Association between stock returns and accounting returns in emerging markets

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General Introduction

This dissertation on emerging markets is driven by the one fundamental question, i.e., is there any association between accounting data and market values in the high-risk and volatile emerging market countries? This topic is important because the investment flows to emerging markets are material[1].Net portfolio investment to emerging markets was very small before 1980, the investment started escalating after words. Financial liberalization in 1989 served as lubricant and private portfolio investment exceeded the US$ 10 billion and reaching to US$14.9 billion. Many factors contribute to this rapid development, like; (i) macro economic development and poverty reduction. (ii) cross border capital flows to emerging markets[2]. According to Dominic Wilson and Roopa Purushothaman of Goldman Sachs[3]:

- In less than 40 years, the BRICs economies together could be larger than the G6 in US$ terms. By 2025 they could account for over half the size of the G6. They are currently worth less than 15% of the current G6, only the US and Japan may be among the six largest economies in US$ terms in 2050.
- The largest economies in the world (by GDP) may no longer be the richest (by income per capita), making strategic choices for firms more complex.
- As today's advanced economies become a shrinking part of the world economy, the accompanying shifts in spending could provide significant opportunities for global companies. Being invested in and involved in the

[1] Bruner Robert F., Conroy Robert M., Wei Li, O'Halloran Elizabeth F., Lleras Miguel Palacios. (2003). "Investing in Emerging Markets." The research foundation of AIMR (CFA Institute). (2003).
[2] Global development finance.(2005) p.33-34,p.14.
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[3] Wilson Dominic, Purushothaman Roopa. (2003). "Dreaming with BRICs: The Path to 2050." Global Economics Paper No.99.October, 2003. GS Global Economics website.

right market – particularly the right emerging markets– may become an increasingly important strategic choice.

In a recent Harvard Business Review article[4], Jeffery R. Immelt, Vijay Govindarajan and Chris Trimble have said:

- The model that GE and other industrial manufacturer have followed for decades – developing high-end products at home and adapting them for other markets around the world-won't suffice as growth slows in rich nations.
- To tap opportunities in emerging markets and pioneer value segments in wealthy countries. Companies must learn reverse innovation: developing products in countries like China and India and then distributing them globally.
- If GE doesn't master reverse innovation, the emerging giants could destroy the company.

These facts, findings and projections set the stage to understand the investment dynamics in emerging markets. Accounting data plays pivotal role in this regard. In this research, we have studied the link between accounting data and market values mainly Ohlson (Ohlson J., 1995), Feltham and Ohlson (Feltham & Ohlson, 1996), Ohlson & Juettner-Nauroth (Ohlson & Juettner-Nauroth, 2005), and Ohlson & Zhan Gao (Ohlson & Gao, 2006) models keeping in view the specific conditions that prevail in emerging market economies and important to the rest of the world.

According to Ohlson (Ohlson J., 1995) model, the present non-accounting information affects the future abnormal or residual income, autoregressively. The confabulation about the Ohlson model for equity valuation starts from the present value of expected dividend, equating it to price. This is also known as

[4] Jeffery R. Immelt, Vijay Govindarajan, Chris Trimble. (2009). "How GE is Disrupting itself." Harvard Business Review, October, 2009.

the first assumption of the Ohlson model. Clean surplus relation, that relates book value to net earnings and dividends is cardinal to accounting based valuation models, is the second assumption of the Ohlson (Ohlson J., 1995) model. Linear information model is the third assumption of the model and according to this both abnormal earnings and non-accounting information are autoregressive. To ring the curtain down, the firm’s market value equals its book value adjusted for the current profitability as measured by abnormal earnings and future profitability as measured by other information. In the same token, the Feltham-Ohlson (Feltham & Ohlson, 1996) dissertate how accrual accounting relates to the valuation of firm’s equity and goodwill. Ohlson Juettner-Nauroth OJ (2005) and Ohlson & Zhan Gao (2006) papers’ discuss the relationship of market value to earning and earnings growth.

The interest in this subject is primarily motivated by practical considerations. Investments in the international equity markets have become significant for fund managers worldwide. The use of methods based on comparison of basic observed ratios, for listed companies, between stock prices and expected earnings per share is often considered the most powerful: “EPS forecasts represented substantially better summary measures of value than did OCF forecasts in all five countries examined, and this relative superiority was observed in most industries ” (Liu, Nissim, & Thomas, 2007). Understanding the link between market value and expected earnings is likely to illuminate the investment process in countries where information is more difficult to collect for foreign investors.

The second motivation is theoretical in nature. It focuses on the relationship between book values and market values. The valuation models based on residual earning (R.I.M.) and abnormal earnings growth (A.E.G.) provide a supportive link between expected future earnings, book value of equities and their market value in the case of RIM, and between expected future earnings, expected dividends and market values in the instance of A.E.G. The pioneer models of Ohlson (Ohlson J., 1995) or of Feltham and Ohlson (Feltham & Ohlson, 1996), for example, suggest a linear relationship between market value, book value of equity per share, expected earnings per share and finally a variable summarizing the effects of other information on the future earnings. The question is whether an extension of the R.I.M models likely to capture the abnormal growth of earnings enabling to establish a link between the book value and market value of equity, at least in certain circumstances.

In case of A.E.G., the pioneering model of Ohlson and Juettner-Nauroth (Ohlson & Juettner-Nauroth, 2005) claims that only the expected earnings for the next two-years and expected dividend are sufficient. The empirical evidence is not conducive to this hypothesis (Gode & Mohanram, 2003), (Penman, 2005). The question is whether an extension of the model A.E.G.(Abnormal Earnings Growth) proposing more fine decomposition of the abnormal earnings growth in volume and intensity provides a better estimate of the link between expected earnings and stock price of a share.

From the perspective of R.I.M., we begin our study by extending the theoretical R.I.M. models. The objective is first to integrate the evolution of abnormal earnings depending upon the type of growth experienced by the firm. The modeling takes into account the possibility of change in the regime of growth at a point in time. It also supposes that the capacity of the firm to conserve the profit for its shareholders, the largest share of wealth created by growth opportunities, depend upon the importance of equity in the balance sheet. Finally, we have been careful not to accept the hypothesis of the relationship called "clean surplus." By integrating these elements, we hope to improve the measurement of the relationship between book value of equity and its market value.

From the empirical stand point, three samples are constructed for the period 1997-2007. They include companies from the United States, other developed countries (Australia, Canada, France, Japan and United Kingdom) and a set of emerging countries (China, Korea, Hong-Kong, India, Malaysia, Singapore, Taiwan and United Kingdom). Our goal is to propose a comparison at international level. From historical accounting data, we construct a synthetic indicator of growth by company. We then proceed to estimate our model by including these variables of growth and other control variables (size, no dividends, year and country). The objective is to verify that the inclusion of the book value of equity not only improves the explanatory power but also the specification of the estimated regression.

From the point of view of A.E.G., we begin our study with a theoretical extension of the model A.E.G. Aware of the fact that the models of type AEG are complex in their inner mechanics (Brief, 2007), we want to make development of the profitability in the form of a progressive realization of a set of growth opportunities. To do this, we take an idea developed by Walker and Wang (2003) in a different context, that of R.I.M. (Residual Income Models). As Walker and Wang, we bring together the microeconomic analysis and modeling of accounting earnings. But we do so as a part of valuation based on taking into account expected earnings and especially their growth.

On the empirical side, three samples are formed over the period 1998-2008. They include American companies, firms from other developed countries (Germany, Australia, Canada, France, Japan, and the United Kingdom) and a set from emerging countries (China, Korea, Hong Kong, India, Malaysia, Singapore, Taiwan and Thailand). Our objective is to provide an international comparison. From historical accounting data, we build a synthetic indicator of growth by company. We, then, proceed to estimate our model by incorporating the variables of expected earnings (in level and in variation), this synthetic variable of growth and other control variables. The objective is to verify (1) that the anticipated effects of abnormal earnings growth are limited in time, (2) that the inclusion of the synthetic variable for growth makes a significant correction when the variable of growth in the short-term alone is insufficient, (3) that the values implicit of cost of capital are acceptable from an economic stand point.

Emerging market economies is a term coined by Antoine W. Van Agtmael of the International Finance Corporation in 1981of the World Bank, an emerging, or developing market economy is defined as an economy with low-to-middle per capita income. Such countries constitute approximately 80% of the global population, representing about 20% of the world's economies. Initially, in 1981, the International Finance Corporation's emerging market index includes only 9 countries; by 2007[5], the total number of countries had reached to 36. Standard and Poor's acquired the IFC indexes in January, 2000. The S&P/ IFC index consider a market "emerging", if it meets the following two criteria:

- It is a low, lower middle, or upper- middle-income economy as defined by the World Bank.
- Its investable market capitalization is low relative to its most recent GDP figures.

The first chapter of this dissertation is theoretical in nature. This chapter presents an introduction to Residual Income valuation (R.I.M.) model and

[5] Standard and Poor Emerging Market Index (Index methodology).November,2007.

Abnormal Earnings Growth (A.E.G.) model as put forward by Ohlson (Ohlson J., 1995), Feltham Ohlson (Feltham & Ohlson, 1996), Ohlson & Juettner-Nauroth (Ohlson & Juettner-Nauroth, 2005) and Ohlson Gao (Ohlson & Gao, 2006).This presentation is supported by specific expansion to the model like inflation, default risk and growth opportunities. In the second section of this chapter, we discuss in detail Ohlson (Ohlson J., 1995) and Feltham Ohlson (Feltham & Ohlson, 1996) models with their specific assumptions. This section also contains some particular cases of Ohlson (Ohlson J., 1995) model like growth and firm value, shareholders' rent and firm value and probability of survival and firm value. In the third section, we discuss inflation, inflation accounting and inflation adjustment of residual income valuation (RIV) as proposed by John O'Hanlon and Ken Peasnell (2004). In the last part of this section, we present through example that the distortion of residual income depends upon the distortion of depreciation which leads us to the conclusion that the more volatile the inflation is, the more uncertain the value of residual income gets, because the accounting system undertaken will be having less time to adapt itself to the abrupt changes of inflation, i.e., the force of Ohlson (Ohlson J., 1995) model diminishes in the volatile inflationary environment. The fourth section of this chapter presents the abnormal earnings growth (A.E.G.) model. The Ohlson Gao (Ohlson & Gao, 2006) paper has been thoroughly discussed.

The second and third chapters are two separate papers. In the second chapter with the title, "The effects of growth on the equity multiples: An international comparison." We seek answers to two research questions. (i) Is the degree of association between book value and market value of equity a function of growth conditions and mode of financing of the company? (ii) Are these forms of association invariant around the world? The first section of this chapter is an introduction that carries motivation for the research sample selection and principal findings. The second section presents problematic and model. The source and evolution of Ohlson (Ohlson J., 1995) model to effectuate empirical work has detailed in this section. The third section presents data and descriptive statistics. The number of companies retained are growing from 7149 in 1997 to 17, 376 in 2007. Finally, the observations retained are 10,657 for U.S.A., 21, 290 for other developed countries and 20,604 for emerging countries. Descriptive statistics for the variables; Market value cum Dividend/Total Assets, Book value cum Dividend/Total Assets, Net Income/Total Assets , size and absence of dividend are presented for the three samples, i.e., U.S.A., other developed countries and emerging countries. Section 4 of this chapter extends the estimation of other explanatory variables like synthetic variable of growth inspired by the methodology of Haribar and Yehuda (Hribar & Yehuda, 2008) and the proportion of the phases of growth of the firms in three samples, i.e., U.S.A., other developed countries and emerging countries. The next part of this section introduce to methodologies used to calculate the dirty surplus and breakdown of observations by classes of dirty surplus and geographical zones. The section 5 presents the regression results. At first instance we observe that the irrespective of geographical zone net income is the variable most strongly associated with the market value. And, the introduction of book value of equity increases the explanatory power of the model but also modifies significantly the estimate of earnings and market value of equity. Two results emerge internationally, the low debt and high growth firms are better valued by the investors during the period. When companies are in debt, the growth in earnings does not systematically reflect by the increase in market value of equity. These empirical results confirm the prediction of our theoretical model.

Chapter 3 with the title, “What is the impact of abnormal earnings growth on the market valuation of the companies: An International comparison,” focuses on the following two research questions. (i) Knowing that the form of association between stock price and expected earnings per share depends on the type of growth of the company, that brings short term increase in expected earnings by financial analysts to explain differences in stock market value. (ii) Can an indicator of growth build on historical accounting data corrects the bias introduced by previous measure? Like chapter 2, the second section of the chapter contains the problematic and model. It introduces the idea developed by Walker and Wang (2003) to A.E.G. (Abnormal Earnings Growth) model to capture growth dynamics of the earnings. The second part of this section holds the development and the third part carries the empirical specification of the model. Data and descriptive statistics have been discussed in the section 3 of the chapter. The data is for the period 1998-2008 and include countries (Germany, Australia, Canada, France, Italy, Japan, United Kingdom, Sweden and USA) and emerging countries (Brazil, China, Korea, Hong Kong, India, Malaysia, Singapore, Taiwan and Thailand). In total, we have 12 603 firm years distributed for 8 776 to other developed countries and 3 827 for emerging countries. The number of observations are increasing over the period : 802 in 2001 and 1809 in 2008. The descriptive statistics are presented in Table 2 of this chapter and discussed in the second part of this section w.r.t., 3 samples and countries. The variable studied include: Market capitalization/Total Assets, Expected EPS/Total Assets per share, Expected EPS variation /Total assets per share, size, variation of sales over 2 years in %, variation of book value of equity in excess of net income over 2 years in % and ratio of investment over 2 years compared to depreciation allowances. Section 4 and Section 5 of this chapter presents the empirical results and robustness tests. The main findings from this research are: irrespective of geographical zone, expected earnings per share remains the variable most strongly associated with the stock market values. But, coefficients are high in developed countries than in emerging countries. At the second instance we note that the PER and PEG ratios combine in valuation, essentially, with in developed countries. These two indicators must be supplemented to avoid either over valuation or under valuation. Finally, at international level, the expected implied rates of return are significantly higher in emerging countries than in developed countries.

Chapter1: Residual Income (R.I.M.) and Abnormal Earnings Growth (A.E.G.) Models

Chapter1: Residual Income (R.I.M.) and Abnormal Earnings Growth (A.E.G.) Models

1. Introduction:

This chapter discusses the Residual Income Valuation Model (RIM) and Abnormal Earnings Growth model (AEG) as proposed by Ohlson (1995), Feltham Ohlson (1995), Ohlson & Juettner-Nauroth (2005) and Ohlson and Zhan Gao (2006), respectively. Beside this principal discussion, in this chapter, we propose different expansion to these models with special reference to inflation, default risk and growth opportunities. A long stream of literature on Ohlson (1995) and Ohlson-Feltham (1995) has been sought to understand the theoretical as well as empirical aspects of the models. Before embarking on our journey for the proposed models in this chapter, it is better to understand the Ohlson (1995) and Ohlson-Feltham (1995) models and to know where actually the models stand on evolutionary tree for capital market research.

Fundamental analysis involves study of a firm's current activities and prospects for the purpose of estimating its value. The objective here is that we know the factors like product demand, corporate strategy, industry outlooks etc. which are not incorporated in the accounting data also affects the firm value. But accounting remains as a base for all firm related decision making and research in accounting data help us to comprehend the fundamental analysis by providing us a link between firm accounts and its value. Hence, the Ohlson (1995) Model.

The technology presented in Ohlson (1995) Model is remarkably simple in nature and very interesting. It is about residual income and non accounting information which are autoregressive. The present non accounting information generates shocks which affect the future abnormal or residual income. Thus, in plain language, non accounting information generates shocks auto regressively which affects the abnormal earnings auto regressively.

Like Ohlson (1995) Model, the Feltham-Ohlson (1995) Model (FO) concerns how one conceptualizes a firm's expected growth with the accounting data reflecting its recent performance. As discussed in detail (later) in this chapter, the model presents the market value in terms of financial assets (liabilities), the expected changes in operating earnings, current operating assets and the expected change in operating assets.

While talking of historical background of the Ohlson (1995) and Ohlson-Feltham (1995) models, we find that the work done during 1960's provided a base for these models. The work of Edward and Bell (1961), Modigliani and Miller (1958), (1961), and Preinreich (1938) is worth to mention in this regard. Later, the contribution by Penman (1997) focuses the capital market research on the relation between accounting data and firm value, i.e., fundamental analysis. Numerous empirical studies based on the models purposed by Ohlson (1995) and Ohlson-Feltham (1995) validate the authenticity of the models. To quote some of them includes the work done by Dechow et al.(1999); Myres (1999) and Morel (2003); etc. Despite the fact that the researchers take some assumption while experimenting the models, the validity and authenticity of the models remains unquestionable.

The third section of this chapter examines Residual Income Valuation (RIV) model in inflationary environment of emerging markets. Various studies, up till now, have demonstrated the accuracy and superiority of RIV on other valuation models. In transitory and growth economies of emerging market countries, inflation is unavoidable. Hyperinflation in some of these countries makes accounting numbers unreliable to infer any sort of investment decision.

