Intrahousehold Allocation of Time and Consumption during Hard Times

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INTRAHOUSEHOLD ALLOCATION OF TIME AND CONSUMPTION DURING HARD TIMES

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Preface

This thesis includes the three following research articles:

- 'Intra-Household Coping Mechanisms in Hard Times: the Added Worker Effect in the 2001 Argentine Economic Crisis', *GATE Working Paper No. 1424*, submitted to *Economic Development and Cultural Change* (april 2015).[1]
- 'Initial Conditions and Lifetime Labor Market Outcomes: The Persistent Cohort Effect of Graduating in a Crisis' (2014).
- 'Crisis at Home: Mancession-Induced Change in Intrahousehold Distribution' (2015).[2]

From three complementary viewpoints, this dissertation evaluates the extent to which the individual decision-making is shaped by the economic environment at the time of decision, both directly, and indirectly through the effect of an adverse shock affecting the life partner. Since every chapter deals with a particular issue, the three chapters can be read separately. The two first chapters provide empirical evidence respectively on short-term and long-term effects of the Argentine economic crisis on labor market choices and outcomes. Chapter 1 deals with temporary, coping labor supply adjustments between life partners. Chapter 2 accounts for investment decisions in human capital along the business cycle, and measures the effects of the depressed economic environment at time of graduation on the income profile later in life. Chapter 3 offers a complementary view to Chapter 1. Using the case of Spain during the Great Recession, it evaluates the consequences of an adverse economic shock on the respective share accruing to each spouse within the household.

[1] The first results regarding the research question raised by this article were published in the single-authored article 'Stratégie familiale de gestion des chocs : l'offre de travail des épouses en réponse aux fermetures d'entreprise en Argentine (*Revue Économique*, 65, 2014), with a different sample and estimation strategy.

[2] Inspired by an article co-written with O. Bargain.

Préface

Cette thèse comprend les trois articles de recherche suivants, rédigés en langue anglaise :

- 'Intra-Household Coping Mechanisms in Hard Times: the Added Worker Effect in the 2001 Argentine Economic Crisis', *GATE Working Paper No. 1424*.[3]
- 'Initial Conditions and Lifetime Labor Market Outcomes: The Persistent Cohort Effect of Graduating in a Crisis' (2014).
- 'Crisis at Home: Mancession-Induced Change in Intrahousehold Distribution' (2015).[4]

À partir de trois points de vue complémentaires, cette thèse de doctorat évalue dans quelle mesure la prise de décision individuelle est structurée par l'environnement économique prévalant au moment de la décision, à la fois directement, et indirectement à travers l'effet d'un choc sur un autre membre du ménage. Puisque chaque chapitre s'intéresse à un aspect particulier de cette question générale, les trois chapitres peuvent être abordés séparément. À partir d'une enquête-ménage menée par l'institut national argentin de statistiques INDEC, les deux premiers chapitres présentent des résultats concernant les conséquences de la crise économique argentine sur les décisions de participation et les profils de revenu du travail des individus sur les court et long termes. Le chapitre 1 traite des ajustements de court terme qui interviennent entre époux sur le marché du travail suite à la crise économique de 2001. Le chapitre 2 rend compte des décisions d'investissement en capital humain le long du cycle économique entre 1995 et 2012, et mesure les effets d'une situation économique dégradée lors de l'obtention du diplôme sur le profil de salaire et l'employabilité au cours de la vie. Enfin, le chapitre 3 offre une approche complémentaire au chapitre 1. Utilisant des données de consommation espagnoles collectées par l'institut national de statistiques INE durant la crise économique de 2009, le chapitre évalue les conséquences d'un choc économique négatif sur la redistribution des ressources au sein du ménage.

[3] Les premiers résultats liés à cette question de recherche ont donné lieu à un article : 'Stratégie familiale de gestion des chocs : l'offre de travail des épouses en réponse aux fermetures d'entreprise en Argentine (*Revue Économique*, 65, 2014), avec un échantillon et une méthode d'estimation différents.

[4] Inspiré d'un article co-écrit avec O. Bargain.

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General Introduction

Time is a finite resource available to each and every human being in the limit of twenty-four hours per day, over the course of his life. Unlike other scarce resources, like capital, or land property, time is an equally distributed resource, and the choices in the allocation of time largely determine the welfare of individuals and their families.

According to the neoclassical vision of the rational choice theory, the decisions made by the economic agents rest on a couple of fundamental assumptions: agents are forward looking and time consistent, they have rational preferences between outcomes that are identified and valued on the basis of full information, and they always allocate their resources so that they maximize the utility they derive from these allocation choices. From the point of view of the economist, over the course of their life, all the choices made by individuals essentially boil down to three broad categories: the allocation of time between labor and leisure, consumption decisions, and investment decisions. In order to decide, individuals reason at the margin: for each potential additional unit (of hour supplied, of good consumed) they balance the gains (wage, satisfaction) and the costs (opportunity cost of leisure, price) to choose the combination of labor supply, consumption and savings that maximize their utility along their life cycle.

Certainly, the rationale choice theory has met serious criticism in the field of sociology with the concept of *habitus*, as well as in economics with the concept of *bounded rationality*. Still, solid and repeated empirical evidence confirms that this theory remains a fruitful theoretical framework to understand the decision-making process, under a variety of economic and social circumstances. Indeed, as noted by Becker (1964), the strength of the framework lays in its looseness: 'It is a *method* of analysis, not an assumption about particular motivations. [...] I have tried to pry economists away from narrow assumptions about self-interest. Behavior is driven by a much richer set of values and preferences.'.[5]

[5]Nobel Lecture, December 9, 1992.

From the perspective of the individual, it would be unrealistic to ignore the fact that the infinite variety of individual motivations, as well as the incommensurate possibilities for bundles of goods and services is constrained by the environment in which the individuals are born and evolve during their life. This environment provides the individuals with a certain level of *capabilities* (Sen, 1979), and exposes them to a certain degree of *vulnerability* (Blaikie et al., 2004). Indeed, the access to basic vital services, to education, as well as to capital markets is not equally distributed across individuals. To reason in Sen (1979)'s terms, individuals have a limited access to *functionings* and consequently have a restricted *capability* because of institutional barriers or market imperfections. Among the components of capability, the concept of equal opportunities has raised an increasing amount of attention.[6]

The social, cultural, and economic context is thus heterogeneous across the different cultural and social groups, and imposes constraints on choices. In addition to their environment, forward looking individuals involved in intertemporal decision-making face at best a risky environment, and in the worst case scenario live in a fundamental uncertainty regarding future realizations. Every individual around the globe is thus vulnerable to adverse shocks – health shocks, food insecurity, income shocks, civil unrest, natural catastrophes – to some degree, which can also have dramatic long-term social, and economic consequences.

The present work aims at analyzing various aspects of the individual decision-making in the presence of unexpected, adverse aggregate shocks which dramatically modify the economic environment of agents. Unlike idiosyncratic shocks, aggregate shocks impose themselves over individuals, and the idea that aggregate shocks are exogenous to individual choices is at the core of the estimations. The consequences of adverse aggregate shocks on households in terms of poverty and vulnerability have been repeatedly documented. Far less has been said on the intrahousehold mechanisms driving the responses to adverse shocks, as well as on the intrahousehold redistribution happening in the aftermath of an adverse shock. The contribution is essentially empirical, and builds on two examples of important economic downturns: the Argentine crisis of 2001-2002, and the Spanish economic crisis during the Great Recession of 2009.

Chapter 1 concentrates on the *labor allocation* of married women in the context of the Argentine crisis. Chapter 2 models the *time allocation between schooling and market production* along the Argentine business cycle, with the idea that the outcome of this trade-off may

[6]See Roemer and Trannoy (2015) for a review on equality of opportunities, and de Barros et al. (2009) for an overview of equal opportunities in Latin America.

differ according to the state of the economy at time of graduation. Chapter 3 relies on the *allocation of resources to consumption* of Spanish couples during the Great recession to infer the consequences of the Great Recession on the intra-household redistribution.

The three chapters have a very different time scope with respect to the distress event. The first chapter deals with the immediate adjustments following the economic downturn on the labor participation of working-aged women engaged in a relationship. *Coping* with shocks at the level of the household appears to be a strong explanatory factor for the participation inflow of married women during an economic crisis, and the average compensation allowed by this additional workforce is substantial. The second chapter concentrates on the *long term* negative consequences of graduating in a depressed economy. The study focuses on individual choices and outcomes. Even in emerging economies, where the labor market is acknowledged to adjust rapidly to the fluctuations of the business cycle, adverse aggregate shocks are found to have important, long term quantitative and qualitative implications for the income flow and employment probability of 'unlucky' cohorts of graduates. Finally, the third chapter sheds light on the *consequences* of the Great Recession on the redistribution of resources between spouses within households in Spain. The 2009 economic shock, symptomatically referred to as a 'mancession', mostly affected men's outcomes on the labor market, and as such represents a historical, exogenous shift in the gender relative opportunities on the labor market. The chapter relies on this shift to empirically assess the importance of relative economic opportunities on the bargaining power and resource sharing between spouses, which are at the core of the theoretical collective models.

0.1 Shocks and Allocation Decisions

0.1.1 How to Define Negative Shocks?

A negative shock is an 'adverse event that leads to a loss of household income, a reduction in consumption and/or a loss of productive assets' (Dercon et al., 2005). A shock is the materialization of a risk, which probability of occurrence was more or less accurately anticipated. The IMF defines an exogenous macroeconomic shock as a deviation from a 'normal', expected situation (Fritz-Krockow and Ramlogan, 2007): a shock is 'a sudden event beyond the control of the authorities that has a significant negative impact on the economy' (p.36). Every individual is exposed, and vulnerable to adverse shocks to some degree. The scope

of shocks varies in time – from temporary to persistent – and space – from idiosyncratic to aggregate.

0.1.1.1 By Origin

Shocks are commonly listed using four broad categories (UN, 2014). *Environmental shocks* relate to natural disasters, the effects of the climate change, or biological hazards. Solely in 2013 and 2012, more than 200 million people around the world, most of them in developing countries, were hit by natural disasters (Hoyoisand et al., 2013). *Health shocks* reduce income inflows, and raise household expenses. For instance, Raman and Bjorkman (2008) report that in India, more than 40 percent of hospital patients either borrow money or sell assets to access health services, and that close to 35 percent fall into poverty because of having to pay for care expenses. *Civil unrest* also has pervasive effects on human development. The World Health Organization estimates that about 4,400 people die every day because of intentional acts of violence (WHO, 2002). Armed conflicts have direct and indirect consequences on welfare by limiting access to the basic services and undermining trust. Lastly, *economic crises* have been a recurrent phenomenon, and examples of aggregate shocks abound: the currency crisis in East Asia in 1998, the 2002 crisis in Argentina, the financial crisis in 2008, the Euro crisis in 2009. Economic shocks have dramatic consequences on poverty rates and income insecurity, both in the developing and in the industrialized countries. In developing countries, where the macroeconomic volatility is important, and where a large proportion of the active population is employed in the informal economy, economic shocks generally translate into a jump in the poverty rate. In 2014 in Latin America, the self-employed account for 35% of the employment and 20% of the wage earners (excluding domestic services) have no social security coverage (ECLAC/ILO, 2015). In the eventuality of an aggregate shock, the scarcity of social safety nets leads to tremendous increases in poverty. For instance, in the Great Buenos Aires area, the 1986 economic crisis raised the poverty level from 10 to 20%, and the period of hyperinflation raised the level again from 25% to 34% (Lustig, 2000). Furthermore, during the 2001 crisis, Fiszbein et al. (2003) note that poverty increased dramatically in a six month window, from 38.3% in October 2001 to 53% in May 2002. Of course, the economic vulnerability does not only concern the developing world: many industrialized countries continue to face high levels of income insecurity. In 2014, six years after the outburst of the

Great Recession, unemployment is still higher than 10% in France and Italy – and higher than 25% in Greece and Spain, with rates around 50-60% for the young people (OECD, 2014a).

0.1.1.2 In Space and Time

In space – While health shocks generally affect individuals and households, natural disaster or armed conflicts typically affect a larger amount of population. A shock can occur at the micro level, and and is referred to as 'idiosyncratic' (e.g. illness); at the community level (e.g. civil unrest); or at the national or international level (e.g. natural disaster, or macroeconomic shocks), in which case it is designated as 'covariant' or 'aggregate'.

From a microeconomic perspective, studying the consequences of idiosyncratic shocks is not an easy task. Indeed, the victims of such shocks are generally not randomly hit. The causal inference is complicated by the presence of sample selection.[7] By contrast, a first important feature of aggregate economic shocks is that although they are produced by the sum of concrete individual choices, their effect transcend the individual preferences and choices. For this reason, economic crises are more likely to have exogenous properties than idiosyncratic shocks. Another related distinguishing feature of economic crises and other kinds of aggregate shocks is that many individuals are simultaneously affected. Is it more difficult for households to mitigate aggregate shocks as opposed to idiosyncratic ones? Can households access the same set of coping strategies in both cases? A consequence of covariant shocks is that many of the informal risk management and coping strategies are less effective (Morduch, 1999), especially when the insurance or coping mechanism is community-based, like microfinance or health insurance schemes. In this perspective, the coping strategies displayed during an aggregate shock can be seen as lower bounds for the coping that would be available to the households, had an idiosyncratic shock randomly hit a few of them.[8]

In time – Another characteristic of shocks is their frequency, intensity and persistence over time. Shocks can be transitory (e.g. a loss of remittances), persistent, or may even have permanent impacts. For example, small shocks such as transient illness are easier to cope with than chronic diseases. Indeed, based on Indonesian data, Gertler and Gruber (2002) find that households can smooth their consumption level in 70% of the cases when the shocks are frequent but small, but this number shrinks down to 30% in cases of serious health shocks

[7] For instance, Martinoty (2014) studies the effect of the husband's unemployment on his wife's labor supply in Argentina using plant closures as an exogenous cause for job displacement.

[8] This view must be handled with caution. Typically, help from neighbors and charity are enhanced by the crisis situation, as shown in Özerdem and Jacoby (2006) for the case of earthquakes in Japan and Turkey.

with long term effects. If shocks persist, or have a covariant dimension, coping is more difficult. Using panel data from Pakistan, Alderman (1996) shows that successive shocks make consumption smoothing more difficult than single shocks do. In Turkey during the Great Recession, the competition increases drastically in the informal sector, with a massive inflow of women sellers on the streets (UNICEF, 2010). Finally, even short-lived shocks can have adverse effects in the long-run. In Philippines, Glewwe et al. (2001) show that child malnutrition is correlated with a lower school achievement. Using data on birth weight during the 2001 Argentine crisis, Bozzoli and Quintana-Domeque (2014) show that children born after the economic turmoil were significantly lighter. They find this difference to be caused by the maternal stress for the whole population of women, and additionally by adjustments in food consumption for the poorest households. A recent, but growing body of literature studies the long term impact of graduating in a recession on labor outcomes later in life. Most studies find a persistent (Oreopoulos et al., 2012), and sometimes even permanent wage or employment penalty associated to the timing of graduation (Kahn, 2010). Long term health outcomes are also affected by the timing of graduation, as demonstrated by Garrouste and Godard (2014) with cohorts graduating before and after the oil shock of the 1970s in Britain.

0.1.2 How do Aggregate Economic Shocks Affect Household Welfare?

Natural or weather-related catastrophes affect households through the destruction of physical capital as well as human capital. In contrast, economic crises affect the households' well-being through a range of different channels. Skoufias (2003) enumerates four generic categories, namely: i) a decrease in income flows, related to a decrease in the labor demand, as well as a decrease in the wage rate of employed individuals ; ii) a change in relative prices, due to cuts in price subsidies for basic food articles, or to a devaluation of the domestic currency affecting the terms of trade ; iii) a cutback in the existing public transfers ; iv) a change in the value and the return of assets, such as land property, which can be determinant when prices of commodities explode.

In return, the exposure to adverse shocks shapes the decision-making process of individuals in a number of ways. Risk management strategies cover all the prevention and mitigation strategies implemented by the household prior to the adverse shock, and the coping solutions available to them after the risk materializes (Skoufias, 2003). For this reason, the economic

literature on coping strategies usually stresses out the distinction between *ex ante* risk-coping and *ex post* shock-coping mechanisms (Alderman and Paxson, 1992). Risk management strategies can be implemented at the individual or household level, at the community level, and in the case of formal arrangements can be market-based or publicly provided (WB, 2001).

Risk-coping includes all the formal and informal mechanisms developed by the households in the eventuality of a crisis: the storing of goods for future consumption, the informal borrowing and lending, the income diversification (through the choice of crop, or a second job), mutual community insurance schemes, kinship arrangements through marriage, or the access to the financial market. For instance, according to the precautionary saving hypothesis, namely the fact that households save to self-insure against uncertainty, the risk of displacement and drops in real income are an important determinant of household saving decisions. From a theoretical point of view, this prediction comes from the life-cycle or permanent income model, originated by Modigliani and Brumberg (1954), and Friedman (1957), where one of the motives for savings is to care for 'rainy days'. Household formation itself is partially motivated by insurance against shocks. Households appeal to livelihood diversification, i.e. the process by which they construct a diverse portfolio of activities and social support capabilities in order to survive (Ellis, 1998). Because households allow for income diversification, insurance is one of the traditional functions of marriage (Gong, 2011).

The literature on *shock-coping* strategies is large. Though response mechanisms vary greatly according to local specificities and types of shock, they can be summed up into three categories (see e.g. Snel and Staring (2001) or Lokshin and Yemtsov (2004)). *Adjustment strategies* consist in modifying consumption patterns, selling assets or allocating more time to home production. In Zimbabwe, individuals responded to drought by selling cattle in a consistent way with long term livestock accumulation objectives (Kinsey et al., 1998). During the 1998 financial crisis in Russia, middle and lower class households decreased their consumption of normal goods (Lokshin and Yemtsov, 2004). In the aftermath of the 2001 Argentine economic crisis, individuals allocated a larger amount of their leisure time to shopping activities, with the aim to track down information on available goods and best prices (McKenzie and Schargrodsky, 2011). *Network strategies* rely on the social capital accumulated by individuals. For instance, sharing a network with family or friends who migrated enables an individual to cash in remittances during hard times (Mohapatra et al., 2012), and also facilitates own migration. In Botswana, urban migrants keep their former rural network and

assets as a safety net against uncertain urban prospects (Krueger, 1998). Informal insurance between households also allows for a monetary or non-monetary redistribution, as in the case of US, where young actives move in and out of the parental home depending on labor market risks (Kaplan, 2012). Finally, *active strategies* regroup labor market oriented strategies, like double shift jobs, informal secondary occupation, or selling of home production. For example, in rural India, Kochar (1999) shows that individuals switch from farm to off-farm activities with climate shocks.

Similarly to risk management strategies, shock-coping decisions taken at the intra-household level are more flexible than the set of strategies available to a single individual because households are assumed to pool their resources in time and income. This is particularly the case for market-oriented strategies. Indeed, single individuals can only increase their labor supply at the intensive margin. On the opposite, households can extend their labor supply by having one or more extra members entering the labor market.

0.1.3 Two Case Studies

Studying the allocation choices formulated by individuals exposed to an adverse unanticipated aggregate shock requires an analysis based on a case study. The present work relies on two aggregate shocks exhibiting relevant specificities, namely, the 2001 economic crisis in Argentina, and the Spanish economic crisis in the context of the Great Recession. The essential elements of context regarding these two profound adverse economic shocks are presented below.

0.1.3.1 Argentina's Economic Situation in the Nineties

Argentina is an upper-middle-income country (World Bank 2009), ranking as 'high' in UNDP's Human Development Index (UNDP 2009). Since Videla's dictatorship, Argentina's economic history has experienced five distinct phases: the *Golden boys* era (1976-1982), the Austral era of President Alfonsin (1983-1989), the Currency board era of President Carlos Menem (1991-1999), its collapse under the Presidency of Fernando de la Rua (1999-2002), and the recovery under Nestor Kirchner Presidency (2003-2007). These phases coincide with changes in the political leadership, and the concordance of the political and economic agenda is no coincidence. Indeed, each period is marked with an economically ambitious set of

reforms, which eventually ends in a social and political debacle from which an alternative leadership emerges.

Golden Boys (1976-1983) – Argentina has made no exception to the *lost decade* experienced by Latin American economies throughout the 1980s: in 1990, the GDP had decreased by 7.25% with respect to its 1980 level. Indeed, during the dictatorship (1976-1983), the doctrine of the *Chicago boys* had extreme consequences on poverty, unemployment, and led to the debt crisis. Together with the debacle of the war against the UK over the Falkland Islands, the debt crisis led to the transition to democracy.

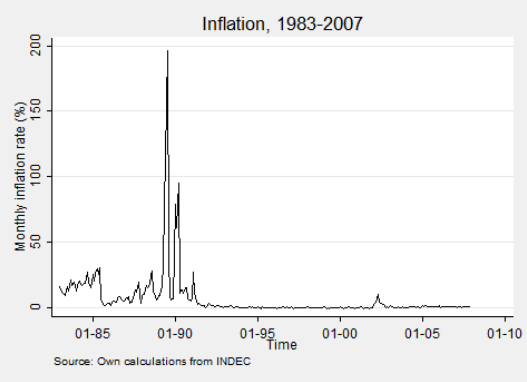
Austral Era (1983-1989) – The Presidency of Raul Alfonsin (1983-1989) from the *Radical* party coped with the disastrous economic situation by creating a new money, the Austral, and by taking anti-liberal measures, such as the strict control over prices. The economy eventually stabilized after 1985 and the Plan Austral, but the Presidency ended tragically with the bank run and the traumatic episode of hyperinflation of 1989. Figure 1 displays summary statistics since the end of the dictatorship in Argentina. As displayed on Figure 1a, in July 1989, the monthly inflation rate reached 200%.

Currency Board Era (1991-2001) – Forced to resign, President Alfonsin was replaced by the *Peronist* Carlos Menem in July 1989. After several months of failed attempts to contain the inflation rate, Menem followed the recommendations of what would become the 'Washington Consensus'. Under the Minister of Finance Domingo Cavallo, the inflation, which had been Argentina's plague for decades, was contained with the currency board decided in March 1991 and implemented shortly after. According to this monetary stabilization measure, the Argentine peso was irremediably pegged to the dollar, following a 'one to one' exchange rate. In parallel, a series of measures were undertaken in order to ensure the credibility and sustainability of the new exchange regime. The beginning of the 1990s witnessed massive waves of privatization of public owned companies, and measures of liberalization of trade and of the labor market.

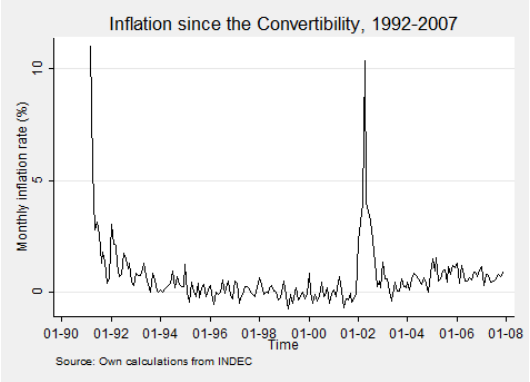
During the 1990s, Argentina took up with growth again. As displayed on Figure 1c, with the exception of the contagion of the Mexican 'Tequila' crisis in 1995, the Argentine economy grew at the annual rate of 5-10%. The trust in the domestic currency was restored: whereas prices had been growing by 1300% between January and December 1990, in April 1991, inflation shrinked to 5.5% monthly, and the annual inflation rate was reduced to 25% by

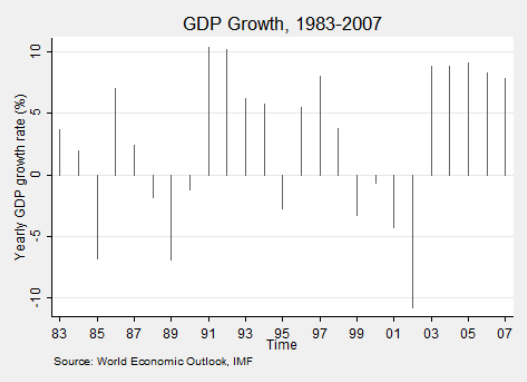
Figure 1: Argentina: Economic Indicators

(a) Monthly Inflation Rate, 1983-2007

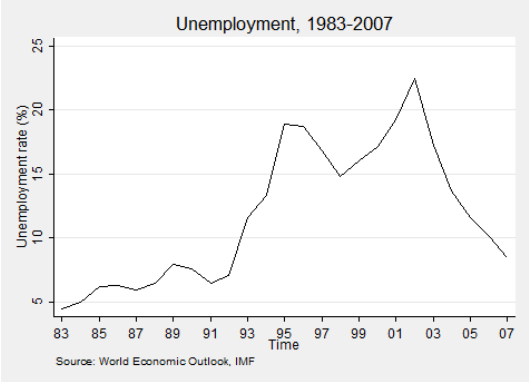


(b) Inflation since Currency Board





(c) Annual GDP Growth Rate, 1983-2007



(d) Unemployment, 1983-2007

April 1992.[9] The liberalization and privatization measures came at costs of a growing unemployment, as documented in Figure 1d: even excluding the Tequila crisis, the unemployment rate doubled in a decade, from less than 7% in 1991 to 15% in 1998. However, overall, Cavallo gained a huge popularity among the middle class.

Collapse of the Currency Board (Nov. 2001-Jan. 2002) – From 1999 onward, a combination of external and internal factors made it increasingly difficult for an Argentina in moderate recession to sustain the Convertibility regime. Internal fiscal and institutional weaknesses, as well as international factors related to the Russian financial crisis, the US monetary policy and the currency devaluation in Brazil led to a first phase of destabilization, where shocks were arguably perceived by households as idiosyncratic.[10] Nonetheless, throughout the difficulties, Argentina was repeatedly financially backed by the IMF. The situation suddenly escalated from October 2001 onwards: the popular Domingo Cavallo had been re-installed as Minister of Finance under the presidency of Fernando de la Rúa with the aim to contain the economic crisis. However, his highly unpopular *corralito* measure – consisting in freezing banking accounts to limit possibilities of a bank run – and the sudden stop to the Argentine financial support decided by the IMF a few days later triggered the social, political and economic collapse of December 2001.

The massive protests of December 20 and 21 led President Fernando de la Rua to resign. The vice president had resigned in October 2000 due to bribery suspicions, and in accordance with the Constitution, the new President Rodriguez Saá (Governor of San Luis) was elected by the Legislative Assembly among the Province Governors. During the last week of 2001, the Rodriguez Saá administration defaulted on the larger part of the public debt, eventually lost support from its own political party, and had to resign. The Legislative Assembly met again and appointed the Peronist Senator Eduardo Duhalde. In January 2002, the peso–dollar parity that had been in place for ten years was abandoned. An official exchange rate was fixed at 1.4 peso per dollar, and the highly unpopular 'pesificación' measure stated that all bank accounts denominated in dollar would be converted to pesos at the official rate. As a consequence of the end of the currency board, the inflation rate rose instantaneously from 0 to 10% monthly, as pictured on Figure 1b. Under this crisis scenario, recession reached 10% of GDP (see Figure 1c) and the unemployment rate peaked at 22% of the active population (see Figure 1d). The deep downgrade of Argentine economic indicators took economists by

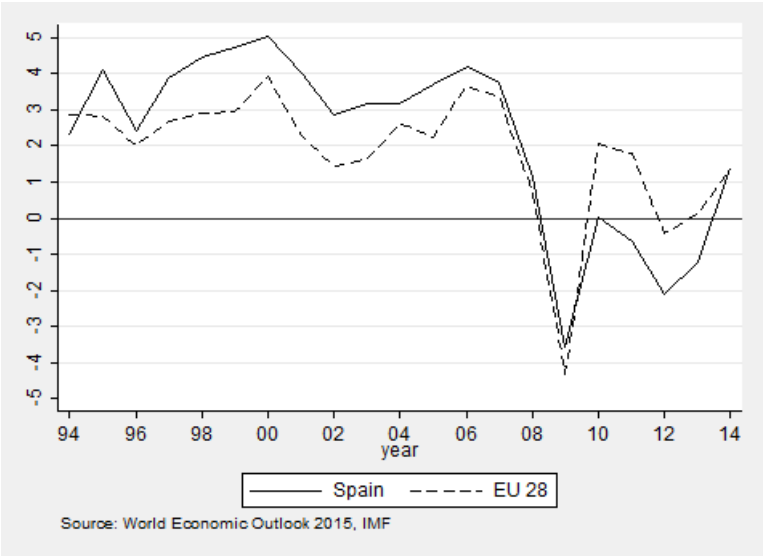
[9] Source: INDEC, Direccion de Indices de precios de consumo.
[10] For a detailed analysis, see e.g. Fanelli (2002).

surprise. In October and November 2001, most predictions were optimistically announcing a zero growth or a moderate recession (McKenzie, 2004).

0.1.3.2 The Great Recession in Spain

Suprime and Housing Markets – Resulting from low US interest rates and from the high sovereign wealth funds accumulated by China, the global liquidity bubble generated a run-up in housing prices during the 2000s. At first, housing markets contributed to a sustained economic activity. During the nineties, and most of the years 2000, Spain experienced an above-average growth rate in the European Union, as visible on Figure 2, namely a 2.3 to 5.0 % yearly growth rate between 1994 and 2007. However, housing markets soon overheated, and opened the way to the world deepest financial crisis since the 1930s – the Great Recession. In the US, the real housing price per dwelling almost doubled between January 2000 and June 2006. Another example is Spain: during 2002-2007, more housing units were built than in France, Germany, and the UK altogether ; simultaneously, the real price of the squared meter exploded: by June 2008, it had reached 250% of its 2000 value.[11] The collapse of the US subprime mortgage market shook the world economy to the core. In December 2011, US dwellings had lost more than 30% of their value. In Spain, the real estate market experienced a similar decline: with the outburst of the housing bubble, the price per squared meter decreased sharply, and stabilized at 30% of its peak value, exhibiting no sign of recovery.

Figure 2: Spain: Economic Growth



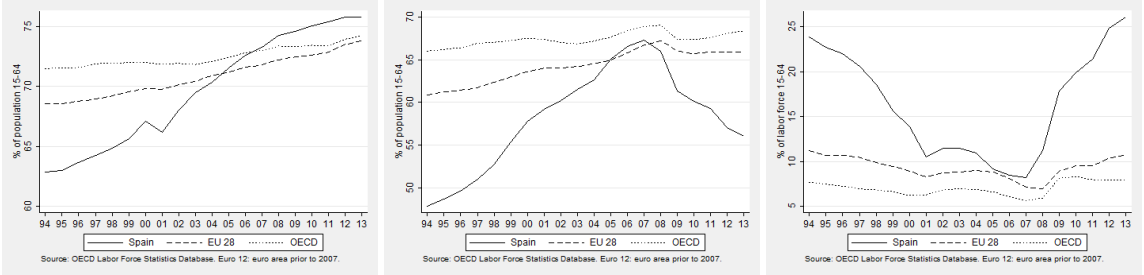
[11] Sources: National sources, BIS Residential Property Price database.

Euro Crisis – What started as a financial crisis rapidly morphed into a real economy crisis. The credit crunch experienced by banks and the negative wealth effect experienced by consumers had a serious, negative impact on the economic activity. In Spain, after ten years of rapid growth, the GDP decelerated (+1.12%) in 2008. In 2009, Spain entered a recession of unprecedented depth and length: -3.57% in 2009, +0.02% in 2010, -0.62% in 2011, -2.09% in 2012 and -1.23% in 2013. The Spanish recession was triggered by the global crisis, but the crisis exacerbated the adjustments related to the current account imbalance and the high indebtedness of the households and enterprises. For this reason, although the Spanish recession was similar to other advanced economies in terms of real GDP in 2009 – as visible on Figure 2 – it led to a longer recession, accompanied by a much higher unemployment rate, and a sharper deterioration in government finances (OECD, 2010).

Labor Markets – The economic crisis deeply affected labor markets around the world. By the end of 2009, unemployment hit just under 10% in the United States, which was more than double the 2007 rate of 4.6%. In the Euro area, the rise was milder: unemployment increased from 7.3% to 10.1% between 2007 and 2010. However, the so-called 'German miracle' was a notable exception. In some other countries, the rise in unemployment was significantly larger. In Spain, the yearly labor income of households decreased by about 2600 euros per person between 2008 and 2012.

As displayed on Figures 3a and 3b, along with the rapid economic growth before 2009, Spain had experienced a long period of employment growth. Figure 3b displays the rapid catch-up operated by the Spanish labor market with respect to the other countries of the euro zone. As a results, Figure 3c shows that the unemployment rate had been cut from 25% to 8%.

Figure 3: Labor Market in Spain 1994-2013

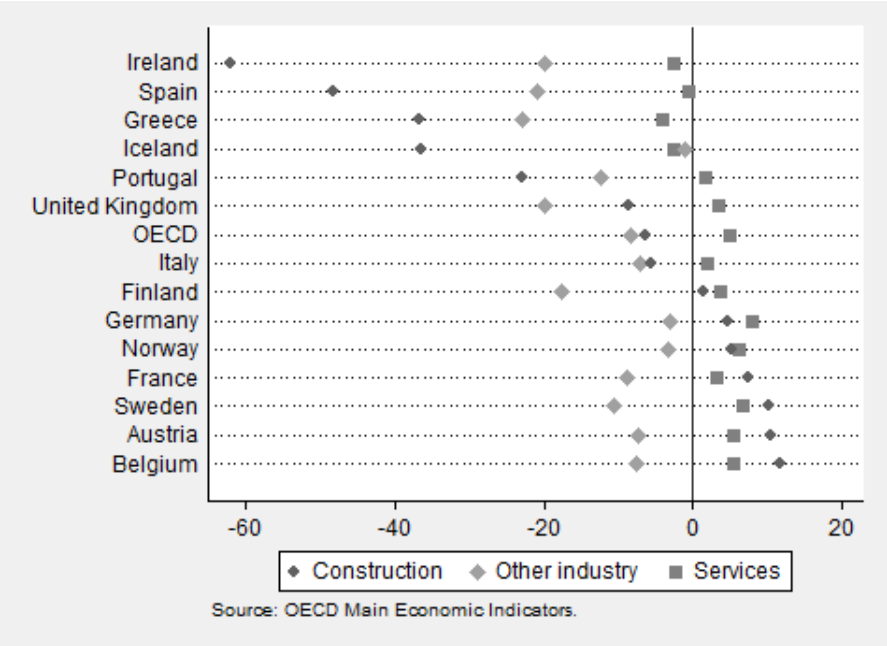


(a) Participation Rate **(b)** Employment Rate **(c)** Unemploment Rate

By contrast, between 2007 and 2012, Figure 3c show that the unemployment rate rose from 8.8% to 25.0%. In fact, between 2007 and 2013, Spain accounted for more than the half of the rise in unemployment of the entire Eurozone: with 54% of working-age adults actually on the job, the employment rate is the third-lowest among thirty-four OECD countries (OECD, 2014b).

As displayed on Figure 4, in Spain, the effect of the economic crisis on employment is widely spread across the different economic sectors, with construction and some manufacturing sectors being most hit. The heterogeneity of the effects of the crisis between regions reflects in fact the specialization of the different regions in the construction sector and other related services such as banking or real estate.

Figure 4: Change in Total Employment 2007-2011, by OECD Country and Sector



0.2 To What Extent does the Workforce of Secondary Workers Respond to the Economic Crisis?

As reported by Mincer (1962) or Killingsworth and Heckman (1986), female labor supply has been increasing steadily during the last century. From this standpoint, three topics are particularly relevant: the role of the family, the allocation of time between market, non-market activities, and leisure, and the heterogeneity of human capital and available jobs.

Labor supply adjustments are an important component of the market-oriented strategies aiming at coping with adverse shocks. The study of the 'added worker effect' clearly relates to the role of the family. To what extent does the does the marriage work as an insurance against adverse economic shocks? What is the main motivation for shifts in labor supply: subsistence, variations in relative labor market opportunities of household members, or an income diversification in situation of perceived higher risk? Does the labor supply of other family members allow for a compensation of the income loss?

0.2.1 What are the Theoretical Conditions for an Added Worker Effect to Arise?

Originally, the concept of 'additional worker' was coined by Woytinsky (1940a) in the aftermath of the Great Depression:

> *by 'additional worker' is meant the person who is on the labor market because of the unemployment of the usual breadwinner in his family and who otherwise would not be seeking work.* (p.1)

Since its origins, the concept created a controversy (Woytinsky, 1940b). Does a theoretical model predict the existence of the 'added worker' effect? The main take-away from the economic theory is that the added worker is incompatible with the life cycle and permanent income theories, unless the hypothesis of perfect information is relaxed.[12]

0.2.1.1 A Static Model of the Household Labor Supply

In static models (Killingsworth and Heckman, 1986), households act as if their decisions today were unrelated to their future economic environment, or their asset accumulation. The model of individual labor supply is extended to a family setting by postulating that the household is a single decision-making unit maximizing a twice-differentiable quasiconcave utility function $U(.)$ depending on leisure L and consumption C of all members. The value of total consumption PC is constrained by the total family income – i.e. the sum of the exogenous family income R and labor income of each member i W_iH_i:

[12] This holds within the broad family of unitary models. In collective models (see e.g. Chiappori (1992)), the participation decision is endogenous to the bargaining process.

$$U = U\left(L_1, L_2, ...L_n, C\right) \tag{1a}$$

$$PC \leq R + \sum_{i=1}^{n} W_i H_i \tag{1b}$$

The FOC maximizing (1a) subject to (1b) are:

$$U_{L_i} \geq \mu W_i \text{ (if } U_{L_i} > \mu W_i \text{, then } H_i = 0) \tag{2a}$$

$$U_C = \mu P \tag{2b}$$

$$PC = R + \sum_{i=1}^{n} W_i H_i \tag{2c}$$

where U_{L_i} and U_C are partial derivatives with respect to leisure and consumption, and μ is the Lagrangian multiplier standing for the household's marginal utility of income.

The income of the household head can be affected in different ways. He can experience a loss in hourly income, a reduction in the number of hours worked, or even a displacement. In the static model, all these configurations reduce the relative value of his spouse's non-market time, and as such foster a reallocation of the labor supply within the couple toward the spouse. However, the opportunity cost of leisure decreases as the economic opportunities worsen. If the income shock affecting the household head is aggregate, then the added worker effect may be mitigated by an income effect, better known as a *discouragement effect*. Since the additional labor supply provided by the spouse is one out of many options for a household to adjust for a loss in income, its importance is linked with the availability of alternative coping strategies.

0.2.1.2 A Life-Cycle Model of the Household Labor Supply

In a life-cycle model, labor supply should only respond to a decline in permanent income (MaCurdy, 1981). The transitory component of income should not come into play. The added worker effect does not show up in such a theoretical framework. If uncertainty is introduced into the model, MaCurdy (1985) shows that labor supply can vary even in the presence of temporary shocks, because these shocks convey information and impact the marginal effect of wealth across periods. In short, the life-cycle modeling under uncertainty extends the

standard static, deterministic models introducing life-time and randomness through the marginal utility of wealth (MaCurdy, 1985, Stephens, 2002). The static budget constraint is replaced by an asset accumulation path constraint. The Lagrange multiplier does no longer represent the marginal utility of income but the marginal utility of wealth. Finally, uncertainty is introduced into the model by allowing the marginal utility of wealth to follow a stochastic process over the lifetime.

Assume a household composed of two working-aged individuals. The household utility is quasi-concave, and depends on consumption C, working hours of its two members H^j, $j = h, w$ and shifts in preferences Z. Typically, taste shifters for labor-leisure trade-off include children as observed variables, or health status and taste for work as unobserved variables: $Z_{it} = X_{it} + v_{it}$. The price of the consumption good is normalized to 1. The household utility in a life-cycle setting depends of present and future values of C, H^j and Z. For tractability, utility separability in time is assumed. At age t, the household optimization program is:

$$\max U_t = E_t \left[\sum_{s=t}^{T} \delta^{s+t} U_s(C_s, H_s^h, H_s^w, Z_s) \right] \tag{3}$$

For simplicity, the model realistically assumes T to be known by agents. The maximization is subject to a budget constraint described by the time path of asset accumulation and a terminal condition:

$$A_{t+1} = (1 + r_{t+1})(A_t + B_t + W_t^h H_t^h + W_t^w H_t^w - C_t) \tag{4a}$$

$$A_T \geq 0 \tag{4b}$$

with A_t the real value of assets in t, B_t the non-labor, non-asset income, W_t^j the hourly wage rate for household member $j = h, w$, and Y_t the household non-labor income.

Under dynamic programming, expression (3) is reformulated as the consumer's value function.

$$V(A_t, t) = \max U[(C_t, H_t^h, H_t^w, Z_t + \delta E_t[V(A_{t+1}, t+1)]] \tag{5}$$

At age t, consumers in the household choose their values of C and H^j subject to (4a). First order conditions yield:

$$\frac{\partial U}{\partial C}\left(C_t, H_t^h, H_t^w, Z_t\right) = \lambda_t \tag{6a}$$

$$-\frac{\partial U}{\partial H_t^h}\left(C_t, H_t^h, H_t^w, Z_t\right) \geq \lambda_t W_t^h \tag{6b}$$

$$-\frac{\partial U}{\partial H_t^w}\left(C_t, H_t^h, H_t^w, Z_t\right) \geq \lambda_t W_t^w \tag{6c}$$

$$\lambda_t = \delta E_t[(1 + r_{t+1})\lambda_{t+1}] \tag{6d}$$

The first three conditions are similar to the static labor supply case, with the important distinction that λ_t now describes the marginal utility of wealth at age t. Following equation (6a), at age t, the household chooses its consumption level so that the last unit consumed costs as much as giving up a unit of savings. Conditions (6b) and (6c) reveal which quantity of labor will maximize the household utility, the preference for leisure being allowed to vary across family members. If the inequality holds strictly for member j, his entire time $\bar{L}$ is allocated to leisure. Euler equation in (6d) describes the allocation rule for wealth across the life-cycle under uncertainty. Households determine their labor supply, consumption and savings in order to equalize the marginal utility of wealth λ_t in current period t with the expected discounted value of marginal utility of wealth in $t + 1$.

What are the consequences of a negative shock of W_t^h on H_t^w? When a household head experiences a negative shock on his earnings W_t^h, his spouse's labor supply first reacts through a cross-wage effect implied by (6b) and (6c): holding λ constant, the wife responds to a change in W_t^h. The sign of this adjustment is ambiguous, because it depends on leisure complementarities between spouses. In addition, under uncertainty, the labor supply of the wife responds to another argument: λ, according to a wealth effect described in (6d). Indeed, under perfect certainty, λ simply summarizes all information about lifetime wages and property income outside the decision period that a consumer needs in order to determine his optimal current consumption and labor supply. Changes in consumption and working hours exclusively depend on evolutions in real wage rate, real interest rate, or in taste shifters. By definition, no wealth effect on the labor supply of married women is observed, since the life cycle wage profile is known by households (MaCurdy, 1981). Under uncertainty, unanticipated shocks are introduced through the marginal utility of wealth, which now follows a stochastic process. Variations in the marginal utility of wealth λ_t conveys information on these unanticipated shocks to the household's optimization decision process through the

saving allocation rule given by equation (6d). According to (6d), expectations of the future value of the marginal utility of wealth is equal to the present observed value: households revise their expectations for the next period by taking into account their forecasting errors realized at t. These forecast errors are assimilated to unanticipated shocks, having impacts on future expected wages, non-labor income or taste shifter variables (Dynarski and Shefrin, 1987). For example, an unexpected decrease in wages between $t-1$ and t leads the household to compute his actualized λ_t from anticipated value $E_{t-1}[\lambda_t]$ and realized forecast error. Assuming concave preferences, a decline in wealth generates a revision of the marginal utility upwards for future period $t+1$. In return, this impacts positively the labor supply of married women. The magnitude of the positive effect depends on the expected consequences in terms of future income flows, and the probability that the household had anticipated this shock Stephens (2002). The higher the expected consequences and the lower the perceived probability of the negative shock, the higher the resulting AWE.

0.2.2 Is There an Empirical Evidence of an AWE?

0.2.2.1 The AWE in the Literature

Two distinct types of applied studies emerged in the attempt to test the AWE hypothesis. Time series allow for the study of correlations in trends between female participation and business cycles. These studies generally favor the *discouraged worker* hypothesis over the AWE in times of economic depression, declining job and wage opportunities crowding women out of the labor force (Tachibanaki and Sakurai, 1991, Darby et al., 2001). However, macro studies focusing on developing countries offer a much more nuanced set of results. For example, studying Latin American countries between 1965 and 1987, Cox-Edwards and Roberts (1994) find that the AWE is significant in low-income countries, present but not significant in middle-income countries, and absent in the richest group of countries like Argentina or Chile. More recently, Bhalotra and Umana-Aponte (2010) investigate cyclicality in women's labor supply for 63 developing countries between 1986 and 2006. Interestingly, they find that the within-country relationship of women's employment and income is, on average, negative in Asia and Latin America, suggesting that part of the developing world exhibits different, specific responses to economic cycles.

A improved understanding of the labor supply mechanisms at stake within households requires the availability of microdata. Correspondingly, a second broad set of studies con-

centrates on the determinants of female participation at the extensive margin (Lundberg, 1985, Bingley and Walker, 2001, Bhalotra and Umana-Aponte, 2010, Gong, 2011) and the intensive margin (Heckman and Macurdy, 1980, Cullen and Gruber, 2000, Stephens, 2002). Early, seminal studies study (Mincer (1962) establish that a *transitory* shock on the labor market outcomes of the spouse does impact the labor supply of his wife, and that this impact outreaches the one stemming from a *permanent* income shock. Using a small panel data of monthly employment histories of families from Seattle and Denver, Lundberg (1985) studies the employment transition probabilities of spouses, and finds a small but significant added worker effect for white families, the rationale being that the reservation wage of women whose husband is unemployed is lower. However, other studies fail to discover any significant effect (e.g. Layard et al. (1980) on UK data; Pencavel (1982) and later Maloney (1991) on US data). On panel data, Heckman and Macurdy (1980) find that there is no relationship between husband's annual hours of unemployment and wives annual hours of work.

By contrast, the recent developments in the literature on AWE (Bingley and Walker, 2001, Stephens, 2002, Gong, 2011) find substantial added-worker effects. Using information on unemployed workers in the Panel Study of Income Dynamics (PSID) between 1968 and 1992, Stephens (2002) finds small pre-unemployment effects and large, persistent post-unemployment effects : in the long run, the increase in one spouse's labor supply compensates 25% of her husband's lost income. Analyzing heterogeneity in the AWE, he further states that wives with low income husbands are less likely to supply more labor. Using seven waves of data from the HILDA Survey between 2000 and 2007, Gong (2011) studies the labor supply responses of married women to their spouses' job loss in Australia. He finds a significant AWE in terms of actual and desired hours worked. The probability of wishing an increase in hours worked is 4.9 percentage points higher for women with recently unemployed partners than for other women in couple.

Several explanations have been put forward to explain the variety of results. First, the diversity of results reflects the underlying variety of definitions behind the concept of AWE. Lundberg (1985) is the first to express her concerns with the fact that definition of AWE itself could drive the results. In particular, she insists on the absolute necessity to take into account that the AWE is necessarily a temporary reaction, impossible to detect when using yearly average working hours. Indeed, an certain number of early studies focus on the labor force participation of individuals with unemployed partners, and do not

distinguish between partners who experienced recent job losses or long term unemployment; nonetheless, in a life-cycle perspective, the difference is quite important since income losses are not necessarily unexpected and can have been anticipated by the household. Moreover, once the unemployment spell begins, the job search may take some time to be effective, thus be difficult to spot in the very short run (e.g. Stephens (2002)). A second crucial timing aspect in determination of the AWE is related to uncertainty: is the AWE a shock-coping strategy in response to actual losses faced by the household, or rather a coping mechanism against perceived risks? Indeed, as exposed in Section 0.2.1.2, in situation of uncertainty and market imperfections, individuals revise their anticipations using present information on the labor market, thus blurring the line between risk- and shock-coping behaviors. For example, Cerrutti (2000) shows that what drives Argentine women into the labor market during the 1990s is less the job loss of their husband than the higher instability in their husband's employment status. Secondary workers' labor supply acts as an insurance scheme rather than a safety net.

Another candidate to explain the apparent incoherence of results between countries is the generosity of the unemployment benefits, which can crowd out the added worker effect (Cullen and Gruber, 2000, Bentolila and Ichino, 2008). More broadly, the magnitude of the AWE depends on several additional factors. To begin with, the magnitude of the AWE will depend on the alternative adjustment strategies available to the household, and whether they can be substitute or complements. The imperfection of markets for credit is also an important point in so far a constrained access to liquidity impedes the consumption smoothing through borrowing (Bingley and Walker, 2001). Last, under uncertainty, the unemployment shock can be perceived as a new information about the negative lifetime income prospects (Dynarski and Sheffrin, 1987).

Finally, the literature also stresses out the increasing attachment of women to the labor force. It is possible that part of the divergence in the results are explained because women are more or less attached to market activities. Getting more and more similar to men's, the labor supply of married women would become less and less elastic to their own wage rate and the one of their spouse (Juhn and Potter, 2007).

0.2.2.2 The AWE in Argentina

Between 1960 and 2010, the female labor market participation increased in Latin America. Argentina made no exception to this trend: 31.4% of women aged 15-59 participated on the labor market in 1970, 50.2% in 1990 and 53.8% in 2000 (Wainerman, 2000, CEPAL, 2002). What are the factors driving this increasing trend?

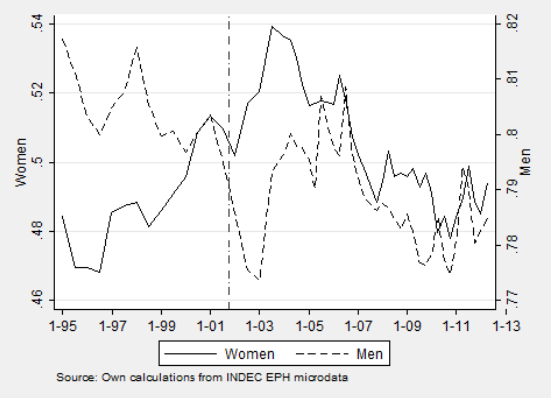
Traditionally, explaining the changes in married women labor market participation relies on a series of hypotheses (Blau and Kahn, 2007). A first general explanation rests on exogenous shocks: better wage and employment opportunities naturally raise the labor supply at the extensive and the intensive margin along the labor supply function. Another explanation lies in deep structural and cultural changes within societies, including investment in schooling, or fertility and the demographic transition. In this case, though individual labor supply curves do not necessarily shift, changes in characteristics at the aggregate level shift the aggregate labor supply curve. Labor supply changes at the aggregate level reflect those compositional changes, without each characteristic having necessarily increased or decreased its influence on the labor supply decisions of individuals. Finally, individual labor supply curves can shift due to changes in unobserved preferences, like gender roles or other unmeasured factors.

Historically, the traditional, dominant family model in Argentina is the patriarchal family organization inherited from successive immigration waves from Christian Europe. In comparison to other Latin American family models, the typical Argentine family received little influence from indigenous and African family models where women work more on average (Rico and Maldonado Valera, 2011). During the 1967-1985 period, a decrease in fertility, combined with an increase in female education and a shift in the sectoral composition towards services were the three main standard factors explaining the dramatic increase in female labor market participation (Cox-Edwards and Roberts, 1994). After the hyperinflation of 1989 and the subsequent neoliberal adjustments over the 1990s, the observed increase in female labor supply essentially concerned married women with low education attainment (MTEySS, 2005). This apparent rupture with the traditional patriarchal model did not cause a radical revolution in gender inequalities. Indeed, the time allocated to market activities added up to the traditional housework and home production (Esquivel, 2006, Cerrutti, 2011). In addition, at equal education attainment, the unemployment and wage gap kept on favoring men over women (MTEySS, 2005, Novick et al., 2008). With the aim of understanding these

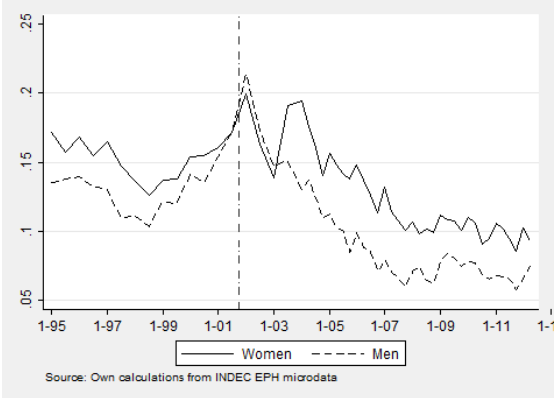
counter-intuitive trends in female labor supply, the AWE hypothesis has triggered interest in the past. While the hypothesis of the added worker was repeatedly invoked as an important driving force for female participation (MTEySS, 2005), the attempts to weight the importance of this particular factor with respect to more traditional, long term economic factors remain scarce.

Figure 5a to 6b display various trends of the labor force over the 1995-2012 period. On each figure, the vertical dashed line marks the December 2001 events. Figure 5a depicts the participation and unemployment rate for men and women during the period 1995-2012. Between 1998 and 2002, the participation rate of men clearly declined, and from an original 82% shrank to 77% of the male working age population. Simultaneously, the participation rate of women, which had first peaked in 1995, rose by 5 percentage points – eventually reaching 54% during the second half of 2003. This time window coincides with the depressed phases of the business cycle, displayed above on Figure 1c. The inflow of female participants thus exceeds the discouraged women, while the reverse holds for men. In addition, as visible on Figure 5b, the excess inflow of female new entrants did not necessarily end up unemployed. During the 2001-2002 events, the unemployment rate faced by female labor suppliers was lower than the male rate, so that the originally lower unemployment rate of men caught up with the unemployment rate of women.

Figure 5: Labor Force in Argentina 1995-2012, by Gender



(a) Participation Rate (16-60)



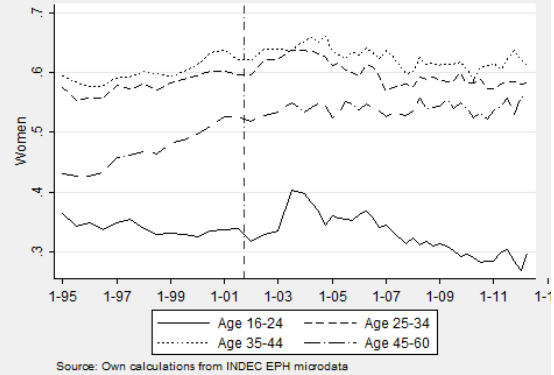
(b) Unemployment Rate (16-60)

Figure 6 focuses on the female labor force, and analyzes the participation rate for various subgroups. Figure 6a displays the participation rates for different age categories separately. Throughout the end of the nineties, the participation rate of women aged 45-60 experienced the most important increase. However, in the aftermath of the December 2001 events, women

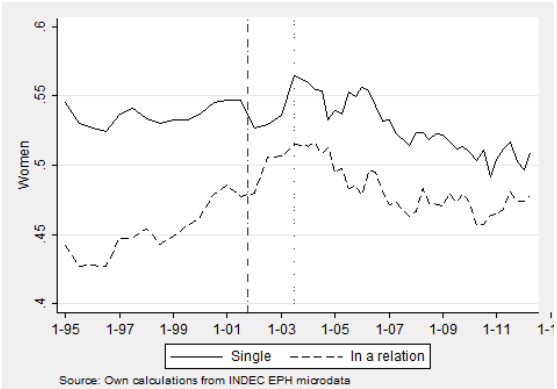
aged 25-34 were most responsive. Figure 6b depicts the participation trend of women according to their family status. Unsurprisingly, over the whole period of observation, married women are systematically less likely to be involved in the market production. However, during the nineties, and until 2003, the increase in female participation was almost entirely driven by married women. Interestingly, the participation rate of single and married women are always positively correlated, with the exception of the crisis event. Women in couple participate more in 2002, while single women seem to shy away from the bad economic opportunities. On the opposite, after the end of the 'abnormal times' in 2003, the outflow of married women clearly exceeds the new entrants; for single women, the pattern is not as established.

Figure 6: Participation Rate of Argentine Women 1995-2012, by Subgroups (16-60)

(a) By Age Category



(b) By Family Status



At the aggregate level, Figures 5 and 6 support the view that the participation of women is driven by a substantial added worker effect. Empirically, only two papers explicitly examined the potential role of such a determinant in the Argentine context. The most convincing piece of evidence is provided by Cerrutti (2000). She concentrates on the 1993-1995 liberalisation period of the Argentine economy. Using panel data to study entries into and exits from different occupational statuses over a restricted period of time, she investigates the effect of husband's changes in employment status on married women labor participation. Within this framework, she shows evidence of a substantial AWE: spouses with husband changing occupational status have 1.9 more chance to enter the labor market with respect to wives whose husband does not change status. However, her specification does not account for the effects of the decline in earnings, which is a main source of loss in earnings on the 1998-2002 period (McKenzie (2004)). Furthermore, it is not clear whether the correlation occurs through

joint preference for leisure or shock-coping. A comparative analysis by Lee and Cho (2005) confronts household coping responses during the Korean and Argentine crises. However, their results based on simple aggregate correlations do not allow for a causal interpretation. So far, no empirical study has assessed the magnitude of the AWE using data on the 2002 economic crisis in Argentina.

To measure the magnitude of the AWE in a convincing empirical framework is the aim of Chapter 1 in the dissertation. One of the predictions of the theoretical model underlying the estimations is that the larger the expected probability that the shock will be deep, the higher the adjustment in female labor market participation. Indeed, the shock proved to have deep, long lasting labor market consequences. This is precisely the object of Chapter 2.

0.3 Consequences in the Short and Long Run: Investment in Education, Labor Market Outcomes Later in Life

An important strand of literature is dedicated to measuring the immediate welfare impact of abnormal times. Under the hypothesis that markets are flexible enough, recoveries should witness a comparable amount of adjustments, so that the economic indicators eventually return to a 'normal' level. Typically, the concept of the 'added worker' effect rests under this logic. Indeed, the flipping side of the coin is that added-workers should withdraw from the labor market once the time of recovery has come and the subsistence level has been guaranteed to the household.

