider consequences of inflation.

In *Capitalism, Socialism, and Democracy*, Schumpeter (1954) formulated the idea of the evaporation of the substance of property. In Schumpeter's system, this was connected to his ideas about the role of the entrepreneur and the importance of technological innovation. Schumpeter starts from a position of general equilibrium. There are no profits and no interest and prices equal average costs. In this equilibrium an innovation intrudes: in the search for profits, an entrepreneur introduces a new production function, financed by bank credit. Interest arises, dependent on the profits of the entrepreneur. As others enter the new field of production, profits are eventually reduced to zero once again due to the pressures of competition (Clemence and Doody 1963; Schumpeter 1949), and as profits disappear, so, naturally, does the interest consequent upon profit.

The role of the entrepreneur then is to introduce technological innovations. But Schumpeter thought that this function would increasingly be taken over by R&D departments of large, centralized capitalist concerns (Schumpeter 1954, 134). The role of the entrepreneur would tend to diminish and eventually disappear, and with him would go the capitalists who had financed his ventures. The concept of property will cease to make sense and the bourgeoisie will be reduced to simply administrators of the large concerns.

There are other issues that tend to eliminate the importance of property in modern society. Instead of businessmen having direct ownership of factories, ownership increasingly becomes abstract and impersonal as more and more businesses are organized as joint-stock corporations (Schumpeter 1954, 141ff). "The capitalist process, by substituting a mere parcel of shares for the walls of and machines in a factory, takes the life out of the idea of property" (Ibid., 142). Property will make less and less sense to people, and they will respect it less and less: "Dematerialized, defunctionalized and absentee ownership does not impress and call forth moral allegiance as the vital form of property did. Eventually there will be *nobody* left who really cares to stand for it – nobody within and nobody without the precincts of the big concerns" (ibid.). Modern executives, even when they are themselves shareholders, do not have the same will to fight and hold on to their property that a

56 Salerno (2013, 22) states: "(I)n Germany the abolition of money through hyperinflation rendered property meaningless and thereby obliterated the ontological basis for the formation of individual human personality." Our argument proceeds along similar lines, dealing not with human personality as a whole but with man's relation to his property, and not only with the extreme case of hyperinflation but with inflation as such.

man with a fuller sense of property has (ibid., 156). Although he does not mention it, Schumpeter comes close to Marxist notions of fictitious capital here.

It is not just in business life that Schumpeter sees the spirit and substance of property evaporating. Even more serious in his eyes is what he terms the evaporation of consumers' property (ibid., 157-63). Capitalism causes the rationalization of everything in life, even to the point that people introduce a sort of cost accounting in their personal lives. The heavy burdens of child-bearing and maintaining a family home are fully realized in money terms, and as a consequence people tend to have fewer children and to substitute outside services for durable consumer goods, principally the large family home. Increasingly, man becomes more and more like the *homo oeconomicus* of the economists' models. He is steered exclusively by an individualistic utilitarianism, and his time horizon shrinks to his own life span. He becomes susceptible to anti-saving theories indicative of a short-run philosophy.

This short summary should indicate the general idea Schumpeter had of the fate of private property and also show why he thought capitalism was destined to evolve into socialism. The basic problem with his theory is that it is not true that interest is consequent upon profits and that profits are derived from technological innovation. There is not a tendency for both to disappear in advanced capitalism, since they derive from aspects of action that are universal and not dependent on special circumstances. Therefore, even though technological innovation may become increasingly automatic, this does not have any consequences for the rate of interest or for the ability of entrepreneurs to earn profit.⁵⁷ Consequently, there will always be a role for private property in the market economy – it will not become 'defunctionalized' and 'dematerialized' as Schumpeter thought, at least not due to the free development of capitalism and the market.

Although the idea of evaporation of the substance of property does not apply to developments on the unhampered market, our contention is that there is one intervention in particular that can be said to have this effect – namely, government control of the money supply in the form of fiat money and the bank privileges that make the process of credit expansion possible. Both aspects of the idea – as it applies to “industrial” and to “consumers” property – is applicable in this context, and it has consequences for how property is treated and for how stewardship over natural resources and land is exercised.

How does inflation lessen the substance of property in the eyes of property owners? To answer this, we must first recall how the new money enter the economy. When fiat money is created in the form

57 For a critique of Schumpeter's theory of profits and interest from the Austrian point of view see Rothbard (2011a).

of credit expansion, this cheapens credit as a source of finance for entrepreneurs and purchasers of durable consumers' goods, leading to a greater reliance on this source of finance as compared to other sources – most notably self-financing. This is in line with the greater importance of the financial system in the economy as a whole that follows from the ability to create fiat money and fiduciary media (Hülsmann 2014). As external credit becomes more important to the individual entrepreneur, he becomes more focused on servicing his debt obligations, almost always in the form of timely money payments. But this in turn means that the monetary revenue an asset can generate becomes comparatively more important than its other characteristics.

Property becomes exclusively seen as a source of revenue, and the non-economic aspects of any specific piece of property – in the agricultural case, usually land – becomes more and more irrelevant to the owner. It loses any substance, becomes “dematerialized” in Schumpeter’s phrase, and the non-economic aspects retreats into the background, or are simply treated as costs. In this way, buildings become more functional as monetary income overshadows questions of beauty, and environmental concerns increasingly disappear from the farmers’ considerations. The opportunity costs of engaging in actions that do not result in more or less immediate monetary income are simply too high, as farmers become more and more indebted in the fiat money system and have to generate a constant stream of income to service their growing debt loads.

The evaporation of the substance of property can also be seen as a shortening of people’s time horizons, as Schumpeter noted, and as a raising of their time preferences. Any kind of use of property that does not yield a monetary return in the near future, even if it might be considered an investment in uncertain future possibilities (e.g., preserving environmental resources that might become valuable in the future), is discouraged. After all, such use is an investment in the uncertain future that might never pay off, and there is a need to maximize monetary income and current capital value now, so the costs of all actions that decrease current monetary income increase. The owner is less likely to act entrepreneurially, as he must follow the dictates of his creditors. Another way to put this is to say that there is a tendency toward short-termism in an inflationary environment (Hülsmann 2016, 85), which means that uncertain returns in the far future are more heavily discounted than they would otherwise have been.

There is also a very concrete sense in which property increasingly evaporates as fiat money inflation and credit expansion increases the reliance of firms on financial intermediaries. As equity evaporates and credit obligations constitute an ever-increasing proportion of the balance sheet, the nominal owner is reduced to the position of little more than the manager of the assets on behalf of

his creditors⁵⁸ – he becomes like the disinterested executive described by Schumpeter. If we recall Mises' (1998, 262) definition of capital as “the *sum of the money equivalent of all assets minus the sum of the money equivalent of all liabilities* as dedicated at a definite date to the conduct of the operations of a definite business unit” (italics added), we can see how financialisation reduces the individual farmer's own stake in his farm. As he increasingly relies on outside funding, his own capital diminishes, albeit he is still the legal owner with all the same rights as before. Yet increasingly, he's simply the caretaker for the financial institutions whose capital allows him to operate the farm. Therefore, there is an increasing tendency for the owner only to be interested in discharging his obligations to his creditors, and he loses interest in the full substance of his property – precisely the evaporation of the substance of property that Schumpeter talked about. It is not a counter-argument to say that the creditors of the legal owner will assume the full sense of property, since they are now the *de facto* owners,⁵⁹ for they too operate with a small capital in the Misesian sense and are principally interested in maximizing monetary returns, as they too have to make fixed money payments to their creditors in turn. The substance of property disappears not only for farmers but also for financial actors. Somewhere down the line there are of course a group of net creditors, but their link to the property in question is practically nonexistent, diffused as it is through a large number of financial intermediaries. Their investments are solely made with an eye to maximizing their monetary incomes, and often they may only hold mortgage backed securities for its collateral value for further credits. The non-economic aspects of land, goods and resources certainly do not interest them.⁶⁰

Along with any real sense of ownership of the resources or land, the general feeling of obligation and responsibility that we described above is also reduced – what we may term, with Schumpeter's words, the evaporation of consumers' property. After all, if the owner no longer feels that he is really the owner, the one that controls a given piece of land, why should he feel it as his obligation to maintain it beyond what he is obliged to in order to fulfil his legal obligations to his creditors? He might still think that, for example, environmental stewardship is part of the obligations of ownership, but he will be increasingly hard put to explain to others as well as himself why it should be an obligation incumbent upon him.

To be clear, we do not mean to suggest that these changes take place overnight. When discussing this fuller sense of property, we are talking about deep-seated cultural prejudices that do not

58 Interestingly, Max Weber (1978, 1:148) formulated much the same idea: “Even the owner becomes effectively a trustee of the suppliers of credit, the banks.”

59 On this see Rothbard (2009, 435–43).

60 Cf. the interesting study by Sippel, Larder, and Lawrence (2017).

disappear overnight. But the constant inflation and increasing importance of debt will gradually undermine it, even if it will take several generations living under fiat money before it is entirely gone. In the world of farming, environmental problems will tend to be increasingly ignored, so long as they do not interfere with current production.

6.8. Conclusion

This general overview of finance and financialisation of agriculture shows what is right in the literature on financialisation and what is lacking. The claims about how derivatives markets distort agricultural production decisions and make farmers more vulnerable to risk, the growing debt of farmers, and “immiserizing growth” or “the agricultural treadmill” are all claims about real phenomena. However, the explanation proffered are deficient, for precisely the reason that the mainstream approach to financial matters is deficient, viz., a lack of attention paid to monetary phenomena.

We have in this chapter offered a sketch showing how money production through credit creation is an important driver of financialisation and the agricultural treadmill. We are now in a position to explain the changing character of agriculture and the role of the ruling monetary order in explaining these changes. As a general rule, we can say that the more banks are able to earn seigniorage by extending credit, the more will these processes be encouraged and lead to systematic changes in agricultural production and organization. An economic order based on commodity, even if it allows fractional reserve banking, is likely to limit the extent of systemic distortions, as the necessity of settling outflows and demands for redemption in general in commodity money imposes a sharp limit on the extent of bank credit expansion. However, in a fiat money system, where the government can produce money at virtually no cost, there is not the same limit. Not only because the demand for money substitutes is likely to be higher in such a system, but also because it will be possible for the government to inject new base money into the banking system and keep the credit expansion going for much longer, as well as to prop up and save the banks from the inevitable depression and credit contraction.

7. Monetary Interventionism and Agriculture: A Summary

The purpose of this brief chapter is to draw together the strands of the analysis presented in the previous chapters and summarily state the main consequences of monetary interventionism in agriculture. Since we have taken a somewhat roundabout way to get this far, it is useful at this point to stop and take stock.

Our main argument is that the system of money production is crucial to how the economy develops. In the natural order of commodity money privately produced, there are no fundamental distortions to the economic order from the production of money. It is a business like any other and governed by the law of costs like all other businesses. However, the modern system of bank money production, where practically all money is created through the process of extending new loans, leads to important and systematic changes in agriculture.

7.1. Changes to land use

We saw in chapter 2 how land was allocated between different uses (pp. 37-41) and how the margin between economic and uneconomic land was determined (pp. 47-50). Marginal land is cultivated and kept in use, if the return expected from this employment of capital is greater than its alternative uses, and units of land are allocated to the most valuable use, that is, in a market economy, the use where they earn the highest DMVPs or yield the greatest direct satisfaction to the consumer (owner). Thus land is allocated between agricultural and non-agricultural uses and between different agricultural uses.

The establishment of money-creating banks changes this. Credit expansion directs investment into formation of capital goods used for more intensive agriculture and reduces the interest rate, and this causes the calculation of land allocation to change. Since the interest rate is lower, the opportunity cost of the complementary factors of production to cultivating new land is reduced. Therefore, more land will be brought into use than otherwise, as the margin of economic land is moved.

Likewise, the allocation of land between different sectors changes, but here there is not an unequivocal influence. This depends on how bank credit affects the different sectors of the economy. During one credit expansion, for instance, residential construction might be especially favoured, while in another forestry booms. In general, the proportion of capital goods to land changes in favour of capital goods and this increases the physical productivity of those land uses where capital-intensive techniques are possible. The opportunity cost of more extensive land

management preserving long term capital values therefore increases and less land will be allocated to such practices, as the net rent of land in the other, capital-intensive uses is higher. A typical example would be deforestation, the turning of forests – wild or commercial – into cropland, but here many other factors also play a role, including subsidies to some products over others and a lack of property rights in the land.

7.2. Increased capitalization

An important consequence of bank credit expansion is the reduction of the loan rate of interest. The rate of interest will always tend to be equal to the price spread between stages of production, since these are in fact expressions of the same underlying reality: the premium of present goods over future goods. However, since the rate of interest can only be expressed in monetary terms, it is possible for monetary intervention to suppress it for some time, as new money created through credit expansion are loaned into existence at a rate of interest lower than what the market rate of interest would otherwise have been. This misleads entrepreneurs and capitalists into calculating their returns and capital values with a wrong benchmark rate, and hence also to estimate the price of durable goods and land wrongly.

Even entrepreneurs perfectly aware of the role of credit expansion in driving down the interest rate and hence of the fact that the market rate of interest was, in some sense, false, would be forced into making this error. This is so since the counterfactual real rate of interest as it would be in the absence of credit expansion is unknowable and any rate other than the market rate is an arbitrary stipulation. Furthermore, while bank credit is unlikely to fund long-term mortgages, some banks might – and in fact do – offer shorter term mortgages. The practice of central banks of accepting some mortgage backed securities as collateral also serves to increase the demand for such mortgages and hence the supply of loans for real estate purchases. All this constitutes an extra supply of money going directly to investment in land, driving up land prices and thus the capital value of land. This process is self-reinforcing, as land price inflation increases farmers' equity and thereby makes them more attractive borrowers for banks and other lenders. While investment in expanded production (to be discussed in the next section) may, for a time, increase revenue and land rent, the increase in the capitalized value of land is detached from this process.

The long run result will be a new set of land prices that again make the purchasing price of land equal to the flow of future rent payments discounted to the present, and since the rate of interest is lower, capital values of land is likely to be permanently higher. If mortgage backed securities are accepted as collateral by the central bank, this means that mortgages to farmers will be permanently

cheaper, as the banks' ability to use these securities to secure new reserves from the central bank will be priced in, as the securities effectively become a necessary input for the continued process of credit expansion. Another long term consequence is that farmers become more indebted, as the link between the value of their production and the capital needed to invest in farmland weakens.

7.3. Changing investment patterns in agriculture

As we saw in chapter 4, section 4.4.2: Net savings and agriculture, net saving will also lead to greater investment in agriculture. However, it will also lead to a change in production patterns. As net saving is always accompanied by a fall in demand for consumer goods, the price of agricultural outputs will decline, even though the inelasticity of demand means that the quantity demanded will not fall much. Falling revenues mean that land rents will fall, and at the same time the fall in the interest rate means that future uses are not as heavily discounted as they were before. Farmers therefore invest in future uses of their land, through various land improvements, as the cost of doing so in terms of present rent foregone has fallen. Land factors may also shift to producing more valuable outputs which take longer time to mature and which were therefore previously too costly to produce.

When agricultural capital is channelled through banks, this dynamic is weakened. Bank credit expansion results in malinvestments and business cycles for agriculture as for the rest of the economy, but there are also permanent effects. The loans made by expanding banks go to funding capital investment, i.e., investment in capital goods, as such investment more nearly match the maturity of the loans. As well, as there is no drop in consumption to steer investment patterns away from consumer goods, it seems rational to expand present production. As new capital goods are bought and implemented on farms, the result is a rise in physical productivity and output. Yet there is no market for this extra production due to Engel's law (cf. above pp. 27-32), and as a result, prices will fall below the costs of production. This will result in a crisis in the capital goods producing industries, as demand for the new farm implements drops, and capital goods will be switched to other productions as investment goes elsewhere.

However, on the farms the most important drop in prices is the fall in the rent of land. Since land is the most specific factor, it is the one most sensitive to changes in the prices of output. The lower revenue from the greater product will therefore lead to a disproportionate fall in the rent of land, and as farmers reorganize production into a structure that reflects the new economic conditions, the result will be a centralization of land on fewer hands, as more land worked with the new capital goods is the mix of production factors that now prove most profitable.

The kind of capital goods produced for agriculture also changes. Bank credit makes increasing present productivity look more profitable than it otherwise would be, as the costs investing in capital goods go down. As a result, technological developments tend to happen in this area, as more credit is available to fund R&D. New seed varieties, more efficient engines of tractors and other new inventions, steer agricultural production along a path where these inventions can be implemented. The agricultural treadmill is the result: long-term sustainable investment is no longer economically possible, as investment and technological development is steered down one specific path.

7.4. Changes to specialization

These changes also partly explain the rise of monocultural farms. To be sure, other economic conditions can explain some cases of extreme specialization. Viticulture, for instance, requires long-term allocation of land. However, the mix of different outputs is usually, as we saw in chapter 3, a method of reducing the uncertainties of income and of best employing the farmer's entrepreneurial talents (cf. especially above, 88-93). The new structure that emerges with the agricultural treadmill requires more intense and specialized production, reducing the possibilities of maintaining the old structure of more diverse methods. This can be seen as more "professional" or less "entrepreneurial" depending on the point of view; the result is more intensive, monocultural cultivation to go along with the larger farm sizes. With each successive round in the treadmill – increased capital investment → increased physical productivity → lower revenue due to Engel's law → crisis and consolidation of farms – the process is repeated and farms grow in size and become more specialized.

In a sense, farms become more capital-intensive, as more capital is invested in agriculture. But since capital values ultimately depend on expected revenues, long term they are likely to decline, as farm revenues decline. In the absence of bank-credit fuelled investment, farms would have been no less capitalistic, but both products and the producer goods used would have been different. As a result, farm capital would likely have been maintained at a higher level long term, and more labour would have been employed in agriculture. The great increase in physical productivity from new investments has as its necessary corollary an increase in the physical productivity of labour, and since Engel's law is no less applicable here, the result is a reduction in the number of labourers employed in agriculture. Increasingly, huge tracts of lands come to be worked by specialized labourers operating sophisticated machinery and other advanced implements. Agricultural expansion from voluntary savings might have had some similar characteristics – there has, for

instance, been plenty of technological improvement and innovation before the age of modern banking – but the treadmill process and the distortion of the agricultural structure would not have arisen.

7.5. Rationality trap

It is important to note that this is not a case of farmers and other agricultural operators (in the capital-goods industries supplying farmers, for instance) acting irrationally or irresponsibly. Each agricultural entrepreneur acts in the way that he thinks will earn him the largest psychic and monetary profit. Making the investment and production decision leading to the outcome described here is, for each individual, the result of sound economic sense. However, while it is sound on the individual level, the system as a whole proves unstable. Profit-seeking entrepreneurship leads to a process of periodic crises, as malinvestments in agriculture repeatedly move the margins of profitable farm sizes and producer goods combinations on the individual farms. Even should the entrepreneur recognize the process, it is not possible to break out of it – indeed, it is not rational or profit-maximising for him. At most, he can try to position himself to most fully take advantage of the process, or perhaps attempt to find a niche untouched by the bank credit system. But since all prices and all production processes are connected in the market economy, this can at best be a mitigation strategy – and in any case, only one a few can use, since there are, by definition, only a few marginal niches. The great mainstream of agriculture, as of other sectors of society, will be “trapped” in the system dominated by bank credit because this is, at the individual level, the optimal strategy, even though it leads to instability on the systemic level.

7.6. Evaporation of the substance of property

The most nebulous of the consequences that flow from financialisation and the modern banking system is the Schumpeterian concept of the evaporation of the substance of property. This concept attempts to describe the owner’s attachment to his land and other property and is therefore necessarily a very subjective concept that will differ from individual to individual. Despite these differences, it is possible to state some generally applicable tendencies.

As the process of financialisation proceeds and farmers become increasingly integrated into the financial system, it becomes more important to them to secure good relations to potential and actual creditors. This is done by proving oneself a reliable credit risk who always pays on time, by presenting an acceptable balance sheet with plenty of collateral, and by always maintaining one’s

revenues. These points are all important to the entrepreneur in the market economy under all circumstances, but their importance becomes accentuated. The farmer in the free market order who only has a minor mortgage can afford to consider his credit rating of secondary importance, but to the man with several loans, who never knows when he might need additional credit, his standing with actual and potential creditors becomes much more important.

The result is that it is precisely those aspects of his property that can be expressed in financial statements – cash flow, income statements, asset valuations – that become increasingly important. Monetary profit becomes much more important than psychic profit and those uses of his property that only yield a psychic profit become much more costly to maintain. Environmental degradation might be one result, as endangered species or rare local ecosystems are of no financial value. Hedges and field borders that provided habitats for animals and flowers may be plowed under to squeeze out a little more revenue.

The farmer thus increasingly thinks less and less of the non-economic or non-financial aspects of his property. He becomes more like a manager trying to use it most efficiently for the ends of his financial supervisors than an owner with an eye for all aspects of the property under his control.

8. The Classical Gold Standard: the Danish Experience 1870-1914

8.1. Introduction

We have so far described the structure of agriculture under the natural order of money production and have in some detail analysed the economics of agriculture and the impact of change in the economy on the agricultural sector. Some of our main findings were: the relative importance of economic land in agriculture as compared to other sectors; the importance of the fact that farmers, in general, produce basic goods and are therefore faced with an inelastic demand curve; that agricultural firms, partly due to the limitations on the division of labour but principally because this is the most profitable way to deal with the problems of uncertainty in agriculture, would tend to be of smaller size, thus explaining the continuing predominance of family farms from the 18th century until relatively recently.⁶¹ We also looked at the role of credit markets and found that, since land usually constitutes a relatively large part of the farmer's capital, there would naturally be some demand for and supply of mortgage credit, but that this kind of borrowing would be strictly secondary and limited to long-term financing of land holdings.

These considerations apply universally to agriculture so long as the conditions we assumed hold. However, actual economic experience is one of interventionism, both in the sphere of money and elsewhere. If we want to show the relevance of our theoretical considerations, we need to take account of the historical record of interventionism. Every period is marked by some kind of government intervention or control of the economy (Hülsmann 2008a, 195–96), and we can therefore not find a clear, historical case study that would illustrate the evolution of agriculture in a pure free-market order. That is, however, not our goal here: rather, armed with our theoretical apparatus we claim to be able to explain actual historical developments, marked by interventionism as they are, since only with a clear, consistent theory will we be able to understand the impact of specific interventions and the general economic evolution.

That said, some periods of economic history were clearly more marked by interventionism than others. In this chapter, we will therefore examine a period of agricultural history that came close in some respects to a pure free-market order, the case of Danish agriculture in the late 19th century.