Valuation is at the centre-stage and in the spot light for all such decision making. This is the context that forces us to verify the authenticity of RIV in the inflationary and uncertain environment of emerging markets. Discussions about inflation are as perennial as changing climatic conditions. As soon as there is a price hike, intellectuals and professionals resume talking about the issue. Historically, we find that the issue remained in discussion during seventies and eighties quite frequently. Now, the studies on inflation appear once in a blue moon.

Accounting statements provide the input data for all sort of decision making. In the period of inflation, this information has been criticized on the ground that it reflects the number of dollars while the value of the dollar is changing. In short, "Inflation creates an earning illusion by mismatching of expenses based on allocation of historical cost with current revenues in determining earnings. This mismatching distorts mapping of aggregate earnings and book value into equity value such that value relevant information is lost." Hughs, Liu and Zhang (2004). This comparison of apples with oranges must be avoided. And, to have fair view apples must be compared with apples. Hence, inflation adjustment is necessary.

As for the question of whether residual income valuation (RIV) should be written in terms of inflation adjusted residual income rather than historical cost residual income. Two very recent studies are worth to mention, in this regard. First is the study by Ritter and Warr (RW) (2002) that claims that this practice can lead to miss valuation of firms. RW claim that for residual income models to produce accurate measures of true economic value "they should use real required returns, adjusted depreciation for the distorting effects of inflation, and make adjustment for leverage-induced capital gains" (Ritter and Warr, 2002, pp.59-60). Second, interesting work in this area is by O'Hanlon and Peasnell

(2004). Their work contradicts the work carried out by RW. They argue that in a setting in which accounting numbers and forecasts are normally presented in historical cost terms, the inflation adjustment of RIV is likely to bring unnecessary complications to the valuation process, which increased scope for errors. Their findings are briefly discussed, later, in this chapter.

Emerging market countries are growth economies. This phenomenon of growth makes it impossible to avoid inflation. Countries like Turkey used to have an exceptionally high inflation rate. This difference matters because inflation affects forecasted local cash flows and local discount rates. This is the reason that in certain countries of Latin America for example Brazil, financial statements are published both in nominal and inflation adjusted forms so that the readers can draw the rational inferences.

Comparative to residual income valuation model, which takes historical accounting data as input for equity valuation, earnings, earnings growth is frequently used by analysts for the same purpose. The relationship of market value to earnings and earnings growth is studied through two recent papers, i.e., Ohlson & Juettner-Nauroth (OJ) (2005) and Ohlson and Zhan Gao (2006). The fourth section of this chapter discusses the Ohlson and Gao (2006) paper. This paper is comprehensive in nature in a sense that it discusses the OJ (2005) valuation model and amplifies the results.

The rest of the chapter is arranged as follows. In section two we discuss Ohlson (1995) model and Feltham-Ohlson (1995) model with some particular cases. Section 3 presents the inflation and inflation, inflation adjustment of RIV and empirical inquiries of RIV from nominal, real and pure accounting angles. Section 4 covers the relationship of earnings growth and value and section 5 concludes this chapter.

2.1) The Ohlson Model

In this section we present the relationship between Ohlson Model and classical valuation models, i.e., present value of expected dividend and discounted cash flow and observe that all these models convert to Ohlson (1995) Model.

The discussion about the Ohlson Model for equity valuation starts from the present value calculation of expected dividends.

2.1.1) The Present Value of Expected Dividends.

Under the neo-classical multi-period framework (Fisher 1930), the market value of a firm's equity *P (t)* at year *t* equals the present value of expected dividends *d (t)* discounted at a constant factor *R*:

$$P(t) = \sum_{\tau=1}^{\infty} \frac{E\left[d(t+\tau)\right]}{(1+R)^{\tau}} \qquad \text{(PVED)} \rightarrow (1)$$

Where *E []* denotes the expectation operator. This model permits negative *d (t)* that reflects capital contributions. The *d (t)* should in fact be referred to as dividends net of capital contribution but we will keep referring it to simply dividends for the sake of brevity. PVED is an equilibrium condition. It is no-intertemporal arbitrage price that results when interest rates are non-stochastic, beliefs are homogeneous and individuals are risk neutral. ***PVED is also known as first assumption of Ohlson Model.***

2.1.2) Residual Income Valuation:

Central to the accounting based valuation models is the clean surplus relation (CSR) that relates book value bv (t) to net earnings x (t) and dividends.

$$
\begin{aligned}
& bv(t) \quad = bv(t-1) + x(t) - d(t) \qquad \text{(CSR)} \rightarrow (2) \\
\Leftrightarrow\ & d(t) \qquad = bv(t-1) + x(t) - bv(t) \\
\Leftrightarrow\ & d(t+\tau) = bv(t-1+\tau) + x(t+\tau) \rightarrow (3)
\end{aligned}
$$

CSR is the second assumption of the Ohlson Model. All the variables on the right hand side of CSR are primitive, so that the current dividend d (t) has no effect on current earnings x (t)

We, now, define residual income ax (t) as the difference between net income and capital charge at the discount rate R:

$$
\begin{aligned}
& ax(t) \qquad = x(t) - R\,bv(t-1) \\
\Leftrightarrow\ & ax(t+\tau) = x(t+\tau) - R\,bv(t-1+\tau) \rightarrow \text{(RI)} \rightarrow (4)
\end{aligned}
$$

Putting (4) in (3)

$$
\begin{aligned}
& \Rightarrow d(t+\tau) = bv(t-1+\tau) + ax(t+\tau) + R\ bv(t-1+\tau) - bv(t+\tau) \\
& \Rightarrow d(t+\tau) = bv(t-1+\tau) + ax(t+\tau) + R\ bv(t-1+\tau) - bv(t+\tau) \\
& \Leftrightarrow d(t+\tau) = (1+R)bv(t-1+\tau) + ax(t+\tau) - bv(t+\tau)
\end{aligned}
$$

Combining (PVED) and (RI) leads us to an alternative representation of the firm’s equity known today as the residual income valuation.

$$
P(t) = \sum_{\tau=1}^{\infty} \frac{E\left[(1+R)\ bv(t+\tau-1) - bv(t+\tau) + ax(t+\tau)\right]}{(1+R)^{\tau}}
$$

$$
\Leftrightarrow P(t) = \sum_{\tau=1}^{\infty} \frac{E\left[bv(t+\tau-1)\right]}{(1+R)^{\tau-1}} - \sum_{\tau=1}^{\infty} \frac{E\left[bv(t+\tau)\right]}{(1+R)^{\tau}} + \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+R)^{\tau}}
$$

Residual income is very similar in nature to a project’s NPV and Stewarts’s (1991) EVA (Economic Value Added), i.e., they are a measure of whether the company is creating or destroying value, with the difference that EVA is written in terms of operating income and book capital while residual income is written in terms of total income and book value.

$$\Leftrightarrow P(t) = bv(t) + \sum_{\theta=1}^{\infty} \frac{E\left[bv(t+\theta)\right]}{(1+R)^{\theta}} - \sum_{\tau=1}^{\infty} \frac{E\left[bv(t+\tau)\right]}{(1+R)^{\tau}} + \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+R)^{\tau}}$$

$$\Leftrightarrow P(t) = bv(t) + \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+R)^{\tau}} \rightarrow (\text{RIV}) \rightarrow (5)$$

This result was originally presented by Preinreich (1938).Equivalently to PVED, RIV shift focus from wealth distribution (dividends) to wealth creation (residual income). Equity valuation reconciles with Modigliani-Miller (1961) theory of dividend irrelevancy through RIV. Residual income valuation also looks attractive to accountants as it reconnects (financial) equity valuation to their long known concept of (accounting) good will, defined as the difference between the market value and book value of a firm.

Directly from the RIV, one can derive the following expression for the firm's good will g (t):

$$\Leftrightarrow \ \mathrm{g(t)} = P(t) - bv(t) = \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+R)^{\tau}} \rightarrow (6)$$

2.1.3) Linear Information Model:

Ohlson contribution lies in the additional specification of the time-series behavior of residual income. A simple linear information model formulates the dynamics of residual income and of information "other than" residual income $\nu(t)$.

$ax(t+1) = \omega\, ax(t) + v(t) + \varepsilon_1(t) \rightarrow (7)$
$v(t+1) \;\; = \gamma v(t) + \varepsilon_2(t) \rightarrow (8)$

Where the disturbance terms $\varepsilon_1(t)$ and $\varepsilon_2(t)$ are two zero-mean random variable and where the parameters ω and γ are fixed and known in the sense that the firm's economic environment and accounting principles determine ω and γ.We restrict ω and γ to be positive and less than 1 for stability.

The equation $v(t+1) \;\; = \gamma v(t) + \varepsilon_2(t)$ ***also know as the assumption three of the Ohlson (1995) model.*** According to this assumption both abnormal earnings and non accounting information are autoregressive. Further, non accounting information is an additive shock to next period's abnormal earnings. The non accounting information can be completely unpredictable (γ=0) or partially predictable (γ=1), but it must flow through abnormal earnings in the next period. The distinction between $v(t)$ and $\varepsilon_1(t)$ is that the $v(t)$ is partially forecastable while $\varepsilon_1(t)$ is completely non-forecastable. Note also that the non accounting shocks to abnormal earnings in period t becomes part of autoregressive process for abnormal earnings (ax (t+1)) going forward. Hence, non accounting information generates shocks auto regressively and these shocks flow through future abnormal earnings autoregressively. In this way the model handles non accounting information very nicely.

More specifically, $v(t)$ can be re-written as:

$v(t) = E\left[ax(t+1)\right] - \omega\, ax(t)$

And thus primarily interpreted as unpredicted growth.

One property of assumption 3 is that paying dividend reduces next periods earning by the amount the rate of interest the firm could have earned on the assets. To see this, substitute the definition of abnormal earnings into the (ax (t+1) process and rearrange to get the “normal” earning process.

$$x_{t+1} = (R-1)bv(t) + \omega ax(t) + \upsilon(t) + \varepsilon_{1t+1}$$

Recall that paying dividend reduces the current book value but has no effect on current earnings (by the clean surplus relation), so we have:

$$\frac{\partial E(x_{t+1})}{\partial d(t)} = -(R-1)$$

A dollar of dividends reduces next period’s expected earnings by the interest that could be earned on that dollar. (This last result is also sometimes referred to as Modigliani /Miller or MM property).

Let’s define the 2-by-2 matrix.

$$M = \frac{1}{(1+R)}\begin{pmatrix} \omega & 1 \\ 0 & \gamma \end{pmatrix}$$

LIM can be expressed as :

$$\begin{pmatrix} \text{ax(t+1)} \\ \nu(\text{t+1}) \end{pmatrix} = (1+R)M\begin{pmatrix} ax(t) \\ \nu(t) \end{pmatrix}$$

Under the expectation operator:

$$\text{E}\left[\begin{pmatrix} \text{ax(t+1)} \\ \nu(\text{t+1}) \end{pmatrix}\right] = (1+R)M\begin{pmatrix} ax(t) \\ \nu(t) \end{pmatrix}$$

Recursively, we have:

$$\text{E}\left[\begin{pmatrix} \text{ax(t+}\tau) \\ \nu(\text{t+}\tau) \end{pmatrix}\right] = (1+R)^{\tau} M^{\tau}\begin{pmatrix} ax(t) \\ \nu(t) \end{pmatrix}$$

Thus,

$$P(t) = bv(t) + \sum_{\tau=1}^{\infty} M^{\tau}\begin{pmatrix} ax(t) \\ \nu(t) \end{pmatrix}$$

The characteristic roots of the trignol matrix M are $\frac{\omega}{1+\text{R}}$ and $\frac{\gamma}{1+\text{R}}$.

Because the maximum charateristic root is less than one , the above M series converges and :

$$P(t) = bv(t) + M\left(1 - M\right)^{-1}\begin{pmatrix} ax(t) \\ \nu\left(t\right) \end{pmatrix}$$

where

$$\left(\text{1-M}\right)^{-1} = \frac{1+R}{\left(1+R-\omega\right)\left(1+R-\gamma\right)}\begin{pmatrix} 1+R-\gamma & 1 \\ 0 & 1+R-\omega \end{pmatrix}$$

Finally the Ohlson Model for equity valuation can be written as:

$$P(t) = bv(t) + \frac{\omega}{\left(1+R-\omega\right)}ax(t) + \frac{(1+R)}{\left(1+R-\omega\right)\left(1+R-\gamma\right)}\nu(t) \rightarrow \text{(OM)} \rightarrow (9)$$

We conclude that the firm's market value equals its book value adjusted for current profitability as measured by ax (t) and for future profitability as measured by $\nu(t)$.

2.1.4) Discounted cash flows (under risk neutrality) and Ohlson Model:

By definition,

$$bv(t) = oa(t) + fa(t); \quad x(t) = fx(t) + ax(t); \quad fx(t) = r.fa(t-1); \quad c(t) = ox(t) - oa(t) + oa(t-1)$$

$$fa(t) = fa(t-1) + fx(t) + c(t) - d(t) = (1+R)\,fa(t-1) + c(t) - d(t)$$

Where $fa(t)$ denotes the financial assets net of debt (most probably negative) and $oa(t)$ the operating assets (As from FO Model).

Each asset contributes to earnings:

$$x(t) = fx(t) + ax(t)$$

Where $fx(t)$ denotes the financial income and ax (t) the operating income, net of tax. Under risk neutrality, the risk less interest rate r is the rate to be used throughout the firm. Then,

$$fx(t) = r.fa(t-1)$$

At the end of the period, free cash flow c (t) from operation (net of capital expenditure)

$c(t) = ox(t) - oa(t) + oa(t-1)$

Are transferred to financial assets, leading to the following financial asset relation:

$$fa(t) = fa(t-1) + fx(t) + c(t) - d(t) = (1+R)\,fa(t-1) + c(t) - d(t)$$

Finally, PVED and FAR lead to the well-known discounted cash flow formula:

$$P(t) = \sum_{\tau=1}^{\infty} \frac{E\left[(1+r)\;fa(t+\tau-1) - fa(t+\tau) + c(t+\tau)\right]}{(1+r)^{\tau}}$$

$$\Leftrightarrow P(t) = \sum_{\tau=1}^{\infty} \frac{E\left[\,fa(t+\tau-1)\right]}{(1+r)^{\tau-1}} - \sum_{\tau=1}^{\infty} \frac{E\left[\,fa(t+\tau)\right]}{(1+r)^{\tau}} + \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+r)^{\tau}}$$

$$\Leftrightarrow P(t) = fa(t) + \sum_{\theta=1}^{\infty} \frac{E\left[\,fa(t+\theta)\right]}{(1+r)^{\theta}} - \sum_{\tau=1}^{\infty} \frac{E\left[bv(t+\tau)\right]}{(1+r)^{\tau}} + \sum_{\tau=1}^{\infty} \frac{E\left[ax(t+\tau)\right]}{(1+r)^{\tau}}$$

$$\Leftrightarrow P(t) = fa(t) + \sum_{\tau=1}^{\infty} \frac{E\left[c(t+\tau)\right]}{(1+r)^{\tau}} \rightarrow (\text{DCF}) \rightarrow (15)$$

DCF is thus formally equivalent to PVED and RIV under risk neutrality.

2.2) Feltham-Ohlson (1995) Model

The FO paper models how a firm's market value relates to accounting data that discloses results from both operating and financial activities. Broadly speaking the paper discusses how accrual accounting relates to the valuation of firm's equity and goodwill. The model takes four "flow" variables: operating earnings, (net) interest revenues(expenses), cash flows, and dividends and three "stock" variables from the balance sheet comprising of (net) operating assets (i.e., marketable securities minus debt), and book value (fa + oa).

Four kinds of analyses are presented in the model. The first set deals with values as it relates to anticipated realization of accounting data. The second set checks how value depends on contemporaneous realizations of accounting data. The third set verifies asymptotic relations comparing market value to earnings and book values, and how earnings relate to the beginning of period book values. The fourth set examines how conservative accounting influences the response of value to increments in various components of earnings and assets, subject to debits equals credits. Conservatism results in unrecorded goodwill and fundamentally affects the relations examined in the analysis presented in the paper. Goodwill can reflect either the understatement of the value of existing assets or the anticipation of future positive net present value investments.

2.2.1) Relation between value and expectations about future accounting numbers

In this model a firm, in a neo-classical setting, discloses accounting data at date t (t = 0, 1 …), pertaining to its operating and financial activities. The following variables are representative of data:

bv_t = book value of the firm's equity , date t

x_t = earnings for period (t-1,t)

d_t = dividends , net of capital contributon , date t

fa_t = financial assets, net of financial obligation, date t

i_t = interest revenues , net of interest expenses , for period(t-1, t)

oa_t = operating assets, net of operating liabilities , date t

ox_t = operating earnings for period (t-1, t)

c_t = cash flows realized from operatig activities ,net of investments in those activities , date t

P_t = Market value of the firm's equity, date t.

The model segregates the firm’s activities into financial and operating activities. The book value at date t is $bv_t = fa_t + oa_t$ and its period (t-1, t) earnings are $x_t = i_t + ox_t$

2.2.1.1) Clean surplus accounting:

The income statement and balance sheet reconciles via the clean surplus relation which is also ***the first assumption of the FO model and can be given from the following set of equations:***

$bv_t = bv_{t-1} + x_t - d_t$ (CSR) $\rightarrow$ (2) (As presented previously)
$fa_t = fa_{t-1} + i_t - d_t + c_t$ (FAR) $\rightarrow$ (10)
$oa_t = oa_{t-1} + ox_t - c_t$ (OAR) $\rightarrow$ (11)

2.2.1.2) Net interest relation

Net interest relation is the second assumption of the FO model and can be expressed from the following equation:

$i_t = (R-1)fa_{t-1}$ (NIR) $\rightarrow$ (12)

It determines the accounting for financial assets so that their book and market value coincide to equal fa_t for all t.