However, the existence of a 'cohort effect' casts doubts on the fact that adverse shock exclusively have temporary impacts. The two early studies reporting a 'cohort effect' on wage profiles are Baker et al. (1994) and Beaudry and DiNardo (1991). Beaudry and DiNardo (1991) are among the first to relate the cohort effect to the unemployment rate. Baker et al. (1994) study personnel records from a firm over a 20 year span. One of the important stylized facts is the existence of a 'cohort effect', namely, that the average wage of a cohort years after entry depends on the average wage of this cohort upon entry. Composition effects of the cohort cannot account for the average wage differences across cohorts.

In labor economics, the 'cohort effect' is a widely studied stylized fact which has raised an increasing amount of attention. Studying the permanent, or even persistent impact of graduating in a recession is both appealing and challenging, because this object encompasses

both very short term and long term considerations regarding the impact of adverse economic shocks. In the very short term, individuals account for the business cycle to decide whether or not to invest in the next schooling level. In the longer run, although the labor market adjusts at each period, current wages and employability still correlate with wages and employability at time of graduation, so that very short term decisions have long lasting consequences. At the end of the day, the observed stylized fact according to which wages differ from one cohort to the next along the business cycle at time of graduation encompasses two effects: a short term adjustment in response to an economic crisis, and longer run mechanisms allowing the initially temporary impact to persist.

0.3.1 Short Run: Schooling vs. Working

0.3.1.1 In Theory

The theory of human capital investment indicates that enrollment depends on an important number of factors. The analysis of the determinants of schooling and activity dates back to Walsh (1935), who considers that individuals invest into schooling until the return to an additional investment unit equates the returns for other investments. Seminal contributions by Mincer (1958), Becker (1967) and Ben-Porath (1967) further investigate the mechanisms at stake behind the decision to invest in human capital. For Mincer (1958), all individuals have the same ability, and the cost of schooling is simply the opportunity cost associated to inactivity, so that the model cannot account for the heterogeneity in schooling investments. By contrast, Becker (1967) provides a static framework allowing for different schooling investments to arise. He confronts a downward sloping demand for education, where the decreasing marginal return represents the intellectual limitations of the human brain, to an upward sloping supply curve defined by the marginal costs of education. Because the determinants of the return to education and costs associated with schooling vary, the investment in education will differ across individuals. Ben-Porath (1967) transposes this setting to the dynamic context, where investment in education is a time allocation issue. He introduces intertemporality into the model by assuming that individuals maximize the discounted lifetime earnings. Willis and Rosen (1979) empirically estimate a model of schooling investment encompassing the elements of Becker (1967) and Ben-Porath (1967) models, and confirm that the decision of attending college is strongly influenced by the expected earnings over the lifecycle. Overall, human capital models thus suggests that

the schooling decision depends on three categories of factors (Card and Lemieux, 2001): individual-level variables such as family background or neighbourhood effects; aggregate-level variables such as interest rates or the wage gap between education degrees; and finally market-level variables such as the unemployment rate.

As exposed in Rees and Mocan (1997), the relation between the business cycle and school investment is an open empirical question. Going back to Becker (1967), individuals oppose the opportunity cost of schooling to the lifetime flow of expected earnings. If 'normal earnings' are depressed by a small fraction for a short period of time, then the individuals who were planing to graduate actually find it more attractive to re-enroll. A negative correlation between the propensity to drop out of school and the unemployment rate can arise, because individuals defer leaving school when the unemployment is high and the starting wage is low (Duncan, 1965). On the other hand, the literature on child labor formulates a 'subsistence' hypothesis (Jacoby and Skoufias, 1997, De Janvry et al., 2006, Duryea et al., 2007). Schooling investment is decided by the entire family: if family members enter the labor market to compensate for the job loss of the primary earner, then high levels of unemployment could be associated with high levels of dropouts, especially from older children.

0.3.1.2 Empirical Evidence

Theoretically, it is thus not clear how an increase in the local unemployment rate affects the drop-out rate. On the empirical side, the evidence is mixed, but several papers suggest that individual education choices depend on the business cycle. Results thus tends to give credit to the human capital motive over the subsistence motive. Betts and McFarland (1995) discover a strong, positive correlation between the local unemployment rate and community college enrollment in the US. In England, Clark (2011) estimates to 15% the share of increase in post-mandatory education due the poor labor market conditions during the 1990s. By contrast, some papers hardly find a correlation at all. For example, in their attempt to explain why the steadily increasing college enrollment rate became flat in the 1970s, Card and Lemieux (2001) examine the local employment conditions and find that the doubling in the male unemployment rate generates a 1 percentage point increase in enrollment for the 17 year-old individuals. Along the same line, also using US data, Rees and Mocan (1997) investigate the relation between the dropout rates and the business cycle using district level data from New York State between 1978-1986. The results indicate that a slack labor market

has a moderate discouragement effect for the students to drop out from high school: the dropout rate decreases by 2% for each additional percentage point increase in the local unemployment rate. Using data from US census in 1988 and 1990, Warren and Lee (2003) ask whether the local labor-market opportunities influence high school dropout. Controlling for socio-demographic and academic variables at the individual level, they find that dropout rates do not vary significantly across labor markets. Most recently, using CPS data for 1994-2010, Johnson (2013) finds that the enrollment for graduates is counter-cyclical for girls, but acyclical for boys. The economic conditions are expected to play an even more important role for households living in emerging economies, where tuition fees can be important, and the returns to schooling uncertain because of an important heterogeneity in the quality of schooling. Indeed, in rural China, Yi et al. (2012) show that dropping out correlates with poverty, poor academic performance, but also with rising opportunity costs: the junior high school students from rural areas tend to be pulled away from their studies by rising wages for low-skill jobs in coastal provinces.

The existing evidence suggests that the effect of the business cycle on schooling decision can be non-negligible. The question is whether a theoretical model can account for the potential sizable effect of temporary business fluctuations on the investment into schooling. Indeed, the opportunity costs alone cannot reasonably account for the magnitude of the counter-cyclicality reported by Clark (2011) or Yi et al. (2012). The literature has come up with additional theoretical channels. Card and Lemieux (2001) recall that current school enrollment decisions will be more responsive to variations in the wage opportunities if re-enrollment is feasible (which is credible, though not without a hurdle cost). Indeed, it creates space for exploiting the short term fluctuations in the opportunity cost of schooling. In their theoretical model, Oreopoulos et al. (2012) suggest that youngsters undervalue the future, so that the opportunity cost of schooling weights more in the schooling/working trade-off than the economic calculation predicts. An alternative to the myopic argument relies on the fact that they may as well compute their expected lifetime earnings taking into account the business cycle. Indeed, common knowledge suggests that unemployment is durably scarring. The possibility that young people anticipate the negative effects of graduating in a recession on the future earnings should not be discarded.

0.3.1.3 Dealing with the Endogeneity Issue

If the timing of graduation is endogenous to the business cycle, then the long lasting impacts of adverse economic shocks could simply reflect a change in the composition of the cohort. This issue has been raised by Bils (1985) and Blundell et al. (2003). It is widely acknowledged that participation incentives are positively correlated to wages. On aggregate wage data, the latter show that changes in aggregate variables can be misleading if the cohort composition effect is not taken into account.

In spite of the importance of taking into account the compositional effect, the literature on long lasting impacts seldomly implements a methodology to solve the endogeneity of the graduation timing. Kahn (2010) instruments the unemployment rate at time of graduation with the year of birth. Stevens (2008) concentrates on the graduates from vocational training, arguing that the graduation year is exogenous to the business cycle because the specialization happens at the age of 10. Nakagawa (2013) relies on a bivariate probit with partial observability as developed by Farber (1983) and Tunali (1986) that she transposes to the case of schooling endogeneity. Employment gaps between the own and the next schooling degree is the exclusion restriction of the sample selection model. In fact, evidence suggests that pupils use the available current information on labor market outcomes for different graduation levels to make their education investment decisions. For instance, Beffy et al. (2012) examine the determinants of the choice of college major in France when the length of studies and future earnings are uncertain. They exploit variations across the French business cycle in the relative returns to majors. Even if the causal relation is very low, and suggests that non-monetary factors play an important role in the education investments, the choice of major is responsive to information on expected earnings in the corresponding field.

0.3.2 Long Run: Explaining the Persistence Puzzle

0.3.2.1 Measuring the Persistence

Overall, the literature on US and Canadian data reports persistent effects of entering the labor market in a recession, as opposed to entering during a flourishing economy. In his paper on PhD economists from seven programs in the US, Oyer (2006) uses macroeconomic conditions as an instrument variable for initial placement. He shows that the initial quality and type of the first job influences the long-term job characteristics in the academics. Similarly, concentrating on MBA graduates from Stanford between 1960 and 1997, Oyer (2008) uses

stock market conditions at graduation as an instrument for the first job. The premium associated with the employment in the financial sector is high relatively to other jobs, so that MBA students graduating in times of a recession earn substantially less than their luckier counterparts of previous and next cohorts. Similarly, Kahn (2010) focuses on US male college graduates between 1979-1986 and follows their labor earnings until 2006. Accounting for ability scores, she finds that recession periods have a permanent effect on individuals' wages. Relatively to the luckiest cohort graduating in 1989, graduates from previous years experience a persistent wage loss of up to 13% each year. The impact lasts for the first 20 years of a new entrant's career. Mansour (2009) also focuses on college graduates in the USA and finds negative, persistent wage effects. In addition, failure to account for endogenous sample composition underestimates both the immediate wage effects as well as the persistence of wage effects resulting from initial labor market shocks. Oreopoulos et al. (2012) document the magnitude and possible sources of long term earning losses associated with the initial labor market conditions at time of graduation using an employer-employee matched dataset recording earnings and employment situation of students graduating between 1976-1995 for a 20 year period. The effects are not permanent, but persistent: the main model indicates that a 5 percentage point increase in the unemployment rate at time of graduation is related to a 9% earning loss in the first year after graduation, with the effects fading away only after 9 years of potential experience. Schoar and Zuo (2011) explore the factors explaining the career and management style of CEOs. They find that an important determinant for career and management style is the initial state of the economy at career start. CEOs who start in recessions manage smaller firms, receive lower compensations, and are more likely to follow a within-firm than between-firm career track. In addition, the initial conditions upon entry durably condition the management style towards more conservative decisions.

Due to the fundamental differences between the labor markets in the US and in Europe, studies focusing on European case studies rather concentrate on low skilled workers and employability issues. Using Norwegian data, Raaum and Røed (2006) show that labor market conditions at the time and place of potential entry into the labor market have a substantial and persistent effect on adult employment prospects. Individuals who face poor local labor market opportunities when they graduate from secondary education are subject to relatively higher unemployment probabilities. Evidence on changes in earnings displays similar results. Using data from the Austrian Social Security database to get information on graduates between

1978 and 2000, Brunner and Kuhn (2014) find that unfavorable labor market conditions have a persistent negative effect on earnings. For each additional percentage point increase in the local unemployment rate, they estimate that the decrease in the initial wage amounts to 0.9%, and the lifetime loss in wages to 1.3%.

Most papers concentrate on either educated or less educated workers, and very few papers analyze the heterogeneous effect of graduating in a depressed economy by education level. Liu et al. (2014) concentrate on Norwegian cohorts graduating between 1986-2002 and focus on the ten years following their graduation. They compare four groups of workers: those who drop out after mandatory schooling, the academic high school graduates, the vocational high school graduates and the college undergraduates. During hard times, the college graduates are almost insulated from being unemployed, except in the very early career. By contrast, the other skill groups experience on average quite large differences in unemployment rates depending on the labor market conditions when entering, and this effect doe not disappear with experience. Liu et al. (2014) propose full-time employment as a measure for the job quality. All skill groups have a high probability of getting a full-time job, but the likelihood varies more strongly with the business cycle if the individual belong to a poorly skilled group (mandatory or academic high school degree) relatively to a skilled group (vocational high school or college degree). Genda et al. (2010) compare male high school graduates and college graduates from the US and Japan. They highlight a persistent, negative effect of bad economic conditions at entry only on the subgroup of less educated Japanese workers. High school graduates entering the economy in a recession are more likely to be unemployed: a 1 percentage point increase in the unemployment rate upon entry raises the likelihood of unemployment by 3 to 4% up to 12 years after the entry on the labor market. In addition, conditional on being employed, they are less likely to work full-time: a 1 percentage point increase in the unemployment rate upon entry decreases the likelihood of being employed full-time by 1.5 to 2.5%, even after 12 years. In their study on male college graduates in Canada, Oreopoulos et al. (2012) create four subgroups of workers using information on college type and major to predict labor market success. They find that the graduates with the lowest predicted earnings suffer larger and more persistent losses: the least advantaged earn 8% of cumulative earnings in the first ten years of their career, which is four time as much as the top graduate.

0.3.2.2 Theoretical Mechanisms

How can economic theories explain the persistence of the negative effect of bad initial conditions on future earnings after the economy recovers? The existing arguments can be summed up into three broad categories. Following a distinction proposed by Brunner and Kuhn (2014), external labor markets consider the career development happening between firms in a context of imperfect information; internal labor market rather concentrates on the wage formation and promotion within firms. Finally, the persistent cohort effect can be related to a sample composition effect.

External Labor Markets The persistent effects of between-firm mobility are related to the scaring impact of employment spells and the imperfect information on the labor market. It is common knowledge that economic downturns witness a strong increase in unemployment, and the new entrants are specifically hit. Looking at the most recent crisis episode, between 2007 and 2014, the youth unemployment (individuals aged 15-24) jumped from 15.0 to 21.0 in the European Union, with heterogeneity across countries (19.1 to 23.5 in France, 18.0 to 53.2 in Spain, 10.2 to 27.0 in Ireland, 11.6 to 7.8 in Germany). In the meantime, the overall unemployment rate grew to a similar pace, but maintained at much lower level: on average, the UE unemployment rate varied from 7.2 to 10.2%.[13] The rationale behind this empirical relation is manifold. For instance, most of the new entrants during a recession are offered a temporary contract, and are more easily dismissed. Employers move workers between tasks so that layoffs are concentrated on workers with low levels of firm-specific capital – usually the new entrants (Devereux, 2000).

Theoretically, a number of factors can explain why a prolonged unemployment spell may have a persistent or even permanent negative impact on the wage rate or the employability. First, just like every type of capital, the human capital can depreciate. The wage rate offered to the worker thus matches his lower productivity (Becker, 1964). In addition, a high mobility associated with unemployment leads to a destruction of firm-specific human capital, so that wage profiles can suffer from mobility between firms. Second, non-cognitive traits such as discouragement can emerge and develop together with a prolonged experience of joblessness (Clark et al., 2001). One may wonder why individuals do not find a job to improve their life satisfaction again; indeed, as pointed out by Gielen and Ours (2014) on GSOEP data,

[13] OECD Data on Youth unemployment rates.

the fact of being unhappy due to a job loss does increase the job searching process, but does not increase the job finding rate. Social norms also play a key role in the scarring caused by unemployment: using data on vote results for reducing unemployment benefits in Switzerland, Stutzer and Lalive (2004) show that stronger local social norms to work are associated with a lower reported subjective well-being.

On the empirical side, evidence related to unemployment scarring has been found. On US data, Stevens (1997) evaluates the wage penalty after displacement to 9% six years after the distress event. She stresses out the importance of a multiple job loss in the wage penalty associated to the unemployment history. On UK data, Arulampalam (2001) finds that unemployment spells carry a wage penalty of about 6% on re-entry in Britain, and 14% after three years. Gregg and Tominey (2005) report a 13-21% wage penalty at age 42 stemming from youth employment, which comes down to 9-11% if the unemployment spell is not repeated. Using US data between 1974 and 2008, Davis and Von Wachter (2011) give an extensive overview of the monetary and psychological costs associated to unemployment, as well as a flavor of how these effects are accentuated in downward phases of the economic cycle. Men lose an average of 1.4 (2.8) years of pre-displacement earnings if displaced in mass-layoff events that occur when the national unemployment rate is below 6% (above 8%). As a consequence, if bad initial conditions specifically affect the employability of young workers, then they will have a persistent impact on the future wage and employability profile of these unlucky cohorts later in life.

A second mechanism happening outside of the firm relies on the assumption of imperfect information regarding the ability of applicants. Then, unemployed individuals may durably suffer from a statistical discrimination from the part of employers. The unemployment status may be used to screen applicants (Lockwood, 1991), although recent evidence from a field experiment suggest that only recent unemployment matters for employers (Eriksson and Rooth, 2014). For Japan, Genda et al. (2010) find long term effects of graduating in a recession for the least educated only. An institutional feature of the Japanese labor market explains the result: high schools organize a smooth transition from the school bench to the job, so that early unemployment spells give a piece of information on the workers' quality. A dual labor market (Doeringer and Piore, 1971) can have similar effects if the contract type is perceived as a signal for productivity by the employer. Employees graduating in a bad economy are more likely to find a low quality contract, and then be durably trapped into 'bad' contract types

and unemployment. For example, Bentolila et al. (2012) compare the French and Spanish labor markets during the Great recession. They show that the high unemployment rate in Spain with respect to France is explained by an extreme two-tier system of contracts, where permanent contract workers are shielded and temporary workers radically exposed to the business cycle. In France, the gap between the two contract types is not as large. On French data, Gaini et al. (2012) show that the initial conditions have almost no impact on the labor outcomes later in life, and explains this result by the fact that youngsters, whatever their ability, are exposed to a period of unemployment, so that the unemployment (or initial contract type) may not be not used as a signal for productivity by employers. Genda et al. (2010) show that the two-tier system plays a crucial role in explaining the persistence of the negative initial conditions for unskilled workers in Japan, in opposition with their American counterpart who search for a job in a spot market.

Internal Labor Markets The theory of *implicit contracts* with costly mobility allows for a long lasting effect of the entry wage on the future wage profile. A worker negotiates his wage according to the economic conditions upon entry, so that the initial wage determines his wage profile later in life. However, as suggested by Beaudry and DiNardo (1991), mobility costs are a strong hypothesis. Then, if contracts are implicit but workers are mobile, wage rates are renegotiated according to the new economic conditions at the time of mobility, so that the conditions upon entry should not come into play. Then, through unemployment scarring, mobility can affect the wage profile in a persistent way. Alternatively, job-to-job mobility can mitigate the persistent effect of the initial shock. The literature on relating recessions to the matching quality suggest that 'good matches endure', so that a high mobility in times of crisis reflects a bad match potentially harming the wage profile in a persistent fashion. Mobility across firms are a way to mitigate the low human capital accumulation related to the bad match.

In theory, business cycle can affect the *quality of the match* between jobs and applicants in two opposed directions. During a recession, the size of the pool of applicants creates *congestion* and dilutes relevant information. On the other hand, an *agglomeration* effect exists, because employers make better matches when the pool of applicants is large (Bowlus, 1995). Empirically, various indicators, such as the task content of positions, or the job tenure, indicate that the quality of the match depends on the business cycle. The empirical evidence converges in showing that the quality of available jobs rather decreases with economic

downturns. For instance, Devereux (2000) shows that firms respond to negative demand shocks by lowering the skill content of the assigned tasks. With the recession, firm-specific human capital accumulation decreases in intensity. Besides the task content, another proxy for the quality of the match is job duration. Using job tenure under the hypothesis that 'good matches endure', Bowlus (1995) shows that jobs created during recessions display a lower quality and paycheck. On US data, she finds that job tenure falls when the unemployment rate is high when starting the contract; the labor market internalizes the lower match quality by offering lower wages.

Of course, the quality of the match is not supposed to have a permanent effect on the lifetime income flow of a worker. If, moreover, the human capital accumulated is low or very specific, then the initial job or task can theoretically explain a significant part of the observed persistent and negative effect on labor market outcomes. In their paper, Gibbons and Waldman (2006) extend their seminal model (Gibbons and Waldman, 1999) to capture the cohort effect put forward by Baker et al. (1994). They incorporate task-specific human capital, in opposition to firm-specific human capital. They show that if recessions witness a decrease in the supply of career-track jobs, then permanent effects can arise from an initially depressed economic environment. Since the skills are not firm-specific but task-specific, and since employers only gradually observe the workers' ability, then the task-specific skills go lost when workers are promoted in a better state of the economy. Even in the presence of a spot market, cohort effects persist and can even be permanent.

0.3.2.3 Empirical Evidence

Empirically, studies rely on two different types of data. Most of the studies on the developed economies rely on panel data. Kahn (2010) uses the individuals graduating from 1979-1989 from the National Longitudinal Survey of Youth (NLSY79). Another source of panel data is employer-employee datasets: Oreopoulos et al. (2012) use a Canadian employer-employee dataset covering the period 1982-1999, Liu et al. (2015)'s paper is based on a matched employer-employee database from Statistics Norway between 1980-2006. Finally, a last source of rich data is provided by the social security records: Brunner and Kuhn (2014) rely on social security records form the Austrian Social Security database between 1972-2009, similarly; Stevens (2008) builds her analysis on the Employment subsample 1975-2001 extracted from the employees subject to Social Security contribution in Germany. Some

studies rely on cross-sectional data and reconstruct the wage profile of the different cohorts: Genda et al. (2010) use labor force surveys from Japan and the US, Machikita (2005) bases his analysis on the Indonesian household survey. The advantage of panel data over cross-sectional data does not rely on the possibility to exploit within-individual variations: indeed, the unemployment upon entry is not varying in time . Panel data does not allow to overcome issues regarding the possible differences in sample composition across cohorts. However, this data is very usefeful in two directions. Firstly, it allows to reconstruct the full employment history of workers, which is ideal to study the long run wage profiles. Secondly, it allows to study in a convincing way the mechanisms leading to the observed cohort effect.

A series of studies stresses the importance of initial placement in the later career. For Oyer (2006), the initial placement is key to understand the persistence. For academics, he finds that initial quality and type of the first job influences the long-term job characteristics. An important channel is the research productivity, which is initially enhanced by a good placement. Similarly, concentrating on MBA graduates from Stanford between 1960 and 1997, he shows that the initial placement in the sector of investment banking has a persistent impact on the likelihood of working on Wall Street later in life (Oyer, 2008). Focusing on male college graduates, Oreopoulos et al. (2012) provide an analysis of the respective roles of initial placement (quality of the match) and reallocation between firms (job mobility). They first measure the quality of the employer with firm size, log total payroll, and log median wage over the course of the panel, and find that graduating in a recession increases the probability of beginning one's career in a low-quality position. Then, they find that unlucky cohorts mitigate the initial effects by experiencing a higher job-to-job mobility. After four years of mobility, the catch-up process essentially happens through experience *within* the firm. Between-firm mobility is found to be an important mitigation factor. In addition, they report an heterogeneity in catch-up rates according to the major and expected earnings, and show that this differential speed in closing the cohort effect gap is also captured by a difference in job mobility: while high skilled workers experience a high increase in their mobility rate, workers with the lower expected earnings experience only small increases, so that the catch-up process only happen within the firm, at a slower pace because of the mobility cost. On a sample of low-educated workers in Germany, Stevens (2008) also briefly investigates the possible channels driving the long lasting effects of initial conditions that she reports. Interestingly, she finds that apprentices from unlucky cohorts in Germany are also

more mobile when the economy recovers, suggesting that the mitigation of the cohort effect also concerns lower skilled workers.

Skill mismatches can also account for the persistence. On a subsample of male college graduates, Liu et al. (2015) define skill mismatch as a discrepency between schooling and task content. They examine how the correlation between education degree and task content evolves with the business cycle. They find that unlucky cohorts in Norway are more likely to get a position poorly match to their major. Then, dividing the groups of college graduates according to the quality of the match, they find that the long lasting effects of graduating in a recession are entirely captured by mismatched workers.

0.3.3 Institutional Background

The main take-away of the literature is that results vary with the labor market institutions, with the education system, and finally with the type of transition between education and the labor market. Measuring and understanding the persistence of initial conditions on future labor market outcomes require complementary knowledge about the specificity of education and labor markets in Argentina.

0.3.3.1 Education in Argentina

In Argentina, the education system is divided into four parts. Initial schooling lasts from 0 to 5 years. Primary and secondary education lasts 12 years. Primary education comprises 6 to 7 years, and secondary education 5 to 6 years according to provinces and institutions. Finally, college education is subdivided into three levels: technical education, university institutes and universities. Technical education usually lasts three years, while the master degree (*licenciatura*) lasts five years and the PhD degree (*maestria*) three additional years.

Education is a responsibility shared by the national government, the provinces and the federal districts. Traditionally, organizing, financing and promoting education was a federal prerogative of the Ministry of education. However, the Federal law of education (1992) established that districts were financially responsible for organizing and administrating schooling institutions, while the federal state stayed in charge of the supervision.

In addition to the devolution, the 1992 reform remodeled the education system. The traditional division between primary and secondary school was replaced by a nine year 'basic' cycle (*Educacion General Basica*) and optional *polimodal* degree lasting three years. The reform

had planed a transition period, during which the two systems coexisted. The provinces had to switch progressively from the old to the new system. Another aspect of the 1992 reform dealt with mandatory schooling: before 1992, school was mandatory until the end of primary education, or below age 12. Then, school became mandatory from the last year of kindergarden to age 14. In 2007, a new National Education Law abolished this system, and replaced it with a primary cycle lasting six years, and a secondary cycle divided into a mandatory *Ciclo basico* (3 years) and an optional *Ciclo orientado* (3 years). In 2008, mandatory schooling was increased to 15 year-old, and to 16 year-old children in 2010. The transitional period ended in 2011. Table 1 sums up the content of the successive systems. For each system, an horizontal line marks the beginning and the end of mandatory schooling.

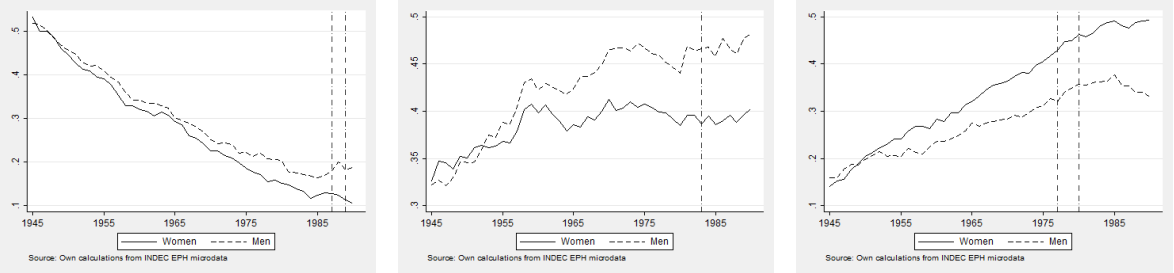
Table 1: The Argentine Education System

Years	Age	Before 1992	1992-2007	After 2007
1	3	Inicial	Inicial	Inicial
2	4			
3	5			
4	6	Primario	EGB1	Educacion primaria
5	7			
6	8			
7	9		EGB2	
8	10			
9	11			
10	12		EGB3	Ciclo basico
11	13	Medio		
12	14			
13	15		Polimodal	Ciclo orientado
14	16			
15	17			

Historically, what are the trends regarding the enrollment in different schooling levels in Argentina? Figure 7 documents the distribution of the population according to the highest schooling degree completed, by birth cohorts from 1945 to 1990 and by gender. Unsurprisingly, attainment rises with the cohort of birth. Independently from their gender, 50% of the individuals born in 1945 had at most a degree from the primary school, and only 15% got a college degree. The proportion of primary school graduates shrank dramatically over the birth cohorts, to reach its lowest level for the cohorts born around 1985. The outflow

of primary graduates translated into an increase in the proportion of high school graduates (for men, the proportion rose from 30 to 45%), and scholars (15% to 35%). Interestingly, women tend to be more educated than men: the descending trend of primary schooling attendance is gender neutral, but results into more boys graduating from the secondary school, while girls go all the way to superior education.

Figure 7: Argentina: Higher Education Degree Attained 1945-1990, by Gender



(a) Primary School **(b)** Secondary School **(c)** Superior Education

Last, should one expect a 'subsistence effect' or a 'human capital effect' to drive the correlation between the business cycle and attainment in Argentina? The child labor argument is unlikely to hold. Indeed, one of the specific features of Argentina is that relatively to other Latin American countries, the law on child labor and mandatory education are properly enforced. In fact, the participation rate of children between 5-14 in Latin America is the lowest of the developing world. In 2012, 8.2% of the children aged 5-14 are working, against 10.1% in Asia and 26.2% in sub-saharian Africa (Diallo et al., 2013). In Argentina, 2.2% of the children aged 5-13 are involved in an economic activity, against 6.6% in 2004 (MTEySS, 2013). Another interesting fact rests on the 2002 economic crisis event, when the unemployment rate peaked and the opportunity cost of schooling was at its lowest. Using a very detailed survey conducted in the aftermath of the 2002 crisis, Fiszbein et al. (2003) devote a particular attention to the use and access to education services. Household heads were asked whether anyone in the household had either dropped out of school or postponed attendance since October 2001. They find that there is no evidence of children aged 6-12 or 13-15 dropping out; a small proportion of high school pupils did drop out, but the proportion was stable between 2001 and 2002, so that this rate is not related to the crisis event. In fact, looking at the schooling expenses, they note that families are reluctant to move their children from the private to the public education, suggesting that the expenses into education are not the first to be cut off. The evidence on school drop-outs seems limited, and suggests that families

preserved the human capital investment on their children. The reason may be that they feel that the investment is important; or it may as well be that school serves as a daily child care so that women enter the labor force more easily.

0.3.3.2 Labor Market Regulation in Argentina

As a country culturally close to Europe, historically, the protection provided to formal wage workers in Argentina is extended. For instance, back in the mid-1980s, regulations on unfair dismissal included an advance notice and a compensation with a three minimum wage ceiling. Temporary contracts were regulated, with a limitation to 5 years duration. On the other hand, the labor market in Argentina also shares an important feature with the labor markets of emerging economies, namely, their profound duality between the formal and informal wage earners (Mondino and Montoya, 2004).

From the late 1980s to the late 1990s, the duality of the labor market was exacerbated by two factors. First, there existed a political willingness – with partial drawbacks related to the electoral agenda – to stick to the line drawn by the Washington Consensus, which stated that the labor market had to open so that firms could adapt to a competitive environment (WB, 1995). Correspondingly, a number of reforms were implemented.[14] The *economic emergency* law of 1989 eliminated the three-month minimum wage ceiling as the basis for calculating lay-off compensation. The *Employment Law* of 1991 introduced promoted employment contracts exempted from contributions to social security. In 1993, a rebate of social security payroll taxes was decided which caused a 1.2% GDP loss of governmental revenues. In 1995, the reform on temporary contracts was simplified. Small businesses were allowed to give a shorter advance notice and reduced the cost of unfair dismissal. Between 1996 and 1998, the share of temporary employment more than doubled, from 8% to 17%. Second, there existed a correlative lenience in the enforcement of the legislation on labor. Parallel to the expansion of short-term contracts, the 1980s and 1990s witnessed an important increase in wage informality, representing one third to one half of the wage employment between 1980-2005. This informality mainly emerged because labor laws were less strictly enforced.

By the early 2000s, the unpopular measures undertaken in the 1990s were reversed in a context of a presidential election and a historically high unemployment. In 1998, the 1995 reforms were repelled, and the trial period was shortened and subject to social contribution.

[14] For a detailed survey on the content of the reforms, see (Marshall, 2004).

In 2002, an emergency measure doubled the cost of unfair dismissal. After 2003, the rate of informal employment diminished significantly. From 2004 to 2011, the participation of formal salaried employment in total employment increased 11.6 percentage points. In 2002, one employee out of two was an informal worker; in 2013, informal employment still concerned one wage earner out of three. Two factors explain this decline: a return to high level of growth and low unemployment favoring the bargaining power of the employee, and a political willingness from the Kirschner presidency to actively denounce and fight labor fraud.

0.4 Aggregate Shocks and the Intrahousehold Distribution of Resources

Labor supply decisions and outcomes can be durably affected by adverse aggregate shocks. As a consequence, shocks negatively impact the welfare of households in absolute terms. In addition, because households have an unequal access to risk management strategies, poor households simultaneously tend to be more vulnerable to shocks, so that adverse economic shocks are inequality-increasing. While there exists widespread evidence over the redistributive welfare impacts of economic crises between the households, little is known about the changes in the relative welfare of individuals living in these households.

Due to data limitation on time use, home production, or individual-level consumption, the measure of the intrahousehold distribution of welfare is certainly challenging. However, there are at least three reasons why the intrahousehold distribution of welfare deserves a particular attention from the part of the economist.

A first, key reason is that ignoring the intrahousehold dimension of the distribution would leave unexplored an important dimension of inter-individual inequalities. The individual is the relevant unit for the economic analysis, not the household. This question is particularly stringent for the debate over the relative welfare of men and women within the couple, as well as the welfare of children with respect to both parents' allocation choices. A scarce but growing literature has stressed the importance of taking into account the intrahousehold distribution of welfare. As stated by Lise and Seitz (2011), not accounting for the within-family level strongly underestimates the individual-level consumption inequality.

On a longer run perspective, understanding the way resources are shared within families is important because casual observation and carefully conducted studies both suggest that decisions made at the intrahousehold level have major implications for a number of economic outcomes, such as time allocation, investment in human capital, labor market participation or wages. Dauphin et al. (2011) show that British children – especially daughters – are decision-maker within their household. In Côte d'Ivoire, Bargain et al. (2014) report that wives sacrify relatively more resources to their children's private consumption than their life partner, and that boys are transferred more utility than girls. It has been shown that women's bargaining power affect key social outcomes, such as own and children's health and education outcomes. As shown by Lundberg et al. (1997) for children benefits in the UK, Attanasio and Lechene (2002) in the case of PROGRESA in Mexico, or more recently in the case of retirement money for Argentine housewives (Berniell et al., 2014), the identity of the resource holder within the family matters for the distribution of welfare within the household.

Overall, Behrman (1997) enumerates three reasons why measuring and understanding the intrahousheold allocation process matters for the public decider. First, intrahousehold allocations may have important distributive effects. A legitimate question is whether the choices reinforce or mitigate the inequalities in endowment. Then, the existence of intra-household allocation may alter the original objective of social transfers targeting specific individuals, like children, or the elderly. Indeed, what happens within the household does not result into equal outcomes for each family member. Finally, in cases where the allocations are determined through non-cooperative bargaining (Udry, 1996), nothing ensures that the allocations are Pareto optimal or socially efficient, creating room for policy.

The reasons for this literature gap are twofold. First, the economic theory generally considers that the decision-making of a household should be conceptually equivalent to the mechanism driving individual choices, and ignores the strategic interactions at stake within the household. In the context of an economic crisis, this unitary vision is exacerbated, because family is primarily seen as an important risk-coping mechanism. Second, the unitary conception shows through the data collection process : consumption data are collected at the household level, so that the possibility to empirically measure the intrahousehold redistribution is limited.

0.4.1 An Overview of the Existing Collective Models

To circumvent the limitation data issue at the individual level, a series of theoretical models have progressively allowed for a structural estimation of the intrahousehold distribution of welfare. This progress in the understanding of the intrahousehold sharing of resources has necessitated several steps.

Household members bargain over many different outcomes entering their utility, such as time use and labor allocation (Bloemen, 2010, Lacroix and Radtchenko, 2011), consumption and expenditure (Bourguignon et al., 1993, Browning et al., 1994, Zamora, 2011), decision-making like children's health and education (Lundberg et al., 1997, Duflo, 2003). On the empirical side, studies aiming at estimating the parameters of the sharing rule developed in two directions. On the one hand, studies use labor supply choices to recover the sharing rule (Fortin and Lacroix, 1997, Chiappori et al., 2002, Bloemen, 2010). On the other hand, assuming that the labor supply of each spouse is exogenously determined, data on private and individual consumption is used, following the seminal work of Bourguignon et al. (1993) and Browning et al. (1994) (see e.g. Zamora (2011)). So far, the empirical research on non-unitary models has focused primarily on consumption decisions. Comparatively less work has been done on labor supply in a non-unitary framework, and this literature will not be presented here.[15]

0.4.1.1 A Vast and Growing Literature

The majority of existing models of household behavior supposes that the household members' preferences can be aggregated into a unique household 'social' utility function. In a consumption setting, Becker (1973, 1981) was the first to explicitly consider that the family was a collection of individuals, each with a personnal utility function interacting to create the decisions observed by the researcher at the household level. The model takes into account the fact that expenditures on each good category is the outcome of an unobserved multi-person decision-making process. This approach clearly contrasts with the standard unitary approach, where households behave just like single decision-makers.

The relevance of the later-to-be-called 'unitary model' of the household decision-making was first properly questioned by Manser and Brown (1980) and McElroy and Horney (1981),

[15]For an extended literature review with a detailed presentation of the different existing theoretical models, see Vermeulen (2002) and Chiappori and Donni (2011).

whose seminal paper is at the origin of a flourishing literature on the Nash-bargaining models of the household. Nash-bargaining models are grounded on the existence of 'threat points' for each member of the household, representing the utility from an 'outside option'. In the terminology of McElroy and Horney (1981), the threat point varies according to 'extra-environmental parameters'. The outside option can be divorce, but need not be the case. In the 'divorce threat' models, the sharing of resources depends upon a threat point corresponding to the spouses' best option outside marriage. The bargaining power will thus depend on the level of resources available to divorcees, and on conditions on the marriage market (Manser and Brown, 1980, McElroy and Horney, 1981).

Chiappori (1988) and Chiappori (1992) propose a general model encompassing the Nash bargaining model as a particular case. It opens the way to another strand of literature, which builds on the Pareto efficiency of the household decision-making. The household maximizes a weighted sum of each member's utility, subject to a pooled budget constraint. The Pareto efficiency is crucial, because it allows to split the decision process in two stages. In a first step, the total household resources are shared among its members according to a specific 'rule'. In a second step, taking this share as given, each member maximizes his own utility subject to his specific budget constraint.

A last strand of literature considers the eventuality that outcomes from the household decision-making may not be Pareto efficient. Indeed, contrasting with the cooperative models, empirical evidence of domestic violence or demand for marriage counseling suggest that the hypothesis of inefficient intrahousehold decision-making should be considered seriously. Non-cooperative models build on the absence of costless binding agreements, as well a that of a pooled budget constraint, which allows for inefficient outcomes. This is the object of 'separate sphere' models, where the threat point is an inefficient, non-cooperative equilibrium internal to the marriage. Lundberg and Pollak (1993) develop non-cooperative models of distribution within marriage, in which distribution may depend on whether resources are controlled by the husband or wife. If this is the case, then the factors of control over resources will be the determinants of the relative bargaining power of spouses.[16] Empirically, the

[16]Note that for this reason, within cooperative and non-cooperative frameworks, identical variables may have very different roles in the bargaining process. The relative contribution of each spouse to the household income is a good example. On the one hand, income and the associated labor supply can be an outcome for these models. A higher bargaining power then means that a spouse works less than previously, giving up a part of its contribution to the total income, but benefiting from the same share in terms of private consumption (Chiappori et al., 2002). On the other hand, benefiting from its own source of income is crucial to the non-cooperative Nash bargaining models, because it plays the role of a distribution factor (Attanasio and Lechene, 2002). In this

evidence on intrahousehold efficiency is mixed. Using data on rural households in Burkina Faso, Udry (1996) finds evidence of Pareto inefficiency supporting the non-cooperative models. Testing for the symmetric relative effect of different distribution factors induced by the collective models of consumption, Bobonis (2009) cannot reject that households consume Pareto-efficiently.

0.4.1.2 Identification of the *Derivative* of the Sharing Rule using Consumption Data on Couples

Within this vast literature, the cooperative, collective models of consumption are at the forefront in the identification of the sharing of resources within families. Assuming Pareto efficiency, from the observation of household demands, what can be deducted about the structural components of the decision process that led to them: the individual utility functions and the sharing function?

As stressed in Chiappori and Donni (2011), rather than a general theory, the literature has provided a scattered set of results based on particular hypotheses: the degree of publicness of goods and the number of price regimes. In the specific literature on collective models of consumption, Bourguignon et al. (1993) and Browning et al. (1994) bring these theoretical results to the the data and estimate a structural model of consumption. In their model, goods are either public or private. Most of the private goods are non-assignable to one of the spouse or the other, and are observed at the household level : $C = C^i + C^j$. Some other private goods are assignable to one spouse or the other : $c^k, k = i, j$. Under egoistic preferences, the household will choose its consumption C^k, c_k so that its utility in (7) is maximized :

$$U = \phi_D^i U^i(C^i, c^i, z) + \phi_D^j U^j(C^j, c^j, z) \tag{7}$$

under the constraint :

$$C + c^i + c^j = E \tag{8}$$

ϕ_D^k stands for the bargaining power of spouse k, which depends on a vector of variables D, known as the 'distribution factors'. The condition for the distribution factor D to correctly identify the parameters of the sharing rule goes as follows: it should not influence the consumption of the assignable good through another channel than its impact on ϕ_D^k. By

configuration, entering the labor market and supplying more hours may actually correlate with an increasing – and not decreasing – bargaining power.

virtue of the second welfare theorem (Chiappori, 1992), the maximization of (7) subject to (8) comes down to maximizing separately for each spouse:

$$U^k(C^k, c^k, z) \tag{9}$$

subject to :

$$C^k + c^k = \Psi_D^k = \psi_D^k E \tag{10}$$

with $\Psi_D^k = E - \Psi_D^{-k} = \psi_D^k E$.

The sharing rule $\psi_D^i = 1 - \psi_D^j$ depends on a vector of variables in D. The budget shares and the sharing function are given functional forms. Besides the Pareto efficiency assumption, the identification relies on the existence of a credible distribution factor, and the existence of a convincing gender-specific good within the consumption survey. Within this framework, the sharing rule is recovered up to a constant. The parameters of the model do not allow to determine the level of each share, but indicate what proportion of an extra unit of pooled household income accrues to each of the spouses.

Using the Canadian *Family Expenditure Survey* 1974-1992, Browning et al. (1994) show that sharing within the household is affected by the differences in ages and incomes of the members and the wealth (proxied by the total expenditure) of the household. Zamora (2011) relies on the clothing expenditure of Spanish couples reported in the *Encuesta de presupuestos familiares* in 1990-1991. She measures the marginal changes in the share accruing to active wives and housewives with respect to an increase in the own (potential) wage, the husband wage, and the non-labor household income. She finds that whatever their working status, wives cannot expect any increase in their relative share of resources before reaching a 50% share in level. Then, nonparticipating wives get larger transfers from increases in household resources and from their husbands' wages than participating wives; however, they cannot capture any gain in consumption from having better labor opportunities.

0.4.1.3 Identification of the *Level* of the Sharing Rule using Consumption Data across Household Types

One of the main limits to the work presented above is that individual preferences are unknown, and have to be estimated simultaneously to the resource shares. The impossibility to identify the level of the sharing rule is an important limitation of the early studies. Indeed,

one of the interests of the concept of 'sharing rule' is precisely to understand better poverty and the distribution of income and welfare across individuals. Recently, the literature on the identification of the sharing rule has been growing at a fast pace. So far, the most recent results have explored two different ways in identifying the level of the sharing rule, and not solely its derivatives. Both solutions appeal to other sources of information to estimate preferences. A first, straightforward approach is to collect additional information on individual consumption within the household (Cherchye et al., 2012). Another approach relies on the revealed preferences displayed by single-person households. Individual preferences are estimated on a subsample of single individuals, and these results are then used in the analysis of couple behavior, so that the decision process is fully identified.

The identification of the sharing parameters from the behavior of single individuals raises a number of concerns, such as the selection bias, since the marriage decision will likely depend on preferences. Ideally, panel data allows to observe individual over time both as single, married, and divorced (Couprie, 2007). But even so, the consumption structure of couples is different than that of single-person households (Vermeulen and Watteyne, 2006). In their seminal work, Browning et al. (2013) conserve the stability of preferences across marital statuses, and suppose instead that the domestic production technology is particular to couples, because the consumption of certain goods is associated with scale economies, or because the substitutability and complementarity of goods evolve with the marital status. For a general linear domestic technology, all the structural parameters of the model, including the scaling and the sharing parameters, are identified. Supposing that the sharing and scaling parameters are independent of the base total expenditure of the household (IB), Lewbel and Pendakur (2008) propose a simplified, easily tractable model with similar features under one single price regime.[17] Lewbel and Pendakur (2008)'s model is then extended to families with children by Dunbar et al. (2013), Bargain and Donni (2012) and Bargain et al. (2014).

On the empirical side, across the different existing studies, results are fairly consistent and in line with theoretical predictions. On the 1990 and 1992 Canadian *Family Expenditure* survey, Lewbel and Pendakur (2008) find that the average woman benefits from 36-46% of the total household resources according to the model. Theoretically, the higher bound of the scale estimate is 1: in this case, the scale economies are 0. On the other end of the spectrum,

[17] The IB condition is hardly testable, but using original detailed Italian consumption data, Menon et al. (2012) are able to test the independence of the base hypothesis regarding the sharing rule. The share accruing to children within the household respects the IB condition, suggesting that the assumption is not overly restrictive.

the lower bound of the scale estimate is equal to the share accruing to the spouse. In this case, the sharing of resources is totally compensated by the scale economies which have the maximum value. Lewbel and Pendakur (2008) find scale parameters equal to 0.7 for women, and 0.8 for men. Similarly, using the 2000 French *Household Budget Survey*, Bargain and Donni (2012) show that in households without children, wives get 55% to 62% of the resources. The average scale economies for women (men) without children vary between 0.64 and 0.84 (0.70 and 0.97); in the simple model, the scale economy for men without children is not significantly different from 1 at the 95% confidence interval. With data from rural Côte d'Ivoire, Bargain et al. (2014) find that the share accruing to childless wives varies between 52-55%, with scale economies ranging from 0.85-0.91.

0.4.2 Married Women in Spain during the Great Recession

So far, the new empirical literature on collective models of consumption has concentrated on two aspects: providing simple illustrations of major theoretical contributions, such as in Browning et al. (2013) or Lewbel and Pendakur (2008), or conducting a poverty analysis in developing countries, like in Dunbar et al. (2013) or Bargain et al. (2014). Little is known about the dynamics of the sharing with respect to the gender-specific variations in the economic context for developed economies.

Certainly, it has been shown that negative economic shocks severely decrease the welfare of households; in addition, their impact across households is highly heterogeneous. Taking the case of the Great recession in Spain, the OECD (2014b) report shows that the income losses were not equally shared among the population, and that the difficulties hit the most disadvantaged households the hardest. While the top ten income earners have lost 1% of their income per year between 2007-2010, the poorest households before the Great Recession experienced a 14% decline in income per year. Interestingly, based on the example of the U.K. from 1968 to 2001, Lise and Seitz (2011) calculate that the rise in between-household inequality has been accompanied by an offsetting reduction in within-household inequality. A legitimate question is whether the Great recession also impacts the intrahousehold distribution.

Besides the mere data availability argument, Spain is an interesting case study for the intrahousehold impact of adverse economic shocks. First, within the pool of developed economies, until recently, Spain was characterized by a low female integration to the labor market, which results from a combination of cultural factors and institutional weaknesses.

In addition, in developed economies, it is acknowledged that economic shocks impact men relatively more than women, phenomenon commonly captured by the vocable 'mancession'. The Great recession in Spain has proved to be highly gender-heterogeneous, and generates sufficient variation to adequately address the following question: *does the gender-specific economic context have an effect on the welfare for women in a couple in a way that this context has not for single ones*?

0.4.2.1 Married Women in Spain

The objective of increasing the employment rate in Europe has been on the political agenda for decades. Since the mid-1990s, female labor supply has attracted most of the attention. Indeed, the gender participation gap remains, even if women's education attainment has been higher than for men. For the policy-maker, a first motive to concentrate on female participation is ethical: equal education investment should imply equal opportunities and returns on the labor market. A second motive is a pragmatic one: the participation rate of women is lower than that of their male counterparts, and the extensive margin should be more responsive to policies.

In their recent working paper on the role of different family policies on the European female labor force, Gehringer and Klasen (2015) first undertake a careful analysis of the trends in labor market participation of European women during the last two decades. Looking at part-time and full-time employment, they conclude that the situation of European women on the labor market has evolved greatly. The changes are visible at the aggregate EU level: on average, the participation rate has increased in the EU-15 from around 57% in the mid-1990s to more than 67% in 2013. The female employment rate has moved in the same direction, but stagnated during the economic crisis (while men's employment rate decreased sharply). An even more interesting pattern emerges when looking at the subgroup level. They note that historically, Norther European women had the highest propensity to participate, but the participation rate of Southern European women is catching up.

In Spain, the catch-up phenomenon has been progressive but continuous since the end of the dictatorship of Franco (1936-1975). Under the dictatorship, a wife could not work, own a property, travel away from home without her husband's approval, referred to as 'permiso marital'. Legal sanctions for adultery or home desertion were less stringent for men than for women, and divorce was left to the discretion of the Church. With article 14 of the

Constitution ratified in December 1978, the young Spanish democracy recognized gender equality before the Law as a principle of the new political order:

> *Art. 14 – Los españoles son iguales ante la ley, sin que pueda prevalecer discriminación alguna por razón de nacimiento, raza, sexo, religión, opinión o cualquier otra condición o circunstancia personal o social.* (Spanish individuals are equal in front of the law, without any discrimination of birthplace, race, gender, religion, opinion or any other personal and social circumstance.)

The 1978 Constitution confirmed the abolition of a series of discriminating measures undertaken against married women during Franco dictatorship. However, in a patriarchal society, the equality in the law was not sufficient, and had to be promoted with active policies of information, which were conducted by the Women's Institute ('Instituto de la Mujer') from 1983 onward. Even with the numerous Plans for Equality of Opportunities ('Planes para la Igualdad de Oportunidades de las Mujeres') starting in 1988 and based on the model of the European Community, the situation for Spanish women improved little.

During the last decade, Spain has been praised for its political commitment to gender equality. After the socialist dominated government took power in April 2004, the new Prime Minister, Jose Luis Rodriguez Zapatero declared that he would make 'the protection of women's rights and gender equality a centerpiece of his administration'[18]. In 2008, he appointed a predominantly female cabinet, thereby setting new standards for female political participation, and he created the Ministry for Equality.[19] Under his administration, two laws of major consequences for women were passed.

First, on 28 December 2004, Zapatero's government passed the Organic Act 1/2004 on Integrated Protection Measures against Gender Violence ('Ley Contra la Violencia de Género'). The law included education, prevention, detection and intervention measures at school, in the public sphere, and in the health sector. In addition to the prophylaxis, the law improved the rights of women victim of gender-based violence. Additional institutional bodies were created in order to promote the enforcement of the new law. Correspondingly, under criminal law, new offenses were introduced to support the victims' rights: a specific category of serious assault was created, and minor instances of coercion or threats against women were from now on regarded as punishable offenses.

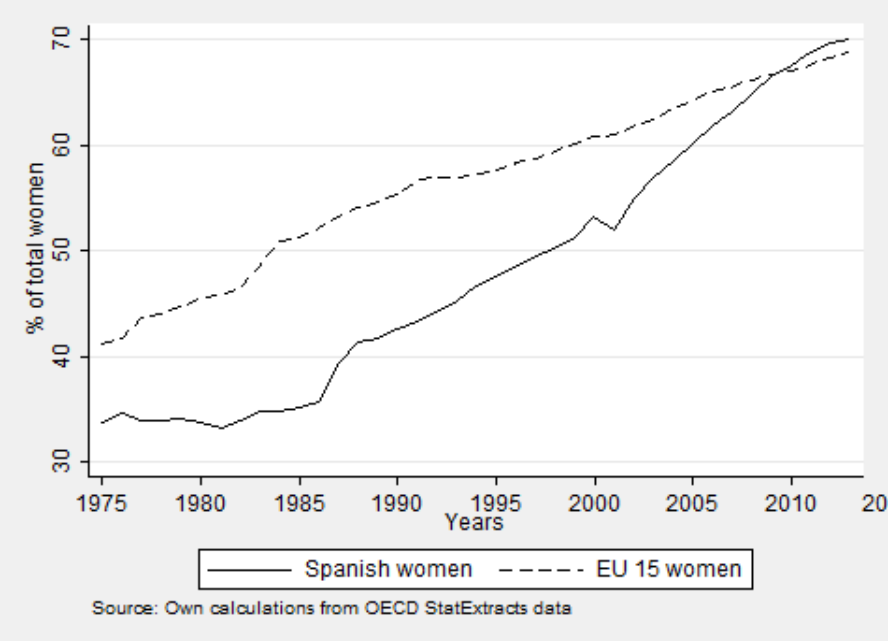
[18] Reported in Freedom House, 08/11/2005, 590

[19] In 2010, the Ministry was absorbed by the Ministry of Health, becoming the Ministry of Health, Social policy and Equality.

Then, in 2007, the Constitutional Act 3/2007 on Guaranteeing Equality between Women and Men ('Ley de Garantía de la Igualdad entre Hombres y Mujeres') alleged that 'Full recognition of formal equality before the law, while indisputably constituting a decisive step, has proved to be insufficient.' and comes to the conclusion that: 'a need is identified for legislative action [...] this demand embodies a genuine right to which women are entitled, but at the same time it is an element that will enrich Spanish society itself by contributing to economic development and a rise in employment levels'. The law defined the basic legal concepts and categories relating to equality, harassment, positive action, and determined the legal consequences of infringements. In addition, the law laid the foundations of an ambitious Plan for Equal Opportunities, both in the political sphere and at the workplace, with measures to guarantee equality in access to employment, vocational training and promotion, as well as working conditions.

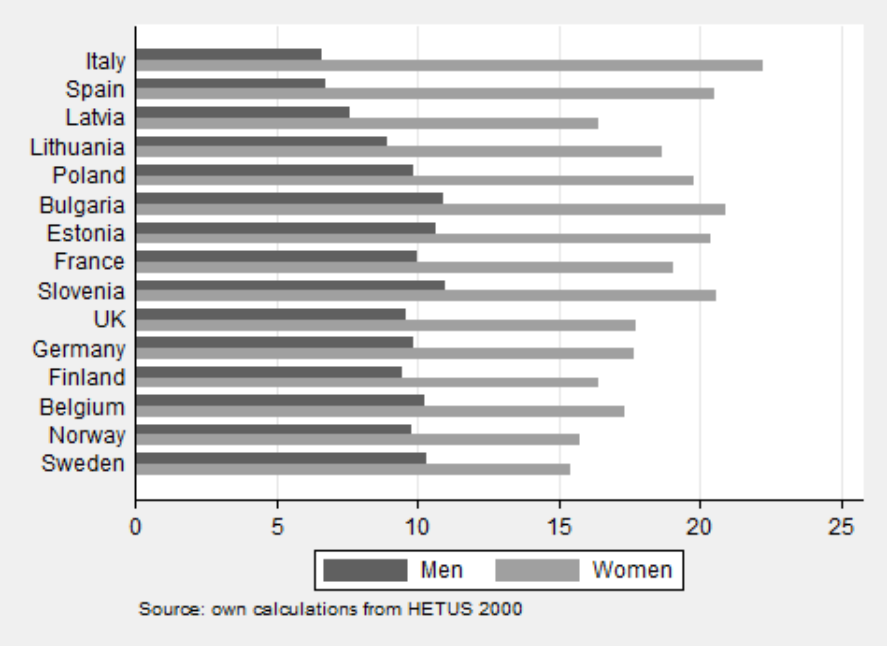
After the end of Franco dictatorship, the change in women's status is spectacular. One important sign is the evolution of women's place within the Spanish workforce, as shown on Figure 8. At the end of the dictatorship, one woman out of three was involved into some market activity. Since then, the female labor force participation rose constantly. It catched up with the EU 15 level in 2009, and reached 70% in 2013.

Figure 8: Female Workforce in Spain, 1975-2013



This being said, a common view on the gender issues in Spain is that the increase in participation is not yet trickling down to employment conditions and wage gap, especially since women are obliged to juggle both employment and family responsibilities due to prevailing traditional stereotypes. In 2010, the Gender equality index[20] – a composite index taking into account the six following domains: labor, resources, knowledge, division of time, and health – reached 54 (out of 100 which stand for perfect equality) which correspond to the EU 27 mean value. Unlike other country members, the main gap is not to be found at the level of public decision-making.[21] In the Spanish case, the most impressive gender gap can be found in the domain of the gender division of time spent at home for domestic chores. Based on the results of the Harmonized European Time Use Survey, Figure 9 depicts the daily time dedicated to household chores by gender and country in 2000-2002. With respect to other European women, Spanish women are relatively more prone to do household chores in absolute terms, and devote one fifth of their time to home production. On the top of it, the gender gap with respect to the household production is striking: in Spain, women are responsible for 75% of the home production, against 59% in Sweden.

Figure 9: Share of Daily Time dedicated to Domestic Chores (%), by Gender and Country



[20] Datasource: EIGE European Institute for Gender Equality

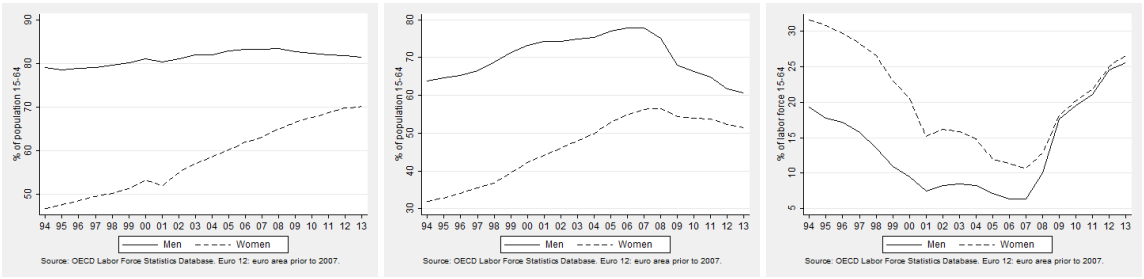
[21] As a matter of fact, Spain is at the forefront of women integration in public decision-making, and ranks fourth in terms of women's political representation at the national and EU Parliament, whose members are 40% women, after Finland, Sweden, and Belgium. A progress is also to be noticed at the top positions in the private sector: between 1994 and 2014, the share of men among members of executive board of the 50 top firms publicly quoted on the national stock exchange shrinks from 97% to 84% (91% to 81% at the EU28 level).