61 As we will lay out in chapter 9, monetary interventionism since WW2 has led to a fundamental change in the structure of agriculture in developed European countries.

Generally *laissez-faire*, there were almost no interventions in agriculture in this period. The main exception is a tariff protecting the sugar interests, and from 1899 state sponsorship of the erection of small cottages along the lines of a Georgist scheme. Both cases are however of minor importance. Sugar was not an important commodity and its production was geographically restricted, and the state cottages were only ever a small minority of the number of cottages. At the same time, Denmark was on the gold standard from 1873 and had before that been on a silver standard. While there was credit expansion, especially after the introduction of “modern” banking on English lines in 1857, this principally took place in Copenhagen and the other main cities and was directed at financing industrial undertakings, railroads and shipping. Farmers largely used rural savings banks which do not appear to have engaged in credit expansion. While this did not leave agriculture completely unaffected by credit expansion elsewhere in the economy, it does not appear that the agricultural sector suffered from business cycles. Nevertheless, monetary interventionism in the form of privileged banking and enforced monometallism was the order of the day, the consequences of which – credit expansion and increased reliance on banking – appeared to intensify gradually in the last decades of the old order before 1914.

The economist and historian Falbe-Hansen (1889, 2:139) declared that the century 1788-1888 was the “century of freedom” for Danish agriculture. We could perhaps have gained a better picture of free-market agriculture by concentrating on this earlier period, but we have chosen the later period 1870-1914 for several reasons:

1. While we agree with Falbe-Hansen’s general assessment, especially the earlier decades 1788-1808 but also the 1840s and 1850s were years of transition. Before the reforms culminating in 1788, the peasants were virtually barred from ownership and personally unfree. Most of the land was directly owned by the king or by government institutions, or owned by large landholders whose tenants the peasants were. Once the rights of private property and personal freedom were recognized, this basically mercantilist and state socialist⁶² structure of ownership and use of the land was rapidly transformed: the king sold off most of his demesne, mainly to the peasants, and the peasants bought their tenancies from their former landlords. At the same time, and directly related to this change in ownership, there was a profound change in methods of cultivating, as the traditional, common open field system was reformed and replaced with separate, privately worked farms. Interesting and worthy of study as this episode is, it is the history of a change from system

62 As an aside, these terms better describe the reality of the situation than the usual phrases evoking feudalism and medieval institutions. The economic conditions in Denmark in the 18th century owed much more to the ideologies of absolutism and mercantilism, and the structure of ownership of land owed much more to the gradual decline of free institutions since the 14th century than it did to any medieval survivals. It was in this respect analogous to the so-called “second serfdom” in trans-Elbian Europe.

based on violence and privilege to one based on freedom and contract, i.e., a free-market order (Løgstrup 2015). In order to examine the consequences of monetary interventionism, however, it is simpler to look at a period when capitalist agriculture was already established. This wasn't the case until about the middle of the 19th century.

2. The years before c. 1830 were characterized by various drastic interventions in the monetary system: various government banks and institutions were involved in issuing paper currency, and after 1807 this resulted in hyper inflation, as the government issued huge sums of inconvertible paper to finance participation in the Napoleonic Wars. When the government tried to salvage the situation after 1813 this unleashed another round of paper inflation, only to be succeeded by fiat deflation after 1818 as the government tried to reach the 1813 silver parity. It was not before the 1830s that this was finally achieved. After that, the monetary system functioned as a silver standard until the introduction of the gold standard in 1873. These interventions are interesting in themselves, but does not yield much new information. The period of inflation saw a boon to landowners and speculators, as their nominal liabilities evaporated; the period of deflation, leading to hardship as nominal claims were fixed while nominal revenues declined. The later period we have selected for our study was characterized by more subtle interventions, as already indicated. To wit, bank credit expansion under the classical gold standard.

3. Finally, the historical sources are incomplete and hard to interpret in anything close to a definite manner before about 1870. There are plenty of sources describing agricultural facts and changes from the earlier period, enough to give a clear impression of what was going on; but the later period is much richer in sources and especially in official statistics. This is not to say that statistics are necessarily a superior way of transmitting information, as they themselves need to be explained and interpreted, but for our purposes statistical description of some facts – capital values, number and size of farms and so on – would simplify matters.

There are also good reasons to prefer the period 1870-1914. This was the period of the classical gold standard, a unified monetary order encompassing virtually all of Europe. It was also a period of both expansion and change in Danish agriculture. Until the mid-1870s, the main output and export had been grains, but Danish exports were increasingly challenged and displaced by American and Russian corn. Alternative products and outlets therefore had to be found, which made new technological developments and sometimes drastic changes in the structure of production necessary. The role of external finances under such circumstances could potentially be very important. We have a reasonably good overview of the financial market and what its importance was for farmers due to the special institutional conditions in Denmark. Iván Berend (2013, 127), in his economic

history of Europe in the nineteenth century, has suggested, in an off-hand remark dealing with Austrian conditions, that provision of mortgage credit from the modern banking system was “a huge boost for modernization” of agriculture. Despite the limitations of our sources and the need for interpretation, the data we have for Denmark in the period 1870-1914 allow us to investigate this question. To give a preview of our conclusion: Our own position, that credit is only of secondary importance and virtually only used to help finance landownership, is vindicated. Most agricultural investment in the period, despite the need for radical changes, was financed out of income or secondarily with loans from savings banks. Despite the degree of intervention in the form of credit expansion, the basic structure of agriculture was not altered – there was not, for instance, a tendency toward concentration. At most, there was some increase in indebtedness, but even this is not a clear-cut conclusion.

The rest of the chapter will proceed as follows: we will first lay out the institutional and historical setting, describing the distribution of landownership, the size of farms, the main products, and the market for agricultural credit. We will then describe the changes in the period and how Danish farmers adjusted to new market conditions and even prospered. We will also show the evolution of the structure of ownership and of credit financing over the period. In particular, we will argue that a flexible money supply or credit expansion were clearly not necessary to accommodate the investment needs of a rapidly changing and expanding sector of the economy, and that the process of urban credit expansion was mostly irrelevant to farmers.

The period of *laissez-faire* – limited as the application of free-market principles were – was brought to a close in Denmark as most elsewhere with the onset of the First World War, which is why we end our investigation in 1914. There were attempts to return to normalcy in the 1920s, but these were short-lived or abortive. In particular, the attempt to revive the gold standard only resulted in adherence to the gold-exchange standard in 1926, and even this was readily abandoned in 1931. There was a partial liberalization after the Second World War, but not in the monetary sphere. We will therefore return to the Danish case when we examine the interventionist monetary order of post-war Europe in chapter 9.

8.2. The institutional and historical background

By 1870, Danish agriculture had for almost a century been operating under free-market principles since the agrarian reforms in the second half of the 18th century. The result was that nearly all the land was in the hands of independent farmer entrepreneurs who operated medium-sized commercial farms, and only a small fraction of the land was still held under the old system of land tenure. This

was not a unique situation in Europe, as other countries pursued similar reforms in a liberal direction – Belgium in 1793, France during the French Revolution – with similar results (Berend 2013, 119–20). The result everywhere was a transformation of the structure of ownership, as the smaller household or family farm proved economically relatively more efficient than the larger estates (Persson 2010, 81–85).

However, almost uniquely in Europe, the Danish reforms were implemented largely voluntarily, not during revolutionary upheavals of one sort or another. They began with experiments in selling off the royal demesne in the 1760s and various estate owners selling their lands to the peasants and really picked up steam after 1788. Even the Danish involvement in the Napoleonic Wars after 1807 did not put a halt to the reforms, and it was only when depression came in 1818 that the transformation slowed down.⁶³ The slowdown was only temporary, as the transformation picked up steam again from the 1830s and especially in the 1850s, so that by 1888 only 2,300 barrels of *hartkorn*⁶⁴ land owed villeinage or *corvée* duties to a landlord, as opposed to 80,000 barrels in 1807 and about 200,000 before 1788 (Falbe-Hansen 1889, 2:108). In addition, the duties that were owed were both much lighter and more certain.

8.2.1. Agriculture

Danish agriculture in the period before 1870 was mainly focused on growing and exporting cereal crops and it was a time of great expansion, both in terms of the land area under cultivation, the number of labourers employed, and the physical productivity of both land and labour. If we take the land area first, the numbers for the earliest period are again uncertain, but we can clearly identify the tendency (Falbe-Hansen 1889, 2:50–55). At the beginning of the nineteenth century, the area under cultivation amounted to 4,301,000 barrels of land. By 1861, this had increased to 4,444,000 barrels of land and by 1881 to 5,129,000 barrels of land. The increase was due to drainage of swamps and moors, clearing of wasteland, and cultivation of the heaths. More recent estimates of the area under cultivation confirms these earlier findings. Erling Olsen (1962, 85) reports an

63 The best overall description of the process from an economic point of view are still the two volumes by Falbe-Hansen (1888; 1889), but see also Bjørn (1977) and Raaschou-Nielsen (1990) for some important corrections to Falbe-Hansen's account, which is at times too focused on the policies of the central administration.

64 *Hartkorn* was the basic measure for the assessment of land values for tax purposes and was fixed by the cadastral surveys of 1688 and 1844. It was abolished as a basis for the tax system in 1903. It is a very imperfect measure, as it is a very theoretical unit and new assessments were seldom carried out. However, our data on farm sales give the prices as paid per barrel of *hartkorn*, and farm sizes are reported in so many barrels of *hartkorn*, so we have little alternative but to use it as the basis of our analysis.

One barrel of *hartkorn* could be anything from 2 to twenty barrels of cropland. Commons and meadows were assessed as 50 barrels of land per barrel of *hartkorn* and forests at 100. On average, one barrel of *hartkorn* was equal to 18-19 barrels of land or about 10 hectares. In the survey of 1844, the total was 372,221 barrels of *hartkorn*. *Barrel of land* was the basic unit of measurement of surface area until metrication in 1907. It is equal to 14,000 Danish square cubits, or about 0.5516 hectares.

increase in land under cultivation from 2,372,000 hectares in 1800 to 2,859,000 hectares in 1881, and Kim Abildgren (2015, 14–15) estimates that the arable agricultural area as a percentage of Denmark's total geographical area increased from about 62 percent in 1845 to about 74 percent in the 1880s.

When it comes to the workforce data are very sketchy. Falbe-Hansen (1889, 2:136–39) does not deal directly with the evolution of the number of workers, but his description of the class of cottagers and day labourers suggests that it had increased. To this number we would need to add the direct labour of the farmers themselves as well as workers hired on long-term contracts. Bairoch (1999, 30), in his statistical account of agricultural development, suggests that the number of male agricultural workers began at 310,000 in 1800, rose to 400,000 in 1850 and fell back to 310,000 in 1870. However, he admits himself that his data before 1850 are very uncertain, and he leaves the female labour force out of account entirely. Perhaps the closest indicator we can get for the earlier period is the total of the rural population, as it is fair to assume that the overwhelming proportion of it was engaged in agriculture throughout the nineteenth century and beyond. In 1801 the rural population numbered 735,000 and in 1870 1,341,000 persons, almost a doubling. Our first number for the workforce is from 1870, and in this year 486,000 persons are said to work in agriculture, 52 percent of the total workforce (Olsen 1962, 87). It thus seems safe to assume an expanding agricultural workforce, even though we cannot say anything more definite than that.

Production and productivity likewise increased: Physical output more than tripled from 1800 to 1870, and physical productivity per worker increased by a factor of 3.2 during the period (Bairoch 1999, 10, 136–37). At the same time, this expansion was very profitable. Populations were growing across Europe leading to rising demand and hence rising prices for corn. Added to this basic rise in demand were also institutional changes that led to a freer world market in cereals, most famously with the abolition of the English Corn Laws, but not limited to Great Britain. There was a general trend to deregulate grain markets across Europe during the period (Persson 1999, 131–55). These two tendencies – increasing productivity on the one hand and increasing populations on the other – explain how Danish agriculture before 1870 could continually expand without having to shift into more value-productive lines: demand for grains was inelastic if taken at any given moment, but the increasing populations meant that the demand curve continued to shift outwards. Even though grain prices only increased slightly or not at all, the increased production per worker and per barrel of cropland led to increasing wages and land rents.

The distribution of agricultural capital across farms is described well in the official statistics from 1860 onwards. The number of farms and cottages and the distribution of land between them in

terms of *hartkorn* was regularly reported after that year, although we don't have good estimates of the value of the capital goods employed on farms. There is some information available about the actual market price of farms for selected periods from sales, but before 1895 these explicitly exclude the sales value of livestock and machines and other inventory. The main sources for our statistical series are the official publications of *Danmarks Statistik*. From 1869 they regularly, although not annually, published comparable statistics, and in 1896 they began publishing statistical yearbooks.⁶⁵

The data available to us is the distribution of *hartkorn* across size categories and the number of farms or cottages in each category (figures 6 and 7). Persons owning farms in the smallest category, cottages below $\frac{1}{4}$ barrel of *hartkorn*, generally would have had to work a substantial amount of time away from their cottage in order to make a living. The next category, cottages of $\frac{1}{4}$ to 1 barrel *hartkorn*, would generally only occasionally have had to take paid work. Farms in the size categories 1-12 barrels of *hartkorn* were full-time enterprises, and except for the smallest of them they all employed regular labourers as well as day labourers during periods of peak demand. Farms above 12 barrels of *hartkorn* count both the surviving estates as well as larger farms. We have here summarized the data from 1860 to 1873, on the eve of the period of change. We see that land is owned mainly in holdings of middling size, as well over half the total value of agricultural land is owned by farms of between 2 and 8 barrels of *hartkorn*. There also does not seem to be much migration between the categories: there is a slight fall the categories of 4-8 and 8-12 barrels, and slight increase in the other categories. This distribution is as we should expect from our theoretical considerations on farm organization. It should also not surprise us that the total number of cottages and small farms is larger than the mid-size and larger farms, since there was a large demand for agricultural labourers and these could supplement their income with their own production. The smallest cottage holdings own a negligible part of the cropland throughout the period, and although they probably cultivated it more intensely with garden crops, the growth in their number is probably best interpreted as an increase in the supply of agricultural labour.

65 In addition to the *Sammendrag af statistiske Oplysninger* (Det statistiske Bureau 1869) and the yearbooks from 1896 on (Det statistiske Bureau 1896), the summaries in French have also been used (Det statistiske Bureau 1874), as well as publications dealing in more detail with credit markets (Danmarks Statistik 1969) and agricultural prices (Det statistiske Departement 1958). Data on price indices, agricultural production and exports and the money supply are compiled from various tables in Svendsen and Hansen (1968).

Figure 6: Farmland distribution in Denmark

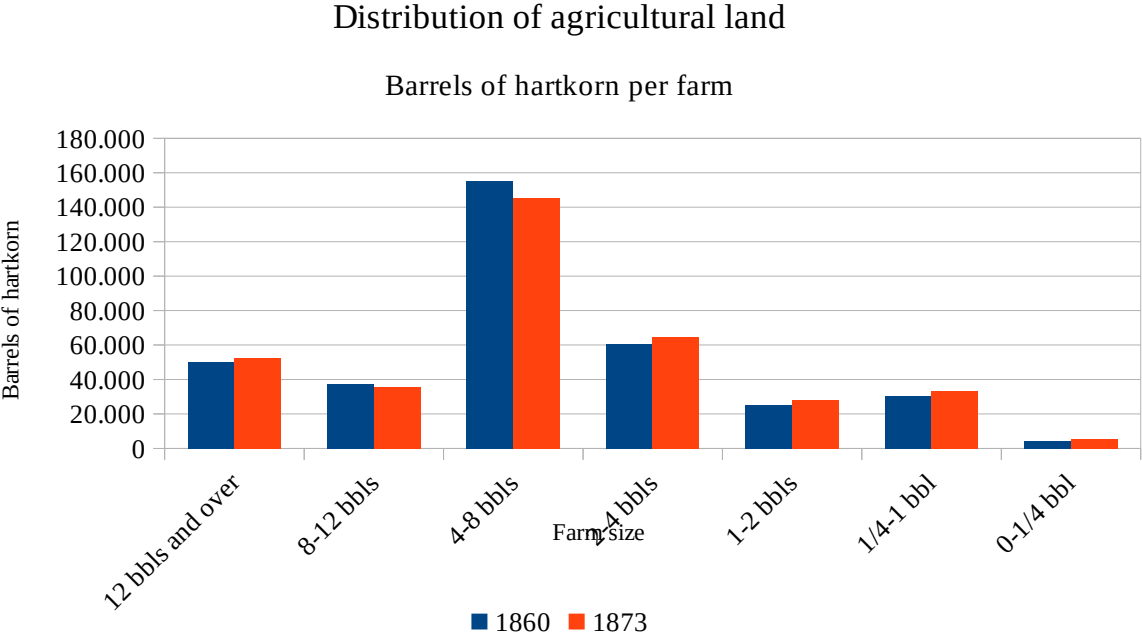
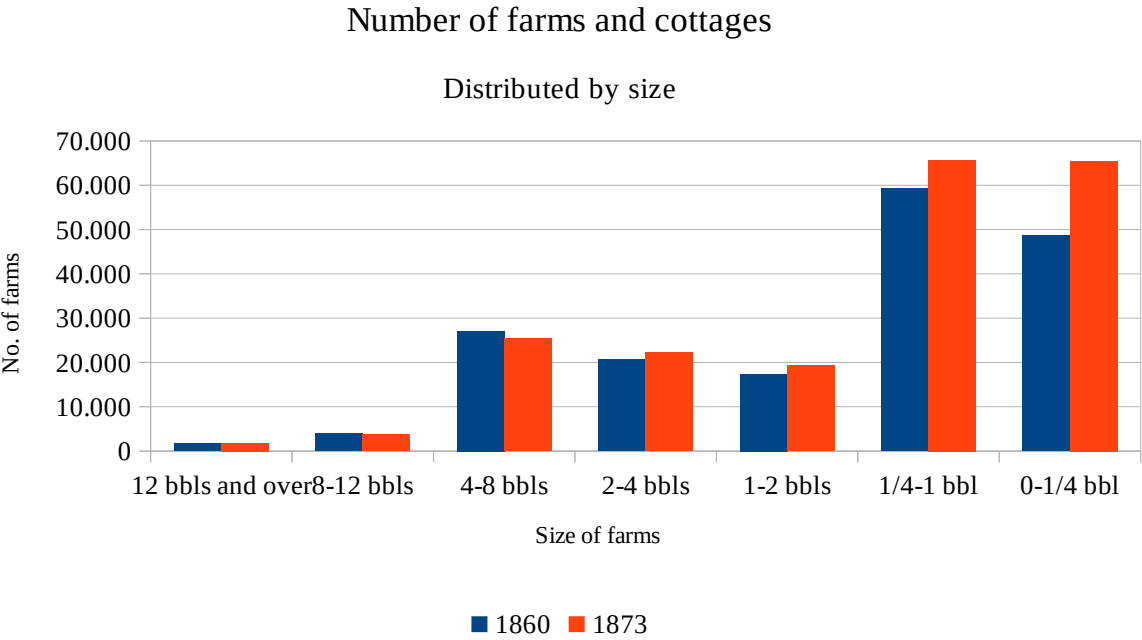


Figure 7: Number of farms in Denmark distributed by size



Livestock was the main kind of capital goods in agriculture in this period, but unfortunately we have no knowledge of the general distribution of livestock across farms. We have, however, included a table (table 2) showing the total numbers of the main kinds of livestock in the period for the years 1866, 1871 and 1876. Horses are in the period the main source of motive power or traction, cattle are kept for both dairy and beef purposes. There is still a sizeable export of live cattle to Germany as well as a nascent export of butter. Swine and sheep appears mainly to have been for domestic consumption, not export, but the growth in the number of cattle and swine indicates that

production of pork and dairy products was slowly expanding already in the 1860s and 1870s. Falbe-Hansen (1873, 436–37) estimates that already in 1872, as a share of total agricultural capital, cattle breeding was only more important in Great Britain. In Denmark the value of the livestock was about 12.6 percent of total agricultural capital, while it was 22 percent in Great Britain.

Table 2: Number of livestock (Det statistiske Bureau 1896)

	Horses	Cattle	Sheep	Swine
1866	352.603	1.193.861	1.875.052	381.512
1871	316.570	1.238.898	1.842.481	442.421
1876	352.262	1.348.321	1.719.249	503.667

It is estimated, based on the assessments conducted by the credit unions (see on these below), that in 1885 the average value of farms, per barrel of *hartkorn* and including livestock and other capital goods, was kr. 10,000 (Falbe-Hansen and Scharling 1885, 1:691). This translates into a total capital value for all agricultural enterprises of kr. 3,850 millions. Of these 152 millions represent woodland, 2.168 millions represent cropland, 960 millions buildings and 570 millions livestock and implements. 1885 is also the first year for which we have data from the statistical yearbooks on the average market price per barrel of *hartkorn* sold that year. This amounted to kr. 6,628 per barrel, including buildings but excluding livestock and other capital goods. If we multiply this by the total amount of *hartkorn* we arrive at a capital value of 2,502 millions. Needless to say, both approaches to estimating total capital rest on some heroic assumptions and are not by themselves of much use, except to suggest the distribution of capital between land and capital goods and the proportion of mortgage credit to total agricultural capital. Since we have no clear indication of this latter amount (see below) for this year, there is little we can learn from this calculation on its own.

8.2.2. Money and credit

In 1845 the Danish paper currency, the *rigsbankdaler*, was again made convertible in silver, restoring sound money after years of confusion and inconvertibility.⁶⁶ The preceding decades had witnessed first inflation, then a fiat deflation of the money supply, as the paper circulation had been gradually contracted in order to achieve parity with silver. We should not be too impressed by the official figures or the effects of this contraction, however, as there was a substantial circulation of silver coins – Danish and foreign – throughout the country during this time. The main effect of the contraction was perhaps on the nominal values of long-term debts: debts contracted in paper money during the inflationary years before 1818 came to weigh heavily on the debtors, as the expected

⁶⁶ The main sources for this section are the official histories of the Danish central bank, Abildgren (2018, chaps 1–2) and especially Svendsen and Hansen (1968).

inflation of money and asset values was brusquely replaced by deflation of the money supply and a collapse of land values (Falbe-Hansen 1889, 2:22–25). At the same time, credit institutions – the first savings bank had been created in 1810 – placed their funds almost exclusively in government bonds, either directly or indirectly (through the central bank), draining the countryside of credit. While mortgage lending was well-established long before 1800, it is impossible to follow the amounts and proportions of mortgage credit during these decades with any precision, as the lenders were not established institutions but almost exclusively private individuals. While mortgages were declared in official registries, their gradual repayment was not registered, meaning that the amount of new mortgage credit issued during a given period significantly overstates the net amount of mortgages outstanding.⁶⁷ Total mortgage debt recorded in these registries are necessarily also overstated.