2.2.1.3) P_t equals PVED:-

$$P_t = \sum_{\tau=1}^{\infty} R^{-\tau} E_t\left[d_{t+\tau}\right] \rightarrow (1) \quad (\textit{As}\ \text{presented previously})$$

PVED is the third assumption of the FO model, the interpretation is same as of Ohlson (1995) Model.

2.2.1.4) Unbiased versus conservative accounting for operating assets:

Value of equity = Value of Financing Activities + Value of operating Activities

$= fa_t + [oa_t + g_t]$

Goodwill imply towards accounting for operating assets. This is because the financial activities have zero abnormal earning due to NIR.

Unbiased accounting obtains if : $E_t[g_{t+\tau}] \to 0$ as $\tau \to \infty$

Conservative accounting obtains if: $E_t[g_{t+\tau}] \supset 0$ as $\tau \to \infty$

Regardless of the dividend policy and the date t information.

2.2.2) Relation between value and current accounting numbers

This relationship is presented with linear information (**fourth assumption of FO model**) dynamics as below:

$$ox^a_{t+1} = \omega_{11} ox^a_t + \omega_{12} oa_t + \upsilon_{1t} + \varepsilon_{1t+1} \to (13); \quad oa^a_{t+1} = \omega_{22} oa_t + \upsilon_{2t} + \varepsilon_{2t+1} \to (14);$$
$$\upsilon_{1t+1} = \gamma_1 \upsilon_{2t} + \varepsilon_{3t+1} \to (15); \quad \upsilon_{2t+1} = \gamma_2 \upsilon_{2t} + \varepsilon_{4t+1} \to (16)$$

The random terms, $\varepsilon_{jt+\tau}$ satisfy the non-predictability, mean zero, condition $\mathrm{E}_t\left[\varepsilon_{jt+\tau}\right] = 0, j = 1,...,4$ t and $\tau \supset 0$. and a realization of these terms updates the information vector from $(ox^a_t, oa_t, \upsilon_{1t}, \upsilon_{2t})$ to $(ox^a_{t+1}, oa_{t+1}, \upsilon_{1t+1}, \upsilon_{2t+1})$ via four above equations.

To make sure the convergence / divergences of these variables, the following restrictions are imposed:

$(1)|\gamma_h| \prec 1, h = 1,2; (2) 0 \le \omega_{11} \prec 1; (3) 1 \le \omega_{12} \prec R$ and (4) $\omega_{12} \ge 0$.

Condition (1) ensures that the random events influencing other information have no long run effect on future other information, i.e., as $E_t[\upsilon_{ht+\tau}] \to 0 \, as \; \tau \to \infty, h = 1,2.$, Condition (2) restricts the (marginal) persistence in abnormal earning. The lower bound $\omega_{11} \geq 0$ eliminates implausible persistence. The upper bound $\omega_{11} \prec 1$, permits positive or zero persistence but that vanishes with time.

Condition (3) restricts growth in operating assets. The lower bound, implies $E_t\left[oa^a_{t+\tau}\right] = E_t\left[ox_{t+\tau}\right] = E_t\left[c_{t+\tau}\right] = 0$ as $\tau \to \infty$. The upper bound $\omega_{22} \prec R$ i.e., the requirement is necessary for absolute convergence in the present value calculations of expected abnormal operating earnings and expected cash flows.

Condition (4) represents the dichotomous possibilities of unbiased $(\omega_{12} = 0)$ versus conservative $(\omega_{12} \succ 0)$ accounting.

The valuation function can be expressed as:

$$P_t = bv_t + \alpha_1 ox^a_t + \alpha_2 oa_t + \beta.\upsilon_t \to (17)$$

where $\alpha_1 = \dfrac{\omega_{11}}{R - \omega_{11}}; \alpha_2 = \dfrac{\omega_{12} R}{(R - \omega_{22})(R - \omega_{11})}$ and $\beta = (\beta_1, \beta_2) = \left[\dfrac{R}{(R - \omega_{11})(R - \gamma_1)} \dfrac{\alpha_2}{(R - \gamma_2)}\right]$

The valuation function coefficients for operating assets and earnings, α_1 and α_2 are more important where as coefficient for other information β_1 and β_2 are less significant.

In the same way goodwill can be expressed as:

$$g_t = P_t + bv_t = \alpha_1 ox^a_t + \alpha_2 oa_t + \beta.\upsilon \to (18)$$

Unbiased accounting is equivalent to $\alpha_2 = \omega_{12} = 0$; conservative accounting is equivalent to $\alpha_{2,} \omega_{12} \succ 0$.

2.2.3) Asymptotic relations among value, value changes, and contemporaneous accounting numbers:

The use of asymptotic relations permits us to abstract from the idiosyncratic effects of information, thereby identifying on average relation. The following three relations are observed in the article:

1) Price/earnings relation; 2) Relation between change in value and accounting earnings;
3) Relation between book value and accounting earnings.

2.2.3.1) Price /earnings relation:

In a world of the conservative accounting, growth firms tend to have larger P/E ratios than no growth firms, and no growth firms tend to have the same ratios as firms using the unbiased accounting.

Conservative accounting $(\omega_{12} \succ 0)$ and growth (ω_{22}) imply :

$$\mathrm{E_t}\left[(P_{t+\tau} + d_{t+\tau}) - \phi x_{t+\tau}\right] \succ 0 \text{ as } \tau \to \infty$$

Unbiased accounting or no growth imply

$$\mathrm{E_t}\left[(P_{t+\tau} + d_{t+\tau}) - \phi x_{t+\tau}\right] \to 0 \text{ as } \tau \to \infty$$

$$where: \phi \equiv \frac{R}{R-1}$$

2.2.3.2) Relation between change in value and accounting earnings

Conservative accounting $(\omega_{12} \succ 0)$ and growth (ω_{22}) imply:

$$\mathrm{E_t}\left[(P_{t+\tau} + d_{t+\tau} - P_{t+\tau-1}) - x_{t+\tau}\right] \succ 0 \text{ as } \tau \to \infty$$

Unbiased accounting or no growth implies

$$\mathrm{E_t}\left[(P_{t+\tau} + d_{t+\tau} - P_{t+\tau-1}) - x_{t+\tau}\right] \to 0 \text{ as } \tau \to \infty$$

2.2.3.3) Relation between book value and accounting earnings

Assume: $d_{t+\tau} = x_{t+\tau} \quad \tau \succ 0$(full dividend payout).Then as $\tau \to \infty$

$$a)\mathrm{E_t}\left[x_{t+\tau}\right] \to (R-1)bv_t \text{ implies },\mathrm{E_t}\left[P_{t+\tau} - bv_{t+\tau}\right] \to 0 \text{ and } \mathrm{E_t}\left[\left(P_{t+\tau} + d_{t+\tau}\right) - \phi x_{t+\tau}\right] \to 0;$$

$$b)\mathrm{E_t}\left[x_{t+\tau}\right] \to (R-1)bv_t + \mathrm{K_t}, \mathrm{K_t} \in (0,\infty) \text{ implies},\mathrm{E_t}\left[P_{t+\tau} - bv_{t+\tau}\right] \succ 0 \text{ and } \mathrm{E_t}\left[\left(P_{t+\tau} + d_{t+\tau}\right) - \phi x_{t+\tau}\right] \to 0;$$

$$K = \omega_{11}\frac{R-1}{R-\omega_{11}}$$

$$c)\mathrm{E_t}\left[x_{t+\tau}\right] \to \infty \text{ implies} \mathrm{E_t}\left[P_{t+\tau} - bv_{t+\tau}\right] \succ 0 \text{ and } \mathrm{E_t}\left[\left(P_{t+\tau} + d_{t+\tau}\right) - \phi x_{t+\tau}\right] \succ 0;$$

Part (a) provides the bench mark relating price in an unbiased fashion to book value and earnings. Part (b) shows a bias in price relative to book value, but not in price relative to earnings. This is because the (expected) goodwill is positive but bounded due to no growth. Part (c) shows biases in both price relative to book value and price relative to earnings, i.e., goodwill grows exponentially, and this leads to understand change in book value.

2.2.4) Comparative dynamics: cash earnings versus accrued earnings

This section examines how an incremental dollar of cash operating earnings versus an incremental dollar of accrued operating earnings affects price. Please consider the following set of equations:

$$a)\Delta ox_t = 1, \Delta c_t = 1, \Delta oa_t = 0 \Rightarrow \Delta x_t = \Delta bv_t = \Delta fa_t = 1.$$

$$b)\Delta ox_t = 1, \Delta c_t = 1, \Delta oa_t = 1 \Rightarrow \Delta x_t = \Delta bv_t = \Delta fa_t = 0.$$

$$c)\Delta ox_t = 0, \Delta c_t = -1, \Delta oa_t = 1 \Rightarrow \Delta x_t = \Delta bv_t = \Delta fa_t = -1.$$

The impact of three types of changes on value and future expected earnings depends on whether the accounting is unbiased or conservative. Consider the following statements:

a) the accounting is unbiased;

$$b)\frac{\partial P_t}{\partial\ accrued\ earnings_t} = \frac{\partial P_t}{\partial\ cash\ earnings_t}; c)\frac{\partial P_t}{\partial\ investment_t} = 0;$$

$$d)\frac{\partial E_t\left[x_{t+1}\right]}{\partial\ accrued\ earnings_t} = \frac{\partial E_t\left[x_{t+1}\right]}{\partial\ cash\ earnings}; e)\frac{\partial E_t\left[x_{t+1}\right]}{\partial\ investment_t} = 0.$$

One replaces the ‘=’ signs in statements (b) through (e) with ‘$\succ$’ signs if accounting is conservative.

2.2.5) Conservative accounting and zero net present value investments

Goodwill can reflect either the understatement of the value of existing assets or the anticipation of future positive NPV investments. In this case unbiased accounting results in capitalization of the initial investment in operating assets. Conservative accounting, in contrast, results in capitalization of only a fraction of that investment and expensing of the remainder. As a result, conservative accounting, on average, results in low earnings in the early periods and large earnings in the later period.

2.3) Some Particular Cases:

From Ohlson (1995) model presented above we can derive the following set of equations:

Noting that $E_0\left[\tilde{X}_1^a\right] = \omega \cdot X_0^a + v_0$, we can write that $v_0 = E_0\left[\tilde{X}_1^a\right] - \omega \cdot X_0^a$.

(OM) equation becomes:

$$MV_0 = BV_0 + \left[X_0 - r \cdot \left(B_0 - X_0 + D_0\right)\right] \cdot \left[\frac{\omega}{R-\omega} - \omega \cdot \frac{R}{[R-\omega]\cdot[R-\gamma]}\right] + \left[E_0\left[\tilde{X}_1\right] - r \cdot BV_0\right] \cdot \frac{R}{[R-\omega]\cdot[R-\gamma]}$$

Please note that:

MV_0= Market value of equity

BV_0=Book value of equity.

Rearranging:

$$MV_0 = BV_0 \cdot \left[1 - \frac{[R-\omega\cdot\gamma]\cdot r}{[R-\omega]\cdot[R-\gamma]}\right] - X_0 \cdot \frac{R\cdot\omega\cdot\gamma}{[R-\omega]\cdot[R-\gamma]} + D_0 \cdot \frac{r\cdot\omega\cdot\gamma}{[R-\omega]\cdot[R-\gamma]} +$$
$$E_0\left[\tilde{X}_1\right] \cdot \frac{R}{[R-\omega]\cdot[R-\gamma]} \quad (19)$$

The above model present the advantage of attaching market value with two well-known accounting values, i.e., equity and net income, one financial variable total dividend and finally one estimated variable well followed by the analysts, i.e., estimated earnings. It may work for empirical results.

Noting, finally, only the price and some rearrangements the same model can be written as:

$$MV_0 = BV_0 \cdot \left[1 - \frac{r}{R-\omega}\right] + \frac{\overline{X_1}}{r} \cdot \frac{r}{[R-\omega]} + \frac{E_0\left[\tilde{X}_1\right] - \overline{X_1}}{r} \cdot \frac{r \cdot R}{[R-\omega]\cdot[R-\gamma]} \quad (20)$$

Where $\overline{X_1} = \omega \cdot [X_0 + (X_0 - D_0) \cdot r] + BV_0 \cdot r \cdot (1-\omega)$.

We can notice that this model is nothing but an extension of the OM equation.

2.3.1) Growth and firm value for shareholders:

The two preceding models have been developed from the hypothesis about the dynamics of total earnings expressed in monetary units but it is normal to decompose earnings as a product of a volume capital invested and rate of return.

In the previous models, the appraisal is done through capital invested BV. But nothing has been said about evolution of return on equity *ROE*.

The first model permitting the evolution of ROE. In fact, we can write:

$$ROE_t = \frac{X_t^a}{B_t - X_t + D_t} + r \quad \text{and} \quad ROE_{t+1} = \frac{\omega \cdot X_t^a}{B_t} + r$$

Noting $1+c=\frac{B_t}{B_t-X_t+D_t}$, the estimated growth in the capital, we get:

$$[ROE_{t+1}-r]=\frac{\omega}{1+c}\cdot[ROE_t-r]$$

It is clear that nothing is supposed in the previous model on dynamics of *c*. It may be varying. However, if c varies, it implies a negative variation and perfectly compensates the persistence of increase in *ROE* and the increase of the growth factor on cost of capital. Is it a reasonable hypothesis? This question can be answered only empirically.

2.3.2) Rent and Firm value for its shareholders:

One of the major critics on the previous modeling is in choosing an autoregressive model for residual income. One supposes that this residual income tends to 0 with time, meanwhile it is difficult to accept this idea that the company can generate investment opportunities at NPV zero. This supposes extremely strong condition of competition.

We purpose the following modeling in terms of *ROE*.

Posing:

$$E_0\left[\tilde{X}_t^a\right]=[k_t+h_t]\cdot BV_{t-1}$$

Where k_t is the part of ROE in increase of the cost of capital subject to disappear. And, h_t is permanent part.

$$\begin{aligned} k_{t+1} &= k_t\cdot\delta \\ h_t &= h_0 \qquad \forall t \end{aligned}$$

Finally supposing constant growth in capital:

$$BV_t = BV_{t-1} \cdot (1+c) \quad \forall t$$

And we can write:

$$E_0\left[\tilde{X}_t^a\right] = \delta^t \cdot k_0 \cdot BV_0 \cdot (1+c)^{t-1} + h_0 \cdot BV_0 \cdot (1+c)^{t-1}$$

It follows:

$$\sum_{t=1}^{\infty} E_0\left[\tilde{X}_t^a\right] \cdot R^{-t} = k_0 \cdot BV_0 \cdot \frac{\delta}{R - \delta \cdot (1+c)} + h_0 \cdot BV_0 \cdot \frac{1}{R-(1+c)} \quad (21)$$

On conditioning that $\delta \cdot (1+c) < R$

Knowing that $X_0^a = [k_0 + h_0] \cdot BV_0 \cdot (1+c)^{-1}$, we can write:

$$BV_0 = X_0^a \cdot (1+c) \cdot \frac{1}{k_0 + h_0} \quad (22)$$

Putting (22) in (21), we get:

$$\sum_{t=1}^{\infty} E_0\left[\tilde{X}_t^a\right] \cdot R^{-t} = \left[\frac{k_0}{k_0+h_0} \cdot \frac{\delta \cdot (1+c)}{R - \delta \cdot (1+c)} + \frac{h_0}{k_0+h_0} \cdot \frac{(1+c)}{R-(1+c)}\right] \cdot X_0^a$$

Or

$$\boxed{MV_0 = BV_0 + \left[\frac{k_0}{k_0+h_0} \cdot \frac{\omega}{R-\omega} + \frac{h_0}{k_0+h_0} \cdot \frac{(1+c)}{R-(1+c)}\right] \cdot X_0^a \quad (23)}$$

Posing $\omega = (1+c)$

Simply three coefficients come here: $\frac{\omega}{R-\omega}$ like previous $\frac{(1+c)}{R-(1+c)}$ and permanent part of ROE is access of $\frac{h_0}{k_0+h_0}$. This modeling has the advantage of being compatible with the hypothesis of projects having NPV positive. It supposes a reinterpretation of the coefficient affecting the residual income.