It has been repeatedly observed that women and men are not symmetrically affected by economic shocks: women tend to be less affected by adverse aggregate economic shocks, leading the media to coin the expression 'mancession'. A question is whether the economic crisis of 2009 had an impact on the welfare of women in Spain.

0.4.2.2 The Mancession in the Economy

A number of studies have shown that during recessions, the unemployment rate rises more for men than for women (Wall, 2009, Albanesi and Sahin, 2013). Empirically, for the US, the 'mancession' hypothesis is clearly supported by the data: during the Great Recession, men face higher unemployment rates than women due to a combination of higher job separation rate and lower employment probability (Sierminska and Takhtamanova, 2010). According to Cho and Newhouse (2013), labor markets of middle-income countries are also witnessing a change in the employment gap in favor of women.[22]

Figure 10: Spanish Labor Supply 1994-2013, by Gender



(a) Participation Rate **(b)** Employment Rate **(c)** Unemploment Rate

Figure 10 depicts the trends by gender on the Spanish labor market. The 'mancession' phenomenon is striking. Between 1994 and 2007, Spanish women aged 15-64 are twice as likely to be unemployed as men from the similar age group (Figure 10c). During 2008, the employment gap shrinks dramatically and by 2009, women are as likely as men to be unemployed. Since the labor supply of women is more elastic to the wage rate, the decreasing employment gap could simply reflect a discouragement effect. If unemployed women enter inactivity, their unemployment rate mechanically decreases - or increases at a slower pace.

[22]Certainly, this view can be challenged by a certain number of arguments. For instance, in the US case, Albelda and Karamessini (2013) find that women, who are historically over-represented in the public sector, have safer jobs, but are affected by state and local government budget cuts in response to declining tax revenues induced by the recession. Similarly, in the developing countries, the ILO (2010) report points out that the exporting industries essentially employ unskilled women, and are simultaneously immediately affected by international economic crises. Finally, women may be hit outside the labor market, and suffer from the burden of a higher home production (Sabarwal et al., 2011).

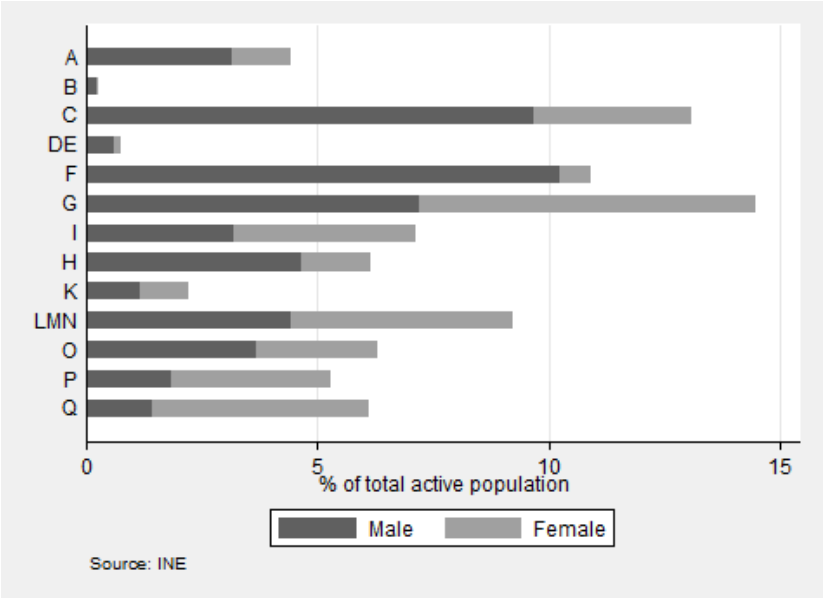
As depicted on Figure 10a, the labor market participation of married women grows steadily during the period, so that the labor market participation alone cannot explain the shrinking unemployment gap. On the opposite, men tend to withdraw from the labor force, which suggests that the gap could actually widen in *favor* of women.

The existing literature explains the 'mancession' phenomenon by the gender composition of the different economic sectors. A negative shock on the aggregate demand has a procyclical adverse effects on the expenditure in durable goods and investment in housing, which are two male dominated sectors (Sahin et al., 2010). In normal times, Olivetti and Petrongolo (2014) exploit the pattern of gender and skill composition of the labor demand, stemming from shifts in the structure of the economy of the US, Canada, and 13 European countries. The key assumption is that differences in the industry composition of employment shape the structure of labor demand, thus the gender wage gap across countries. They show that the difference in the service share is indeed an important determinant of the cross-country variation in women's labor market outcomes. Finally, during recessions, as shown by Albanesi and Sahin (2013) on 17 OECD countries, gender differences in the composition of the workforce in the industry are key to explain the evolution of the gender employment gap, while they do not explain gender differences in employment growth during recoveries.

Figure 11 allows to get an deeper look at the Spanish mancession episode. Figure 11a first displays the gender ratio within each sector of the economy. Clearly, the sectoral composition of the labor force is not gender neutral. While some sectors are clearly male dominated, like quarrying (B), energy and water supply (DE), or construction (F), some other sectors are rather female dominated, such as education (P) or health care (Q). Figure 11b then plots the production growth according to these sectors. Female dominated sectors are much less exposed to the 2009 depression. In 2009, the GDP declined by less than 5% in the sector of education, public administration, defense, health (OPQ). The sectors with the highest male composition from Figure 11a: agriculture (A), industry (BCDE), construction (F) are highlighted in bold. These sectors clearly experienced a much higher decrease in GDP during the 2008-2011 period. In 2009, the primary sector and the industry sector respectively experienced a 7% and a 15% recession.

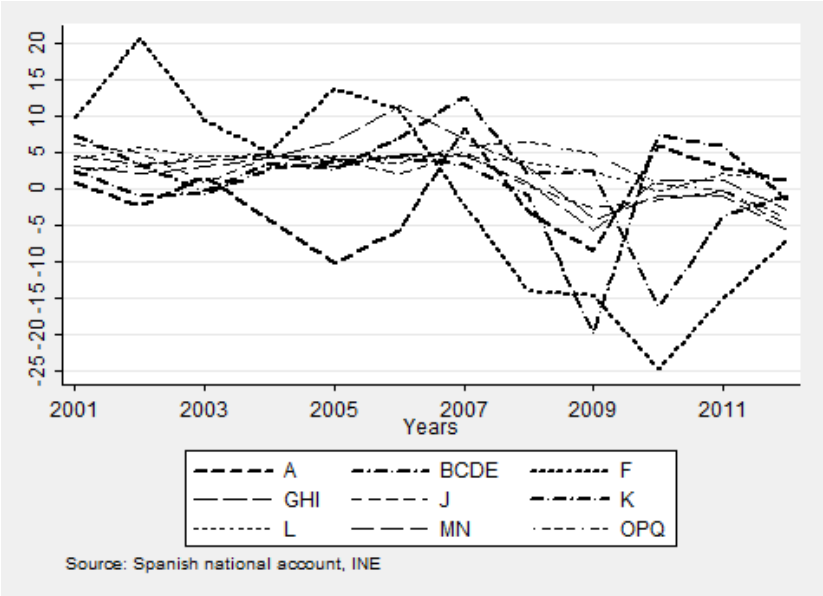
Clearly, the sector hit the hardest was the construction sector (F), which found itself at the epicenter of the 'mancession' episode in Spain. First, the sector displays the highest male-to-female employment ratio: in 2009, 91.4 of the workers within the sector are men

Figure 11: Spanish Economy 2006-2011, by Economic Sector



(a) Gender Composition (Mean 2006-2011)

Notes: Encuesta de población activa, INE. The gender composition of the total workforce is 60%-40% in favor of men.



(b) Production Growth Rate, 2001-2012

Notes: National Spanish Account, INE. **A** Agri., forest., etc. **B** Mining and quarrying **C** Manufacturing **DE** Electricity, gas, water **F** Construction **G** Wholesale, retail, veh. repair **H** Transp., storage, comm. **I** Accommodation, food services **K** Financial, insurance **LMN** Public admin., def., social sec. **O** Public admin., def., social sec. **P** Education **Q** Health, social work.

(ILO, 2010). Second, in the context of a bursting housing bubble, the construction sector was particularly exposed: in 2007, it represented 12% of the Spanish GDP: by 2012, the GDP in construction had shrunk to hardly 59.6% of its 2007 level. Pissarides (2013) evaluates that the construction sector is responsible for ten percentage points of the post crisis Spanish unemployment rate. According to Bentolila et al. (2012), the reduction of employment in this sector was 36%, with regional rates varying between 18-55%.

0.4.2.3 The Mancession at Home

The economic literature has reported the existence of a 'mancession', but has left unexplored the possible consequences of the Great recession on the distribution of resources within the families.

A few very recent papers revisit the household decision-making in the context of economic crises or idiosyncratic shocks and explicitly investigate whether the household plays an insurance role during hard times, or leaves room for bargaining between its members. Liu (2009) studies how spousal labor supply affects the bargaining over private consumption between spouses, relying on a collective model of labor supply where the outcomes of bargaining are determined by the sharing rule in line with Chiappori (1992). Using US panel data, he finds that the job loss of the husband is associated with a 15% decrease in his share over private consumption. Using the same data, Zhang (2014) extends the existing static collective model of Chiappori (1992) to a dynamic collective model with labor supply allowing for wage shocks effects within the sharing rule, with the aim to study whether and how household labor supply provides an insurance against wage shocks. Indeed, when they exist, the within-household labor supply adjustments are mostly explained by an insurance mechanism. Ortigueira and Siassi (2013) aim at measuring the quantitative effect of the risk-sharing allowed by the marriage institution. They propose a model where workers are subject to idiosyncratic employment risk and where capital markets are incomplete. Doing a calibration exercise on US data, they find that precautionary savings are half the size of those generated by a similar economy but which would lack access to family-based informal insurance. Intrahousehold risk-sharing is higher among wealth-poor households: wealth-rich households rely on savings to smooth their consumption against shocks, while wealth-poor households essentially rely on labor supply of the life partners.

Only a handful of papers relies on economic shocks to derive implications regarding the distribution of welfare within the household. Duflo and Udry (2004) study resource allocation within households in Côte d'Ivoire. They establish that husbands and wives farm different plots, with gender-specific crops. They rely on the fact that crops are heterogeneously exposed to rainfall shocks, and exploit these shocks to show that the composition of household expenditure is sensitive to the gender of the recipient of the shock, as well as to the origin of the income. More precisely, rainfall-induced variations in income from women-specific crops shift the household expenditure towards food. Social norm delimits the use of profits from yam cultivation, which is carried out by men, and indeed rainfall shocks are transmitted to expenditure on education. Stating that the wage gap dramatically evolved in favor of women during the post-communist transition period, Lacroix and Radtchenko (2011) estimate a collective model of labor supply on Russian data and allow the sharing rule to change discretely during the 1998 financial crisis. They show that the parameters of the derivative of the sharing-rule have shifted to a new equilibrium in the aftermath of the crisis: with respect to the previous period, husbands transfer relatively less to their spouses, and wives relatively more.

With the exception of Duflo and Udry (2004), who use consumption data and a country and time-specific empirical strategy to identify the insurance and coping mechanisms, the existing literature has two important limitations. First, all the existing papers rely on collective models of labor supply. Because they build on major assumptions regarding leisure complementary and susbtitutability between spouses, collective models of labor supply are less convincing than collective models of consumption decisions in determining the share of resources accruing to each spouse. Furthermore, with the exception of Duflo and Udry (2004) and Lacroix and Radtchenko (2011), the exogeneity of the idiosyncratic wage and unemployment shocks is not fully motivated, so that the interpretation in terms of insurance or bargaining is subject to caution.

With respect to the existing literature, the Great recession represents an adverse economic shock with attractive exogeneity properties, and adds an alternative, credible distribution factor to the collective model empirical toolbox. So far, the distribution factors that have been suggested in the literature essentially include relative incomes and wages (Bourguignon et al., 2009). However, such variables also captures labor supply decisions, human capital investments and even investments for the marriage market. By contrast, the gender-specific

variation in the labor market outcomes caused by the mancession is an exogenous shift in gender relative opportunities on the Spanish labor market, so that the effect of opportunities can be singled out from the effect of the current employment situation of the spouses. In addition, data on consumption is available form the Spanish statistical institute, so that unlike in the previous studies, a collective model of *consumption* can be built to recover the parameters of the full sharing rule. A model accounting for the mancession episode fills a gap between the seminal paper of Browning et al. (2013), which explicitely depends on the price variations to identify the sharing rule and the scale economies, and Lewbel and Pendakur (2008), who propose a simplified identification of the sharing rule under a single price regime.

0.5 Structure of the Dissertation

Aggregate shocks have important short and long run consequences on the welfare of individuals. The present work proposes to study the effect of such shocks on fundamental aspects of the individual decision-making and for different time scopes, namely the labor supply, the investment in human capital, and the consumption decision in the short and longer run. The figure of the household is alternatively a risk-sharing social structure allowing individuals to partially smooth the effects of a negative economic shock, and a bargaining social structure in which individuals maximize their private utility while benefiting from the sharing of resources and from scale economies. Overall, my empirical illustrations, namely the Argentine crisis of 2001-2002, and the Spanish economic crisis starting in 2009, are grounded on theoretical predictions from development, labor and family economics.

Chapter 1: 'Intra-Household Coping Mechanisms in Hard Times: the Added Worker Effect in the 2001 Argentine Economic Crisis'

Chapter 1 deals with a specific market-oriented shock-coping strategy, commonly known in the literature as the 'added-worker' effect. Dating back to Woytinsky (1940), the AWE hypothesis states that in the eventuality of a shock on the primary earner in the household, secondary workers would enter the labor market as imperfect substitutes to smooth consumption profile at the household level. Using an Argentine panel dataset between 2000-2002, the chapter shows that the added-worker effect (AWE) plays an important role in coping against aggregate shocks, even in cases where the discouragement effect prevails at a macroeconomic

scale. A standard view in the literature is that women's participation decision is endogenous to her husband's earnings, for individuals marry alike, and because the labor-leisure trade-off is a joint decision within the household. I overcome this issue by using the 2001 economic crisis in Argentina as a natural experiment. I instrument the endogenous variation in the labor market outcomes of household heads using the collapse of the Convertibility era as a natural experiment, and measure its causal impact on their spouses' labor supply decisions. Within this framework, I show that a woman whose husband experiences the average decline in income (resp. looses his job) is 4.4 percentage points more likely to enter the labor market (resp. 43 percentage points). Out of four new entrants, three work at least one hour weekly, and one even finds a full-time job. An heterogeneous analysis shows that the AWE essentially affects the 50% lower tail of the income distribution; the AWE is divided by 2 in case the household owns his house, and is statistically 0 in case the income loss is at least partially compensated with unemployment benefits. In a broader perspective, the AWE detected with this method is higher than the traditional cross-wage elasticity, suggesting that such a proxy performs poorly. The AWE at the micro level (+ 4.4 percentage points) is higher than the actual increase in participation observed at the macro level (+ 1 percentage point), suggesting a strong discouragement effect on participation for women whose spouse is less exposed to shocks. Results are robust to alternative definitions of the instrument, a placebo test, a test for panel attrition with respect to variables of interest, as well as a sensitivity analysis on the definition of female participation checking for possible time-varying confounders.

Chapter 2: 'Initial Conditions and Lifetime Labor Market Outcomes: The Persistent Cohort Effect of Graduating in a Crisis'

The recent literature on industrialized countries highlights a persistent or even permanent penalty of graduating in a bad economy. A combination of factors – a higher volatility of the business cycle, coupled with an embryonic social safety net and a deeply divided two-tier labor market – suggests that emerging economies should be particularly concerned with the 'cohort effect', namely, the fact that graduates from a same cohort statistically have a common fate on the labor market. Is there such a thing as a 'lucky' cohort in developing countries? How many years of experience on the labor market are requested to compensate for the initial wage penalty of graduating in a depressed economy? Measuring the extent of a cohort effect for emerging economies is important, because lucky and unlucky cohorts face dramatically different opportunities in terms of lifetime employability and earnings. So

far, only a handful of papers have undertaken the task to document the persistence puzzle for emerging economies. At the origin of this gap lies the common belief that good quality panel data is an absolute requirement. Chapter 2 considers the Argentine crisis in a long term perspective, and shows that it is possible to extract a substantial amount of information form a very standard household cross-sectional survey data. Using *EPH* data between 1995-2012, I focus on a subsample of active working age males born in Argentina, who graduated between 1995 and 2011. I reconstitute the wage profile and employment probability of various cohorts of mandatory school graduates, optional secondary graduates, and university scholars, based on their graduation year, so that I can compare their wage profiles and employability. First, I observe that current labor market outcomes are indeed correlated with past initial conditions, suggesting a cohort effect similar in magnitude to the effects observed for the developed economies. While mandatory school graduates are affected quantitatively through a persistently lower employment probability lasting up to ten years after completion, high school and college graduates are penalized by a permanently lower wage rate indicating that the qualitative content of the task is lower. Then, I implement a double selection probit with partial observability to control for the sequential schooling decisions. When accounting for the selection, the persistent effect is even higher, indicating that the sample composition biases the observed persistence downwards. Finally, I concentrate on the qualitative data reported by wage earners at time of survey, and attempt to provide some intuition regarding the mechanisms driving the persistence. The intricate pattern of correlations between initial conditions upon graduation and the current characteristics of the job suggests that for college graduates, the wage gap depends on a long-lasting differential in task-specific human capital related to an initial mismatch in skills at first placement. For mandatory school graduates, it seems that the fundamental duality of the Argentine labor market explains why individuals are durably trapped into bad quality contract types. In both cases, between-firm mobility seems to play a strategic role in the progressive catch-up: the propensity to be currently on-the-job search is found to mitigate the impact of bad initial conditions on the current wage.

Chapter 3: 'Crisis at Home: Mancession-Induced Change in Intrahousehold Distribution' (from an article co-written with O. Bargain)

It is known that adverse aggregate economic shocks deeply affect the welfare of households in absolute terms. In addition, because households have an unequal access to risk man-

agement strategies, poor households simultaneously tend to be more vulnerable to shocks, so that adverse economic shocks are inequality-increasing. While there exists widespread evidence over the redistributive impacts of economic crises between the households, little is known about the changes in the relative welfare of individuals living in these households. A virtually substantial amount of redistribution happening at the individual level is simply ignored. This question is particularly stringent for the debate over the relative welfare of men and women within the couple, as well as the welfare of children with respect to both parents' allocation choices. The reasons for this literature gap are twofold. First, the economic theory generally considers that the decision-making of a household should be conceptually equivalent to the mechanism driving individual choices, and ignores the strategic interactions at stake within the household. In the context of an economic crisis, this unitary vision is exacerbated, because family is primarily seen as an important risk-coping mechanism. Second, the unitary conception shows through the data collection process : consumption data are collected at the household level, so that the possibility to empirically measure the intrahousehold redistribution is limited.

The Great Recession has often been referred to as a 'mancession' in several countries including Spain and the US. Although women did experience substantial job losses during the recession, the crisis hit men harder than women for they were disproportionately represented in heavily affected sectors such as construction, manufacturing and financial services. To date, nothing is known about the way the mancession has translated within the household. More generally, we know little about how labor market opportunities affect intrahousehold distribution. To study this issue, Chapter 3 exploits the exogenous, gender-oriented evolution of the economic environment in Spain. Using consumption data from 2006-2011, we adapt and estimate a collective model of consumption which allows testing original distribution factors. In particular, we allow the sharing rule to depend on regional-time variation in relative job opportunities during the mancession. Looking more specifically at the gender-differentiated shock from the construction sector, we also suggest a difference-in-difference estimation originally embedded in the structural model. We find that the mancession strongly impacts the way the resources are shared within the household. On average, following the improvement of their relative opportunities on the labor market, the resource share accruing to Spanish wives increased by around 5-6 percent in stable marriages. This effect is similar, in

magnitude, to the distributional impact of actual husbands' unemployment. The difference-in-difference estimates confirm that most of the effect is driven by the construction sector.

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Chapter 1

Intra-Household Coping Mechanisms in Hard Times: the Added Worker Effect in the 2001 Argentine Economic Crisis

1.1 Introduction

Along her life cycle, an individual is repeatedly exposed to a wide variety of idiosyncratic shocks, like health or displacement shocks, as well as aggregate shocks, like economic turmoil, political conflicts, or climate change. These shocks may cause a transitory or permanent wealth loss. Transitory shocks like displacement or economic crises affect individuals because they usually impact their ability to supply work. In theory, this should not lead to any particular strategic adjustment, because temporary demand for credit allows them to smooth their consumption along the life cycle. However, given that information is imperfect and credit markets are constrained, shocks come at cost in terms of well-being, in so far people are unable to maintain their consumption at an optimal level.

Clearly, household formation plays an important role in all coping responses against risks and shocks. Indeed, insurance is one of the traditional functions of marriage (Gong, 2011), in so far it allows for *ex ante* risk diversification. In addition, shock-coping decisions taken at the intrahousehold level are *de facto* more flexible than the set of strategies available to a single

individual, because households are assumed to pool their resources in time and income.[1] This is particularly the case for market-oriented strategies. Indeed, single individuals can only increase their labor supply at the intensive margin. On the opposite, households can extend their labor supply by having one or more extra members entering the labor market. Taking its origin in Woytinsky (1940), the *added worker effect* hypothesis (henceforth AWE) states that in the eventuality of a shock on the primary earner in the household, secondary workers would enter the labor market as imperfect substitutes to smooth consumption profile at the household level.

In theory[2], assuming complete markets and perfect information, the AWE is expected to be small for two reasons. At the individual level, the first life cycle models show that the income reduction from a temporary shock is negligible in relation to lifetime income (Heckman and Macurdy, 1980). Intertemporal allocation of other members' time should thus not be too distorted by the transitory unemployment spell or income shock hitting the household head. Second, at the aggregate level, a discouraged worker effect should prevail over the added worker effect: even if spouses individually increase their labor market participation in response to a negative shock affecting the household head, the depressed economy is expected to drive even more spouses to withdraw from the labor market, the overall impact of the negative shock on additional workers' participation thus being negative.

However, in practice, the magnitude of the AWE depends on several factors, namely the availability of alternative strategies to smooth income loss; the degree of imperfection of markets for credit and liquidity constraint limiting access to consumption smoothing through borrowing (Bingley and Walker, 2001); or the perception of unemployment shocks as a new information about negative lifetime income prospects (Dynarski and Sheffrin, 1987). Taking this uncertainty into account, Stephens (2002) extends the life cycle model of labor supply under uncertainty of MaCurdy (1985) to a two adult household, allowing for a substantial temporary added worker effects. As in MaCurdy (1985)'s seminal model, the stochastic marginal utility of wealth is the key determinant of the labor supplied by the family members. At each period, the household computes its marginal utility of wealth by updating its expected value with the available new piece of information carried by unanticipated

[1] This income pooling hypothesis corresponds to a unitary conception of the household. Collective models have proven their empirical consistency and repeatedly rejected full income pooling (see e.g. Chiappori (1992) and Duflo and Udry (2004)). However, in this chapter, we adopt a unitary framework. Sadly, our dataset does provide the necessary information to test the adequacy of the unitary model.

[2] For a detailed description of the models and their implication regarding the AWE, see Section 0.2.1.

wealth shocks. Accordingly, family members readjust their current labor supply from period to period. Within this uncertain lifetime environment, an increase in other members' labor force participation thus represents an optimal response to temporary shocks on the household head's occupation. The overall effect of shocks in a husband's earnings on family members' participation decision is an open empirical question depending on the magnitude of the effects at stake.[3]

Empirically, the literature testing the existence of this AWE reports mixed evidence.[4] While early, seminal studies (Mincer, 1962, Heckman and MaCurdy, 1982) established that transitory shocks on husband's labor market outcomes have an impact on their spouse's labor supply (also see Lundberg (1985), Maloney (1987)), other studies failed to highlight any significant effect (e.g. Layard et al. (1980) on UK data; Pencavel (1982) and later Maloney (1991) on US data). Recent developments in the literature on AWE (Bingley and Walker, 2001, Stephens, 2002, Gong, 2011) explain this inability to reach a consensus by several methodological issues, namely the differences in the definition of the AWE (or in the underlying labor supply model), or weaknesses in the identification strategy. Taking these flaws into account, the most recent studies tend to favor the AWE hypothesis. Using panel data to investigate fluctuations in child labor and schooling attendance in rural India, Jacoby and Skoufias (1997) show that child labor varies with income shocks, suggesting that child labor does cope against adverse economic shocks. In Tanzania, Beegle et al. (2006) find that transitory income shocks lead to an increase in child labor, particularly in households who have no asset. Karaoglan and Okten (2015) concentrate on the AWE for spouses, and show that between 2000 and 2010, Turkish women increased their participation by 4 to 8 percent following their husband's job loss. The effect also appears in developed economies, mostly in cases where access to social security is limited (Cullen and Gruber, 2000, Hardoy and Schoene, 2013), as well as where the tax system is not too discouraging for the participation of married women (Harkness and Evans, 2011). Using PSID data from 1968 to 1992, Stephens (2002) revisits the AWE in the US and shows that the number of working hours of married women increases by as much as 11 percent in the four years following their husband's displacement. In Japan, over the period 1993-2004, the AWE accounts for 2.1 to 2.7 percent of the increase in married women labor market participation (Kohara, 2010). Between 2001 and 2007, Australian women with a husband experiencing a job loss are 2.8 percentage points more likely to be employed full-time

[3] See the General Introduction for an in-depth presentation of labor supply models.
[4] For a detailed literature review, see Section 0.2.2.

than similar women with employed husband (Gong, 2011). During the 2007-2009 recession in the US, a married woman with displaced husband is 4 percentage points more likely to participate in the labor market than her counterpart married to an employed husband (Starr, 2013).

In Argentina, the AWE hypothesis is generally acknowledged as a main explanatory factor explaining the increase in labor market participation of married women after 1990 (., 2005). Between 1970 and 1990, following the same trend as other countries in the *Cono Sur* (Argentine, Brazil, Chile, Uruguay), female participation rate had risen from 31.4 to 50.2 percent of the female working age population. However, before 1985, this trend was mainly driven by traditional factors, namely changes in fertility and education, combined with a structural change in economic activities towards services. In the aftermath of the 1989 hyperinflation, a series of liberal measures were undertaken, implying waves of privatization and labor market flexibility measures, which created the conditions for economic growth, at the cost of a burst in unemployment. The increase in unemployment coexisted with an increase in married women participation, giving credit to the AWE hypothesis. Building on this stylized fact, Cerrutti (2000) explores the relationship between the increasing employment instability of male heads of household and the increasing female labor force participation using panel data. She finds that between 1991 and 1994, in the Great Buenos Aires area, a married woman whose husband experiences instability in his employment status is twice as likely to enter the labor market than a woman whose husband remains employed over time.

However, this positive correlation between a growing husband unemployment rate and female labor market participation faded out in the second half of the decade. In 2001, male unemployment rate kept up with its historically high 1995 level, whereas female participation slightly decreased. Did the AWE disappear completely? Could it be that the 1991-1994 AWE exhausted the stock of married women with the lowest reservation wages? Or did the discouraged worker effect prevail over the AWE at the aggregate level?[5]

Using the *Encuesta permanente de hogares* (EPH) panel data between 2000 and 2002, this chapter aims at assessing the existence and magnitude of the AWE during the 2001 economic crisis in Argentina. Identifying the causal effect of a household head unemployment or

[5]In their study of the AWE in Spain between 1968-2007, Congregado et al. (2011) find that the AWE dominates the discouraged worker effect, but only when unemployment is below a 11 percent threshold. Above this threshold, the two effects cancel each other out: married women participation rate is not influenced by further deterioration of economic conditions. If this is the case, the AWE disappears at the aggregate data level, but should still be observed at the individual data level.

income loss on his spouse's labor market outcomes is challenging because spouses choose simultaneously their time allocation between leisure, home and market production according to a utility function including both spouses' preferences. Female labor supply is the result of a household maximisation process that evolves taking into account changes in market wages and tastes, or alternatively the result of a bargaining process in case of a collective intrahousehold labor supply model.[6] Without a proper identification strategy, the AWE would spuriously account for these decisions that are by no mean coping strategies against unexpected shocks. In this chapter, we take advantage of the 2001-2002 economic crisis episode. The sudden end of the Convertibility era in December 2001 creates an unanticipated shock, asymmetrically affecting the different economic sectors. This exogenous, asymmetric variation is exploited as an instrument for the observed variations in labor earnings and employment status of the household head. The EPH database provides information on households directly before and after the sudden collapse of the Convertibility. By selecting the variations in income and unemployment that are unrelated to the classical intrahousehold bargaining process, the IV estimation allows for a causal identification: under the common trend and exclusion restriction assumptions, this estimation strategy yields an unbiased estimate of the AWE in Argentina.

This chapter's contribution to the literature is threefold. A first distinguishing feature of this chapter is its innovative identification strategy. The fact that panel data are an absolute requirement for studying household-level labor supply responses to shocks is well-known, and has been repeatedly assessed in the literature (MaCurdy, 1985, Blundell and Macurdy, 1999, Stephens, 2002). Nonetheless, studying the effects of an economic shock in emerging countries rarely involves panel data analyses. A notable exception to this criticism is Cerrutti (2000)'s paper on the AWE in the Great Buenos Aires area. However, in our view, even when using panel data, the estimated positive correlation between the household head's employment stability and the married woman's entry on the labor market captures other effects unrelated to the AWE. First, such a correlation appears whenever spouses' leisure times are substitutes, which would be unrelated to shock-coping. Second, Cerrutti (2000)'s variable of interest is a dummy standing for changes in the occupation status of the household head (job loss and job entry), not just job loss. This is problematic, because it makes it impossible

[6]For example, if leisure of both spouses are substitutes, the correlation between the labor supply decisions of both spouses within the household simply picks up the intrahousehold decision process where husbands and wives commonly decide of a new allocation set between labor and leisure, keeping the overall household welfare constant.

to see whether the positive correlation means that female labor supply acts as a counter or rather procyclical force with respect to the decline in family earnings due to the primary earner income loss. This chapter adds an IV strategy to the use of panel data in order to identify the AWE. Natural experiment settings using economic shocks to reveal strategical responses from households are still sparse, though promising methods (Yang, 2008). To our knowledge, this study is among the very few relying on an IV strategy to causally estimate the AWE.[7]

Second, this chapter adds to the existing literature on female labor supply and intrahousehold decision process by collecting information on labor supply decisions in an emerging economy. So far, the AWE was predominantly computed for industrialized countries, leaving aside the developing world, where the family is assumed to play an important shock-coping role in the absence of a universal social safety net. Understanding the process by which household labor allocation occurs is important for policy and project design (Haddad et al., 1997), as indirect implications of this increase in participation are unclear for own and other household members' welfare (Lundberg and Pollak, 1993, Pollak, 2005, Lim, 2000, Klasen and Pieters, 2012).

Finally, this chapter contributes to the literature on AWE by stating the clear distinction between its aggregate and micro dimensions. It untangles the fact that the AWE at the micro level is a necessary condition for the macroeconomic AWE to exist, but that the reverse does not necessarily hold. The concept of AWE confusingly builds on two very different strands of literature that should not be assimilated. We show that the AWE should not be discarded as a candidate for female labor supply decision in Argentina, even if the negative correlation between labor outcomes of married spouses washes out at the aggregate level.

Our findings suggest that in the absence of a sufficient safety net, shock-coping is still one of the functions of marriage. A baseline regression analysis reveals that the average 32 percent decrease in husband real monthly labor income is associated with a 0.55 percentage point increase in married women participation, which represents half of the variation observed over the period at the aggregate level. A woman whose husband looses his job is 7.3 percentage points more likely to enter the labor market, 4 percentage points more likely to find an occupation, and almost 2 percentage points more likely to work full-time. When

[7] Interestingly, parallel to our work, a recent study by Ayhan (2014) investigates the AWE in Turkey. It exploits the 2008 economic crisis, and instruments the displacement of the household head with the variation in the production level of the male-dominated sectors induced by the crisis.

instrumenting for husband labor market outcomes, we find that the causal effect of a negative shock affecting the household is even higher. On average, married women are 4.4 percentage points more likely to supply labor at the extensive margin if the household head experiences the average 32% decline in labor income. If we adopt stricter definitions of participation, the effect still accounts for a 2.1 percentage points increase in married women participation over the period. In spite of the constraint on the demand side of the labor market, married women even have a 1 percentage point higher probability to find a full-time job. When a household head experiences an unexpected displacement, his spouse is 40 percentage points more likely to enter the labor market, and 35 percentage points more likely to be employed. At the intensive margin, the results are in line with expectations, but the pattern is less clear-cut. On average, following the job loss of their husband, four out of ten employed women express the willingness to work more hours. However, they face a constrained demand and this willingness to work does not effectively translate into more hours. Interesting wealth and income effects arise when studying heterogeneities in the AWE, both at the household and the spouses levels.

Section 1.2 details the empirical strategy, gives key elements of the Argentine political and economic context, and outlines the construction of the sets of instrument. Section 1.3 presents the dataset. Section 1.4 reports and comments the main results. Section 1.5 conducts robustness checks and a sensitivity analysis, and section 1.6 gives insights on heterogeneity in the AWE. The final section sums up the results and concludes.

1.2 Estimation Strategy

In order to measure the causal effect of a household head's evolution in labor market outcomes on his partner's labor supply, this chapter relies on panel data and develops an instrumental variable strategy. There are at least three reasons why panel data is preferable to a repeated cross-section for the sake of our analysis. First, empirical models based on the standard Mincer equation have no behavioral interpretation in a life-cycle framework. Indeed, when regressing hours worked on the hourly wage, the estimated coefficient captures the response of labor supply to wage changes along three directions: wage changes arising from movements along a wage profile, shifts in a wage profile, and changes in the profile slope (MaCurdy, 1981). From the theoretical discussion in Section 0.2.1, it should be clear that the use of panel data is an absolute requirement to capture the AWE. Indeed, since

the marginal utility of wealth – a key theoretical component – is household-specific and unobserved, it should be taken into account and differentiated out (Blundell and Macurdy, 1999). In addition, with labor market conditions deteriorating over the period, probabilities of being employed are likely to fall for spouses with non-employed partners as well, even if they produce an extra effort to find or keep a job. Finally, the pool of households with unemployed heads is likely to differ strongly according to whether the economy is booming or in the midst of a deep recession. A repeated cross-section would compare households that differ with respect to unobserved characteristics, and this unobserved heterogeneity would partly contribute to the measured difference in difference between a spouse with a non-employed partner and an observationally identical spouse with an employed partner (Starr, 2013).

Unlike estimations relying on cross-sectional data, fixed effect estimations thus allow to measure the correlation in labor supply decisions within the household, abstracting from spurious correlations due to unobserved differences between households. This being said, in our case, this correlation is not necessarily causal. The negative correlation between job loss of husbands and their spouse's activity is certainly at least partly driven by behavioral decisions.[8]

For this reason, we present the IV strategy below.[9] In order to estimate the causal effect of a household head's evolution in labor market outcomes W_{it} on his partner's labor supply decisions Y_{it}, this chapter relies on an instrumental variable approach combined with panel estimations controlling for individual and time fixed effects, as follows:

$$\begin{aligned} Y_{it} &= X_{it}\beta + \hat{W}_{it}\gamma + \mu_i + \phi_t + \epsilon_{it} \\ W_{it} &= X_{it}\beta' + Z_{it}\alpha + \mu_i' + \phi_t' + \epsilon_{it}' \end{aligned} \tag{1.1}$$

In equation (1.1), μ_i is the unobserved fixed effect that may be correlated with levels of W_{it}, ϕ_t is a time fixed effect, ϵ_{it} represents a time varying idiosyncratic error. X_{it} is a matrix containing a unitary vector, as well as information on time-varying household characteristics and partners' characteristics. Finally, we use an exogenous, profound economic shock Z_{it}

[8]Such a negative correlation arises whenever the leisure time of spouses are substitute to one another. The job loss of the household head is not necessarily perceived as a negative income shock exogenously affecting his spouse's participation. Unemployment can be seasonal, or correspond to a quit. In this case, no shock-coping mechanism is to be expected from the spouse, since unemployment is part of the household welfare optimization.

[9]Other strategies have been used to isolate the AWE related to unexpected shocks from behavioral motives. In particular, involuntary unemployment, and specifically plant closure events, have been used to circumvent the endogeneity issue (Stephens, 2002, Martinoty, 2014).

asymmetrically affecting household heads' labor market outcomes from December 2001 onto October 2002. The IV Z_{it} relies on a typical natural experiment framework and exploits variation in time and across sectors.

Figure 1.1: GDP Yearly Growth Rate 1991-2005, by Primary/Goods and Service Sectors

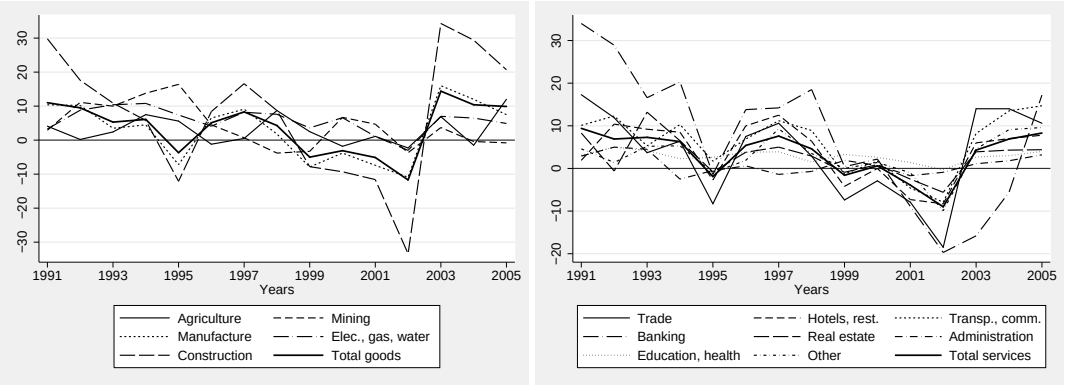

Figure 1.1 conveys the intuition behind Z_{it}. It displays the growth rates by sector between 1991 and 2005. The 2002 deep recession clearly contrasts with the growth period of 1991-1998, and even with the mild recession happening in 1999-2000, usual in a volatile emerging economy. Within the 1991-2005 period, no other recession period is to be noted, except in 1995, because of the regional contagion of the Tequila crisis in Mexico. During the 2002 economic crisis, the sectoral asymmetry in growth rates is large, and exacerbated with respect to the growth and mild recession periods. Indeed, during the growth period before 1999, asymmetries are to be noted, however the volatility is general and rather erratic – especially before 1995. During the mild recession years (1999-2001), growth rates are either around 0 for all tertiary sectors, or concentrated in a -10/+10 bandwidth for secondary sectors. After the outburst of the crisis in December 2001, the recession rates differ greatly between sectors: -30 percent for the construction sector, -20 percent for the banking sector against 0 percent growth for mining and -5 for the real estate sector in 2002.

1.2.1 Constructing the Instrumental Variables

The sudden collapse of the convertibility regime has the properties of a natural experiment. The asymmetric effects of this event on economic sectors serve as an instrument for changes in household heads' labor market outcomes between 2000 and 2002. For robustness purposes, we construct three different versions of the instrument. All of the defined instruments exploit the variation in time as well as the asymmetry between exposed and preserved economic

sectors, and control for group manipulation if the household head changed sector within the observation window. Each set of instruments thus contains three variables: a dummy variable equal to 1 if the observation was collected after December 2001, a variable indicating whether the household head belongs to a later to be exposed sector of activity[10], and an interaction term between these two variables. The sets of instruments differ only with the measure of 'exposure'. Whereas first two definitions of the instrument rely on the EPH data, the last instrument is constructed using information on GDP variations within economic sectors provided by the Argentine statistical agency.

To define the first two instrument variables sets, we first regress the labor income of the household head W_{it} on a dummy variable $shock_{it}$ equal to 1 if observation is from May or October 2002 and 0 otherwise, using a panel estimator with individual fixed effects. Then, the same estimation is run separately for each of the 22 economic sectors s, as seen in equation (1.2).

$$\begin{aligned} W_{it} &= a_0 + a_1 shock_{it} + c_{is} + u_{it} \\ W_{its} &= a_{0s} + a_{1s} shock_{it} + c_{is} + u_{its} \end{aligned} \tag{1.2}$$

The coefficient a_{1s} is a measure of sectoral exposure.[11] For the first set of instruments (*IV1*), we first define a sector s as exposed if household heads employed in this sector experience a negative and significant degradation in W_{it} between 2001 and 2002 (a_{1s} significant and negative), and if sector s suffers relatively more than other sectors (i.e., $a_{1s} > a_1$). The second instrumental variable set (*IV2*) relies on the intensity of the economic shock. It relaxes the rigidity of this asymmetry, and uses directly a_{1s} instead of the 0/1 dichotomy. In this case, the exposure dummy still defines whether sector is a later to be exposed or protected one. Finally, a third instrument set (*IV3*) is generated using sectoral GDP data between 2000 and 2002. The information is disaggregated in 13 economic sectors. The set *IV3* thus contains: the log of the GDP of the 13 sectors, the shock dummy, and the interaction between the two.

Estimates for specification (1.2) and IV definitions are presented in Appendix. The top panel of Table 1.A.1 gives results for primary and secondary sectors, and the top panel of Table 1.A.2 displays results for service sectors. Definitions of the *IV1* and *IV2* sets are reported in bottom panels of Tables 1.A.1 and 1.A.2.

[10] In case of the second and third instrument set, the dummy is replaced by the shock intensity measure.

[11] Alternatively, equation (1.2) can be estimated defining W_{it} as the household head's unemployment instead of his labor income. Results are very similar, thus not reported here.

1.2.2 Validity of the Exclusion Restriction

The validity of the estimation design presented in (1.1) is conditioned to the two following assumptions: (i) As common in linear probability models with individual fixed-effects, the empirical strategy exposed above is valid if the common trend assumption holds: no time-varying unobservable variable is allowed to affect both the interest and outcome variables; (ii) As usual in an instrumental variable approach, the exclusion restriction must hold: the asymmetrical change in labor market outcomes of the household head should have no direct influence on the labor supply decision of his spouse, except through the endogenous regressor instrumented: $cov(Z_{it}, \epsilon_{it} = 0)$. Additionally, the instrument should not be too weakly correlated with the endogenous regressors, because IV estimators perform poorly when instruments are weak (Stock and Yogo, 2002).

Under these assumptions, the IV procedure enables to capture the causal effect of W_{it} on Y_{it}. Additionally, it corrects for the attenuation bias resulting from measuring error in the labor income of the household head W_{it}.

However, these assumptions do not necessarily hold for a series of reasons. Hereafter, we provide evidence supporting the exclusion restriction Z_{it}. Most importantly, we argue that the asymmetrical change in labor market outcomes of the household head has no direct influence on the labor supply decision of his spouse, but is strongly correlated to the labor market outcomes of the household head. Indeed, on the subsample of women participating on the labor market before 2001, the wife's sector correlates poorly with her husband's. In addition, we account for the evolution in labor market opportunities for women. This allows to capture labor supply effects related to the evolution in the economic environment, but disconnected from the personal household situation. We do so by computing a wave-region-age-education hourly wage relative to the wage rate faced by males with similar characteristics, and introducing it into X_{it} in (1.1).

The *common trend* is another important hypothesis to the validity of our strategy. The common trend is not satisfied in the case where households have access to superior information and can foresee the profoundness of the oncoming economic shock, and take precautionary measures in anticipation. Understanding to what extent the shock is exogenous requires some contextual elements.[12] After the hyperinflation of 1989, Argentina followed the recommendations of the Washington Consensus in various economic areas, starting with restoring

[12] In the General Introduction, Section 0.1.3.1 recalls the recent economic history of Argentina in greater detail.

the trust in the Argentine peso by choosing the rule against the discretion. The rule was the currency board, that irremediably pegged the Argentine peso to the US dollar and launched the 'Convertibility era'. A combination of internal and external factors made the currency board difficult to sustain, but the IMF repeatedly confirmed its support and backed up its model pupil. The situation suddenly escalated in November 2001 with the freezing of accounts that started a bank run. The IMF suspended its financial support in December, and triggered the social, political and economic collapse of December 2001.

In this context, before November 2001 and the *corralito* measure, the collapse of the currency board system is likely to have been largely unanticipated by Argentine households. The deep degradation in Argentine economic indicators took economists by surprise. In October and November 2001, most predictions were optimistically announcing a zero growth or a moderate recession (McKenzie, 2004).[13] There is no reason to believe that individuals would be more informed on the gravity of their country's economic situation. Under this exogeneity assumption, the pre-crisis labour market participation decisions were not related to the imminence of a deep crisis. On the other hand, post-crisis adjustments in labor market participation can legitimately be interpreted as strategical responses to this new information. Most of the time, the effect of wages on variations in labor supply and demand is not identified, as both curves shift over time. Here, the economic shock plays the role of an exogenous labor demand curve-shifter (Angrist and Krueger, 2001), allowing to properly measure the causal effect of a shock on a husband's wage on his wife's labor force participation.

Besides the possibility of diverging trends, a second threat to the valididity of our estimation strategy is the poverty alleviation program *Jefes y jefas* extended in 2002, which could play as a *time varying confounder* and bias the estimation results. The JJH program was introduced in January under loan and technical assistance from the World Bank as an extension to the *Trabajar I* (1993) and *Trabajar II* (1996) workfare programs. Eligible to the program were unemployed household heads with at least one child under 18. Though the program was universal, 20 weekly working hours were required as a counterpart for the $150 AR\$$, in order to target the poorest households, whose members have a lower reservation wage. Following the collapse of the convertibility era, the program had been largely extended

[13] For example, the IMF (2001) predicted a 1.1 percent decline in GDP coupled with 0.5% deflation for 2002 in the December 2001 *World Economic Outlook*. These forecasts evolved rapidly in response to December 2001 events, such as January 2002 Economist Intelligence Unit Country Report who drastically revised its GDP predictions from -1% to a -7% and its inflation predictions from -0.6% to 12.7% increase in consumer price index.

from April 2002 onwards.[14] In theory, this program simply relaxed the constraint on labor demand by offering low paid activities under the market wage rate. In practice, the rapid extension of the program casts doubts on the enforcement or the work requirement.[15]

Finally, a third (standard) source of bias is related to *attrition*. As for any panel survey, attrition is of potential concern. Notably, the INDEC (2002b) reports some troubles in collecting the data for interviewers in nine areas of the Greater Buenos Aires (GBA) after the outburst of the economic and social turmoil of December 2001. According to their estimates, insecurity on field accounts for a 2.2 percentage point decrease in GBA sample's representativeness. A random assignment of these social troubles is unlikely. Mismatching represents another concern for attrition bias. As mentioned earlier, in its sampling strategy, the *EPH* uses a geographical criterion, following household structures rather than specific households. As a consequence, mismatches can lead to an attrition bias, especially if the decision to move in or out is determined by the economic environment.

Section 1.5 formally tests the robustness of the results to the intuitions exposed here. The common trend assumption is tested using data prior to 2001 within a placebo regression analysis. Windfall effects of the JJH workfare program are accounted for using a restrictive, conservative definition of female participation. Finally, the attrition bias is tested with a series of mean tests across survey waves.

1.3 Data

The data for this study comes from the *Encuesta Permanente de Hogares*, hereafter EPH. The EPH is collected by Argentina's National Statistical Agency (*Instituto Nacional de Estadisticas y Censos*, herafter INDEC) in May and October of each year in 28 main urban areas (INDEC,

[14] Decision N 565 of April 3, 2002, acknowledging that *taken into account the highly critical economic and financial situation of the Republic, has been declared a state of emergency regarding the social, economic, administrative, financial and exchange fields*, concludes: *being public and notorious the knowledge on severity of the crisis affecting [Argentina], which reaches new levels of extreme poverty, aggravated by deep productive paralysis, it is essential to take the necessary and appropriate measures to overcome the difficult situation experienced by a large segment of the population.*

[15] This workfare program is a potential source of estimate bias for two reasons. First, institutions had no possibility to know who was the head of the household, which drove women into soliciting this complementary income while husbands were searching for work – or were involved in informal activities (Galasso and Ravallion, 2004). This creates a spurious correlation between a husband unemployment and his spouse's participation decision. Second, the program allocation decision is highly decentralized and distributed according to a 'first come, first served' basis with high level of clientelism through syndicates and *piqueteros* associations (associations of unemployed individuals protesting and blocking roads to defend their right to jobs and social protection). Indeed, observers in randomly picked localities reported a strong heterogeneity in levels of control for compliance with working hours counterpart (Bosaz and al., 2003, Modolo, 2004). This windfall effect is likely to bias the measured added worker effect upwards, because the women benefiting from moral hazard or local acquaintances would otherwise not have been seeking a job.

2002a). The survey is a rotating panel: each household is followed during at most 18 months (four waves), then rotated out. Each wave contains information on employment, as well as demographic, economic, and social characteristics of roughly 90,000 individuals in 30,000 households. Non-response represents roughly 20% of the available information. Like most extensive household surveys, the survey uses a geographical criteria, and follows household dwellings, rather than specific groups of individuals. Households moving to another area are not followed. To avoid mismatching, the spouse's age cannot differ by more than one year from one wave to the next (McKenzie, 2004).

To investigate how the labor market outcomes of spouses are affected by dynamics at work within the household, we extract information on couples with working age spouses (women aged 16-60 and males aged 18-65) from the May 2000 wave to the October 2002 wave.[16] Married women receiving pension and perceiving unemployment benefits represent respectively 2.54% and 0.15% of the sample. Because their participation decision is endogenous to these income sources, and in so far they represent an extremely small group, the corresponding observations are dropped. Households whose head is retired or student are also excluded from the sample. Finally, the panel is restricted to households that are observed at least once before *and* after the end of the Convertibility era. The final sample contains 15,577 observations on working age couples with an active head between May 2000 and October 2002.[17]

In the data, the negative income shock experienced by household heads is defined as a decline in *real monthly labor income*, or alternatively as a *job loss*. Married women can respond to this negative shock experienced by their husband by supplying work at the extensive margin or at the intensive margin. As for the extensive margin, *participation* is a dummy variable equal to 1 if the spouse is currently employed or declare to be actively looking for an occupation. *Occupation* is a dummy standing for employment only, unemployed labor market participants being redefined as 0. A dummy for *full-time* employment signals whether the spouse is currently employed and works at least 21 weekly hours.

[16]The legal age for marriage is 16 for women and 18 for men. In 2001, children can theoretically work from the age of 14 ; however, children aged 14 to 16 are allowed to work up to 3 hours daily and 15 hours a week during the morning or afternoon, as long as the work is within a family business, is not hazardous, and does not interrupt schooling. Between 1994-2002, an ongoing pension reform gradually changed the pension age for men and women. The retirement age is 62 for men and 57 for women in 1994, 63/58 in 1996, 64/59 in 1998, and 65/60 since 2001. In this study, the working age for women is defined following the 2001 legislation.

[17]The main analysis is based on this sample. The robustness checks typically use a larger sample going back to the May 1998 wave.

These measures of labor supply are completed by taking into account the workfare program *Jefes y jefas de hogar* (henceforth JJH program). As explained in Section 1.2, the implementation of the program may have created windfall effects, biaising the results upwards. To account for this possibility, we redefine participation and occupation by excluding participants of the JJH workfare program from 'activity', unless they work strictly more than the minimum legal amount of hours, or declare working the legal number of hours *and* wishing to work more hours. Finally, at the intensive margin, this chapter concentrates on two labor supply measures: *actual weekly working hours*, and a dummy variable equal to 1 if the spouse expresses the willingness to work more hours.

On the whole, this set of variables at the extensive and intensive margins allows to investigate (i) whether spouses experiencing a shock at the household level supply more work than spouses experiencing no such negative shock over the period ; (ii) whether these spouses actually manage to increase their employment probability and their working hours when the constrained demand side of the labor market is taken into account.

All specifications in this chapter are estimated using panel data with individual fixed effects.[18] All individual fixed effects are thus differentiated out in the *within* estimation procedure. Time-varying variables are accounted for in case they influence married women participation into the workforce. Having additional children is a first time varying variable potentially influencing married women participation decisions. For this reason, we control for the variation in the number of pre-schooling children, children in mandatory schooling age, and children in working age. Another important time-varying variable is the availability of alternative shock coping strategies. There is no reason why households should pick only one strategy in the available set. As detailed by Frankenberg et al. (2003) in the 1997 Indonesian crisis case, households usually diversify their coping strategies to mitigate the negative effects of a shock on their well being. For this reason, and within the limits of available data, we control for alternative coping strategies using information on sources of non-labor income: labor income coming from other household members, and a series of non-labor income sources proxying for adjustment strategies (fluctuation in capital income) or network strategies (fluctuation in remittances from non-members).

Another reason for married women participation to rise could be that their opportunities on the labor market increase in absolute terms, or relatively to their male counterpart. This

[18] Serial correlation is accounted for by clustering the standard errors at the household level (Bertrand et al., 2004).

Table 1.1: Summary Statistics: Labor Market Outcomes of Both Spouses

	Mean before and after Convertibility		
	Before	After	Mean test
Labor market outcomes, female			
Participation[a] (%)	48.47	49.42	0.197
Participation[b] (%)	47.94	46.89	0.151
Unemployed (%)	5.06	5.87	0.016**
Occupation (%)	43.41	43.55	0.845
Full time[c] (%)	31.20	29.52	0.013**
Self-employed (%)	7.93	7.10	0.032**
Workfare program JJH (%)	1.70	4.62	0.000***
Hours worked	29.44	25.62	0.000***
Add. hours supplied[d] (%)	33.18	27.81	0.000***
Labor market outcomes, male			
Participation[b] (%)	99.81	99.26	0.000***
Unemployed	10.04	14.37	0.000***
Occupation	89.96	85.63	0.000***
Full time [c] (%)	81.80	75.57	0.000***
Self-employed (%)	8.77	7.84	0.022**
Workfare program JJH (%)	1.43	2.56	0.000***
Hours worked	41.68	37.30	0.000***
Add. hours supplied [d] (%)	37.77	36.44	0.196

Notes: Statistics on the 2000-2002 EPH sample of working age couples with active household head and being observed at least once before and after the currency board breakdown. P-values of differences, * p $<$ 0.1, ** p $<$ 0.05, *** p $<$ 0.01. [a] Participation is 1 if individual is employed or declare actively looking for a job. [b] Participation rate excluding workfare program beneficiaries who do not declare looking for more hours or an other occupation. [c] Full-time employment is working strictly more than 20 hours. [d] Additional hours supplied is 1 if individual is employed and declares willing to work more hours.

could be the case if the sectoral composition changes towards services. To control for this eventuality, we compute the mean unemployment rate and hourly wage rate faced by female workers at each wave-region-age-education level[19], and include them into the regression. Furthermore, we include the ratio of hourly female wage rate on hourly male wage rate, calculated at the wave-region-age-education level as well, to account for an evolution in relative hourly wages.

Tables 1.1 and 1.2 present summary statistics for outcome, interest, control and demographic variables.[20] Table 1.1 gives information on married women labor market decision and husbands' outcomes. As mentioned above, simple descriptive statistics are not supportive of

[19]There are 6 regions, 3 age categories (16-29, 30-44, 45-59) and 3 education levels (primary or less, secondary, superior education)

[20]Means of time constant variables are actually not constant between 2000-2001 and 2002 because households can be observed twice before or after the currency board collapsed.

Table 1.2: Summary Statistics: Income and Household Characteristics

	Mean before and after Convertibility		
	Before	After	Mean test
Income			
Husband monthly wage	642.70	437.80	0.000***
Wife monthly wage	219.74	154.99	0.000***
Monthly wage, other	76.76	51.49	0.000***
Pension	9.17	7.62	0.078*
Capital	5.34	2.56	0.003***
Unemployment benefits	3.99	3.69	0.742
Remittances	3.11	2.16	0.014**
Other	12.85	8.10	0.040**
Non-labor income	34.45	24.13	0.000***
Macroeconomic opportunities, female			
Mean unemployment	15.52	16.39	0.000***
Mean hourly wage	3.20	2.35	0.000***
Relative hourly wage	0.64	0.63	0.000***
Demographics, female			
Age (in years)	38.13	38.93	0.000***
Primary or less (%)	38.63	39.45	0.255
Secondary (%)	39.18	39.07	0.876
Superior (%)	22.19	21.49	0.246
Demographics, male			
Age	40.89	41.70	0.000***
Primary or less (%)	41.23	41.89	0.357
Secondary (%)	40.32	40.16	0.817
Superior (%)	18.45	17.95	0.378
Demographics, household			
Gran Buenos Aires	15.47	12.70	0.000***
North-West	20.33	20.62	0.632
North-East	12.01	12.65	0.185
Cuyo	11.31	12.07	0.106
Pampa	26.47	26.88	0.532
Patagonia	14.40	15.09	0.187
Household members			
Nb child 0-5	0.66	0.64	0.068*
Nb child 6-13	0.95	0.96	0.438
Nb child 14-17	0.39	0.41	0.046**
Nb older dependent	0.05	0.05	0.669

Notes: See Table 1.1. All Information on Income is expressed in May 1998 Pesos.

an added worker effect. Women participation increased from 48.47 to 49.42 percent between 2000 and 2002, however, this difference is not statistically significant. In case JJH beneficiaries who do not declare working 20 hours weekly nor actively seeking to work more hours are redefined as inactive, the participation even tends to decline. The same evolution is observed at the intensive margin: conditional on being occupied during the Convertibility era, married women work on average 5 hours less in 2002 than in 2000-2001. Additionally, they are not willing to work extra hours: on the opposite, the proportion of women willing to work more hours actually decreases significantly. This was to be expected because unemployment is rising between the pre and the post-convertibility periods: the labor supply mechanically decreases at the intensive margin, as part of the formerly employed married women now supply labor at the extensive margin again. Finally, as expected, the number of workfare program beneficiaries increases together with its extension decided in April 2002, and concerns 4% of married women in 2002.

Table 1.2 conveys information on other time-varying variables detailed above. Unsurprisingly, all types of non-labor income decreased, except unemployment benefits.[21] Part of this decline is related to the 30 percent inflation following the peso devaluation; the rest is either nominal decrease, or asset selling in the case of capital income.