Falbe-Hansen (1889, 2:80–91) gives a general description of the agricultural credit market drawn from many sources: in the late 18th century mortgage debt amounted to about 40 percent of the value of agricultural land. The total amount increased due to the inflation after 1808, but the proportion fell. Then the crisis of 1818 led to a crash of land values and the proportion of mortgage debt increased and remained high into the 20s, as it was only gradually brought down during the years of deflation and depression. In the 1830s and 40s this again changed, as land values increased, but people were slow to borrow, leading to the proportion of mortgage credit being much below 40 percent. This had again changed by the 1850s as increased prosperity, and faster turnover of farms and more secure and cheaper credit institutions meant farmers and lenders were again more willing to enter debt contracts. By the 1870s the proportion was again around 40 percent.

The silver standard was exchanged for gold relatively painlessly in 1873 (Svendsen and Hansen 1968, 305–10). Since about 1865 there had been increasing convergence on the idea that a gold standard was preferable, and as Germany adopted gold in 1871 the time had come for Denmark and Sweden-Norway to do the same. The change proceeded without problems, as the new currency, the *kroner* or crown was exchanged for the old *daler* at the rate of 1:2. The gold content was 0.403 grams of gold per crown, but the only gold coins minted were the 10-crown and 20-crown pieces. Their value was much too high for daily use, and the hopes of some reformers that gold would circulate throughout the country were thus dashed (ibid., 309). By 1900 the total gold coinage (10 and 20 crown pieces) amounted to kr. 39,298,520 out of a total coin circulation of kr. 62,291,495.28 and a note circulation of kr. 92 million.

67 There are no data on total mortgage credit before the 20th century.

That the new gold coinage was not practical for daily use clearly favoured the use of token coins and bank notes. Bank notes, however, were a stable part of the money supply, as since 1845 any new issue had to be fully backed by metal, that is, there was a 100 percent marginal reserve requirement. This principle was not abrogated by the adoption of the gold standard. Of much more importance for the monetary system was the impetus given to the use of money substitutes and the expanding banking system, since the use of cheques was much more convenient than gold coins and the use of money substitutes really took off in the 1860s (Svendsen and Hansen 1968, 289). At the same time, it is not easy to estimate to what extent the money substitutes issued by the banks were fiduciary media, as there are no clear data on their holdings of gold and bank notes. That they operated with fractional reserves seems beyond question. However, it is not at all clear that all the accounts (checking accounts with commercial banks and savings accounts with savings banks) counted in the official money supply statistics were really used as fiduciary media. Especially the use of saving deposits for this purpose seem questionable, as the savings banks did not suffer the crises and periodic contractions we would expect if they issued unbacked money substitutes. This is important, as the savings banks' primary customers were in the rural areas among the farmers and cottagers (Boje 2020, 188).

In any event, the rate of change of the money supply as officially reported and of its different components – bank note circulation, checking accounts with commercial banks and savings accounts with savings banks – are still indicative of monetary trends.

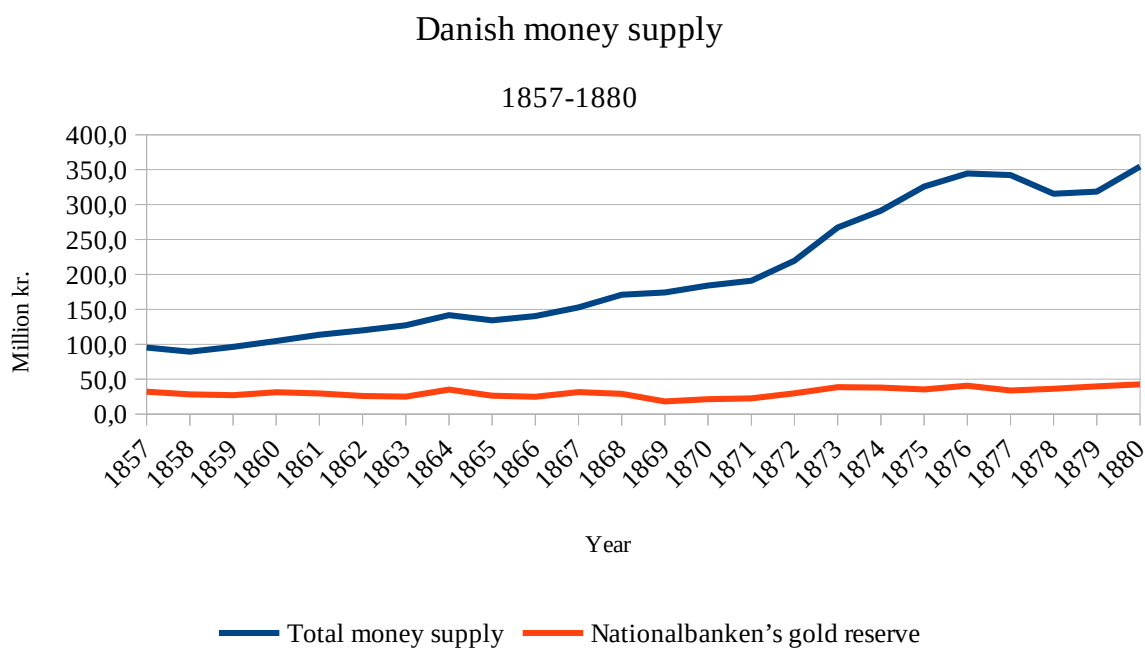
Table 3: Danish money supply 1857-1880. In kr. millions (Olsen 1962)

	Note circulation	Deposits with commercial banks	Deposits with savings banks	Total money supply	Gold reserves
1857	43,6	4,4	47,3	95,3	32,0
1858	38,4	3,8	47,2	89,4	28,2
1859	43,0	9,2	44,0	96,2	27,1
1860	42,6	12,7	49,3	104,6	31,3
1861	41,6	15,7	56,4	113,7	29,5
1862	39,2	17,5	63,3	120,0	25,9
1863	40,4	18,9	67,8	127,1	25,0
1864	50,8	18,5	72,3	141,6	35,1
1865	41,6	17,2	75,4	134,2	26,3
1866	39,2	17,9	83,2	140,3	24,8
1867	41,8	20,9	90,1	152,8	31,5

	Note circulation	Deposits with commercial banks	Deposits with savings banks	Total money supply	Gold reserves
1868	42,6	25,9	102,4	170,9	29,1
1869	38,6	24,6	110,9	174,1	18,1
1870	44,4	27,2	112,5	184,1	21,4
1871	45,6	26,9	118,5	191,0	22,6
1872	52,2	34,5	133,0	219,7	29,7
1873	60,2	53,7	153,3	267,2	38,6
1874	58,2	58,7	174,4	291,3	37,9
1875	59,2	70,3	196,4	325,9	35,2
1876	59,6	71,2	213,8	344,6	40,7
1877	54,7	66,6	221,1	342,4	33,7
1878	52,7	55,1	207,8	315,6	36,3
1879	57,3	60,7	200,5	318,5	39,7
1880	59,7	77,6	217,2	354,5	42,6

The money supply figures before and after 1873 are not strictly comparable, since before that year the country was on a silver standard. Here the early figures have been translated into gold terms at the official exchange rate between the old and new currency of 1:2. As the silver/gold exchange rate was fairly stable in the preceding decades, the error resulting from this procedure is minor.

Figure 8: Money supply 1857-1880 (Olsen 1962)



It becomes progressively easier to follow the market for agricultural credit after 1850. The reason is that credit unions inspired by the Prussian *Landschaften* were authorized that year, and they increasingly took over the provision of credit to agriculture – and to landowners generally – from then on. While their introduction required a change in the laws, this change was really just a question of freeing private associations from unnecessary legal restrictions. Their basic principle is derived from the freedom of association: an association of individuals with the aim of securing credit by mutually pledging their real estate as collateral for the bonds issued by the union (Hein 1888, 410–11).

In order to fully establish this, let us briefly sketch the privileges accorded credit unions by the law of June 20, 1850 (Indenrigsministeriet 1869, 7–10). These are:

- A) The bonds issued by the unions are free of stamp duty and to be issued to bearer;
- B) The union's debtors surrender to the union's administration the right, in case of non-fulfilment of contractual obligations, to seize and auction off the pledged land without the need for any further legal process;
- C) The unions receive the same rebate from the royal post as is enjoyed by *Nationalbanken* (the central bank);
- D) The unions can borrow and lend money at rates higher than the legal maximum of 4 percent;
- And E) The guardians of legal wards and the administrators of public funds are permitted to buy bonds issued by the unions.

Of these privileges the first is key to ensure a secondary market for the bonds and thus increase their acceptance by the public. B reduce the legal uncertainties of the collateral and lowers administration costs, and C lowers administrative costs. The legal maximum on the rate of interest was briefly abolished in 1857 only to be introduced, so the exemption from it may have increased the market for the bonds as well as simplified administration. E is financially unimportant as these funds were only a small share of the credit market, but signalled the political commitment to the credit unions.

In order to benefit from these privileges, a credit union had to meet the following conditions:

- A) a minimum subscription of 1 million *rdl.*, later lowered to ½ million, in a geographical area no larger than that the board of the union can survey the assessments and quality of pledged collateral without too much trouble;
- B) No property can be pledged as collateral for more than 3/5 of its assessed value;

- C) The union cannot issue bonds for a higher amount than its debtors have pledged collateral for;
- D) The debtors to the union are jointly and severally responsible for the union's bonds to the amount of their pledged collateral;
- E) The union bonds have to carry interest;
- And F) The debtors have to amortize their loans from the union at a suitable rate each year.

It should be clear that neither the privileges nor the conditions on which they were given detract from the character of the credit unions as a purely free-market phenomenon (Hein 1888, 411). At most, the rebate on the post can be considered a subsidy to the administration of the union, but this would not influence the rate of interest at which the bonds were sold, nor the prices they traded at on the stock exchange.

The importance of the establishment of credit unions and mortgage bonds traded in secondary markets is not in granting credit on easier terms, but in making the evolution of mortgage credit visible to the historian, as we can follow the amount of their outstanding debts from year to year. It is still not possible from the statistics to clearly isolate agricultural mortgage credit, as the same credit union might grant loans to both farmers and town dwellers. However, we can exclude the unions focused on Copenhagen and the towns from our survey. This will probably still include too many debtors and too much debt in our estimate of agricultural credit, but it will minimize this error.

The emergence of the unions was only gradual, as there was, as noted above, already an established market for mortgage credit between individuals. As new credit was regularly required, however, the new credit unions were generally preferred. But the credit unions were only very gradually established as a source of credit, as it was only when farms were put up for sale or when the main heir had to buy out his joint heirs that credit might be needed. In other words, as we should expect, mortgage credit was only used to ease the exchange of the most valuable agricultural assets, not for current investment purposes. This did not change with the growth of the credit unions (Falbe-Hansen and Scharling 1885, 1:740–42). Hein (1888, 409) states that by 1888 there were between kr. 1,500 and 2,000 million of outstanding mortgages in total, of which credit unions' outstanding loans constituted about kr. 400 million, which serves to illustrate the slow growth of the credit unions, as they after close to 30 years of operations were only responsible for between about 1/3 to 1/5 of mortgage credit. Savings banks were another source of mortgage loans, but of declining importance. That there were other sources too is clear from the fact that the net increase of mortgage credit in the 1870s was larger than the increase in the amount of the outstanding bonds of the credit unions.

We can try to relate the sum of outstanding mortgage debt to the capital value of agricultural land. 1876 is the first year we have data from the mortgage operations of both credit unions and savings banks. This amounted to a total of kr. 247.7 millions. We also have an estimate of the average sales price of land: kr. 7,259 per barrel *hartkorn* excluding livestock and capital goods. If we multiply by the total stock of land, this gives a capitalized value of kr. 2,774.4 millions. This gives us a proportion of mortgage debt to asset values of about 9 percent. However, we know that this greatly underestimates the outstanding mortgage debt. We can perhaps use Hein's numbers on mortgage credit in 1888 to help us estimate a better guess. If we assume his assumptions on total outstanding debt holds and that the proportion of the credit unions and the savings banks are the same in 1876 as in 1888 – between 2/5 and 3/10 – total outstanding mortgages in 1876 would be between 619.75 and 825.67 millions. This results in a debt to assets ratio of between 22.5 and 30 percent. Needless to say, all these calculations are based on heroic assumption piled upon heroic assumption, so not much can be done with it, except to suggest that Falbe-Hansen's estimate mentioned earlier was perhaps not completely wrong, if possibly a little too high.

8.3. Four decades of change

Having laid out the historical and institutional foundations of Danish agriculture in the second half of the nineteenth century, we now come to analyse its performance under the classical gold standard, a period of fundamental change for Danish farmers. This change can be summed up as the transformation of the sector from a focus on cereal growing for export to the production and export animal products, in particular butter and bacon. The transformation was so radical that by the 1890s great quantities of grain now had to be imported to feed the population and the livestock. The trigger for this transformation has traditionally and with some justification been seen as the conquest of European grain markets by American and Russian exports. Danish growers could not compete with the low-cost producers on the great prairies and had to find alternative products to market to the European consumers. This is somewhat overstated, however, as the transformation of Danish agriculture was already under way in the 1860s and early 1870s, before American and Russian production dominated the world market, but it definitely received an impetus in the late 1870s and early 1880s.

Our purpose here, however, is not to analyse the world market for agricultural products. It is enough for us to state that there was a well-integrated market for grain as well as for other agricultural products, which the Danish producers could access with no restrictions. Denmark was in a unique position, as capitalism and industrialization did not lead to the relative decline of agriculture we

asserted would be a consequence of increased saving and investment in our examination of the consequences for agriculture of savings-led growth on pp. 115-120. Danish farmers were in a position to expand production and supply more heavily industrialized countries – primarily Great Britain – where growing populations were primarily employed in industry.

Rather, our purpose is to show how the transformation took place, what consequences, if any it had on the structure of ownership and distribution of land and capital among farms and farmers, and what the role of financial markets was in it. This transformation was not only the consequence of changing conditions on the world market: there was a clear and substantial growth in savings and in net investment in the agricultural sector (Svendsen and Hansen 1968). Indeed, this may have been the driving force, as the price indices of agricultural prices do not show that grain prices fell relative to the prices of animal products, which we would expect if changing market conditions was driving the change in production; if anything, the reverse was true. We are therefore dealing with a shift in the structure of production to more capitalistic methods of production primarily due to increased savings and investment. At the same time, farmer-entrepreneurs were alert to new opportunities by shifting production into new, more value-productive lines.

One important aspect of the transformation is the change in the relative importance of land and livestock and other capital goods. Cereal growing requires relatively few inputs other than land and labour, so it is natural that most of the value of the product is capitalized in the value of the land. When it comes to dairy and meat production, however, a lot of complementary capital goods are required, not only off the farm in the form of dairies and slaughterhouses, but also and especially on the farm, as the number and value of livestock increase while the value of land tend to decrease. There were also important technological innovations made, as farmers experimented with more capital-intensive production processes. These experiments were themselves made possible by the greater availability of capital.

We will first give a general account of the change in the markets and the relative importance of the different exports, then move on to analysing the changing composition and distribution of capital, and then look at the role of financial markets and finally assess how the distribution of farms and assets was affected.

8.3.1. From grain to bacon and butter

The growth in importance of animal products as a proportion of Danish exports had been a slow and steady phenomena for some years before 1870 (Falbe-Hansen 1889, 2:69–70). In that year, they nearly equalled the export of grain in value and were to outpace it steadily in the 1870s, until grain

exports rapidly declined to almost nothing through the 1880s and early 1890s. When we consider that these numbers are gross exports, the situation is even starker, as Denmark became a net importer of grain long before the 1890s. Bairoch's estimate of the rate of self-sufficiency in cereals (domestic production as a percentage of domestic consumption) indicates the trend: in 1860 it stood at 120, in 1890 it had declined to 91 and by 1911 it was only 72 percent (Bairoch 1999, 14). Even this underestimates the change, as the cereals grown were now to a great extent for feeding purposes, that is, they were an input in the production of animal products. At the same time, the value of exports of animal products (primarily butter and pork to Great Britain, as the export of live cattle to Germany was of declining importance) rose at an annualized rate of over 5 percent from 1870 to 1895 (see table 4).⁶⁸ When it is remembered that the prices fetched by animal products were generally lower in the 1880s and 1890s than they had been in the 1870s (see table 5), this change becomes even more impressive.

Table 4: Value of agricultural production and exports, 1858-1895 (Det statistiske Bureau 1896)

<i>Year</i>	Value of production (in millions of kr.)	Value of exports (in millions of kr.)		
		<i>Cereal</i>	<i>Other</i>	<i>Total</i>
1858	191,0	26,5	17,5	44,4
1859	198,0	32,3	23,7	56,0
1860	190,0	31,9	20,9	52,8
1861	213,0	32,6	22,0	54,6
1862	200,0	26,7	26,0	52,7
1863	188,0	31,9	17,4	49,3
1864	181,0	23,7	16,9	40,6
1865	247,0	44,8	35,5	80,6
1866	256,0	44,9	40,3	85,2
1867	287,0	48,5	34,9	83,4
1868	297,0	39,4	38,6	78,0
1869	280,0	39,3	38,6	77,9
1870	305,0	52,7	50,6	103,3
1871	313,0	51,2	49,2	100,4
1872	325,0	53,8	67,9	121,7
1873	350,0	48,2	78,4	126,6

⁶⁸ The statistical yearbooks give detailed account of the net exports and imports, in value and real terms, but I have not had time to compile this data. Looking through them indicates that the trend is the same throughout the period: increasing net exports of especially butter and pork products, and net imports of grain.

Year	Value of production (in millions of kr.)	Value of exports (in millions of kr.)		
		42,4	98,6	141,0
1874	357,0			
1875	346,0	43,0	88,0	131,0
1876	364,0	49,0	91,0	140,0
1877	315,0	38,0	87,0	125,0
1878	315,0	44,0	77,0	121,0
1879	307,0	48,0	77,0	125,0
1880	367,0	55,0	97,0	152,0
1881	352,0	45,0	93,0	138,0
1882	346,0	30,0	113,0	143,0
1883	355,0	26,0	120,0	146,0
1884	332,0	18,0	112,0	130,0
1885	318,0	20,0	90,0	110,0
1886	311,0	21,0	93,0	114,0
1887	314,0	16,0	116,0	132,0
1888	311,0	15,0	121,0	136,0
1889	345,0	12,0	136,0	148,0
1890	397,0	13,0	159,0	172,0
1891	413,0	15,0	162,0	177,0
1892	415,0	15,0	162,0	177,0
1893	390,0	10,0	162,0	172,0
1894	385,0	7,0	185,0	192,0
1895	408,0	3,0	187,0	190,0

Table 5: Price indices 1870-1914 (1870=100) (Svendsen and Hansen 1968, 312)

Year	Agricultural sales prices			Wholesale prices	Retail prices	Agricultural wages	Hartkorn prices
	Total	Cereals	Animal products				
1870	100	100	100	100	100	100	100
1871	103	111	98	107	96	98	104
1872	104	115	99	112	93	108	112
1873	114	126	108	120	105	108	122
1874	118	131	110	118	108	115	130
1875	113	124	107	111	100	119	143

1876	117	125	112	107	103	122	148
1877	116	131	107	99	102	121	147
1878	106	110	102	90	92	118	140
1879	102	108	98	88	88	117	135
1880	112	124	104	94	102	116	140
1881	110	127	102	95	104	115	140
1882	109	111	109	93	98	116	144
1883	119	107	109	93	93	118	145
1884	106	107	105	88	93	119	148
1885	97	100	95	80	84	120	145
1886	89	90	87	74	80	120	131
1887	86	85	86	73	78	119	129
1888	89	88	88	77	75	117	122
1889	93	90	91	80	79	119	125
1890	96	100	95	80	82	120	126
1891	101	109	97	82	90	121	122
1892	97	102	94	74	84	122	122
1893	92	89	93	74	84	125	121
1894	87	79	91	69	79	126	118
1895	85	77	88	68	74	127	118
1896	83	77	85	69	73	130	116
1897	85	86	84	70	73	132	113
1898	90	97	86	73	76	144	113
1899	88	87	86	78	78	147	113
1900	91	87	92	82	80	146	110
1901	94	91	96	78	82	145	110
1902	97	96	98	80	83	144	114
1903	94	88	96	78	80	146	116
1904	95	91	95	79	80	149	119
1905	98	96	99	82	81	152	122
1906	102	98	105	84	83	157	127
1907	105	106	104	87	88	163	135
1908	103	105	101	84	90	171	140
1909	105	109	103	85	87	177	144
1910	103	94	107	88	87	184	146

1911	108	104	110	91	87	192	...
1912	116	117	116	97	92	216	...
1913	114	101	120	95	95	210	185
1914	126	129	123	107	98	218	190

In a price deflationary environment, and despite the general impression of the last couple of decades of the 19th century being a period of general economic depression,⁶⁹ farmers managed to rapidly rearrange the structure of production and consistently maintained high profitability: usually above 5 percent most years, which compared to a steadily falling rate of interest on mortgages of between 3.5 and 4.5 percent is very good (Danmarks Statistik 1969, chaps 3, tables 7-10; Svendsen and Hansen 1968, 324–30). At the same time, both nominal and real wages of labourers in agriculture increased, as did land prices eventually, indicating that capital accumulation was continuing apace, lifting wages.

The theoretical explanation presented above pp. 110ff. of the processes of economic growth from an increase in voluntary savings, technological change and entrepreneurship fits these general facts well. However, we need to examine the process in more detail. Among other things, we need to take account of the fall in land prices, since our theory suggests that an increase in savings should lead to higher capital values of durable goods and especially of land. To do this, we now turn to an account of the changes in the agricultural production structure.

8.3.2. From land to cattle and co-operatives

One important aspect of the changing conditions was the general decline of land prices for most of the period. These fell from an average of kr. 7,292 per barrel of *hartkorn* for the years 1880-4 to a low of kr. 5,032 in 1901. These prices only include land and buildings, however. There are no data on sale prices for livestock and other capital goods before 1895. The value of these, however, consistently rose throughout the period for which we have data.