Estimated earnings can be expressed as:

$$E\left[\tilde{X}_1\right] = r \cdot BV_0 + \left[\delta \cdot k_0 + h_0\right] \cdot BV_0$$

and

$$X_0^a = \left[k_0 + h_0\right] \cdot BV_0 \cdot (1+c)^{-1}$$

We can deduce:

$$E\left[\tilde{X}_1\right] = r \cdot BV_0 + \left[\delta \cdot k_0 + \frac{X_0^a}{BV_0} \cdot (1+c) - k_0\right] \cdot BV_0$$

Or

$$E\left[\tilde{X}_1\right] = \left[r - k_0 \cdot (1-\delta)\right] \cdot BV_0 + X_0^a \cdot (1+c) \quad (24)$$

Same can be written as:

$$E\left[\tilde{X}_1\right] = r \cdot BV_0 + \left[\delta \cdot \frac{X_0^a}{BV_0} \cdot (1+c) - \delta \cdot h_0 + h_0\right] \cdot BV_0$$

or

$$E\left[\tilde{X}_1\right]=\left[r+h_0\cdot(1-\delta)\right]\cdot BV_0+\delta\cdot X_0^a\cdot(1+c)\quad (24')$$

Equation (24) and (24') permit us to express X_0^a as a function of BV_0 and $E\left[\tilde{X}_1\right]$. Introducing these in (23)[6], we get equation (25).

$$\boxed{\begin{aligned}MV_0 &= BV_0\cdot\left[1-\left\{\frac{k_0}{k_0+h_0}\cdot\frac{r}{R-\omega}+\frac{h_0}{k_0+h_0}\cdot\frac{r}{R-(1+c)}\right\}+\frac{k_0\cdot h_0\cdot(1-\delta)}{k_0+h_0}\cdot\left[\frac{1}{R-(1+c)}-\frac{1}{R-\omega}\right]\right]\\ &\quad+\frac{E_0\left[\tilde{X}_1\right]}{r}\cdot\left\{\frac{k_0}{k_0+h_0}\cdot\frac{r}{R-\omega}+\frac{h_0}{k_0+h_0}\cdot\frac{r}{R-(1+c)}\right\}\quad (25)\end{aligned}}$$

In a general case, we can observe that the sum of two coefficients is no more equal to one. We obtain a substantive accounting value more or less important according to the part of the increase of return subject to disappearing and its persistence.

Note that the Gordon-Shapiro model is just a particular case of equation (22).In fact, if k_0=0, we have:

$$MV_0=\frac{E_0\left[\tilde{X}_1\right]-c\cdot BV_0}{r-c}$$

Where $E_0\left[\tilde{X}_1\right]-c\cdot BV_0$ is distributed income.

6 (24') is used by multiplying X_0^a with $\frac{k_0}{k_0+h_0}\cdot\frac{\omega}{R-\omega}$ and (20) by multiplying with X_0^a

3) Modeling with the probability of survival:

Knowing that the present value of equity can be expressed as:

$$E_o = \frac{C_1 + E_1}{(1+k)} \to (26)$$

where :

E_o = Market value of equity at time 'o'; C_1 = Cash flow at time '1' ;k=Required rate of return on equity.

Now let π= Probability of survival in 'n'years

And (1-π)=Probability of failure with which(if occur) value of the company will be zero.

Value of equity with probability of survival can be expressed as:

$$E_o = \frac{\pi[C_1 + E_1]}{(1+k)} \Leftrightarrow E_o = \frac{[C_1 + E_1]}{\left(\frac{1+k}{\pi}\right)}$$

$$Let \quad 1+\rho = \frac{1+k}{\pi} \Leftrightarrow \rho = \frac{1+k-\pi}{\pi}$$

$$E_o = \frac{X_1 - B_1 + B_o + E_1}{1+\rho} \Leftrightarrow E_o = B_o + \frac{X_1 - B_o\rho + E_1 - B_1}{1+\rho}$$

$$\Leftrightarrow E_o - B_o = \frac{X_1 - B_o\rho}{1+\rho} + \frac{E_1 - B_1}{1+\rho}$$

Recursively we get:

$$\mathrm{E_o} - B_o = \sum_{t=1}^{\infty} \frac{X_t - B_{t-1}\rho}{(1+\rho)^t} \to (28)$$

Hence the desired equation for the residual income valuation with the probability of survival with in it.

We know from the clean surplus relation:

$$C_1 = X_1 - [B_1 - B_o] \to (\text{CSR}) \to (11)$$

where:

$\mathrm{X_1}$ = income at time '1' ;$\mathrm{B_o}$ = book value at time'o'.

$$\Leftrightarrow E_o = \frac{X_1 - B_1 + B_o + E_1}{(1+k)} \Leftrightarrow E_o = \frac{X_1 - B_1 + B_o(1+k) - B_o k + E_1}{(1+k)}$$

$$\Leftrightarrow E_o - B_o = \frac{X_1 - B_o k + E_1 - B_1}{(1+k)} \Leftrightarrow E_o - B_o = \frac{X_1 - B_o k}{(1+k)} + \frac{E_1 - B_1}{(1+k)}$$

In the same fashion we can write:

$$\Leftrightarrow E_1 - B_1 = \frac{X_2 - B_1 k}{(1+k)} + \frac{E_2 - B_2}{(1+k)}$$

Recursively we get;

$$\Leftrightarrow E_o - B_o = \sum_{t=1}^{\infty} \frac{X_t - B_{t-1}k}{(1+k)^t} \to (\text{RIV}) \to (27)$$

3 - INFLATION AND INFLATION ACCOUNTING

The discussion about inflation is not complete; unless and until, we are clear about the difference between general and specific price movements. A general price level change occurs when, on average, the prices of all goods and services in an economy change. Putting it differently, the monetary unit gain or loses purchasing power in general. An overall increase in the prices of goods and services is called inflation, a decrease is called deflation. While a specific price change refers to a change in the price of a specific commodity.

Under a historical cost-based system of accounting, inflation leads to two basic problems. First, many of the historical numbers appearing on the financial statements are not economically relevant because prices have changed since they were incurred. Second, since the numbers on the financial statements represent dollars expended at a different point in time and, in turn, embody different amounts of purchasing power, they are simply not additive.

During a period of inflation, asset values recorded on the books at their original acquisition cost seldom reflect their current (higher) value. The understatement of asset values leads to understated expenses and overstated income. From a managerial point of view, such overstatements distort (1) financial projections based on unadjusted historical time series, (2) budgets against which actual results are measured, and (3) performance data that fail to isolate the non controllable effects of inflation. Overstated earnings may in turn lead to:

- ❖ Increase in proportionate taxation
- ❖ Requests by shareholders for more dividends
- ❖ Demands for higher wages by labor or their representatives

- ❖ Disadvantageous actions by host governments (e.g., imposition of excess profits taxes)

Failure to adjust company financial data for changes in the purchasing power of the monetary unit also makes it difficult for statement readers and stakeholders to interpret and compare reported operating performance of the firm. In an inflationary period, revenues are typically expressed in currency with a lower general purchasing power (i.e., purchasing power of the current period) than applies to the related expenses. Expenses are expressed in currency with a higher general purchasing power because they are typical based on the later consumption of resources that were acquired when the monetary unit had more purchasing power. Subtracting expenses based on old historical purchasing power from revenues based on current purchasing power results in an inaccurate measure of income. Conventional accounting procedures also ignore purchasing power gains and losses that arise from holding cash and debt (or equivalents) during an inflationary period.

Purchasing power gains and losses arise as a result of holding net monetary assets or liabilities during a period when the price level changes. Monetary assets and liabilities include cash itself and other assets and liabilities that are receivable or payable in a fixed number of dollars. These include accounts and notes receivable and payable and also long-term liabilities. The potential for gain and losses is summarized in the Exhibit 1(below) where “net monetary assets” refers to total monetary assets exceeding monetary liabilities and the converse is true for “net monetary liabilities.”

<u>Exhibit-1</u>

Purchasing Power Gains and Losses

	State of the Economy	
State of Enterprise	Inflation	Deflation
Net Monetary Asset Position	Purchasing Power Loss	Purchasing Power Gain
Net Monetary Liability Position	Purchasing Power Gain	Purchasing Power Loss

Like monetary items are subject to a gain or loss as the price level changes, non monetary assets (real assets) are subject to gain or loss as a result of change in their value. Holding gains and losses on real assets can be divided into two parts: (1) monetary holding gain and losses, which arise purely because of the change in the general price level during the period; and (2) real holding gains and losses, which are the differences between general price-level-adjusted amounts and current values. Monetary holding gains and losses are capital adjustments only; they are not component of income. The disposition of real holding gains and losses is an important theoretical issue effecting the determination of income. This concept of holding gains and losses can also be classified from the point of view of realized and unrealized in the conventional accounting sense.

With the concept of holding gains and purchasing power gains and losses are in place. We now embark on inflation adjustment issues. From the emerging markets standpoint, we discuss the following model. To illustrate, let:

M=Monetary assets; N= Non monetary assets; L=Liabilities; E=Equity; i=Inflation rate.

Permanent assets include fixed assets, buildings, investments, deferred charges and their respective depreciation, amortization or depletion accounts.

Stockholders' equity accounts comprise capital, revenue reserve, revaluation reserves, retained earnings, and a capital reserve account used to record the price level adjustments to capital. The later result from revaluing fixed assets to their current replacement costs less a provision for technical and physical depreciation.

We can write:

$$M + N = L + E \rightarrow (1)$$

Multiplying both sides of Eq.1 by (1+i) quantifies the impact of inflation on the firm's financial position.

Thus:

$$M (1+i) + N (1+i) = L (1+i) + E (1+i) \rightarrow (2)$$

Eq.2 can be re-expressed as:

$$M + Mi + N + Ni = L + Li + E + Ei \rightarrow (3)$$

Regrouping Eq.3 as:

$$M + \underbrace{N + Ni}_{\substack{Permanent \\ assets \\ adjustment}} = L + \underbrace{E + Ei}_{\substack{Owners' \\ equity \\ adjustments}} + \underbrace{(L - M)i}_{\substack{Monetary \\ gain\ or\ loss}} \rightarrow (4)$$

Since M + N = L + E , then:

$$Ni = Ei + (L - M)i \rightarrow (5)$$

Or

$$\underbrace{Ni}_{\substack{Inflation \\ adjustment \\ to\ nonmonetary \\ (permanent) \\ assets}} - \underbrace{Ei}_{\substack{Inflation \\ adjustment \\ to\ owners' \\ equity}} = \underbrace{(L - M)i}_{\substack{Monetary \\ gain\ or\ loss}} \rightarrow (6)$$

A permanent assets adjustment greater than the equity adjustment produces a purchasing power gain, suggesting that a portion of the assets have been financed by borrowing. This concept of inflation adjustment is further explained through numerical illustration 1 in Exhibit 2.

BEAVER (1979) in his land mark article, “Accounting for inflation in an efficient Market” argued that one can get interpretable results from historical accounting values, i.e., by measure of ROE (return on equity) which give us nominal rate of return depending on the anticipated inflation adapted depreciation scheme. This development is presented in the Exhibit 2 through numerical illustration 2 and 3.

Exhibit-2

Numerical Illustration 1:

Assuming a firm with a financial position prior to monetary correction is:

Permanent assets	500	Liabilities	250
		Owners’ equity	250

With an inflation rate of 30% , a price level adjusted balance sheet would appear as:

Permanent assets	650	Liabilities	250
		Capital	250
		Capital reserve	75
		Monetary Gain	75

(This analysis assumes that liabilities are of the fixed rate variety where actual inflation rate exceed the expected rate that is incorporated in covenants of original borrowing.)

Numerical Illustration 2(BEAVER Adjustment to inflation) :

Income Statement	1	2
EBITDA	630	606.38
DA	475	525
EBIT	155	81.32
Interest	0	73.625
Tax	0	0
Net Income	155	155
Dividend	155	155
Balance Sheet		

Balance Sheet		
Fixed Assets	525	0
Cash	475	1000
Total Assets	1000	1000
Equities	1000	1000
ROE	15.5%	15.5%

Numerical Illustration 3:

Consider a firm with following financial information

Data								
Fixed assets	1000		Tax rate	0%	Int. real rate	10%	Payout	100%
Depreciation	475	525	Inflation rate	5%	Int. nom rate	15.50%		
Cash	0							
Equities	1000							
EBITDA (Constant)	700	650						

Income Statement (For period 1 and 2)			DCF 1	DCF 2	Σ
	1	2			
EBITDA	735	716.625	636.364	537.190	1173.554
DA	475	525.000		620.455	1173.554
EBIT	260	191.625			
Good will depreciation	78.099	95.455			
Interest	0	85.730			
Tax	0	0.000			
Net Incom	181.901	181.901			
Dividends	181.901	181.901		0	

Balance Sheet (dated 0, 1, 2)			
	0	1	2
Fixed assets	1000	525	0
Goodwill	173.554	95.455	0
Cash	0	553.099	1173.554
Equities	1173.554	1173.554	1173.554

ROE	15.50%	15.50%

Cash Flow Statement (for period 1 and 2)

	1	2
EBITDA	735	716.625
Interest	0	85.730
Tax	0	0.000
Dividends	181.901	181.901
Cash at beg.	0	553.099
Change	553.099	620.455
Cash end	553.099	1173.554

Explanation:

Numerical illustration 3 proposes an inflation adjusted depreciation plan to the firms. With all the information mention in the data section of the illustration 3, the following adjustment has been made to arrive at inflation adjusted depreciation plan.

1. The firm discounts its EBITDA at nominal rate for the considered periods.
2. The difference between aggregate of discounted cash flow and fixed assets value is the value of goodwill. This is added to the fixed assets to arrive at inflation adjusted value of fixed asset. In the absence of liabilities, a parallel increase can be observed in the equities.
3. The goodwill depreciation (the difference between two consecutive periods' goodwill) has been expensed in the income statement to arrive at the inflation adjusted net income.
4. The inflation adjusted value of net income and equities has been used to compute Return on Equities (ROE) which in turn equal to nominal rate.

3.1) INFLATION ADJUSTMENT OF RIV

In this section we summarize the findings of John O'Hanlon and Ken Peasnell (2004) which they presented in the article "Residual Income Valuation: Are Inflation Adjustment Necessary? They argue that, in a setting in which accounting numbers and forecasts thereof are normally presented in historical cost terms, the inflation adjustment of RIV is likely to bring unnecessary complications to the valuation process, with increase scope for error. They present two formulations of RIV, each of which is based on inflation –adjusted income measure that has appeared in prior literature. The first formulation is based on current cost residual income. The second is based on real current cost residual income, being current cost residual income less a purchasing- power capital maintenance charge. They demonstrate that each is equivalent to the standard historical cost of RIV; consequently, neither is any more correct nor any less correct than that standard formulation of RIV.

3.2) Residual Income –Based Valuation Using Historical Cost Numbers:

RIV has three foundations that is present value relationship (which is the corner stone of theory of asset valuation), clean surplus relationship and Residual Income denoted by the following expressions:

$$P_t = \sum_{\tau=1}^{\infty} \left(\frac{E_t\left(d\left(t+\tau\right)\right)}{\prod_{k=1}^{\tau}\left(1+R_{e,t+k}\right)} \right) \rightarrow (PVED)$$

Where P_t is the intrinsic value of equity at time t, $d\left(t+\tau\right)$ is the dividend net of new equity contribution at time $t+\tau$, $R_{e,t+k}$ denotes the nominal cost of equity applicable to the equity capital of time t+k-1, and $E_t\,|.|$ denotes expectations at time t. All transaction are assumed to occur at the end of the relevant period.

$$BV_{t+\tau} = BV_{t+\tau-1} + X_{t+\tau} - d_{t+\tau} \rightarrow (CSR)$$

Where *BV* denotes the book values of equity and *X* denotes the earnings.
Residual Income assumption is given by:

$$X^{a}_{t+\tau} = X_{t+\tau} - R_{e,t+\tau} BV_{t+\tau-1} \rightarrow (RI)$$

The combining PVED, CSR and RI generate the RIV:

$$P_t = BV_t + \sum_{\tau=1}^{\infty} \left(\frac{E_t \left| X^{a}_{t+\tau} \right|}{\prod_{k=1}^{\tau} \left(1 + R_{e,t+k}\right)} \right) \rightarrow (RIV)$$

As long as forecast accounting numbers conforms to CSR, the estimate of equity value given by RIV is equal to the estimate P_t, given by PVR.

The historical cost balance sheet of the firm as comprising real (non-monetary) depreciable assets measured at historical cost net of depreciation, net debt, and equity measured on historical cost basis. These three items are denoted by A^h, D, BV^h, respectively, where the superscript *h* indicates that the accounting numbers in question is measured on a historical cost basis. To avoid unnecessary computation, it is assumed that debt is measured on the same basis under historical cost and current cost accounting. The historical cost book value of shareholder equity at time $t+\tau$ is the excess (or shortfalls) of assets over debt:

$$BV^h_{t+\tau} = A^h_{t+\tau} - D_{t+\tau} \rightarrow (7)$$

Historical cost income for time $t+\tau$ denoted $X^h_{t+\tau}$ is represented as comprising historical cost net income excluding depreciation, denoted by $EBITD^h_{t+\tau}$, less historical cost depreciation, denoted $Dep^h_{t+\tau}$:

$$X_{t+\tau}^{h} = EBITD_{t+\tau}^{h} - Dep_{t+\tau}^{h} \rightarrow (8)$$

Historical cost residual income for $t+\tau$, denoted by:

$$X_{t+\tau}^{ah} = X_{t+\tau}^{h} - R_{e,t+\tau} BV_{t+\tau-1}^{h} \rightarrow (9)$$

Provided that forecasts of historical cost income, historical cost book value of equity and dividends articulate in accordance with the historical cost CSR given by:

$$BV^{h}{}_{t+\tau} = BV^{h}{}_{t+\tau-1} + X^{h}{}_{t+\tau} - d_{t+\tau} \rightarrow (10)$$

The value of equity can be written as:

$$P_t^h = BV_t^h + \sum_{\tau=1}^{\infty} \left(\frac{E_t \left| X_{t+\tau}^{ah} \right|}{\prod_{k=1}^{\tau} \left(1 + R_{e,t+k}\right)} \right) \rightarrow (RIV - H)$$

$$= P_t$$

RIV-H is the historical cost formulation of RIV, where P_t^h is the estimate of the value of equity at time t in terms of the historical cost book value of equity and forecasts of historical cost residual income, and is equal to the value estimate, P_t, given PVED.