1.4 Estimation results

1.4.1 Baseline Estimation: Fixed Effect Results

As a preliminary analysis, we generate baseline estimates from a simple linear probability model with fixed-effects:

$$Y_{it} = X_{it}\beta + W_{it}\gamma + \mu_i + \phi_t + \epsilon_{it} \tag{1.3}$$

where Y_{it} represents the labor supplied by household i's married woman in t, W_{it} stands for her spouse's labor market outcome, μ_i is the unobserved fixed effect that may be correlated with levels of W_{it}, ϕ_t is a time fixed effect, ϵ_{it} represents a time-varying idiosyncratic error, and X_{it} is a matrix containing time-varying household characteristics and partners' characteristics.

[21] As mentioned above, households with wife cashing in unemployment benefits are dropped out of the sample for endogeneity issues. Unemployment benefits still concern 1.11 percent of the sample. In 86.6 percent of the cases, unemployment benefits belong to the household head.

Results of specification (1.3) are displayed in Table 1.3. A 30 percent decrease in the labor income of the household head (which is the mean evolution in household head labor income over the period) is associated with a 0.51 percentage point increase in his spouse's probability to enter the labor market (column 1).[22] Going back to Table 1.1, this represents half of the variation in female labor supply over the period. Turning to unemployment, it appears that a married woman is 7.3 percentage points more likely to enter the workforce if her husband looses his job. Since unemployment probability for married men rises by 4.3 percentage points, this overall unemployment is related to a 0.3 percentage point increase in female participation. Accounting for potential windfall effects generated by the introduction of the workfare program does not dramatically change the results (column 2). As it was to be expected in such a depressed context, the added participants do not all find a job. Still, employment represents more than two third of the additional workforce (column 3) related to husband's losses in labor income or employment, half of which translating into full-time employment (column 5).

Finally, employed married women do wish to work more hours in case their husband experiences a negative shock on the labor market. The overall decline in income is related to a 0.3 percentage point increase in their probability to declare wanting additional working hours (column 6). However, at the intensive margin, this extra labor supply does not translate into more actual working hours (column 7).[23]

1.4.2 IV Estimation Results

[22] The fact that this effect could be driven by women *withdrawing* from the labor market when their husband reenters employment or get a better paycheck is a legitimate concern. To rule out this possibility, we run the same estimations on the subsample of wives *entering the labor force* after the end of the Convertibility. As expected, using specification (1.3), the negative effect of the household head income on participation holds. This means that the effect is not driven by women withdrawing from the labor force. The size of the IV estimates more than doubles, and the precision increases.

[23] For the sake of completeness, we run a symmetric regression analysis with husbands' labor market outcomes as a dependent variable, explained by changes in their spouse's income or employment status. Since we concentrate on active women, the sample size shrinks down to half. Coefficients of interest are of expected sign, but of a much smaller magnitude, and not significantly different from 0.

Table 1.3: Female Labor Market Participation and their Spouse Labor Market Outcomes – Linear Probability Results

	Extensive margin					Intensive margin	
	(1) Part	(2) Part^{+}	(3) Occup	(4) Occup^{+}	(5) Full-time	(6) Wish more hours	(7) Hours worked
Household head monthly wage	−0.017***	−0.013***	−0.013***	−0.009***	−0.004*	−0.010**	−0.059
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.097)
Household head unemployment	0.073***	0.059***	0.053***	0.040***	0.017*	0.069***	0.421
	(0.013)	(0.013)	(0.012)	(0.012)	(0.010)	(0.024)	(0.573)
Observations	18755	18755	18755	18755	18755	7944	7944

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the individual level. $^{+}$Restrictive definition of participation and occupation: excludes JJH workfare program participants, unless they declare working strictly more than the legal amount, or 20 hours and wishing to work more hours.

Estimates from linear-probability regressions with individual fixed effects. The following time-varying variables are included into the estimation: *macroeconomic opportunities for female suppliers* (mean unemployment rate at year-region-age level, log mean hourly wage rate at year-region-age level, relative hourly wage rate with respect to male counterparts at year-region-age level), *household composition* (number of children under schooling age, number of children at compulsory schooling age, number of children in working age and under 18, number of third generation parents), *alternative sources of income* (other labor income, pension, capital income, unemployment indemnities, remittances, other), and *time fixed effects* for each observation wave.

Table 1.4: The Asymmetric Breakdown of the Convertibility Era and Spouses' Labor market Outcomes: First Stage and Reduced Form Estimations

	First stage		Reduced form						
	Household head monthly wage	Household head unemployment	Part	Part^{+}	Occup	Occup^{+}	Full-time	Wish more hours	Hours worked
Exposed sector	0.093	0.016	−0.020	−0.012	−0.020	−0.012	−0.009	0.036	0.349
	(0.065)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)	(0.011)	(0.025)	(0.671)
Shock (2002)	−0.160***	−0.026***	0.047***	0.009	0.030***	−0.008	0.012	−0.013	−0.422
	(0.050)	(0.009)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)	(0.022)	(0.591)
Shock ∗ Exposed sector	−0.409***	0.081***	0.046***	0.031***	0.040***	0.025**	0.010	0.012	−0.665
	(0.051)	(0.009)	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.023)	(0.548)
F-stat FS	32.63	30.60							
Exposed sector	0.069	0.019	−0.017	−0.008	−0.019	−0.010	−0.007	0.030	0.368
	(0.063)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.010)	(0.024)	(0.656)
Shock (2002)	0.251***	−0.114***	0.003	−0.013	−0.012	−0.028*	0.007	−0.049	0.436
	(0.078)	(0.014)	(0.017)	(0.017)	(0.016)	(0.015)	(0.015)	(0.033)	(0.875)
Shock ∗ Exposed sector	−0.932***	0.195***	0.102***	0.057**	0.094***	0.049**	0.016	0.068	−1.857
	(0.111)	(0.021)	(0.022)	(0.022)	(0.021)	(0.020)	(0.018)	(0.046)	(1.144)
F-stat FS	33.83	34.45							
Sectoral log GDP	0.001	−0.046***	−0.008	0.001	0.001	0.010	0.001	−0.035	0.792
	(0.064)	(0.012)	(0.013)	(0.013)	(0.012)	(0.012)	(0.011)	(0.025)	(0.658)
	(0.050)	(0.009)	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.023)	(0.553)
Shock (2002)	−1.452***	0.273***	0.190*	0.106	0.251**	0.168*	0.101	0.277	1.725
	(0.495)	(0.089)	(0.106)	(0.105)	(0.098)	(0.095)	(0.091)	(0.226)	(5.447)
Shock ∗ Sectoral log GDP	0.117**	−0.028***	−0.013	−0.009	−0.021**	−0.017*	−0.009	−0.030	−0.233
F-stat FS	15.89	12.82							

Notes: See Table 1.3. Each set of instruments contains 3 variables: a time dummy variable equal to 1 after the economic shock ; a dummy variable equal to 1 if the employment sector of the household head is a later to be exposed sector ; an interaction term between the time dummy and a measure of the exposure intensity. In IV1, this exposure is defined as a dummy variable; IV2 adopts a continuous intensity measure ; IV3 relies on variations in sectoral GDP.

Following the empirical strategy defined in Section 1.2, equation (1.1) is estimated using instrumental variables Z_{it}. Control variables X_{it} are similar to the variables presented for the preliminary analysis in Section 1.3.[24]

Table 1.4 reports the first stage (left hand side panel) and reduced form results (right hand side panel). Looking at the first stage, the coefficients are strongly significant, and of expected sign: husbands working in exposed sectors experience a higher decrease in labor income, and a higher probability to lose their job than the other household heads. Correspondingly, the F-stat are all above 10, ruling out the issue of weak instruments. On the whole, the first stage results suggest that the chosen variables qualify for instrumentation. Considering the reduced form, the exposure to the shock is a good explanatory variable for the variation in married women participation. For example, looking at the instrument set *IV1*, the fact that a husband is working in an exposed sector makes a wife 4.6 percentage points more likely to enter the labor market after 2001. Note that on the opposite, the IV sets correlate poorly with the intensive margin measures of female participation.

Tables 1.5 and 1.6 present the results of the estimation of equation (1.1), using the three sets of instrumental variables and instrumenting for two variables of interest, namely the labor income and unemployment status of the household head (Table 1.5) and unemployment (Tables 1.6).

Results displayed in Table 1.5 are consistent across all specifications of the instruments. We first look at participation increases at the extensive margin. A 1 percentage point decrease in husband unemployment generates a 0.14 percentage point increase in female labor market participation. Considering that the household head real wage decreased by 32% between 2000 and 2002 (see Table 1.2), this implies that the AWE generated a 4.4 percentage point increase in female participation. This is clearly superior to the 1 percentage point increase observed at the aggregate level, meaning that the AWE is indeed offset by an important discouraged worker effect.

Since the JJH workfare program is a potential confounder, we single out and exclude the program beneficiaries who declare working 20 required hours or less, or work exactly the 20 hours without explicitely wish to work more hours. Almost half of the program beneficiaries

[24]Only time fixed effects are accounted for differently. Indeed, time already appears within the instrumentation procedure through a pre/post convertibility dummy variable, because the identification relies on sectoral differences before and after the collapse of convertibility. A complete set of semestrial time fixed effects is collinear to the pre/post dummy. Within each of the pre and post periods, time fixed effects are accounted for. Reference categories are October 2001 for the *pre* period, and October 2002 for the *post* period.

Table 1.5: Female Labor Market Participation and their Spouse's Labor Income – IV Results

	Extensive margin					Intensive margin	
	(1) Part	(2) Part^{+}	(3) Occup	(4) Occup^{+}	(5) Full	(6) Wish more hours	(7) Hours worked
IV1							
Household head monthly wage	−0.142***	−0.071***	−0.110***	−0.038**	−0.032*	−0.013	1.495
	(0.025)	(0.022)	(0.022)	(0.020)	(0.018)	(0.037)	(0.915)
IV2							
Household head monthly wage	−0.135***	−0.062***	−0.110***	−0.037**	−0.025	−0.040	1.676*
	(0.023)	(0.020)	(0.021)	(0.018)	(0.017)	(0.034)	(0.884)
IV3							
Household head monthly wage	−0.195***	−0.068**	−0.149***	−0.022	−0.054*	−0.005	1.307
	(0.041)	(0.033)	(0.035)	(0.029)	(0.029)	(0.056)	(1.469)
Observations	18755	18755	18755	18755	18755	7039	7039

Notes: See Table 1.3 and Table 1.4. Estimates from linear-probability instrumental regressions with individual fixed effects.

are redefined as inactive. With this definition, the AWE is slightly smaller, and statistically less significant. However, it still accounts for 1.92 to 2.24 percentage point increase in the labor market participation of married women over the period.

Does this AWE translate into more employment for married women whose husband lost labor income with the outburst of the 2001 economic crisis? Occupation does indeed increase significantly: a spouse whose husband experienced a 1 percent decrease in his labor income is 0.11 percentage points more likely to actually work at least one hour. The effect shrinks down to 0.04 if we follow the strictest definition of participation and exclude JJH beneficiaries as described above. Even so, the coefficient remains higher than the baseline specification of Table 1.3. Looking at IV1 and IV3, in one third of the cases, the increase in participation results in full-time employment.

Turning to Table 1.6, similar effects are found when measuring the causal impact of household head displacement on the participation of his spouse. A married woman with unemployed husband is 32 to 43 percentage points more likely to enter the labor market if her husband becomes unemployed. Within this period, unemployment increased by 4.3 percentage points, implying that unemployment generated a 1.38 to 1.85 percentage point increase in married women participation overall. When windfall effects of the JJH workfare program are singled out, the AWE decreases by one third and IV3 coefficients become insignificant. However, considering IV1 and IV2, the AWE mechanism generates a 1 to 1.25 percentage point increase in female participation. Note that unlike decreases in

Table 1.6: Female Labor Market Participation and their Spouse's Employment Status – IV Results

	Extensive margin					Intensive margin	
	(1) Part	(2) Part^{+}	(3) Occup	(4) Occup^{+}	(5) Full	(6) Wish more hours	(7) Hours worked
IV1							
Household head unemployment	0.433***	0.289**	0.353***	0.209*	0.069	0.287	−6.158
	(0.124)	(0.118)	(0.116)	(0.109)	(0.097)	(0.218)	(5.441)
IV2							
Household head unemployment	0.429***	0.242**	0.379***	0.192**	0.048	0.406*	−7.631
	(0.110)	(0.103)	(0.103)	(0.095)	(0.085)	(0.209)	(5.219)
IV3							
Household head unemployment	0.328*	0.124	0.306*	0.102	0.113	0.726**	−11.008
	(0.174)	(0.168)	(0.164)	(0.155)	(0.143)	(0.363)	(8.648)
Observations	18755	18755	18755	18755	18755	7039	7039

Notes: See Table 1.3 and Table 1.4. Estimates from linear-probability instrumental regressions with individual fixed effects.

income, the household head's job loss has no significant positive effect on the probability to work full-time for his wife.

Both Table 1.5 and Table 1.6 also display estimates for spouses' labor supply at the intensive margin. Here, the sample is reduced to households with an employed spouse in both periods. Compared with the extensive margin, results are less robust across the various specifications. Looking at Table 1.6, an interesting robust causal relation appears between household head's unemployment and his spouse's desire to work more hours. Indeed, with respect to women whose husband does not change situation, they are twice more likely to declare wishing to work more hours. Interestingly, looking back at Table 1.5, no such relation appears when husbands experience a decrease in income, suggesting that this additional supply of working hours is driven by leisure substitution between spouses.

However, this additional supply of hours does not evolve into an actual increase in working hours. In fact, if anything, the relation goes counter the AWE hypothesis. Indeed, looking back at Table 1.5, only women whose husband experiences a positive labor income shock are actually likely to work more hours. This suggests that the capacity to extend working hours is not randomly assigned with respect to household characteristics, and is related to the fact that spouses are assorted.

Overall, the results obtained with the IV method in Tables 1.5 and 1.6 are higher in magnitude than the results obtained with the simple fixed effect model in Table 1.3.

1.4.3 Some Evidence on Compensation Effects

To what extent does the labor income shock experienced by the household head affect the total household income? To what extent does the added worker effect manage to compensate for this loss?

We provide some suggestive evidence using the specification in equation (1.4). We reason at the intrahousehold level, and we focus on the correlation between variations in the labor income of the household head W_{it}, and other income sources I_{it}. S_t is a dummy variable standing for the post crisis period, $W_{it} \times S_t$ is an interaction term capturing specific post crisis correlations between the income of the household head and the other income sources. μ_i is an individual fixed effect, and ϕ_t is a time fixed effect.

$$I_{it} = W_{it}\beta + S_t\gamma + W_{it} \times S_t\delta + \mu_i + \phi_t + \epsilon_{it} \tag{1.4}$$

In Table 1.7, we first look at the correlation between the variation of the household head's labor income, and the total monthly family income (column 1). A 1 percent decrease in the household head labor income is associated with a 0.37 percent decrease in the total family income. This coefficient is significantly lower than 1, implying that variations in the income of the household head are at least partially compensated by variations in other income sources.

Next, we focus on the correlation between variations in the labor income of the household head, and variations in other income sources (column 2-8). Clearly, non-labor income is the most sensitive to the variations in the labor income of the household head. A 1 percent income loss is associated with a 0.18 percent increase in the non labor income of a family (column 2). The labor income of other members of the household is far less responsive. If anything, the labor income of other members (spouse excepted) correlates positively with the labor income of the household head (column 3).

Nonetheless, the variation in labor income of the spouse reveals interesting patterns. First of all, the variation in the labor income of married women is negatively correlated with the labor income of her spouse (column 4). Interestingly, adding the interaction term $W_{it} \times S_t$ indicates that the negative correlation exclusively relates to the post 2002 period (column 5), while this was not the case for other income sources. Column 6 suggests that the compensation is stronger whenever the sample is restricted to spouses whose husband experienced a decline in labor income over the period 2000-2002: the correlation appear not to be driven by married women withdrawing from the labor market when their husband finds

Table 1.7: Alternative Income Sources and the Labor Income of the Household Head

	Family income[a]	Non-labor income[b]	Labor income[c]	Spouse labor income				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Household head Log mthly inc. (W)	0.365***	−0.183***	0.020*	−0.026**	−0.010	0.022	0.043	0.052
	(0.014)	(0.015)	(0.011)	(0.011)	(0.013)	(0.022)	(0.029)	(0.032)
Shock (2002)	−0.250***	−0.057	−0.058	−0.190***	−0.025	0.148	0.666***	0.804***
	(0.089)	(0.098)	(0.083)	(0.052)	(0.096)	(0.141)	(0.191)	(0.199)
Shock × W	0.005	−0.002	0.012		−0.030**	−0.060***	−0.076***	−0.083***
	(0.014)	(0.015)	(0.012)		(0.014)	(0.020)	(0.027)	(0.027)
Observations	18755	18755	18755	18755	18755	14429	7864	6171

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the individual level. All specifications include time and individual fixed effects. [a]Family income contains all income sources, including the labor income of the household head and his spouse. [b]Non labor income includes pensions, capital income, remittances, and other income sources. [c]Labor income of all household members, head and spouse excepted.

a job. Unsurprisingly, the correlation is even more negative when the sample is restricted to women whose husband experienced a decline in income, and who are either on the market during the whole period, or entering the labor market after the 2002 economic shock (column 7). Finally, column 8 considers women who are either employed during the full period, or entering an occupation after the shock. The point estimate of 0.8 suggests that when a married woman is/enters on the labor market, and manages to work at least one hour, almost one tenth of the household head's income loss at the time of the crisis is compensated.

1.5 Robustness Analysis

In this section, we first run a sensitivity analysis with respect to the workfare program JJH. We then perform standard robustness checks to support the validity of our empirical design. To give additional credit to the common trend hypothesis, we run a placebo regression, arbitrarily redefining the date of the shock in October 2001 instead of December 2001. We then test for attrition across waves. Finally, we provide additional evidence supporting the exogeneity of the shock with respect to married women participation decision.

1.5.1 Sensitivity Analysis

Within the *EPH*, JJH beneficiaries are defined as employed. However, the rapid scaling-up and the institutionally explosive context made it difficult to ensure that beneficiaries were complying with the work requirements, which may have fostered shirking. Additionally,

anecdotal claims report clientelism from the part of municipalities and unions in the granting process. If this is the case, the JJH program plays the role of a time confounder in the causal estimation of the AWE.

This issue should not be too preoccupying. Indeed, in their evaluation of the JJH program, Galasso and Ravallion (2004) insist on the essential role of the program in alleviating poverty and reducing unemployment: more than the half of the JJH participants were originally unemployed, meaning that the windfall effect does not exceed 50 percent of the JJH beneficiaries. Still, we adopt two strategies to disentangle the windfall effect of the program from the measured AWE. First, we use available information in the *EPH* to redefine as inactive JJH participants that would most likely not seek for a job. Second, we concentrate on relevant subsamples, and show that the AWE also appears in subgroups where the JJH program was not available or requested.

We first redefine JJH beneficiaries as inactive, unless they declared actively looking for a job at least once in the year prior to their participation in the JJH program participation. Of course, such a piece of information is not available for all married women in the panel, so this definition is overly conservative: only 14.7% of the original JJH beneficiaries qualify to be included into the labor market participating group. Then, taking into account that the working counterpart was mostly enforced after May 2002 (Galasso and Ravallion, 2004), we redefine all beneficiaries entering the program before May 2002 as inactive. We argue that these restrictions select out the beneficiaries that are least likely to comply with the workfare contribution and most likely to shirk and benefit from a windfall effect. If the moral hazard issues are sorted out, the implementation of the workfare program comes down to relaxing the constraint over the demand side.

The first two columns of Table 1.8 present the results for participation decision and employment probability with respect to husband labor market outcomes, once we restrict participation and occupation definitions. The AWE is still significant, and represents one half to two thirds of the estimates displayed in Table 1.5.

Alternatively, we now measure the AWE by excluding the households where the wife participates into the JJH program from the sample. The results are presented in Column 3 of Table 1.8. The AWE is still showing up, and is far from negligible: a 10 percent decrease in the household head's labor income generates a 0.64 percentage point increase in the probability of his spouse to participate into the labor market. This represents 60 percent of the AWE

Table 1.8: Sensitivity Analysis using Restrictive Definitions for Participation and Occupation

	Dep. Var: Participation			Dep. Var: Occupation		
	(1)	(2)	(3)	(1)	(2)	(3)
Household head monthly wage	−0.056**	−0.088***	−0.064**	−0.040*	−0.072***	−0.035
	(0.026)	(0.027)	(0.027)	(0.024)	(0.025)	(0.024)
F-stat FS	33.78	33.78	31.57	33.78	33.78	31.57
Household head unemployment	0.217*	0.322***	0.245**	0.145	0.249**	0.111
	(0.114)	(0.120)	(0.116)	(0.107)	(0.111)	(0.105)
F-stat FS	45.55	45.55	45.89	45.55	45.55	45.89
Observations	18755	18755	18088	18755	18755	18088

Notes: See Table 1.3 and Table 1.4. *Specification (1)*: JJH beneficiaries excluded from participation and occupation, unless they happen to have been unemployed prior to JJH program extension. *Specification (2)*: JJH beneficiaries excluded from participation and occupation if they entered the program before May 2002. Instrument set is *IV1*. *IV2* set yields similar results. With *IV3*, coefficients are of similar magnitude, but error terms are higher. *Specification (3)*: JJH beneficiaries excluded from participation.

effect found using the whole sample. However, unlike in the case of Table 1.5 or 1.6, this participation does not translate that easily into more employment. In a context of decreasing opportunities, spouses whose husband experiences an income decline or a job loss are not more likely to actually find a job than spouses with more stable husbands, which mean that they enter unemployment without benefiting from the JJH program. This result gives further evidence in favor of the poverty and unemployment alleviation role played by the JJH (Galasso and Ravallion, 2004): married women ineligible or unable to benefit from the JJH express willingness to supply labor, but cannot cope against the shock affecting their household.

1.5.2 Placebo Test

If the common trend assumption holds, the AWE should not exist before the actual outburst of the crisis. We thus perform a placebo test arbitrarily redefining the Convertibility collapse to happen in October instead of December 2001. Table 1.9 is generated by running the exact same instrumental definition and estimation procedures presented in Section 1.2, with this new definition of the Convertibility collapse. Within this estimation framework, we find that variations in the labor outcomes of the household head do not affect female participation. The top (respectively bottom) panel of Table 1.9 presents results instrumenting for the labor income (respectively the occupation status) of the household head. In both panels, all the

displayed coefficients are smaller than the coefficients reported in Tables 1.5 and 1.6. All coefficients (but one) do not significantly differ from 0 at the 10% level.

Table 1.9: Placebo Test: the Convertibility Arbitrarily Ends before October 2001

	Extensive margin					Intensive margin	
	(1) Part	(2) Part$^+$	(3) Occup	(4) Occup$^+$	(5) Full	(6) Wish more hours	(7) Hours worked
IV1							
Household head monthly wage	−0.065	−0.063	−0.045	−0.044	0.037	0.034	−0.089
	(0.039)	(0.039)	(0.035)	(0.035)	(0.035)	(0.084)	(2.914)
IV2							
Household head monthly wage	−0.049	−0.043	−0.030	−0.025	0.036	0.005	0.852
	(0.036)	(0.036)	(0.032)	(0.032)	(0.032)	(0.081)	(2.958)
IV3							
Household head monthly wage	−0.150	−0.120	−0.146*	−0.116	−0.097	0.030	−9.186
	(0.091)	(0.085)	(0.087)	(0.080)	(0.075)	(0.165)	(8.818)
Observations	20281	20281	20281	20281	20281	9576	9576
IV1							
Household head unemployment	0.315	0.295	0.198	0.179	−0.169	−0.175	−0.587
	(0.200)	(0.198)	(0.181)	(0.177)	(0.179)	(0.397)	(13.744)
IV2							
Household head unemployment	0.243	0.207	0.130	0.093	−0.166	−0.041	−4.806
	(0.187)	(0.185)	(0.168)	(0.165)	(0.166)	(0.381)	(13.304)
IV3							
Household head unemployment	0.292	0.226	0.254	0.189	0.126	0.078	3.852
	(0.187)	(0.184)	(0.174)	(0.169)	(0.159)	(0.287)	(11.160)
Observations	20281	20281	20281	20281	20281	9576	9576

Notes: See Table 1.3 and Table 1.4. Estimates from linear-probability instrumental regressions with individual fixed effects.

1.5.3 Attrition

As for any panel survey, attrition is of potential concern. Notably, the Argentine statistical institute INDEC reports some troubles in collecting the data for interviewers in nine areas of the Greater Buenos Aires after the outburst of the economic and social turmoil of December 2001. Mismatching represents an other concern of attrition bias.

A simple test for panel attrition consists in computing group-means for a range of outcomes of interest: husband unemployment, husband log income for each year $t = 1998, 1999, ...2002$ separately. Individuals are grouped according to their stage j ($j = 1, 2, 3, 4$)

Table 1.10: Mean Test for Sample Attrition Analysis

	Dep. var.: husb. monthly income			Dep. var: husb. unemployment		
	EPH 2000	EPH 2001	EPH 2002	EPH 2000	EPH 2001	EPH 2002
Second wave participant	−0.003	−0.023	−0.095	0.001	0.011	0.014
	(0.038)	(0.043)	(0.061)	(0.006)	(0.007)	(0.010)
Third wave participant	−0.043	−0.020	−0.078	0.004	0.006	0.015
	(0.038)	(0.043)	(0.061)	(0.006)	(0.007)	(0.010)
Fourth wave participant	−0.021	−0.069	−0.063	0.001	0.010	0.016
	(0.040)	(0.045)	(0.062)	(0.006)	(0.007)	(0.010)
Constant	5.875***	5.669***	5.191***	0.085***	0.101***	0.122***
	(0.028)	(0.031)	(0.051)	(0.005)	(0.005)	(0.008)
Observations	16184	15945	12936	16184	15945	12936

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the individual level.

in the successive waves of the EPH. Significant differences in means between these different groups would give support to the attrition bias hypothesis.

Formally, we use the enlarged sample and test for mean equalities: $\overline{W}_1 = \overline{W}_2 = \overline{W}_3 = \overline{W}_4$: regressing it on j dummies for waves, for each t between 1998 and 2002:

$$W_i = \alpha + \sum_{j=1}^{4} \beta_j w_{ij} + \epsilon_i \tag{1.5}$$

The constant term α gives the mean outcome for the new entrants in the survey. Then, the coefficients measure the deviation from this mean for participants in waves 2, 3, and 4 of the same year exposed to the same economic conditions. Results reported in Table 1.10 suggest that the panel attrition is limited.[25]

1.5.4 Superior Information

We now provide additional evidence supporting the exogeneity of the negative shock with respect to the participation decision of married women. In this section, we consider the fact that households may have accessed superior information, and consequently given an anticipated response to the shock. As previously stated, the international statistical agencies did not forecast the depth of the Argentine economic crisis. As an additional piece of evidence, we re-run the specification (1.3), but we replace the interest variables with their forward values. The idea behind this specification is that if the superior information hypothesis holds,

[25] Alternatively, we regress the probability for a household to drop out from the sample before the fourth wave on the labor income, and the employment status of the household head, controlling for time fixed effects. We find no difference in the probability of dropping out: in the period before they drop out of the sample, dropouts are not different from non-dropouts with respect to key interest variables. The results (not reported here) are available upon request.

part of the adjustment should have happened before the negative shock actually hit the households.

Table 1.11: Test for Superior Information

	Extensive margin					Intensive margin	
	(1) Part	(2) Part$^+$	(3) Occup	(4) Occup$^+$	(5) Full-time	(6) Wish more hours	(7) Hours worked
Household head monthly wage	0.000	−0.000	−0.002	−0.002	−0.003	0.003	−0.057
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.006)	(0.134)
Household head unemployment	−0.004	−0.000	0.017	0.020	0.015	−0.006	0.311
	(0.017)	(0.017)	(0.015)	(0.015)	(0.014)	(0.035)	(0.787)
Observations	11971	11971	11971	11971	11971	4965	4965

Notes: See Table 1.3. Estimates from linear-probability regressions with individual fixed effects.

Table 1.11 indicates that no correlation exists between the labor supply of a married woman and the labor market outcomes of her husband observed during the following semester.[26]

1.5.5 Group Manipulation

Household heads working in the most exposed sectors may have switched sector to avoid the negative effects of the crisis on their labor outcomes. Unsurprisingly, household heads did change sector across periods. Overall, between October 2000 and October 2002, 8.08% of the household heads switched sector, either from a protected towards an exposed sector (3.73%), or vice versa (4.35%). Though the phenomenon is not massive, whether these changes may be endogenous to female participation or not is a relevant question. In what follows, we first provide the intuition behind the possible bias. We then provide empirical evidence ruling out the bias related to group manipulation.

Regarding the first stage regression, the existence of a strategic group manipulation could bias the negative relationship between the husband income and the sector's exposure towards 0 (in case of a reverse causality, where only the least exposed actually stay involved in their sector of origin). Alternatively, the bias could be of an undetermined sign, if unobserved characteristics determine both the capacity of a household head to change sector and his income variation. In any case, the group manipulation is mostly problematic if these unobserved

[26] In addition, we re-run the IV specification (2.1). At the extensive margin, the results (not reported) are not significantly different from 0.

characteristics simultaneously affect the decision of married women to supply labor.[27] In this case, the sector of the household head is endogenous to the participation decision of the spouse. Under this hypothesis, the estimates would be biased. Theoretically, the sign of the bias is unclear, and mainly relates to the degree of substitution and complementarity existing between the two coping strategies, i.e. the added worker and the change in sector of activity. The estimates will be biased upward if the strategies are substitutes (husbands who switch sectors do so because their wives are unable or unwilling to supply labor). The bias will go in the opposite direction if the strategies are complements: spouses whose husband switch sector are also more able or willing to supply labor. The empirical literature on household vulnerability clearly favors the complementarity argument (Lokshin and Yemtsov, 2004): while some households benefit from a wide panel of adjustment strategies, others fail to compensate for negative shocks. For example, in our case, the fact to possess an extended network could enable a household head to switch sector and simultaneously his wife to supply additional hours or get a job.

We check the robustness of our results following three intuitions. First, if changing sector really matters for husbands' outcomes and female participation, it should already be enhanced by the first stage and reduced form regressions of Table 1.4 (Section 1.4). Indeed, as explained in Section 1.2, the instrument sets already include a dummy indicating whether the sector of activity is a protected or exposed one. In the first stage, the effect of a change in sector type on the income of the household head is thus taken into account. As indicated by the point estimate for the variable *Exposed sector* in Table 1.4, on average, this change has no effect on the income or employment status of the household head. In addition, the reduced form regressions suggest that there is no correlation between shifts in sectors and married women participation, even through the channel of their husband's labor market outcomes. These results thus convey a first convincing piece of evidence suggesting that changes in sectors are exogenous to female participation.

Second, we take advantage of the fact that switching sector is a common event for individuals in normal times as well. We compare the household heads who switch sector during the 2002 events with those who switch in the previous periods. Our goal is to see whether the post-Convertibility switchers have specific characteristics with respect to their

[27] These unobserved characteristics do not need to vary with time. Although they are time-invariant, they are not differentiated out with the individual component because their effect itself is time-varying. These characteristics come into play once the negative shock hits, and can play the role of a time-varying confounder.

counterparts in normal times, that would then strategically interact with the added worker effect. We regress the probability to change sector on a series of individual and occupation-specific characteristics at baseline: age, education, number of children and elderly in the household, home-ownership, employment status (owner, self employed, wage earner), firm size, task qualification, stability of the job. We allow these characteristics to have a specific effect after October 2001. In line with expectation, the probit results (not reported here) show that overall, household heads changing sectors tend to be qualified wage earners with jobs limited on duration at baseline. However, no observed individual or occupation-specific characteristic allows to distinguish individuals switching sector with respect to the timing of the Convertibility crisis. This supports our view that the possibility for household heads to change sector does not come at cost of our exogeneity assumption.

Finally, as a third robustness check, we take into consideration the extreme hypothesis that the households whose husband switches sector entirely drive the results. We run the analysis again excluding the switchers from our sample. From Table 1.12, we see that the results are robust to the exclusion of the households whose head switches sector between October 2001 and May 2002.[28]

Table 1.12: Test for Group Manipulation

	Extensive margin					Intensive margin	
	(1) Part	(2) Part$^+$	(3) Occup	(4) Occup$^+$	(5) Full-time	(6) Wish more hours	(7) Hours worked
Household head monthly wage	−0.016***	−0.012***	−0.011***	−0.007***	−0.003	−0.011**	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.110)
Household head unemployment	0.071***	0.052***	0.048***	0.029**	0.014	0.058**	0.049
	(0.014)	(0.014)	(0.013)	(0.013)	(0.012)	(0.027)	(0.661)
Observations	17239	17239	17239	17239	17239	7300	7300

Notes: See Table 1.3. Estimates from linear-probability regressions with individual fixed effects.

[28] In addition, we re-run the IV specification (1.1) (not reported here). When we instrument for the variations in the household head monthly wage, the results are very similar to the main results of Table 1.5. When instrumenting for the unemployment status, the magnitude of the point estimates is higher. In this case, the group manipulation may be responsible for a downward bias. This gives credit to the hypothesis of complementarity between coping strategies.

1.6 Heterogeneity Analysis

This section provides an insight into heterogeneous effects at work beyond the average AWE. Several assumptions can be made regarding the relevant sources of heterogeneity. First, in a traditional labor supply perspective, women in childless couples should have a preference for working, or should be less constrained in their labor supply decisions. As a consequence, their AWE should exceed the AWE for women with children. On the other hand, according to a more collective view of the household (Chiappori, 1992, Lundberg et al., 1997), all else being equal, and controlling for the variation in the number of children within the household, women with children could enter relatively more the labor market if their husband experiences a decline in income, in order to smooth their children's consumption. Second, the AWE should be negatively correlated with the holding of assets. Though information on savings is not available within this survey, the life cycle theory suggests that individuals smooth their consumption over their lifetime, implying that savings are formed in an intermediate phase of the life cycle. The AWE is expected to vary according to the age category of the household (Starr, 2013). Third, income utility marginally decreases. Correspondingly, the wealth effect associated with a given temporary income loss should be higher if the household belongs to the first income quartile at baseline, than in case it pertains to the richest quartile (MaCurdy, 1985). Following this idea, the AWE should be smaller in case the household owns its dwelling. Finally, all else being equal, the AWE should be related to the level of human capital accumulated by married women. On the one hand, the AWE should be higher when wives are more educated, because educated wives should be prone to work and find better opportunities. On the other hand, their participation level is already high relatively to the less educated women, and their reservation wage is higher, which is a barrier to entry on the informal labor market.

In order to answer these empirical questions, household head's labor market outcomes – i.e. labor income and employment status – should be interacted with a series of characteristics that are allegedly a source of heterogeneity. In our case, an issue appears, in so far household head's labor market outcomes are instrumented. Following Wooldridge (2002)[29], the interaction terms are thus endogenous, non linear variables. In Wooldridge's words, a 'forbidden regression' would arise if we interact the exogenous variables with the predicted value of our instrumented variable of interest. As in the case of the variable of interest, all of the

[29] Section 9.5 pp. 236-7.

interaction terms have to be instrumented by an interaction between the exogenous variables and the instruments. For example, a correct estimation of the heterogeneous effect of baseline home ownership implies to instrument husband's income using the set of instruments *IV1*, and to instrument the interaction between husband's income and the exogenous ownership dummy with the *IV1* set itself interacted with the home ownership dummy.[30]

Results are presented in Table 1.13. For the sake of concision, we only display results using the IV1 set of instruments, and participation decision at the extensive margin. Only results using husband's variation in income are presented, because regressions instrumenting for husband's variation in employment status is subject to weakness.

Looking at Panel A, the AWE does not differ according to age categories. There is no evidence that younger couples use relatively more labor market coping strategies because they cannot cope against unexpected shocks using savings. Panel B and C show that the wealth effects associated with the shock varies indeed according to the level of income at baseline, or according to home ownership. Women belonging to the richest quartile in 2000-2001 are less likely to enter the labor market and find a job in case their husband is hit by a shock than women belonging to quartiles 1, 2 and 3. Panel C indicates that in case households own their dwelling, the AWE is divided by half. Panel D displays heterogeneity results according to education attainment. The AWE is more important for lower educational degrees, however this heterogeneity disappears when JJH beneficiaries are redefined as non-participants. Panel E displays the differences in AWE for childless couples, couples with at least one child under compulsory schooling age, and couples with at least one child above schooling age and under 18. Surprisingly, while women with young children react similarly to unexpected shocks in their husband's income, women with children above 5 have a significantly lower AWE. Finally, Panel F indicates that the AWE is significantly smaller for women whose husband experiences a decrease in labor income, but is entitled to unemployment insurance or compensation.[31]

[30] Because of this complex instrumentation procedure, we study each heterogeneity source separately. As a consequence, the heterogenous effect of income quartile at baseline is likely to partly capture the heterogeneous effects of human capital.

[31] This result further supports the view that the extra labor supplied by married women is the consequence of an income effect, and not the result of spouses' joint preference for leisure. Married women do not enter the labor market to avoid spending time home when their spouse is unemployed, but to compensate for the income loss.

Table 1.13: Heterogeneity Analysis

	Part	Part$^+$	Occup	Occup$^+$	Full-time
Panel A : Age, woman					
Husb. monthly income	−0.0189	−0.0405	−0.0230	−0.0446*	0.0114
	(−0.70)	(−1.51)	(−0.89)	(−1.76)	(0.49)
× aged 16 29	−0.0142	0.0150	−0.00215	0.0271	−0.0205
	(−0.56)	(0.60)	(−0.09)	(1.14)	(−0.93)
× aged 30 44	−0.00477	0.0167	0.00775	0.0292	−0.00900
	(−0.22)	(0.76)	(0.36)	(1.40)	(−0.47)
Panel B : Homeownership					
Husb. monthly income	−0.119***	−0.0667**	−0.0925***	−0.0403*	−0.0356*
	(−4.67)	(−2.82)	(−3.99)	(−1.91)	(−1.89)
× owner	0.0587***	0.0302**	0.0469***	0.0184	0.0182
	(3.82)	(2.13)	(3.36)	(1.46)	(1.61)
Panel C: HH income quartile at baseline					
Husb. monthly income	0.0201	0.0263	0.0454**	0.0516**	0.0283
	(0.98)	(1.29)	(2.32)	(2.69)	(1.46)
× income Q1	−0.0388*	−0.0419**	−0.0568**	−0.0599**	−0.0342*
	(−1.84)	(−1.99)	(−2.83)	(−3.05)	(−1.74)
× income Q2	−0.0566**	−0.0580**	−0.0735***	−0.0749***	−0.0401*
	(−2.60)	(−2.67)	(−3.48)	(−3.61)	(−1.95)
× income Q3	−0.0178	−0.0211	−0.0394*	−0.0428**	−0.0253
	(−0.79)	(−0.94)	(−1.84)	(−2.01)	(−1.16)
Panel D: Education, woman					
Husb. monthly income	0.0532**	−0.00928	0.0381**	−0.0243	0.00898
	(2.73)	(−0.49)	(2.10)	(−1.40)	(0.52)
× primary degree	−0.0679***	−0.00970	−0.0487**	0.00951	−0.0153
	(−4.06)	(−0.60)	(−3.14)	(0.64)	(−1.03)
× secondary degree	−0.0544***	−0.00902	−0.0394**	0.00593	−0.0124
	(−4.20)	(−0.72)	(−3.27)	(0.52)	(−1.07)
Panel E: Children					
Husb. monthly income	−0.0919**	−0.0667**	−0.0563**	−0.0310	−0.0376
	(−3.11)	(−2.29)	(−2.07)	(−1.19)	(−1.53)
× child under 5	0.0153	0.00866	0.00317	−0.00352	0.00478
	(1.33)	(0.76)	(0.30)	(−0.35)	(0.50)
× child above 5	0.0468**	0.0335*	0.0319*	0.0187	0.0240
	(2.43)	(1.77)	(1.81)	(1.10)	(1.50)
Panel F: Husb. gets U benefits					
Husb. monthly income	−0.146***	−0.0722**	−0.113***	−0.0391*	−0.0332*
	(−5.77)	(−3.22)	(−4.96)	(−1.95)	(−1.77)
× U benefits	0.111***	0.0640**	0.0685**	0.0219	0.0158
	(4.37)	(2.81)	(3.11)	(1.13)	(0.90)
Observations	18755	18755	18755	18755	18755

Notes: See Table 1.3 and 1.4. Instruments set is IV1. Because of the complex instrumentation procedure involving endogenous non linear variables, each source of heterogeneity is analysed in a separate regression. When categories are not binary, reference categories are: age 45-59, superior degree, income Q4, childless couple.

1.7 Conclusion

So far, the existing literature on the added worker effect has answered separately two main questions: (i) do households whose head is hit by an idiosyncratic shock – e.g. unexpected plant closures in developed countries, or climate shocks in developing countries – respond by sending additional workers on the labor market? and (ii) in downward business cycles, is the AWE prevailing over the discouraged worker effect at the aggregate level? This chapter fills

the gap between the two literatures and develops an original empirical strategy to assess the existence and extent of the added-worker shock-coping strategy in the case of an aggregate shock and a macro discouragement effect. Intrahousehold market-oriented strategies are tricky to measure, because in normal times spouses' labor supply is jointly determined, implying that the decision of each spouse is endogenous to the decision of the other spouse. The dramatic collapse of the convertibility era generates an aggregate shock presenting asymmetries with respect to economic sectors. This natural experiment framework is used to instrument for the household head's endogenous labor market outcomes. Results point out that even when discouragement prevails at the aggregate level, there is evidence of an added-worker effect.

In the Argentine case, this AWE is far from negligible. Married women whose spouse experiences a 30 percent decrease in monthly wage (which correspond to the sample mean) are 4.4 percentage points more likely to enter the labor market. The magnitude of this effect reflects the fact that the Argentine state relaxes the demand side of the labor market by offering workfare programs paid below the market wage. As a robustness check, program participants are redefined as inactive if they do not work the legal amount of time to be entitled to the program, or if they do not declare wishing to work more hours, in order to select out the potential windfall effect created by the program. The AWE still accounts for a 2 percentage points increase in married women participation over the period. In line with intuition, this AWE is nonetheless slightly inferior to the one observed by Cerrutti (2000) during upward business cycle, even after controlling for the changes in macroeconomic opportunities over the period. A preliminary analysis at the intensive margin displays less robust patterns of an "added hours effect" from the part of spouses whose husband undergoes a wage decrease or a job loss. Finally, in line with intuition, the AWE proves to be heterogeneous with respect to home ownership, household income quartile, education degree, husband's unemployment insurance, and the presence of children within the household at baseline.

In a broader perspective, this chapter contributes to a recent shift in focus towards a better understanding of the role of labor supply in mitigating uncertainty within households over the lifetime. Perhaps surprisingly, shock-coping is still an essential role of the family. Highlighting the existence of a non-negligible AWE is the first step towards a better understanding of intrahousehold coping mechanisms in emerging economies with an embryonic

social safety net. Future work will have to assess the effectiveness of this AWE in mitigating the impact of the economic downturn. A complementary aspect of the AWE is whether the additional workforce actually returns to inactivity once lost income has been compensated for.

Overall, a correct identification of the interrelations between primary and secondary earners' wages, as well as the indirect effects of this intrahousehold insurance scheme have important policy implications. The literature on female labor supply generally proposes alternative welfare fallouts: female participation increases the bargaining power (Chiappori, 1992, Pollak, 2005), affecting income allocation between members, but also leads to precarious positions and overwork (Lim, 2000, Klasen and Pieters, 2012). Design and implementation of welfare programs have to interfere intelligently with these existing mechanisms.

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Appendix

1.A Defining the Instruments

Table 1.A.1: Construction of the Instrumental Variables, based on the 2002 Shock Asymetry between Household Head Sectors: Primary and Secondary Sectors

	Prim	Goods						
		Alim	Text	Chem	Metal	Other	Gas	Constr
Shock(2002 = 1)	−0.437*	−0.413*	−0.304	−0.623*	−0.847*	−0.831*	−0.310*	−1.027*
	(0.145)	(0.112)	(0.199)	(0.170)	(0.144)	(0.131)	(0.100)	(0.080)
Constant	5.913*	5.449*	5.483*	6.226*	5.861*	5.661*	6.507*	4.769*
	(0.091)	(0.068)	(0.117)	(0.107)	(0.087)	(0.077)	(0.061)	(0.049)
Observations	594	585	282	253	690	723	287	3291

	Prim	Goods						
		Alim	Text	Chem	Metal	Other	Gas	Constr
IV1								
Exposed sector [a]	0	0	0	1	1	1	0	1
IV2								
Exposure intensity [b]	−0.437	−0.413	−0.304	−0.623	−0.847	−0.831	−0.310	−1.027

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the individual level.

Notes: As detailed in the above table, IV sets IV1 and IV2 are build using two alternative measures for sectoral exposure. Under the assumption that individuals do not change sector, the exposure variable itself is not time-varying. Each of these IV sets builds on two more variables : a shock dummy - standing for the end of the Convertibility, and an interaction between this shock dummy and the exposure variable - capturing the shock's sectoral asymmetry. [a] IV1 : the first measure of exposure, "Exposed sector", is a dummy equal to 1 if the shock coefficient is significantly negative and lower than the mean aggregate shock. [b] IV2 : the second measure of exposure, "Exposure intensity", is measured by the shock coefficient estimated in the panel above.

Table 1.A.2: Construction of the Instrumental Variables, based on the 2002 Shock Asymetry between Household Head Sectors: Services

	Services														Tot
	Trade	Retail	Rest	Transp	Comm	Bank	Estate	Adm	Educ	Health	Other	Repair	Domestic	Care	
Shock(2002 = 1)	−0.608*	−0.487*	−0.590*	−0.515*	−0.891*	−0.349*	−0.516*	−0.455*	−0.208*	−0.503*	−0.439*	−0.670*	−0.535	−0.611*	−0.591*
	(0.105)	(0.068)	(0.187)	(0.077)	(0.209)	(0.118)	(0.105)	(0.043)	(0.101)	(0.109)	(0.087)	(0.119)	(0.470)	(0.139)	(0.023)
Constant	5.816*	5.578*	5.430*	5.700*	5.877*	6.549*	6.127*	6.286*	5.948*	6.561*	5.959*	5.421*	4.201*	5.286*	5.682*
	(0.061)	(0.042)	(0.114)	(0.048)	(0.125)	(0.075)	(0.064)	(0.028)	(0.067)	(0.072)	(0.054)	(0.074)	(0.276)	(0.083)	(0.015)
Observations	887	1813	306	1488	452	356	818	2875	607	553	688	821	92	294	18755

	Services														Tot
	Trade	Retail	Rest	Transp	Comm	Bank	Estate	Adm	Educ	Health	Other	Repair	Domestic	Care	
IV1															
Exposed sector [a]	1	0	0	0	1	0	0	0	0	0	0	1	0	1	
IV2															
Exposure intensity [b]	−0.608	−0.487	−0.590	−0.515	−0.891	−0.349	−0.516	−0.455	−0.208	−0.503	−0.439	−0.670	−0.535	−0.611	

Notes: See note Table 1.A.1

Chapter 2

Initial Conditions and Lifetime Labor Market Outcomes: The Persistent Cohort Effect of Graduating in a Crisis

2.1 Introduction

Depending on the calendar year she graduates, an individual happens to face dramatically different opportunities on the labor market. The effect of *current* local unemployment on earnings and employability has been extensively studied and shows a robust pattern in a wide range of countries, datasets and specifications.[1] The literature about long-lasting effects of entry level unemployment is much more recent, and has been flourishing for the developed world. So far, evidence has been mixed, and ranges from no long term effect to persistent losses in wage, leading to a substantial intercohort divergence in lifetime earnings. The literature on US and Canadian data reports persistent effects of entering the labor market in a recession, as opposed to entering during a flourishing economy. In his paper on PhD economists, Oyer (2006) shows that the initial quality and type of the first job influence the long-term job characteristics in the academics. Concentrating on MBA graduates from Stanford between 1960 and 1997, Oyer (2008) finds that MBA students graduating in times of a recession earn substantially less than their luckier counterparts of

[1] See Nijkamp and Poot (2005) for a detailed survey of the literature.

previous and next cohorts. Kahn (2010) focuses on US male college graduates between 1979-1986 and follows their income until 2006. She finds that recession periods have a permanent effect on individuals' wages of up to 13% each year. Oreopoulos et al. (2012) document the magnitude associated with the initial labor market conditions at time of graduation using an employer-employee matched dataset recording earnings and employment situation of students graduating between 1976-1995 for a 20 year period in Canada. He finds persistent, though not permanent effects: the main specification suggests that a 5 percentage point increase in the unemployment rate at time of completion is related to a 9% earning loss in the first year after graduation, with the effects fading away only after 9 years of potential experience. Logically, results on European, less flexible labor markets focus on low skilled workers and tend to concentrate on unemployment probabilities rather than labor market earnings. For example, using Norwegian data, Raaum and Røed (2006) show that labor market conditions at the time and place of entry into the labor market have a substantial and persistent effect on adult employment prospects. Using data from the Austrian Social Security database to get information on graduates between 1978 and 2000, Brunner and Kuhn (2014) find that unfavorable labor market conditions have a persistent negative effect on earnings. For each additional percentage point increase in the local unemployment rate, they estimate that the decrease in the initial wage amounts to 0.9%, and the lifetime loss in wages to 1.3%.[2]

Accounting for the persistent, and even permanent effects of a depressed economic environment at time of graduation is a real challenge to the economic theory. Indeed, under the hypothesis of labor market perfection, these differences in initial conditions should have a short term effect on earnings. As the economy recovers, differences related to luck with graduation year should fade away, either because contracts are renegotiated within the firm, or because individuals have access to better opportunities and switch job. How to account for the 'cohort effect' highlighted by Baker et al. (1994), namely that even years after, the average wage of a cohort depends on the unemployment rate at time of entry on the labor market?

The theoretical literature on the effects of graduating in a downward cycle usually mentions several channels linking long lasting gaps in earnings between cohorts and initial labor market conditions. Provided that the composition of cohorts does not change in time – an assumption which should be handled with caution, the existing arguments boil down

[2]See Section 0.3.2 of the General Introduction for a more detailed literature review.

to two broad categories: *within* and *between* firm determinants. Among the determinants outside the firm, early career unemployment scarring (Lockwood, 1991), two-tier labor markets (Doeringer and Piore, 1971) or industry/firm specific human capital (Becker, 1967) can explain the persistent effect of an initial unemployment spell or a bad match on labor outcomes later in life. Within the firm, implicit contracts with costly mobility (Beaudry and DiNardo, 1991) or task-specific human capital (Gibbons and Waldman, 2006) are relevant elements to understand the persistence of cohort effects at the firm level. On the empirical side, Oyer (2006) insists on the importance of the initial placement which he finds to enhance the productivity of academics and to offer better career tracks for MBA graduates. The poor quality of initial placement is also the key explanation for Oreopoulos et al. (2012), who find evidence that the catch-up process essentially involves between-firm mobility. On Norwegian data, Liu et al. (2015) find that during recessions, mismatches in skills are more likely to arise, causing a depreciation in human capital which accounts for the the persistent effects of initial conditions.

The recent accumulation of case studies evaluating the long lasting impacts of shocks on a series of outcomes indicates that the issue attracts a growing attention. Nevertheless, so far, little interest has been shown for emerging economies. A first reason for this gap in the literature is related to the short run emergency situation generated by adverse aggregate shocks. In times of crisis, emerging economies display a high poverty rate and an important vulnerability linked to the failing community-based insurance schemes and the insufficient institutional safety nets. In accordance with the necessity of emergency public intervention, the immediate consequences of aggregate economic shocks on the welfare of households are a well-documented topic.[3] Yet, beyond the flourishing literature on the immediate consequences of aggregate shocks, no study has attempted to measure the effects of an economic crisis on the labor market outcomes later in life. A second reason behind this gap in the literature lies in the common belief that labor markets are less regulated and necessarily adjust more easily in emerging economies than in the developed world thanks to the informality margin. However, this belief does not resist to a careful analysis of the labor market regulation in Argentina. Labor market regulation is stringent (Mondino and

[3] Argentina is a good example. The 2002 Argentine crisis has been the object of various vulnerability studies. Corbacho et al. (2007) uses the EPH dataset and establishes that the most vulnerable households are the less-educated, men-headed, private sector wage earners. Qualitatively, based on a specific dataset conducted in the aftermaths of the economic crisis, Fiszbein et al. (2003) reports an increase in the incidence of crime and a decrease in well being associated with the distress event.

Montoya, 2004), and the rigidity of the labor market is exacerbated by the coexistence of a formal and an informal wage sectors (Marshall, 2004). A last obstacle is the availability of relevant data. Sadly, unlike for developed economies, no available matched employer-employee data (Oreopoulos et al., 2012) or social security database (Brunner and Kuhn, 2014) allow to reconstruct the full wage and employment history of graduate cohorts in the case of Argentina.

To my knowledge, only two papers analyze the long lasting effects of initial labor market conditions on employment probability and labor income in an emerging economy. Machikita (2005) uses data from the Thailand Labor Force Survey between 1994 and 2000. The author takes advantage of the 1997 financial crisis to design a difference-in-difference estimation procedure. He compares labor market outcomes of similar individuals, according to whether they entered the labor market before or after the 1997 crisis. To his words, workers entering before vs. after should have no reason to have very different expectations when they first decided their investment in schooling. However, I argue that this design does not solve for labor market entry delays through further education, as well as positive selection into employment. Additionally, while it is arguable that 1997 is an exogenous shock, the difference between 1997-1998 on the one side and 1999-2000 on the other appears much less clear cut. Nakagawa (2013) uses the same dataset and implements a strategy to control for this type of selection. She finds that the effect is long lasting, but not persistent. She remarks that the quality of the initial placement, measured by the probability to start one's career in the unpaid sector or the agricultural sector, is inversely related to the business cycle, suggesting that initial placement matters. While the strength of her analysis lies in the panel feature of the data, which allows her to reconstruct at least partially a career history, this comes at the cost of attrition, which is allegedly high, but not documented. Another limitation to her results is that the selection into schooling goes counter to the human capital theory for high school school graduates entering university. Then, the selection terms have opposite signs according to the considered employment outcome. The analysis does not propose a rationale in the Indonesian context to account for these counter-intuitive results.

A second contribution of the chapter relates to the broader literature on the endogeneous schooling decisions with respect to the business cycle along unobserved characteristics. Back in the nineties, Bils (1985) insisted on the importance of taking into account the compositional effects of the workforce when studying aggregate variables. In particular, Blundell et al.

(2003) warn against a bias in the observed variation of the aggregate wage rate, which can be decomposed into three components, namely, the change in wage distribution, the change in hours worked, and the change in participation rate. The latter captures the change in composition from one cohort to the next. Of course, for young men in Argentina, the essential part of the inactivity is in fact related to investments in education, so that the time allocation trade-off between participation and inactivity actually boils down to comparing the opportunity cost of schooling with the expected returns to education.[4] On the empirical side, several papers suggest that individual education choices depend on the business cycle. Using data on the US, Betts and McFarland (1995) discover a strong, positive correlation between the local unemployment rate and community college enrollment. In England, Clark (2011) finds a large impact of the youth labor market on enrollment in post-mandatory education. Overall, the correlation between the school enrollment and the business cycle appears to be negative. Although the endogeneity is widely acknowledged by the literature, few papers actually take the issue seriously. For example, in her study on German graduates, Stevens (2008) concentrates on the graduates from vocational training, arguing that the graduation year is exogenous to the business cycle because the specialization happens at the age of 10. Another notable exception is Kahn (2010), who takes into account the potential endogeneity of the schooling decision by instrumenting the unemployment rate at time of graduation with the year of birth. Although the methodology is convincing, the estimation focuses on a single education level, i.e. college. The sequential enrollment process from one education level to the next, and its relation with the business cycle, is left unexplored. I overcome the limitation by relying on an alternative modeling strategy based on a series of selection models. Notably, I use a bivariate probit with partial observability proposed by Farber (1983) and Tunali (1986), transposed to the case of schooling endogeneity by Nakagawa (2013). I define three schooling decision nodes: mandatory schooling, optional high school and college education. At each schooling decision node, the sequential decision depends on the past decisions, as well as on the observed unemployment for own and next education degree at time of the decision to enroll or find a job.

Finally, a last original feature of the chapter with respect to the existing literature is that it provides a complete picture of the persistence of the effects across the different schooling

[4] Alternatives could be fertility and home production – which is the main reason why I leave aside the labor market outcomes of women and concentrate on the sample of men graduates. A credible alternative to the education-activity trade-off – not considered here – may be criminal activities, whose opportunity cost also varies with the business cycle (Machin and Meghir, 2004).

degrees. So far, the existing evidence is almost entirely based on a single education level (college graduates or vocational trainees). Although the collection of existing papers covers all education levels, the comparability of the results obtained on different countries and samples is doubtful. Most papers concentrate either on educated or on less educated workers, and very few papers analyze the heterogenous effect of graduating in a depressed economy by education level. An exception is Liu et al. (2014), who concentrate on Norwegian cohorts graduating between 1986-2002 and focus on the ten years following their graduation. They compare four groups of workers: those who drop out after mandatory schooling, academic high school graduates, vocational high school graduates and college undergraduates. Another paper comparing skills is Genda et al. (2010) who compare male high school graduates and college graduates from the US and Japan. Unlike most of the previous literature, I am able to observe the magnitude of the effects according to the highest completed degree.