Table 6: *The market price of land 1880-1914* (Det statistiske Bureau 1896)

<i>Year</i>	Market price of land per bbl hartkorn	Market price of livestock and implements per bbl hartkorn	Total market price per bbl hartkorn
1880-1884	kr. 7,292	-	-
1885	kr. 6,628	-	-

69 This impression has been challenged by historical scholarship. See the works by Saul (1969) and Bordo et al. (Bordo, Landon-Lane, and Redish 2010).

<i>Year</i>	Market price of land per bbl hartkorn	Market price of livestock and implements per bbl hartkorn	Total market price per bbl hartkorn
1886	kr. 5,985	-	-
1887	kr. 5,834	-	-
1888	kr. 5,542	-	-
1889	kr. 5,727	-	-
1890	kr. 5,769	-	-
1891	kr. 5,605	-	-
1892	kr. 5,564	-	-
1893	kr. 5,505	-	-
1894	kr. 5,406	-	-
1895	kr. 5,399	kr. 1,241	kr. 6,640
1896	kr. 5,289	kr. 1,261	kr. 6,550
1897	kr. 5,173	kr. 1,266	kr. 6,439
1898	kr. 5,147	kr. 1,305	kr. 6,452
1899	kr. 5,162	kr. 1,361	kr. 6,523
1900	kr. 5,055	kr. 1,329	kr. 6,384
1901	kr. 5,032	kr. 1,401	kr. 6,433
1902	kr. 5,213	kr. 1,412	kr. 6,625
1903	kr. 5,319	kr. 1,527	kr. 6,846
1904	kr. 5,466	kr. 1,637	kr. 7,103
1905	kr. 5,587	kr. 1,648	kr. 7,235
1906	kr. 5,825	kr. 1,761	kr. 7,586
1907	kr. 6,189	kr. 1,934	kr. 8,123
1908	kr. 6,414	kr. 1,984	kr. 8,398
1909	kr. 6,588	kr. 1,962	kr. 8,550
1910	kr. 6,578	kr. 2,075	kr. 8,653
1911	-	-	-
1912	-	-	-
1913	kr. 8,312	kr. 2,066	kr. 10,378
1914	kr. 8,769	kr. 2,253	kr. 11,022

It may seem strange, at first, that land values should fall when we claim this was a period of much net investment in agriculture. However, it is important to remember that there are two determinants of land values: the rate of interest and the net rent to land (see above p. 41 and following). Net

saving means that people are shifting their preferences between present and future consumption, and that future consumption is now valued higher than previously. This is reflected in a lower rate of interest and should normally also be reflected in a higher capitalized value. However, at the same time, the value of the land factor in its *current use* may decline: it would not be profitable to invest in raising its productive capacity, as the consumers demand not only more *future* goods, but also goods of a different quality. The demand for basic foodstuffs as explained in chapter 2 is generally highly inelastic beyond a certain point, since as soon as people are no longer starving, they would rather spend their money on other consumer goods than food, or would prefer higher-quality foodstuffs to simply more of the basic stuff. An increase in population might continually shift the demand curve to the right, but it is important to remember that in the situation we are analysing here, this increase in demand was amply met by overseas producers who outcompeted Danish farmers in the market for grains. The value of land factors in their use for cereal production was therefore declining.

At the same time, the cost of the complementary factors of production was increasing as these were bid away for other uses due to the higher monetary demand for them. Since land is the specific factor, this necessarily meant that higher prices for the complementary factors would, with output prices remaining the same or falling, lead to a smaller share of the revenue being imputed to land. It was therefore less profitable to use land for the old purposes and conversely less costly to convert them to other uses. Since it takes time to change over production as completely as was done in these decades, it is natural that land prices should remain depressed for some years, until the complementary factors of production – larger dairy herds, modern dairies, more swine and so on – were completed. Once the changes were complete however, and the economy settled back into a more quiet state, it would also be natural that land prices rose again, as the increased profitability would tend to be reflected in higher capital values. Land was still the most specific factor, even though the new production processes were more capital intensive. The capital value of land would therefore not rise to its old proportion of the value of all assets, but it would rise – as it indeed did after 1901.⁷⁰

That production became more capital intensive is most clearly seen in the increase of the number of livestock. This increase was especially pronounced in the number of cattle and pigs, but also the number of horses rose appreciably. Since horses were the primary work animals and means of transportation, this indicates that more work was needed in the fields and in transport. New varieties of plants were needed to increase fodder production for cattle, turnips and grasses and so on; these

⁷⁰ The rise in land values can also be seen as following from the general rise in prices that set in around the turn of the century, and also from a change in government policy. More on this below.

required more work than before, and there was an increased need for transportation. Milk had to be delivered to the dairy every day, and pigs too had to be brought to the new slaughterhouses.

Table 7: Livestock populations 1876-1914 (Det statistiske Bureau 1896)

Year	Horses	Cattle	Sheep	Swine
1876	352.262	1.348.321	1.719.249	503.667
1881	347.561	1.470.078	1.548.613	527.417
1888	375.533	1.459.527	1.225.196	770.785
1893	410.639	1.696.190	1.246.552	829.131
1898	449.329	1.744.797	1.074.413	1.168.493
1903	486.935	1.840.466	876.830	1.456.699
1909	534.680	2.243.889	726.027	1.466.932
1914	567.240	2.462.862	514.908	2.496.686

The other main form of new capital formation was the foundation of many new cooperative dairies and slaughterhouses. The first of the new dairies was founded in 1882, and the late 1880s saw hundreds created in a few years. Cooperative slaughterhouses came a little later, as the waste products of the new processes of milk treatment was a cheap source of swine fodder and thus provided an opportunity for greatly expanding the herds of swine.

The cooperative structure of dairies and slaughterhouses meant that these industries were effectively vertically integrated with their suppliers. On the one hand, there are good reasons why this form of organization was adopted: intensive dairy production meant large investments in fixed capital, which could give the suppliers hold-up power over the dairy firm: the dairy was interested in long-term delivery contracts, but an individual, independent supplier was not, as he might be able to increase profits through opportunistic behaviour, e.g., renegeing on delivery contracts or supplying a sub-standard or otherwise fraudulent product. By organizing on the cooperative model, the farmers became the residual claimants and in effect the owners of the dairy and thereby acquired an interest in its long-term profitability. They had a clear interest in behaving well and in monitoring others to secure against misconduct. If a member broke the rules of the cooperative, he could lose his membership and the money he had invested in it (Persson 2010, 85–87).

While this organizational advantage of cooperatives is real, it was not the main reason for their formation, since it was not of importance for the slaughterhouse and meat packing industry, where the cooperatives also quickly dominated. It is therefore important to realize that forming new cooperatives is a form of net investment (Huerta de Soto 2020, 314): the farmers had to put some of their income into the cooperative in order to get it off the ground, and once it was running at a

profit, they usually build capital in the cooperatives through retained earnings. However, while the explosive growth of cooperatives from the late 1880s on was a form of direct investment by the farmers themselves, most of the fixed capital was financed by the savings banks, ranging from 54 percent to 91 percent in different parts of the country (Bjørn 1988, 3:242). Since the main depositors in rural savings banks were virtually always farmers, and the most prosperous and influential farmers often controlled the local savings bank, this can also be seen as an indirect way of farmers investing their own savings in the new cooperatives.

There were also important technological changes introduced during this period. One significant innovation directly related to butter production was the automatic cream separator introduced in 1878. Indeed, a recent study comes close to considering this invention the technological precondition for the success of the cooperative dairies (Henriksen, Lampe, and Sharp 2011, 476). However, Falbe-Hansen (1889) had noted the gradual increase in butter production and exports in the decades before 1870, and it took several years before the invention came into widespread use. In reality, both the spread of the new technique and the growth of the cooperatives was a result of the increase in investment. There can certainly be no doubt that constructing the specialized machines, training dairymen and other specialists and related activities were all capital-intensive. This is not to deny the importance of new technologies, but rather to suggest that the precondition for adopting existing advanced techniques and experimenting with new inventions and improvements always presuppose that there are resources available to do so. Rarely can new techniques be adapted to existing capital goods without costs.⁷¹

Other inventions and technological improvements were made in other fields as well to improve the physical productivity of the factors of production and adapt them to the demands of the new processes. While it is not customarily thought of in this way, the introduction of new breeds of animals and improvements in breeding can be considered improved technologies, as the same inputs are made to yield increased outputs. Thus, in our case, pigs were bred to fatten faster and cows to yield more milk, with quite impressive improvements. The transformation culminated after decades of improved breeding, which had generally elevated the quality of Danish livestock – horses as well as cattle and pigs – to hitherto unseen heights (Falbe-Hansen 1889, 2:61–69). New plants and feedstuffs were also introduced and old ones improved. Year-round milk production required fodder that would keep its nutritive power during the winter. Fodder beets was one possible avenue of research, and a private association established 1876 began experiments with beets and other root

71 As well as section 4.3: Technological change and agriculture pp. 105-110, see on the economics of technological change the works by Machlup (1962), Schmookler (1966; 1972), Jewkes, Sawers, and Stillerman (1969), and Kealy (1996).

vegetables in 1886 (Winther Jensen 1989, 104). Since the work of the German chemist Justus von Liebig in 1840 on soil chemistry, there had been a general acknowledgement of the need for applied scientific work in agriculture. The association's work on fodder beets proved highly successful: where beets were practically unused in 1881, in 1896 they were planted on 2.9 percent of the total cropland area and on 10.1 percent in 1912. The importance of beets peaked in 1960, when they were planted on 15.3 percent of the land area (ibid., 100), but the new technology had clearly been speedily adopted.

The result of these investments and technological improvements was a large improvement in physical productivity of the factors of productions. In particular, agricultural labour became much more productive: Bairoch calculates an increase in productivity of 1.4 percent per year for male agricultural workers in Denmark in the period 1860-1910 (Bairoch 1999, 140). Only Germany and Austria-Hungary saw comparable increases in productivity in the period. It is true that the earlier period, 1830-1860, saw still larger increases of productivity – 2 percent per year – but these numbers are more uncertain. In any case, we need to remember that as well as increasing physical productivity, Danish farmer-entrepreneurs also shifted agricultural production to different, more *value*-productive lines. It is clear that these decades of change saw Danish agriculture specializing in its own niche in the international division of labour, supplying other countries – primarily Great Britain – with high-quality dairy and pork products.

Generally, in most European countries, agriculture developed as part of the capitalistic economy (Berend 2013, 119). However, this development was very diverse, as not every country had the same comparative advantages (see table 8). In Great Britain, for instance, physical productivity in agriculture rose at a much lower rate. This does not indicate any lack of resources for investment there, but rather shows that Great Britain's advantage lay elsewhere. Investment in agriculture was not profitable for Englishmen to the same extent it was for Danes. Similarly, France's lower rate of increase in physical productivity does not signify lack of capital but rather her specialization in viticulture, where there were not the same possibilities for profitably increasing physical productivity, as well as her specialization in non-agricultural sectors.

Table 8: Evolution of physical productivity of labour in agriculture 1830-1910⁷²

Country	1830-1860	1860-1910	1890-1910	1830-1910
<i>Europe</i>	<i>Annual rates of increase (in percent)</i>			
Germany	1,52	1,37	2,56	1,73

72 Source: Bairoch (1999, 140)

Country	1830-1860	1860-1910	1890-1910	1830-1910
Austria-Hungary	0,7	1,41	1,2	1,09
Belgium	1,01	1	1,87	1,22
Denmark	2,05	1,4	1,36	1,63
Spain	0,7	0,23	1,72	0,78
Finland	1,16	1,08	0,49	0,96
France	1,46	0,57	0,99	1,01
Greece	0,12	0,01	-0,29	-0,02
Italy	0,05	-0,22	1,78	0,38
Norway	1,55	-0,06	1,07	0,83
Netherlands	0,51	0,75	1,72	0,9
Portugal	0,59	-0,5	0,15	0,07
UK	0,96	0,43	0,81	0,72
Sweden	1,13	1,01	1,51	1,18
Switzerland	1,13	0,85	0,92	0,97
<i>Other dev. countries</i>				
Australia	0,47	2,36	1,09	1,33
Canada	0,79	1,75	2,76	1,64
US	0,75	1,34	0,95	1,02
New Zealand	2,29	1,21	1,16	1,6
<i>Average Europe</i>	0,65	0,44	1,09	0,68
<i>Average other dev. countries</i>	0,78	1,47	1,03	1,1

More generally, it should be evident that in an economic order of free trade and international division of labour, we should expect there to be a great diversity in the evolution of the economies of the different countries. The populations have different aptitudes and cultures shaping what kind of production they are most suited for, the natural endowments of different regions vary, and the stock of permanent and fixed capital goods produced in the past also influence what kind of activities can be most profitably undertaken (Mises 1998, 502–4). We should therefore not expect economic development to lead to the same outcomes in all sectors of the economy in all countries: the reason that physical productivity in agriculture increased at a greater rate in Denmark than in most other countries was that Danish farmers had a comparative advantage – first in grain

production, then in animal products – and more capital was therefore invested in Danish agriculture, raising productivity in order to take full advantage of this comparative advantage.⁷³

8.3.3. Money, credit, and farm ownership

What importance did changes in the monetary system have for the evolution of Danish agriculture in this period? From 1873 until August 1914, Denmark was committed to the gold standard, and as such the monetary order Danish agriculture was a part of was truly global in scale. The monetary base was therefore the whole stock of gold in existence at any one time. Increases in the stock of gold would be driven by the relative profitability of mining gold, which in turn depends on the purchasing power of gold.⁷⁴ If our interpretation of the episode is correct, savings-driven growth should lead changes in the money supply: in the first years, there would not be an appreciable increase in output, hence prices would tend to be stable and there would be little profit from adding to the money supply. Then, as the new physically more productive and higher-valued processes of production gradually matured, output would increase leading to a fall in retail prices. Such falling prices are the same as increasing purchasing power of gold, and they would therefore stimulate gold production.

The classic work on gold and gold production is Roy Jastram’s *Golden Constant* (Jastram 1977), but more recent work put out by the GoldMoney Foundation (Turk 2012) gives a clearer picture of the global gold stock and gold production during the period of the classical gold standard. Based on this data, reproduced in table 9, we can see that gold production 1870-1914 fell into two clearly distinct periods. In the first period, 1870-1894, the global stock of gold grew at an annualized rate of 1.65 percent, while in the second period, 1894-1914, the rate of growth was substantially higher, at 3.05 percent.

Table 9: Gold stock and annual gold production 1870-1914 (Jastram 1977; Turk 2012; World Gold Council 2021)

Year	Estimate of annual gold production (in tons)	Estimate of the aboveground gold stock (in tons)	Annual growth rate
1870	177	8.777	2,1%

73 A possible complementary reason for the changing composition in Danish exports may be sought in reduced shipping costs, especially if shipping costs of butter and bacon fell relative to shipping costs of grain. The changing export pattern could then be partly understood as a special application of the Alchian-Allen effect, that of two substitutable goods, the higher valued substitute will tend to be exported (Alchian, Allen, and Jordan 2018, 127–28; Borcherding and Silberberg 1978), since different foodstuffs are at least partial substitutes.

74 We refer to the discussion in chapter 1 and the works cited there for a fuller account.

Year	Estimate of annual gold production (in tons)	Estimate of the aboveground gold stock (in tons)	Annual growth rate
1871	185	8.962	2,1%
1872	176	9.137	2,0%
1873	159	9.297	1,7%
1874	155	9.452	1,7%
1875	160	9.612	1,7%
1876	164	9.776	1,7%
1877	179	9.955	1,8%
1878	173	10.129	1,7%
1879	162	10.291	1,6%
1880	162	10.452	1,6%
1881	157	10.610	1,5%
1882	152	10.762	1,4%
1883	147	10.908	1,4%
1884	154	11.062	1,4%
1885	159	11.221	1,4%
1886	157	11.378	1,4%
1887	161	11.539	1,4%
1888	168	11.707	1,5%
1889	187	11.893	1,6%
1890	179	12.073	1,5%
1891	196	12.269	1,6%
1892	220	12.489	1,8%

Year	Estimate of annual gold production (in tons)	Estimate of the aboveground gold stock (in tons)	Annual growth rate
1893	236	12.725	1,9%
1894	271	12.996	2,1%
1895	298	13.294	2,3%
1896	303	13.597	2,3%
1897	354	13.952	2,6%
1898	429	14.381	3,1%
1899	464	14.845	3,2%
1900	384	15.228	2,6%
1901	394	15.622	2,6%
1902	448	16.070	2,9%
1903	493	16.563	3,1%
1904	523	17.086	3,2%
1905	572	17.658	3,4%
1906	605	18.263	3,4%
1907	621	18.884	3,4%
1908	666	19.549	3,5%
1909	683	20.232	3,5%
1910	685	20.918	3,4%
1911	695	21.613	3,3%
1912	701	22.314	3,2%
1913	702	23.016	3,1%
1914	669	23.685	2,9%

If we look back to our price indices, we see that retail prices generally fell in the period 1870-1896, as the index declined from 100 to an absolute low of 73 in the two years 1896-7. This translates into

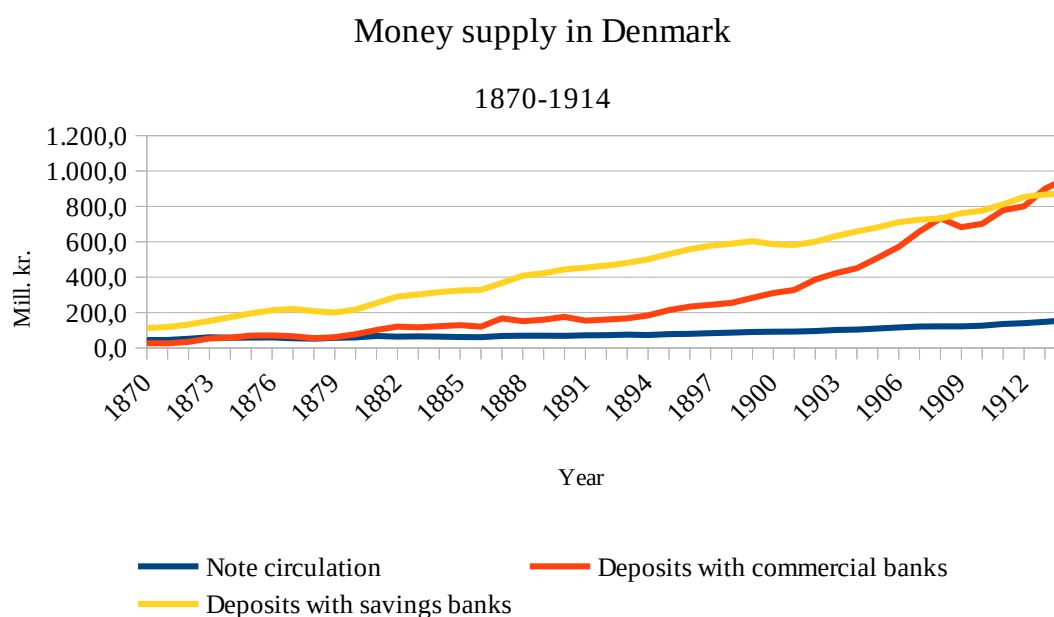
an annualized rate of price deflation of 1.23 percent for the whole period, and if we look at only the years 1881-1896 – since prices were generally stable before that point – we get an annualized rate of deflation of an impressive 2.23 percent. If we look at the later period, 1896-1914, the previous price deflation is replaced by a clear price inflation of 1.71 percent per year, and if we look at only the last ten years the annual rate of inflation was 2.01 percent.

These data match well with our understanding of economic change. We should expect first stable consumer goods prices as net investment in longer processes of production requires time to mature. While they are being completed, workers subsist on the accumulated fund of consumer goods. Once the new capital goods are completed and the structure of production has been deepened and widened, the factors of production are more physically productive and, if the entrepreneurs were correct in their assessment of the markets, the new products are sold at a profit to consumers. Increased exports of high-quality animal products translate into increased imports of consumer goods and higher real wages. The increasing purchasing power of the monetary unit also acts as an incentive to increased gold production, as it is now profitable to shift factors of production to gold mining and there are higher potential profits to be made from prospecting for new sources of gold. It is natural that there should be a time lag between the increase in real incomes and increased money production – indeed, this lag is necessary in order for profit opportunities in gold mining to develop. In short, Jacques Rueff's estimate of the period is generally correct: a tremendous economic expansion led to a decline in the general price level which in turn stimulated gold production, which finally led to the price level being substantially unchanged (Rueff 1972, 45). He only made an error in estimating the changes in the stock of gold: instead of a threefold increase in the period 1890-1910, our best estimate is an almost threefold increase over the period 1870-1914.

We can also, incidentally, now understand the negative assessment of the period (Svendsen and Hansen 1968). The first part of the period was considered deflationary and tough for business, but this we can now see is erroneous. Economists advancing this view mistakenly interpret the initial drop in consumer spending and the price deflation resulting from increased saving and investment as signs of a depression, while they see the later expansion of the money supply consequent upon increased productivity and the resulting increase in consumer prices as a sign of economic expansion.⁷⁵

75 All figures for the money supply in Denmark are from Svendsen and Hansen (1968).

Figure 9: Growth of the money supply in Denmark 1870-1914



While international gold production thus behaved as we should expect under a natural monetary order, we cannot ignore the possible influence of the national banking system on the process. As already mentioned, gold did not circulate to any great extent, and the use of substitutes greatly expanded. There were episodes of credit expansion and crashes – in 1857 and 1907 for instance, to take the most notorious – but it is not clear that the banks expanding credit primarily lend to agriculture. The boom that ended in the crash of 1907 was primarily in urban real estate and construction (Svendsen and Hansen 1968, 368–83). Farmers’ bank connections were mainly to the rural savings banks, but it is striking that, while deposits with savings banks increased, they did so at a much slower rate than did deposits with commercial banks, as is evident from figure 10: By plotting the money supply cumulatively on a logarithmic scale, we clearly see the declining importance of deposits with savings banks. This seems to be a clear indication that credit expansion was primarily undertaken by the urban commercial banks, and that it therefore mainly caused malinvestment in the urban housing and industrial sectors. The effect on agriculture would therefore be that farmer-entrepreneurs had to compete with an artificial demand for producer goods and investment loans from urban industries propped up by credit expansion.