3.3-Residual Income Using Inflation Adjusted Numbers:

In this section, the authors formulate a version of RIV based on two inflation adjusted residual income measures: (1) current cost residual income (2) real current cost residual income expressed in real terms as at the valuation date current cost residual income and real current cost residual income are derived from income measures appear in Edward and Bell (1961), and which required to be disclosed under Statement of Financial Accounting Standard No.33. For each inflation adjusted formulation, they show analytically that inflation, adjustment has no effect on the residual income based value estimate.

3.4-RIV on A Nominal Current Cost Basis:

The first inflation adjustment that the authors consider is restating income and residual income to a current cost basis. We follow the tradition in the literature of assuming that current cost will normally be defined as the cost of replacing the firm's assets. Note that fundamental is involved in changing from historical to current cost. The current cost book value of shareholder equity at time $t+\tau$ is as follows:

$$BV^c_{t+\tau} = A^c_{t+\tau} - D_{t+\tau} \rightarrow (11)$$

Where $A^c_{t+\tau}$ is the cost at time $t+\tau$ of replacing the non-monetary assets, based on the prices of those assets, and $BV^c_{t+\tau}$ is the book value of equity at time $t+\tau$ measured on current cost basis. Nominal current cost income for time $t+\tau$ is given by:

$$\begin{aligned} X^c_{t+\tau} &= EBITD^c_{t+\tau} - Dep^c_{t+\tau} + \pi_{t+\tau} A^c_{t+\tau-1} \\ &= X^h_{t+\tau} - ADep_{t+\tau} + \pi_{t+\tau} A^c_{t+\tau-1} \rightarrow (12) \end{aligned}$$

Where $Dep^c_{t+\tau}$ is the current cost depreciation charge based on the replacement cost of the related assets , $ADep_{t+\tau}$, is the adjustment required to convert the historical cost depreciation charge to a current cost charge at time $t+\tau$ (i.e. $Dep^c_{t+\tau} = Dep^h_{t+\tau} + ADep_{t+\tau}$) and $\pi_{t+\tau} A^c_{t+\tau-1}$, reflecting the periodic change in the current cost of the specific non-monetary assets, is sometimes referred to in the inflation accounting literature as holding gain (Scapens, 1981, p.61) or as a 'realizable cost saving' (Edward and Bell 1961) Nominal current cost. Residual income for time $t+\tau$ is given by:

$$\begin{aligned} X^{ac}_{t+\tau} &= X^{c}_{t+\tau} - R_{e,t+\tau}BV^{c}_{t+\tau-1} \\ &= X^{h}_{t+\tau} - ADep_{t+\tau} + \pi_{t+\tau}A^{c}_{t+\tau} - R_{e,t+\tau}BV^{c}_{t+\tau-1} \rightarrow (13) \end{aligned}$$

Provided that forecasts of current cost income, including holding gains and depreciation adjustments, current cost book value of equity and dividends articulate with each other in accordance with the current cost CSR given by:

$$BV^{c}{}_{t+\tau} = BV^{c}{}_{t+\tau-1} + X^{c}{}_{t+\tau} - d_{t+\tau} \rightarrow (14)$$

The value of equity can be written as:

$$\begin{aligned} P^{c}_{t} &= BV^{c}_{t} + \sum_{\tau=1}^{\infty}\left(\frac{E_t\left|X^{ac}_{t+\tau}\right|}{\prod_{k=1}^{\tau}\left(1+R_{e,t+k}\right)}\right) \rightarrow (RIV-C) \\ &= P_t = P^{h}_{t} \end{aligned}$$

RIV-C is the nominal current cost formulation RIV, where, P^{c}_{t} is the value estimate in terms of the current cost book value of equity and forecasts of nominal current cost residual income. P^{c}_{t} is equal to the value estimates, P_t and P^{h}_{t} since the accounting in each conforms to CSR.

3.5-RIV on A Real Current Cost Basis:

The transformation of nominal current cost residual income to real current cost residual income stated in real terms as at valuation date requires two adjustments. The first involves (1) deducting from nominal current cost income the amount by which opening equity needs to increase over the period in order for its beginning-of-period purchasing power to be maintained, and (2) replacing the nominal capital charge by its real counterpart as applied to the beginning-of-period equity restated in end-of-period purchasing power. This gives:

$$X_{t+\tau}^{c,real} = \left[X_{t+\tau}^{h} - ADep_{t+\tau} + \pi_{t+\tau} A_{t+\tau-1}^{c} \right] - \rho_{t+\tau} BV_{t+\tau-1}^{c} - r_{e,t+\tau} BV_{t+\tau}^{c} \left(1+\rho_{t+\tau}\right) \rightarrow (15)$$

Where $X_{t+\tau}^{c,real}$ is real current cost residual income at time $t+\tau$, $r_{e,t+\tau}$ is the period real cost of equity and $\rho_{t+\tau}$ is the periodic rate of change in the general price level for period $t+\tau$. Given the real cost of equity:

$$r_{e,t+\tau\equiv} \left(R_{e,t+\tau} - \rho_{t+\tau}\right) / \left(1+\rho_{t+\tau}\right) \rightarrow (16)$$

Rewriting (15)

$$X_{t+\tau}^{c,real} = \left[X_{t+\tau}^{h} - ADep_{t+\tau} + \pi_{t+\tau} A_{t+\tau-1}^{c} \right] - R_{e,t+\tau} BV_{t+\tau-1}^{c} \rightarrow (17)$$

From R.H.S of equation (14) and (17)

$$\text{Q.E.D } X_{t+\tau}^{c,real} = X_{t+\tau}^{ac} \rightarrow (18)$$

In other words, real current cost residual income is equal to normal current cost residual income. This equality is the key to an understanding of the equivalence between valuation approaches based on nominal and real residual incomes, holds because the nominal cost of capital used in arriving at the residual income capital charge already includes expected inflation, thus obviating the need to make a separate capital maintenance adjustment.

The second adjustment restates forecasts of real current cost residual income to real terms as at the valuation date, with appropriate adjustment to the cost of equity used to discount the forecasts. Real residual income at time $t+\tau$ stated in real terms as at the valuation date t is defined as follows:

$$X_{t+\tau}^{c,real,t} = X_{t+\tau}^{c,real} / \prod_{k=1}^{\tau}(1+\rho_{t+k}) \rightarrow (19)$$

Following (16), the real discount factor applicable to forecasts of this item is as follows (Fisher's parity)

$$\prod_{k=1}^{\tau}\left(1+r_{e,t+k}\right) = \frac{\prod_{k=1}^{\tau}\left(1+R_{e,t+k}\right)}{\prod_{k=1}^{\tau}\left(1+\rho_{t+k}\right)} \rightarrow (20)$$

Substituting (18), (19), and (20) into RIV-C enables the value of equity to be written as follows:

$$P_t^{c,real} = BV_t^c + \sum_{\tau=1}^{\infty}\left(\frac{E_t\left|X_{t+\tau}^{c,real,t}\right|}{\prod_{k=1}^{\tau}\left(1+r_{e,t+k}\right)}\right) \rightarrow (RIV-CR)$$

$$= P_t = P_t^h = P_t^c$$

RIV-CR is a formulation of RIV in terms of real current cost residual incomes stated in real terms as at the valuation date, t.

3.6-EMPIRICAL INQUIRIES ON RIV FROM NOMINAL, REAL AND PURE ACCOUNTING ANGLE

In the section of inflation, in this chapter, we have discussed the concepts of inflation and inflation accounting. For inflation accounting adjustments two concepts have been discussed in detail, i.e., inflation adjustment through non-monetary assets, equities and monetary assets (Eq.6) and Beaver (1979), inflation adjustment through an adapted depreciation scheme. This section discusses both of these inflation adjustments from historical, real, and fair value (current and real) values accounting point of view.

Before we go further in our developments, a vital point to be considered is that in the argument of Beaver (1979), neither we find the presence of residual income or abnormal earnings nor the concept of goodwill. Beaver has just emphasized on anticipated inflation adapted depreciation scheme. According to him, if one has this scheme one can get meaningful results in both historical and real accounting terms. In the absence of residual income and goodwill consideration, this result of Beaver is not sufficient while we are talking in the context of Residual Income Valuation.

From Exhibit 3, we can observe that by keeping the same depreciation scheme one may get the confusing results (this fact is highlighted in the Exhibit and corresponding numbers appear in bold) because ROE is varying from one period to another and there is no particular reason for that. The key point, here, is that the following relationship must hold as the finding of Beaver is the most important development in inflation accounting.

$$(1+ROE_H) = (1+ROE_R)(1+i) \rightarrow (21)$$

Where ROE_H mean return on equity in historical accounting, ROE_R stands for return on equity in real accounting and i is equal to inflation rate. So, we extend the finding of Beaver depreciation scheme in a way that it not only takes into account the expected inflation but also the expected goodwill. It is only then we have nominal measure equivalent to real measure plus inflation rate.

The values in historical accounting are not equal to the values of real accounting. Now the question is which method is best to follow. The answer to this is all depend upon the choice of a depreciation scheme and most important point is that the relationship in the equation 21 must hold. In the emerging market scene, we could not say as what firms had chosen as depreciation schemes, e.g., 475, 500 et cetera. The point is if they had chosen say 475 as depreciation this would definitely affect the residual income and fundamental relation.

In cases of current and fair value accounting there will be no residual income or abnormal earnings. And, in the absence of residual income the Ohlson (1995) model cannot be applied.

To investigate further, we present Exhibit 3.1 (which serve as a comparative advantage of the choice of a good depreciation scheme) by introducing 500 as depreciation for period 1.We can observe that the values of net income have changed to 235 in both historical and real accounting cases so is the value (on the left side of the exhibit) of residual income which is 85 for the period 1. And, this is true in the second period as well.

In Beaver’s (perfect) world, we have three accounting systems.

1. Historical Accounting System.
2. Real Accounting System.
3. Fair Value accounting i.e. inclusion of goodwill.

Fair value accounting provides nice figures (as we can see from the exhibit 3), in historical accounting system we have nominal ROE and in real accounting we have real ROE. In a perfect world (use of good depreciation scheme) values of assets in a balance sheet are fair values. To have the asset value of 525 in the second period, we must choose a good depreciation scheme. In this case the measure of residual income is exactly the same in both real and historical accounting which confirm the result of O’Hanlon and Peasnell (2004) paper, “Residual Income Valuation: Are Inflation Adjustment Necessary?”

Present accounting systems are deviating from the fair value of the assets and this deviation is large in the volatile inflationary environment. Hence, we must acknowledge as well that a complete fair value accounting system does not exist and from this view point the RIV (residual income valuation) model is useful. Saying it differently, the utility of the RIV model is maximum if the accounting systems are not based on fair value. In this situation, a part of goodwill is not measured by the accounting system. So, the residual income must differ from zero in period t_{n+1} from period t_n . That is the goodwill or residual income must not be inclined toward zero. It may be constant or positive. This is quite contrary to the basic assumption of Ohlson (1995) model. According to which the residual income must tend to zero as we progress in time.

From Exhibit 3.1, we can infer that the distortion of residual income depends upon the distortion of depreciation which leads us to the conclusion that the more volatile the inflation is, the more uncertain the value of residual income gets, because the accounting system under taken will be having the less time to adapt itself to the abrupt changes of inflation. In other words, the force of the Ohlson (1995) model diminishes in the volatile inflationary environment. It is quite difficult to have a proper residual income figure; in this case, since accounting number gets useless when inflation is volatile. The basic problem lies with the choice of good depreciation scheme and use of that scheme in the volatile inflationary environment.

4. Abnormal Earnings Growth

In the context of valuation of the firms future wealth generation and/or earning potential of the firms play a pivotal role. In the same vein the most frequently used heuristics by practitioner are price earning (P/E) ratio price earnings growth ratio (PEG).

The phenomenon of growth in earnings and their relationship to market value is studied through two main models in the literature. First is the Gordon-Shapiro (1956) model that assumes a constant growth in earnings and second is Ohlson Juettner-Nauroth (2005) model. This model was further studied and classified in a paper by James Ohlson and Zhan Gao (2006) with the title, "Earnings, Earnings Growth and Value." This paper reviews the OJ (2005) valuation model, its properties and expands on previous results by illuminating the issues not addressed, previously. This section briefly discusses the findings of Ohlson and Gao (2006) paper.

4.1) **The OJ Model : An Overview:**

Following are the main properties of the OJ (2005) Model:

1. In the OJ valuation framework, equity value depends on four variables:
   - (i) Next year's (FY_1) expected earnings(forward earnings);
   - (ii) Short-term growth in expected earnings, FY_2 vs. FY_1.
   - (iii) Long-term, or the asymptotic, growth in expected earnings; and
   - (iv) The discount factor, or the cost of equity capital.
2. According to the OJ (2005) model value should be equal to the present value of future expected dividends without depending on the specific dividend policy.
3. Short term and asymptotic measure of growth in expected earnings have a positive influence on the price to forward-earnings ratio.

4. The price to forward earnings ratio can be relatively large.
5. The short term growth in expected earnings might well exceed the cost of equity capital.
6. The accounting must be conservative.
7. One can infer cost of equity capital from price and analyst's forecasts.
8. As special cases and with added structures one can derive the valuation models like market to book model and free cash flow based on constant growth on residual earnings and free cash flow model, respectively.
9. The model is based on unexpected earnings, subsequent expected earnings and their growth.
10. Assumptions differentiating operating vs. financial activities hold.

4.2 Basics of the Models:

A broad set-up:

p_o = Price (or value) of equity at date zero(today)

x_t = Expected earnings for period t given today's information.

d_t = Expected dividends at date t given today's information

R_t = 1+r = the discount factor, i.e., r = cost of equity capital

b_t = Expected book value at date t, given today's information.

$x_t^a = x_t - r.b_{t-1}$ = Expected residual earnings for period t, given today's information.

Assuming:

(i) There is only one share outstanding at all points in time.

(ii) Firm has only one owner at all points in time so that d_t can be negative as well as positive.

Present value of expected dividends is given as:

$$p_o = \sum_{t=1}^{\infty} R^{-1}\ d_t \rightarrow (PVED)$$

Where:

R > 1 is a fixed constant.

Knowing that firm's risk and risk-free rate influence the discount factor R. It can be thought of as an internal rate of return that equals price.

Consider the following equality:

$0= y_o+R^{-1}(y_1-Ry_o)+R^{-2}(y_2-Ry_1)+$ …………

$0= y_o+\sum_{t=1}^{\infty} R^{-1}(y_t - Ry_{t-1}) \rightarrow (4.1)$

Expression (4.1) holds for any sequence $\{y_t\}_{t=0}^{\infty}$

Provided that $lim_{t\rightarrow\infty} R^{-t} y_t = 0$

Putting (4.1) in PVED we get:

$$p_o = y_o + \sum_{t=1}^{\infty} R^{-1}\, z_t^{/} \rightarrow (4.2)$$

Where:

$$z_t^{/} = y_t + d_t - Ry_{t-1}$$

In equation (4.2), y_o provide the starting point in valuation and present value term of $Z_t^{/}$ act as its complement. Hence,

$$y_o = \frac{x_1}{r}$$

$\Rightarrow y_t = \frac{x_{t+1}}{r}$ for t=1,2……

Following above specification, $z_t^{/}$ can be expressed as:

$z_t^{/} = \frac{1}{r}\{\Delta x_{t+1} - r(x_t - d_t)\}$

So, Z_t can be defined as:

$$z_t \equiv r.z_t^{/} = \Delta x_{t+1} - r(x_t - d_t), \qquad t = 1,2 \ldots ....$$

Hence:

$$p_0 = \frac{1}{r}.x_1 + \frac{1}{r}\sum_{t=1}^{\infty} R^{-1} z_t \rightarrow (4.3)$$

Equation (4.3) equates value to capitalized forward earnings, $\frac{x_1}{r}$, plus an adjustment for subsequent abnormal growth in expected earnings. Please note Z_t=0 is the benchmark meaning earnings growth is neutral. In short, increase in earnings Δx_{t+1} must be adjusted by the term r $(x_t - d_t)$, which identifies the earnings due to earnings retained in the firm. This equation is also called Abnormal Earnings Growth model or AEG model. Like RIV(Residual Income Valuation) model $(p_o - b_o)$, it explains the market value minus capitalized forward earnings premium in terms of superior growth in subsequent expected earnings.

Superior growth in earnings can be arisen because of two reasons:

(i) Expectation that the firm undertakes positive net present value projects.

(ii) Conservative accounting practices, today and in future also cause superior growth in earnings. Thus, one can say that more conservative accounting in growth settings reduces $\frac{x_1}{r}$ while at the same time it increases z_t such that $p_o$remains the same.