The findings display a complex picture of the effect of initial labor market conditions, in which short-lived adverse labor market conditions have long run implications for the different cohorts of individuals. First, I find that selection on the labor market is driven by the business cycle, justifying my estimation strategy based on a double sample selection. Without controlling for the cohort composition, I find that bad initial conditions affect the mandatory school graduates *quantitatively*, while graduates from optional secondary schooling and college are affected *qualitatively* through persistently lower labor earnings reflecting a lower *job quality*. Controlling for the self-selection into the labor market shows that the unobserved characteristics driving the selection into activity are also positively correlated to the labor market outcomes for the mandatory and college graduates. Once the selection is accounted for, the magnitude of the effects is higher, and both mandatory and college graduates are affected qualitatively and quantitatively. A 1 percentage point increase in the unemployment rate at time of graduation is associated with a 4.5 (1.6) percentage points lower employability for mandatory school (college) graduates, and a 11% (7%) decrease in labor earnings. The effect on employability fades away after 10 years of experience; on the other hand, the impact on earnings is persistent. No persistent effect is found for high school graduates. Then, I investigate the possible channels underlying the 'persistence' puzzle using a subsample of wage earners employed at time of survey. Unlucky cohorts of mandatory school graduates employed at time of survey have an above-average tendency to be informal wage earners engaged in on-the-job search and looking for extra hours. Unlucky cohorts

of college graduates are found to occupy skill-mismatched positions in smaller firms with less social benefits. While experience gradually allows these unlucky cohorts to close the informality gap with their luckier counterparts, they permanently occupy lower skilled positions in smaller firms, indicating that the persistence may be driven by poor initial placement and slower career tracks.

The remainder of this chapter is structured as follows. Section 2.2 details the theoretical mechanisms accounting for the 'persistence' puzzle. The theoretical channels are illustrated with results from the existing empirical literature. Finally, their relevance to the specific Argentine context is evaluated in the light of key features of the labor markets and schooling system in Argentina. Section 2.3 presents the data and the estimation method. Section 2.4 details the results and reports suggestive evidence on the mechanisms driving the persistent of bad initial conditions in labor outcomes years later. Section 2.5 concludes.

2.2 Hypotheses

2.2.1 Potential Mechanisms Explaining a Persistent Effect In Argentina

As stated above, if labor markets work as spot markets, then the correlation between the unemployment or wage at time t and past labor market experiences should be nonexistent. In Argentina, workers have historically enjoyed strong labor rights.[5] In the 1990s, the regulation came under attack, and the ambitious reforms accompanying the currency board in 1991 certainly brought some additional flexibility for employers. Notably, in December 1995, new types of fixed-term contracts were created, with an extended tryout period, reduced social security contributions, and other benefits that made them attractive to employers.
However, overall, the ambitious neoliberal economic program did not really translate into far-reaching reforms in the labor market regulation. By contrast, there are four reasons why a negative relationship between bad conditions upon entry on the labor market and current labor market outcomes could arise in Argentina.

Unemployent Scarring. A first explanation rests under the idea that early career unemployment spells can be scarring. The unemployment scar results from a combination of

[5] As reported by Mondino and Montoya (2004), worker-firm contracts are governed by three layers of binding regulations: the Labor Code (Ley de Contrato de Trabajo—20.744'), the collective bargaining within each sector, and firm-level contracts necessarily respecting the above two layers.

different factors. The human capital depreciation (Becker, 1964), the loss of non-cognitive skills such as motivation, or a lower life satisfaction affecting health can have pernicious, long term effects on the productivity. On the empirical side, Arulampalam (2001) shows that unemployment spells have long term consequences on the wage rate of British workers. The evidence is mixed regarding the mechanisms driving the scarring: Clark et al. (2001) find evidence of a lower job satisfaction eventually leading to a decrease in self-reported health, and Stutzer and Lalive (2004) show that stronger local social norms to work are associated with a lower reported subjective well-being when unemployed. In Argentina, two elements suggest that the scarring hypothesis could hold. First, in the absence of a universal social safety net, a job loss has immediate consequences on the subsistence and health of an individual. This extreme vulnerability to unemployment is illustrated by the 2002 economic crisis, where the poverty rate jumped from 38% to 53% within a few months in the Great Buenos Aires area (Fiszbein et al., 2003). The health consequences are immediate: for instance, Bozzoli and Quintana-Domeque (2014) show that the economic crisis significantly affected the weight of the children at birth, which is commonly known as an important determinant for future health and labor market outcomes. Last, on the side of social norms, the 'piquetero' figure[6] certainly has a negative image because of the repeated corruption scandals within the unions and the massive clientelism operating through the supposedly apolitical movement (Svampa and Pereyra, 2004).

Signal Theory. A second argument relates to the fact that past unemployment – and more broadly the individual history of short term contracts – carry information about a job applicant. As such, these events may be used by employers as a signal for ability and productivity in a context of imperfect information about a worker's type and effort (Lockwood, 1991). This creates an unemployment trap – or job precarity trap. Empirically, Genda et al. (2010) provide evidence favoring the signal hypothesis in Japan in explaining the persistence of initial bad conditions years later. As stated by Mondino and Montoya (2004), the Argentine labor market differs in important ways from those operating in industrial countries, the most striking feature being the weight of the informal sector. During the 1990s, the rate of informal employment rose more in Argentina than in any other country in Latin America (WB, 2008), and represents half of the total pool of wage earners in 1995 (Mondino

[6]The word *piquetero* is the nickname given to the unemployed massively blocking the roads against privatizations in the 1990s and early 2000s in Argentina to protest against the high unemployment and the short term contracts.

and Montoya, 2004).[7] Informal employment is harmful because it can trap workers and small firms in a vicious cycle of low productivity and precarious employment. The existence of a trap into bad contract types could thus explain the persistence of bad initial conditions on the flow of future earnings.

Skill mismatch. Third, the persistence puzzle may be solved with the concept of task-specific skills (Gibbons and Waldman, 2006). Indeed, poor matches in the early career have dramatic consequences later on. If the skill content of tasks is lower during recessions, as suggested by Devereux (2000), then the task-specific human capital accumulated is lower (Gibbons and Waldman, 2006), and get lost when individuals get promoted within the firm, so that their wage remains lower. Even supposing a constant specific human capital content of tasks along the business cycle, job search costs increase during recessions, because the offer rate accruing to applicants is lower, and because sending information signals is more costly as the ratio of applicants per job increases. As a consequence, high educated workers tend to apply to lower skilled jobs. Empirical evidence indicates that the skilled workers do experience a lower, less cyclical unemployment (Nickell, 1979). When the unemployment rate is high, the more educated tend to accept lower skilled positions (Devereux, 2002). Building a search model with heterogeneous workers, Chassamboulli (2011) shows that if the payoff for unemployment is sufficiently low, then skilled workers may accept low quality matches. In Argentina, the unemployment benefit coverage is very low, and unlike in developed countries, there is no universal subsistence benefits for the new labor market entrants. In line with the theoretical model, highly educated workers should accept lower skilled jobs upon entry when initial conditions are bad, which could translate into a worse position years after.

The role of mobility. A further consideration is that the mobility perspectives offered to workers who recently graduated may vary along the business cycle. Certainly, as stated above, on the one hand, the forced mobility related to unstable jobs and mismatched positions has a negative effect on future labor market earnings. However, another strand of literature highlights the importance of early mobility for future labor market outcomes. Mobility and career choices within the first 10 years of experience largely determine the flow of future earnings (Topel and Ward, 1992). In Argentina, the dual labor market makes mobility more

[7] During the 1990s, the share of self-employment within the workforce (another measure of informality) is stable and amounts to 8-10% of the total workforce.

costly, potentially giving some credit to the implicit contract theory. Indeed, in the presence of mobility costs, the terms of the contract are less likely renegotiated, so that the economic conditions when starting the contract are allowed to durably determine the wage profile of different cohorts of graduates (Beaudry and DiNardo, 1991). As a consequence, tenure could potentially harm the long term labor market earnings of highly skilled individuals.

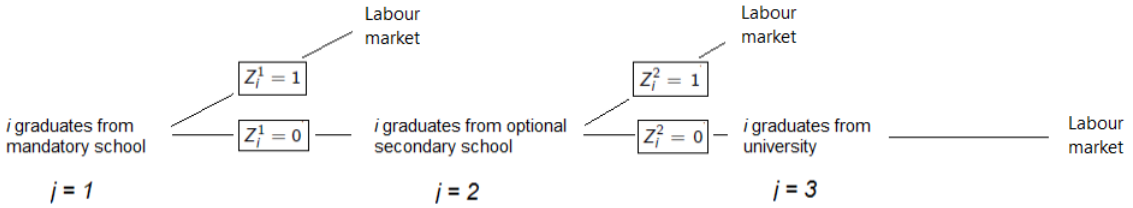
In the empirical part (Section 2.4.2), I am able to convincingly measure the persistence of the effect. There are several possible explanations for this persistence, giving rise to hypotheses that I wish to explore. Of course, the cross-sectional data does not allow to rigorously test among the four possible explanations for the negative relationship between initial conditions and future labor market outcomes. The four cases presented above were analyzed separately in order to see whether the institutional characteristics of the labor market in Argentina came in support of the existing theoretical models explaining the persistence of the effects. In Section 2.4.3, a simple correlation exercise rely on the intuitions exposed above. It allows to complement the main analysis with insights on the potential mechanisms at stake behind the measured persistence. I will devote a specific attention to the differential effects arising across different education level.

2.2.2 Modeling the Sample Selection

A Composition Effect? Besides the four mechanisms expored above, a last, complementary mechanism explaining persistent effects is the fact that the composition of the cohort may change with the business cycle. Then, the persistence puzzle may be explained by a selection bias. In the configuration where certain categories of population have observed or unobserved characteristics that make them more likely to enter the labor market in hard times and simultaneously be less productive, then the sample composition can – at least partly – account for the persistent effect of the initial conditions on employability and earnings (Baker et al., 1994, Blundell et al., 2003). An opposite sign would suggest that a correlation analysis would lead to understate the true persistence of the effect. In what follows, I propose an econometric modeling of the selection in the spirit of Nakagawa (2013). The main objective is to compute sample correction terms to account for the composition effect within the main regression analysis.

The Econometric Model. The sequential decision process of an individual between working and studying is modeled using the sample selection toolbox. Figure 2.1 illustrates the education pathway. There are two important decision nodes: at the end of mandatory schooling ($j = 1$), at the end of optional secondary schooling ($j = 2$). Whenever an individual reaches a diploma, she chooses between continuing to invest into schooling, or enter the labor market. Once enrolled into superior education ($j = 3$), the individual has no choice but to graduate and enter the labor market.

Figure 2.1: Selection Path into the Labor Market at each Decisional Node



The self-selection of mandatory school graduates into the labor market relies on a traditional Heckman (1979) sample selection approach. Self-selection of secondary school graduates into the labor market is trickier to model, because the selection happens conditional on the fact of having chosen to invest in education after mandatory schooling completion. I rely on a bivariate probit estimation allowing for partial observability, as presented in Farber (1983) or Meng and Schmidt (1985). This method has been notably applied to education decision and labor market outcomes by Nakagawa (2013) in the Indonesian case. In Appendix, I provide additional information on the bivariate probit with partial observability.

For college graduates, I simplify the model by assuming that individuals have no other choice and enter the labor market. Still, I account for the selection into college upon high school completion. College graduates are very specific with respect to the population of mandatory and high school graduates: unlike mandatory schooling and high school, enrollment in college largely depends on the family culture, and the decisions upon mandatory and secondary schooling must be very similar for this category of graduates. For this reason, I do not model the sequential selection from primary to secondary schooling, and I simply resort to a standard Heckman selection model.[8]

[8]Note that in the Heckman selection model for mandatory school graduates, the selection is defined as the selection *into the labor market*. Here, on the other hand, selection means selection *into superior education*. For this reason, the selection parameters are expected to be of opposed signs.

Exclusion Restrictions. The selection model is based on the use of business cycle variables as exclusion restrictions. Theoretically, there are at least two reasons why investment into schooling may directly react to the business cycle: a 'cost-benefit analysis' motive, and a 'subsistence' motive. According to the cost-benefit motive, a negative correlation between the propensity to enroll and the aggregate wage rate can arise because individuals defer leaving school when the starting wage is low (Duncan, 1965). As stated by Blundell et al. (2003), the incentives to enter the labor market are usually positively correlated to the wage rate. On the other hand, the schooling investment is decided by the entire family. If secondary workers enter the labor market to compensate for the job loss of the primary earner, then a 'subsistence' motive explains why high levels of unemployment can be associated with high levels of dropouts, especially from older children. It is thus not clear how an increase in the local unemployment rate affects the drop-out rate.[9] In the Argentine case, I expect the first line of argument to hold for two important reasons. First, child labor is not common. The law on child labor is properly enforced.[10] Second, the unemployment was highest in 2001-2002. Based on a very detailed survey conducted in the aftermath of the 2002 crisis, asking whether anyone in the household had either dropped out of school or postponed attendance since October 2001, Fiszbein et al. (2003) report no evidence of children aged 6-12 or 13-15 dropping out. Only a small percentage of drop-outs (2.3%) is found for children aged 16-18, but this percentage does not increase in the aftermath of the economic crisis.

Selection Variables. Then, I compute the corresponding inverse Mills ratio from the above estimations. The standard economic incentives are already taken into account through the exclusion restrictions: better opportunities should attract a higher inflow of workers into the labor market. Now, the inverse Mills ratios computed from the above estimations stand for the unobserved characteristics affecting the probability to select either into education or activity, once I abstract from the effect of the unemployment rate at time of graduation. What is left is the unobserved capacity of individuals to accumulate human capital, as well

[9] Ideally, one would like to account for the family background, which is the second important determinant on the side of expected earnings, as demonstrated in Willis and Rosen (1979)'s seminal paper. Sadly, the cross sectional data does not allow to use family background at time of graduation.

[10] The participation rate of children between 5-14 in Latin America is the lowest of the developing world. In 2012, 8.2% of the children aged 5-14 are working, against 10.1% in Asia and 26.2% in sub-saharian Africa (Diallo et al., 2013). In Argentina, 2.2% of the children aged 5-13 are involved in an economic activity, against 6.6% in 2004 (MTEySS, 2013).

as their unobserved capacity to actually find a job – that can be mediated through the equally unobserved social status, network, or even IQ, whatever the economic condition.

The question is then the following: once the business cycle is taken into account, do the unobserved characteristics of individuals rather correlate positively or negatively to the labor market outcomes later in life? Once again, the effect of the unobserved characteristics on the selection choices of individuals is an open empirical question. For instance, the level of social skills typically correlates positively to the labor market outcomes, by increasing the probability to find a job, or to bargain over a wage. The question is whether such skills, which have specific returns on the labor market but not necessarily so much at school, are rather substitutes or complements to standard schooling skills. If they are substitutes, then self-selection into the labor market can simultaneously lead to higher labor market outcomes. Another possible mechanism could be the imperfect information regarding the ability of potential workers. As exposed by Stange (2012), individuals gradually learn about their ability as they invest in education. Because of the risk, the cost of schooling is higher. Simultaneously, talented individuals usually receive offers at a higher rate, so that they could seize the opportunity and enter the labor market instead of enrolling into the next schooling level, simultaneously ending up with relatively better positions. In the remainder of the chapter, I will refer to this mechanism as 'expedience', as opposed to the 'complementarity' hypothesis according to which unobserved social skills both foster individuals to enroll into the next schooling level and boost their labor market outcomes later in life.

Which effect is expected to prevail in the case of the cohorts graduating between 1995-2011 in Argentina? I argue that the early selection into the labor market happens for one reason: abilities create room for job opportunities yielding better returns than the one offered to the standard new entrant who would not be endowed with these specific characteristics. In Argentina, several specific institutional features of the education system and the labor market lead to believe that the 'expedience' effect should win over the 'complementarity' hypothesis. For instance, at university, classes are systematically organized in day and night shifts, so that students may get an economic activity corresponding to their major. When ability is unobserved, high social skill students meet more employers and are more likely to quickly select into full-time market activities. Another example relates to lower skilled family backgrounds, where social skills are favored in taking over the family business, so

that youngsters with high ability could select early into the labor market with a smooth school-to-job transition.

2.3 Data and Method

2.3.1 Data

The dataset used throughout this chapter stems from the same *Encuesta permanente de hogares* survey also used in Chapter 1, with the difference that I now consider the 1995-2012 time span. Before October 2003, this survey was conducted on a semester basis in May and October. Individuals and households are followed during four waves, then rotated out. From October 2003 on, the survey is conducted in a continuous manner within a year. The survey is designed to be representative of the selected urban areas at the cross-sectional level. INDEC (2002) reports that the EPH is representative of 70% of urban Argentina. In line with Genda et al. (2010), I use this survey in a cross-sectional fashion.

Sample Selection I select working age males (16-64) born in Argentina, and employed or actively looking for a job. Usually, in comparison with female participation, male labor supply decision is less sensitive to own hourly wage. In addition, for women, fertility is an important factor to take into account when studying the interplay between the business cycle and the schooling decisions. Men respond less to other dimensions of the life cycle. Excluding women from the sample, I can reasonably assume that after obtaining a certain degree, an individual has no alternative option but to enter the labor market or engage into more schooling. Then, all observations with missing information on education are dropped (1.24% of the original sample). Currently active, enrolled students are dropped because their labor supply is constrained and does not correspond to their education level. Since information on labor market conditions upon entry as well as at time of schooling decisions are required, the sample is further restricted to new labor market entrants supplying labor from 1995 onward, with complete information on unemployment rates at time of their schooling decision. Last, all observations with missing information on wages or labor participation are dropped from the sample (12% of the remaining sample).[11] The final sample contains 85,186 observations:

[11] In the Appendix, I examine whether individuals reporting incomplete information on earnings have specific characteristics. Table 2.B.1 reports the marginal effects from the probit regression, calculated at the sample average. Unsurprisingly, the attrition is not random. In the final sample, the more educated are underrepresented, as well as the individuals living in the Great Buenos Aires area and in Patagonia. On average, all else being

35,642 individuals leaving school after mandatory education, 40,368 individuals engaging into optional secondary education, and 9,176 university graduates.[12] A cohort is a pool of individuals graduating on the same year. Each cohort is assigned its corresponding unemployment rate at time of entry on the labor market. According to her graduation year and region, an individual was enrolled in different schooling systems.[13] Taking this into account, I assign to each attained degree its corresponding school duration. From information on school duration and age, I compute the potential experience and the graduation year of each individual in the sample. If an individual declares having dropped out before graduating, I infer her potential experience using complementary information on the number of years she was enrolled in this degree, and consider that she graduates on that year with the highest degree previously attained. Since individuals graduate in December, I assume they enter on the labor market during the following calendar year. Since child labor incidence is very low in Argentina, in case children drop out of school before the legal working age, I infer their potential experience based on the minimum legal working age of their cohort.[14]

A First Look at the Data Summary statistics on the dependent variables are displayed by education degree in Table 2.1. The main outcome variables are measured at time of the survey. They include the current employment status and the fact of being employed in a full-time activity. In the EPH survey, an individual is defined as employed if she worked or actively looked for a job during the previous week. In Argentina, the upper limit for labor contracts is 48 hours weekly, but many contracts rely on a 40 hours basis. Individuals working at least 40 hours are thus considered as full-time workers. Because Argentina is an emerging economy, I also consider the impact of bad economic conditions on the probability of being self-employed at time of the survey. The pool of self-employed includes the self-declared self-employed, as well as the managers of small firms (with five employees or less). Then,

equal, the drop-outs tend to be younger, single, and have more children. That being said, the marginal effects are reasonably low. For instance, an additional year of education raises the probability for an individual to drop out of the sample by 0.44 percentage point. The fact of living in Patagonia is associated with a 2.7 percentage point increase in the probability to report incomplete information.

[12] A question is whether sample sizes are sufficient for each cohort and level of experience. Logically, given the nature of the data, the pattern is not regular. Automatically, new entrants in 1995 tend to have a longer experience, and this is simply because I can observe them until 2012. On the opposite, observations for 2012 are at most new entrants, because 2012 is the last wave I observe. This should not be a problem since all regressions control for potential experience and current macroeconomic conditions.

[13] See Section 0.3.3 of the General Introduction for a detailed description of the schooling system in Argentina and its evolution between 1995-2011.

[14] The minimum legal working age is 14 for new entrants in 1995-2008, then 15 for new entrants in 2008-2010, and 16 afterwards.

another important labor market outcome is labor earnings. All the sources of labor income are pooled into log monthly real labor earnings.[15] Income from other sources is left aside.

Then, I concentrate on a series of qualitative information on the occupation of wage earners employed at time of the survey, with the objective to explore the mechanisms driving the persistence. First, the quality of a job is proxied by three dummy variables. Long term contracts are signaled with a 1. Informality ('No social benefits') equals to 1 when the employer does not contribute to the social security. Last, the variable 'size' of the firm takes the value 1 if the number of employees is above 40. Job satisfaction is apprehended using information on the willingness to work more hours, on the on-the-job search (1 if the worker declares to actively look for another occupation), and on the length of the job tenure (1 if tenure is longer than one year). Finally, I consider a possible skill-mismatch by using individual-level information on the type of skill required by tasks. The survey provides detailed information on tasks. A task has a high skill content if it is designated as 'professional' or 'technical', and a low skill content if it is labeled as 'operative' or 'unqualified' (INDEC).

Table 2.2 presents the means and standard errors for the interest and control variables by education degree. The measure of the economic conditions upon entry is the unemployment rate at time of graduation.

[15] All monetary variables are expressed in 2008 Argentine pesos. I used the the consumer price index calculated by the institute INDEC before the fourth quarter of 2007. For later quarters, the price index used stems from the *State Street PriceStats* reported by *The Economist*.

Table 2.1: Summary Statistics: Labor Market Outcomes

	Whole sample			Sample of wage earners		
	Mandatory	Secondary	Superior	Mandatory	Secondary	Superior
Main outcomes						
Employed	0.83	0.86	0.92	0.86	0.89	0.94
	(0.38)	(0.35)	(0.28)	(0.35)	(0.31)	(0.24)
Full time	0.78	0.82	0.88	0.82	0.87	0.91
	(0.42)	(0.38)	(0.32)	(0.38)	(0.34)	(0.29)
Self-employed	0.16	0.11	0.12	0.00	0.00	0.00
	(0.36)	(0.31)	(0.32)	(0.00)	(0.00)	(0.00)
Real log monthly wage	6.56	6.95	7.32	6.63	7.00	7.35
	(0.78)	(0.75)	(0.67)	(0.73)	(0.71)	(0.64)
Complementary outcomes						
Long term contract	0.41	0.56	0.66	0.49	0.66	0.78
	(0.49)	(0.50)	(0.48)	(0.50)	(0.48)	(0.42)
No benefits	0.46	0.30	0.17	0.57	0.36	0.20
	(0.50)	(0.46)	(0.37)	(0.49)	(0.48)	(0.40)
Firm size over 40	0.18	0.31	0.39	0.23	0.36	0.46
	(0.39)	(0.46)	(0.49)	(0.42)	(0.48)	(0.50)
Wish to work more hours	0.21	0.13	0.11	0.19	0.12	0.11
	(0.40)	(0.34)	(0.32)	(0.39)	(0.33)	(0.31)
On the job search	0.19	0.15	0.15	0.18	0.15	0.15
	(0.39)	(0.36)	(0.36)	(0.38)	(0.35)	(0.35)
Tenure over 1 year	0.36	0.48	0.57	0.43	0.57	0.68
	(0.48)	(0.50)	(0.49)	(0.50)	(0.50)	(0.47)
Low skilled occupation	0.93	0.87	0.59	0.98	0.93	0.64
	(0.25)	(0.34)	(0.49)	(0.14)	(0.26)	(0.48)
Observations	35642	40368	9176	28635	34010	7735

Notes: [a]Real 2008 Argentine pesos. Information on wages and hours worked are given conditional on being employed.

Table 2.2: Summary Statistics: Interest and Control Variables

	Whole sample			Sample of wage earners		
	Mandatory	Secondary	Superior	Mandatory	Secondary	Superior
Interest variables						
Unemployment at entry (U0)	11.17	11.37	10.03	11.18	11.38	10.06
	(3.03)	(3.66)	(4.28)	(3.05)	(3.66)	(4.29)
U0 × pot.exp.	89.15	79.73	57.77	90.16	80.78	58.26
	(46.97)	(47.56)	(46.27)	(46.66)	(47.20)	(46.32)
Control variables						
Potential experience (years)	7.85	6.71	5.17	7.93	6.79	5.20
	(3.65)	(3.22)	(2.53)	(3.60)	(3.15)	(2.51)
Squared pot. exp.	74.92	55.43	33.12	75.80	56.06	33.31
	(63.74)	(47.42)	(29.00)	(63.11)	(46.88)	(28.87)
Current unemployment	7.49	6.84	6.14	7.33	6.73	6.13
	(3.11)	(2.52)	(1.33)	(2.94)	(2.33)	(1.28)
In couple	0.33	0.30	0.34	0.34	0.31	0.35
	(0.47)	(0.46)	(0.47)	(0.47)	(0.46)	(0.48)
Children	2.14	1.16	0.56	2.09	1.16	0.58
	(1.97)	(1.36)	(0.93)	(1.92)	(1.35)	(0.93)
Great Buenos Aires	0.13	0.16	0.15	0.14	0.17	0.16
	(0.34)	(0.37)	(0.36)	(0.34)	(0.38)	(0.37)
North-West	0.24	0.21	0.20	0.23	0.20	0.20
	(0.42)	(0.41)	(0.40)	(0.42)	(0.40)	(0.40)
North-East	0.11	0.12	0.10	0.10	0.11	0.10
	(0.31)	(0.32)	(0.30)	(0.30)	(0.32)	(0.30)
Cuyo	0.11	0.09	0.10	0.11	0.10	0.11
	(0.31)	(0.29)	(0.31)	(0.31)	(0.29)	(0.31)
Pampa	0.32	0.29	0.33	0.33	0.28	0.32
	(0.47)	(0.45)	(0.47)	(0.47)	(0.45)	(0.47)
Patagonia	0.09	0.13	0.11	0.09	0.14	0.11
	(0.29)	(0.34)	(0.31)	(0.29)	(0.35)	(0.32)
Observations	35642	40368	9176	28635	34010	7735

Notes: [a]Real 2008 Argentine pesos. Information on wages and hours worked are given conditional on being employed.

2.3.2 Method

I estimate the impact of the unemployment rate at entry on the current employment status and labor income, net of the year-of-graduation fixed components ϕ_y. In line with the existing literature, I first run a standard labor supply function taken at the extensive and intensive margin, augmented with initial labor market conditions at entry time, as described in (2.1):

$$Y^j_{ity} = \alpha^j_0 + \alpha^j_1 U_y + \alpha^j_2 exp_{it} + \alpha^j_3 exp^2_{it} + \alpha^j_4 U_y * exp_{it} + \alpha^j_5 U_y * exp^2_{it} + \alpha^j_6 U_t + \sum_k \beta^j_k x^k_{it} + \phi^j_y + \epsilon_{ity}, \tag{2.1}$$

The superscript $j = 1, 2, 3$ stands for the highest education degree attained (1 is mandatory schooling, 2 is highschool, and 3 is college education). Y_{ity} is the labor market outcome of individual i having graduated in year y and observed at time of survey t. U_y is the unemployment rate prevailing at time of entry on the labor market. α_1^j thus describes the initial loss (gain) in terms of employment probability or earnings from graduating in a recession (boom). $U_y * exp_{it}$ is the interaction term between the initial labor market conditions and the potential number of years of experience on the labor market. Assuming that the effect of experience on the initial loss is linear, α_4^j reveals to what extent this initial loss or gain due to relatively better or worse economic conditions is persistent, or on the contrary fades away with time. α_5^j allows the effect of the initial unemployment rate to vary in a non-linear way with experience. $\sum_k x^k$ includes additional controls: the number of children, the marital status, and the region of residence. Finally, it is important to account for temporary macroeconomic shocks at time of survey. Correspondingly, α_6^j captures the effect of the current national unemployment rate U_t.

Form the above discussion, if schooling decisions depend on the business cycle at time of graduation, then U_y can be manipulated, and the estimation of (2.1) yields biased estimates. The modeling of the sequential investment decision into education presented above allow for the computation of the inverse Mills ratios, which precisely capture the correlation between the unobserved characteristics and the education choices (Heckman, 1979, Tunali, 1986). Equation (2.1) is estimated again, with the difference that it is enriched with the appropriate selection term(s). At a given education level j, a significant coefficient for the included selection term means that the composition of the cohort changes along the business cycle, as predicted by Blundell et al. (2003). If the selection into the labor market correlates with the current labor market outcomes, the effect of the initial conditions U_y could change.

2.4 Results

2.4.1 Selection Equations

Table 2.1 first presents the results of the four selection equations, as sketched in Section 2.2.2, and further detailed in Appendix. The main take-away is that as expected, the decision-making follows a standard cost-benefit analysis. Individuals choose to invest in an additional schooling degree only when the opportunity cost for schooling is low, i.e. for high levels

of unemployment. Simultaneously, they are most willing to invest in education when the unemployment rate faced by the holders of the desired diploma is low. This result holds whatever the education level at baseline.

Having a closer look at the estimations separately, the first column of Table 2.1 reports that for mandatory school graduates, the probability to enter the labor market depends negatively on the own unemployment rate at time of graduation. For youngsters graduating from mandatory school, the higher the unemployment rate, the lower the probability to enter the labor market at time of graduation. The unemployment rate for next schooling level has the opposite effect: the higher the unemployment rate faced by individuals with the next schooling degree, the higher the probability for mandatory school graduates to enter the labor market straightaway, without investing in the next schooling level.

Table 2.1: Selection Equations

	Probit	Bivariate probit with partial observability		Probit
	Entry upon mandatory	Entry upon secondary	Selection into secondary	Selection into superior
$U(j=1)$ at mandatory school graduation	−0.0472***		0.0439***	
	(0.0084)		(0.0043)	
$U(j=2)$ at mandatory school graduation	0.0903***		−0.0776***	
	(0.0092)		(0.0047)	
Upward BC trend at mandatory school graduation	0.0520**		0.1113***	
	(0.0216)		(0.0157)	
$U(j=2)$ at secondary school graduation		−0.1170***		0.1790***
		(0.0075)		(0.0245)
$U(j=3)$ at secondary school graduation		0.1030***		−0.1777***
		(0.0080)		(0.0250)
Upward BC trend at secondary school graduation		−0.1675***		
		(0.0089)		
Upward BC trend at secondary school graduation				0.1273***
				(0.0230)
Region FE	Y	Y		Y
Cohort FE	Y	Y		Y
Rho		0.99996		
Observations	85186	85186		85186

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey.

The second and third columns of Table 2.1 display the estimates for the selection into the labor market after graduating from the optional secondary school (high school) – taking into account the selectivity into this schooling level at the time of mandatory school graduation. At first, the third column presents the estimates for the selection into optional secondary schooling. In line with the results presented above, graduates from optional secondary school positively selected into this degree according to the own unemployment rate faced at time of their mandatory degree, and negatively according to the unemployment rate faced by the next degree. Once I take the partial observability into account (column 2), the selection into the labor market after optional secondary schooling follows the same pattern as the simple probit: the higher the own unemployment rate, the higher the enrollment into tertiary education, and consequently the lower the probability to enter the labor market. Conversely, the higher the unemployment rate faced by individuals with a college degree observed at time of graduation, the lower the probability to invest further in education.

Finally, the last column of Table 2.1 reports the result for the selection into college. Since I assume that individuals have no other option but to enter activity once they graduate, the selection process is symmetric to the selection into activity after graduating from high school. Unsurprisingly, the same factors driving individuals to enter activity after high school deter them from investing into superior education.

2.4.2 Persistence of Initial Conditions

Following the model exposed in Section 2.3.2, I now measure the persistence of initial bad economic conditions for Argentine men who graduated between 1995-2011, taking into account the sequential decision process between schooling and market activities. Results are reported in Tables 2.2-2.4. For the sake of comparison, I also report the results obtained with standard OLS regressions.

Having a general look at the tables, and at the selection parameters presented in the bottom part of each table, a first general result is that when they are significant, the selection coefficients for the probability to enter the labor market (resp. the next education level) are positive (resp. negative). In other words, characteristics driving individuals to enter the labor market at time of graduation also have a positive impact on their labor market outcomes later in life. As expected given the specific features of the Argentine labor market, the 'expedience' hypothesis is indeed preferred to the 'complementarity' hypothesis. Then,

comparing the OLS point estimates for the interest variables and the estimates obtained with the selection model indicates that there is evidence of a quite substantial cohort composition effect in Argentina. Not taking the time allocation process between working and schooling into account would yield downward biased estimates of the true long term effects.

Having a closer look at Table 2.2, a long term effect of bad initial conditions on later labor market outcomes arises for mandatory school graduates and college graduates. The quantitative penalty is three times higher for mandatory school graduates: according to the specification, a 1 percentage point increase in the unemployment rate at time of graduation is associated with a 1.8 to 4.5 decrease in the employment probability at time t. Their employment probability catches up after 5 to 12 years of potential experience. The employment probability penalty for graduating in a bad economy is lower for college graduates, whose employment probability is downgraded by 1.6 percentage point for each additional percentage point higher unemployment rate at time of entry on the labor market. Unlike for the mandatory school graduates, the coefficient of the interaction term between experience and initial conditions tells that the gap is permanent, i.e. does not fade away with experience on the observed span of data. Last, comparing the impact of the unemployment rate at entry with the impact of the actual unemployment rate shows that the magnitude of their effect on current employability is roughly similar.

Table 2.3 reports the results using full-time employment as a dependent variable. It displays a similar pattern of results. Mandatory school graduates have a lower propensity to be employed when the economy at time of graduation is depressed. On the other hand, for the college graduates, the permanent effect of initial conditions on long term labor outcomes looses statistical significance.

In emerging economies, informality is an adjustment margin to the worsening of the business cycle, both for employers – because it lowers the labor costs – and for workers – because it shifts the constraint related to the negative shock from the labor market to the good or service market (Mondino and Montoya, 2004). In parallel, belonging to this sector is an important predictor for occupying this type of position later in life. It is legitimate to ask whether the probability of being self-employed or manager of a small company ($\leq$5) increases or decreases together with the unemployment rate at time of graduation. The results (not shown here) provide no evidence of such an effect, independently from the education degree.

Table 2.2: Employment Probability Regression Results

	Stopped upon mandatory		Stopped upon secondary		Went to university	
	Selection	OLS	Selection	OLS	Selection	OLS
Unemployment at entry U0	−0.0450***	−0.0182***	−0.0062	−0.0045	−0.0158**	−0.0065
	(0.0075)	(0.0056)	(0.0058)	(0.0043)	(0.0076)	(0.0074)
Experience	−0.0078	−0.0078	0.0344***	0.0344***	0.0191	0.0230*
	(0.0128)	(0.0128)	(0.0090)	(0.0090)	(0.0124)	(0.0125)
Squared pot. exp.	−0.0003	−0.0003	−0.0024***	−0.0024***	−0.0008	−0.0010
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0009)	(0.0009)
U0 × pot. exp.	0.0035***	0.0035***	0.0027***	0.0027***	0.0005	0.0003
	(0.0013)	(0.0013)	(0.0009)	(0.0009)	(0.0017)	(0.0017)
Unemployment	−0.0204***	−0.0205***	−0.0169***	−0.0169***	−0.0150**	−0.0152**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0064)	(0.0064)
Selection terms						
Into activity	0.5161***					
	(0.0945)					
$\lambda 1$			−0.0216			
			(0.0506)			
$\lambda 2$			−0.0079			
			(0.0500)			
Into university					−0.1687***	
					(0.0287)	
Region FE	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y
Observations	35642	35642	40368	40368	9176	9176

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

Table 2.3: Full-Time Employment Probability Regression Results

	Stopped upon mandatory		Stopped upon secondary		Went to university	
	Selection	OLS	Selection	OLS	Selection	OLS
Unemployment at entry U0	−0.0589***	−0.0060	−0.0022	0.0040	0.0065	0.0134
	(0.0092)	(0.0060)	(0.0067)	(0.0041)	(0.0090)	(0.0085)
Experience	0.0237	0.0238	0.0537***	0.0537***	0.0322	0.0352*
	(0.0176)	(0.0174)	(0.0122)	(0.0121)	(0.0195)	(0.0198)
Squared pot. exp.	−0.0011**	−0.0011**	−0.0030***	−0.0030***	−0.0003	−0.0004
	(0.0005)	(0.0005)	(0.0004)	(0.0004)	(0.0013)	(0.0013)
U0 × pot. exp.	0.0011	0.0011	0.0010	0.0010	−0.0022	−0.0024
	(0.0016)	(0.0016)	(0.0012)	(0.0012)	(0.0023)	(0.0023)
Unemployment	−0.0241***	−0.0241***	−0.0195***	−0.0195***	−0.0277***	−0.0279***
	(0.0018)	(0.0017)	(0.0019)	(0.0019)	(0.0079)	(0.0080)
Selection terms						
Into activity	1.0144***					
	(0.1447)					
$\lambda 1$			−0.0814			
			(0.0783)			
$\lambda 2$			−0.0502			
			(0.0795)			
Into university					−0.1257**	
					(0.0517)	
Region FE	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y
Observations	35642	35642	40368	40368	9176	9176

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

This is not surprising since in Argentina, the vast majority of unwanted informality happens in fact within the wage sector.

Now turning to the subsample of individuals employed at time of survey, I investigate whether the state of the economy at time of entry is associated with a penalty in labor earnings. Point estimates in Table 2.4 indicate that college graduates are clearly exposed to a wage penalty of around 6 percent for each additional percentage point of unemployment at time of graduation. The OLS regression results indicate that unlucky college graduates seem to catch up with luckier cohorts within a ten year span. However, turning to the selection results, the parameter reflects a mere sample composition effect, where individuals who self-select into college are simultaneously less likely to follow a career path allowing for catch-up. Results for mandatory and secondary school graduates display an intricate pattern. Looking at the OLS results, only secondary school graduates are durably affected by initial conditions. Each additional percentage point in unemployment upon entry translates into a permanent 2.6 lower observed wage rate years later. However, results from the selection equation indicate that even if individuals who self-select into the labor market after secondary schooling are exactly as likely as other high school graduates to receive a certain monthly wage, they happen to be more likely to suffer from initially bad economic conditions, so that the effect washes out once selection is controlled for. The opposite effect arises for mandatory school graduates: once the selection into activity is taken into account, the impact of the initial unemployment on current wages is high (11 percent for each additional percentage point unemployment at time of graduation) and permanent. Unlike for mandatory or tertiary school graduates, self-selection into the labor market after secondary schooling increases the exposure to long run effects. In this case, the composition effect biases the result upward.

I have exposed how bad initial conditions, even when they are short-lived, matter for a cohort of new entrants, so that there can be 'lucky' and 'unlucky' cohorts. How do the results obtained on Argentina compare with the existing literature?

The literature mainly focused on college graduates. In terms of magnitude, the effects for this group in Argentina are in range with the existing literature. For each additional unemployment percentage point at time of graduation, the wage penalty amounts to 0.9 percent in Austria (Brunner and Kuhn, 2014), 1 percent in Canada (Oreopoulos et al., 2012), and up to 13 (permanent) percent in the US (Kahn, 2010).

Table 2.4: Log Monthly Real Wage Regression Results

	Stopped upon mandatory		Stopped upon secondary		Went to university	
	Selection	OLS	Selection	OLS	Selection	OLS
Unemployment at entry U0	−0.1123***	−0.0150	0.0022	−0.0263**	−0.0687**	−0.0609***
	(0.0204)	(0.0175)	(0.0381)	(0.0100)	(0.0334)	(0.0134)
Experience	0.0801	0.0801	0.0811	0.0820***	0.0800	0.0617*
	(0.0555)	(0.0554)	(0.0555)	(0.0255)	(0.0554)	(0.0326)
Squared pot. exp.	−0.0018	−0.0018	−0.0018	−0.0023***	−0.0017	−0.0051***
	(0.0016)	(0.0016)	(0.0016)	(0.0008)	(0.0016)	(0.0019)
U0 × pot. exp.	−0.0021	−0.0021	−0.0022	0.0033	−0.0021	0.0066*
	(0.0052)	(0.0052)	(0.0052)	(0.0028)	(0.0052)	(0.0038)
Unemployment	−0.0505***	−0.0507***	−0.0506***	−0.0359***	−0.0507***	−0.0325**
	(0.0034)	(0.0034)	(0.0034)	(0.0049)	(0.0034)	(0.0131)
Selection terms						
Into activity	1.8634***					
	(0.2548)					
$\lambda 1$			0.3524			
			(0.5035)			
$\lambda 2$			0.5066			
			(0.5102)			
Into university					−0.4540*	
					(0.2563)	
Region FE	Y	Y		Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y
Observations	29377	29377	29377	34480	29377	8408

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

In addition, a few studies provide results about the heterogeneity of the persistence according to the education degree. A common finding is that the less educated are also the less insulated form the long term consequences of negative shocks on labor market outcomes. Liu et al. (2014) show that poorly educated individuals experience a permanent decline in wage when graduating in a bad economy. For Genda et al. (2010), only the Japanese high school graduates durably suffer from entering the economy in a recession. High school graduates are more likely to be unemployed: a 1 percentage point increase in the unemployment rate upon entry raises the likelihood of unemployment by 3 to 4% up to 12 years after entry on the labor market. Conditional on being employed, they are less likely to work full-time: a 1 percentage point increase in the unemployment rate upon entry decreases the likelihood of being employed full-time by 1.5 to 2.5%, even after 12 years. The results obtained for mandatory school graduates in Argentina are of the same magnitude. In addition, Liu et al. (2014) propose full-time employment as a measure for the job quality. The probability of having a full-time job varies more strikingly with the business cycle if the individual belongs to a poorly skilled group (mandatory or academic high school degree) relatively to a skilled group (vocational high school or college degree). Again, this result is in line with what I find using Argentine data. However, these cross-degree comparative studies fail to find evidence of a persistent effect of initial bad conditions on the outcomes for college graduates. For instance, Liu et al. (2014) show that college graduates recover rapidly from adverse economic conditions upon entry. A first explanation for this discrepancy relates to institutional aspects of the labor and schooling markets. Genda et al. (2010) suggest that US labor markets are very flexible, so that mobility within and between firm should allow for immediate adjustments. This is not the case in Argentina, where the labor market is characterized by its extreme duality. College graduates negotiate contracts with benefits at the sector and firm level. In a two-tier labor market, between firm mobility can be extremely costly, so that the wage inertia could be accounted for by the implicit contract theory. Another explanation is that previous studies do not account for selection. I argue that composition effects are more likely to arise for higher degrees, because the 'expedience' effect linked with the accumulation of social capital should be positively correlated with age. Not accounting for selection yields downward-biased estimates of the true persistence of initial conditions upon entry.

2.4.3 Mechanisms at Stake

Ideally, one would like to pinpoint the main factors driving the persistence of the effect of bad initial conditions on the employment probability and earnings in the long run. This would create room for a policy aiming at containing the unequal inter-cohort redistribution accompanying negative shocks.

So far, the only clearcut mechanism explaining the small observed persistence is the changing cohort composition. I show that the same unobserved characteristics which are driving individuals to enter the labor market rather than enrolling into the next schooling also positively influence the labor outcomes later in life. Simultaneously, in most of the cases, these individuals find a way to mitigate the negative effects of bad initial conditions, so that once I correct for the sample selection, the long term effect of the initial economic condition on the future employability and earnings generally increases.

Once the effect of the sample composition is accounted for, what are the explanatory factors for the persistent effect? From the above discussion, it should be clear that the data does not allow to test directly among the four possible explanations behind the measured persistence, namely unemployment scarring, job quality, skill mismatch, and mobility. Such an analysis necessitates a detailed individual history of employment and wages. Still, the available piece of information regarding the *current* labor market status can be used to get an insight on the possible channels driving the persistent effect. Here, I rely on the basic idea that present experiences should be good indicators of past experiences. Behind its apparent diversity, the theoretical literature systematically explains the persistence by a situation (poor job quality, lower task-specific human capital content) in which the new entrant can be trapped. For instance, a downward business cycle negatively impacts the task intensity of the available positions, and then limits the accumulation of human capital, so that individuals will be durably assigned to low-quality task. Studying how the characteristics of the current position correlate with the unemployment rate at time of graduation thus provides some intuition regarding the forces driving the persistence.

Due to data availability, this correlation exercise relies on the subsample of currently employed wage earners.[16] For the sake of parsimony, I only report the results of estimations accounting for the sample selection.

I first examine the impact of bad initial conditions on the quality of the position today. The quality is captured along three complementary dimensions: belonging to the primary labor market and enjoying a long term contract; being employed in the secondary labor market as an informal wage worker, and finally the size of the company, which is a good indicator of the job quality in various aspects, notably the within-firm career perspectives. Table 2.5 shows that for each additional percentage point increase in unemployment upon graduation, workers are 3.5 percentage points more likely to be informal wage earners, independently from their education degree. The effect is permanent for mandatory and secondary school graduates, but fades away as time passes by for the most educated. Unlucky cohorts of college graduates are rather offered positions in relatively smaller firms, with lower evolution perspectives. Note that the effect of the *current* employment on the job quality measures is much lower than the effect of past unemployment, or even virtually 0. This confirms that early career characteristics of a job are crucial to the career development – and the associated employment probability and earnings of a worker.

Then, Table 2.6 investigates the relation between the job satisfaction at time of survey and the unemployment rate at time of graduation. First, the expressed willingness to work more hours is used as proxy for unemployment scarring. If early unemployment leads to discouragement, and lack of motivation, then the willingness to supply extra hours should be negatively correlated with the unemployment rate at time of graduation. Results in Table 2.6 show that it is not the case. Of course, the willingness to supply more hours could also be explained by the demand side of the labor market relationship, because the less constrained the labor demand, the less likely the willingness to work more. Keeping this limitation in mind, the unemployment scarring through the depreciation of non-cognitive skills is not supported by our simple correlation exercise.

Turning to mobility, mandatory and high school graduates are more likely to currently search on-the-job when they graduated in a depressed economic environment. A 1 percentage point increase in the unemployment rate at entry is associated to a 1.6 to 2 percentage points

[16]This population accounts for 85% of the employed individuals in the sample. I run the same analysis as in Section 2.4.2 with the subsample of wage earners, and find identical results. The fact that the employment status (i.e. the selection into the sample of employed wage earners) is itself determined by the unemployment rate at entry time should be kept in mind when interpreting the results. The bias is likely to be downward.

Table 2.5: Job Quality Regression Results

	Stopped upon mandatory			Stopped upon secondary			Went to university		
	Long term	No benef	Firm over 40	Long term	No benef	Firm over 40	Long term	No benef	Firm over 40
U0	−0.0163	0.0356***	0.0097	−0.0363***	0.0369***	−0.0111	−0.0046	0.0397***	−0.0228*
	(0.0130)	(0.0132)	(0.0129)	(0.0096)	(0.0122)	(0.0088)	(0.0096)	(0.0101)	(0.0118)
Exp.	−0.0169	−0.0694***	0.0514***	0.0351**	−0.0736***	0.0543***	−0.0000	0.0217	0.0143
	(0.0243)	(0.0207)	(0.0153)	(0.0148)	(0.0147)	(0.0107)	(0.0175)	(0.0179)	(0.0294)
Squ. exp.	0.0010	0.0015**	−0.0015***	−0.0016***	0.0026***	−0.0014***	0.0010	−0.0014	0.0023
	(0.0006)	(0.0006)	(0.0005)	(0.0005)	(0.0005)	(0.0004)	(0.0014)	(0.0011)	(0.0017)
U0 × exp.	0.0014	0.0030	−0.0024	0.0017	0.0001	−0.0025**	0.0015	−0.0051**	−0.0020
	(0.0026)	(0.0019)	(0.0015)	(0.0015)	(0.0016)	(0.0012)	(0.0020)	(0.0023)	(0.0035)
Unemployment	0.0046	0.0055**	−0.0005	0.0046	0.0048*	0.0003	−0.0069	0.0026	−0.0052
	(0.0029)	(0.0021)	(0.0020)	(0.0028)	(0.0029)	(0.0023)	(0.0083)	(0.0084)	(0.0084)
Selection									
Into activity	0.3405*	−0.8371***	−0.1367						
	(0.1971)	(0.2087)	(0.2085)						
$\lambda 1$				−0.3524***	0.5134***	−0.3477***			
				(0.0935)	(0.1315)	(0.0989)			
$\lambda 2$				−0.2525***	0.3678**	−0.2654**			
				(0.0960)	(0.1484)	(0.1041)			
Into univ.							−0.1224***	0.3189***	−0.3596***
							(0.0454)	(0.0580)	(0.0673)
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	24454	24454	24454	30347	30347	30347	7262	7262	7262

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

increase in the probability to actively search for an occupation while currently employed. In addition, unlucky cohorts graduating from high school and college tend to have a lower job tenure: for college graduates, each additional percentage point in the initial unemployment rate is related to a 3 percentage point lower propensity to be employed in the same position for one year or more. The correlation suggests that unlucky cohorts attempt to mitigate the effect of bad initial conditions with a between-firm mobility strategy (Topel and Ward, 1992), which is observed years later at survey time. The existing literature shows that among the most educated, mobility is a key strategic component of career development. The fact that the most educated do not attempt to mitigate the long lasting negative effect of bad initial conditions with on-the-job search is puzzling, and may relate to the dual labor market, where individuals prefer insuring against risk with long term wage contracts, and get promoted from the inside.

Of course, besides desired mobility, there is another possible interpretation to the positive correlation between initial conditions and likelihood to be on-the-job search. Indeed, on-the-job search may as well reflect a dissatisfaction with the poor quality of the job. Such an argument can also account for the negative correlation between the job tenure at time of survey and the unemployment upon entry: tenure is not necessarily a choice, and depends on labor demand factors, such as fixed-term, informal contracts, or lay-offs. In this case, tenure can also be another proxy for the quality of a job. Then, the negative correlation simply reflects the fact that unlucky cohorts are trapped into low quality jobs. To get an intuition regarding the two possible channels, I examine whether the effect of the job search and the job tenure on the monthly wage rate vary with the initial conditions upon entry. If tenure and the propensity to be on-the-job search tend to increase the wage for high values of initial unemployment, then it rather supports the mobility argument, according to which mobility mitigates the initial negative effect of graduating in a bad economy. On the other hand, if tenure and on-the-job search are negatively correlated with wages when the initial unemployment rate is higher, then job search and low tenure rather reflect the job quality – or the ineffectiveness of the strategic mobility. The results are reported in Appendix. Unsurprisingly, the wage at time of survey is positively correlated to tenure and negatively to job-search. The parameter of the interaction term between initial unemployment and on-the-job search is positive and significant for secondary school graduates and college graduates, suggesting that the propensity to be on-the-job-search mitigates the negative

Table 2.6: Job Satisfaction and Mobility Regression Results

	Stopped upon mandatory			Stopped upon secondary			Went to university		
	More hours	Job search	Tenure >1y	More hours	Job search	Tenure >1y	More hours	Job search	Tenure >1y
U0	0.0389***	0.0203*	0.0006	−0.0002	0.0162**	−0.0235***	0.0105	0.0134	−0.0269***
	(0.0098)	(0.0118)	(0.0126)	(0.0049)	(0.0074)	(0.0078)	(0.0093)	(0.0110)	(0.0102)
Exp.	0.0067	0.0514*	0.0172	−0.0275**	−0.0122	0.0912***	−0.0027	−0.0113	0.0656***
	(0.0257)	(0.0261)	(0.0193)	(0.0117)	(0.0112)	(0.0163)	(0.0158)	(0.0216)	(0.0230)
Squ. exp.	−0.0004	−0.0016*	0.0000	0.0006	0.0003	−0.0034***	0.0003	0.0002	−0.0025*
	(0.0008)	(0.0008)	(0.0006)	(0.0004)	(0.0004)	(0.0005)	(0.0012)	(0.0013)	(0.0015)
U0 × exp.	−0.0033	−0.0016	0.0041**	0.0014	0.0002	0.0015	−0.0011	−0.0008	0.0025
	(0.0022)	(0.0024)	(0.0019)	(0.0013)	(0.0012)	(0.0015)	(0.0021)	(0.0030)	(0.0025)
Unemployment	0.0234***	−0.0114***	0.0006	0.0264***	−0.0155***	−0.0079***	0.0193**	−0.0061	−0.0025
	(0.0022)	(0.0017)	(0.0026)	(0.0018)	(0.0016)	(0.0027)	(0.0088)	(0.0086)	(0.0086)
Selection									
Into activity	−0.4667***	−0.3439**	−0.4245**						
	(0.1524)	(0.1674)	(0.1873)						
$\lambda 1$				−0.0069	0.0665	−0.2570***			
				(0.0497)	(0.0660)	(0.0806)			
$\lambda 2$				−0.0158	0.0502	−0.1667*			
				(0.0536)	(0.0674)	(0.0929)			
Into univ.							0.0806**	0.0640**	−0.3110***
							(0.0332)	(0.0265)	(0.0468)
Region FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	24454	24454	24454	30347	30347	30347	7262	7262	7262

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

persistent impact of bad initial conditions. For college graduates, current long term tenure is positively correlated with wages, and even more so for unlucky cohorts.

Finally, the job search theory predicts that the persistent effects of initial conditions can be explained by the poor quality of initial matches for the college graduates. I thus concentrate on the skill mismatch at time of survey. If the latter depends on the initial conditions upon graduation, then skill mismatch is a valid candidate to explain the persistence in earnings across wage earners in Argentina. In line with the theory, Table 2.7 shows that each additional percentage point in the initial unemployment rate faced by college graduates increases by 5.6 percentage points their probability to be employed in a low skilled position.

Table 2.7: Probability of Having a Low Skilled Position Regression Results

	(1) Stopped upon mandatory	(2) Stopped upon secondary	(3) Went to university
U0	−0.0014	0.0059	0.0563***
	(0.0041)	(0.0043)	(0.0136)
Exp.	−0.0057	−0.0134	−0.0417
	(0.0049)	(0.0095)	(0.0262)
Squ. exp.	0.0001	0.0001	0.0005
	(0.0002)	(0.0003)	(0.0015)
U0 × exp.	0.0006	0.0012	0.0026
	(0.0005)	(0.0009)	(0.0033)
Unemployment	−0.0001	−0.0011	0.0080
	(0.0007)	(0.0013)	(0.0103)
Selection			
Into activity	0.0503		
	(0.0565)		
$\lambda 1$		0.1454***	
		(0.0402)	
$\lambda 2$		0.1175***	
		(0.0422)	
Into univ.			1.0263***
			(0.0786)
Region FE	Y	Y	Y
Cohort FE	Y	Y	Y
Observations	24454	30347	7262

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

2.5 Conclusion

Measuring the persistence of initial conditions at time of graduation on labor market outcomes later in life is important, because it is a source of inter-generational inequality. Economic conditions impose themselves on individuals, and the timing of graduation is only partly manipulable. In an emerging economy, the issue of persistence is even more crucial for two reasons, namely because the labor markets differ substantially from spot markets due to the nepotism and the fluctuating informality margin (Mondino and Montoya, 2004), and because these economies are exposed to a higher volatility than industrialized countries (Loayza et al., 2007).

In this chapter, I investigate the long term consequences of graduating in a depressed economy for men graduating between 1995 and 2012 in Argentina. I take into account the potential endogeneity of the investment in education with respect to the business cycle by modeling the schooling vs. working trade-off as a sequential selection using the selection model toolbox (Heckman, 1979, Tunali, 1986).

Overall, I find that short-lived adverse labor market conditions have long run implications on the labor market outcomes. As expected, the long lasting effects situate in the upper range of the results obtained on more developed economies. Without taking the cohort composition effect into account, I find that a depressed economic environment impacts the mandatory school graduates in a *quantitative* way through a durably lower employability, while high school and college graduates suffer from a permanently lower paycheck, suggesting that the persistence of the effect happens through the *qualitative* channel of a lower productivity or task content. Taking into account the selection increases the magnitude of the estimated persistence of bad initial conditions, suggesting that a simple correlation analysis masks most of the persistent effect through a cohort composition effect.

Then, within the limited possibilities offered by the cross-sectional dataset, I explore various hypotheses likely to account for the findings. Using the subsample of employed workers at time of the survey, I select proxies for job quality, job-to-job mobility, job satisfaction, and skills associated to the task, and examine how they correlate with the business cycle at time of graduation. For college graduates, I find that the job quality and task skills are still affected by the business cycle years after the graduation. This suggests that the wage gap between lucky and unlucky cohorts is compatible with the task-specific human capital argument exposed by Gibbons and Waldman (2006), according to which a poor initial placement leads to a slow

career track because of the poor skill content of the task. Additional results on the on-the-job search indicate that mobility could well play a role in mitigating the effects of a bad initial placement For mandatory school graduates, skill mismatch does not come into play, which is consistent with the descriptive statistics and the theoretical predictions from the job search theory with business cycle fluctuations and heterogeneous skills (Chassamboulli, 2011). Still, unlucky cohorts of mandatory school graduates tend to be more frequently informal workers, and more likely to be on-the-job search or looking for extra hours, which rather supports the existence of a dual labor market with bad contract traps.

Last, an element related to the selection issue deserves to be noted. Indeed, the results obtained from the selection model indicate that in most of the cases, the sorting of individuals into the labor market or the education system mitigates the persistence of the shock through a sample composition effect. In terms of policy, taking the selection results seriously has two important implications. First, the selection issue should not be underrated when determining the necessity of a policy intervention, because the persistence of the effect would otherwise be understated. Second, although the sample selection mitigates the persistence effect of the bad initial conditions, individual and social welfare are not necessarily improved, because individuals may leave the education system too soon. The policy-maker should probably rely on another mechanism than the composition of a cohort to mitigate the long term effects of graduating in a good or a bad year.

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Appendices

2.A Modeling Selection into Schooling

Decision upon mandatory primary schooling – Once an individual graduates from mandatory primary school, she decides whether she opts out of school and enters the labor market instead ($Z_i^1 = 1$), or whether she enrolls into optional secondary school, lasting three additional years ($Z_i^1 = 0$).

$$Z_i^1 = \begin{cases} 1 \text{ if } Z_i^{1^*} = W_i^1\gamma^1 + u_i^1 > 0 \\ 0 \text{ if } Z_i^{1^*} \leqslant 0 \end{cases} \tag{2.2}$$

Decision Z_i^1 depends on matrix W^1, containing dummies for birth cohorts, regions, difficulties at school (measured by earlier dropout), but most importantly including the unemployment rate faced *at time of graduation* for individuals with the *same* education level and for individuals with *next* schooling level within her region: U_y and U_y^2. These variables play the role of exclusion restrictions.