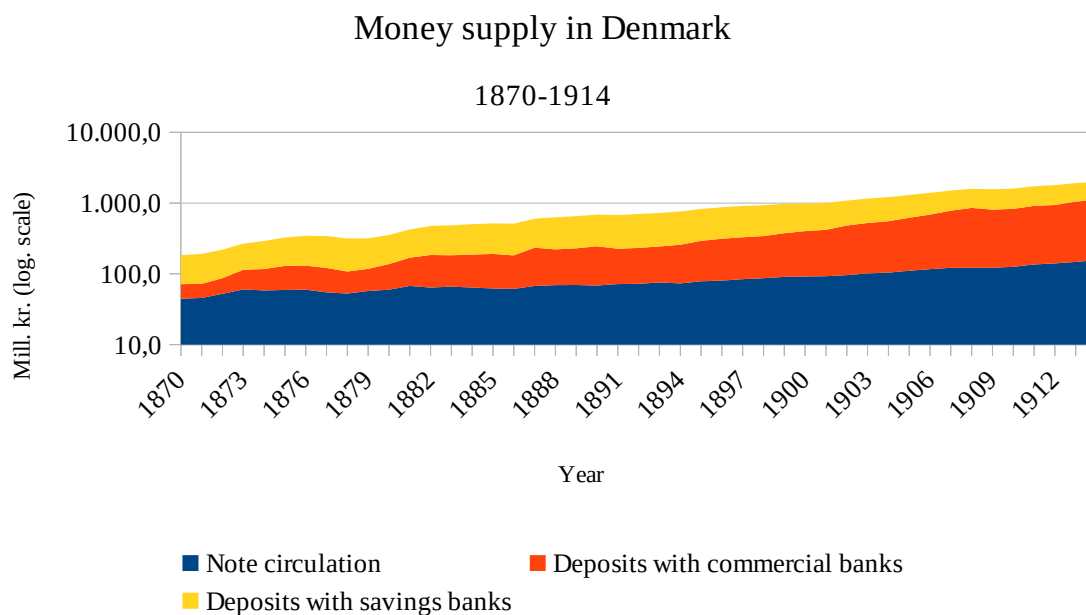
Evidence of the quality of savings banks deposits and in particular on how great a part of them can be considered fiduciary media is inconclusive. It seems clear that deposits were considered money substitutes, but a precise estimate of their backing has so far not been possible. The expansion of savings bank deposits was in any case much slower than that of commercial banks. An important change in the composition of the money supply occurred, particularly from the 1890s on. As is clear

from figure 11, the reserves of gold (before 1873 of silver) declined as a proportion of the total money supply, from 34 percent in 1857 to 12 percent in 1870 to only 4 percent by the end of the period.

Of great significance was also the change in the cover of bank notes: *Nationalbanken* had a monopoly on the issue of bank notes and was required to keep full reserves for any issue above kr. 30 million. This 100 percent marginal reserve requirement was meant to ensure that the circulation would behave exactly as if it were a purely metallic currency in accordance with the currency principle. However, this principle was honoured more in the breach than in the observance. The uncovered issue was increased twice, in 1897 and 1901, by a total of kr. 8 million, and in addition to this the bank regularly exceeded the legal amount of issue from 1896 on (Svendsen and Hansen 1968, 363–64).

In 1908 the bank, which had been chartered for 90 years in 1818, needed its charter renewed. There was general agreement on changing the cover for its note issue: by changing to the so-called percentage system, under which 50 percent reserves were required for the note issue, the money supply would become more elastic, allowing the bank to more easily accommodate periods of peak demand. In addition, the change to the percentage system would at one stroke increase the bank's mobile reserves, as less gold was needed for its outstanding issue. Concretely, the note circulation was in 1908 kr. 120 million on a gold reserve of about 90 million. The maximum circulation of kr. 128 million under the old system could under the new rules be maintained with gold reserves of only kr. 64 million (Svendsen and Hansen 1968, 364–67). All in all, the negotiations and debates over the new charter aimed at making the bank “better suited to solve its tasks without hindering the ongoing expansionary movement” (ibid., 365; my translation).

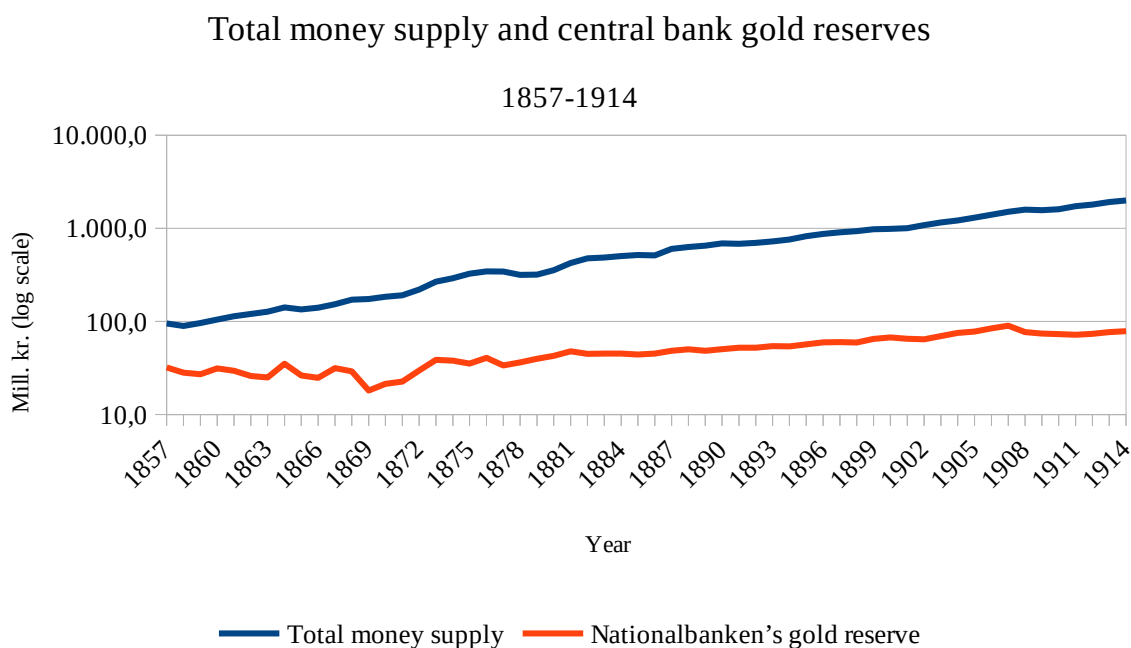
Figure 10: Composition of the money supply in Denmark 1870-1914



These changes in central bank policy were clearly inflationary, from the constantly recurring violations of the charter from 1896 on to the new charter in 1908. But the consequences went further than simply allowing the bank to emit more bank notes. By reducing the gold backing and making the money supply more flexible and expansionary, the quality of the currency was also reduced. Alternatives to holding base money – gold coins and bank notes – therefore became more attractive. The main alternative was commercial bank deposits, and the expansion of bank activity from the 1890s on – the “expansionary movement” – must be understood in connection with this looser central bank policy. Not only was *Nationalbanken* more accommodating toward demand from the commercial banks, the policy changes made the public more willing to hold bank deposits, as they could here earn an interest return and the quality difference between paper money and bank deposits was diminished by the change in policy. The accelerated growth rate of commercial bank deposits indicates this change in demand.

The other alternative to holding money is relatively safe financial assets (Hülsmann 2016; Žukauskas and Hülsmann 2019), which in the Danish context meant government bonds and credit union bonds. A reduction in the quality of the krone therefore led to increased demand for these assets. The resulting drop in the interest rate, indicating the demand for service as what Mises (1998, 461) termed a secondary medium of exchange (see above pp. 16, would naturally stimulate the supply of financial assets. A lower loan rate on mortgage loans would lead farmers to borrow more money to buy farms and land, and the additional demand would lead to an upward pressure on the price of these assets.

Figure 11: Danish money supply and central bank gold reserves 1857-1914



These changes in the money supply and the quality of money help us understand the changing asset prices in agriculture. As agricultural output prices fell, so did the price of land, both absolutely and in proportion to product prices. We have already discussed the proportional fall above: as the structure of production changed, land factors in their current uses fell in value and were reallocated to new uses. As the new structure of production proved to be more profitable, this increased profitability led to increased returns to the original factors, labour and land. If there had been no additions to the money supply, we might well have expected that land prices would settle at a lower level, but that the price of land might still again rise relatively, reflecting that land factors had been allocated to more productive uses. A decline in the rate of interest would also have encouraged this rise in land prices. However, as a greater proportion of farm capital was now invested in livestock, cooperatives and other capital goods, we need not expect the proportion between gross revenue and land prices to rise to the old proportion, since the discounted MVP of land factors had fallen.

The increase in the money supply naturally led, as we saw, to price inflation, and by the 1910s both retail prices and agricultural sales prices were back close to their level from the 1880s. We should naturally expect this inflation to be reflected in higher land prices, and in higher prices for all agricultural capital goods. We do not have numbers for the price of capital goods for the earliest sales, but we can see that the share of the value of livestock and other capital goods of the total value of farms sold rises gradually, from about 1/5 in 1895 to nearly 1/3 in 1910. The average sales value of farms reach their nadir in 1900 at kr. 6,384 per barrel *hartkorn* and then rises gradually to kr. 8,653 in 1910 and kr. 11,022 in 1914 (the reader is referred back to table 6). This rise of about 3

percent per year brought the proportion between land prices and agricultural sales prices as reflected in the price indices back close to its level from the 1880s. The assessments of land values in 1904, 1909, and 1916, carried out in conjunction with a tax reform, were somewhat lower than this: the average assessed value per barrel of *hartkorn* was kr. 6,502 in 1904, kr. 7,025 in 1909 and kr. 9,559 in 1916.

What importance did credit markets have for financing investment and change in agriculture? This is more difficult to assess. We can be almost certain that the debt-to-assets ratio grew during the almost 20 years of falling land prices, but it is difficult to assess how much. One indication of growing debts is the appearance in the 1890s of credit unions specializing in secondary mortgage who lend up to $\frac{3}{4}$ of the property's assessed value. Their total loans were only a fraction of mortgage credit, and they seem to have been more used in the towns than in the rural areas, but there was some demand for them. There is also some data on farm sales that include the amount of mortgage debt which we present in table 10. These reports suggest that the debt ratio reached a height of 56 percent in 1900. However, this is only on farms put up for sale (excluding forced sales and sales between family members). There are no clear data on what kind of farmers sold. Undoubtedly, some might have been retiring farmers who had no heir to pass the farm on to, but this category must have been small, as large families with many children were still the norm; the rate of growth of the population was well above 1 percent per year from the 1880s on. It seems more plausible that the bulk of sales were made by farmers who for various reasons gave up on farming, i.e., that the marginal, high-cost producers were the ones who sold. It is plausible that these carried a higher debt load than others, as they may have taken out second mortgages trying to finance the improvements necessary to make their farms profitable. If that's the case, then these numbers clearly overstate the debt burden.

The greater market for mortgage bonds from their use as secondary media of exchange would naturally stimulate lending to farmers, as already stated. This would create upward pressure on land prices, as land could now be used as collateral for financing, even if it was not initially acquired with a disproportionate amount of loan financing. The result would be a rising price of farmland in general, even outpacing the actual amount of mortgage debt recorded on the properties sold. This is borne out by the evidence from property sales in table 10: from 1900 on the price per bbl of *hartkorn* keeps increasing, and the amount of mortgage debt on properties increases from 1897 on, except for in 1901 and 1907. The proportion of mortgage debt declines, however, from the high in 1900 of 56 percent.

Table 10: Mortgage debt on sold properties 1895-1910 (Danmarks Statistik 1969; Det statistiske Bureau 1896)

Year	Sales price per bbl hartkorn	Mortgage debt on sold properties per bbl hartkorn	Proportion of mortgage debt to sales price
1895	kr. 6,640	kr. 3,617	54.47%
1896	kr. 6,550	kr. 3,611	55.13%
1897	kr. 6,439	kr. 3,564	55.35%
1898	kr. 6,452	kr. 3,566	55.27%
1899	kr. 6,523	kr. 3,583	54.93%
1900	kr. 6,384	kr. 3,596	56.33%
1901	kr. 6,433	kr. 3,499	54.39%
1902	kr. 6,625	kr. 3,670	55.40%
1903	kr. 6,846	kr. 3,693	53.94%
1904	kr. 7,103	kr. 3,712	52.26%
1905	kr. 7,235	kr. 3,767	52.07%
1906	kr. 7,586	kr. 3,930	51.81%
1907	kr. 8,123	kr. 3,898	47.99%
1908	kr. 8,398	kr. 4,083	48.62%
1909	kr. 8,550	kr. 4,358	50.97%
1910	kr. 8,653	kr. 4,379	50.61%

A compilation of agricultural mortgage debts for 1909 produced by the Statistical Office and published in the 1914 yearbook may give a better indication of the state of affairs by the end of the period after land prices had started rising again. In this compilation, mortgage debt is contrasted with the value of the collateral, which in turn is calculated on the basis of the tax assessment and the value of livestock, agricultural implements and other capital goods. The amount of mortgage debt is probably overstated in this compilation, but not much. It includes various minor charges, such as the capitalised value of emphyteutic leases and the remainder of a forced loan, which sum to kr. 59 millions. While we do not know how these charges are distributed between urban and rural

properties, it matters little, for the total of mortgage debt on agricultural properties is very close to our own calculations of the total of mortgages owed to credit unions and savings banks. The sum outstanding was for 1909 kr. 1,350 millions, which is very close to the Statistical Office's total of kr. 1,417 millions.

If we look at the total of farms and estates, the debt ratio in 1909 was 42.8 percent. The majority of properties carried some mortgage, and on average the debt ratio on these was 49.4 percent. However, there was also a significant minority – 17,257 properties out of a total of 169,469, or 47,688 barrels of *hartkorn* out of a total of 363,082 barrels – which were not burdened by mortgages at all. The majority of these, according to the *hartkorn* and the capital invested, were farms of middling size and the remaining entailed estates, which legally could not be mortgaged.

Unfortunately, we have no further data on the distribution of the debt load between the farms, only the totals for the different categories. This makes it difficult to say anything further about the significance of mortgage credit. The debt ratio appears to have increased somewhat from what it was in the 1870s, but does this indicate that some farms carried very high mortgages, as the owners had taken out second and third mortgages to stay afloat during the difficult years of price deflation, while others managed to decrease debt loads? Or was it a general increase across all farms, as farmers had generally financed investment through mortgage credit? We would on theoretical grounds be averse to that explanation, as the role of mortgage credit in farming, as we argued in chapter 2, is as long-term financing. According to that view, mortgages are taken out to finance part of the purchase price of a farm, or to buy out coheirs, perhaps to the extent of 50 percent of the assessed value (Hein (1888) shows that practice in the 1880s was to generally restrict mortgage credit to less than 50 percent of the value of the property). As the loans are amortized over time, farm equity naturally increases over time, until the farmer can sell or pass on to his heir a virtually debt-free farm. On the other hand, the greater supply of and easier terms for mortgage credit may well have led to a general increase in the use of external financing across the board. However, even in the later period 1900-1914, when increasing revenues and easier credit would lead one to suspect greater reliance on external finance, most agricultural investment was financed out of the farmers' own savings. Capital close to 1 billion kroner was invested in the period, and of this 70 percent was financed out of farmers' own savings (Bjørn 1988, 3:237–38).

8.3.4. A case study: the farm *Porsager*

There are no statistical data available to indicate which interpretation is correct, but some qualitative historical research indicates how at least some farms were financed, and whether this

changed over time. A historian found diaries and account books covering the period 1867-1918 from a farm, *Porsager*, located in the eastern part of the island of Zealand (Jensen 1985). The farm was of middling size, but the quality of the land was good. It amounted to 47 ½ barrels of land assessed at 6.625 barrels *hartkorn* according to the 1844 cadastral survey. The farm was passed on to the next generation in 1878, and in that connection the new owners took out a mortgage of kr. 20,000 at five percent to pay off the remainder of an older mortgage and to pay out their coheirs. Originally, two brothers inherited it, but one of them (Hans Christian Sørensen – HCS, our diarist) was clearly the leading partner. The credit union assessed the farm at kr. 45,000, so the initial mortgage amounted to 4/9 or about 44 percent of its value.

Of livestock there was in 1878 5 horses, 11 cows, 6 sheep and 4 swine, but this gradually changed over the years, as focus shifted from growing wheat to milk production and pigs.⁷⁶ This shift was also clearly reflect in how the sources of income changed: in the five-year period 1875-80, grain products accounted for 55.9 percent of income, while in 1914 dairy and pigs together accounted for 90.4 percent. The year 1882-3 is the first for which accounts are complete. There is no depreciation account, but all purchases of durable goods and investments in improvements are financed out of current income. Allowing for implicit wages to the two brothers, the farm earned a net return of 4.3 percent based on the assessed value of kr. 45,000 that year (*ibid.*, 82). Not huge profits, perhaps, but acceptable compared to a market rate of interest of about 4 percent in those years. Later years usually saw profits of between 5 and 6 percent.

The brothers split in 1888, as one of them moved to another farm close by. As an aside, the brothers were unusual, as they held their farms not as private property but emphyteutic leases, that is, permanent, negotiable leases. This made no difference for questions of selling or mortgaging the farms, however. It was simply a question of personal conservatism, a holdover from the earlier era, as most other farmers in the area had bought out the lease at small sums in the 1850s and 1870s.

HCS was also involved in the creation of the cooperative dairy in 1884, where he was treasurer for more than 25 years, and he was very active in this and other professional pursuits, such as horse and cattle breeding. Jensen makes no mention of any loans in connection with the dairy, so it seems probable that the farmers themselves financed it. If there were external financing for the dairy, HCS was in any case not liable for it beyond his subscribed capital. The creation of the dairy led to increased focus on milk production and increases in productivity of about 2.5 percent per year. Milk production per cow increased from 2,000 kg per year in 1878 to 4,040 kg in 1914 (*ibid.*, 89).

76 See the following table, reproduced from Jensen (1985, 77).

Most years saw the purchase of new capital goods, machines for use both in the field or in various work on the farm. They were either bought on own account or in partnership with neighbours, usually the brother. These investments were always paid out of income, and there is no indication of any loan financing. Even more capital intensive work, such as new stables in 1893 and drainage from 1902 on, was financed out of current income. Indeed, the building of a completely new farmhouse in 1907, costing about kr. 12,000, was financed out of savings – the owner laconically notes that his liquid funds that year declined by kr. 11,500 (ibid., 96). In fact, there was no external financing during HCS's career as farmer beyond the original loan. In 1887 the original mortgage was replaced with a loan from a savings bank to the same amount but at only 4 percent interest. The brother's share in the farm was bought in 1896, but there is no information as to how they settled it. Indeed, not only did HCS build capital through the amortisation of his loan, expansion of his cattle and swine herds and the gradual improvement of land and buildings, he also built significant cash reserves: by 1907 he thus had over kr. 30,000 in his savings account, before paying for the new construction.

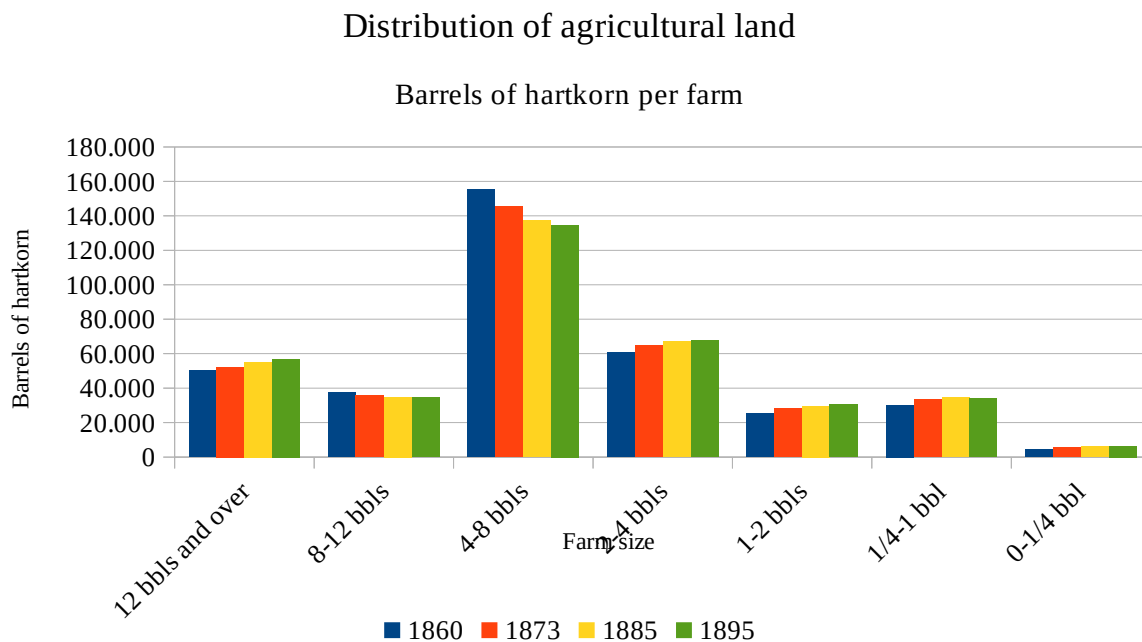
It is obviously dangerous to make any grand conclusions on the basis of one farm and one farmer's experience. Jensen's judgement is that HCS no doubt was a skilled farmer and good businessman, but that many other farmers undoubtedly achieved similar results (ibid., 98). Less skilled farmers or poorer entrepreneurs, on the other hand, may have had to seek external financing during the difficult years of deflation. HCS' conservative streak, indicated by his keeping to the older feudal form of landholding, may also suggest that he was more reluctant than most to go into debt. However, what we can say based on this case study, is that external loans was not at all necessary to finance economic change and development during this period. 5 to 6 percent profits are respectable, but they are not fantastic returns. It's safer to say that HCS did better than many other farmers, but not that much better, and that the average farmer-entrepreneur could probably achieve similar prosperity during this period. We can therefore with some assurance say that the loan market played a very minor role in financing economic expansion in Danish agriculture under the gold standard, despite the impetus given to it by the easy money policies of the last decades before the Great War.