4.2.1) Adding structure to AEG:

Considering the constant growth in z_t , we can write:

$z_{t+1}= \gamma . z_t$, t= 1,2,…. → (4.4)

Where $\gamma (< R)$ the growth parameters.

Since (4.4) implies that $\{R^{-t} z_t\}_t$ satisfies a geometric sequence, one obtains:

Present value of Z= $\frac{Z_1}{R-\gamma}$.

The above assumption result in the OJ model , assuming PVED and

$z_{t+1} = \gamma . z_t$ t= 1,2,……

Where $\gamma < R$ and

$z_t \equiv \Delta x_{t+1} - r(x_t - d_t)$

Then:

$p_o = \frac{x_1}{r} + \frac{1}{r} . \frac{Z_1}{(R-\gamma)} = \frac{x_1}{r} [\frac{g_2 - (\gamma - 1)}{r - (r-1)}]$ → (4.5)

Where $g_2 \equiv (\Delta x_2 + r . d_1)/x_1$

Equation (4.5) has two variations depending on whether the term that augment $\frac{X_1}{r}$ is additive or multiplicative. The later approach appeals because consistent with the investment practices, it introduces a measure of percentage growth in near-term earnings, g_2. This measure of growth corrects in the numerator for forgone period 2 earnings due to date 1 dividends. Hence, $r.d_t$ must be added to Δx_2 .The dynamic (4.4) has two degree of freedoms (i) the initialization of Z_1 (ii) the growth parameter γ with $z_1 \geq 0$ and $\gamma \geq 1$ (in normal cases).

Two main points to be considered here are:

First, if CSR holds, then the dynamic (4.4) corresponds to

$$\Delta x^a_{t+1} = \gamma . \Delta x^a_t \quad , \qquad t = 2,3, \ldots ..$$

Second, as a special case of this setting, one obtains:

$$x^a_t = \gamma . x^a_{t-1} \ , \qquad t = 2,3 \ldots \ldots$$

Where γ is a measure of long term growth.

Proposition 4.2:-

Assuming:

$$z_{t+1} = \gamma . z_t \qquad \text{t=1,2….}$$

Where $\gamma < R$ and

$$z_t \equiv \Delta x_{t+1} - r\ (x_t - d_t), Z_1 > 0$$

Assuming as well:

$$\frac{d_t}{x_t} = k \geq \frac{(R-\gamma)}{r} \quad for\ all\ t \geq T, some\ T.$$

Then $\lim_{t\to\infty} \frac{x_{t+1}}{x_t} = \gamma$

Corollary 4.3:-

Given the assumption of proposition 4.2:

$$\lim_{t\to\infty} \frac{d_{t+1}}{d_t} = \gamma$$

Here the dividend payout ratio is to interpret γ and not required by OJ model. If a dividend payout ratio is low enough, i.e.,

$$k < \frac{(R-\gamma)}{r}$$

Then,

$$\lim_{t\to\infty} \frac{x_{t+1}}{x_t} = \lim_{t\to\infty} \frac{d_{t+1}}{d_t} = R - r.k$$

Even for this class of dividend policies, it is true that:

$$\lim_{t\to\infty} R^{-t}\, x_{t+1} = 0$$

4.2.2) Properties of OJ valuation formula:

Assume equation (4.5) and consider the following:

$$p_o = \frac{x_1}{r}\left[\frac{g_2 - (\gamma - 1)}{r - (\gamma - 1)}\right]$$

From R.H.S. we can observe that the p_o is directly related to x_1, g_2, or γ and inversely related to r.

We further note that $\frac{p_o}{x_1} = \frac{1}{r}$ iff. g_2 = r and z_1 =0

Or it can be said that the price to forward-earnings ratio builds in a premium only if there is an expectation of superior growth in subsequent expected earnings.

The short-term earnings growth can be expressed in terms of linear equation explaining the price to forward-earnings ratio as a function of g_2.

$$p_o = k_1 + k_2 . g_2$$

Where:

$$k_1 = -\frac{(\gamma - 1)}{r(R - \gamma)} \leq 0$$

$$k_2 = \frac{1}{(r(R - \gamma))} > 0$$

Noting that as γ increases, the slope increases and the negative intercept becomes even more negative, i.e., p_o is more responsive to short-term growth comparative to long-term growth increase.

From another point of view, the OJ formula see p_o as a function of the two expected earning quantities for FY_1 and FY_2, x_1 , x_2+ r.d_1 , in addition to γ and r. Hence:

$$p_o = \omega . f_1 + (1 - \omega) f_2$$

$$\omega = -\frac{\gamma}{(R - \gamma)} \text{ , } and$$

$$f_1 = \frac{x_1}{r}$$

$$f_2 = \frac{(x_2 + r\, d_1)}{r\, R}$$

Noting that the weight on f_1 is negative, which means that value decreases as forward-earnings increases, while f_2 is constant meaning that g_2 increases as f_1

decreases. And, g_2 is positively related to equity values. For short-term growth, we can write:

$$p_o = f_1 + (1-\omega)(f_2 - f_1)$$

Where:

$$1-\omega = \frac{R}{(R-\gamma)} > 1$$

The term $(f_2 - f_1)$ (measure of growth) adds to value with an elasticity of $\frac{R}{(R-\gamma)}$ and elasticity increases as γ increases, provided that $f_2 > f_1$

Instead of searching value in f_1 , consider the alternative f_2:

$$p_o = f_2 - \omega.(f_2 - f_1)$$

Where :

$$\omega = -\frac{\gamma}{(R-\gamma)} < 0$$

Hence:

$$p_o > f_2 \ and \ f_1$$

Provided that:

$$f_2 > f_1 \ (or \ g_2 > r)$$

No long-term growth in expected earnings, or r = 1, implies that:

$$p_o = \frac{(\Delta x_2 + \gamma.d_1)}{r^2}$$

Here $\gamma = 1$ reduces the information required from $(x_1, \Delta x_2 + r.d_1)$ to $\Delta x_2 + r.d_1$ to value the equity. This is a crude estimation of firm value.

Application of OJ formula requires a specification of γ. Perhaps putting γ equal to very long-term growth in GNP; say 3.5% and assuming γ is same for all firms. But treating γ as "universal constant" has a drawback of losing a degree of freedom in a cross-section leaving two degrees of freedom g_2 and R to explain the price to forward earnings ratio. Allowing, the additional degree of freedom

(γ to represent an average growth rate for "foreseeable future") leads to greater subjectivity as to how to apply the model.

Discount factor is not a known constant and one solves r by equating the R.H.S. of the OJ model as:

$$r = A + \sqrt{A^2 + (\frac{\Delta x_2}{x_1} - (\gamma - 1)\frac{x_1}{p_o})}$$

Where:

$$A \equiv (\frac{\gamma - 1 + \frac{d_1}{p_o}}{2})$$

For the special case when $\gamma = 1$ the above formula reduces to:

$$r = \sqrt{\frac{1}{PEG}}$$

Where:

$$PEG = \frac{p_o}{x_1}\Big/ g_2$$

4.2.3) A special case of the OJ model: The market-to-book model:

The accounting in M/B model follows CSR, contrary to OJ model. And is given as:

$$\frac{p_o}{b_o} = \frac{roe_1 - (\gamma - 1)}{r - (\gamma - 1)} \rightarrow (4.6)$$

Prvided CSR holds and PVED is equivalent to RIV, i.e.,

$$PVED = b_o + \sum_{t=1}^{\infty} R^{-1} x_t^a$$

And the dynamics:

$$x_{t+1}^{a} = \gamma . x_t^a \quad , \quad t \geq 1 \; produce \; x_t^a$$
$$\Rightarrow \Delta x_{t+1}^{a} = \gamma . \Delta x_t^a$$

This implies that the OJ model combined with CSR and more restrictive dynamics (as above) reduces to M/B formula.

And, from very definition of x_1^a;

$$\frac{x_1}{r} = b_o + \frac{x_1^a}{r}$$

Hence the OJ formula can be given as:

$$p_o = b_o + \frac{x_1^a}{r} + \frac{\Delta x_2^a}{(r(R-\gamma))}$$

Second, $x_2^a = \gamma . x_1^a$ implies that

$$\Rightarrow \Delta x_2^a = (\gamma - 1). x_1^a$$

Putting Δx_2^a into the last equation yields in:

$$p_o = b_o + \frac{x_1^a}{r(R-\gamma)}$$
$$= b_o + \frac{x_1^a}{R-\gamma}$$
$$= b_o . \frac{roe_1 - (\gamma - 1)}{r - (\gamma - 1)}$$

Where $\gamma < R$.Then the OJ model converts to the M/B model

$$p_o = \frac{x_1}{r} + \frac{\Delta x_2^a}{r(R-\gamma)} = b_o . \frac{roe_1 - (\gamma - 1)}{r - (\gamma - 1)}$$

Switching attention from market-to-book ratio ($\frac{p_o}{b_o}$) to price to forward-earnings ratio, we can write:

$$\frac{p_o}{x_1} = k_1 + \frac{k_2}{roe_1}$$

Where:

$$k_1 = \frac{1}{(R-\gamma)},$$

$$k_2 = \frac{(1-\gamma)}{(R-\gamma)}$$

To check the roe_1's effect of $\frac{p_o}{x_1}$, consider the two specifications:

(i) If $\gamma \geq 1$ and assuming $x_1^a \geq 0$ ($or\ roe_1 \geq \gamma$) i.e., conservative accounting combined with growth in the business.

(ii) If $\gamma \leq 1$ and assuming $x_1^a < 0$ ($or\ roe_1 < r$). But profitability is expected to improve and approaches to the benchmark, in the long-run, i.e., $x_t^a < x_{t+1}^a < \cdots \to 0\ as\ t \to \infty$

Specification (i) implies $k_2 < 0$ .Thus $\frac{p_o}{x_1}$ is bounded below by $\frac{1}{r}$ and the ratio $\frac{p_o}{x_1}$ increases as roe_1 increases (where $roe_1 > r$).

Specification (ii) implies the converse, $k_2 > 0$. Again $\frac{p_o}{x_1}$ is bounded below by $\frac{1}{r}$ but the ratio now decreases as roe_1 increases (where $roe_1 < r$).

From M/B model, the cost of equity capital can be obtained as:

$r = \frac{p_o - b_o}{p_o} \cdot (\gamma - 1) + \frac{x_1}{p_o}$.

Further, $\frac{p_o - b_o}{p_o} \cdot (\gamma - 1)$ is always positive for both settings iff $x_1^a \geq 0$.

In addition, following inferences can be drawn:

(i) r always exceeds forward earnings yields $\frac{x_1}{p_o}$. However, in real world $p_o < \frac{x_1}{r}$.

(ii) r increases as $\frac{x_1}{p_o}$ increases.

(iii) For a profitable firm r increases as the market-to-book ratio increases and vice versa.

4.2.4) Another special case of the OJ model: Free cash flows and their growth:-

Consider the following expression:

$$p_o = fa_o + \sum_{t=1}^{\infty} R^{-1} c_t \rightarrow (4.7)$$

Where:

fa_o= financial assets, net of debt, on date 0.

c_t= expected free cash flow from operation, period t.

Assuming that the net financial assets can be valued without ambiguity in the absence of probability of bankruptcy and related costs, taxes, or agency costs etc.

As noted earlier, as well, all financial activities are zero NPV activities and operating activities are positive NPV.

$$fa_t = fa_{t-1} + fx_t + c_t - d_t, \qquad for\ t = 1,2, \ldots. \qquad (A1)$$

Where:

fx_t= expected financial income or interest income,

A1 above stands for assumption 1.

$$fx_t = r.fa_{t-1}\ , \quad for\ t = 1,2 \qquad (A2)$$

Please note that the weighted average cost of capital, or discount factor related to operating activities, differs from the (after-tax) borrowing /lending rate.

Assuming free cash flow growth at a constant rate.

$$c_{t+1} = \gamma.c_t\ , \quad for\ \ t = 1,2 \qquad (A3)$$

Hence:

$$p_o = fa_o + \frac{c_1}{(R-\gamma)}$$

If firm is using cash accounting, then:

$$x_t = fx_t + c_t$$

Since fx_t is essentially equivalent to cash. From CSR, we can write:

$$b_t = fa_t$$

$$x_t^a = x_t - fx_t$$

$$\Delta x_2^a = c_2 - c_1 = -(1-\gamma)c_1$$

Thus:

$$p_o = \frac{x_1}{r} + \frac{\Delta x_2^a}{r(R-\gamma)}$$

$$p_0 = \frac{fx_1 - c_1}{r} + \frac{-(1-\gamma)c_1}{r(R-\gamma)}$$

$$p_o = fa_0 + \frac{c_1}{R-\gamma}$$

If accounting is of cash accounting $b_t = fa_t$ and $x_t^a = c_t$ free cash flow approach is equal to M/B model approach. And, M/B model is a special case of OJ model. But these models do not compete with the OJ model as they present better conclusions because of additional assumptions.

4.3) The OJ Model and Dividend Policy Irrelevancy:-

Dividend Policy Irrelevancy (DPI) means that one can determine the value without having any particular information about the d-sequence. Analytically speaking, consider a saving account, following OJ model and restrictions:

$$x_{t+1} = R.x_t - r.d_t \qquad for\ \ t = 1,2, \ldots.$$

And, $$d_{t+1} = c_1.x_t + c_2.d_t \qquad for\ t = 1,2, \ldots \ldots..$$

Where c_1 and $c_2$are two dividend policy parameters. The above equations generate a sequence d_2,d_3….. for any value of x_1 and d_1. So PVED is a function of (x_1, d_1) and R, c_1,c_2, are known.

For finite PVED, consider the convergence condition:

(i) $c_1 > 0$ and (ii) $|c_2| < R$

These two conditions correspond to a standard regulatory condition that the maximum root (modulus) of the implies transition matrix $\begin{bmatrix} R & -r \\ c_1 & c_2 \end{bmatrix}$ is less than R.

Lemma 4.3.1:-

To check how the OJ model covers DPI, consider the following 3×3 dynamics:

$$\begin{pmatrix} x_{1t+1} \\ x_{2t+1} \\ d_{t+1} \end{pmatrix} = \begin{pmatrix} \omega_{11} & \omega_{12} & \omega_{13} \\ 0 & \omega_{22} & 0 \\ \omega_{31} & \omega_{32} & \omega_{33} \end{pmatrix} \begin{pmatrix} x_{1t} \\ x_{2t} \\ d_t \end{pmatrix}$$

,for t=1,2,..

With the regularity condition, PVED does not depend on the dividend policy parameters ω_3 iff $\omega_{11} = R \Rightarrow PVED = PVED(x_{11}, x_{21}, d_1)$ is independent of d_1 and vice versa.

On the margin $\frac{\partial x_{t+1}}{\partial x_t} = \omega_{11} = R$.

This can be interpreted as "no arbitrage" condition on the x_1 to effect today's value. In the three variable set-up (x_1, x_2, d), x_2 has its own evolution regardless of x_1 and d influence the behavior of x_1 via ω_{13}.

From the above lemma we can see that policy parameters $(\omega_{31}, \omega_{32}, \omega_{33})$ are of no valuation relevance. We can also observe that the dividend influence the forecasting of the x_1 variable (through ω_{13}).

From the OJ dynamics and last lemma,

Let (x_t, z_t) correspond to (x_{1t}, x_{2t}) and putting$\omega_{11} = R$, $\omega_{13} = r$ so that,

(i)$x_{t+1} = Rx_t - rd_t + z_t$ or $z_t = \Delta x_{t+1} - r(x_t - d_t)$

(ii) z_t grows at a constant rate $\gamma = \omega_{22}$.

This states that the expected dividend is part of OJ dynamics but they need to be clarified.

Proposition 4.3.2:-

Following the assumption of lemma 4.3.1 and $\omega_{11} = R, \omega_{12} = 1$, $\omega_{13} = -r, \omega_{22} = \gamma$ one can write OJ dynamics as:

$$z_{t+1} = \gamma . z_t$$

Where:

$$z_t = \Delta x_{t+1} - r(x_t - d_t)$$

And $\lim_{t\to\infty} R^{-1} x_t = 0$

Proposition 4.3.2 uses the regularity condition stated in lemma 4.3.1. for the conclusion $\lim_{t\to\infty} R^{-1} x_t = 0$.

4.4) The Labeling of $\mathbf{x_t}$ as expected earnings:-

4.4.1) The analytical properties of $\mathbf{x_t}$:-

In this section Ohlson and Gao (2006) has first presented the dynamics of the OJ model in terms of its three primitives(x_t, z_t, d_t) and then a number of analytical properties of x_t from a time series perspective has been discussed.

The 3×3 dynamics which support the OJ model can be given as:

$$\begin{pmatrix} x_{t+1} \\ z_{t+1} \\ d_{t+1} \end{pmatrix} = \begin{pmatrix} R & 1 & -r \\ 0 & \gamma & 0 \\ c_1 & c_2 & c_3 \end{pmatrix} \begin{pmatrix} x_t \\ z_t \\ d_t \end{pmatrix}, t = 1, 2, .$$

As per standard linear dynamics modeling, there can be no explicit or implicit contemporaneous dependence among the three above variables which mirrors the standard accounting (including GAAP) for earnings which do not depend on the contemporaneous dividends.