As described in equation (2.3), labor market outcomes for primary school graduates in t are observed if $Z_i^1 = 1$, and depend on X_{it}, which contains all controls described in equation (2.1):

$$Y_{it}^1 = \begin{cases} X_{it}\beta^1 + \epsilon_{it}^1 \text{ if } Z_i^1 = 1 \\ 0 \text{ otherwise} \end{cases} \tag{2.3}$$

Since $cov(\epsilon_{it}, u_i^1) = \rho$, with $\rho \neq 0$, $\mathbb{E}(Y_i^1 | Z_i^1 = 1) \neq X_{it}\beta^1$. Instead, $\mathbb{E}(\epsilon_{it}^1 | Z_i^1 = 1) = \rho \frac{\phi(W_i^1\gamma^1)}{\Phi(W_i^1\gamma^1)}$ (Heckman, 1979), implying that the inverse Mill's ratio $\frac{\phi(W_i^1\gamma^1)}{\Phi(W_i^1\gamma^1)}$ should be integrated in matrix X_{it} of equation (2.3) as an additional explanatory variable[17].

[17] As standard in the literature, $var(u_i^1) = 1$. This assumption holds for all error terms in selection equations throughout the chapter.

Decision upon optional secondary schooling – After graduating from the optional secondary school, an individual either enters the labor market ($Z_i^2 = 1$), or engages into a university degree ($Z_i^2 = 0$). In this case, she follows a two step decision path: she first enrolls into secondary schooling, but then opts for activity upon graduation:

$$Z_i^2 = \begin{cases} 1 \text{ if } \left(Z_i^{2^*} | Z_i^1 = 0\right) > 0 \\ 0 \text{ if } \left(Z_i^{2^*} | Z_i^1 = 0\right) \leqslant 0 \end{cases} \tag{2.4}$$

Here again, $Z_i^{2^*} = W_i^2\gamma^2 + u_i^2$ depends on demographic characteristics, as well as on own and next educational level's regional unemployment rates at time of graduation: U_y^2 and U_y^3. Logically, I assume that schooling decisions upon primary and secondary graduation are jointly distributed: $cov(u_i^1, u_i^2) = \mu$. In this case, the likelihood of entering the labor market upon secondary graduation takes the form of a bivariate probit with partial observability (Farber, 1983, Meng and Schmidt, 1985), because I observe Z_i^2 only if $Z_i^1 = 0$, that is to say if the individual keeps on studying after mandatory schooling:

$$\begin{aligned} L =& \prod_{i=1}^{n} \mathbb{P}(Z_i^1 = 1)^{Z_i^1} \times \mathbb{P}(Z_i^2 = 1, Z_i^1 = 0)^{Z_i^2(1-Z_i^1)} \times \mathbb{P}(Z_i^2 = 0, Z_i^1 = 0)^{(1-Z_i^1)(1-Z_i^1)} \\ =& \prod_{i=1}^{n} \mathbb{P}(Z_i^{1^*} > 0)^{Z_i^1} \times \mathbb{P}(Z_i^{2^*} > 0, Z_i^{1^*} \leqslant 0)^{Z_i^2(1-Z_i^1)} \times \mathbb{P}(Z_i^{2^*} > 0, Z_i^{1^*} \leqslant 0)^{(1-Z_i^1)(1-Z_i^1)} \\ =& \prod_{i=1}^{n} \Phi(W_i^1\gamma^1)^{Z_i^1} \times \Phi_2(W_i^1\gamma^1, -W_i^2\gamma^2, -\mu)^{Z_i^2(1-Z_i^1)} \times \Phi_2(-W_i^1\gamma^1, -W_i^2\gamma^2, \mu)^{(1-Z_i^2)(1-Z_i^1)} \end{aligned} \tag{2.5}$$

Following Heckman (1979), Tunali (1986) shows that in this case,

$$\mathbb{E}\left(Y_i^2 | Z_i^1 = 0 \cap (Z_i^2 | Z_i^1 = 0) = 1)\right) = X_{it}\beta^2 + \sigma_{u^1}\lambda_{1i} + \sigma_{u^2}\lambda_{2i} \tag{2.6}$$

where:

$$\begin{aligned} cov(\epsilon_i^2, u_i^1) &= \sigma_{u^1} \\ cov(\epsilon_i^2, u_i^2) &= \sigma_{u^2} \\ \lambda_{1i} &= \phi(X_{it}\beta^1) \times \Phi\left(\frac{X_{it}\beta^2 - \mu X_{it}\beta^1}{\sqrt{1-\mu^2}}\right) / \Phi_2(X_{it}\beta^1, X_{it}\beta^2, \mu) \\ \lambda_{2i} &= \phi(X_{it}\beta^2) \times \Phi\left(\frac{X_{it}\beta^1 - \mu X_{it}\beta^2}{\sqrt{1-\mu^2}}\right) / \Phi_2(X_{it}\beta^1, X_{it}\beta^2, \mu) \end{aligned} \tag{2.7}$$

Selection into the superior degree – In this paper, individuals graduating from the superior face no alternative but to enter the labor market. This being said, the group of university graduates represents *de facto* a self-selected sample from the previous decision-making. For this reason, I still account for the selection using a standard Heckman selection bias approach. College graduates likely had the same reasoning after graduating from mandatory and optional secondary schooling. For this reason, the bivariate probit with partial observability is not a requirement here. The estimation strategy is identical to the case of mandatory school graduates, with the exception that the selection into superior education is now based on the fact to continue schooling after secondary education.

2.B Attrition with Respect to Incomplete Labor Market Information

Table 2.B.1: Probit Regression for Attrition based on Incomplete Labor Market Data

	Marginal effects
Age	−0.0089***
	(0.0003)
Single	0.0143***
	(0.0030)
Household head	0.0023
	(0.0035)
Number of children	0.0067***
	(0.0006)
Number of older dependents	−0.0017
	(0.0048)
Northwest	−0.0060*
	(0.0035)
Northeast	−0.0318***
	(0.0043)
Cuyo	−0.0040
	(0.0042)
Pampa	−0.0218***
	(0.0033)
Patagonia	0.0227***
	(0.0040)
Years of education	0.0000
	(0.0005)
Homeowner	−0.0032
	(0.0024)
Observations	97533

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Reference categories: in a couple, other household member, Great Buenos Aires, not homeowner.

2.C Wage Equations and Mobility

Table 2.C.1: Wage Equations accounting for Tenure and On-The-Job Search

	Stop at mandatory		Stop at secondary		Went to college	
	(1)	(2)	(1)	(2)	(1)	(2)
U0	−0.1108***	−0.1204***	−0.0670***	−0.0685***	−0.1003***	−0.0992***
	(0.0188)	(0.0200)	(0.0153)	(0.0161)	(0.0134)	(0.0137)
U0 × exp.	−0.0023	−0.0023	0.0030	0.0022	0.0070**	0.0068*
	(0.0041)	(0.0048)	(0.0026)	(0.0028)	(0.0035)	(0.0036)
Search	−0.3738***		−0.5222***		−0.4232***	
	(0.0437)		(0.0349)		(0.0417)	
U0 × search	−0.0045		0.0070**		0.0065*	
	(0.0038)		(0.0031)		(0.0035)	
Tenure > 1 year		0.1451***		0.1610***		0.1852***
		(0.0324)		(0.0210)		(0.0401)
U0 × tenure		−0.0001		0.0041**		0.0002
		(0.0026)		(0.0017)		(0.0033)
Exp.	0.0977**	0.0746	0.0853***	0.0773***	0.0379	0.0312
	(0.0440)	(0.0514)	(0.0240)	(0.0253)	(0.0294)	(0.0302)
Squ. exp.	−0.0020	−0.0014	−0.0022***	−0.0017**	−0.0031*	−0.0028
	(0.0013)	(0.0015)	(0.0008)	(0.0008)	(0.0017)	(0.0017)
Unemployment	−0.0494***	−0.0447***	−0.0400***	−0.0315***	−0.0387***	−0.0361***
	(0.0029)	(0.0030)	(0.0043)	(0.0045)	(0.0115)	(0.0122)
Selection						
Into activity	1.8036***	2.0120***				
	(0.2432)	(0.2552)				
$\lambda 1$			−0.5088***	−0.4882***		
			(0.1546)	(0.1535)		
$\lambda 2$			−0.3266**	−0.3183**		
			(0.1606)	(0.1598)		
Into univ.					−0.8376***	−0.8038***
					(0.0767)	(0.0761)
Region FE	Y	Y	Y	Y	Y	Y
Cohort FE	Y	Y	Y	Y	Y	Y
Observations	24454	24454	30347	30347	7262	7262

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the region-graduation year level. Sample of active men having graduated between 1995-2011 and not attending school at time of survey. Additional controls: current number of children, and dummy for being currently in a relationship. *Region fixed effects* for 6 regions (Grand Buenos Aires, Pampa, North-East, North-West, Cuyo, Patagonia). *Cohort FE* stands for graduation year fixed effects.

Chapter 3

Crisis at Home: Mancession-Induced Change in Intrahousehold Distribution

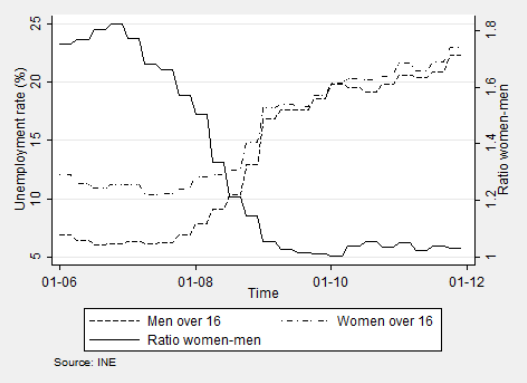
3.1 Introduction

The Great Recession witnessed a dramatic increase in unemployment. In the United States, by the end of 2009, unemployment hit just under 10%, which was more than double the 2007 rate of 4.6%. Some countries in the Euro zone experienced a comparable variation: in Spain, the unemployment rate rose from 8.8% to 19.7% between 2007 and 2010 and in Ireland it trippled from 4.8% to 13.2% (OECD, 2010).

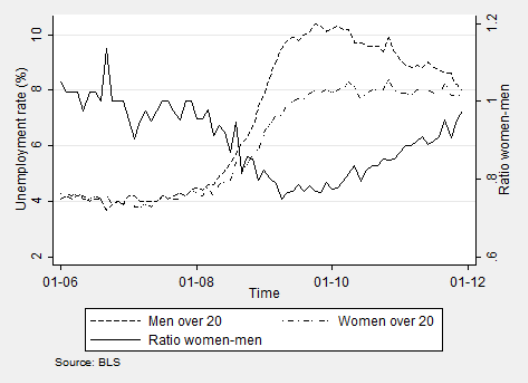
A number of studies have pointed out that during recessions, the unemployment rate rises more for men than for women, resulting into the downturns being characterized as 'mancessions'. Empirically, the mancession hypothesis is clearly supported by the data. Figure 3.1 displays the unemployment gap between men and women aged 15-64 in Spain and in the US. In the US, men and women were as likely to be unemployed before 2008; between 2008 and 2010, this ratio clearly evolved in favor of women. In Spain, at the onset of the recession in 2008, women's unemployment was double the size of men's. By 2010, women's unemployment had risen, but men's unemployment had risen even more sharply, so that men and women were exactly as likely to be unemployed.[1]

[1]One may object that the labor force participation of women is more elastic to the economic opportunities, unemployed women becoming inactive. If this is the case, then the reduction in the employment gap may mechanically arises from a discouragement effect. However, the labor force participation rate of Spanish women

Figure 3.1: Unemployment Rate by Gender, 2006-2011



(a) Spain



(b) United States

The evidence of a mancession has been previously assessed by the literature. Studying the Great Recession in the US, Sierminska and Takhtamanova (2010) note that men face higher job separation probabilities, lower job finding probabilities and, as a result, higher unemployment rates than women in the US. Wall (2009)'s report points out that the large difference in the relative effects of the recession on the employment of men and women is not unusual. Between 1969 and 1991, male employment fell by an average of 3.1 percent during the five recessions experienced during the period. Female employment, on the other hand, actually tended to rise by an average of 0.3 percent during recessions (Goodman et al., 1993). The mancession does not only concern developed economies. Concentrating on a subsample of 17 middle income countries, Cho and Newhouse (2013) find that because they were employed in the hard-hit industrial sector, men were significantly more exposed to adverse labor market events than women during the Great Recession.

The gender composition of the sectors is the key explanatory factor to the phenomenon (Sahin et al., 2010): when the aggregate demand drops, the spending on durable goods, capital goods, as well as investment in housing decline even more sharply. Since employment in these sectors is more men intensive, while female workers tend to be more employed in the service sectors (ILO, 2010)[2], a recession implies a greater displacement rate among men than women.[3]

(men) grew by 4.9% (0,3%) between 2006-2008 and by 3.4% (-0,7%) between 2009-2011. The observed men's unemployment rate is lower than the unemployment rate accounting of the discouraged workers, so that if anything, the unemployment gap may actually be understated.

[2]According to the ILO, in 2008, 85 percent of women in the developed economies worked in services, 3 percent in agriculture, and 12 in manufacturing. The corresponding percentages for men are 61, 4, and 35.

[3]Of course, some studies also point out that women may be relatively more vulnerable than men in other dimensions than the employment or wage gap (Sabarwal et al., 2011). For example, newly active women may

Spain makes no exception to this pattern. The construction sector plays a key role in explaining the variation in the gender employment gap (Bentolila et al., 2012). During the overconfident climate of the mid-2000s, the sector had been flourishing; symmetrically, as the housing bubble burst, it was the first enter the recession, and it was particularly strongly hit. In 2006, 11,9% of the existing jobs were offered in the construction sector which represented 10,4% of the total GDP ; by 2011, the share of employment within the construction sector had shrunk down to 6,9% of the total job pool, and to 6,8% of the total GDP.[4] In parallel, construction is by far the most male specific sector: only one worker out of ten is a woman.

This exogenous change in unemployment risk may have considerably affected intrahousehold allocation of resource. As a matter of fact, there is hardly any evidence on the effect of unemployment and unemployment risk on the balance of power within the household. In this chapter, we exploit the Spanish mancession as a natural experience to investigate how a change in the gender unemployment gap translated into the household.[5] While actual unemployment of a spouse may carry endogeneity issues, we can treat the mancession as an exogenous shock on unemployment risk and more specifically on the gender differential in unemployment probability.

In our view, this chapter contributes to the existing literature in shedding additional, well-needed light on the consequences of the economic crisis on the distribution of resources between individuals. So far, the existing literature on the mancession essentially focused on measuring the gender gap emerging with the economic crisis, and assessed the vulnerability *across* different demographic groups (Sierminska and Takhtamanova, 2010, Hoynes et al., 2012, Cho and Newhouse, 2013). While there exists widespread evidence over the redistributive impacts of economic crises between the households, little is known about the changes in the relative welfare of individuals living in these households. Indeed, a virtually substantial amount of redistribution happens at the individual level. Ignoring the potential for intrahousehold inequality may lead to a severe underestimation of the individual-level consumption inequality (Lise and Seitz, 2011).

Precisely, we suggest a collective model identified on observations from both singles and individuals in couple without children. The model is estimated before and during crisis

suffer from the burden of the home production in addition to the job search or the market working time. The ILO (2010) report insists on the fact that women are predominant in short term, export oriented industries.

[4]Source: Instituto Nacional de Estadísticas de España.

[5]In the General Introduction, Section 0.4.2.1 provides complementary elements on the social role of married women in Spain and its evolution since the end of the Franco dictatorship.

years (2006-2011). We retrieve the complete sharing rule and test original determinants. The first empirical approach consists in using time and spatial variation in women's relative unemployment risk. In this way, we can assess the impact of varying labor market opportunities on the intrahousehold distribution of resources in stable marriages. The second approach focuses more specifically on the role played by the construction sector. It consists in embedding a double difference approach within the sharing rule, i.e. in identifying the effect of husbands being in the construction sector after the outburst of the crisis.

Controlling for price variations during the period, we find that the mancession strongly impacts the way the resources are shared within the household. Depending on the specification, we evaluate the average resource share accruing to Spanish wives for their own consumption at baseline to 0.46-0.60. Following the improvement of their relative opportunities on the labor market, their baseline share increases by 5-6 percent. Importantly, this result holds after controlling for the variation in the relative wage of both spouses, as well as their current labor market status. In terms of magnitude, the effect of this change of economic context alone has the same effect as the *actual* unemployment of the household head on the sharing of resources. In addition, using the alternative difference-in-difference setting based on the specificity of the construction sector, we conclude that this sector is a key driving force to explain the observed changes in the sharing of resources between life partners. Wives with husbands employed in the construction sector experience a 8-12 percent increase in their resource share.

The chapter is structured as follows. In Section 3.2, we describe the model and its identification. In Section 3.3, we present the functional forms and the estimation method, and we motivate the choice of the distribution factors. Section 3.4 presents the Spanish consumption survey and provides a first look at the data. Section 3.5 reports the results, complemented with a discussion and various robustness checks. Section 3.6 concludes.

3.2 Model and Identification

3.2.1 Overview

Our approach is closely related to the most recent developments of the literature on collective models.[6] In particular, Browning et al. (2013) and Lewbel and Pendakur (2008) consider a

[6]Sections 0.4.1.2 and 0.4.1.3 of General Introduction give a comprehensive overview of the collective models of consumption.

model where each individual in a household is characterized by a specific utility function. They suggest the complete identification of the resource sharing function and of economies of scale, exploiting data on couples and single-person households simultaneously. Browning et al. (2013) model economies of scale for each composite good using Barten scales, which reflect how much each good is jointly consumed by household members. This model is highly nonlinear in prices, expenditures and other characteristics, and is consequently difficult to estimate, both numerically and in terms of data requirements. Lewbel and Pendakur (2008) suggest a model which is slightly more restrictive but much more tractable. They posit a single function representing the economies from joint consumption and assume it is independent of total expenditure ('independence of base'). With this (testable) simplification, they can identify both resource sharing and economies of scales without observing price variation: the demand system reduces to a mildly nonlinear system of Engel curves, estimated on cross-sectional data.

The model we use is somewhat intermediary. Indeed, our six years of data surrounding the crisis are not enough variation to identify Barten scales. At the same time, we cannot ignore the little price variation that has taken place. Our aim is to retrieve the sharing rule over the period and estimate some original distribution factors like the gender differentials in unemployment risk. Hence, we rely on a model similar to Lewbel and Pendakur (2008), yet explicitly accounting for prices. We use the same basic behavioral identifying assumptions, namely the existence of some private, assignable goods, the fact that individual preferences do not change across household compositions, and the 'independence of base' assumption. This middle ground model is very convenient when using data in which spatial or time variation in prices cannot be ignored but is not big enough to be used for Barten scale identification.

3.2.2 Model and Assumptions

We model decisions about consumption only. Individuals are indexed by subscript $i = m, w$ for men and women respectively while superscript $k = 1, ..., K$ denotes goods. The log total expenditure in a household is denoted by x and the vector of log prices by $\boldsymbol{p}$. For a *single person*, individual log resources simply coincide with household log expenditure x. His/her welfare level is represented by:

$$u_i = v_i(x, \boldsymbol{p}, \boldsymbol{z}_i) \tag{3.1}$$

where $v_i(\cdot, \boldsymbol{p}, \boldsymbol{z}_i)$ is a well-behaved indirect utility function and $\boldsymbol{z}_i$ is a vector of individual characteristics. In a *couple*, individual log resources are equal to:

$$x + \log \eta_i(\boldsymbol{p}, \boldsymbol{z}) - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \tag{3.2}$$

where $\eta_i > 0$ is a function representing the share of total expenditure accruing to individual i and $s_i > 0$ is a scale that may represent economies of scale or externalities in consumption, with $\boldsymbol{z}$ a vector of individual and household characteristics. We assume that each individual i in a couple has her/his own indirect utility function, so that the indifference curves of this individual satisfies the condition:

$$u_i = v_i(x + \log \eta_i(\boldsymbol{p}, \boldsymbol{z}) - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i). \tag{3.3}$$

Function $v_i(\cdot, \boldsymbol{p}, \boldsymbol{z}_i)$ does not depend on the type n of the household. Hence, differences in expenditure patterns between a person living alone and a person living in a couple can be attributed to scaling and sharing functions only. The stability of individual preferences across household types is the key hypothesis behind identification results.[7]

We model consumption decisions in a couple as a repeated choice for which the assumption of efficiency is plausible. The most general representation of an efficient household decision-making process is the collective approach, which can be seen as a two-stage budgeting process (Browning et al., 1994). In a first stage, household resources are supposed to be allocated between spouses according to a sharing rule, i.e., the outcome of an unspecified decision process. Individual i living in a couple receives a share $\eta_i(\boldsymbol{p}, \boldsymbol{z})$ of total expenditure $\exp(x)$. In a second stage, expenditures on all goods are chosen *as if* each individual solved her/his own utility maximization problem subject to an individual budget constraint, i.e., spent her/his own resources $\eta_i \cdot \exp(x)$. The sharing functions $\eta_i(\boldsymbol{p}, \boldsymbol{z})$, $i = 1, 2$, are differentiable, comprised between zero and one, and sum up to unity. Following Lewbel and Pendakur (2008), we assume for the sake of identification that they do not depend on household total expenditure.[8] Yet they vary possibly with prices and a vector of household

[7] The idea of combining data on people living alone and in couples to retrieve the complete resource sharing rule is applied in Couprie (2007), Lise and Seitz (2011), Browning et al. (2013), Lewbel and Pendakur (2008) and Bargain and Donni (2012). The assumption of stable preferences across marital status is necessary to make 'situation comparisons' (i.e., compare the welfare of adults when living alone or with others) in the terminology of Pollak (1991).

[8] This assumption implies that the indifference scales derived from the model are independent of the level of utility, a desirable property most often imposed in the traditional literature on equivalence scales. Bargain and Donni (2012) show that identification results still hold, theoretically at least, when sharing functions depend on

characteristics $\boldsymbol{z}$, which includes individual characteristics $\boldsymbol{z}_i$ and possibly some distribution factors $\boldsymbol{z}^D$ that capture spouses' relative bargaining position. Formally, distribution factors are variables that affect intra-household bargaining without influencing preferences or the budget constraint. They are sometimes used to identify collective models (Bourguignon et al., 2009), which is not the case in the present framework. Hence, we are free to incorporate any such factors, and in particular to test the potential role of original environmental factors like the spouses' relative risk of unemployment.

Beyond sharing, life in a couple can be characterized by other events affecting individual welfare. These are summarized here by Engel scales $s_i(\boldsymbol{p}, \boldsymbol{z})$, $i = 1, 2$. Following Lewbel and Pendakur (2008), we assume 'independence of the base' (IB), i.e. the fact that these scales are independent of the base expenditure – and hence of the utility level – at which they are evaluated.[9] The scale $s_i(\boldsymbol{p}, \boldsymbol{z})$ can be interpreted as a measure of the cost savings experienced by person i as a result of scale economies in the household. That is, the 'value' of total expenditure is inflated because of (partially) joint consumption by the spouses (e.g., when they ride the car together, they 'consume' gasoline twice). With this interpretation, scales should be smaller than 1 (purely private consumption) and larger than $\eta_i(\boldsymbol{p}, \boldsymbol{z})$ (purely public consumption). Yet these scales may reflect other aspects of couple life, including consumption externalities (for instance, a man may decide to stop smoking after marriage), or the departure from our assumption of preference stability (Browning et al., 2013). Hence, scaling function $s_i(\boldsymbol{p}, \boldsymbol{z})$ generally depends on all the individual characteristics of the persons living in the household, $\boldsymbol{z}$. Moreover, the fact that scaling depends on prices makes the IB scale far more general than traditional Engel scales: the idea that some goods are consumed in common (and thereby largely affected by economies of scale) can be represented here by the derivative of $s_i(\boldsymbol{p}, \boldsymbol{z})$ with respect to prices.

3.2.3 Model Identification

We now discuss the identification of structural components. For singles, the budget share of individual i for good k is defined by

total expenditure. Also, this assumption can be mitigated in empirical applications by including measures of household wealth other than total expenditure in resource shares.

[9] This assumption is similar to the IB restriction in the equivalence scale literature (Lewbel, 1991), but it concerns individual utility functions rather than aggregated household utility functions. The IB scales can be seen as an approximation of Barten scales (used by Browning et al. (2013)) in the sense that indirect utility functions can be both IB and Barten scaled if at least one linear restriction exists on the log of Barten scales (Lewbel, 1991). See Lewbel and Pendakur (2008).

$$w_i^k(x, \boldsymbol{p}, \boldsymbol{z}_i) = -\frac{\partial v_i(x, \boldsymbol{p}, \boldsymbol{z}_i)/\partial p^k}{\partial v_i(x, \boldsymbol{p}, \boldsymbol{z}_i)/\partial x}, \tag{3.4}$$

using Roy's identity. Turning to couples, we can denote log individual resource shares $x_i = x + \log \eta_i$ and apply Roy's identity to equation (3.3) to define the 'reduced-form' budget share on good k of spouse i as:

$$\omega_i^k(x, \boldsymbol{p}, \boldsymbol{z}) = -\left.\frac{\partial v_i(x_i - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i)/\partial p^k}{\partial v_i(x_i - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i)/\partial x_i}\right|_{x_i = x + \log \eta_i(\boldsymbol{p}, \boldsymbol{z})}.$$

This is the fraction of spouse i's resource share, $\exp(x) \cdot \eta_i(\boldsymbol{p}, \boldsymbol{z})$, spent on good k, expressed as a a function of household (log) expenditure x, prices $\boldsymbol{p}$ and household characteristics $\boldsymbol{z}$. Developing the derivatives on the right-hand side easily leads to:

$$\omega_i^k(x, \boldsymbol{p}, \boldsymbol{z}) = \lambda_i^k(\boldsymbol{p}, \boldsymbol{z}) + w_i^k(x + \log \eta_i(\boldsymbol{p}, \boldsymbol{z}) - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i) \tag{3.5}$$

where $\lambda_i^k(\boldsymbol{p}, \boldsymbol{z}) = \partial \log s_i(\boldsymbol{p}, \boldsymbol{z})/\partial p^k$ is the elasticity of $s_i(\boldsymbol{p}, \boldsymbol{z})$ with respect to the k-th price. The right-hand side puts some structure on individual budget shares as a result of the IB restriction, using the *basic* budget share function $w_i^k(\cdot, \boldsymbol{p}, \boldsymbol{z}_i)$ used for single individuals. The consequence of this assumption is that the budget share equations of person i living in a couple differ from when living alone only in that they are translated over by the elasticity $\lambda_i^k(\boldsymbol{p}, \boldsymbol{z})$ and depend on her/his individual resources adjusted by the scaling $s_i(\boldsymbol{z})$. This property of 'shape invariance', as defined by Pendakur (1999), implicitly means that single individuals are used as the demographic structure of reference.[10] We can also define an *indifference scale*, $I_i(\boldsymbol{p}, \boldsymbol{z}) = \eta_i(\boldsymbol{p}, \boldsymbol{z})/s_i(\boldsymbol{p}, \boldsymbol{z})$, as the adjustment applied to total expenditure that allows a person living in a couple to reach the same indifference curve as if living alone (Lewbel, 2003).[11]

We denote W_n^k the household budget share for good k and household type $n = 1, 2$ for single individuals and couples respectively. For singles, the total budget share for good k is simply defined by

[10] The translation function $\lambda_i^k(\boldsymbol{p}, \boldsymbol{z})$ is specific to good k and related to the differences that may exist between goods with respect to the possibility of joint consumption or externalities. Intuitively, economies of scale may have a wealth effect and a substitution effect. The former is represented by $\log s_i(\boldsymbol{p}, \boldsymbol{z})$ and the latter by $\lambda_i^k(\boldsymbol{p}, \boldsymbol{z})$. The substitution effect is positive (negative) if good k is essentially public (private).

[11] This concept differs from an ordinary equivalence scale, which attempts to compare the welfare of an individual to that of a household, and hence suffers from the fundamental identification problem associated with interpersonal comparisons. In contrast, indifference scales can be seen as comparing the same individual in two different marital situations, respecting individualism.

$$W_1^k(x, \boldsymbol{p}, \boldsymbol{z}_i) = w_i^k(x, \boldsymbol{p}, \boldsymbol{z}_i) \tag{3.6}$$

For couples, total expenditure on each good k can be written as the sum of individual expenditure $\omega_i^k(x, \boldsymbol{p}, \boldsymbol{z}) \cdot x_i$, $i = m, w$, on that good. Dividing this identity by the total outlay $\exp(x)$, we directly obtain the couple's budget share function for good k as:

$$W_2^k(x, \boldsymbol{p}, \boldsymbol{z}) = \sum_{i=m,w} \eta_i(\boldsymbol{p}, \boldsymbol{z}) \cdot \left(\lambda_i^k(\boldsymbol{p}, \boldsymbol{z}) + w_i^k\left(x + \log \eta_i(\boldsymbol{p}, \boldsymbol{z}) - \log s_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right) \right). \tag{3.7}$$

This is simply the sum of individual budget share equations weighted by individual resource shares.

Identification concentrates on how to retrieve the structural components s_i and η_i, for $i = m, w$, from the knowledge of the deterministic components $W_n^k(\cdot)$. The approach derives from Lewbel and Pendakur (2008) and Bargain and Donni (2012), with several differences compared to these studies: Lewbel and Pendakur (2008) do not use individual-specific goods for their demonstration, Bargain and Donni (2012) do so but consider couples with children and ignore price variation. In our version of the model, we do include price variation, as motivated above, and use exclusive goods (male and female clothing). The main result is summarized in the following proposition:

Proposition 1. *Assume that there exists at least one exclusive good for each adult in the household. More precisely, one good k_m is consumed by men but not by women and one other good k_w is consumed by women but not by men. Assume that $\nabla_x w_i^{k_i} \neq 0$ and $\nabla_{xx} w_i^{k_i} \neq 0$ almost everywhere for $i = m, w$ and the functions $\Delta_i^{k_i}(\cdot, \boldsymbol{p}, \boldsymbol{z}_i) \equiv \nabla_x w_i^{k_i}(\cdot, \boldsymbol{p}, \boldsymbol{z}_i) \cdot \left[\nabla_{xx} w_i^{k_i}(\cdot, \boldsymbol{p}, \boldsymbol{z}_i)\right]^{-1}$ are not periodic in their first argument. The sharing functions $\eta_i(\boldsymbol{p}, \boldsymbol{z})$ and the scaling functions $s_i(\boldsymbol{p}, \boldsymbol{z})$, for $i = m, w$ in couples can be identified from the estimation of the budget share equations $W_n^{k_i}$ on the exclusive goods.*

The proof follows in two steps. First, the basic budget share equations can be identified from single individuals since preferences are stable across household types n. That is, we simply have:

$$W_1^k(x, \boldsymbol{p}, \boldsymbol{z}) = w_i^k(x, \boldsymbol{p}, \boldsymbol{z}_i),$$

for any k, with $i = m, w$, and identification of the functions $w_i^k(\cdot, \boldsymbol{p}, \boldsymbol{z}_i)$ can be obtained from a sample of single male and female individuals. Second, the resource sharing functions and scaling functions for $n = 2$ can be identified from a sample of couples. Precisely, household budget share equations for adult good k_i in a couple can be written as:

$$W_2^{k_i}(x, \boldsymbol{p}, \boldsymbol{z}) = \eta_i(\boldsymbol{p}, \boldsymbol{z}) \cdot \left[\lambda_i^{k_i}(\boldsymbol{p}, \boldsymbol{z}) + w_i^{k_i}\left(x - \log I_i(\boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right)\right], \tag{3.8}$$

for $i = m, w$. Then, we eliminate function $\lambda_i^{k_i}(\boldsymbol{z})$ by computing the first-order derivative of this expression with respect to x:

$$\nabla_x W_2^{k_i}(x, \boldsymbol{p}, \boldsymbol{z}) = \eta_i(\boldsymbol{p}, \boldsymbol{z}) \nabla_x w_i^{k_i}\left(x - \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right), \tag{3.9}$$

where the left-hand side is identified. Differentiating this expression again with respect to x gives the second-order derivative:

$$\nabla_{xx} W_2^{k_i}(x, \boldsymbol{p}, \boldsymbol{z}) = \eta_i(\boldsymbol{p}, \boldsymbol{z}) \nabla_{xx} w_i^{k}\left(x - \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right), \tag{3.10}$$

and taking the ratio of (3.9) and (3.10), we have:

$$\frac{\nabla_x W_2^{k_i}(x, \boldsymbol{p}, \boldsymbol{z})}{\nabla_{xx} W_2^{k_i}(x, \boldsymbol{p}, \boldsymbol{z})} = \frac{\nabla_x w_i^{k_i}\left(x - \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right)}{\nabla_{xx} w_i^{k_i}\left(x - \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right)} = \Delta_i^{k_i}\left(x + \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right)$$

where function $\Delta_i^{k_i}(\cdot, \boldsymbol{z})$ is known from the first step. This condition uniquely identifies the indifference scales $I_i(\boldsymbol{p}, \boldsymbol{z})$ for $i = m, w$, provided the function $\Delta_i^{k_i}(\cdot)$ is not periodic in its first argument – a rather natural requirement. Then, for $i = m, w$, identification of sharing functions $\eta_i(\boldsymbol{p}, \boldsymbol{z})$ follows from (3.9) and identification of translation functions $\lambda_i^{k_i}(\boldsymbol{p}, \boldsymbol{z})$ from (3.8). Finally, the scaling functions $s_i(\boldsymbol{p}, \boldsymbol{z})$ can be computed for $i = 1, 2$ from the definition of $I_i(\boldsymbol{p}, \boldsymbol{z})$.

Generic identification requires that budget share equations for exclusive goods are non-linear in log total expenditure (i.e., the second order derivative of the budget share equation must be different from zero), at least for some values of x. This is not necessarily a serious issue: as recognized by Banks et al. (1997), budget share equations are generally non-linear. Yet the functional form must be sufficiently flexible to account for it and this regularity condition must be checked in a preliminary step of the empirical analysis.

3.3 Empirical Implementation

3.3.1 Functional Forms

We turn to the empirical specification of the complete model with 3 goods which includes 4 budget share equations (2 per household structure). Formally, one gender-specific good and a composite good are indeed just what we need to identify the scaling and sharing parameters. For the seek of completeness, we then estimate a complete model with 8 categories of goods (7 budget share equations per household structure). For the functional form, we suggest a parameterization that balances flexibility and empirical tractability. The first component, which appears in the specification of the different demographic groups, is the "basic" budget share equation. We adopt the following QUAIDS-type quadratic specification:

$$\begin{aligned} w_i^k(x_{i,n}, \boldsymbol{p}, \boldsymbol{z}_i) &= \bar{a}_i^k + \sum_j a_{i,j}^k z_j + \sum_q b_{i,q}^k p_q + c_i^k \left(x_{i,n} - \sum_j e_{i,j} z_j \right) \\ &\quad + d_i^k \left(x_{i,n} - \sum_j e_{i,j} z_j \right)^2, \qquad \text{for } i = w, m \text{ and } k = 1, ..., K, \end{aligned}$$

where $x_{i,1} = x$ and $x_{i,2} = x + \log \eta_i$. Parameters $\bar{a}_i^k, a_{i,j}^k$, $b_{i,q}^k$, c_i^k, d_i^k and $e_{i,j}$ are specific to individual $i = m, w$ but do not depend on the demographic type n since the 'basic' budget share equations are the same for single women (resp. men) and for women (resp. men) living in a couple. The demographic variables enter the specification both as a translation of budget share equations and as a translation of log scaled expenditure.

In line with the existing literature (Lewbel and Pendakur, 2008, Bargain and Donni, 2012), the basic characteristics entering $\sum_j e_{i,j} z_j$ are mainly dummies, to ease the estimation process. Age is a dummy equal to 0/1 if the individual is aged below/above 35, education is a dummy signaling whether the individual has a university degree. The effect of the living place is captured by two variables: a dummy for living in Madrid/Barcelona, and a dummy for living in a rural area. Wealth effects are captured by a dummy for home ownership without a pending loan, and by the ownership of a costly durable good in terms of fixed and variable costs, i.e. a car.[12] Those entering $\sum_j a_{i,j}^k z_j$ include the same variables. In addition,

[12]Note that the terms e_i introduce some flexibility in the budget share equations. The elasticity of the Engel curve with respect to the total expenditures is allowed to vary with a few basic characteristics z_j: at a given level of $x_{i,n}$, the demand for good k is allowed to respond differently to a 1 euro increase in $x_{i,n}$. Note that it allows to relax the constraint imposed by the 'independence of the base' hypothesis. The rescaling of the total expenditures

the existing collective models of consumption assume that prices are constant over time (Lewbel and Pendakur, 2008, Bargain and Donni, 2012). In the context of the Great Recession, the hypothesis that prices are time-invariant is unrealistic. We account for the variation on prices by introducing a full vector of relative prices within each of the budget share equations. Finally, parameters c_i^k and d_i^k account for the rescaled log of total expenditures and its square.

Next, we specify the household budget share equations. To account for unobserved factors, we add error terms to the household budget shares previously defined:

$$\begin{aligned} \widetilde{W}_n^k(x, \boldsymbol{p}, \boldsymbol{z}) &= W_n^k(x, \boldsymbol{p}, \boldsymbol{z}) + \varepsilon_n^k, \\ &\quad \text{for} \quad n = 1, 2 \quad \text{and} \quad k = 1, \ldots, K, \end{aligned} \tag{3.11}$$

where $\widetilde{W}_n^k(\cdot)$ is the stochastic extension of $W_n^k(\cdot)$. Error terms ε_n^k are traditionally interpreted as optimization/measurement errors or unobservable heterogeneity in the individual budget share equations (hence assuming random utilities), in the scales or in the resource shares. For single adults, budget shares coincide with the "basic" budget share equations plus the additive error term:

$$\widetilde{W}_1^k(x, \boldsymbol{p}, \boldsymbol{z}) = w_i^k\left(x, \boldsymbol{z}_i\right) + \varepsilon_1^k. \tag{3.12}$$

For couples, and for non-exclusive goods, the household budget share equations:

$$\widetilde{W}_2^k(x, \boldsymbol{p}, \boldsymbol{z}) = \sum_{i=m,w} \eta_i(\boldsymbol{p}, \boldsymbol{z}) \left[\lambda_i^k(\boldsymbol{p}, \boldsymbol{z}) + w_i^k\left(x - \log I_i(\boldsymbol{p}, \boldsymbol{z}), \boldsymbol{p}, \boldsymbol{z}_i\right)\right] + \varepsilon_2^k, \tag{3.13}$$

comprise the individual functions $w_i^k\left(\cdot, \boldsymbol{p}, \boldsymbol{z}_i\right)$ as already specified and structural components defined as follows. First, the *sharing functions* are specified using the logistic form:

$$\eta_w(\boldsymbol{z}, \boldsymbol{p}) = \frac{\exp(\overline{\beta} + \sum_j \beta_j z_j + \sum_d \beta_d z_d^D + \sum_q \beta_q p_q)}{1 + \exp(\bar{\beta} + \sum_j \beta_j z_j + \sum_d \beta_d z_d^D + \sum_q \beta_q p_q)}, \tag{3.14}$$

$$\eta_m(\boldsymbol{z}, \boldsymbol{p}) = 1 - \eta_w(\boldsymbol{z}, \boldsymbol{p}), \tag{3.15}$$

where $\overline{\beta}$, β_j, β_d and β_q are parameters. Variables in $\sum_j \beta_j z_j$ contain age and education dummies for the wife.[13] Variables in $\sum_d \beta_d z_d^D$ are distribution factors, and are commented

notably captures some wealth effects through the home and car ownership, which are then translated to the estimation of the sharing and scaling functions.

[13]The age and education of the husband are excluded to avoid multicolinearity.

more in detail in Section 3.3.2 below. $\beta_q p_q$ are time-region relative prices of each good k with respect to the other $k-1$ categories of goods.[14]

Second, the log *scaling functions* that translate expenditure within the basic budget shares can be written as:

$$\log s_i(\boldsymbol{z}, \boldsymbol{p}) = \overline{\alpha}_i + \sum_j \alpha_{i,j} z_j + \sum_q \alpha_{i,q} p_q, \qquad \text{for } i = m, w, \tag{3.16}$$

where $\overline{\alpha}_i$, $\alpha_{i,j}$ and $\alpha_{i,q}$ are parameters. Concretely, variables in $\sum_j \alpha_{i,j} z_j$ include the same variables as in $\sum_j a_{i,j} z_j$ in the budget share equations. $\sum_q \alpha_{i,q} p_q$ are the relative prices.

Third, the functions that translate the basic budget shares $\lambda_i^k(\boldsymbol{z})$ are *price elasticities*. Measuring price effects is generally challenging – and it is all the more difficult to capture their interaction with demographic variables in any plausible way. Therefore we restrict these terms to be constant:

$$\lambda_i^k(\boldsymbol{z}) = \overline{\lambda}_i^k, \qquad \text{for } i = m, w \text{ and } k = 1, \ldots, K.$$

3.3.2 Sharing Rule Specification

To capture the effects of the mancession on the intrahousehold distribution of resources, we proceed in two steps. First, choosing a general framework, we proxy the change in the relative gender economic opportunities with the regional gender unemployment ratio, and examine its effect on the sharing of resources.[15] Then, we have a deeper look at the mancession by concentrating on its epicenter: the construction sector, which represents 12% of the Spanish GDP in 2006, and is responsible for 50% of the male unemployment rate by 2011.

The regional gender unemployment ratio – As a proxy for the economic context, we use the regional men-to-women gender unemployment ratio, computed based on the regional

[14] The vector p contains exactly $(K-2) \times t \times r$ different price values, that is, for each period and region, the number of goods present in the model, minus the price of the composite good (excluded from the system of budget share equations) and the price of male clothing (supposed identical to the price for female clothing). The model with three goods thus includes the relative price of clothing with respect to other goods, while the model with eight goods considers a vector of regional-time relative prices for six goods.

[15] We are not the first study to use the gender-specific unemployment rate to study aspects of the bargaining power within the household. Recent findings suggest that this measure is relevant and promising. In Britain, Anderberg et al. (2015) observe that the unemployment across regions and genders varies greatly with the onset of the late-2000s recession, and combine this data with individual-level information on intimate partner violence. Controlling for time and area fixed effects, they find that while the general unemployment rate has no effect on the incidence of domestic violence. Interestingly, it is the gender unemployment gap that matters. Female unemployment increases the risk of domestic abuse, and unemployment among males reduces it.

database provided by the Spanish national statistical agency INE: $u_{r,t}^{ratio}$.[16] Besides the unemployment *risk*, we may want to control for the *current* labor market outcomes of spouses using the female-male wage ratio within the couple $w_{i,t}^{ratio}$, as well as the unemployment status of the husband $u_{i,t}^{husb}$. Then, within the argument of the logistic function for the sharing rule described by equation (3.14), distribution factors z^D are:

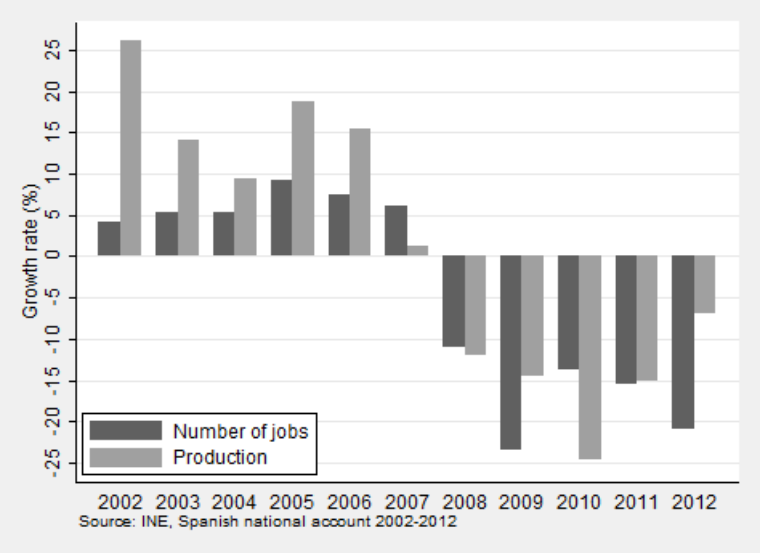
$$\sum_d \beta_d z_d^D = \beta_1 u_{r,t}^{ratio} + \beta_2 w_{i,t}^{ratio} + \beta_3 u_{i,t}^{husb} + \phi_r$$

where $u_{r,t}^{ratio}$ is the regional gender unemployment ratio and ϕ_r are regional fixed effects.

The construction sector before and after 2008 – Construction is an important sector within the Spanish economy: in 2008, one man out of six is employed in the construction sector. As such, it is a fact that the regional variation in unemployment is closely related to the regional shares of employment in the construction industry, which has plummeted during the recession years. Indeed, in the context of a bursting real estate bubble, the construction sector, which had been flourishing in the previous overconfident period, was the first exposed sector, and was particularly strongly hit from 2008 onward, as displayed on Figure 3.1. By 2011, ten percentage points of the post-crisis unemployment rate were imputable to the construction sector alone (Pissarides, 2013). The reduction of employment in this sector was 36%, with regional rates varying between 18-55%. Bentolila et al. (2012) note that the raw correlation between the changes in total and construction employment shares across Spanish regions is 0.7. Finally – and unlike the manufacturing sector, construction is the most gender specific sector of all: 91.4% of the workers within the sector are men (ILO, 2010).

[16] The full dataset on time-regional unemployment ratio is available in Table 3.A.1 (see Appendix). As repeatedly assessed throughout the literature (Cho and Newhouse, 2013, Hoynes et al., 2012), age categories are another important dimension of the Great Recession. Within our framework, we may want to account for a plausible age heterogeneity of the regional gender unemployment ratio. In 2006-2008, as well as in 2009-2011, the men-women gender unemployment gap is more favorable to younger women than older ones (INE). On average, the regional men-women unemployment ratio amounts to 0.73 for women aged 20-24, against 0.61 for women aged 25-54. After 2009, the opportunities increase for both age groups: women aged 20-24 are less likely to be unemployed than their male counterparts (ratio of 1.1); for women over 25, the unemployment ratio between 2009-2011 reaches 0.9. What matters for our analysis is that during the mancession episode, a woman is exposed to the same improvement in her perceived relative opportunities, whatever her age group. Using regional data on the gender unemployment gap by gender and age groups between 2006-2011, we show that there is no statistically significant difference between the growth rate of the gender relative opportunities of the two age groups. Over the period 2006-2011, younger women are exposed to a stable 8% higher relative men-women unemployment gap than older women. In addition, between 2006-2008 and 2009-2011, the relative men-women unemployment gap increases by 52% for each age group.

Figure 3.1: The Construction Sector in Spain, 2002-2012



We thus deepen our analysis and concentrate on the construction sector constituting the epicenter of the mancession. We run a standard difference-in-difference analysis, where the argument of the logistic function for the sharing rule described in (3.14) contains a vector of basic characteristics and prices as presented above, and a vector of variables z^D such as:

$$\sum_d \beta_d z_d^D = \beta_1 constru_i + \beta_2 post_t^{2008} + \beta_3 constru_i \times post_t^{2008} + \beta_4 w_{i,t}^{ratio} + \beta_5 u_{i,t}^{husb}$$

We control for the specific effect of being married to a man employed in the construction sector, whatever the time period ($\beta_1 constru_i$); we single out the impact of the post-2008 period in the share accruing to each spouse, whatever the economic sector of the life partner ($\beta_2 post_t^{2008}$). We argue that β_3 – the parameter of the interaction term between the post-2008 dummy and the fact for a husband to be employed in the construction sector – captures the effect of the unemployment risk on the sharing of resources at the intrahousehold level.

3.3.3 Estimation Method

The model with K goods is composed of (K-1) budget share equations for each household structure: single men and single women (equation (3.12)), and couples (equation (3.13)), as well as two sharing and scaling functions as described in equations (3.14)-(3.16). Concretely, in our estimations, K will either contain 3 or 8 good categories. The model is estimated by the iterated SURE method. To account for the likely correlation between the error terms ε_n^k

in each budget share function and the log total expenditure, each budget share equation is augmented with the 'Wu-Hausman' residuals (Banks et al., 1997, Blundell and Robin, 1999). These are obtained from reduced-form estimations of x on all exogenous variables used in the model plus some excluded instruments (a third order polynomial in household disposable income). Since budget shares sum up to one, equation for good K is unnecessary. The household budget share equations for the $K-1$ goods and for the three demographic groups are estimated simultaneously. The error terms are supposed to be uncorrelated across households but correlated across goods within households. They are also assumed to be homoskedastic for each family type. The method is described in Bargain and Donni (2012). Let h denote the observations, H_n the number of households of type n. Let $W_{h,n}$ ($\hat{W}_{h,n}$) be the vector of observed (predicted) budget shares for the $K-1$ goods consumed by household h (for some parameter θ). The vector of residuals is then: $\epsilon_{n,h}(\theta) = W_{h,n} - \hat{W}_{h,n}(\theta)$. Let $\hat{\theta}_0$ be an initial consistent estimation of the vector of parameters, and $\hat{\epsilon}_{n,h}$ the corresponding vector of residuals. Then the estimated variance-covariance matrix is: $\hat{V}_n = H_n^{-1} \times \hat{\epsilon}_{n,h}\hat{\epsilon}'_{n,h}$. The SURE criterion is then:

$$\min_{\theta} \sum_{n=1}^{2} \sum_{h=1}^{H_n} (\epsilon_{n,h}(\theta))'(\hat{V}_n)^{-1}(\epsilon_{n,h}(\theta)) \tag{3.17}$$

The criterion provides us with a new value for $\hat{\theta}$. The process is iterated until the variance-covariance matrix reaches convergence.

3.4 Data

3.4.1 Sample Selection

We use consumption data from the *Encuesta de Presupuestos Familiares* collected by the Spanish national statistical agency INE. The EPF is a nationally representative panel survey of households living in Spain, and provides information on consumption, labor supply, as well as socioeconomic characteristics at the household and individual level for 2006-2011.[17] It surveys around 24,000 households on a yearly basis.

The original EPF sample contains detailed information on the consumption and demographic characteristics of 129,722 households during the period 2006-2011. Our sample is drawn from the EBF according to the following lines. To begin with, we select single individuals and couples without children living in the home. Couples with children under

[17] Although waves for 2012 and 2013 are also available, we restrict our analysis around the 2009 breaking point.

16 account for around 20% of the sample. Other types of families (alone mother or father, or extended families) account for another 40% of the original sample. This leaves us with 37.14% of the original sample (around 48,000 observations). We then discard individuals whose age is below 20 or above 45. This age category represents three quarter of the remaining sample, so that our sample now consists in 10,129 observations. In addition, to simplify our analysis, we restrain the sample to individuals who are not retirees nor students (1.5% of the remaining observations). Furthermore, we do not allow for men to be inactive (0.7% of the observations – housewives are included into the sample). Around 3.5% of the households left in the sample report incomplete information on education or income. Income is redefined as 0 whenever the survey states that the question is 'not applicable' (around 10.4% of women, and 2.9% of men). We are left with a sample of 8,875 observations, composed for 22.29% with single men, 15.26% with single women, and the remaining 62.46% with childless couples, all between 20-44.

Last, the estimation of the structural model in the difference-in-difference setting requires information on the sector of employment of the husband. In the EPF, this information is retrieved only when the husband is declared as the head of the household, a distinction left to the appreciation of the spouses. In addition to the 'large' sample, we thus use a 'restricted' sample, where couples with female household head are excluded. Note that within this sample, the population of single-person households is unchanged.

Table 3.1 displays standard statistical information on the individuals and their household composing this sample drawn from the EBF 2006-2011. Data on real expenditure and income are obtained by adjusting for inflation using the inflation index (base 2008).[18] Single individuals without children are older (35 on average for men and women, while the mean for couples is 33 and 32 respectively). While single and married men tend to have a similar education level, single women are more educated than married women. Single and married men tend to have the same level of income. In line with expectation, single women earn less than single men, and married women earn less on average than single women. The mean share of resources brought by the wife to the household is 40%. 12% of single men work in the construction sector, which corresponds to the average share of this sector within the Spanish economy. This share amounts to 17% of household head men living in a couple. Unsurprisingly, with respect to the larger sample, couples from the restricted sample differ

[18]Source: IMF, World Economic Outlook

Table 3.1: Summary Statistics on Individuals, by Household Types.

	Large sample			Restricted sample
	Single women	Single men	Couples	Couples
Women				
Aged over 35	0.46		0.21	0.20
	(0.50)		(0.41)	(0.40)
Tertiary education	0.62		0.55	0.51
	(0.49)		(0.50)	(0.50)
Income[a]	1308.90		993.69	869.74
	(639.74)		(639.63)	(591.65)
Men				
Aged over 35		0.50	0.32	0.33
		(0.50)	(0.47)	(0.47)
Tertiary education		0.45	0.43	0.43
		(0.50)	(0.50)	(0.49)
Income[a]		1366.28	1367.27	1461.94
		(698.79)	(668.56)	(644.13)
Construction sector		0.12		0.17
		(0.33)		(0.37)
Household				
Share of wife in total income			0.40	0.34
			(0.21)	(0.18)
House ownership, w/o loan	0.12	0.14	0.09	0.09
	(0.32)	(0.35)	(0.28)	(0.28)
Car ownership	0.51	0.63	0.81	0.82
	(0.50)	(0.48)	(0.39)	(0.39)
Rural area	0.12	0.21	0.20	0.21
	(0.33)	(0.41)	(0.40)	(0.41)
Madrid or Barcelona	0.13	0.11	0.10	0.10
	(0.33)	(0.31)	(0.31)	(0.31)
Observations	1354	1978	5543	4230

Notes: Statistics on 2006-2011 EPF sample of working age couples (20-44). [a]Monthly nominal values. Standard error in parentheses.

essentially in the fact that wives are less educated, and earn a less important share of the household income. On the other hand, interestingly, husbands and households have very similar characteristics in both samples. Looking at the bottom part of Table 3.1, single women tend to live relatively more in Madrid or Barcelona, while single men and couples are more likely to live in a rural area. Home ownership appears to be low for all household types. This is explained by the fact that we look at young individuals without children, age and fertility being important predictors for home ownership. Furthermore, to capture the wealth effect associated with home ownership, we consider only home ownership without a pending loan. The home ownership rate for young couples without children jumps to 74% once accounting for properties under mortgage.

Last, how does our selected sample of couples without children compare with the other family types, namely singles and couples with children, as well as non-nuclear family structures? Table 3.A.4 (in Appendix) reports basic demographic characteristics of household

heads and their life partner according to their family type. In particular, the last three columns show that women in couple without children are younger and more educated than other women in a relationship. They are much more likely to participate into the labor market (94% against 77%) and less likely to be unemployed, so that they earn more than other married women and have a higher wage ratio within the household (0.4 against 0.3). Married men without children are also younger and more educated, but as likely to be employed or unemployed as married men in other family types. Finally, unsurprisingly, couples with children are more likely to own their home and live in a rural area than couples without children from our selected sample.

3.4.2 A First Look at the Data

Formally, only a pair of gender-specific goods is required to identify the share of resources accruing to each spouse. We use clothing expenditures, which are gender-specific.[19] In this case, the estimation relies on two gender-specific goods and one composite good: $K = 3$. Then, in the estimation, we also consider other non-durable goods to improve the efficiency of the estimations, namely: food and accommodation, transport and communication, alcohol, tobacco and gambling (commonly referred to as 'vice'), housing services, leisure, personal care ($K = 8$).[20]

Table 3.2 presents descriptive statistics on the different consumption patterns of individuals according to their household structure. In addition, it allows for a closer look at the effects of the Great Recession by comparing the mean value of the consumption variables before and after the outburst of the Great Recession.

The first panel of Table 3.2 displays the mean total expenditure by household structure. On average, single individuals spend about 20,000 euros on consumption goods, against 31,000 when living in a couple. Once excluding durable goods, investment goods and housing, the total expenditure amounts to 13,000 euros for single-person households, and 23,000 euros for

[19]To ensure assignability, we define clothing expenditure of the opposite gender as zero for single-person households. In the data, the share of non-zero values for single individuals is in fact quite high : about 10% of single men report a positive value for female clothing expenses, and 20% of single women declare a non-zero value for male clothing. However, the declared amounts are generally very low. The annual amount exceeds the median amount of clothing expenditure of couples only in 10% of the observations for single women, and 4% for single men.

[20]The model being essentially static, we refrain from including expenditure on education or health. This would require adding dynamics and uncertainty in the structural model, which we leave for future research. Traditionally, the expenditure on housing is not modeled because this expenditure may be difficult to evaluate for owners. We stick to the approach despite the presence of imputed rents in the EPF survey and because of measurement errors affecting this data.

couples. After the outburst of the Great Recession, yearly expenditure significantly dropped for all household structures.

Table 3.2: Summary Statistics on Budget Shares Before and After the Outburst of the Mancession, by Household Structure

	Large sample						Restricted sample	
	Single women		Single men		Couples		Couples	
	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011	2006-2008	2009-2011
Yearly expenditure								
Total yearly expenses	20754	19278***	21563	19546***	33303	30026***	33210	29924***
Selected goods^{+}	19117	17661***	20110	18105***	30765	27731***	30711	27645***
W/o housing	13905	12339***	15150	12778***	25138	21753***	25136	21723***
Budget shares								
Food	0.3083	0.3149	0.3479	0.3453	0.3273	0.3334*	0.3286	0.3349
Transp. and comm.	0.2333	0.2261	0.2791	0.2676	0.2702	0.2630	0.2694	0.2639
Housing services	0.2019	0.2057	0.1703	0.1832**	0.1492	0.1586***	0.1494	0.1580***
Leisure	0.1068	0.1007	0.0946	0.0917	0.1052	0.0979***	0.1045	0.0969***
Vice	0.0287	0.0339*	0.0399	0.0501***	0.0390	0.0435***	0.0389	0.0437***
Personal care	0.0567	0.0594	0.0257	0.0236	0.0434	0.0417*	0.0437	0.0414*
Assignable good: yearly expenditures								
Female clothing	900	741***	0	0	957	817***	956	797***
Male clothing	0	0	669	521***	749	586***	745	588***
Budget shares								
Female clothing	0.0642	0.0593	0.0000	0.0000	0.0373	0.0361	0.0372	0.0351*
Male clothing	0.0000	0.0000	0.0424	0.0385	0.0284	0.0259**	0.0282	0.0261*
Proportion of positive values								
Female clothing	0.7859	0.7588	0.0000	0.0000	0.7920	0.7623***	0.7916	0.7559***
Male clothing	0.0000	0.0000	0.5798	0.5429	0.6723	0.6318***	0.6738	0.6344***
Observations	612	742	871	1107	2716	2827	2198	2032

Notes: P-values of differences, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. $^{+}$Total expenditure for the non-durable goods.