8.4. Conclusion

The great economic changes in the period 1870-1914 did not fundamentally alter the structure of ownership in Danish agriculture. As figure 12 below shows, there was a small shift among the different categories of farm, as the amount of land owned by larger farms declined very slightly, while that of the largest and the smaller farms increased slightly. After 1895, unfortunately, the

farms are no longer categorized according to their *hartkorn* in the statistical yearbooks. Now they are categorized simply by the amount of land they own. We summarize the data for 1901 in figures 13 and 14. Although these data are not strictly comparable to the previous years' data, we get the same impression. Most agricultural capital was concentrated in farms of middling size.⁷⁷

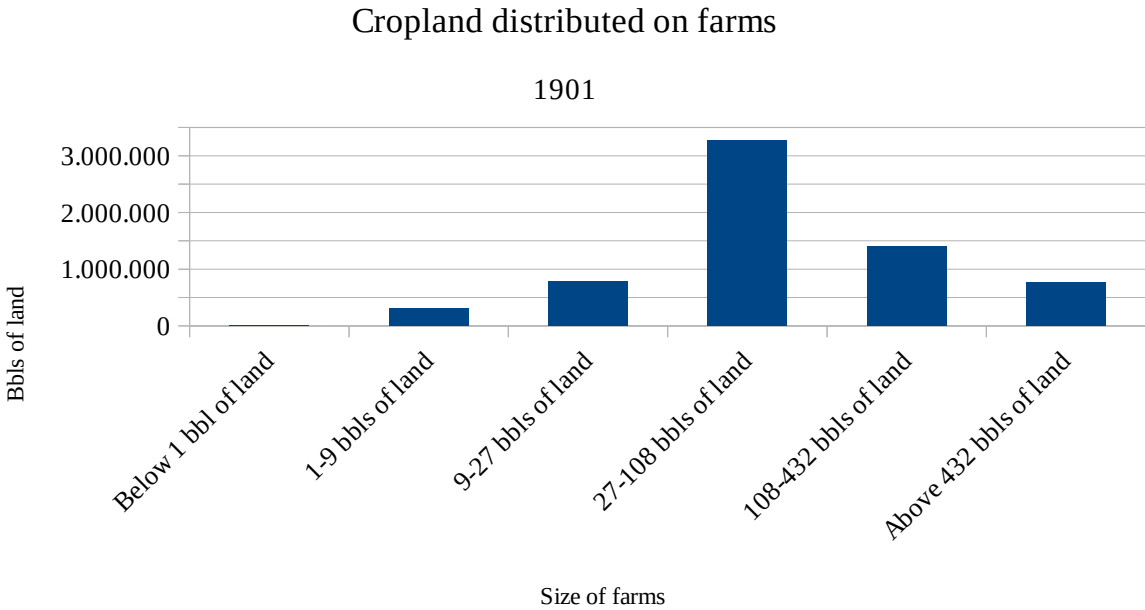
Figure 12: Distribution of agricultural land 1860-1895



We can also see how the role of mortgage credit did not change fundamentally during the period, despite the impetus from monetary policy. It was fundamentally not an important factor in financing economic expansion in agriculture. The appearance of secondary mortgages and the falling land prices suggest some farmers struggled with higher debt ratios, but the best estimates we have indicate that mortgage financing in general did not increase in importance. It was still mainly used to help finance ownership, not to invest and expand.

77 Data on land distribution and farm distribution across size classes from (Det statistiske Bureau 1869; 1896).

Figure 13: Distribution of cropland across farms in 1901



Even when government policies and monetary changes favoured debt financing to some extent, the basic anchor to sound money in the form of the gold standard kept the pressures of credit expansion in check. Even when the agricultural sector was undergoing significant change that might well have suggested the need for external financing, evidence suggests that farmers could primarily rely on their own monetary savings for capital. At least in the Danish context, we can therefore reject the claim (see above pp. 142-147) that financial markets and institutions were necessary for the economic development of agriculture. Capital formation was financed largely out of incomes and accumulated monetary savings. This conclusion should not surprise us, as Tostlebe (1957, 19) observed the same reality in his study of agricultural capital in the U.S. in the period 1870-1950.

Figure 14: Farms distributed according to size of land holdings 1901



Unfortunately, we cannot follow this story of agriculture on a free market under the gold standard beyond 1914. The Danish government followed virtually all European governments in suspending convertibility into gold in 1914 and, under the excuse of the war, introduced a myriad of interventions that were not fully got rid off after the war. We have described the development of Danish agriculture under the gold standard at some length, as we think it an instructive illustration of our theoretical analysis of agricultural organization and development, and as we think it will provide a useful contrast to the experience under the interventionist monetary system in post-war Europe.

9. Fiat money, Financialisation, and Agriculture: The European Experience

9.1. Introduction

Postwar agricultural history followed a different path than under the classical gold standard. As we saw in the Danish case, the half-century before 1914 was an era of rapid change and economic development, in agriculture as in the rest of the economy, but this development did not lead to fundamental structural change in farming, in Denmark or elsewhere. The end of the Second World War inaugurated another era of economic growth, but this time the experience of agriculture was very different. Unprecedented increases in physical productivity was accompanied by greater concentration of farmland, as the number of active farms declined rapidly across the developed world.

This development has been explained in different ways by various economists. Cochrane (1958) suggested seeing agricultural development as a race between aggregate demand and aggregate supply – essentially, a question of the rate of population growth versus the rate of technological change and improvement. As technological change accelerated, the process of the technological treadmill kicked in, leading to increasing concentration and a fundamental change in the structure of agriculture. The problem with this theory is that it leaves technological change unexplained – why did technological development accelerate in agriculture in the postwar period? After all, capitalistic agriculture is nothing new, it was the order of the day in the 19th century as we saw in the Danish case. The flow of investment into new technologies, or rather a shift of emphasis on the margin to investment in new technologies – e.g., favouring tractorization – needs to be explained, not simply assumed as an external force acting on the economy.

The focus on productivity growth – and, explicitly or implicitly, technological change – is common among scholars dealing with agricultural change. Jorgenson and Gollop (1992) describe postwar growth in U.S. agriculture as mainly a case of high total factor productivity growth: the average annual rate of growth was 1.58 percent, almost four times the rate in the nonfarm economy of 0.44 percent. Jorgenson and Gollop estimates that 80 percent of growth in agriculture comes from increased productivity, compared to only 15 percent in the nonfarm economy. Johnson (1997) makes a similar argument on a larger timescale, seeing the rapid growth of agricultural labour productivity as the prerequisite for the industrial revolution. Increased productivity released workers

from employment in agriculture, and the increase in food production made food available for the growing urban population.

Lu (1985) considers new technologies to be scale neutral, although they do tend to favour larger farms, as these have better access to information and external financing required to implement new technologies. The sources of financing in explaining changing agricultural structure may be key, as Hallam (1991) argues that there is no inherent economies of scale for agriculture. The role of finance has been emphasized in a general way by Rajan and Zingales (1998), who argue that well-developed financial markets, by lowering the costs of external finance, are a key driver of growth for industrial sectors that are relatively more in need of external finance. Rajan and Zingales do not consider the case of agriculture in this regard, but a different study suggests that land concentration in the U.S. in the early 20th century constricted the supply of credit (Rajan and Ramcharan 2011). In any case, none of these studies consider the role of monetary institutions and the possible consequences of fiat money and credit expansion on the demand for and supply of external financing.

Mundlak (2000) takes a somewhat broader view of the drivers of agricultural growth and emphasizes the role of demand in his model (Mundlak 2005). Matsuyama (1992) only considers change driven by learning-by-doing on the side of manufacturing in his two-sector model of the economy, leaving agriculture completely passive. Lucas (2004) in his model of rural-urban migration focuses on the attraction of urban centres with an assumed unending potential for growth, but he too concedes that the inelasticity of demand for agricultural goods alone would make growth more focused on urban, non-agricultural industries. The migration out of agriculture can also be seen in terms of “labour pull” and “labour push” channels (Alvarez-Cuadrado and Poschke 2011). Improvements in agricultural technology combined with Engel’s law constitute the labour push channel, while improvements in industrial technology attract labour out of agriculture (labour pull channel). Alvarez-Cuadrado and Poschke find that, based on data from 12 industrialized countries from the 19th century on, the pull force was dominant until 1920 and the push channel dominated after 1960. This change also tracks changing trends in total factor productivity growth: annual U.S. TFP growth in farming averaged 0.8 percent over period 1820-1948 compared to 1.7 percent in the nonfarm sector, but in the later period this changes. 1948-2002 annual TFP growth in U.S. agriculture is 1.7 percent compared to 1.4 percent in the nonfarm sector (Alvarez-Cuadrado and Poschke 2011, 139–40). These trends correspond well to the figures Bairoch (1999) compiled for the industrialized countries as a whole: virtually everywhere we see the same change in trends after WW2 with agricultural productivity growth now outpacing industrial productivity growth. Cao and

Birchenall (2013) found a similar pattern of agricultural growth in post-reform China: labour input in agriculture declined about 5 percent per year while agricultural TFP growth was 6.5 percent.

Engel's law is often considered important in explaining the changing structure of agriculture. Dennis and İşcan (2009) consider structural change in terms of the Engel effect and the Baumol effect. Apparently contradicting Alvarez-Cuadrado and Poschke, they find that the Engel effect accounts for almost all labour reallocation out of U.S. agriculture until the 1950s, after which the Baumol effect becomes predominant. However, the contradiction is only apparent and stems from the de authors' understanding of the Engel and Baumol effects. Their Engel effect operates on employment shares of different sectors: as incomes rise, agriculture sheds labour due to the low income-elasticity of demand for agricultural products. The Baumol effect is a version of Baumol's cost disease: relatively faster productivity growth in agriculture pushes farm workers out of agriculture. Part of this process is due to capital accumulation or capital deepening: agriculture is more conducive to rapid capital deepening, which in turn pulls labour into the more labour-intensive nonfarm sector. The Baumol effect and capital accumulation thus explain the structural change of U.S. agriculture beginning in the 1960s (Dennis and İşcan 2009, 198).

These explanations are clearly complementary, not contradictory. However, none of them explain why there was this change in the dynamics of change – why did the push channel and the Baumol effect dominate in post-war American agriculture? That the whole scale of farming in the U.S. has changed radically is beyond question (J. F. Hart 2003). In terms of dollars, acres of land or number of animals, American farmers increased their operations by an order of magnitude (ibid., 1). Hart explains this change partly as resulting from the vast increase in physical productivity, partly as due to inflation. However, he sees that as only a nominal change, explaining why gross revenues has to be 10 or 100 times greater than they used to in dollar terms. Cochrane (1993, 134) does not offer any direct explanations for the change in his history of American farming, although some are suggested by implication.⁷⁸ Specifically, whereas he describes how 19th century farmers were short of credit, in the 20th century this was no longer the case. What Cochrane (1993, 187) calls the Jeffersonian dream of relatively small farms had come true by about 1900, despite ongoing and rapid change in agricultural technology, specifically mechanization (ibid., 89-90). This should not surprise us, as this was also the history of Danish agriculture during the same period. However, what Cochrane calls a shortage of credit may simply, as in the Danish case, be due to the fact that self-financing was preferred to external financing. American farmers, furthermore, generally did not

78 Curiously, Cochrane makes little mention of his own theory (Cochrane 1958) concerning the forces of aggregate demand and aggregate supply as drivers of agricultural development.

have to finance as heavy capital outlays, since land prices were much lower in America than in most European countries.

All this suggests that economists until now have neglected the search for any underlying causes of structural change since the middle of the 20th century. The financial model of growth and structural change (Boehlje 1992) comes closest to our own theory, to be presented below, that changes in monetary institutions led to systemic changes in agriculture as well. Boehlje's financial model of change considers not only the relative price of inputs and outputs, but also financial charges and capital gains. Financial charges reflect interest payments on funds borrowed to finance inputs as well as explicit or implicit collateral constraints. These latter dependent more on cash flow and liquidity of assets than on relative prices. Boehlje (1992, 224) concludes that at least part of the structural changes in the three decades leading up to the 1980s – increase in per farm use of durable inputs, increase in farm size, and additional use of leverage – is a result of the continuous capital gains that occurred over the period. The cause of this asset inflation is, however, not examined by Boehlje.

Our goal in this chapter is to examine the structural change of European agriculture in the post-war period and specifically to argue that changes in the monetary system is a key, as yet unexamined cause, of these changes. Changes in European agriculture has been examined in numerous studies, but never mentioning the possible role of monetary institutions. Various aspects of the European common agricultural policy are most frequently studied in connection with structural change. The importance of milk quotas for dairy farming is one example (Hüttel and Jongeneel 2011), and especially the subsidies to agriculture have been studied. This has been studied in connection with agricultural productivity (Rizov, Pokrivcak, and Ciaian 2013), where it was found that subsidy payments impacted negatively on total factor productivity before decoupling of payments, after which the picture becomes more muddled. Subsidies have also been studied in connection with the capital structure, that is, the capitalization of subsidy payments into land rents (Ciaian, Kancs, and Swinnen 2013; Ciaian and Kancs 2012; Ciaian et al. 2021). Kilian et al. (2012) focused on the impact of the 2003 reform and the introduction of decoupled payments and found that subsidies are now capitalized into rental prices to a larger degree than previous to the reform. More recently, a study (Klaiber, Salhofer, and Thompson 2017) found that the 2013 reform of the CAP also led to an increase in the capitalization of subsidies. They estimate, based on Bavarian data, that on the margin 53 cents of an additional euro of subsidy payment is capitalized into land rents. In general, large variety in the capitalization rate of subsidies have been found (Michalek, Ciaian, and Kancs 2014), ranging between 3 and 94 percent.

Subsidies have also been studied in connection with credit markets. Ciaian and Swinnen (2009) show that in the presence of credit constraints, land rents increase by more than the subsidy when subsidy payments are introduced. The reason is that the subsidy relaxes farmers' credit constraint and allows them to finance the purchase of more capital goods. This increases farm productivity and the marginal revenue productivity of land, increasing demand for land and leading to a rise in the land demand curve. However, since the land rent increases more than the subsidy, only land owners are net gainers.

Several regional studies look at various aspects of agricultural structure in Europe. In one study (Fałkowski, Bukowska, and Wójcik 2019), large-scale landowners in Poland were found to have greater political power. One study using a panel of French farmers (Blancard et al. 2006) finds that financially unconstrained farmers have larger enterprises and seem to benefit from a virtuous circle, since access to financial markets allow them to increase production. Benjamin and Phimister (2002) compared the role of differences in French and British capital markets for investment decisions in agriculture. Another study (Saint-Cyr et al. 2019) using data from Brittany, France, found that farm exit is correlated with the size of neighbouring farms, suggesting to us that the easier financing obtained by larger farms fuels further expansion. Piet (2019) found that the agricultural workforce tends to concentrate on the 10 percent largest enterprises, measured in the euro value of their gross output. Piet et al. (2012) found, somewhat surprisingly, that agricultural policies have not increased farm size inequality in France, and that if anything, such policies have actually decreased such inequality. On the other hand, Piet and Saint-Cyr (2018) project a 30 percent decrease in the number of French farms over the period 2010-2025. Even if the relative size distribution of French farms remain the same, we are clearly faced with a continuing trend toward concentration of farmland and other assets on fewer and larger farms.

The trend toward centralization and larger-scale agriculture has been analysed both in terms of an Markov chain model (Hüttel and Margarian 2009) and more recently Neuenfeldt et al. (2019) used a multiplicative competitive interaction model to study structural change in European agriculture 1989-2013. However, while they clearly describe the facts of change – declining number of farms, farm size growth and production re-specialisation – these studies don't look to monetary drivers of these long-term trends. Neuenfeldt et al. (2019, 728) do consider the interest rate among the macroeconomic variables in their model, but the money supply as such and monetary institutions and channels of money creation are absent from their model.

Yet such a substantial change of the patterns of development in agriculture and of farm structure over such a long period of time as has been conclusively shown to have occurred since the late

1940s suggests that something fundamental changed in the economic order. It is most unlikely to be a change internal to agriculture, a fundamental shift in the supply of or demand for agricultural goods. Perhaps increased demand for farmland for non-agricultural purposes played some role, as the post-war era saw the rapid “suburbanization” of virtually all countries, but the increase in the demand for land for residential purposes was relatively small compared to the land available. Such a shift in demand for land can only explain a marginal increase in the rental price of land, it does not explain the tendency toward centralization and the larger rate of increase in TFP in agriculture for most of the post-war period compared to the situation prior to the Great War.⁷⁹

It is our contention that this fundamental shift in the development of agriculture was caused by an equally fundamental change in monetary institutions that marks a clear break from the era of the classical gold standard and the economic order characterized by commodity money. All historical eras have been marked by some degree of intervention by the state in monetary affairs, but only in relative recent history have national monetary systems deviated significantly from the free market order. In earlier history, while national governments could intervene in local monetary affairs – debasing the currency, privileging banking, issuing paper money and so on – the commodity moneys, gold and silver, were always available to furnish a standard for comparison and an escape when the interventions became unbearable.

Post-WWII Europe furnish us the first extended period of pervasive government control of the monetary system. The monetary experience was not exactly identical in each country, but the basic system was similar: governments issued paper money and stimulated bank credit expansion, leading to high rates of growth in the money supply and persistent price inflation. As Kindleberger (1993, 3) says in his financial history, Western Europe can be treated as one unit for analysis, as the diversity of experiences does not blot out the basic unity of the monetary and financial history of the continent.

The institutional setup also changed during this period, but never in such a way as to prevent inflationary policy: from the fixed-exchange regime of Bretton Woods (1945-1971) through the era of fluctuating currencies and various efforts at international cooperation (1971-1999) into the era of the common currency (1999-present), the institutions in charge of monetary policy have always pursued basically inflationary policies, i.e., policies that continuously led to an expansion of the money supply. Post-war monetary history has been treated principally in terms of international monetary cooperation, both the time of Bretton Woods (Eichengreen 2011; Bordo and Eichengreen

⁷⁹ The inter-war period was characterized by many different interventions as well as monetary disorders. While the period repays study in its own right, it is excluded from the present work, since the period is too short and too chaotic to consider the effects of changes on the systematic level.

1993), the era of fluctuating rates (Solomon 1982; James 1996), and the introduction and functioning of the common European currency (Padoa-Schioppa 1994; Grauwe 1997). Philipp Bagus (2010) combines the history of the creation of the euro with an overview of the current institutional setup of the European monetary system.

Through all these changes, however, the money supply kept expanding. This was true on the gold standard as well, as new gold was continuously mined. However, the effects of additional money produced through gold mining were very different than the continuous increase of paper money and bank credit that dominates modern economies. As explained in chapter 1, the production of commodity money is governed by the law of costs (Hülsmann 2003d, 39; Hansen 2020, 342–43), just like the production of all other commodities. The Cantillon effect (Sieroń 2019) under these circumstances are not different from the redistributive effects of successful entrepreneurial action in other fields of production: successful entrepreneurs earn profits, the labourers employed in their enterprises earn higher wages, and the landowners whose land are used earn higher rents. The successful entrepreneurs expand their production until the pure profit component of their income disappears, and they only earn about the market rate of interest on their invested capital and implied wages. Entrepreneurs engaged in gold mining will follow the same pattern and not systematically disarrange economic conditions or induce structural changes. Successful entrepreneurs will simply earn higher profits and spend this extra revenue on consumption or investment as they might prefer.

Money production since 1945 has not followed this pattern. It is true that until 1971 there was a tenuous connection to gold, as European central banks could redeem dollars for gold at a fixed rate, but neither the Americans nor the Europeans were thereby prevented from continuously increasing the supply of domestic paper money. Under these conditions, the process of credit expansion and the demand for bank credit are not kept within the narrow bounds set by the classical gold standard.

9.2. The post-war evolution of European agriculture

For purposes of the present study, “post-war” means simply the time from the end of the Second World War to the present. While there were many institutional changes over this period, none of these changes amounted to a revolutionary break with what came before. In the monetary sphere, while monetary institutions developed and even changed in some significant ways – the end of Bretton Woods and the introduction of the euro comes to mind – these changes did not change the basic dynamics of the monetary system set up after the war.

European refers to Western Europe for most of the period. Central and Eastern European countries were outside the influence of modern monetary institutions until after the fall of the Berlin Wall, and were therefore not affected by the dynamics here described until the 1990s at the earliest. Thus, farming in Eastern Europe was not subject to the same centralizing causes, although in some countries socialization and collectivization of farming were processes leading to centralization and large-scale agriculture. Even so, in countries like Romania and Poland many small farms existed by the 90s, and as these countries adopted western monetary institutions, the same consequences for agriculture appeared there. However, the specific policies enacted during the era of privatization can also have distorted the process in some ways, both in favour of smaller and larger-scale farming, depending on the country. While the same monetary system led to the same consequences for agriculture across all capitalist countries in the period, we have narrowed our focus to Europe for convenience's sake. It should also be noted that the scale of farming is not the same in all countries: in America, farms are generally larger than in Europe due to the greater availability of land.

In general, the number of farms have been decreasing over the period in all European countries, while the agricultural area has been stable. In 1975 the number of farms in EU-9 (Belgium, Denmark, Germany, France, the Netherlands, Great Britain, Ireland, Italy and Luxembourg) was just under 600,000, and it decreased steadily over the period to just above 200,000 in 2013 (European Union 2018). In the decade 2003-2013 the number of farms in the EU-27 declined by 2 percent per year, with a greater decline in the new member states (2.7 percent) and smaller decline in the old member states (0.9 percent).

This decline in the number indicates a concentration of farming on fewer and larger farms. Thus in 2016, farms with a size above 100 hectares constituted only 3.3 percent of the number of farms, but they farmed more than half, 52.7 percent, of the utilized agricultural area (UAA) of the EU (see figure 15). Over the period 2005-2016, the number of farms in all size categories declined, except for the category of farms above 100 hectares (figure 16).

Distribution of EU farms and utilised agricultural area according to farm size, 2016 (%)

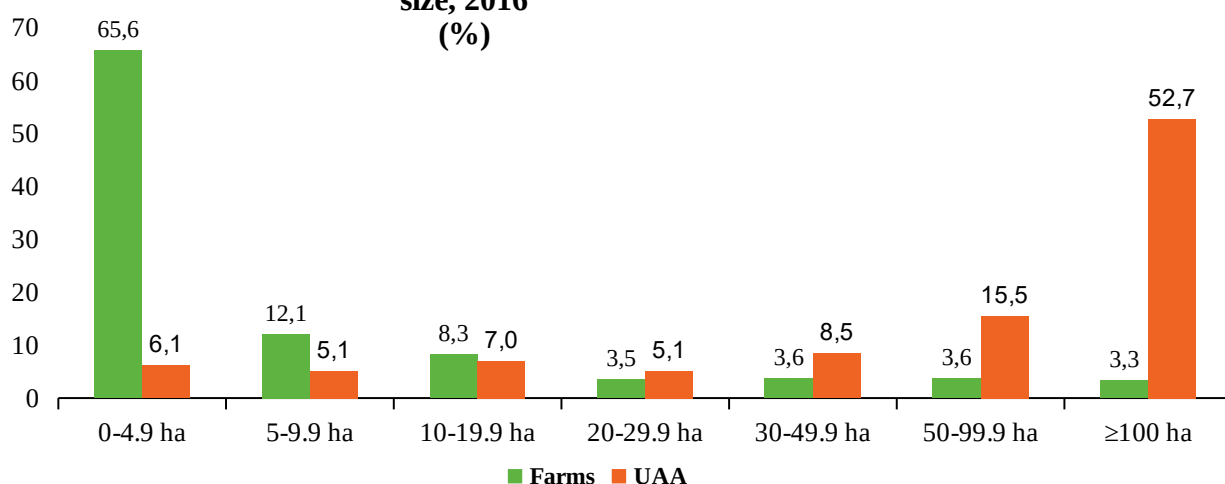


Figure 15: Distribution of EU farms and UAA according to farm size, 2016. Source: Eurostat, Cook (2020).