From a time series point of view, we can infer additional properties of x_t that makes the label "earnings" right. Specifically,

(i) $\frac{\partial x_{t+1}}{\partial d_{t+1}} = -r$

(ii) $\frac{\partial x_{t+1}}{\partial x_t} = R$

(iii) $\frac{\partial (x_{t+2}+r.d_{t+1}+x_{t+1})}{\partial d_t} = -(R^2 - 1)$

(iv) $\frac{\partial (x_{t+2}+r.d_{t+1}+x_{t+1})}{\partial x_t} = R^2 + R$

The first two properties are straightforward. From (iii) the increase in dividend decreases earnings, systematically. And, in (iv) earnings cause more earnings for the period to follow in a systematic way.

4.4.2) The OJ model derived from the four properties of earnings:-

Consider the dynamics:

$$x_{t+1} = \omega_{11}.x_t + \omega_{12}.d_t$$
$$d_{t+1} = \omega_{21}.x_t + \omega_{22}.d_t$$

With the restriction:

(i) (x_t, d_t) should not grow more than R when $t \to \infty$.

(ii) Supposing PVED holds and by saving account dynamics

$$\omega_{11} = R \text{ and } \omega_{12} = -r$$

And the remaining two parameters $(\omega_{21}, \omega_{22})$ are irrelevant.

Since restriction on earnings properties result in the valuation function so by replacing x_t with two variables x_{1t}, x_{2t} and by 3×3 matrix (Proposition 4.4.1).

Proposition 4.4.1:-

$$\begin{pmatrix} x_{1t+1} \\ x_{2t+1} \\ d_{t+1} \end{pmatrix} = \begin{pmatrix} \omega_{11} & \omega_{12} & \omega_{13} \\ \omega_{21} & \omega_{22} & \omega_{23} \\ \omega_{31} & \omega_{32} & \omega_{33} \end{pmatrix} \begin{pmatrix} x_{1t} \\ x_{2t} \\ d_t \end{pmatrix}, t = 1, 2, \ldots$$

Standard regulatory condition holds. Assuming, further, the following four properties:

(i) $\frac{\partial x_{1t+1}}{\partial d_{t+1}} = -r$

(ii) $\frac{\partial x_{1t+1}}{\partial x_{1t}} = R$

(iii) $\frac{\partial (x_{1t+2} + r.d_{t+1} + x_{1t+1})}{\partial d_t} = -(R^2 - 1)$

(iv) $\frac{\partial (x_{1t+2} + r.d_{t+1} + x_{1t+1})}{\partial x_{1t}} = R^2 + R$

And:

$$\omega_{11} = R, \quad \omega_{13} = -r, \quad \omega_{21} = \omega_{23} = 0, \quad \omega_{12} = 1$$

Without loss of generality unless $\omega_{12} = 0$. Further, if PVED and $\omega_{22} < R$ are assumed, the OJ formula can be given as:

$$p_o = \frac{x_{11}}{r} + \frac{x_{21}}{r(R - \omega_{22})}$$

With the above said restriction of ω.

If $\omega_{12} = 0$ then the model reduces to saving account. If $\omega_{12} = 1$ then $\omega_{21} = \omega_{23} = 0$. The presence of DPI makes $\omega_{31}, \omega_{32}, \omega_{33}$ irrelevant.

From the proposition 4.4.1, we can infer:

$$x_{2t} = z_t$$

$\therefore \; x_{2t} = \Delta x_{t+1} - r(x_{1t} - d_t)$

This confirms that short-term and long-term expected earnings growth explains the price to forward-earnings ratio.

Proposition 4.4.2:-

This proposition shows how the OJ model's x-variable is equal to an ideal construct disturbed by an additive error.

Assume PVED and x_t^* fulfills the following relationship:

$$x_{t+1}^* = R.x_t^* - r.d_t \rightarrow (4.8)$$

Given any sequence $d_1, d_2, \dots..$ that implies $\lim_{t\to\infty} R^{-t} x_t^* = 0$

Defining:

$$x_t = x_t^* - err_t \qquad for\ t = 1,2 \dots.$$

From above the following statement implies:

(i) $err_{t+1} = \gamma.err_t \qquad for\ \ t = 1,2, \dots \dots..\, and\ err_1 \geq 0;$

(ii) $x_{t+2} = r.d_{t+1} - Rx_{t+1} = (R - \gamma).err_{t+1} \qquad for\ all\ t$

About error the authors assume that the OJ model implies a constant growth in "what is missing" in ideal earning.

In short, as per analysis constant growth assumption is applicable provided that start is from ideal earning construct that embeds DPI. Next step is an error introduced in ideal earnings that grows at a constant rate, to keep analysis simple.

4.5) Capitalized Expected Earnings as Estimate of Terminal Value:-

Equity valuation, from practitioners point of view consists of two parts, i.e., evaluation of expected dividends up to a horizon and estimating the terminal value. This section discusses the x-variable in the OJ model serving the role of terminal value. Consider the relation:

$$p_o = \sum_{t=1}^{T} R^{-t}\, d_t + R^{-T} p_T$$

Where:

T = horizon date.

From above expression, the authors analyze the valuation error as:

$TrErr = p_o - [\sum_{t=1}^{T} R^{-t} d_t + R^{-T} (\frac{x_{T+1}}{r})]$,

Where:

TrErr= truncation error.

Since $p_O \neq \frac{x_{t+1}}{r}$, $TrErr \neq 0$ and for long-term when $T \to \infty$ $TrErr \to 0$ because of regularity condition of OJ model, $R^{-T} x_T$ tends to zero.

Proposition 4.5.1:-

Assuming PVED and the dynamics $z_{t+1} = \gamma . z_t \quad for\ t = 1,2, \dots ..$

Where:

$$z_t \equiv \Delta x_{t+1} - r(x_t - d_t)$$

Then:

$$|TrErr_{T+1}| < |TrErr| \ \ for\ all\ T,$$

And TrErr goes to zero as T tends to infinity for any dividend policy.

Following the long-horizon approach and relaxing the assumption on the z_t dynamics so that:

$$z_{t+1} = \gamma . z_t \qquad for\ t \geq T$$

Where starting date $T \neq 1$. The valuation formula can be given as:

$$p_o = PVED_T + R^{-T} p_t^*$$

Where : p_T^* is estimate for terminal value.

$p_T^* = \frac{x_{T+1}}{r} + \frac{1}{r} . \frac{z_{T+1}}{(R-\gamma)} = \frac{x_{T+1}}{r} [\frac{g_{T+2} - (\gamma - 1)}{r - (\gamma - 1)}]$,

Where:

$$g_{T+2} \equiv (\frac{\Delta x_{T+2} + r . d_{T+1}}{x_{T+1}})$$

The above analysis can be mapped with the developments in the section 4.2.3(M/B model) by assuming $x^a_{t+1} = \gamma . x^a_t \quad for\, t \geq T$ for some T which may exceed 1.

4.6) The OJ model and cost of equity capital:

In valuation cost of equity capital appears as the discount factor to let PVED determine value. It can also be considered as the market's rate of return presented as r. In the PVED formula r depends on the firm's opportunities and plans. Hence the authors considered r in the dynamics $x_{t+1} = R.x_t - r.d_t + z_t$ where $z_{t+1} = \gamma . z_t$. In the OJ model, it can be given as:

$$\frac{\partial x_{t+1}}{\partial(-d)} = r$$

Where:

$-d =$ Capital contribution.

The above analysis shows that the earnings capture the marginal effect of capital contribution. The cost of equity capital also affects the behavior of expected earnings as:

$$\frac{\partial x_{t+1}}{\partial x_t} = R$$

In other words, margin earnings grow at the cost of capital. This also means that the supply of capital leads to expect benefit for many periods to follow, i.e., cost of equity capital also affect the time series behavior of earning. Consider the (expected) earnings dynamics as:

$$x_{t+1} = x_t + r(x_t - d_t) + z_t$$

The above expression shows that the investment financed by retained earnings earns a rate of return equal to r. Firm may plan to consider positive NPV investments and variable z_t handle it quite nicely.

4.7) Accounting rules and the OJ formula:-

In this section of the paper the authors, first, check the changes in the accounting rules such that the forward earnings and their near-term growth change, yet the price remains the same. Second, in case of more conservative accounting, i.e., lowering expected books value which leads to decrease in forward earnings while there is an increase in the near term growth in expected earnings. No change in price means cosmetic changes like accounting rules do not change the value of the firm. Third, changes in accounting rules do not affect the long-term growth of earnings as measured by γ i.e.,$\frac{x_{t+1}}{x_t}$ (earning growth measure) cancel each other as $t \to \infty$.

Let (x_t, b_t) represents the accounting under current rules and consider the following changes in the current and future book values:

$$\hat{b}_t(k) = \gamma^t + b_t$$

For t = 0,1…

Where k> 0 means the accounting is less conservative (in expectation). Thus the term $\gamma^{t-1}k$ represents the total increase in the book value at date t due to the change in depreciation method. And,

$$\hat{b}_t - b_t$$

Show that additional amount in the PPE should grow as the firm grows. From CSR it follows that expected earnings also change:

$$\hat{x}_t(k) = \gamma^{t-1}k(\gamma - 1) + x_t$$

Lemma 4.7.1:-

Assume CSR and consider:

$$\hat{b}_t(k) = \gamma^t + b_t$$

$$\hat{x}_t(k) = \gamma^{t-1}k(\gamma-1) + x_t$$

Then,

$$x_{t+1}^a = \gamma x_t^a$$

$$\Rightarrow \hat{x}_t^a(k) = \gamma . \hat{x}_t^a$$

For any k and conversely.

Proposition 4.7.1:-

The assumptions of the above Lemma holds:

$$\hat{x}_1(k) = k(\gamma - 1) + x_1$$

And $\hat{x}$ (k) depnds on k. But:

$$\hat{p}_o(k) \equiv \frac{\hat{x}_1(k)}{r} + \frac{\Delta \hat{x}_2^a(k)}{r(R-\gamma)}$$

Does not depend on k.

$$\hat{x}_1 > x_1(= \hat{x}_1(0))$$

Iff:

$\hat{g}_2(k) < g_2\big(= \hat{g}_2(0)\big), where$

$\hat{g}_2(k) = \frac{(\Delta \hat{x}_2(k) + r.d_1)}{\hat{x}_1(k)}$.

This proposition expresses the accounting-dependence of forward earnings and their growth. Conservative accounting effect the book value, earnings and short-term growth, i.e., $\gamma > 1$. It also becomes apparent how conservative accounting increases the market-to-book ratio with an offsetting increase in expected return on equity.

4.8) Information Dynamics that Sustain the OJ Model:-

In this section the authors develop information base approach and show that $(\bar{p}_{t+1}+\bar{d}_{t+1})/p_t$, depends on "new" information. As in previous section assume PVED and DPI to determine price all dates, consider the following information dynamics:

$$\begin{pmatrix} \tilde{x}^a_{t+1} \\ \tilde{v}_{1t+1} \\ \tilde{v}_{2t+1} \end{pmatrix} = \begin{pmatrix} 1 & 1 & 1 \\ 0 & \gamma & 0 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} \tilde{x}^a_t \\ v_{1t} \\ v_{2t} \end{pmatrix} + \begin{pmatrix} \tilde{\varepsilon}_{1t+1} \\ \tilde{\varepsilon}_{2t+1} \\ \tilde{\varepsilon}_{3t+1} \end{pmatrix} \qquad (ID)$$

Where $\tilde{\varepsilon}_{1t+1}$ are unpredicted disturbance terms with zero means. The disturbance terms $(\varepsilon_{1t+1}, \varepsilon_{2t+1}, \varepsilon_{3t+1})$ resolves the uncertainty as time pass from date t to t+1. The two variables $(\tilde{v}_1, \tilde{v}_2)$ reflect "other information" that goes beyond the basic accounting data; (b,x,d). The accounting satisfies CSR, given any realization (x^a_t, v_{1t}, v_{2t}), then ID implies :

$E_t(\tilde{x}^a_{t+2}) = \gamma . v_{1t}$

Further,

$E_t(\tilde{x}^a_{t+1}) = \gamma . E_t(\tilde{x}^a_{\tau}), \quad for\, \tau \geq t+2$

From the second equation in ID. For the forward earnings, the first equation in ID results in forecast:

$E_t(\tilde{x}_{t+1}) = R.x_t - r.d_t + v_{1t} + v_{2t}$

Proposition 4.8.1:-

Assume PVED and ID, with any dividend policy. Then:

(i) The OJ model holds

(ii) $p_t = b_t + \beta_1 . x^a_t + \beta_2 . v_{1t} + \beta_3 . v_{2t}$,

Where $\beta = (\frac{1}{r}, \frac{R}{(r(R-\gamma))}, \frac{1}{r})$

This proposition inform us how the period (t, t+1) excess return

$\tilde{r}^{e}_{t+1} \equiv \frac{(\tilde{p}_{t+1}+\tilde{d}_{t+1})}{p_t - R}$, depends on the period's uncertainty resolution, $(\varepsilon_{1t+1}, \varepsilon_{2t+1}, \varepsilon_{3t+1})$.

Corollary 4.8.1:-

Following the assumption in proposition 4.8.1,

$$\tilde{r}^{e}_{t+1} = \sum_{k=1}^{3} \frac{uk(\tilde{\varepsilon}_{k,t+1})}{p_t} \quad \rightarrow (4.9)$$

Where :

$$u = (\frac{R}{r}, \frac{R}{(r(R-\gamma))}, \frac{1}{r})$$

First coefficient R/r is consistent with the contemporaneous earnings having a multiplier of R/r on value. Second, the coefficient, $\frac{R}{(r(R-\gamma))}$, takes the information, ε_{2t+1}, that effect the perception about subsequent, near-term, growth in expected earnings. Third, the coefficient 1/r with the information ε_{3t+1}, corrects the expectation about the next period's expected earnings that goes beyond actualized earnings. Fourth, the equation (4.8.1) does not contain a term related to unexpected dividend due to DPI.

The other information $(\tilde{v}_1, \tilde{v}_2)$ makes the relation between accounting data and market value possible. The model also assumes conservative accounting in expectation.

Proposition 4.8.3 :-

Assume PVED and information dynamics (ID), then:

$$\lim_{\tau \to \infty} E_t[\tilde{p}_{t+\tau} - \tilde{b}_{t+\tau}] > k > 0$$

$$\Rightarrow p_t - b_t \equiv \sum_{\tau}^{\infty} R^{-\tau} \;\; E_t[\tilde{x}_{t+\tau}^a] \;\; and \;\; \lim_{s\to\infty} E_t[E_{t+\tau}\,[\tilde{x}_{t+\tau+s}^a]] > 0 \; for \; all \; \tau \geq 1.$$

Or, on average we can expect future expected abnormal earnings to be positive.

4.9) Operating versus Financial Activities:

In valuation firms' activities can be divided into operating and financial activities. This section of the paper informs the readers how the shift in focus from the bottom line earnings, to the bottom line before financial expenses/revenues i.e., operating earnings results in the application of the model. The valuation of operating activities will depend on expected operating earnings and their subsequent growth. This can be achieved in the OJ formula by replacing earnings with operating earnings, dividend with cash flow and extending DPI to Cash Flow Irrelevancy (CFI).

By definition all financial activities have zero NPV and one infer their value on the balance sheet. The value of (net) operating assets in the balance sheet has no particular relation to their economic value because the later particular depends on positive NPV investments that are expected to be undertaken in the future. Intangible assets in the balance sheet belong to operating activities. Consider the following:

$ox_t = \; Operating \; earnings, period \; t$

$fx_t = financial \; earnings, period \; t$

$oa_t = operating \; assets, net \; of \; liabilities, date \; t$

$fa_t = financial \; assets, net \; of \; financial \; liabilities, date \; t.$

The first assumption belongs to the accounting beyond CSR,

$$ox_t = \Delta oa_t + c_t \qquad\qquad (A4)$$

$$fx_t = fa_t - c_t + d_t$$

Adding the two equations results in CSR: $x_t = \Delta b_t + d_t$.The second assumption is about zero NPV property of financial activities:

$$fx_t = r.fa_{t-1} \qquad (A5)$$

Proposition 4.9.1:-

Consider the assumption of the OJ model with (A4) and (A5):

Then,

$$p_o - fa_o = \frac{ox_1}{r} + \frac{\Delta ox_2^a}{r(R-\gamma)} = \frac{ox_1}{r}[(\hat{g}_2 - (\gamma-1)/(r-(\gamma-1)))]$$

Where:

$$\hat{g}_2 \equiv (\Delta ox_2 + rc_1)/ox_1$$

From above two caveats comes to mind. First, CFI (Cash flow Irrelevancy) cannot retain the spirit of DPI. Since we know $d_t = K.x_t$ for a set of values of dividend policy parameters K ($like\ 0 < K \leq 1$) at the same time one may question the economic or accounting intuition of $c_t = \hat{K}.ox_t$. Second, x_t does not depend on d_t and to say that the same independence is applicable to ox_t as it relates to c_t is a different matter.

With the above two points in mind, one still refer to CFI, i.e., one can infer the value of operating activities without knowing the elements in the sequence of expected cash flow.