The second panel of Table 3.2 presents the shares for non-assignable goods. In line with expectations, the expenses are primarily dedicated to food (around 30%), transportation (20 to 25%), and services (15% to 20%). The food budget share for single men is higher because of the food-outside-the-home component. Unsurprisingly, the budget share for personal care is higher for single women than for single men. In general, the budget share of typically public goods decreases with the size of the household. Indeed, the expenditure share for housing services declines from 20% to 15%.[21] The economies of scale appear to be substantial, and we expect the share of privately consumed goods to increase with the scale economies allowed by the increase in the household size. The budget share devoted to private goods

[21] Perhaps surprisingly, this is not the case for transportation and communication expenses. In fact, this reflects the differences in car ownership. Looking at Table 3.1, we see that the car ownership amounts to 80% when in a couple, against 50 to 60% for single individuals. Even accounting for scale economies, car ownership typically comes with higher costs.

does increase with the size of the household when looking at men (1 additional percentage points in the budget share for leisure, 2 for personnal care), but not so much when comparing the budget share of single women to the expenditure pattern of couples. The expenditure patterns evolved little in time for single men and single women : the budget share devoted to 'vices' and housing expenditures increased. Regarding couples, the relative share of leisure and personal care decreased, while the relative share of housing services, 'vice' and food increased.

The three bottom parts of Table 3.2 give statistics for the assignable good. The expenditure share for clothing increases together with the change in marital status, but not as fast as the total expenditure, so that the share of clothing in the total expenditure for both spouses is lower. Clothing expenses are non-zero in 77% of the cases for women independently of their marital status, and they are strictly positive for 56% of the single men and 65% of the men living in a couple.

How did the expenses and shares of the gender-specific good vary in time? In absolute terms, clothing expenses dropped significantly during the period. In relative terms, looking at the large sample, only the clothing share for married men was downsized. The proportion of positive clothing expenditure decreases between 2006-2008 and 2009-2011. Furthermore, as noted by Lewbel and Pendakur (2008), clothing expenses allow us to get a first approximation of the resource shares accruing to each spouse, under the strong assumption that budget shares are independent of the total expenditure and demographic characteristics. In this very specific case, the resource share of married individuals would be reflected by the ratio of the budget share of clothing for married vs. single individuals of the same gender. Computing these ratios, we find that the resource share for women increases from 0.57 to 0.61, while the share for men remains relatively stable around 0.67.[22]

Finally, data on prices are collected by the Spanish national statistical agency INE as well. The INE reports price indexes disaggregated by region and good category. We account for the regional structural difference in prices by expressing the price indexes in base 2002 (i.e. four years prior to our first survey year). Since our analysis focuses on consumption goods only, and excludes the expenses for health care or education, we do not rely on the general price index to compute the relative prices of each goods. Instead, we compute a 'non-durable good' price index: $\sum_{j=1}^{K} w_{j,r,t}.P_{j,r,t}$. Each non-durable good k contributes to this index according to

[22]Of course, statistically, these shares should sum to one according to the restrictions of the model.

its weight $w_{k,r,t}$ within the basket of non-durable goods, also available from the INE database. The relative price of good k is then:

$$RP_{k,r,t} = \frac{P_{k,r,t}}{\sum_{j=1}^{K,j\neq k,t} w_{j,r,t}.P_{j,r,t}} \tag{3.18}$$

Figure 3.A.1a in Appendix plots the national price index for each category of goods. Figure 3.A.1b displays the relative prices of the different goods k, with respect to the weighted evolution of the $K-1$ goods, as described in equation (3.18). Note that for the sake of readability, the graph displays the relative prices at the national level. The relative price that we use in the empirical estimation is the relative price of good K with respect to the index price of the $K-1$ other goods at the *regional* level.[23]

3.4.3 Nonlinearity of the Engel Curves

As previously discussed, the generic identification of the model requires the nonlinearity of the budget share equation for identifying (assignable) goods with respect to the total log expenditure. First, to check that budget share equations are indeed nonlinear, we estimate a reduced form of the model on the subsamples of single individuals and couples. In addition, among the preliminary checks, we check for the endogeneity of the total expenditure. To do so, we first compute the Wu-Hausman residuals for each household structure by regressing the $(K-1)$ budget shares on all the exogenous variables of the model, plus some excluded instruments, i.e. a fourth order polynomial in the logarithm of the household income (Banks et al., 1997, Blundell and Robin, 1999, 2000). We then plug them into the Engel curves regressions.

Table 3.A.5 in Appendix reports the results of the reduced forms. The budget shares for assignable goods are indeed nonlinear with respect to the log of total expenditure, which is a standard result in the literature (Bargain and Donni, 2012). In Appendix, Figure 3.A.3 graphically illustrates the nonlinearity of the eight budget shares with respect to the total expenditure. Results clearly indicate a nonlinear behavior for most goods. Food, 'vice' and housing services are necessity goods: holding prices constant, their demand increases with the total expenditure, but less rapidly. On the opposite, leisure, personal care and transport are luxury goods, in so far their shares in the total budget increase together with the total

[23] In the Appendix, Figure 3.A.2 displays the regional relative price for clothing. Tables 3.A.2 and 3.A.3 report the full dataset on time-regional relative prices.

expenditure. In particular, women and men clothing seem to be a luxury good. At the top of the income distribution, clothing then becomes a necessity good, especially in the case of women clothing.

3.5 Results

3.5.1 Unemployment Risk

We first consider a model with three goods, which contains the budget share equations for the two gender-specific goods and the residual, composite good – the latter being omitted from the estimation – as well as sharing and scaling equations.

The estimated coefficients for the budget share equations are presented in Table 3.B.1 in the Appendix.[24] Men and women's demand for clothing have the same determinants in terms of sign and magnitude. In line with the nonlinearity identification condition presented above, it depends positively on the log of total expenditure, and negatively on its square. Besides, women tend to spend more on clothing items if they live in Madrid or Barcelona, and relatively less if they live in a rural area. Finally, note that the coefficient for the relative price is positive for men and women: the higher the relative price of clothing with respect to the composite good, the higher the expenditure share spent on the item. This indicates that the demand for clothing is rather price-inelastic.

The estimated parameters for the sharing functions are shown in Table 3.1. In the baseline specification (column [1]), the sharing of resources depends on the age and education of the wife, as well as on the men-women unemployment ratio at the region level, controlling for regional fixed effects as well as for the regional price of clothing relatively to the price of the composite good. The most salient result is that the parameter for the gender unemployment ratio is positive. The higher the unemployment rate faced by the husband on the labor market relatively to the one faced by his wife, the higher the share accruing to the wife.

To have a better understanding of the results, we use the parameters estimated in Table 3.1 and compute the shares accruing to a representative wife. Table 3.2 reports an increase in the average share accruing to Spanish wives between 2006 and 2011. Looking at Specification [1], between 2006 and 2008, the average woman receives 46.4 % of the resources of the household.

[24] For the sake of parsimony, we report the parameters corresponding to the specifications [1] and [4] of Table 3.1. For the sake of completeness, we also report the estimated parameters of the budget shares for the complete model with 8 goods. The parameters reported in Appendix, Table 3.B.2 correspond to the most simple specification displayed in Table 3.1.

Table 3.1: Parameters of the Sharing Rule

	Model with $K = 3$						Model with $K = 8$		
Parameters, wife	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Constant	-0.0037	0.0478	0.0763	-0.025	0.0299	0.0485	-6.4232	-7.1899	-5.8413
	(1.4502)	(1.4571)	(1.454)	(1.451)	(1.456)	(1.4552)	(22.2237)	(22.0785)	(23.0038)
Reg. unempl. ratio	0.3831	0.3731	0.3687	0.3813	0.3735	0.3682	0.4364	0.4322	0.4419
	(0.1716)	(0.1718)	(0.1712)	(0.1718)	(0.1719)	(0.1713)	(0.2604)	(0.2542)	(0.2807)
Aged ≥ 35	0.1419	0.1411	0.14486	0.1432	0.1416	0.14473	0.1273	0.1263	0.1407
	(0.0853)	(0.0854)	(0.0855)	(0.0851)	(0.0853)	(0.0853)	(0.1285)	(0.1291)	(0.1308)
High ed.	0.02	0.0147	0.0161	0.018	0.0142	0.0137	0.0566	0.055	0.0501
	(0.0713)	(0.0714)	(0.0714)	(0.0711)	(0.0713)	(0.0713)	(0.1086)	(0.1096)	(0.1097)
Wage ratio		0.118			0.1206			0.0432	
		(0.0694)			(0.0748)			(0.0763)	
Husb. unempl.			0.093			0.0907			0.1457
			(0.0532)			(0.0537)			(0.0615)
Active				0.0390	-0.00559	0.0252	-0.0370	-0.0534	-0.0529
				(0.0680)	(0.0736)	(0.06866)	(0.0610)	(0.0666)	(0.0657)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Standard errors in parenthesis. Unless specified, the demographic characteristics are women's. Men to women unemployment ratio. Women to men wage ratio.

Between 2009 and 2011, the share increases by nearly 4 percentage points (i.e. 8 percent) and reaches 50.3%.[25] We decompose this variation by freezing the effects other than the change in the regional male-female unemployment gap. This exercise shows that the increase is almost entirely explained by the gender unemployment ratio: plugging the post-2009 mean of the ratio into the share computed using the pre-2009 values still yields a 6 percent increase in the share accruing to the wife. The remainder of the increase is explained by the variation in the relative price of clothing. Changes in the relative prices do not seem to influence greatly the sharing of resources.

Specification [2] then allows the sharing of resources to depend on the wage ratio within the couple. The wage ratio is the standard distribution factor in the literature, and equals the ratio of the wife labor market earnings on the total household labor income. As expected, Table 3.1 shows that a favorable female-male wage ratio positively influences the sharing of resources towards the wife: the higher the relative contribution of the wife to the total household income, the higher her share for private consumption. The gender unemployment ratio parameter is robust to the inclusion of the wage ratio, indicating that labor market opportunities play an specific role, independently from the effective financial power represented by the wage ratio. The bottom part of Table 3.2 reports heterogenous effects. The average shares calculated for different values of the wage ratio suggest an elasticity of the

[25] Note that the standard errors associated with the estimated shares are not sufficiently low to assure that the positive increase is significant ; however, the fact that the parameter on the gender unemployment ratio variation is significant in Table 3.1 is reassuring. The noise comes from other parameters that are imprecisely estimated.

Table 3.2: Estimated Share of the Average Spanish Wife

	Model with $K = 3$						Model with $K = 8$		
Estimated	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Pre 2009 (0)	0.46423	0.46527	0.47577	0.45901	0.46277	0.47212	0.59238	0.5928	0.60481
	(0.0793)	(0.0798)	(0.08006)	(0.07908)	(0.07955)	(0.07971)	(0.04858)	(0.04879)	(0.04782)
Pre 2009 (1)	0.49395	0.49422	0.50441	0.48855	0.49174	0.50072	0.62469	0.62479	0.63713
	(0.08017)	(0.0807)	(0.08086)	(0.07999)	(0.08046)	(0.08052)	(0.05165)	(0.05168)	(0.05137)
Post 2009 (2)	0.49558	0.49677	0.50782	0.49031	0.4943	0.50414	0.62609	0.62648	0.64107
	(0.08004)	(0.08056)	(0.08078)	(0.07985)	(0.08032)	(0.08044)	(0.05172)	(0.05175)	(0.05145)
Post 2009 (3)	0.50325	0.50568	0.51595	0.49849	0.50303	0.5124	0.60878	0.60926	0.62084
	(0.08345)	(0.08404)	(0.08412)	(0.08323)	(0.08375)	(0.08378)	(0.04994)	(0.05007)	(0.04921)
$\%\Delta_{(0)-(3)}$	8.40	8.69	8.45	8.60	8.70	8.53	2.77	2.78	2.65
$\%\Delta_{(0)-(1)}$	6.40	6.22	6.02	6.44	6.26	6.06	5.45	5.40	5.34
Heterogeneity									
Low ed.	0.46161	0.46334	0.47364	0.45665	0.4609	0.47032	0.58515	0.58567	0.59837
	(0.08053)	(0.081)	(0.08134)	(0.08029)	(0.08076)	(0.08099)	(0.05189)	(0.05211)	(0.05109)
High ed.	0.46659	0.467	0.47767	0.46112	0.46445	0.47375	0.59883	0.59916	0.61054
	(0.07913)	(0.07965)	(0.07985)	(0.07891)	(0.0794)	(0.07949)	(0.04886)	(0.04911)	(0.04821)
Aged <35	0.45764	0.45871	0.46901	0.45236	0.45619	0.46538	0.58662	0.58708	0.5985
	(0.07967)	(0.08015)	(0.0804)	(0.07944)	(0.0799)	(0.08005)	(0.04849)	(0.04868)	(0.04777)
Aged ≥35	0.49301	0.49391	0.50519	0.48803	0.49148	0.50151	0.61712	0.61734	0.6318
	(0.07966)	(0.08023)	(0.08055)	(0.07949)	(0.08)	(0.08021)	(0.05594)	(0.05623)	(0.05515)
Wage ratio 0%		0.45392			0.45117			0.58874	
		(0.08003)			(0.07976)			(0.04916)	
25%		0.46124			0.45865			0.59136	
		(0.07983)			(0.07956)			(0.0488)	
50%		0.46858			0.46615			0.59397	
		(0.07982)			(0.0796)			(0.04887)	
75%		0.47593			0.47366			0.59658	
		(0.08001)			(0.07987)			(0.04937)	
100%		0.48329			0.48119			0.59918	
		(0.08041)			(0.08038)			(0.05027)	
Husb. empl.			0.47458			0.47097			0.60302
			(0.08001)			(0.07966)			(0.04781)
Husb. unemp.			0.49784			0.49363			0.63734
			(0.08186)			(0.08161)			(0.04972)
Inactive				0.44997	0.46407	0.46626	0.6007	0.60478	0.61655
				(0.08105)	(0.08181)	(0.08186)	(0.04998)	(0.05065)	(0.04944)
Active				0.45966	0.46268	0.47255	0.59177	0.59192	0.60395
				(0.07905)	(0.07953)	(0.07968)	(0.04862)	(0.04882)	(0.04787)

Notes: Standard errors in parenthesis. (0) Share computed with pre-2009 averages. (1) Share computed with pre-2009 averages but post-2009 regional unemployment ratio. (2) Share computed with post-2009 averages but pre-2009 regional relative prices. (3) Share computed with post-2009 averages. Unless specified, the demographic characteristics are women's. Men to women unemployment ratio. Women to men wage ratio.

resources to the wage ratio of around 0.03. For a Spanish wife, quantitatively, the effect of the average increase in the regional unemployment ratio on the share of resources she receives is equivalent to a variation of her contribution to the household labor income from 0 to 100%.

In specification [3], we allow the sharing rule to depend on the *actual* unemployment of the husband. Before the economic crisis, the actual unemployment of the husband is not exogenous: husbands who loose their job have particular characteristics simultaneously affecting the parameters of the sharing rule. For this reason, no structural model relies on the impact of unemployment on the intrahousehold distribution. This argument is not as relevant in times of crisis, where the exogenous negative demand shock generates massive lay-offs. The endogeneity issue remains; however, to compare the effect of an effective job loss with the effect of the gender-specific unemployment risk is certainly insightful to understand the magnitude of the effect we observe. In Table 3.1, the parameter for the unemployment status of the husband (specification [3]) displays the expected sign. Table 3.2 indicates that the fact of being married to an unemployed husband is associated with a 5 percent higher share of resources. In terms of magnitude, the increase in the resource share of the average Spanish wife following her husband's job loss represents two thirds of the shift in resources because of the changing unemployment risk. Overall, the main takeaway from specifications [2] and [3] is that the impact of the real changes in the wage ratio or the employment status of the husband on the share of resources accruing to the wife never exceeds the effect captured by the variations in the regional gender unemployment ratio. The gender relative unemployment ratio parameter is robust to the inclusion of the additional variable capturing the actual experience on the labor market. The increased *perceived* probability of an adverse shock has at least the same impact than the *actual* adverse shocks hitting the household.

The estimation of the scale economies within the household is not the purpose of our study. Still, the parameters of the scaling function and the estimated scale economies of the life partners are reported in Table 3.3. In line with the existing literature, the results indicates that the parameters are imprecisely estimated. Recall that the closer the estimated scale is to 1, the lower the scale economies. For women, car ownership has a negative, significant impact on the scaling function, meaning that the scale economies increase with the ownership of a car. The estimated scales suggest that women benefit from more economies of scale than men within the household. For the average husband, the scale estimate is well above 1; however, it is very imprecisely estimated, so that we cannot statistically reject the fact that it may be

Table 3.3: Estimated Scale Economies and Scale Parameters

	Model with $K = 3$						Model with $K = 8$		
Estimated scales	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Wife	0.64501	0.62796	0.70161	0.63422	0.62958	0.69179	0.52976	0.52415	0.5787
	(0.20058)	(0.19506)	(0.2188)	(0.19754)	(0.19581)	(0.21706)	(0.10926)	(0.10846)	(0.1139)
Husband	1.80107	1.91727	1.72899	1.84417	1.9117	1.72247	1.30482	1.33416	1.19572
	(0.67228)	(0.73059)	(0.65576)	(0.69126)	(0.72841)	(0.65119)	(0.20413)	(0.21109)	(0.19212)
Parameters, wife									
Constant	1.22741	1.36964	1.26645	1.32206	1.37556	1.29097	-18.81754	-19.02719	-17.78617
	(1.39747)	(1.405)	(1.34775)	(1.41304)	(1.40786)	(1.36053)	(15.74509)	(15.82613)	(15.07674)
Age ≥ 35	0.08265	0.08187	0.0681	0.08394	0.08238	0.06856	0.13086	0.13092	0.1282
	(0.17653)	(0.17702)	(0.17143)	(0.17743)	(0.17712)	(0.1723)	(0.11759)	(0.11905)	(0.1093)
High ed.	-0.02014	-0.01579	-0.01578	-0.02069	-0.01744	-0.01775	0.03935	0.04235	0.02679
	(0.16615)	(0.16655)	(0.16152)	(0.1671)	(0.16673)	(0.16228)	(0.10472)	(0.10654)	(0.09627)
Rural	0.14113	0.13616	0.1408	0.14404	0.13824	0.14157	-0.05039	-0.05024	-0.06502
	(0.19205)	(0.19306)	(0.19013)	(0.19351)	(0.19315)	(0.19059)	(0.0913)	(0.09042)	(0.08824)
Madrid	-0.1603	-0.15967	-0.16886	-0.1627	-0.16082	-0.16789	-0.0786	-0.07626	-0.08687
	(0.18848)	(0.19041)	(0.18245)	(0.19002)	(0.19042)	(0.18348)	(0.11387)	(0.11245)	(0.11133)
Car owner	-0.31128	-0.31492	-0.29628	-0.31104	-0.31284	-0.29779	-0.255	-0.25181	-0.25061
	(0.13765)	(0.13839)	(0.13455)	(0.1384)	(0.13845)	(0.13521)	(0.06964)	(0.06839)	(0.06866)
Home owner	0.11013	0.11473	0.09414	0.1125	0.11476	0.09512	0.10891	0.10728	0.10956
	(0.18304)	(0.18434)	(0.17833)	(0.18376)	(0.18412)	(0.17927)	(0.0924)	(0.09129)	(0.08959)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Parameters, husband									
Constant	-2.67216	-2.64394	-2.81874	-2.69623	-2.64119	-2.90722	7.07747	7.18896	7.26803
	(1.72048)	(1.71449)	(1.7678)	(1.71143)	(1.71535)	(1.7638)	(8.10426)	(7.93363)	(8.7012)
Age ≥ 35	-0.07485	-0.08169	-0.06689	-0.08464	-0.08814	-0.06907	-0.01826	-0.01967	-0.0174
	(0.21481)	(0.21315)	(0.21771)	(0.21449)	(0.21363)	(0.21787)	(0.04841)	(0.04809)	(0.05002)
High ed.	-0.19393	-0.19837	-0.17956	-0.19494	-0.19976	-0.17837	-0.16114	-0.16384	-0.16438
	(0.21183)	(0.2107)	(0.2146)	(0.21164)	(0.21121)	(0.21456)	(0.05068)	(0.05054)	(0.05214)
Rural	-0.05082	-0.04806	-0.04829	-0.05045	-0.05056	-0.04753	0.11025	0.11005	0.13345
	(0.25117)	(0.24831)	(0.25471)	(0.25)	(0.24853)	(0.25464)	(0.07449)	(0.07382)	(0.07752)
Madrid	0.2978	0.28426	0.30425	0.2911	0.28199	0.30329	0.21782	0.2143	0.23158
	(0.34603)	(0.34601)	(0.34946)	(0.34536)	(0.34517)	(0.3495)	(0.1086)	(0.10695)	(0.11488)
Car owner	0.36694	0.37922	0.36699	0.37244	0.38068	0.36597	0.11268	0.10813	0.13086
	(0.23283)	(0.23198)	(0.23564)	(0.2325)	(0.23238)	(0.2353)	(0.08033)	(0.07848)	(0.08792)
Home owner	-0.31511	-0.29628	-0.33548	-0.29135	-0.2895	-0.32766	-0.16697	-0.16487	-0.18487
	(0.29833)	(0.29052)	(0.30764)	(0.29352)	(0.29047)	(0.30712)	(0.09554)	(0.09408)	(0.10154)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Standard errors in parenthesis.

lower than 1, as predicted by the theory. In any case, the fact of changing household structure comes with less scale economies for men than for women.[26]

We now run a series of estimations to test the robustness of our results. A first potential concern relates to the added worker hypothesis, namely, the fact that women enter the labor market in times of hardship as a market-oriented shock-coping strategy to compensate for the income loss of the primary earner. If the added worker effect is high enough, it could partly explain the apparent positive correlation between the economic context and the resource share accruing to the wife. Using a cointegration approach on quarterly Spanish data between 1976-2008, Congregado et al. (2011) identify an unemployment threshold of 11.7% up to which the added worker effect disappears due to the overwhelming discouragement effect. The threshold is clearly reached by 2009, so that the eventuality of a large scale added worker effect is limited. Still, we take the concern seriously. So far, no collective model has jointly modeled the consumption and labor allocation decisions. In this chapter, we thus suppose that the decision to enter the labor market is separable. In the spirit of the two step budgeting approach, the quantity of labor supplied by the wife does not directly enter into the private utility functions: the supply of labor is decided upfront. The individuals maximize their utilities taking the participation of the wife as given. While this hypothesis may be strong, since participation may be endogenous to the sharing process, it has already been repeatedly made in the literature (see e.g. Zamora (2011) or Zhang (2014)). The separability assumption allows us to have the participation enter the sharing rule. We thus run the exact same regressions as in columns [1]-[3] of Tables 3.1-3.2, but include the wife's decision to participate as an additional explanatory variable for the sharing. In specification [4] and [6] of Table 3.1, the participation decision positively impacts the share – though not significantly. This positive correlation disappears in specification [5] once we take into account the wage ratio, suggesting that the positive correlation arising from the decision to enter the labor market plays through the violation of the income pooling hypothesis. In Table 3.2, across

[26]Overall, these estimates are in line with the existing findings of collective models of consumption in developed economies. In their empirical exercise on the 1990 and 1992 Canadian Family Expenditure Surveys, Lewbel and Pendakur (2008) find that the average woman benefits from 46% of the total household resources. The average scale economies are 0.7 for women, and 0.8 for men, but the hypothesis that scales are indeed under 1 cannot be rejected by the data, due to the large standard error associated with the estimates. Similarly, using the 2000 French Household Budget Survey, Bargain and Donni (2012) show that in households without children, wives get 55% to 62% of the resources. The average scale economies for women (men) without children vary between 0.64 and 0.84 (0.70 and 0.97); in the simple model, the scale economy for men without children is not significantly different from 1 at the 95% confidence interval.

specifications [4]-[6], the participation decision never crowds out the effect of the 'mancession', which still accounts for 4 percentage points increase in the share accruing to wives.

Another related labor market concern comes from the fact that clothing may not be a purely private, non-durable consumption good, casting doubt on the interpretation of our result. In the context of an economic crisis, clothing expenses could alternatively stand for a labor market investment made by employed individuals, as well as for new job seekers. Then, the immediate question that comes to mind is whether the investment motive could explain why women's budget share for clothing increases together with the decline in the unemployment gap. Such an interpretation would favor the insurance role of marriage over the bargaining hypothesis put forward here. However, a key element to bear in mind is that the identification of our model relies on the budget share of single individuals, for given characteristics and at a given point in time. The sharing rule for couples is identified using information on the single individuals with similar characteristics. In our view, there is no obvious reason why married women should invest more in clothing than single women to enter on the labor market or keep their job.

The household formation and dissolution is another important dimension that we do not jointly model into our collective model of consumption decisions.[27] Nonetheless, the regional gender unemployment gap could easily interpreted as a shift in the 'outside options' or 'extra-environmental parameters' put forward by the early bargaining models of the household à la McElroy and Horney (1981), where the position along the efficiency frontier is explained by spouses' utility in case of a divorce. In a standard vision of the bargaining power, the changes in relative opportunities raise the value of the outside option of the wife relatively to the husband. The marriage ends whenever the individual cost that each spouse bears from living in a couple outreaches the benefits associated to life sharing. A legitimate concern arises if the exogenous shift in opportunities is likely to affect household formation and dissolution, so that the sample composition of the single and the couples may vary in time.

A first answer is to recall that by adopting the widely used collective consumption model, we have maintained the assumption that households make Pareto-efficient consumption

[27] As a matter of fact, very few studies have attempted to endogenize the household formation in a collective model of consumption. Recently, Mazzocco et al. (2014) study the relationship between household consumption decisions (on labor supply and savings behavior) and marital choices. Cherchye et al. (2014) add the assumption that marriages are stable to the standard Pareto-efficiency of the household consumption decisions hypothesis. They endogenize the marriage matching decisions and show that combining these two assumptions generates strong testable implications for household consumption patterns.

decisions. This implies that household members act cooperatively: by assumption, the model does not allow for free-riding on the consumption of the public goods, nor for Nash equilibrium allocations where the divorce is a relevant threat point.[28] Even so, we empirically investigate the likelihood that our sample may suffer from a selection bias linked with the dynamics on the marriage market by examining the number of divorces for childless couples by region between 2006 and 2011. Independently of the number of children, the number of divorces actually tend to decrease with the economic crisis.[29] A simple OLS regression analysis between the regional log number of divorces for childless couples and the regional unemployment ratio suggests that divorce and gender relative economic opportunities are unrelated.[30] This result indicates that the sample composition alone cannot entirely account for the magnitude of the effect displayed in Table 3.2.

The model with three goods has the advantage of simplicity and should yield robust results ; on the other hand, the limited information may decrease the efficiency of the estimates (Bargain and Donni, 2012). We then estimate a complete model including eight budget share equations. One of the main advantages of the complete model is to improve the efficiency of the scaling point estimates: indeed, the scaling estimates for men are still non significantly different than 1, but closer to 1 on average than in the simple model. The complete model comes in support of the previous findings. Specifications [7]-[9] of Table 3.2 indicate that the resource share accruing to women at baseline is higher than in the simple model, and reaches 59.2 to 60.4 percentage points according to the specification. During the crisis period, the share increases by 1.6 to 1.8 percentage points, which is smaller than the increase observed in the simple model. When we single out the impact of the regional gender unemployment ratio from the effect of price variation, we find that had the relative prices not change, the share would have increased by 4 percentage points as well. In the complete model, the full vector of relative prices plays against the private consumption of married women, and moderates the increase in the share accruing to them. This is an important remark, because none of the price parameters are actually significantly different from zero, while the effect of the gender employment gap is significant and positive in Table 3.1. When we compute the estimated share, the significant increase due to one single interest variable is thus mechanically partly offset by the non-significant effect of six relative prices.

[28] For non-cooperative Nash bargaining models, see Browning et al. (2010) or Lechene and Preston (2011).
[29] Source: INE.
[30] This result also holds accounting for regional and time fixed effects.

3.5.2 Difference-in-Difference

The literature has stressed the leading role of the construction sector in the Great Recession in countries such as Spain and Ireland (Bentolila et al., 2012, Pissarides, 2013). Consequently, we narrow our analysis and now concentrate on the epicenter of the mancession with the difference-in-difference specification exposed in Section 3.3.2.[31]

Turning to the difference-in-difference estimates, Table 3.4 displays the results obtained exploiting the specificity of the construction sector during the Great Recession. For the purpose of completeness, we propose the exact same specifications as in previous result Tables 3.1 to 3.3.[32] In all specifications, the estimates indicate that women whose husband is employed in the construction sector get on average substantially less from the household resources than other women with the same age and education degree. Indeed, looking at specifications [1] to [6], before 2008, the share accruing to them varies between 44.9-45.6%, while wives whose husband is employed elsewhere or unemployed benefit from 48.8 to 49.3% of the total household resources.

The dramatic adverse shock in the construction sector has important consequences on the sharing of resources. After 2008, specifications [1]-[6] report that the share accruing to wives whose husband works in the construction sector increases by 6 to 7 percentage points, while the share of wives from other households remains statistically stable (the parameter of the time dummy is positive but not significantly different from 0). Note that the change in relative prices contributes to the increasing share by 2 percentage points, so that the pure effect of the Great Recession on women with husbands working in the construction sector is around 5 percentage points.

The results are robust to the estimation of the complete model with 8 goods presented in columns [7]-[9]. Wives with husbands employed in the construction sector after 2008 receive a 3 to 4 percentage point higher share of the total resources for private consumption after the outburst of the economic crisis.

[31] Recall that due to data limitation on the sector of activity of the household head, we use a restricted sample for the difference-in-difference analysis. Table 3.B.3 in Appendix allows for a comparison between the original sample and the restricted sample used for the difference-in-difference estimation. We estimate again specifications [1] and [7] of Table 3.2 using the restricted sample instead of the large sample. Reassuringly, it appears that the results commented above are robust to the sample restriction.

[32] The estimates for the scale economies are reported in Appendix, Table 3.B.4. Unlike in the previous estimations, we do not exploit a regional source of variation. In the difference-in-difference estimations, to account for the regional fixed effects thus makes little economic sense. Consequently, we get rid of the regional fixed effects. Note that keeping them actually leaves the results unchanged.

Table 3.4: Estimated Share of Spanish Wives and Sharing Rule Parameters

	Model with $K = 3$						Model with $K = 8$		
Estimated	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
All sectors before 2008	0.4835	0.4852	0.4927	0.4777	0.4848	0.4810	0.6205	0.6244	0.6292
	(0.0887)	(0.0906)	(0.0895)	(0.0911)	(0.0922)	(0.0917)	(0.0567)	(0.0560)	(0.0562)
All sectors after 2008	0.5072	0.5087	0.5095	0.5015	0.5086	0.5055	0.6160	0.6191	0.6253
	(0.0927)	(0.0942)	(0.0936)	(0.0949)	(0.0959)	(0.0957)	(0.0555)	(0.0550)	(0.0551)
Other sectors before 2008 (a)	0.4885	0.4927	0.4888	0.4868	0.4904	0.493	0.6268	0.6353	0.6307
	(0.0888)	(0.0895)	(0.0892)	(0.0888)	(0.0895)	(0.0897)	(0.0563)	(0.0559)	(0.0557)
Other sectors after 2008 (b)	0.5051	0.5095	0.5052	0.5034	0.5073	0.5097	0.6158	0.6255	0.6191
	(0.0927)	(0.0936)	(0.093)	(0.0928)	(0.0936)	(0.0936)	(0.0555)	(0.0551)	(0.0549)
Construction before 2008 (c)	0.451	0.455	0.4511	0.4493	0.4528	0.4554	0.5787	0.5884	0.5824
	(0.0896)	(0.0903)	(0.0899)	(0.0896)	(0.0903)	(0.0904)	(0.0613)	(0.0607)	(0.0611)
Construction after 2008 (d)	0.523	0.528	0.523	0.5214	0.526	0.5274	0.6167	0.6246	0.6192
	(0.0932)	(0.0941)	(0.0934)	(0.0931)	(0.094)	(0.0939)	(0.0567)	(0.0563)	(0.0563)
Construction after 2008 (1)	0.505	0.5095	0.5052	0.5033	0.5073	0.5093	0.6186	0.6258	0.6212
	(0.0894)	(0.0901)	(0.0897)	(0.0894)	(0.0901)	(0.0902)	(0.0597)	(0.0593)	(0.0595)
$\%\Delta^{All}$	4.90	4.84	3.40	4.98	4.91	5.08	-0.74	-0.84	-0.61
$\%\Delta^{Other}$	3.38	3.40	3.34	3.43	3.44	3.40	-1.75	-1.55	-1.83
$\%\Delta^{Constru}$	15.97	16.04	15.92	16.05	16.15	15.81	6.56	6.14	6.32
(d)−(c) − ((b)−(a))	0.0555	0.0562	0.0555	0.0554	0.0562	0.0552	0.0489	0.0460	0.0483
Parameters									
Constant	1.0688	1.1212	1.0593	1.0532	1.0999	1.083	-13.216	-12.9339	-13.1151
	(1.2959)	(1.3065)	(1.2942)	(1.296)	(1.306)	(1.3026)	(20.6767)	(20.8455)	(21.0048)
Husband in construction	-0.151	-0.1513	-0.1514	-0.1505	-0.1508	-0.1507	-0.2009	-0.1976	-0.2024
	(0.0688)	(0.0687)	(0.0689)	(0.069)	(0.069)	(0.0688)	(0.0825)	(0.0807)	(0.0882)
Post 2008	-0.0117	-0.0116	-0.0115	-0.0117	-0.0115	-0.0116	-0.0429	-0.0434	-0.0461
	(0.0522)	(0.0523)	(0.0522)	(0.0523)	(0.0523)	(0.0522)	(0.074)	(0.0733)	(0.0781)
Construction × Post 2008	0.2227	0.2256	0.2227	0.2225	0.2256	0.2216	0.2046	0.1938	0.2028
	(0.0863)	(0.0865)	(0.0862)	(0.0864)	(0.0866)	(0.0861)	(0.0959)	(0.0939)	(0.1015)
Age ≥ 35	0.1415	0.1378	0.1416	0.1418	0.1382	0.1396	0.113	0.116	0.1139
	(0.0977)	(0.0985)	(0.0977)	(0.0977)	(0.0984)	(0.0982)	(0.1487)	(0.1512)	(0.1496)
High ed.	0.0294	0.031	0.0296	0.0287	0.0302	0.029	0.0161	0.0159	0.0187
	(0.0801)	(0.0805)	(0.0801)	(0.08)	(0.0804)	(0.0805)	(0.123)	(0.1248)	(0.123)
Husb. Unempl.		-0.0437			-0.0462			0.0834	
		(0.0781)			(0.0785)			(0.0857)	
Wage ratio			-0.0161			-0.0348			-0.1753
			(0.1017)			(0.1101)			(0.1177)
Active				0.0178	0.0206	0.0271	-0.0564	-0.0596	-0.0022
				(0.0697)	(0.07)	(0.0756)	(0.0594)	(0.0594)	(0.0696)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Standard errors in parenthesis. Unless specified, the demographic characteristics are women's. Women to men wage ratio. (1) Share computed with post-2008 averages but pre-2008 prices.

Finally, the sign and magnitude of the parameters for the wage ratio and employment status of the spouses deserve some attention. As it was the case for the previous results, the impact of the participation of the wife to the labor market on the sharing process is virtually 0. In the simple model, the estimate for the husband job loss is negative, but small and insignificant; in the complete model, it is higher and positive, which is more in line with expectation, although not significant. The only counter-intuitive result comes from the parameter associated with the wage ratio in specification [9]. The parameter is not significant, but high in magnitude and negative, which suggests that a higher contribution of the wife to the total income of the household is associated with a *lower* share accruing to her once sitting at the negotiating table. We explain this result by the fact that household-declared female household heads, which are more likely to bring home a higher share of the total household income, are excluded from the sample. The effect of wage ratio on the sharing may well be nonlinear, a woman contributing with a very low share of earnings being transferred less utility than than a housewife (Zamora, 2011).

Overall, all the specifications converge to one main result, namely that the fact of having a husband in the construction sector strongly and significantly increases one's resource share devoted to private consumption within the household. Now, is it possible that our results are driven by a sample composition effect? As already mentioned, using the restricted sample, we are able to successfully replicate the findings presented above obtained on the gender employment ratio (see Appendix, Table 3.B.3). Another way to test the coherence of the results is to exclude unemployed men from the sample. Indeed, it is likely that a consequent share of the pool of unemployed after 2008 stem from the construction sector. The results (not reported here) are unchanged. Finally, more importantly, recall that the structural model builds on the information on singles to retrieve the parameters of the sharing and scaling functions. Even in the case where men still employed in the construction sector would be very different from men employed in the sector before the economic crisis, there is no reason why the selection of the remaining employees of the construction sector based on unobserved characteristics would operate differently for singles and for men in a couple. The population of construction employees may have changed, but the comparability of preferences across household types is unlikely affected.

3.6 Conclusion

This chapter studies the dynamics of intrahousehold resource allocation among Spanish households during a significant economic downturn. We first show that the Great Recession starting in 2009 caused a dramatic, exogenous change in the relative employment opportunities in favor of Spanish women, commonly described as a 'mancession'. Then, we measure the extent to which the intrahousehold sharing of resources responded to this new order of relative gender opportunities. Beyond the closing gender gap observed at the aggregate level, we show that the mancession also invited itself over to the family negotiating table. The changing economic context had implications all the way to the core of the household consumption decisions, and as such impacted the intrahousehold distribution of welfare.

More broadly, this chapter revisits the intrahousehold bargaining for the sharing of resources from an innovative angle. First, by exploiting the features of the mancession, we complement the existing literature with an alternative distribution factor, which we believe is more credible than the standard distribution factor, such as the wage or sex ratio. In addition, while previous studies generally identify the sharing rule up to a constant, we estimate an intermediary model between the structures proposed by Browning et al. (2013), Lewbel and Pendakur (2008) and Bargain and Donni (2012). Thanks to the presence of private, gender specific goods, we fully identify the parameters of the sharing function.

In line with expectations, we show that the exogenous variation in gender relative opportunities did create room for marital bargaining. As the regional gender unemployment gap closed in favor of women, their share devoted to private consumption increased by 3 to 5 percentage points (5-6 percent). Interestingly, the magnitude of this effect is higher than the effect of changes in the actual situation of individuals, like a job loss for the husband, or an increase in the relative earnings for the wife. Narrowing the analysis to the epicenter of the mancession, we find that in line with expectations, the increased share accruing to wives was not uniform across economic sectors: the essential of the measured shift in resources actually concerned women married to construction workers, who were exposed to the earliest, and highest risks of unemployment during the Great Recession.

Finally, this chapter leaves open several interesting questions for future research. First, while the distributive effects of the Great Recession in Spain are clearly stated in the study, the issue of welfare is far more tricky. Clearly, in absolute terms, the Great Recession caused the household consumption to decrease. Still, in relative terms, consumption shifted towards

women, and we may ask whether this transfer was welfare-improving. Of course, the chapter leaves equally open the companion, normative question of whether the fairness of the intrahousehold distribution was improved by this new deal. The existence of a redistribution necessarily lead to revisit the risk-sharing role of the household: is the resource transfer happening within the household really efficient, or are husband and wife engaged in a non-cooperative bargaining solution? A convincing answer to this interrogation would require to capture the eventual added-worker effect, and thus model jointly the labor supply and consumption decisions. The identification of a full income sharing rule within this complex theoretical framework is yet to come in the collective model literature. Last, a last unsolved issue deals with the long term effects of the mancession. We may wonder whether the intrahousehold allocation changes occurring together with the current 'mancession' will persist when the Spanish economy – and more specifically its industry and construction sectors – will go back on tracks towards a recovery.

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Appendices

3.A Data Appendix

Table 3.A.1: Regional Unemployment 2006-2011, by Region

	Unemployment rate, men						Unemployment rate, women						Men/women unemployment ratio					
Region	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011
Andalucia	9.27	9.56	15.26	24.05	26.70	28.69	17.67	17.41	21.20	26.85	29.17	31.97	0.52	0.55	0.72	0.90	0.92	0.90
Aragon	3.87	3.91	6.63	13.41	14.19	16.88	7.86	7.17	8.20	12.59	15.94	17.32	0.49	0.55	0.81	1.07	0.89	0.97
Asturias	6.80	6.48	6.77	12.64	15.15	18.31	12.28	10.87	10.61	14.34	16.81	17.29	0.55	0.60	0.64	0.88	0.90	1.06
Baleares	5.23	6.02	9.69	19.25	20.79	22.35	8.06	8.70	10.78	16.25	19.30	21.28	0.65	0.69	0.90	1.18	1.08	1.05
Canarias	9.47	8.62	16.13	25.58	29.15	29.40	14.60	12.92	18.75	26.55	27.91	29.13	0.65	0.67	0.86	0.96	1.04	1.01
Cantabria	4.27	4.45	5.88	11.55	12.67	16.09	9.43	7.97	8.84	12.56	15.00	14.30	0.45	0.56	0.67	0.92	0.84	1.13
Castilla y Leon	5.24	4.81	6.92	12.08	14.22	15.69	12.26	10.45	13.36	16.53	17.86	18.37	0.43	0.46	0.52	0.73	0.80	0.85
Castilla Mancha	5.33	5.22	9.29	17.19	19.22	20.88	14.69	11.56	15.29	21.36	24.15	26.09	0.36	0.45	0.61	0.80	0.80	0.80
Cataluna	5.24	5.59	9.04	17.21	18.59	19.77	8.14	7.63	8.70	14.98	16.51	18.43	0.64	0.73	1.04	1.15	1.13	1.07
Valencia	6.41	6.90	10.91	20.97	22.93	23.70	11.03	11.27	13.43	20.49	22.76	24.33	0.58	0.61	0.81	1.02	1.01	0.97
Extremadura	9.94	9.27	11.09	17.52	20.57	23.03	18.56	18.50	21.69	25.03	26.30	27.89	0.54	0.50	0.51	0.70	0.78	0.83
Galicia	5.98	5.72	7.35	11.66	14.59	16.56	11.27	9.88	10.22	13.36	16.19	18.06	0.53	0.58	0.72	0.87	0.90	0.92
Madrid	4.64	4.92	7.85	13.91	15.57	16.40	8.32	7.84	9.51	13.79	16.14	16.27	0.56	0.63	0.83	1.01	0.96	1.01
Murcia	5.97	6.00	11.95	21.63	23.19	25.01	10.82	9.92	13.14	18.49	22.44	24.96	0.55	0.60	0.91	1.17	1.03	1.00
Navarra	4.15	3.14	5.64	9.99	11.50	12.57	7.02	6.90	8.42	11.94	12.40	13.49	0.59	0.46	0.67	0.84	0.93	0.93
Pais Vasco	5.74	4.97	5.73	11.08	10.29	11.76	9.03	7.85	7.77	11.65	11.18	13.04	0.64	0.63	0.74	0.95	0.92	0.90
La Rioja	5.11	4.05	6.47	12.59	12.85	16.65	7.57	8.32	9.91	12.72	15.87	17.91	0.68	0.49	0.65	0.99	0.81	0.93

Own calculation from INE data: Tasas de paro por distintos grupos de edad, sexo y comunidad autónoma

Table 3.A.2: Regional Relative Price 2006-2011, by Region

Region	Food						Vice						Clothing					
	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011
Andalucia	1.067	1.093	1.120	1.134	1.096	1.070	1.025	1.073	1.075	1.194	1.317	1.421	0.951	0.929	0.898	0.890	0.867	0.840
Aragon	1.060	1.079	1.114	1.122	1.091	1.068	1.027	1.068	1.068	1.177	1.301	1.407	0.945	0.927	0.895	0.889	0.872	0.849
Asturias	1.050	1.079	1.110	1.122	1.095	1.079	1.025	1.071	1.072	1.182	1.298	1.393	0.981	0.967	0.933	0.925	0.904	0.877
Baleares	1.054	1.080	1.104	1.113	1.073	1.047	1.012	1.054	1.050	1.146	1.245	1.330	0.954	0.938	0.909	0.898	0.879	0.854
Canarias	1.027	1.058	1.087	1.117	1.084	1.064	1.144	1.102	1.115	1.188	1.196	1.229	0.916	0.896	0.856	0.856	0.841	0.813
Cantabria	1.063	1.082	1.106	1.120	1.081	1.054	1.024	1.066	1.064	1.174	1.282	1.375	0.945	0.923	0.890	0.883	0.863	0.837
Castilla y Leon	1.063	1.086	1.117	1.132	1.105	1.084	1.026	1.070	1.072	1.185	1.302	1.403	0.958	0.941	0.910	0.905	0.885	0.859
Castilla Mancha	1.060	1.080	1.110	1.128	1.090	1.066	1.028	1.079	1.082	1.204	1.330	1.433	0.942	0.923	0.892	0.887	0.866	0.837
Cataluna	1.052	1.074	1.099	1.119	1.092	1.071	0.999	1.043	1.045	1.140	1.238	1.320	0.983	0.966	0.936	0.925	0.903	0.877
Valencia	1.056	1.087	1.118	1.134	1.101	1.079	1.025	1.072	1.073	1.187	1.312	1.417	0.968	0.952	0.922	0.915	0.897	0.871
Extremadura	1.043	1.068	1.101	1.117	1.083	1.058	1.048	1.097	1.101	1.228	1.359	1.469	0.947	0.927	0.894	0.887	0.864	0.834
Galicia	1.046	1.064	1.093	1.113	1.084	1.070	1.001	1.054	1.050	1.145	1.241	1.321	0.957	0.942	0.908	0.901	0.881	0.853
Madrid	1.052	1.071	1.092	1.101	1.069	1.046	1.025	1.078	1.077	1.189	1.309	1.411	0.930	0.913	0.883	0.871	0.851	0.825
Murcia	1.067	1.106	1.132	1.143	1.104	1.070	1.011	1.047	1.049	1.163	1.278	1.371	0.964	0.940	0.910	0.903	0.883	0.856
Navarra	1.059	1.076	1.104	1.112	1.082	1.057	1.013	1.057	1.065	1.172	1.286	1.382	0.989	0.976	0.948	0.942	0.927	0.902
Pais Vasco	1.070	1.097	1.125	1.145	1.120	1.103	1.015	1.055	1.057	1.151	1.257	1.345	0.932	0.919	0.889	0.878	0.861	0.838
La Rioja	1.060	1.075	1.095	1.101	1.069	1.045	1.013	1.055	1.059	1.167	1.283	1.378	0.939	0.922	0.892	0.884	0.870	0.844

Own calculation from INE data.

Table 3.A.3: Regional Relative Price 2006-2011, by Region (continued)

Region	Leisure						Personal Care						Transport					
	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011
Andalucia	0.870	0.833	0.794	0.794	0.766	0.737	0.996	0.997	0.991	1.029	1.031	1.026	1.004	0.986	0.997	0.944	0.988	1.033
Aragon	0.888	0.863	0.822	0.825	0.796	0.771	1.008	1.015	1.004	1.044	1.055	1.056	1.010	0.995	1.003	0.953	0.992	1.032
Asturias	0.861	0.829	0.792	0.794	0.769	0.746	1.005	1.015	1.017	1.053	1.060	1.051	1.010	0.992	1.000	0.951	0.986	1.024
Baleares	0.869	0.842	0.808	0.815	0.800	0.766	1.013	1.016	1.009	1.051	1.057	1.058	1.018	1.003	1.021	0.969	1.008	1.054
Canarias	0.882	0.846	0.802	0.810	0.789	0.758	0.999	1.001	0.978	1.014	1.015	0.998	1.056	1.048	1.077	1.013	1.070	1.134
Cantabria	0.891	0.863	0.836	0.850	0.828	0.805	1.007	1.012	0.998	1.036	1.042	1.034	1.016	1.004	1.021	0.959	1.010	1.062
Castilla y Leon	0.863	0.827	0.789	0.790	0.763	0.738	0.999	1.001	0.994	1.031	1.034	1.034	1.002	0.989	0.997	0.944	0.982	1.022
Castilla Mancha	0.862	0.827	0.785	0.786	0.766	0.737	0.997	0.998	0.987	1.022	1.025	1.021	1.023	1.011	1.024	0.968	1.011	1.056
Cataluna	0.894	0.866	0.834	0.835	0.806	0.781	1.015	1.027	1.024	1.066	1.079	1.083	0.997	0.978	0.990	0.932	0.968	1.008
Valencia	0.870	0.835	0.799	0.804	0.779	0.752	1.010	1.013	1.006	1.040	1.043	1.038	1.005	0.988	0.999	0.944	0.983	1.024
Extremadura	0.874	0.834	0.790	0.787	0.768	0.738	1.022	1.022	1.008	1.043	1.048	1.043	1.015	0.993	1.001	0.945	0.982	1.029
Galicia	0.895	0.868	0.829	0.832	0.805	0.778	0.989	0.990	0.981	1.015	1.018	1.011	1.018	1.006	1.020	0.963	1.009	1.053
Madrid	0.884	0.856	0.823	0.826	0.799	0.775	1.010	1.023	1.022	1.064	1.072	1.073	1.026	1.011	1.028	0.977	1.020	1.059
Murcia	0.866	0.828	0.800	0.803	0.773	0.746	1.019	1.017	1.014	1.048	1.048	1.049	0.999	0.974	0.990	0.934	0.980	1.034
Navarra	0.906	0.880	0.846	0.856	0.830	0.809	1.013	1.029	1.031	1.073	1.091	1.102	0.996	0.981	0.988	0.934	0.971	1.012
Pais Vasco	0.880	0.846	0.814	0.817	0.795	0.773	0.999	1.005	1.001	1.032	1.037	1.036	1.002	0.987	0.997	0.942	0.979	1.019
La Rioja	0.895	0.872	0.841	0.839	0.805	0.792	1.027	1.032	1.034	1.075	1.093	1.097	0.982	0.969	0.978	0.926	0.966	1.003

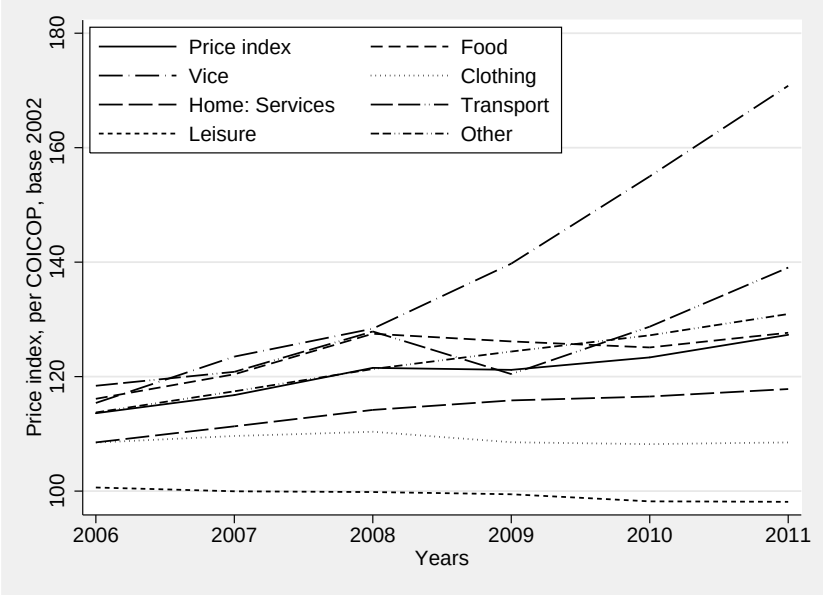
Own calculation from INE data.

3.B Results Appendix

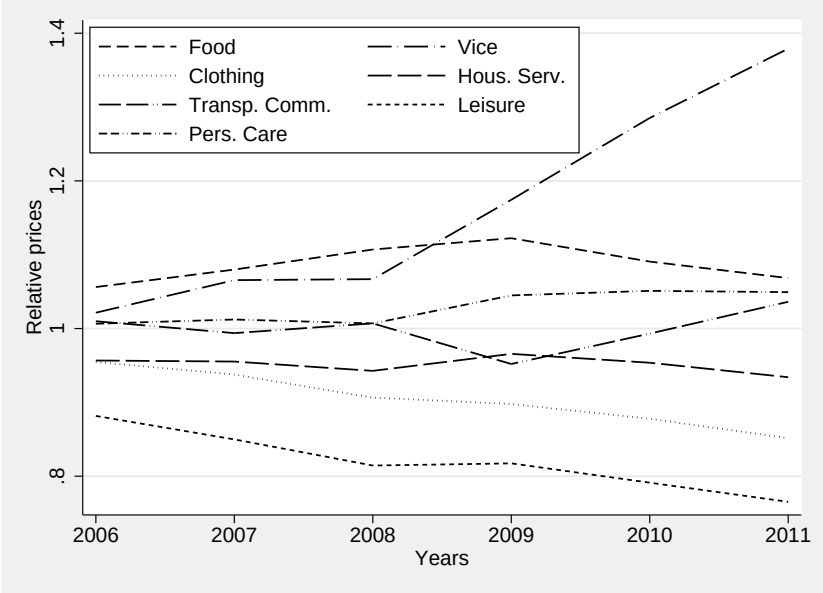
Table 3.A.4: Summary Statistics on Household Heads and Life Partners aged 20-44, by Household Structure, 2006-2011

	Single men			Single women			Couples		
	No child	With child	Other	No child	With child	Other	No child	With child	Other
Women									
Age (in years)				34.72	37.76	34.85	31.59	35.87	34.01
				(5.92)	(5.14)	(6.41)	(4.98)	(4.77)	(6.11)
Primary education				0.04	0.12	0.13	0.05	0.10	0.15
				(0.19)	(0.32)	(0.34)	(0.21)	(0.30)	(0.36)
Secondary education 1				0.14	0.33	0.28	0.18	0.29	0.35
				(0.35)	(0.47)	(0.45)	(0.38)	(0.45)	(0.48)
Secondary education 2				0.20	0.27	0.28	0.23	0.23	0.27
				(0.40)	(0.44)	(0.45)	(0.42)	(0.42)	(0.45)
Superior education				0.62	0.29	0.31	0.55	0.38	0.22
				(0.49)	(0.45)	(0.46)	(0.50)	(0.49)	(0.41)
Income				1308.90	1084.78	1025.55	993.69	720.05	628.53
				(639.74)	(634.80)	(572.65)	(639.63)	(720.34)	(638.49)
Active				0.99	0.95	0.98	0.94	0.76	0.77
				(0.11)	(0.22)	(0.15)	(0.24)	(0.43)	(0.42)
Employed				0.92	0.78	0.88	0.82	0.62	0.62
				(0.40)	(0.53)	(0.33)	(0.43)	(0.53)	(0.52)
Unemployed				0.08	0.18	0.10	0.12	0.15	0.15
				(0.28)	(0.39)	(0.30)	(0.33)	(0.35)	(0.35)
Men									
Age (in years)	35.23	36.11	33.47				33.32	37.66	36.17
	(5.70)	(6.60)	(6.18)				(4.98)	(4.51)	(5.70)
Primary education	0.07	0.13	0.18				0.07	0.12	0.17
	(0.25)	(0.33)	(0.38)				(0.25)	(0.32)	(0.37)
Secondary education 1	0.25	0.37	0.29				0.26	0.33	0.39
	(0.43)	(0.48)	(0.45)				(0.44)	(0.47)	(0.49)
Secondary education 2	0.24	0.19	0.24				0.25	0.23	0.24
	(0.42)	(0.40)	(0.43)				(0.43)	(0.42)	(0.43)
Superior education	0.45	0.31	0.29				0.43	0.33	0.20
	(0.50)	(0.46)	(0.46)				(0.50)	(0.47)	(0.40)
Income	1366.28	1190.24	1109.38				1367.27	1481.58	1214.86
	(698.79)	(598.76)	(543.83)				(668.56)	(754.25)	(712.64)
Employed	0.88	0.90	0.89				0.91	0.91	0.86
	(0.33)	(0.30)	(0.31)				(0.29)	(0.28)	(0.35)
Unemployed	0.12	0.10	0.11				0.09	0.09	0.14
	(0.33)	(0.30)	(0.31)				(0.29)	(0.28)	(0.35)
Household									
Homeowner w/o loan	0.14	0.53	0.21	0.12	0.23	0.20	0.09	0.20	0.24
	(0.35)	(0.50)	(0.41)	(0.32)	(0.42)	(0.40)	(0.28)	(0.40)	(0.43)
Homeowner	0.62	0.80	0.40	0.61	0.63	0.41	0.74	0.82	0.63
	(0.49)	(0.40)	(0.49)	(0.49)	(0.48)	(0.49)	(0.44)	(0.39)	(0.48)
Rural area	0.21	0.24	0.19	0.12	0.17	0.12	0.20	0.25	0.25
	(0.41)	(0.43)	(0.40)	(0.33)	(0.37)	(0.33)	(0.40)	(0.43)	(0.43)
Madrid-Barcelona	0.11	0.11	0.19	0.13	0.10	0.15	0.10	0.08	0.13
	(0.31)	(0.31)	(0.39)	(0.33)	(0.31)	(0.36)	(0.31)	(0.28)	(0.33)
Wage ratio							0.40	0.29	0.31
							(0.21)	(0.24)	(0.27)
Observations	1978	548	656	1354	2132	685	5543	21211	1665

Figure 3.A.1: Prices, by Good Category, Base 2002



(a) Price index



(b) Relative price

Figure 3.A.2: Relative Price by Region, Clothing

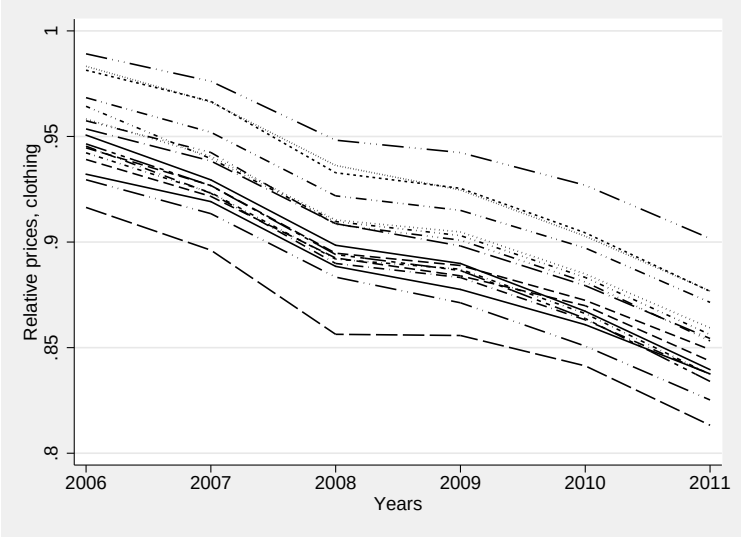


Figure 3.A.3: Engel Curves, Kernel Weighted Local Polynomial Smoothing

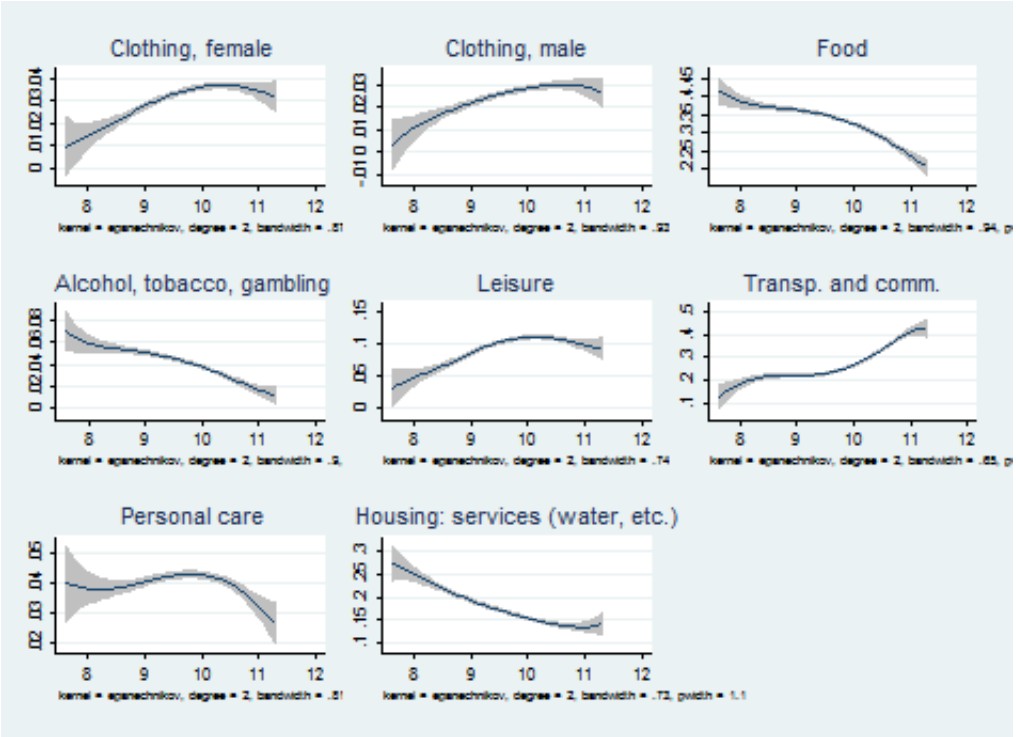


Table 3.A.5: Nonlinearities in Budget Shares of Assignable Goods, by Gender and Household Structure

	Linear	Quadratic	
		W/o Wu-Hausman	Wu-Hausman
Clothing share, single women			
Log yearly expenditure	0.00743***	0.223***	0.228***
	(2.60)	(3.78)	(3.88)
Squared log yearly expenditure		-0.0115***	-0.0106***
		(-3.66)	(-3.35)
Wu-Hausman residual			-0.0266***
			(-3.32)
Observations	1354	1354	1354
Clothing share, single men			
Log yearly expenditure	0.00975***	0.156***	0.154***
	(4.79)	(3.87)	(3.81)
Squared log yearly expenditure		-0.00779***	-0.00797***
		(-3.63)	(-3.70)
Wu-Hausman residual			0.00617
			(1.07)
Observations	1978	1978	1978
Clothing share, women in couple			
Log yearly expenditure	0.00549***	0.152***	0.152***
	(5.18)	(6.25)	(6.25)
Squared log yearly expenditure		-0.00743***	-0.00708***
		(-6.03)	(-5.72)
Wu-Hausman residual			-0.00804***
			(-2.78)
Observations	5543	5543	5543
Clothing share, men in couple			
Log yearly expenditure	0.00612***	0.0799***	0.0799***
	(6.14)	(3.48)	(3.48)
Squared log yearly expenditure		-0.00374***	-0.00351***
		(-3.22)	(-3.01)
Wu-Hausman residual			-0.00522*
			(-1.91)
Observations	5543	5543	5543

Notes: $^{+}$ T-statistics in parenthesis. P-values: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Additional controls : age, tertiary education dummy, rural area dummy, main city dummy, dummy for home and car ownership, year fixed effects.