This change in farm size is related to the change in productivity in agriculture over the period. In Europe as elsewhere, the rate of growth of agricultural productivity increased dramatically, both from what it had been in the 19th century and relatively to the rate of growth of productivity in the manufacturing sector.

In the post-war period, the annual rate of growth in agricultural productivity outstripped the rate of growth in productivity in manufacturing, whereas in the period 1830-1950 the opposite had been the case (Bairoch 1999, 128). The more natural development in a progressing economy is what we see in the earlier period, that is, increases in food production lacking behind increases in the production of other goods. Once basic needs are met, there is no reason to primarily invest in agriculture. New capital formation will be more likely to take place in other industries and agriculture will tend to lack behind (see the discussion in chap. 4). But in the post-war period, this natural tendency is not only reversed, the increase in agricultural productivity far outstrips that in manufacturing. Whereas the annual rate of growth of agricultural and manufacturing productivity was 1.2 and 1.9 percent respectively 1830-1950, by the 1960s it rises to 6 and 4.1 percent, respectively (see table 11). And whereas the annual rate of growth in agricultural productivity seldom rose above 1.5 percent with significant differences between countries, from 1950 most European countries experienced productivity growth around 4-6 percent. Since this took place over decades, it cannot simply be the result of the introduction of new technologies, or the abolition of controls after the Second World War, since such changes would not have such systematic consequences.

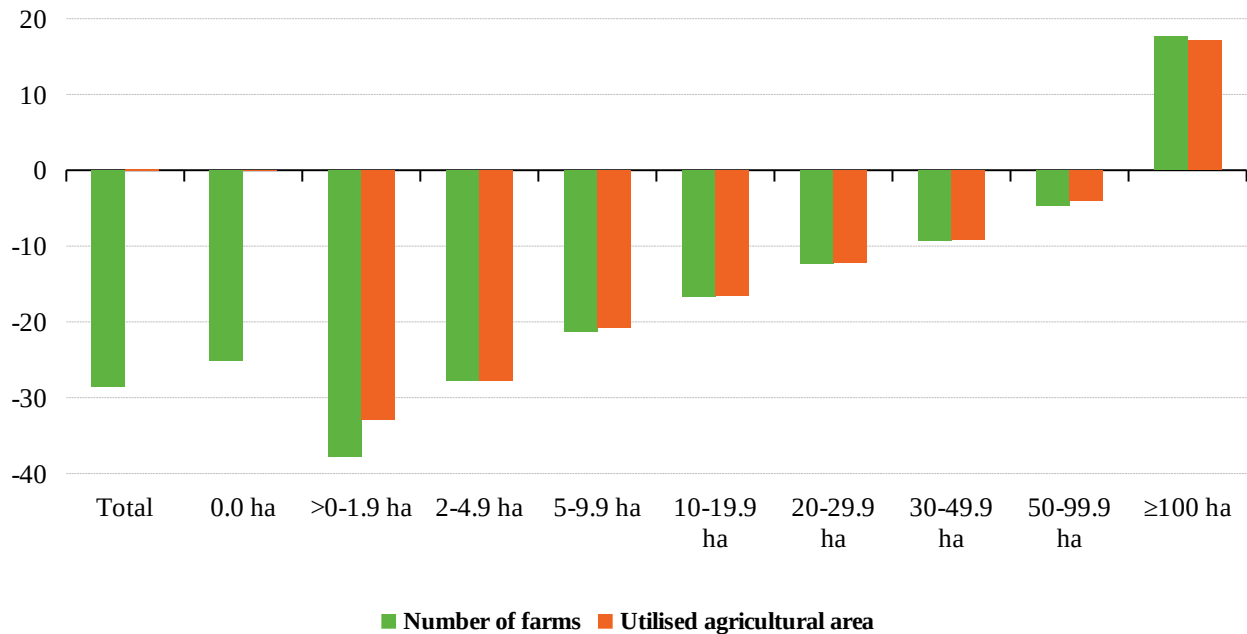


Figure 16: Change in the number of farms and UAA in percent by size class, EU-28, 2005-2016. Source: Eurostat, Cook (2020).

That this increase in productivity was in fact unsustainable is shown by the rapid decline in the number of farm enterprises and of the people employed in agriculture. Across all kinds of farms, the number of enterprises fell over the last four decades of the 20th century (Eurostat 2000, 111ff.). As productivity grows, farmers have had to consolidate their holdings in order to remain sustainable. This trend has continued into the 21st century (Cook 2019, 18–23; Piet 2019) and is projected to continue for the foreseeable future (Piet and Saint-Cyr 2018).

Table 11. Comparison of annual rate of growth in productivity per male agricultural worker and manufacturing industry in western developed countries 1830-1995

Source: Bairoch (1999, 128).

	Agriculture		Manufacturing industry	
	Excluding Japan and S. Africa	Excluding Japan and S. Africa	Excluding Japan and S. Africa	Including Japan and S. Africa
1830-1950		1.2	1.9-	
1950-1995		4.7	3.3-	
1830-1860		1.3	2.2-	
1860-1910		1.3	1.8-	
1910-1950		1.9	1.9-	
1950-1960		5.4-		2.9
1960-1970		6-		4.1
1970-1980		4.9-		2.7
1980-1990		3.5-		2.7
1990-1995		3.3-		2.8

The change in productivity and scale of farming is connected to changing production patterns and more capital-intensive technology. Investment increasingly took place in capital goods that led to greater physical product in the short term. This is not in itself an indication that the economic order is dysfunctional, since there are many situations where this simple kind of short-term improvement is the path of agricultural development desired by the consumers. For instance, in an era of rapid population growth, at least some investment will take the form of expansion of present production, whether in the form of technological innovation or the purchase of additional inputs.

However, in Europe in this period there was no increased demand from a growing population. Investment in agriculture should have been along the lines indicated in the section 4.4.2: Net savings and agriculture. Instead, capital was invested in simply expanding current production and increasing yields with the consequence that physical productivity greatly increased. However, since the pattern of demand did not justify this expansion, the result was that revenues collapsed, as we should expect following our explanation of Engel's law in chap. 2.

It is this change in investment patterns that caused the structural change in agriculture. Since it was ongoing for decades, it cannot be explained by transient causes. Aspects of the CAP could provide part of the explanation. The attempted insulation of European agriculture from the world market and the higher intervention prices paid in Europe for agricultural output made agricultural production more profitable, but this should only lead to a one-off jump in European production – it cannot explain the structural change over several decades. In any case, the process of transformation had been ongoing for about a decade when the CAP was introduced in the late 1950s.⁸⁰

Instead, we must look to the monetary system to explain the change in agriculture.

9.3. Post-war money creation – banking and seigniorage

European monetary history can be divided into different periods according to one's focus. If we focus on the international aspect, then a division into the Bretton Woods period 1945-1971, the period of attempts at international cooperation 1971-1999, and finally the period of the euro from 1999. The two latter periods could also be united into one, as the euro or some common currency was the explicit goal of cooperation.

80 It seems probable that the CAP was introduced not simply as a protectionist measure, but in response to some of the problems of structural change already at that early period – declining productivity on smaller farms, farmers being squeezed out and so on – problems whose roots were taken to be in having to compete on the global market. We have not investigated this interesting historical question further.

We could also divide according to the effects of monetary policy on price inflation, but then the periods would not line up exactly in each country. However, in general the Bretton Woods period would then be a period of moderate to high inflation, the 1970s would be a period of high inflation, and from the beginning of the 1980s on would be a period of moderate to low inflation. Inflation rates were low especially from the mid-90s, as countries' monetary policies converged in preparation for adoption of the euro. As measured by the official HICP (harmonized index of consumer prices), the European Central Bank has managed to keep inflation rates below 2 percent since its inception. However, recent monetary policy choices in response to the corona crisis may well result in higher price inflation in the future. Discussions about central bank digital currency (CBDC) may also lead to a fundamental change in monetary institutions. As this is still in the future, we will analyze these possibilities later in the chapter. For now, we will focus on the functioning of the system up to the present.

Money is created in two distinct ways in the modern monetary system. Central banks create base money or high-powered money, while commercial banks create money substitutes (Belke and Polleit 2009, 19). Despite appearing on the liability side of the central bank balance sheet, base money is not a liability of the central bank – it cannot be redeemed into anything else. At most, the form of base money can change from commercial bank deposits (reserves) with the central bank to bank notes issued by the central bank. Since the central bank can always print as many bank notes as may be required, there is no doubt as to its ability to change the composition of its balance sheet as required.

The creation of money substitutes is a much larger part of the money supply. By lending out money, banks in fact create additional money substitutes. They are not simply credit intermediaries, but create the funds lent in the very act of extending credit. This process and its consequences have been described in great detail in the literature (Mises 1953, 261–338; Rothbard 2008; Huerta de Soto 2020, 167–263; Belke and Polleit 2009, 19–37), and we will not go further into the process here. The important point is that commercial banks operating on the fractional reserve principle are not principally financial intermediaries; they earn their profits through credit expansion instead. These earnings are better understood as a form of seigniorage, that is, as income from money production (M. Klein and Neumann 1990): the bank lends newly-created money substitutes to business or the government and in return receives a claim against the borrower for interest and repayment of principal. Money creation and seigniorage is not limitless in this system, since banks need some reserves as a basis for credit expansion and can only expand credit if there is a demand

for it. Hence, the credit expansion process looks like a market process, as banks compete for customers while attempting to maintain adequate reserves.

Since they are not constrained by the available supply of savings, banks can reduce the rate of interest they charge on loans below the market rate of interest. When this happens, borrowers will naturally obtain bank loans instead of alternative sources of funding, including self-funding. So long as the banks maintain the loan rate below real rate of interest – understood here as always as the price spread between stages of production (Rothbard 2009, chap. 6) – the supply of credit and of money substitutes will expand as first explained by Wicksell (1898).

Similarly, in periods of contraction when the loan rate of interest increases above the real rate, banks contract credit and the amount of money substitutes in existence shrinks, as banks consolidate and try to reduce the risk of a run that will reveal their untenable position. However, when the central bank is no longer constrained by the necessity of maintaining the gold standard, that is, when it can expand the supply of central bank money without fear of losing gold reserves, it can come to the help of the commercial banking system. To save the financial system and avoid economic recession, the central bank can more easily step in and recapitalize threatened banks, take over bad loans, and make sure that the supply of credit does not contract.

The result is that the financial system is not disciplined to the same extent as under the gold standard. Instead of relatively short business cycles and sharp depressions, where bad loans and banks are liquidated, credit expansion can now, unconstrained by the requirement for redemption into commodity money, go on for longer, and the financial system as a whole is saved from the worst effects of the recession. At the same time, since the quality of money is lower on a paper standard – whether the Bretton Woods System or later – than on a gold standard, there will be less demand for base money. Liquidity needs will instead be met by holding more secondary media of exchange – principally liquid financial assets – or by exchanging one's cash balance for bank deposits, since these usually earn an interest income.

While the production of money was constrained by the rules of the Bretton Woods System, European countries were not on the gold standard during this period – at best, it was a severely weakened metallic standard, in Bernholz' (2003) phrase. Their objective was only to keep the exchange rate to the dollar fixed, which proved to be a loose constraint on monetary policy. While some countries such as Germany in general had a tighter or harder monetary policy than the U.S., as is seen from the flow of gold from the U.S. to Germany, other countries pursued a looser monetary policy, such as Great Britain, which had to devalue the pound in 1949 and 1967. In all countries,

however, money production was divorced from the production of commodity money. The anchor in the system was the U.S. dollar, and American inflation set the tone for the European countries: the only limit on European inflation was to maintain parity with the dollar, a much looser constraint than a commodity standard. This can be clearly seen when looking on the rate of growth of the money supply in Germany. As is clear from figure 17, both the amount of base money, here proxied by the amount of cash in circulation, and the amount of money substitutes (M3) increased constantly at a high rate throughout the Bretton Woods era. The remarkably high rate of growth must be compared to the rate of growth of the supply of commodity money. As we saw in chapter 8, under the classical gold standard the supply of gold grew at a stable rate of 1-2 percent per year.

Change in the German money supply 1948-1971

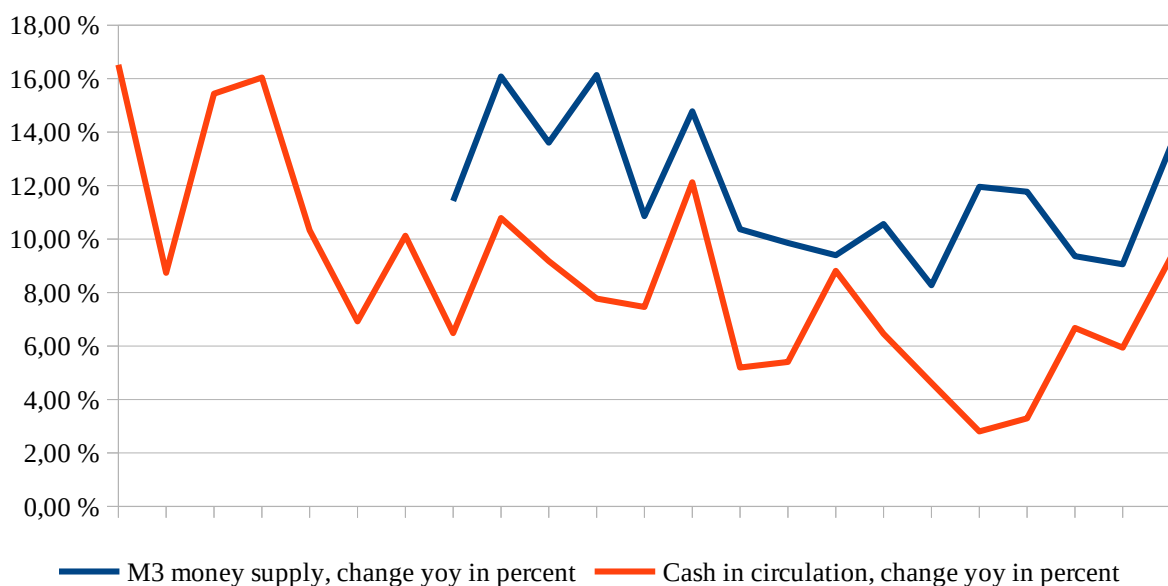


Figure 17: Growth of German money supply 1948-71. Source: [HiStat Gesis](#)

While the figures for M3 don't go back farther than 1955, we can clearly see that credit systematically expanded at a faster rate than the supply of base money in the hands of the public. The process of financialisation must therefore be traced from the beginning of the post-war era, not the 1980s, since bank credit was clearly greatly favoured, leading to an expansion of dependence on external finance and financial modes of thinking (cf. above pp. 154ff.), even if the proportion of external debt on the balance sheet of firms fell for some years, as asset prices rose in tandem with or even ahead of credit expansion.

Change in the German money supply 1972-1997

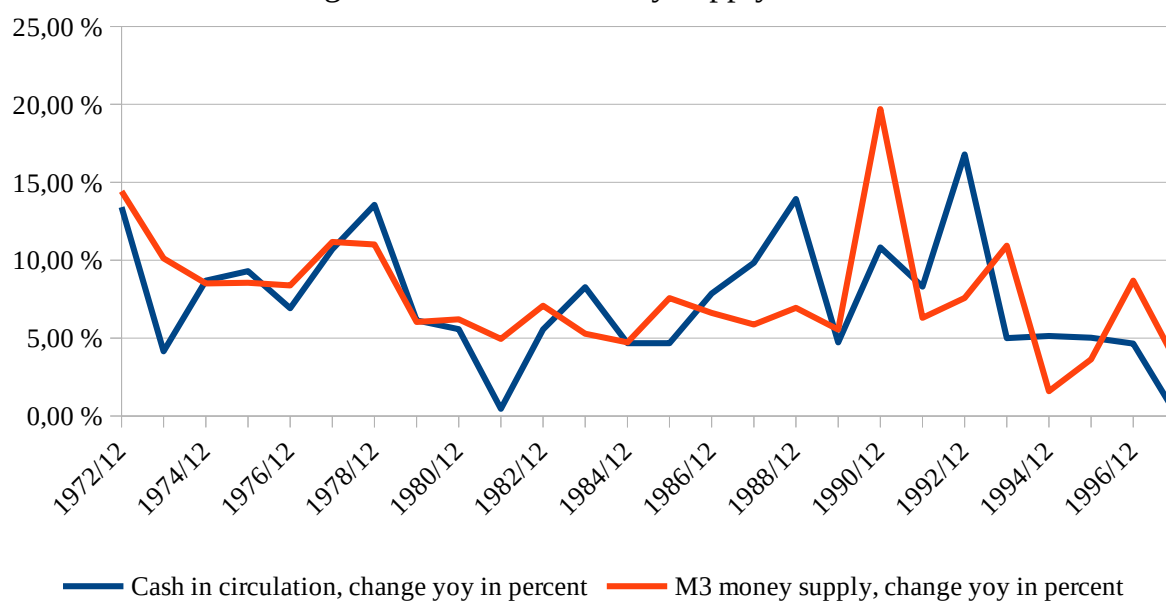


Figure 18: Growth of German money supply 1972-97. Source: [HiStat Gesis](#)

If we look at the same time series post-Bretton Woods (figure 18), we initially seem to see our theory contradicted. The growth rate is generally lower, if only slightly, and there is no longer the same clear difference in the rate of growth of currency in circulation and M3. However, the contradiction disappears if we look at a narrower monetary aggregate M2.⁸¹ M3 includes some very liquid financial assets that are not real money substitutes, while M2, being narrower, excludes these. This aggregate thus gives a clearer picture of the importance of money substitutes. As figure 19 shows, M2 regularly grew at a rate above the growth rate of M3. What happened was therefore a further shift into money substitutes, but now also away from financial assets that had been in high demand. The end of Bretton Woods thus led to an even greater part of the money supply being created by credit expansion, and thus debt financing assuming an even greater importance. Looking at American data for the period 1968-2005, Belke and Polleit (2009, 140–41) found that nominal bank loans grew faster than nominal output. No doubt the same was true in Europe, as the same processes of financialisation was at work, leading to greater reliance on external credit.

81 The HiStat dataset does not include separate calculation of M2, I have therefore relied on the IMF statistics as presented by the St Louis Fed for German M2.



Figure 19: Growth in German M2 1970-1998. Source: [FRED](#)

9.3.1. A brief review of European monetary history

As the following sketch of European monetary history will show, the development of monetary institutions in Europe worked to progressively worsen the quality of money and privilege the use of bank credit and money substitutes. We can divide the monetary history of Western Europe after the Second World War into three eras: the Bretton Woods period, the era of fluctuating exchanges and attempts at cooperation, and the era of the euro.

The Bretton Woods system lasted from 1945 to 1971. Under this system, European exchange rates were fixed to the dollar and European central banks could redeem their dollar holdings for gold at the official rate of \$35 per ounce. However, while in theory each country's exchange rate was fixed, in reality they could often be, and were, devalued. Moreover, that the exchange rates were fixed did not prevent domestic inflation within each country. Since European central banks held dollars in reserve for their own paper money, they could use an inflow of dollars to expand their own fiduciary issues. Only when the inflationary pressure thus created became alarming to the officials in charge would European central banks redeem their dollar holdings for gold.

1958 marked the turning point of the system: around that year American inflation began to outrun what the Europeans found acceptable. Before then, there was much talk of a dollar shortage in Europe, as the inflating Europeans were chronically short of dollar reserves; after, Europeans began to redeem dollars for gold, as the inflationary policies of the U.S. led to a flood of dollars abroad. By the mid-60s the flow of dollars into Europe had become critical, with the French economist Jacques Rueff (1972, 191) calling the accumulation of artificially over-valued dollar balances in Europe “an unprecedented system of spoliation.” Redemption into dollars continued apace, and the attempts to stop the market price of gold from rising above the official rate and stop the drain of

gold from the U.S. – most notably the two-tier system introduced in March 1968 that tried to separate the official holdings from the free market in gold (Eichengreen 2011, 58–59) – all failed. Already in 1971 dollar redemption was suspended and the dollar was devalued, although the system of fixed exchange rates lingered until 1973, when the Smithsonian Agreement broke down.

The second period lasted from the 1970s until 1999. At last cut loose from gold, inflation accelerated. First, in the 1970s, the creation of new money resulted in increasing price inflation, with yearly price inflation rates running into double digits. In the early 1980s this changed: monetary inflation became more moderate and was directed into financial markets. While consumer price inflation fell, this meant that the process of financialisation accelerated, as the costs of debt financing fell further relatively to other sources. The increased supply of loanable funds led to a gradual decline in interest rates and increasing asset price inflation meant that borrowers had good collateral for loans.

Financialisation thus occurs because the monetary system privileges borrowing over other sources of financing. Banks earn seigniorage by extending new loans and can therefore charge lower interest on their loans, since it's not really as credit intermediaries that they earn their profits. Bank financing is therefore systematically privileged above other sources of financing, and businesses therefore rely on it to a greater extent. At the same time, the declining quality of money means that the demand for money to hold falls, further undermining the economic rationale of self-financing out of accumulated savings. The demand for loanable funds increases even more, as business owners aim at economizing even more on the need to hold cash.

The final period is the period of the euro. Formally introduced in 1999, now it is the European Central Bank that is in charge of money creation. While committed to a target of low consumer price inflation – close to but below 2 percent per year – the ECB has continued the basic system of money creation inaugurated around 1980: it issues new money to the banks in the forms of open market purchases of assets or (usually) in the form of collateralized loans (Bagus 2010, 69–75; Belke and Polleit 2009, 40–45).⁸² Recent changes, such as outright purchases of government debt after the great financial crisis, do not change the basic financialised character of money creation: for also in this case the new money go first to financial markets and institutions. The systematic tendencies are the same under the euro as previously: debt financing is favoured and the quality of money is further eroded (Žukauskas 2021), again reducing the demand for money to hold.

82 Countries outside the eurozone – the UK, Denmark, Sweden – have similar monetary institutions, that is, while the institutional setup of money creation may differ in some respects, its general character is the same.

As already stated, for our purposes this threefold division of monetary history is not the most useful. Rather, a twofold division – roughly before and after 1980 – better elucidates the importance of the monetary system and its changing impact on the structure of European agriculture. However, even this division highlights only a difference of degree, not of kind. After 1980 the process of financialisation became more accentuated, but it had been ongoing from the outset of the Bretton Woods System as explained above.

9.4. Agriculture in the European fiat money system

We have in previous chapters explained the structure of agriculture and its normal development in a progressing economy. To recap, as the economy expands, the overall share of agriculture in output is bound to diminish. This is due principally to Engel's law: as a family's income increases, the share of it devoted to acquiring food and other basic goods is bound to decline. Since foodstuffs are the primary output of agriculture, this means that the bulk of economic expansion in a progressing economy will take place in some other sector, and that agricultural expansion will principally mean a change to higher-quality foodstuffs that take longer to produce – e.g., a marginal shift from the production of grains to meats. While the agricultural sector declines relatively to other sectors of the economy, there is no inherent tendency for it to decline in absolute terms, either in terms of output, people employed or revenue to the farmer. There is also no systematic causes in a progressing economy inducing a fundamental change in farm structure, such as a tendency to larger, more consolidated farms.

Capitalist entrepreneurs will always seek investments that yield them the highest profits, that either cut costs or increase output in such a way as to generate monetary profits. The scope for investment is therefore limited in agriculture, if the capitalist simply want to expand current production. Since he is constrained by an inelastic demand curve for his product – the clear implication of Engel's law – any increase in supply not matched by an increase in demand will reduce total revenues. If he is more efficient than his competitors and can operate at lower costs will he profit from increasing production – but only because some other farmer is now sub-marginal and leaves the market. Our example about potatoes in section 4.3, pp.105-110 showed this.

What we are faced with in post-war Europe, however, is a situation where agricultural production was expanded across the board to such an extent that the result was a vast increase in output and a resulting decline in revenues. This is the real phenomenon referred to above as immiserizing growth (Bhagwati 1968; Vakulabharanam 2004) and the agricultural or technological treadmill (Lang and

Heasman 2004, 147–48; Russi 2013, 57), and it is our contention that its roots are in the monetary system.

As explained above, the fundamental driver of this process was ongoing credit expansion made possible by the abolition of the gold standard. We will first explain how bank credit expansion and increased lending to farmers drove the process of rapid technological change, and then turn to the impact of financialisation. The creation of money substitutes does not simply alter nominal values: since it privileges financial transactions, a systematic change in financing occurs, but the change is by no means limited to the balance sheet and the distribution of claims on farmers. Money creation has real consequences for the structure of farms, production decisions and the general shape of the agricultural sector.

9.4.1. Credit and the technological treadmill

In the fiat or paper money system, where banks are able to reduce interest rates for substantial periods of time, it becomes increasingly more attractive for farmers to rely on external financing. Banks, whose seigniorage depends on them lending out money, are happy to oblige, especially since farmers have comparatively good collateral in the form of land. However, the new credit has to be invested. It cannot simply be invested in land, as land prices are still determined by the capitalized DMVP of each piece of land as explained in chap. 2. As the supply of land in Europe in this period is fixed, it is also not possible to cultivate virgin soil. Farmers therefore have to find alternative investment opportunities to expand production so that they can service their extra debt. More of the other productive factors, labour and capital goods, will be acquired.

It is here that the treadmill is set in motion. Newly-available tractors and other farm machines are bought and put to use, more artificial fertilizer is used, new higher-yielding seed varieties are sought out and purchased. All this results in greater physical productivity per hectare and per worker. This increase in physical output necessarily leads to a fall in price, and due to Engel's law as explained above, this fall in price will overcompensate the increase in product, as the farmers' face very steep demand curves. As a result, farm revenue and income to the factors of production falls. How will this reduction be distributed among the different factors?

The agricultural workforce will be reduced, as labour is a very nonspecific factor and labourers find non-farm work easily. Wages will therefore not fall. Since land is the specific factor in agriculture, the decline in revenues would therefore result in a relative decline in the value of land while the prices of new capital goods would be largely unaffected, since they – or the factors used in their production, at least – are relatively unspecific. Hence, the farmer will bear the brunt of the loss.

With revenues down and the prices of capital goods constant or only declining slightly, while land rent falls,⁸³ farms would now necessarily operate at a loss and be unable to afford the capital goods necessary to maintain output.

In this situation, there would be more capital goods specific to the current, less profitable kind of production in existence than would otherwise have been the case, and it would to a greater degree be more profitable to continue current production in larger units to fully profit from the gains in productivity, rather than to shift to a different line of production. Yet in order to do so profitably, it is necessary to merge farms into larger units. As a result, land and specific capital goods will become more concentrated on fewer farms, and farmers will further expand the highly capitalized production of basic goods. Hence, there will be a systematic tendency for each farmer to acquire more land, bidding up prices, driving marginal farmers out and consolidating agricultural land on fewer farms. At the same time, the creation of credit driving the process continues, and farmers can continue to finance expanded production with new cheap loans. The supply of cheap bank credit means that for each individual farmer, this is the rational thing to do, but the overall consequences are the structural changes described. After only a few decades of this system, European agriculture was transformed and was said to be already then “over-mechanized” (Schwarzweiler 1971).⁸⁴ In the case of Denmark, mechanization was financed primarily through loans, first bank lending and then through new credit institutions founded to finance the acquisition of tractors and machines. These institutions financed up to 75 percent of the purchase price of the new tractors and machines (Pedersen 1988, 4:231–32).

This situation was recognized by the OECD in 1970, when a report published by them argued that access to external credit in agriculture led to innovation and technological change, but also to increased debt levels. The continued dominance of financial actors, they found, would encourage the further adoption of intensive techniques rather than more low-input, sustainable practices (Organisation for Economic Co-operation and Development, Committee for Agriculture 1970, 7–8).

Note that we are not here describing the dynamic of the business cycle, although there are some similarities. The pattern of error we have identified here is systematic but not exactly cyclical, since it did not depend on the business cycle initiated by credit expansion. The periods of credit expansion and unsustainable boom played a subsidiary role in the process, as periods of boom increased the apparent profitability of investing in higher-order goods and a longer, more intensive production structure. This reinforced the tendency to over-investment in current agricultural

83 Note that this fall is only relative, not nominal, as the period was also one of high price inflation leading to higher asset prices.

84 Referring to a German case study only.

production, as there appeared to be a larger supply of capital goods available than was really the case and as credit was available on easier terms. The underlying process would, however, still have taken place in the absence of any business cycle.

9.4.2. Financialisation of farming

From about 1980 there was a change in the direction of money creation. Instead of a generalized inflation, new money entered financial markets first and boosted the process of financialisation. The dynamic is different now than before. Since the financial system is awash in liquidity, credit can be obtained more easily, especially so since the 80s and 90s also saw a change in agricultural financial institutions toward a privatized, free market system (Coleman, Grant, and Josling 2004, 37). The result is that a larger supply of loanable funds are made available and, consequently, the nominal interest rate falls. It becomes even more attractive to finance farming with external credit, as borrowers on easy terms can outbid others in the market for capital goods and farmland. Asset prices therefore rise without any change in underlying product prices.

Under this setup, while there is a rise in asset prices, the rise in equity lags behind the rise in debt. Farmers take on a greater proportion of debt in order to invest, both in short term capital goods and when buying land. Those for whom the immediate result of financialisation is a rise in asset values through appreciation of land will take on more debts, as their debt ratio has fallen.

Just as before, the system will lead to increasing capital investment and expansion of production. The costs of financing capital investment fall along with the interest rate, leading farmers to believe that expanding production will be profitable. After all, while revenues may fall, costs have already fallen and the individual farmer may thus expect to be able to profit from increasing production. But again, he runs into the brutal reality of the real demand for agricultural products: there has been no increase in demand, and hence the product prices will fall relative to the costs of his additional investments. Again the same dynamic of sub-marginal farmers leaving the sector and the remaining consolidating the land on larger farms take over.

An additional complicating element is introduced by the fact that the banks who have lent the funds to the farmers will be unwilling to accept losses. This reluctance is not simply due to obstinacy, but rather springs from how monetary institutions function. In the European context, high-quality government bonds can be used as collateral for loans from the ECB, but so can mortgage-backed securities (Bagus 2010; Bindseil et al. 2017). Having to write off bad loans therefore means a loss of good collateral for the banks. This might slow down the process of bankrupt farmers leaving

agriculture and their competitors taking over their assets, as the creditors are unwilling to realize the assets at a loss, even if this means that resources are frozen in a sub-optimal constellation.

The processes described here will also tend to cultivate an increasingly “managerial” mindset, and less of an “ownership” mindset, due to the mechanism laid out in chapter on financialisation. The owner is increasingly only a nominal owner, as his share of the balance sheet is much reduced, and he is more focused on maintaining and increasing cash flow than if he were less dependent on external credit. Performance metrics set by the creditors also become increasingly important to the owner, as maintaining the relationship to his creditors is now essential to keep control of the farm. This can have two contradictory consequences: on the one hand, since cash flow and paying regular debt payments become paramount, non-economic considerations retreat to the background. The farmer may have some notion of the importance of environmental values, for instance, but he can no longer afford to cultivate his land in a more environmentally friendly way, if this is even marginally more costly. On the other hand, as governments or the general public become more concerned with environmental problems and see, rightly or wrongly, modern agriculture as causing these, external creditors may become concerned with too intensive practices. Among the performance metrics, environmental friendliness and animal welfare and similar “soft” values show up and the farmer has to take these into account. In reality, government regulation often pre-empts demand from the creditors, but the result is the same: the farmer has to follow bureaucratic guidelines for how to manage his farm, guidelines that tend to become ever more detailed. Bureaucratized, large-scale farms is the end result.

The evaporation of the substance of property suggested by Schumpeter and discussed above, pp. 166-171 is thus linked to the increasing dependence on external financing, it is not the natural evolution of capitalism.

9.5. Helicopter money

Helicopter money was first suggested as imply a thought experiment by Milton Friedman (1969), but has since taken on a life of its own. It is a way of describing the distribution of newly created money directly to the general public instead of through the financial system. Especially with the rise of interest in CBDCs (European Central Bank 2020; Bank for International Settlements 2020), which would make such a distribution practically costless is this an interesting question.

One motivation for pursuing a digital currency is to enable lower interest rates, to overcome the “zero lower bound” on interest rates (Goodfriend 2000; Agarwal and Kimball 2019), and even

enable negative interest rates. To do this, it is necessary to limit alternatives to bank deposits such as cash. A CBDC could be controlled, so people could not hold more than a set amount of euros in this form and were forced to spend the rest or put it in the bank despite a negative interest rate on deposits. If this was pursued, greater amounts of money would be held in the form of bank deposits and the banks could continue expanding credit without regard to their depositors. In effect, it is an attempt on the part of the central bank to extend control over the loose joint in the credit creation process, that is, the depositors, who until now have had to be induced to hold bank money by greater convenience, interest payments, or some other perceived benefit to the account holders. With a CBDC, people would have only the choice between spending their money and, beyond whatever amount of CBDC each person was allowed to hold, putting it in the bank.

Another possibility is that the central bank will assume direct control of the money supply by issuing a CBDC, a process referred to as credit disintermediation. Why hold bank money if you earn no interest on it and all the same conveniences can be had from holding digital currency?

What will be the consequences of a large increase in the money supply airdropped into each person's cash holding? The nominal wealth of everyone will go up by the amount of helicopter money each person receives, but beyond that it depends on people's spending patterns. If it is a one-time cash infusion not expected to be repeated, people will likely not change their value scales. The new money will be spent on whatever good or service was previously submarginal to them, that is, ranked just below the marginal good a person did buy on his value scale. This is likely to be either some luxury item or perhaps investment in financial assets. The result is higher incomes for the providers of luxury goods and higher prices for financial assets. There are no clear consequences for agriculture in this case.

If the spread of helicopter money is ongoing, things change. Now that people expect to regularly receive new money, they will rearrange their expectations and value scales accordingly. Inflationary expectations will develop, as people spend the new money on current consumption. Consumer prices will rise in proportion to the infusion of money in this way.

Agricultural output prices are likely to rise along with all other prices. If the processes described above are ongoing, this rise in prices will only reinforce them. Farmers will receive higher nominal revenues, but they will still be squeezed in the same manner and there will still be a tendency toward concentration and financialisation.

9.6. Conclusion

We have in this chapter examined what consequences the introduction of a fiat money system have had for European agriculture. Drawing on the theoretical foundations laid in previous chapters, we have found that the trend toward capital-intensive, large-scale farming to a large extent is explained by monetary factors. Specifically, the working of the Cantillon effect (Sieroń 2019) under these conditions have systematically led rational farmers to overinvest in capital goods which in turn led to increasing physical productivity. As farmers face inelastic demand, this led to a fall in revenues, especially in the income to farmers from land, and farms therefore had to become larger and larger to become viable. This process, which has been described as financialisation and the technological treadmill, is not a simple consequence of modern capitalistic farming, but tied to the monetary system.

We have limited the chapter to studying European conditions, but the same process is likely to occur in other countries with similar monetary institutions which enable banks to earn seigniorage on loans to business.

10. Conclusion

We have in this dissertation examined the determinants of the structure of agriculture and agricultural firms and the causal influence exerted by money production on agricultural organization. Our findings underline the importance of monetary institutions for the changing shape of the economy.

However, it is important to stress that our focus on money does not mean that other factors and especially other interventions do not play a major role in shaping the evolution of modern agriculture. The limitation of our study is that we must ignore all these other factors as we try to trace out the importance of money and monetary interventionism. The real world, of course, does not present us with simple, mono-causal relationships which we can easily identify to test or apply our theories. Every economic phenomenon is the result of multiple factors and the share of each cause in producing it can only be assessed by the investigating economist or historian.

That said, our narrow focus on money enabled us to highlight some important, hitherto neglected, causal connections. By first examining how agriculture would evolve under a natural order of money production, that is, market-provided commodity money, we saw that the small or medium-sized family farm would naturally be the dominant organizational form. Economic development, whether in the form of technological change, population growth or net savings (by far the most important case), does not change this outcome. In a progressing economy, farmers would naturally adapt to the increased availability of capital for investment by rearranging their production structure, on the margin shifting to longer production processes with a higher-valued output. An increase in the production of basic foodstuffs would only happen if demand for it increased, that is, it would be a response to population growth.

We also saw that the financing needs of farmers can primarily be served out of their own savings or direct investments from family or capitalists. Despite the capital requirements from the large proportion of land used in farming, external financing in the form of bank loans is not a necessary prerequisite for the financing of capitalistic farming. This was underscored by our study of Danish agriculture under the gold standard, as we saw that despite the process of credit expansion making credit relatively cheaper, farmers still mainly financed new investments out of their own revenues. This was true even of the last decade before the Great War when credit was at its cheapest, suggesting that the discipline imposed by the gold standard limited the attractiveness of going into

debt. Monetary savings was still a viable and widely used source of capital, even if most monetary savings was in the form of money substitutes, primarily bank deposits.

With the elimination of commodity money after the Second World War, this changed. Reviewing the literature on financialisation, we suggested that it is this basic change in how money is created that leads to greater dependence on external financing. Debt is privileged above savings and equity because banks can now systematically offer cheaper loans, while the abolition of the gold standard means that monetary savings is no longer a viable form of savings. The lower quality of fiat money and fiat money substitutes as compared to gold means that the purchasing power of money is continuously eroded. Thus, both the demand for and the supply of loanable funds increase, and the attractiveness of alternative sources of capital decline.

This results in two processes of deformation of agricultural organization. First, financialisation sets in, as new investment is increasingly financed with loans. The status of the farmer as owner of his enterprise is eroded, as his equity progressively disappears. Over time, the logic of financialisation makes farmers more the manager taking directives from the suppliers of capital rather than independent owners. This can be phrased in Schumpeter's phrase about the "evaporation of the substance of property", but it is clear that it is a result of unbridled credit expansion and monetary disorder, not the natural evolution of capitalism, as Schumpeter thought.

Second, the flow of new investment also changes. Instead of leading to longer, more value-productive production processes, the illusion of new capital in the form of increased bank credit leads farmers to invest in capital goods used in shorter-term production processes. The result is overproduction of basic goods which, per Engel's law, must lead to a fall in farm revenues. Farm bankruptcies or closures and the concentration of agricultural capital – primarily land – on fewer farms. This process, known in the literature as the technological treadmill, is thus shown to have its origins in a monetary system privileging the use of bank money and other forms of credit.

We have only tangentially touched on other interventions in agriculture. Since such interventions are ubiquitous in contemporary Europe, it might well be asked whether these could not explain the changes in European agriculture that we have examined. The Common Agricultural Policy (CAP) of the EU intervenes both in the form of detailed regulations of farming and in the form of massive subsidies, so it clearly is not irrelevant to the economic reality of the farmer. However, the more direct interventions of the CAP do not have the systematic consequences that we have seen flow from credit expansion and monetary debasement in the modern monetary system. Subsidies lead to increased capital values, but they do not privilege one source of capital over another, although they

do increase the collateral available to the farmer. Regulations are a burden on the farmer and increases his costs, but they too don't have systematic consequences.

Rather, we would tentatively suggest that modern intervention in agriculture is, at least in part, motivated by a desire to alleviate the consequences of fiat money but without comprehending their true source. Thus, early price intervention, insulating European farmers from the world market, was an attempt to prop up falling farm revenues stemming from the technological treadmill. Environmental regulation may, at least partly, be the result of concern with real environmental degradation. If farmers are less concerned with protecting environmental values, this is caused by their greater need for increasing cash flow and servicing debt; protecting the environment, which might otherwise have given many farmers great psychic satisfaction, is simply too expensive, as it might jeopardize their ability to earn enough to service debts and acquire new credit from banks and other financial providers.

There is general concern with the disappearance of family farming, the expanding role of finance, and the environmental impact of farming. If all these perceived problems are, at root, the consequences of the way money is created in the modern world, how might they be alleviated? The easy answer is to say that the monetary system must be reformed. Remove the cause of the disease and the economic order will in short order heal. Returning to the discipline of a market-based commodity standard would be the simplest and most effective reform. Here is not the place to suggest if or how this could realistically be achieved, a question economists have examined in depth. Suffice it to say that the general conclusion is that such a reform is still possible and desirable on other grounds as well (Huerta de Soto 2020, 715–812; Hansen 2020).

Only one point will be made here concerning such a reform: can it be done in one country in isolation, or is the constitution of the global monetary system such that only a global reform would be possible, or at least only a reform in a large area such as the EU or the U.S.? In other words, would the same processes not continue in the agriculture of one isolated country returning to the gold standard, as foreign capitalists would be willing to finance domestic farmers cheaply? While it is true they would be willing to do so, the appreciation of the new gold money of the reforming country would largely nullify the availability of artificially cheap credit. On the one hand, since money could be expected to appreciate, monetary savings would again become attractive, reducing the demand for credit, including foreign credit. On the other hand, loans would have to be paid back in appreciating currency (or the farmers would have to exchange appreciating currency on the foreign exchange market), which further reduces the attractiveness of borrowing money, since the borrower will have to forego not only the interest payments but also the appreciating capital sum.

The credit market in the reforming country would be limited to commodity credit, and while we should expect a lively credit market, it would in all likelihood be of secondary importance.

Other effects of interventionism would still affect the reforming country, since its farm products would be sold on the world market. To the extent that the world market was affected by the monetary system predominating in the rest of the world, this would also have consequences for the one country now on the gold standard. Thus, the greater physical productivity in the production of basic foodstuffs engendered by cheap credit leads to lower world market prices for staples like wheat than they otherwise would have been. This is a fact of which all farmers will have to take account. But this simply means that, unable to produce wheat at competitive prices and cut off from sources of artificially cheap credit, farmers would have to market alternative products. More than likely, they would return to the pattern of longer, more extensive production processes, as the capital and land-intensive production of wheat was simply too expensive. Investment in farming would return to the proportions dominant in the 19th century and earlier, instead of chasing ever-higher short-term yields.

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Titre : Les systèmes monétaires et l'organisation de l'industrie : le cas agricole

Mots clés : systèmes monétaires, économie agricole, financiarisation, interventionnisme

Résumé : Cette thèse traite de l'importance des systèmes monétaires pour le développement de l'agriculture. Nous examinons d'abord l'ordre libre de la production monétaire, puis nous expliquons en détail la forme et le développement de l'économie agricole dans ces conditions. Nous analysons la demande de produits agricoles ainsi que la nature et l'importance des facteurs de production dans l'agriculture. Nous examinons aussi comment les caractéristiques propres à l'agriculture déterminent les dimensions optimales des entreprises agricoles et quels changements l'épargne et l'investissement nets entraînent dans la structure de production agricole.

Sur cette base, nous examinons ensuite l'importance de l'interventionnisme monétaire. Il existe une importante littérature sur la financiarisation, que nous examinons de manière critique.

Nous montrons comment la création d'argent par le système bancaire moderne est la cause fondamentale de ce processus financier. Nous examinons ensuite les conséquences de ce processus sur l'organisation de l'agriculture. Le processus connu sous le nom de "tapis roulant agricole" est expliqué en référence aux investissements alimentés par le crédit bancaire.

Ensuite, nous appliquons notre théorie à quelques cas historiques : l'un sous l'étalon-or classique et l'autre dans les développements européens de l'après-guerre. Nous voyons clairement comment la création monétaire par les banques et de la monnaie fiduciaire émise par les gouvernements provoque les processus de déformation analysés dans les chapitres précédents.

Title : Monetary Systems and Industrial Organization : The Case of Agriculture

Keywords : monetary systems, interventionism, agricultural economics, financialisation

Abstract : This thesis deals with the importance of monetary interventionism for the development of agriculture. We examine first the free market order of money production and then give a detailed account of how the agricultural economy looks under these conditions. In particular, the demand for agricultural products and the nature and importance of economic land and of the other factors of production in agriculture is analyzed. We also examine how features specific to agriculture determine the optimal firm size and how net savings and investment lead to changes in the agricultural structure of production.

With this background, we then go on to examine the importance of monetary interventionism. There is a large literature on financialisation which we examine critically, and we show how money creation through the banking system is the fundamental cause of this process. We then discuss what consequences this has for agricultural organization.

The process known as the "agricultural treadmill" is explained with reference to credit-fuelled investment.

In the final chapters we apply our theoretical framework to some historical cases: one under the classical gold standard and the other European developments in the post-war era. We see clearly here how it is the combination of money creation by banks and fiat money issued by governments that causes the processes of distortion analysed in the previous chapters.

In the conclusion we suggest some possible remedies to the systemic distortions.