Table 3.B.1: Estimated Parameters when K=3 – Budget Share Equations for Men and Women

	$K = 3$, specification [1]		$K = 3$, specification [4]	
	Budget share for men clothing	Budget share for women clothing	Budget share for men clothing	Budget share for women clothing
Constant	-0.8030	-1.4473	-0.7993	-1.4537
	(0.1557)	(0.2392)	(0.1551)	(0.2400)
Characteristics				
Aged over 35	-0.0036	0.0027	-0.0037	0.0025
	(0.0024)	(0.0055)	(0.0024)	(0.0055)
University degree	0.0025	0.0030	0.0026	0.0030
	(0.0028)	(0.0047)	(0.0028)	(0.0047)
Log scaled exp.	0.1693	0.2802	0.1684	0.2816
	(0.0327)	(0.0503)	(0.0326)	(0.0505)
Sq.log scaled exp.	-0.0089	-0.0138	-0.0089	-0.0139
	(0.0018)	(0.0027)	(0.0018)	(0.0027)
Rural resident	0.0002	-0.0087	0.0003	-0.0088
	(0.0028)	(0.0042)	(0.0028)	(0.0042)
Madrid Barcelona resident	0.0044	0.0149	0.0043	0.0149
	(0.0043)	(0.0076)	(0.0043)	(0.0076)
House owner	0.0034	0.0030	0.0035	0.0033
	(0.0040)	(0.0075)	(0.004)	(0.0075)
Car owner	-0.0056	-0.0126	-0.0056	-0.0126
	(0.0037)	(0.0051)	(0.0037)	(0.0051)
Regional relative prices				
Rel.price of clothing	0.0557	0.1254	0.0560	0.1256
	(0.0267)	(0.0370)	(0.0267)	(0.0370)

Notes: Standard errors in parenthesis. The parameters of the budget share correspond to specification [1] and [4].

Table 3.B.2: Estimated Parameters when K=8 – Budget Share Equations for Men and Women

	Clothing		Food		Vice		Leisure		Transport		Personal care	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
Constant	-0.0723	-1.1264	-4.2224	-1.1956	0.8252	-0.3532	-2.8399	-1.7409	6.1244	3.3281	-0.3133	-1.1548
	(0,3362)	(0,3854)	(1,0246)	(1,023)	(0,4647)	(0,3738)	(0,5488)	(0,5921)	(1,2671)	(1,1725)	(0,226)	(0,318)
Characteristics												
Aged over 35	-0.0038	0.0038	0.0035	-0.0017	0.0106	-0.0039	-0.0041	0.0116	-0.0193	-0.0285	0.0014	0.0040
	(0,002)	(0,0029)	(0,0061)	(0,0074)	(0,0028)	(0,0031)	(0,0036)	(0,0041)	(0,0066)	(0,0069)	(0,0014)	(0,0021)
University degree	0.0011	0.0041	-0.0063	-0.0020	-0.0269	-0.0174	0.0394	0.0191	-0.0093	0.0047	0.0022	-0.0024
	(0,0019)	(0,0026)	(0,006)	(0,0063)	(0,0029)	(0,0026)	(0,0038)	(0,0034)	(0,0068)	(0,0058)	(0,0014)	(0,0019)
Log scaled exp.	0.1750	0.2542	0.9175	0.4081	0.0769	0.1312	0.5014	0.4751	-1.4611	-1.0812	0.0620	0.1925
	(0,0293)	(0,0335)	(0,1044)	(0,1162)	(0,047)	(0,0392)	(0,0477)	(0,0624)	(0,1377)	(0,1536)	(0,0221)	(0,0324)
Sq.log scaled exp.	-0.0093	-0.0123	-0.0526	-0.0264	-0.0063	-0.0091	-0.0249	-0.0242	0.0817	0.0597	-0.0031	-0.0100
	(0,0017)	(0,0018)	(0,0058)	(0,0062)	(0,0026)	(0,0021)	(0,0026)	(0,0033)	(0,0078)	(0,0085)	(0,0012)	(0,0017)
Rural resident	0.0005	-0.0035	0.0109	-0.0192	0.0074	-0.0044	-0.0117	0.0023	0.0228	0.0030	-0.0061	-0.0014
	(0,0023)	(0,0023)	(0,0092)	(0,0093)	(0,0041)	(0,0038)	(0,0047)	(0,0051)	(0,0095)	(0,0099)	(0,0017)	(0,0022)
Madrid Barcelona resident	0.0077	0.0144	-0.0128	-0.0014	0.0017	-0.0133	0.0043	0.0283	0.0150	-0.0332	-0.0039	0.0042
	(0,0036)	(0,0038)	(0,011)	(0,0111)	(0,005)	(0,0046)	(0,0071)	(0,0075)	(0,0116)	(0,0116)	(0,0025)	(0,0031)
House owner	0.0025	-0.0027	0.0081	-0.0133	-0.0055	-0.0039	0.0071	0.0060	-0.0114	-0.0127	0.0018	0.0019
	(0,0029)	(0,0031)	(0,0101)	(0,0106)	(0,0046)	(0,0043)	(0,0057)	(0,0065)	(0,01)	(0,01)	(0,0021)	(0,0028)
Car owner	-0.0030	-0.0083	-0.0678	-0.0431	0.0004	-0.0063	-0.0206	0.0067	0.1292	0.0856	-0.0049	-0.0057
	(0,0022)	(0,0023)	(0,0075)	(0,0075)	(0,0034)	(0,0032)	(0,0043)	(0,0043)	(0,0074)	(0,0073)	(0,0015)	(0,0019)
Regional relative prices												
Clothing	0.0000	0.0970	-0.0209	0.0804	-0.0275	-0.0573	0.0649	0.0633	0.0058	-0.2484	-0.0261	0.1740
	(0,0662)	(0,0748)	(0,1957)	(0,1744)	(0,0798)	(0,0671)	(0,1085)	(0,1111)	(0,223)	(0,1997)	(0,0412)	(0,0604)
Food	-0.2295	0.0066	0.3082	0.0037	-0.2061	0.0221	0.0792	-0.1733	0.0834	0.5640	0.0097	0.0828
	(0,1077)	(0,1232)	(0,3112)	(0,2948)	(0,1308)	(0,1148)	(0,171)	(0,1874)	(0,3631)	(0,3383)	(0,0695)	(0,0991)
Vice	-0.0063	0.0481	-0.1200	0.0516	0.0462	-0.0030	0.0715	-0.1372	-0.0572	0.0361	-0.0178	0.0088
	(0,0289)	(0,0315)	(0,0851)	(0,076)	(0,0364)	(0,0315)	(0,0475)	(0,0488)	(0,0962)	(0,0892)	(0,0189)	(0,026)
Leisure	-0.0998	0.0580	-0.1030	0.0137	-0.1330	0.0425	0.2283	-0.4348	-0.0799	0.5710	0.0124	-0.0833
	(0,0729)	(0,0831)	(0,217)	(0,1912)	(0,093)	(0,0788)	(0,1235)	(0,1258)	(0,2397)	(0,2322)	(0,0493)	(0,0679)
Transport	-0.2127	-0.1131	0.2542	-0.0193	-0.2973	-0.0321	0.0341	-0.0759	0.3361	0.6228	0.0528	0.0506
	(0,0814)	(0,0934)	(0,2453)	(0,227)	(0,1036)	(0,0869)	(0,1358)	(0,1494)	(0,2826)	(0,2608)	(0,0532)	(0,075)
Personal care	-0.1442	-0.1773	0.2815	-0.1231	-0.3458	-0.0120	-0.0013	0.2300	0.2718	0.2238	0.0072	0.0523
	(0,0747)	(0,0822)	(0,2194)	(0,2046)	(0,0985)	(0,0809)	(0,1281)	(0,1294)	(0,2423)	(0,2197)	(0,0503)	(0,0682)

Notes: Standard errors in parenthesis. The parameters of the budget share correspond to specification [7].

Table 3.B.3: Sample Comparison

	Large sample				Restricted sample			
	Three goods		Eight goods		Three goods		Eight goods	
	Estimate	St. Err.	Estimate	St. Err.	Estimate	St. Err.	Estimate	St. Err.
Estimated share								
Pre 2009	0.4642	0.0793	0.5924	0.0486	0.4932	0.0836	0.6418	0.0537
Pre 2009 (1)	0.4940	0.0802	0.6247	0.0517	0.5408	0.0847	0.6739	0.0557
Post 2009 (2)	0.4956	0.0800	0.6261	0.0517	0.5416	0.0846	0.6746	0.0558
Post 2009	0.5033	0.0834	0.6088	0.0499	0.5172	0.0887	0.6344	0.0544
Parameters								
Constant	-0.0038	1.4502	-6.4232	22.2238	-2.1315	1.6919	-16.9838	23.4249
Reg. unempl. ratio	0.3831	0.1717	0.4365	0.2604	0.6105	0.2136	0.4557	0.2513
Age $\geq$ 35	0.1419	0.0854	0.1273	0.1286	0.1475	0.1050	0.1398	0.1553
High ed.	0.0200	0.0713	0.0567	0.1087	-0.0264	0.0826	0.0311	0.1269
Active, wife			-0.0371	0.0610			-0.0504	0.0533
Prices	YES		YES		YES		YES	
Region FE	YES		YES		YES		YES	
Estimated scales								
Wife: scale economies	0.6450	0.2006	0.5298	0.1093	0.6433	0.2177	0.5086	0.1120
Husband: scale economies	1.8011	0.6723	1.3048	0.2041	1.2618	0.4614	1.6734	0.3357
Parameters, wife								
Constant	1.2274	1.3975	-18.8175	15.7451	-0.0464	1.6615	-24.5118	17.8583
Age	0.0827	0.1765	0.1309	0.1176	0.1644	0.2024	0.1624	0.1403
Education	-0.0201	0.1661	0.0394	0.1047	-0.0331	0.1854	0.0428	0.1235
Rural	0.1411	0.1921	-0.0504	0.0913	0.1331	0.2035	-0.0183	0.0811
Madrid-Barcelona	-0.1603	0.1885	-0.0786	0.1139	-0.1157	0.2009	-0.0825	0.1002
Car owner	-0.3113	0.1377	-0.2550	0.0696	-0.3257	0.1486	-0.2428	0.0610
Home owner	0.1101	0.1830	0.1089	0.0924	0.0546	0.2050	0.1071	0.0813
Regional relative price	YES		YES		YES		YES	
Parameters, husband								
Constant	-2.6722	1.7205	7.0775	8.1043	-4.5251	1.9809	13.8204	7.7519
Age	-0.0749	0.2148	-0.0183	0.0484	-0.1062	0.2462	-0.0566	0.0493
Education	-0.1939	0.2118	-0.1611	0.0507	-0.2999	0.2383	-0.1902	0.0517
Rural	-0.0508	0.2512	0.1103	0.0745	-0.1826	0.3015	0.0792	0.0742
Madrid-Barcelona	0.2978	0.3460	0.2178	0.1086	0.3597	0.4006	0.2116	0.1022
Car owner	0.3669	0.2328	0.1127	0.0803	0.3326	0.2705	0.0839	0.0739
Home owner	-0.3151	0.2983	-0.1670	0.0955	-1.6952	0.5882	-0.1226	0.0899
Regional relative price	YES		YES		YES		YES	

Notes: Standard errors in parenthesis. (1) Share computed with pre-2009 averages but post-2009 regional unemployment ratio. (2) Share computed with post-2009 averages but pre-2009 regional relative prices. Unless specified, the demographic characteristics are women's. Men to women unemployment ratio. Women to men wage ratio.

Table 3.B.4: Diff-in-diff Estimates of the Scale Economies

	Model with 3 goods						Model with 8 goods		
Estimated	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Estimated scales									
Wife: scale economies	0.6609	0.642	0.6669	0.6552	0.6349	0.6606	0.5518	0.5632	0.5717
	(0.2183)	(0.2165)	(0.2231)	(0.2176)	(0.2155)	(0.2225)	(0.1185)	(0.1205)	(0.122)
Husband: scale economies	2.1022	2.161	2.0786	2.1209	2.1855	2.0845	1.3881	1.398	1.3143
	(0.9153)	(0.955)	(0.916)	(0.927)	(0.9698)	(0.9237)	(0.2442)	(0.2602)	(0.2357)
Parameters, wife									
Constant	0.7062	0.6449	0.6904	0.7295	0.6699	0.6563	-25.9561	-24.236	-24.1246
	(1.5025)	(1.5095)	(1.5021)	(1.5109)	(1.5197)	(1.4991)	(17.1223)	(16.9373)	(16.8795)
Age $\geq$ 35	0.1251	0.1285	0.1234	0.1259	0.1299	0.1223	0.133	0.1315	0.1309
	(0.1899)	(0.1912)	(0.1896)	(0.1906)	(0.192)	(0.1899)	(0.1297)	(0.1291)	(0.1258)
High ed.	0.0303	0.0329	0.0295	0.0315	0.0343	0.0318	0.0296	0.0256	0.0216
	(0.1759)	(0.1768)	(0.1754)	(0.1764)	(0.1775)	(0.1752)	(0.1132)	(0.1125)	(0.109)
Rural	0.1243	0.117	0.1246	0.1249	0.118	0.1191	-0.0252	-0.0307	-0.0348
	(0.1958)	(0.1955)	(0.1953)	(0.1965)	(0.1965)	(0.1946)	(0.0855)	(0.0836)	(0.0853)
Madrid	-0.0366	-0.0286	-0.0389	-0.0348	-0.0263	-0.034	-0.0638	-0.0627	-0.0647
	(0.1842)	(0.1863)	(0.1836)	(0.1852)	(0.1877)	(0.1838)	(0.0996)	(0.097)	(0.099)
Car owner	-0.3107	-0.3205	-0.3089	-0.3118	-0.322	-0.3142	-0.2439	-0.2435	-0.2482
	(0.1446)	(0.1461)	(0.1439)	(0.1451)	(0.1468)	(0.144)	(0.0657)	(0.0641)	(0.0663)
Home owner	0.0969	0.1017	0.0952	0.0977	0.1028	0.0944	0.1135	0.1134	0.114
	(0.1933)	(0.1963)	(0.1925)	(0.1942)	(0.1975)	(0.1933)	(0.0879)	(0.0857)	(0.0876)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES
Parameters, husband									
Constant	-1.5707	-1.5517	-1.5822	-1.5667	-1.5414	-1.6268	16.9766	15.6459	16.0298
	(1.956)	(1.9508)	(1.9639)	(1.9481)	(1.9402)	(1.9711)	(9.0087)	(8.8841)	(9.3359)
Age *geq* 35	-0.1374	-0.1376	-0.1371	-0.1368	-0.1367	-0.1338	-0.0695	-0.0676	-0.0692
	(0.2254)	(0.2243)	(0.226)	(0.2252)	(0.224)	(0.2263)	(0.0518)	(0.0517)	(0.0528)
High ed.	-0.231	-0.236	-0.2298	-0.2321	-0.2373	-0.231	-0.1619	-0.1671	-0.1584
	(0.219)	(0.2179)	(0.2195)	(0.2186)	(0.2174)	(0.2192)	(0.0544)	(0.0546)	(0.0553)
Rural	-0.0522	-0.0523	-0.0519	-0.0524	-0.0525	-0.0516	0.0935	0.103	0.1066
	(0.2588)	(0.257)	(0.2595)	(0.2582)	(0.2562)	(0.2593)	(0.0769)	(0.0771)	(0.0784)
Madrid	0.1584	0.1546	0.1601	0.1579	0.1543	0.1588	0.1964	0.1998	0.1997
	(0.3627)	(0.3628)	(0.3632)	(0.3622)	(0.3622)	(0.3643)	(0.1088)	(0.1086)	(0.112)
Car owner	0.3442	0.3503	0.3422	0.345	0.3513	0.3434	0.0867	0.0977	0.0987
	(0.2454)	(0.2444)	(0.246)	(0.245)	(0.2439)	(0.2458)	(0.0806)	(0.0817)	(0.0851)
Home owner	-0.2159	-0.2098	-0.2175	-0.2134	-0.2073	-0.2147	-0.1417	-0.1505	-0.1504
	(0.2986)	(0.2953)	(0.3)	(0.2974)	(0.2939)	(0.2994)	(0.0952)	(0.0958)	(0.099)
Prices	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: Standard errors in parenthesis.

General Conclusion

Along the course of her life, an individual formulates a large number of decisions, allocating her time to labor, consumption, or investment. In this process, she is constrained by different elements that impose themselves on her. These constraints can bind at very different scales: while individual-based characteristics, such as preferences, tastes, or ability lay at the very heart of the individual utility function, local-based factors such as local unemployment rates, neighborhood or peer effects also happen to play a role – though they are somewhat manipulable; finally, aggregate variables define the general state of the economy, such as unemployment, interest rates, or the structure of relative prices, conditioning the decision-making.

This dissertation documents the impact of macro-level constraints on individual decision-making. More specifically, it investigates various aspects of the individual adjustment responses to adverse aggregate economic shocks. A first important dimension is that individuals are generally not isolated in bearing the constraints brought by an adverse economic environment. They are engaged into various types of household structures, starting with the standard nuclear family. Although households are always part of the decision-making equation throughout the dissertation, the role played by this social structure in the context of an economic shock differs substantially along the chapters. Chapter 1 posits a unitary model of the household. Resources and allocation decisions are pooled. As a consequence, households allow for a wider set of possible allocation decisions: living in a household protects the individual because it relaxes the constraint imposed on her by adverse economic shocks. The added-worker is one example of the adjustment mechanisms available to the household. Chapter 2 implicitly conserves the unitary vision of the family, with the notable difference that youngsters have no power over the household formation, and may be limited in their right to decide. When the time comes to invest into education, the household thus enters as a constraint to the decision-making process. First, in a traditional Beckerian conception, the

parental background determines the availability and cost of financing. In addition, children may be an integral part of the shock-coping strategy formulated by the decision-makers, whose decisions can interfere with the standard human capital investment calculation. The intensity of this constraint varies with the business cycle. During booms, low interest rates provide a cheap alternative to parental funding. However, in abnormal times, markets for credit are constrained and the household shock-coping mechanisms generally come at cost of schooling. Finally, Chapter 3 posits a collective conception of the household: households pool and share resources respecting the Pareto efficiency, and individuals then maximize their own utility function (that can be altruistic). Households no longer collectively insure their members against asymmetric adverse economic shocks: on the opposite, adverse economic shocks shift the bargaining power within the household and determine the outcome of the resource sharing process.

In addition to the various dimensions of the household decision-making process, the dissertation provides insights on the effect of adverse economic shocks along different time lines. Chapter 1 concentrates on the immediate short-term subsistence adjustments in the intrahousehold allocation of time. However, even in very short term, temporary adjustments have proven to have large and persistent consequences in the long run on a wide range of economic and social outcomes. In this regard, Chapter 2 is insightful because it highlights how short term adjustments in human capital investment due to the business cycle play a role in explaining labor market outcomes of individuals, even years after the economic indicators have turned back to green. Last, Chapter 3 restrains to a short term analysis, but goes beyond the analysis of coping strategies and documents the consequences of adverse economic shocks on the intrahousehold redistribution of resources.

Using household labor and income data on the 2001 crisis in Argentina and household consumption data during the Great Recession in Spain, the dissertation highlights that labor supply, investment in schooling and consumption decisions are significantly altered by extreme variations in the business cycle. In response to the negative shock affecting their husbands' earnings, Argentine wives increase their participation on the labor market by 4.4 percentage points (8 percent). In the longer run, unlucky cohorts graduating during the recession years experience a large persistent negative effect of the economic conditions upon graduation on their lifetime labor market outcomes, which adds up to the temporary income loss. For each additional percentage point in the unemployment rate at time of graduation,

mandatory school graduates are 4.5 percentage points less likely to be employed at the time of the survey. High school and college graduates experience a persistent impact on their lifetime earnings. Looking at the investment into education, young Argentine men entering the labor market between 1995 and 2011 are responsive to the standard Beckerian incentives and delay their entry on the labor market when the economic environment is depressed. Last, the consumption patterns of Spanish men and women reveal that over the course of the Great Recession, the distribution of resources within the household shifted: the share accruing to Spanish wives for their private consumption increased by 5-6 percent.

The main takeaway of the dissertation is the key role played by the household in the way shocks are passed over to individuals. Along this line, the literature is still scarce, but expending at a rapid pace, and the dissertation proposes a broad scope for future research.

First, it stresses the important role of households in the transmission of shocks to the individual; however, it remains silent about the way households form and dissolve. Household formation may be endogenous to the risk-sharing or the bargaining, and the modeling of household formation could be integrated into future research on coping strategies or bargaining issues.

Second, the dissertation introduces several models aiming at understanding the various aspects of the interplay between the household structure and the individual decision-making. A drawback of this approach is that there is no articulation between the mechanisms developed in Chapter 1 and 3. A fruitful area for future research would be to embed the modeling of labor supply within the collective model of consumption, bringing the added worker into the literature on bargaining power. Indeed, in normal times, labor supply and consumption decisions should be modeled jointly because consumption depends on resources in time (leisure) and money (income). This relation is even more important in a period of economic distress. On the consumption side, adaptative coping strategies are even more time consuming when monetary resources are scarce. More importantly, the labor market adjustments such as the added worker effect are directly related to the bargaining process within the household, in at least two dimensions. First, the relative improvement of the opportunities for secondary workers on the labor market plays the role of a 'threat point' out of the family: the added worker should not arise. On the other hand, the attachment to the labor market increases the bargaining power of spouses, because they benefit from their own source of income, so that the added worker effect should increase the bargaining power of the wife.

From the above discussion, it is clear that a joint modeling of labor supply and consumption would yield interesting implications; however, so far, no collective model has attempted to model the added worker.

Last, a natural extension to Chapter 3 would be to extend the analysis to couples with children, and to measure whether the shift in resources also arises for this type of family structure. Here, the issue at stake is whether the shift in the resource share from the husband to the wife translates into an increase in the resource share for the private consumption of children, measured alternatively with clothing and education expenses. Such an extension would add to Chapter 2 by shedding additional light on the interplay between the business cycle and the family background in explaining investment choices in education.

Résumé

ALLOCATION INTRAFAMILIALE DES RESSOURCES EN SITUATION DE CRISE

Laurine Martinoty

INTRODUCTION

Le temps est une ressource finie accessible à tout être humain dans la limite de vingt-quatre heures par jour, et ce durant toute sa vie. À la différence d'autres ressources rares, le temps est une ressource équitablement distribuée, et les choix d'allocation de ce temps déterminent largement le bien-être des individus et de leurs familles. Cependant, il serait irréaliste d'ignorer le fait que l'infinie variété des motivations individuelles, ainsi que l'incommensurable nombre de combinaisons possibles de biens et services, sont en fait contraints par l'environnement dans lequel les individus sont nés et évoluent durant leur vie. D'abord, cet environnement leur fournit un certain niveau de *capabilités* : en effet, l'accès aux services vitaux, à l'éducation, ainsi qu'aux marchés de capitaux n'est pas également distribué entre les individus. Ensuite, les individus sont exposés à un certain degré de *vulnérabilité* : les individus prévoyants engagés dans une prise de décision intertemporelle font face à un environnement risqué – voire incertain. Ainsi, dans l'ensemble, tout individu est exposé un jour ou l'autre à des chocs négatifs – chocs de santé, insécurité alimentaire, chocs de revenu, guerres civiles, catastrophes naturelles, qui peuvent être idiosyncratiques ou agrégés, et qui ont potentiellement des conséquences dramatiques sur le court et le long terme.

Cette thèse cherche à analyser divers aspects de la prise de décision individuelle en présence de chocs négatifs agrégés non anticipés qui bouleversent le paysage économique

des agents. À la différence des chocs idiosyncratiques, les chocs agrégés s'imposent aux individus, et l'idée que les chocs agrégés sont exogènes vis-à-vis des choix individuels est au cœur des stratégies d'identification. Les conséquences des chocs négatifs agrégés sur les ménages en terme de pauvreté et de vulnérabilité ont été souvent documentés. Beaucoup moins d'écrits ont été consacrés aux mécanismes intrafamiliaux qui sous-tendent les réponses à ces chocs négatifs, aux conséquences de long terme de ces réponses, et à la redistribution au sein de la famille liée à ces chocs.

Cette thèse contribue à cette réflexion de manière essentiellement empirique. Elle est construite sur deux exemples de crises économiques importantes : la crise argentine de 2001-2002, et la crise espagnole suivant la récession mondiale de 2008-2009. Le premier chapitre est consacré à l'allocation du travail des femmes mariées dans le contexte de la crise économique argentine. Le deuxième chapitre modélise les choix d'allocation entre l'école et la production de marché le long du cycle économique argentin, avec l'idée que le résultat de ce calcul peut différer selon l'état de l'économie au moment de la remise du diplôme. Le troisième chapitre a trait à l'évolution des choix de consommation des célibataires et des couples espagnols durant la récession de 2009, ce qui permet d'inférer les conséquences de la récession sur la redistribution intrafamiliale des ressources.

Les trois chapitres ont une perspective temporelle très différente vis-à-vis de la catastrophe économique. Le premier chapitre a trait aux ajustements immédiats de participation sur le marché du travail des femmes argentines en couple suite à la crise économique. Le second chapitre se concentre sur les conséquences négatives de long terme d'obtenir son diplôme dans une économie en déclin. Enfin, le troisième chapitre met en évidence les conséquences de la récession de 2009 sur la redistribution des ressources entre époux en Espagne.

Chapitre 1

'Mécanismes intrafamiliaux de gestion de crise : l'effet travailleur additionnel durant la crise économique argentine de 2001'

Le premier chapitre s'intéresse à une stratégie de marché spécifique formulée en réponse à la crise, communément désignée dans la littérature économique comme l'effet 'travailleur additionnel' (ci-après ETA). Trouvant son origine dans un ouvrage de Woytinsky en 1940, l'hypothèse d'un ETA dit que dans l'éventualité d'un choc portant sur le chef de ménage dans une famille, des travailleurs secondaires pourraient entrer sur le marché du travail comme des substituts imparfaits afin de générer un revenu permettant de lisser la consommation à l'échelle du ménage. Utilisant une base de donnée argentine entre 2000 et 2002, le chapitre montre que l'ETA joue une rôle important dans la gestion des chocs agrégés, même dans les cas où l'effet de découragement domine à l'échelle macroéconomique. Selon une opinion répandue dans la littérature économique, la décision des femmes de participer au marché du travail est endogène aux revenus de leur mari, car comme le dit l'adage 'qui se ressemble s'assemble', et parce que l'arbitrage travail-loisir est une décision jointe à l'intérieur de la famille. Je surmonte ces problèmes en utilisant la crise économique de 2001-2002 en Argentine comme une expérience naturelle. J'instrumente la variation endogène des situations des chefs de ménage sur le marché du travail utilisant l'effondrement de l''Ère de la Convertibilité' comme une expérience naturelle, et mesure son effet causal sur l'offre de travail des épouses.

Dans ce cadre analytique, je montre que les femmes dont le mari fait l'expérience de la diminution moyenne de revenu (perd son travail) ont 4.4 points de pourcentage plus de chance d'entrer sur le marché du travail (43 points de pourcentage). Sur quatre nouvelles participantes, trois d'entre elles travaillent au moins une heure par semaine, et l'une d'entre elles trouve même un emploi à temps plein. Une analyse des effets hétérogènes montre que l'ETA concerne essentiellement les familles appartenant aux premiers quantiles de la distribution des revenus. L'ETA est divisé par deux si le ménage est propriétaire de sa maison. Il est statistiquement égal à zéro si la perte de revenu du chef de ménage est compensée – au moins partiellement – par des allocations-chômage. Dans une perspective plus large, l'ETA détecté avec cette méthode est plus élevé que l'ETA mesuré à travers une élasticité croisée standard, ce qui confirme la piètre performance de cette variable dans la compréhension de l'ETA. L'ETA au niveau microéconomique (+ 4.4 points de pourcentage) est plus élevé que

l'augmentation de participation observée au niveau macro (+ 1 point de pourcentage), ce qui suggère un effet de découragement fort sur la participation des femmes dont le mari est relativement peu exposé. Les résultats sont robustes à des définitions alternatives de l'instrument, à un test placebo, à un test d'attrition vis-à-vis des variables d'intérêt, ainsi qu'à une analyse de sensibilité des résultats à la définition de la participation des femmes prenant en compte des facteurs variables dans le temps.

Chapitre 2

'Conditions initiales et intégration sur le marché du travail : l'effet cohorte persistant des diplômés durant une crise économique'

La littérature économique récente sur les pays développés souligne les effets persistants voire permanents liés au fait d'obtenir son diplôme durant une période de récession. Existe-t-il vraiment des cohortes 'chanceuses' et 'malchanceuses' dans les pays émergents ? Combien d'années d'expérience sur le marché du travail sont requises pour compenser la pénalité initiale liée à l'obtention du diplôme dans une économie en perte de vitesse ?

Une combinaison de facteurs – une volatilité plus haute du cycle économique, couplée à une sécurité sociale réduite à peau de chagrin, et à un marché du travail à deux vitesses – suggère que les économies émergentes devraient être particulièrement exposées à un possible 'effet cohorte', à savoir le fait que les nouveaux diplômés d'une même cohorte subissent statistiquement un sort identique sur le marché du travail. La mesure de l'ampleur de cet effet cohorte est importante, car les cohortes chanceuses et malchanceuses font face à des conditions extrêmement diverses en terme d'employabilité et de profil de revenu du travail, mais ne devraient pas être pénalisées d'un point de vue de justice sociale. Jusqu'à maintenant, seules quelques études ont tenté d'expliquer pourquoi l'effet des conditions initiales persiste dans les économies émergentes. Ce relatif désintérêt s'explique par deux éléments, à savoir la primauté de l'urgence sur les analyses de long terme quand les filets de sécurité en matière de santé et de nutrition sont fragiles ou inexistants, et l'opinion communément admise selon laquelle cette question ne peut être abordée sans données de panel de qualité.

Le chapitre 2 montre qu'il est possible d'extraire une quantité substantielle d'information à partir de données transversales standard. J'utilise les données de l'enquête *Encuesta Permanente de Hogares* entre 1995 et 2012. Je me concentre sur un sous-échantillon d'hommes actifs nés en Argentine, diplômés entre 1995 et 2011. À partir des années d'obtention de diplôme, je reconstitue le profil de salaire et l'employabilité des différentes cohortes selon leur niveau de diplôme : diplômés de l'école obligatoire, diplômés de l'école secondaire, diplômés de l'enseignement supérieur. Je peux ensuite comparer les niveaux d'employabilité et les profils de salaire des différentes cohortes par niveau d'éducation.

D'abord, j'observe que les conditions actuelles sur le marché du travail sont corrélées avec les conditions passées, ce qui suggère qu'il existe un effet cohorte quantitativement similaire

à l'effet observé dans les économies développées. Alors que les diplômés de l'enseignement obligatoire sont affectés *quantitativement* par une probabilité d'emploi moins élevée qui persiste jusqu'à dix ans après l'entrée sur le marché du travail, les diplômés du secondaire et du supérieur sont plutôt affectés de manière *qualitative* par un salaire moins élevé qui indique que le contenu de la tâche est moins élaboré.

Ensuite, je considère le cas où les individus choisissent leur niveau de diplôme de manière endogène. J'estime le modèle avec un double probit sous observabilité partielle, qui permet de contrôler l'impact des décisions séquentielles d'éducation. Quand la sélection est prise en compte, la persistance de l'effet cohorte est encore plus importante. Ceci indique que la composition de l'échantillon tend à biaiser le paramètre estimé à la baisse.

Enfin, je me concentre sur les données qualitatives reportées par les salariés employés au moment de l'enquête, et fournis des pistes de compréhension au sujet des mécanismes qui sous-tendent la persistance de l'effet cohorte. Le schéma complexe de corrélations entre les conditions initiales au moment de l'obtention du diplôme et les caractéristiques actuelles de l'emploi suggère que pour les diplômés du supérieur, l'écart de salaire entre cohortes dépend d'un différentiel de longue haleine en capital humain spécifique lié à un mauvais appariement lors du premier poste. Les diplômés de l'école obligatoire semblent davantage souffrir d'un marché du travail fondamentalement dual, et se trouvent durablement piégés dans des contrats de travail précaires. Dans les deux cas, la mobilité entre firmes paraît jouer un rôle stratégique important dans le processus de rattrapage. En effet, la propension à rechercher une nouvelle occupation tout en étant en emploi paraît modérer l'effet des conditions initiales sur le salaire actuel.

Chapitre 3

'La maison en crise : modifications de distribution intrafamiliale liées à l'homme-cession'

Co-écrit avec Olivier Bargain

Il est de connaissance commune que les chocs économiques agrégés affectent le bien-être des ménages de manière importante. De plus, puisque les ménages ont un accès inégal aux stratégies de gestion des chocs, les ménages pauvres tendent à être davantage vulnérables face aux chocs négatifs, ce qui implique que ceux-ci contribuent à creuser les inégalités. Alors qu'il existe des preuves tangibles des effets redistributifs des crises économiques entre les ménages, on sait peu des changements relatifs de bien-être au sein de ces ménages. Une quantité possiblement importante de la redistribution en jeu au niveau individuel est tout simplement ignorée. Cette question est particulièrement cruciale pour les débats ayant trait au bien-être des époux au sein du couple, ou au bien-être des enfants par rapport aux choix d'allocation des ressources effectués par les parents.

Au moins deux raisons viennent justifier l'absence de contribution scientifique claire sur cette question. D'abord, la théorie économique considère généralement que la prise de décision d'un ménage est conceptuellement équivalente au mécanisme guidant les choix individuels. Elle ignore les interactions stratégiques au sein du ménage. C'est encore plus vrai dans le contexte d'une crise économique, puisque la vision unitaire est alors exacerbée : le ménage est d'abord vu comme un rempart contre les conséquences délétères du choc négatif. Ensuite, cette vision unitaire a laissé son empreinte sur la manière dont les données de consommation sont collectées : les données de consommation sont récoltées au niveau du ménage, ce qui rend difficile la mesure de la redistribution des ressources au sein de la famille.

La récession économique de 2009 a souvent été décrite comme une 'mancession' ou 'homme-cession' dans des pays comme les États-Unis, l'Irlande, ou l'Espagne. Même si hommes et femmes ont souffert de la crise économique, ce sont les hommes qui ont été davantage exposés au chômage et aux restrictions salariales, car ils sont davantage représentés dans les secteurs comme la construction, l'industrie ou les services financiers. À ce jour, on ne sait rien sur la manière dont cette 'homme-cession' s'est propagée dans la famille. Plus généralement encore, on ne sait rien de la manière dont les opportunités sur le marché du travail affectent la redistribution au niveau du ménage.

Afin d'étudier ces questions, nous exploitons une évolution exogène du contexte économique favorisant les femmes en Espagne. Nous utilisons les données de consommation *Encuesta de Presupuestos Familiares* collectées par l'institut statistique espagnol INE entre 2006 et 2011. Nous adaptons puis testons un modèle collectif de consommation qui nous permet de tester des facteurs de distribution originaux. En particulier, nous faisons varier la règle de partage avec le risque régional relatif homme-femme d'être au chômage durant la 'homme-cession'. Examinant plus spécifiquement le choc sur le secteur de la construction, largement dominé par l'emploi masculin, nous suggérons une estimation par double différence imbriquée dans le modèle structurel. Les estimations indiquent que la 'homme-cession' a un impact important sur la manière dont les ressources sont partagées dans le ménage. En moyenne, suite à l'amélioration relative de leurs conditions sur le marché du travail, la part des femmes dans les ressources du ménage augmente de 5-6 pour cent dans les couples stables. Quantitativement, l'effet du risque de chômage est plus important que l'effet distributionnel de l'entrée *effective* au chômage de l'époux. Les estimations par double différence confirment que l'effet est mené par le secteur de la construction. Sur la période, les femmes dont le mari travaille dans ce secteur connaissent une évolution spectaculaire de leur part, entre 5 et 12 pour cent.

Conclusion

Au long de sa vie, un individu formule un grand nombre de décisions, alloue son temps au travail, à la consommation, aux investissements. Dans ce processus, il se trouve contraint par plusieurs éléments qui s'imposent à lui. Ces contraintes interviennent à différents niveaux : alors que les caractéristiques individuelles, comme les préférences, les goûts, le talent se trouvent au cœur-même de la fonction d'utilité individuelle, les facteurs locaux comme le taux de chômage local, les effets de voisinage et autres effets de pairs jouent également un rôle important. Enfin, le taux de chômage national, les taux d'intérêt ou la structure des prix relatifs définissent la santé générale de l'économie et conditionnent la prise de décisions.

Cette thèse documente l'impact de contraintes macroéconomiques sur la décision individuelle. Plus spécifiquement, elle s'intéresse à divers aspects des ajustements individuels en réaction aux chocs économiques agrégés. Une première dimension a trait au fait que les individus ne sont pas isolés dans leur confrontation avec les contraintes imposées par leur environnement. Ils sont engagés dans différents types de ménages, en commençant par la famille nucléaire. Malgré le fait que les ménages fassent toujours partie du processus de décision, le rôle de cette structure sociale diffère selon les chapitres de la thèse. Le chapitre 1 repose sur un modèle unitaire du ménage. Les ressources sont mises en commun. En conséquence, le fait de vivre au sein d'un ménage permet à l'individu d'avoir accès à un éventail plus large de choix d'allocation. Vivre dans un ménage protège l'individu car la contrainte qui pèse sur lui est relâchée. L'effet travailleur additionnel est l'un des exemples des stratégies d'ajustement à portée des ménages. Le chapitre 2 conserve une vision unitaire de la famille, avec la différence notable que les jeunes n'ont pas de pouvoir de décision sur la formation du ménage et sont généralement limités dans leurs choix d'allocation du fait de la contrainte financière des ménages sur lesquelles ils ont peu de prises. Quand arrive le moment de choisir un niveau d'investissement en éducation, le ménage apparaît comme une contrainte dans le processus de décision. D'abord, dans une tradition *beckerienne*, l'environnement familial détermine l'accès et le coût du financement. De plus, les enfants peuvent faire partie intégrale des stratégies de gestion de chocs économiques formulées par les preneurs de décision au sein du ménage. Dans une logique de court terme, leurs décisions peuvent interférer dans le calcul standard d'investissement en capital humain. L'intensité de cette contrainte varie donc avec le cycle économique. Durant les périodes de relance et de croissance, les taux d'intérêts

faibles donnent accès au marché du crédit pour un faible coût, ce qui constitue une alternative intéressante au financement parental. Pendant les périodes plus difficiles, les marchés du crédit fonctionnent mal et les stratégies des ménages sacrifient l'éducation des enfants. Enfin, le chapitre 3 suppose une conception *collective* de la famille. Les ménages mettent en commun leurs ressources et les partagent de manière Pareto-efficiente selon une règle de partage qu'il convient de percer à jour. Les individus maximisent ensuite leur propre fonction d'utilité, qui peut être égoïste ou altruiste. Les ménages ne sont plus une assurance collective contre les chocs économiques asymétriques : à l'opposé, les chocs négatifs influencent le pouvoir de négociation au sein du ménage et déterminent le résultat du processus de partage des ressources entre époux.

En complément des diverses dimensions de prise de décision des ménages, la thèse revient sur les effets d'un choc économique négatif selon des perspectives temporelles différentes. Le chapitre 1 se concentre sur les conséquences de court terme des chocs économiques en matière d'allocation du temps au sein de la famille. Cependant, même dans le très court terme, les ajustements temporaires ont des conséquences importantes dans le long terme sur une série de variables économiques et sociales. Le chapitre 2 fournit des éléments de réflexion à ce sujet en s'intéressant aux investissements en capital humain qui varient avec le cycle des affaires. En ce sens, le cycle économique joue un rôle dans les différentes réalisations individuelles sur le marché du travail, et ceci des années après que les voyants économiques soient revenus au vert. Enfin, le chapitre 3 se restreint à une analyse de court terme, mais va plus loin que la simple analyse des stratégies de gestion de crise pour documenter les conséquences des chocs économiques négatifs sur la redistribution au sein des ménages.

Le principal résultat de cette thèse est que le ménage joue un rôle clé dans le passage des effets de la crise du niveau agrégé vers le niveau individuel. La littérature économique à ce sujet est encore éparse, mais se développe à un rythme soutenu. La présente thèse débouche sur plusieurs voies possibles de recherche. D'abord, elle met l'accent sur les ménages dans la transmission des chocs aux individus, mais reste silencieuse sur la manière dont ces ménages se forment (et disparaissent). La formation et la dissolution des ménages peut être endogène au partage de risque ou au processus de négociation intrafamilial. La modélisation de la formation des ménages pourrait être intégrée dans une future recherche sur les stratégies de gestion de crise ou sur la redistribution intrafamiliale.

Ensuite, la thèse introduit plusieurs modèles permettant de comprendre les relations entre structures de ménage et prise de décision individuelle. Le revers de cette approche est qu'il n'y a que peu d'articulation théorique possible entre les mécanismes développés dans les chapitres 1 et 3. Une direction fructueuse pour de futures recherches serait d'imbriquer la modélisation de l'offre de travail dans le modèle collectif de consommation, ce qui créerait un pont entre la littérature du travailleur additionnel et celle du pouvoir de négociation. En effet, les décisions de travail et de consommation peuvent être modélisées de façon jointe car le niveau et la structure de la consommation dépendent des ressources en temps (loisir) et argent (revenu). Cette relation est encore plus importante en période de récession. En effet, du côté de la consommation, les stratégies adaptatives de consommation sont d'autant plus consommatrices en temps que les ressources monétaires sont rares. De plus, les ajustements du marché du travail comme l'effet travailleur additionnel sont directement liés au processus de négociation au sein du ménage, au moins suivant deux dimensions. D'abord, l'amélioration relative des opportunités pour les travailleurs secondaires sur le marché du travail peut jouer le rôle d'un 'point de menace' hors de la sphère familiale. De surcroît, l'attachement au marché du travail accroît le pouvoir de négociation des épouses qui bénéficient de leur propre source de revenu. Cette discussion montre bien l'intérêt à modéliser de manière jointe offre de travail et consommation. Jusqu'à aujourd'hui, aucun modèle collectif n'a mené ces deux modélisations de front.

Une dernière extension possible au chapitre 3 serait d'ouvrir l'analyse aux couples avec enfants, afin d'évaluer dans quelle mesure le déplacement des ressources intervient également dans les ménages de ce type. Dans ce cas, l'enjeu est de comprendre si un transfert mari-femme se traduit en un transfert favorable à la consommation privée des enfants, qui pourrait être mesurée à travers l'habillement ou les dépenses en éducation. Une telle extension viendrait ajouter des éléments de compréhension sur les mécanismes intrafamiliaux de décision d'investissement en capital humain, et en ce sens fournirait un complément d'analyse au chapitre 2 dans la compréhension des interrelations entre milieu parental et investissement en éducation.

Mots-Clés : allocation des ressources, offre de travail, travailleur additionnel, rendement de l'éducation, cycle économique, choc négatif agrégé, modèle collectif, consommation des ménages, partage intrafamilial des ressources, crise économique de 2008, Argentine, Espagne.
Classification JEL : C32, C65, E42, F41, O40, O54.

INTRAHOUSEHOLD ALLOCATION OF TIME AND CONSUMPTION DURING HARD TIMES.

Laurine Martinoty

Abstract

Time is a finite resource available to each and every human being in the limit of twenty-four hours per day, over the course of his life. Unlike other scarce resources, time is an equally distributed resource, and the choices in the allocation of time largely determine the welfare of individuals and their families.

Nonetheless, it would be unrealistic to ignore the fact that the infinite variety of individual motivations, as well as the incommensurate possibilities for bundles of goods and services, are constrained by the environment in which the individuals are born and evolve during their life. First, this environment provides the individuals with a certain level of *capabilities*: indeed, the access to basic vital services, education, as well as capital market is not equally distributed across individuals. Then, individuals are exposed to a certain degree of *vulnerability*: forward-looking individuals involved in intertemporal decision-making face at best a risky environment, and in the worst case scenario live in a fundamental uncertainty regarding future realizations. As such, every individual around the globe is vulnerable to adverse shocks – health shocks, food insecurity, income shocks, civil unrest, natural catastrophes, which can be idiosyncratic or aggregate, and which can have dramatic short and long-term consequences.

The present work aims at analyzing various aspects of the individual decision-making in the presence of unexpected, adverse aggregate shocks which dramatically modify the economic environment of agents. Unlike idiosyncratic shocks, aggregate shocks impose themselves over individuals, and the idea that aggregate shocks are exogenous to individual choices is at the core of the estimations. The consequences of adverse aggregate shocks on households in terms of poverty and vulnerability has been repeatedly documented. Far less has been said about the intrahousehold mechanisms driving the responses to these adverse shock, about the long term consequences of these responses, and about the redistribution within the family.

The contribution is essentially empirical, and builds on two examples of important economic downwards: the Argentine crisis of 2001-2002, and the Spanish crisis during the Great Recession of 2009. The first chapter concentrates on the *labor allocation* of married women in the context of the Argentine crisis. The second chapter models the *time allocation between schooling and market production* along the Argentine business cycle, with the idea that the outcome of this trade-off may differ according to the state of the economy at time of graduation. The third chapter relies on the *allocation of resources to consumption* of Spanish couples during the Great Recession to infer the consequences of the Great Recession on the intrahousehold redistribution.

The three chapter have a very different time scope with respect to the distress event. The first chapter deals with the immediate adjustments following the economic downturn on the labor participation of working age women engaged in a relationship. The second chapter concentrates on the *long term* negative consequences of graduating in a depressed economy. The study focuses on individual choices and outcomes. Finally, the third chapter sheds light on the *consequences* of the Great Recession on the redistribution of resources between spouses in Spain.

Chapter 1: 'Intrahousehold Coping Mechanisms in Hard Times: the Added Worker Effect in the 2001 Argentine Economic Crisis'

The first chapter deals with a specific market-oriented shock-coping strategy, commonly known in the literature as the 'added-worker' effect (henceforth AWE). Dating back to Woytinsky (1940), the AWE hypothesis states that in the eventuality of a shock on the primary earner in the household, secondary workers would enter the labor market as imperfect substitutes to smooth consumption profile at the household level. Using an Argentine panel dataset between 2000-2002, the chapter shows that the AWE plays an important role in coping against aggregate shocks, even in cases where the discouragement effect prevails at a macroeconomic scale. A standard view in the literature is

that women's participation decision is endogenous to her husband's earnings, for individuals marry alike, and because the labor-leisure trade-off is a joint decision within the household. I overcome this issue by using the 2002 economic crisis in Argentina as a natural experiment. I instrument the endogenous variation in the labor market outcomes of household heads using the collapse of the Convertibility era as a natural experiment, and measure its causal impact on their spouses' labor supply decisions.

Within this framework, I show that a woman whose husband experiences the average decline in income (resp. looses his job) is 4.4 percentage points more likely to enter the labor market (resp. 43 percentage points). Out of four new entrants, three work at least one hour weekly, and one even finds a full-time job. An heterogeneous analysis shows that the AWE essentially affects the 50% lower tail of the income distribution; the AWE is divided by 2 in case the household owns his house, and is statistically 0 in case the income loss is at least partially compensated with unemployment benefits. In a broader perspective, the AWE detected with this method is higher than the traditional cross-wage elasticity, suggesting such a proxy performs poorly. The AWE at the micro level (+ 4.4 p.p.)is higher than the actual increase in participation observed at the macro level (+ 1 p.p.), suggesting a strong discouragement effect on participation for women whose spouse is less exposed to shocks. Results are robust to alternative definitions of the instrument, a placebo test, a test for panel attrition with respect to variables of interest, as well as a sensitivity analysis on the definition of female participation checking for possible time-varying confounders.

Chapter 2: 'Initial Conditions and Lifetime Labor Market Outcomes: The Persistent Cohort Effect of Graduating in a Crisis'

The recent literature on industrialized countries highlights a persistent or even permanent penalty of graduating in a bad economy. Is there such a thing as a 'lucky' cohort in developing countries? How many years of experience on the labor market are requested to compensate for the initial wage penalty of graduating in a depressed economy?

A combination of factors – a higher volatility of the business cycle, coupled with an embryonic social safety net and a deeply divided two-tier labor market – suggests that emerging economies should be particularly concerned with the 'cohort effect', namely, the fact that graduates from a same cohort statistically have a common fate on the labor market. Measuring the extent of a cohort effect for emerging economies is important, because lucky and unlucky cohorts face dramatically different opportunities in terms of lifetime employability and earnings. So far, only a handful of papers have undertaken the task to document the persistence puzzle for emerging economies. At the origin of this gap lies the common belief that good quality panel data is an absolute requirement.

Chapter 2 shows that it is possible to extract a substantial amount of information form a very standard household cross-sectional survey data. Using *EPH* data between 1995-2012, I focus on a subsample of active working age males born in Argentina, who graduated between 1995 and 2011. I reconstitute the wage profile and employment probability of various cohorts of mandatory school graduates, high school graduates, and college graduates, based on their graduation year, so that I can compare their wage profiles and employability. First, I observe that current labor market outcomes are indeed correlated with past initial conditions, suggesting a cohort effect similar in magnitude to the effects observed for the developed economies. While mandatory school graduates are affected quantitatively through a persistently lower employment probability lasting up to ten years after completion, high school and college graduates are penalized by a permanently lower wage rate indicating that the qualitative content of the task is lower. Then, I implement a double selection probit with partial observability to control for the sequential schooling decisions. When accounting for the selection, the persistent effect is even higher, indicating that the sample composition biases the observed persistence downwards. Finally, I concentrate on the qualitative data reported by wage earners at time of survey, and attempt to provide some intuition regarding the mechanisms driving the persistence. The intricate pattern of correlations between initial conditions upon graduation and the current characteristics of the job suggests that for college graduates, the wage gap depends on a long-lasting differential in task-specific human capital related to an initial mismatch in skills at first

placement. For mandatory school graduates, it seems that the fundamental duality of the Argentine labor market explains why individuals are durably trapped into bad quality contract types. In both cases, between-firm mobility seems to play a strategic role in the progressive catch-up: the propensity to be currently on-the-job search is found to mitigate the impact of bad initial conditions on the current wage.

Chapter 3: 'Crisis at Home: Mancession-induced Change in Intrahousehold Distribution', with Olivier BARGAIN

It is known that adverse aggregate economic shocks deeply affect the welfare of households in absolute terms. In addition, because households have an unequal access to risk management strategies, poor households simultaneously tend to be more vulnerable to shocks, so that adverse economic shocks are inequality-increasing. While there exists widespread evidence over the redistributive impacts of economic crises between the households, little is known about the changes in the relative welfare of individuals living in these households. A virtually substantial amount redistribution happening at the individual level is simply ignored. This question is particularly stringent for the debate over the relative welfare of men and women within the couple, as well as the welfare of children with respect to both parents' allocation choices. The reasons for this literature gap are twofold. First, the economic theory generally considers that the decision-making of a household should be conceptually equivalent to the mechanism driving individual choices, and ignores the strategic interactions at stake within the household. In the context of an economic crisis, this unitary vision is exacerbated, because family is primarily seen as an important risk-coping mechanism. Second, the unitary conception shows through the data collection process : consumption data are collected at the household level, so that the possibility to empirically measure the intrahousehold redistribution is limited.

The Great Recession has often been referred to as a 'mancession' in several countries including Spain and the US. Although women did experience substantial job losses during the recession, the crisis hit men harder than women for they were disproportionately represented in heavily affected sectors such as construction, manufacturing and financial services. To date, nothing is known about the way the mancession has translated within the household. More generally, we know little about how labor market opportunities affect intrahousehold distribution. To study this issue, we exploit the exogenous, gender-oriented evolution of the economic environment in Spain, using consumption data from 2006-2011. We adapt and estimate a collective model of consumption which allows testing original distribution factors. In particular, we allow the sharing rule to depend on regional-time variation in relative job opportunities during the mancession. Looking more specifically at the gender-differentiated shock from the construction sector, we also suggest a difference-in-difference estimation originally embedded in the structural model. We find that the mancession strongly impacts the way the resources are shared within the household. On average, following the improvement of their relative opportunities on the labor market, the resource share accruing to Spanish wives increased by around 5-6 percents in stable marriages. This effect is similar, in magnitude, to the distributional impact of actual husbands' unemployment. The difference-in-difference estimates confirm that most of the effect is driven by the construction sector.

Keywords: resource allocation, labor supply, added worker, return to education, business cycle, adverse aggregate economic shock, collective model, intrahousehold consumption decisions, sharing of resources, economic crisis of 2008, Great Recession, Argentina, Spain.
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