4.9.2) Information dynamics for operating and financial activities:-

The model assumes CSR and distinguishes between operating and financing activities.

$$b_t = oa_t + fa_t$$

$$x_t = ox_t + fx_t$$

Where x_t equals to comprehensive income and free cash flow,c_t, equals

$$c_t = ox_t - \Delta oa_t$$

$$\Rightarrow c_t = \Delta fa_t - fx_t + d_t$$

The information dynamics for operating activities can be given as:

$$\begin{pmatrix} o\tilde{x}^a_{t+1} \\ \tilde{\nu}_{1t+1} \\ \tilde{\nu}_{2t+1} \end{pmatrix} = \begin{pmatrix} 1 & 1 & 1 \\ 0 & \gamma & 0 \\ 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} ox^a_t \\ \nu_{1t} \\ \nu_{2t} \end{pmatrix} + \begin{pmatrix} \tilde{\varepsilon}_{1t+1} \\ \tilde{\varepsilon}_{2t+1} \\ \tilde{\varepsilon}_{3t+1} \end{pmatrix}$$

The first equation from the above expression can be given as:

$$\widehat{ox}_{t+1} = R.ox_t - r.c_t + \nu_{1t} + \nu_{2t} + \hat{\varepsilon}_{1t+1}$$

And free cash flow can be given as:

$$\hat{c}_{t+1} = \theta_1.ox_t + \theta_2.c_t + \theta_3.\upsilon_{1t} + \theta_4.\upsilon_{2t} + \hat{\varepsilon}_{4t+1}$$

Since CFI applies, there is no need to specify a dividend policy. The dynamic of financial activity is:

$$fx_{t+1} = r.fa_t + \hat{\varepsilon}_{5t+1}$$

Now PVED implies the following valuing function:

$$p_t = AI_t + OI_t$$

Where:

$$AI_t = fa_t + oa_t + \frac{ox^a_t}{r} = \text{"}accounting\ information\text{"}$$

$$OI_t = \frac{R.\upsilon_{1t}}{r(R-\gamma)} + \frac{\upsilon_{2t}}{r} = \text{"}Other\ information$$

Considering the concept of net earnings as opposite to comprehensive earnings (x_t), as:

$$ne_t \equiv ox_t + r.fa_{t-1}$$

$$\varepsilon_{5t} = x_t - ne_t = other\ comprehensive\ earnings.$$

As per GAAP, “windfall” gains and losses on holding financial assets by pass the income statement and show up as a direct debit or credit to shareholders’ equity. Thus:

$$AI_t = \left(\frac{R}{r}\right).ne_t - (d_t - \varepsilon_{5t})$$

And from the proposition (4.8.1), it follows that the OJ formula holds for all firm's activities and also for operating activities alone adjusted for financial assets.

$$p_t = \frac{E_t[\hat{x}_{t+1}]}{r}.[\frac{g_{t+2} - (\gamma - 1)}{r - (\gamma - 1)}]$$

Where:

$$g_{t+2} \equiv \frac{E_t[\Delta \hat{x}_{t+2} + r.\hat{d}_{t+1}]}{E_t[\hat{x}_{t+1}]}$$

And for operating activities one obtains:

$$p_t = fa_t + \frac{E_t[ox_{t+1}]}{r}.[\frac{h_{t+2} - (\gamma - 1)}{r - (\gamma - 1)}]$$

Where:

$$h_{t+2} \equiv \frac{E_t[\Delta \widehat{ox}_{t+2} + r.\hat{c}_{t+1}]}{E_t[\widehat{ox}_{t+1}]}$$

And market return in excess of expected return over the period (t, t+1) can be explained as:

$$\hat{r}^e_{t+1} \equiv \frac{(\hat{p}_{t+1} + \hat{d}_{t+1})}{P_t - R}$$

And,

$$\hat{r}^e_{t+1} = \frac{\hat{\varepsilon}_{1t+1}}{r} + \frac{R.\hat{\varepsilon}_{2t+1}}{r(R - \gamma)} + \frac{\hat{\varepsilon}_{3t+1}}{r} + \hat{\varepsilon}_{5t+1}$$

From above we can conclude as well that the unpredictable gains/Losses have the same effect on value as dividend and must be distinguished from (i) expected earnings due to the holdings of financial assets (ii) realized operating earnings.

5. Conclusion

In this chapter we have discussed the theoretical and modeling development of Residual Income Valuation Model (RIM) and Abnormal Earnings Growth Model (AEG). The first has been studied with special reference to emerging markets, .i.e., the rent and the firm value for its shareholders, modeling with probability of survival, and inflation adjustment of RIM. This chapter has been started with detailed discussion of Ohlson (Ohlson J. , 1995) and Feltham and Ohlson (Feltham & Ohlson, 1996) model. It has been shown that the valuation model like Economic Value Added (EVA) and discounted cash flow can be derived from the Ohlson model (Ohlson J. , 1995). Later, Feltham and Ohlson (Feltham & Ohlson, 1996) model has been presented showing how a firm's market value relates to accounting data that discloses results both from operating and financial activities.

In third section, inflation and inflation accounting has been studied with numerical illustrations of anticipated inflation adapted depreciation scheme following Beaver (Beaver, 1979). Finally, it is concluded that the distortion of residual income depends upon the distortion of the depreciation, i.e., more volatile the inflation is, the more uncertain the value of residual income gets or we can say that in a volatile inflationary environment the Ohlson model (Ohlson J. , 1995) is less successful because of lack of reliability of accounting numbers. While discussing inflation adjustment of RIM John O'Hanlon and Ken Peasnell (O'Hanlon & Peasnell, 2004) argued that, in a setting in which accounting number, and forecast thereof are normally presented in historical cost terms, the inflation adjustment of RIM is likely to bring unnecessary computations to valuation process, with increase scope of errors.

The relation of growth in earnings to market value has been summarized following the development of Ohlson and Zhan Gao (Ohslon & Gao, 2006) paper, in the last section of this chapter. It is demonstrated that market to book and free cash flow and their growth models are special cases of Ohlson and Juettner-Nauroth (OJ) (Ohlson & Juettner-Nauroth, 2005). Further, we covered the various modeling development of OJ model like labeling of x_t as expected earnings, capitalized expected earnings as terminal value, cost of equity capital, accounting rules and OJ formula, information dynamics of OJ model and operating vs. financial activities. We conclude this chapter with a practical note that Ohlson (Ohlson J. , 1995), and Feltham and Ohlson (Feltham & Ohlson, 1996) models are very important developments in the valuation literature since they trace the value in the fundamentals of the company. While the models like Ohlson and Juettner-Nauroth (OJ) (Ohlson & Juettner-Nauroth, 2005) should be used with caution keeping in view the lack of empirical evidence about their validity.

Annex-1

Exhibit-3:

Historical Accounting

Income statement		1	2
EBITDA		735	716.625
DA [a]		476.420	523.5801
EBIT		258.580	193.0449
Interest		0	85.7300
Tax		0	0
Net Income		258.580	278.775
Dividend [b]		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000	523.580	0
Cash	0	553.099	1173.554
Total Assets		1076.679	1173.554
Book value of equities	1000	1000	1076.679
Net Income		258.580	278.775
Dividend		181.901	181.901
Total equities		1076.679	1173.553
Equities with goodwill Equities	1000	1078.099	1173.554
ROE(Unadjusted) [c]		**24.016%**	**23.755%**
ROE(Adjusted) [d]		25.86%	25.86%

"Real" Accounting

Income statement		1	2
EBITDA		735	716.625
DA		476.420	523.580
EBIT		258.580	193.045
Interest		0	85.730
Tax		0	0.000
Net Income		258.580	278.775
Effect on fixed assets(Ni)		50	26.179
Effect on equities (Ei)		50	53.834
Mon Eff.		0	27.655
Real Net Income		208.580	224.941
Dividend		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000	523.580	0
Cash	0	553.099	1173.554
Total Assets		1076.679	1173.554
Book value of equities	1000	1000	1076.679
Effect on equities (Ei)		50	26.179
Mon Eff.		0	27.655
Real net income		208.580	224.941
Dividend		181.901	181.901
Total equities	1000	1076.679	1173.553
ROE(Unadjusted) [c]		**19.86%**	**19.90%**
ROE(Adjusted) [d]		19.86%	19.86%

a: The values of Depreciation and amortization adjusted

b:The dividend has been chosen to be equal to comprehensive income

c:ROE just consider the expected inflation

d:ROE has been adjusted to consider inflation and residual income

Current Fair Value Accounting

Income statement		1	2
EBITDA		735	716.625
DA		475	525
EBIT		260	191.625
Interest		0	85.73
Tax		0	0
Net Income		260	277.355
Goodwill depr.		78.099	95.455
Comprehensive Income		181.901	181.901
Dividend		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000	525	0
Cash	0	553.099	1173.554
Total Assets		1078.099	1173.554
Book value of equities	1000	1000	1078.099
		260	277.355
		181.901	181.901
Total equities		1078.099	1173.553
Equities with goodwill			
Equities	1000	1078.099	1173.554
Goodwill	173.554	173.554	95.455
		78.099	95.455
		95.455	0
Total	1173.554	1173.554	1173.554
ROE		15.50%	15.50%

Real Fair Value Accounting

Income statement		1	2
EBITDA		735	716.625
DA		475	525
EBIT		260	191.625
Interest		0	85.73
Tax		0	0
Net Income		260	277.355
Goodwill depr.		78.099	95.455
Comprehensive Income		181.901	181.901
Dividend		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000	525	0
Cash	0	553.099	1173.554
Total Assets		1078.099	1173.554
Book value of equities	1000	1000	1078.099
		260	277.355
		181.901	181.901
Total equities		1078.099	1173.553
Equities with goodwill			
Equities	1000	1078.099	1173.554
Goodwill	173.554	173.554	95.455
		78.099	95.455

		95.455	0
Total	1173.554	1173.554	1173.554
F A Eff		50	26.25
GW effect		8.678	4.773
Mon Ass.		0.000	27.655
"Real" Comprehensive Inc.		123.223	123.223
Effect on Equities		58.678	58.678
Equities+ Effect on equit.		1232.232	1232.232
ROE		10.00%	10.00%

Annex-2

Exhibit 3.1:

DATA

Inflation rate	5.0%
Real rate	10.0%
Nominal rate	15.5%

	1	2
EBIT	735.000	716.625
DA Beaver accounting	475.000	
DA studied	500.000	
Dividend	181.901	181.901

Historical Accounting			
Income statement		1	2
EBITDA		735.000	716.625
DA		**500.000**	**500.000**
EBIT		235.000	216.625
Interest		0.000	85.730
Tax		0.000	0.000
Net Income		235.000	302.355
Balance sheet	0	1	2
Fixed Assets	1000.000	500.000	0.000
Cash	0.000	553.099	1173.553
Total Assets	1000.000	1053.099	1173.553
Book value of equities at beg.		1000.000	1053.099
Net Income		235.000	302.355
Dividend		181.901	181.901
Total equities at the end	1000.000	1053.099	1173.553
ROE nominal		23.50%	28.71%
ROE real		**17.62%**	**22.58%**
Residual income		**80.000**	**139.125**

Historical Accounting			
Income statement		1	2
EBITDA		735.000	716.625
DA		**475.000**	**525.000**
EBIT		260.000	191.625
Interest		0.000	85.730
Tax		0.000	0.000
Net Income		260.000	277.355
Balance sheet	0	1	2
Fixed Assets	1000.000	525.000	0.000
Cash	0.000	553.099	1173.553
Total Assets	1000.000	1078.099	1173.553
Book value of equities at beg.		1000.000	1078.099
Net Income		260.000	277.355
Dividend		181.901	181.901
Total equities at the end	1000.000	1078.099	1173.553
ROE nominal		26.00%	25.73%
ROE real		**20.00%**	**19.74%**
Residual income		**105.000**	**110.250**

"Real" Accounting			
Income statement		1	2
EBITDA		735.000	716.625
DA		**500.000**	**500.000**
EBIT		235.000	216.625
Interest		0.000	85.730
Tax		0.000	0.000
Net Income		235.000	302.355
Effect on fixed assets		50.000	25.000
Monetary effect		0.000	27.655
Real Net Income		185.000	249.700
Dividend		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000.000	500.000	0.000
Cash	0.000	553.099	1173.553
Total Assets		1053.099	1173.553
Book value of equities at beg.		1000.000	1053.099
Effect on equities (Ei)		50.000	52.655
Real net incom		185.000	249.700
Dividend		181.901	181.901
Total equities at the end	1000.000	1053.099	1173.553
ROE		**17.62%**	**22.58%**
Residual income		**80.000**	**139.125**

"Real" Accounting			
Income statement		1	2
EBITDA		735.000	716.625
DA		**475.000**	**525.000**
EBIT		260.000	191.625
Interest		0.000	85.730
Tax		0.000	0.000
Net Income		260.000	277.355
Effect on fixed assets		50.000	26.250
Monetary effect		0.000	27.655
Real Net Income		210.000	223.450
Dividend		181.901	181.901
Balance sheet	0	1	2
Fixed Assets	1000.000	525.000	0.000
Cash	0.000	553.099	1173.553
Total Assets		1078.099	1173.553
Book value of equities at beg.		1000.000	1078.099
Effect on equities (Ei)		50.000	53.905
Real net incom		210.000	223.450
Dividend		181.901	181.901
Total equities at the end	1000.000	1078.099	1173.553
ROE		**20.00%**	**19.74%**
Residual income		**105.000**	**110.250**

Chapter2: The effects of growth on the equity multiples: An international comparison

Chapter2: The effects of growth on the equity multiples: An international comparison

1. Introduction

We study the relationship between market value of a company and its book value. While doing so, we answer two questions: (i) is the degree of association between book value and market value of equity a function of growth conditions and mode of financing of the company and (ii) are these forms of association invariant around the world?

The interest for this subject is first motivated by practical considerations. Investments in the international stock markets have become important for the fund managers of the entire world. In addition, the companies are more interested in the direct investment of the non-listed firms. The use of the methods based on observed ratios for the listed companies is very frequent in these two areas: "multiples are used often as a substitute for comprehensive valuations, because they communicate efficiently the essence of those valuations" (Liu, Nissim, & Thomas, 2002). Understanding the link between market value and accounting indicators is likely to enlighten the investment process for the countries where information is difficult to access for foreign investors.

The second motivation is theoretical in nature. It focuses on the relationship between book values and market values. The valuation models based on residual earning (R.I.M.) provide a supportive link between expected future earnings, book value of equities and their market value. The pioneer models of Ohlson (Ohlson J., 1995) or of Feltham and Ohlson (Feltham & Ohlson, 1996), for example, suggest a linear relationship between market value, book value of equity per share, expected earnings per share and finally a variable summarizing the effects of other information on the future earnings. New valuation model based on abnormal earning growth (A.E.G) has emerged and losing all reference to book value of equity (Ohlson & Juettner-Nauroth, Expected EPS and EPS Growth as determinants of Value, 2004). They claim that the expected earnings for the two future operating years and expected dividends are sufficient. The question is whether an extension of the R.I.M models likely to capture the abnormal growth of earnings enabling to establish a link between the book value and market value of equity, at least in certain circumstances.

We begin our study by extending the theoretical R.I.M. models. The objective is first to integrate the evolution of abnormal earnings depending upon the type of growth experienced by the firm. The modeling takes into account the possibility of change in the regime of growth at a point in time. It also supposes that the capacity of the firm to conserve the profit for its shareholders, the largest share of wealth created by growth opportunities, depend upon the importance of equity in the balance sheet. Finally, we have been careful not to accept the hypothesis of the relationship called "clean surplus.” By integrating these elements, we hope to improve the measurement of the relationship between book value of equity and its market value.

The second part of this chapter is empirical. Three samples are constructed for the period 1997-2007. They include companies from the United States, other developed countries (Australia, Canada, France, Japan and United Kingdom) and a set of emerging countries (China, Korea, Hong-Kong, India, Malaysia, Singapore, Taiwan and United Kingdom). Our goal is to propose a comparison at international level. From historical accounting data, we construct a synthetic indicator of growth by company. We then proceed to estimate our model by including these variables of growth and other control variables (size, no dividends, year and country). The objective is to verify that the inclusion of the book value of equity not only improves the explanatory power but also the specification of the estimated regression.

Our empirical study allows establishing the following results:

(i) Whatever is the geographical area, net income is the variable most strongly associated with the market value.

(ii) The introduction of the book value of equity not only increases the explanatory power of the models but also modifies significantly the estimate of earnings and market value of equity. These results show that inclusion of the book value of equity, in the regression which relates the market value of equity to net income, is important. Otherwise, a problem of missing variable biases the estimates obtained. Denying the information provided by the book value of equity is penalizing the empirical plan.

(iii) Taking into account the book value of equity in a direct linear form is insufficient. We show on one hand that the measurement used to characterize the phases of growth of the firm reflects the nonlinear nature of association between book value of equity and market value and on the other part that association between book value of equity and market value may be fundamentally different in the case of high and low indebted firms.

(iv) Two results emerge internationally. The low debt and high growth firms are better valued by investors during the period. When companies are in debt, the growth in earnings does not systematically reflect by the increase in the market value of equity. These empirical results confirm the prediction of our theoretical model.

We finally checked whether the variables of financial analysts' provisions and "dirty surplus" reflect the effects of expected growth. In this case we can expect that their inclusion affects our estimates. Our results show that:

(i) The information concerning the forecast of the expected earnings for the operating year and its variation provided by the analysts for the following year enhances the explanatory power of our regression. Their introduction in the regression models decreases the coefficient of association estimated previously between book value and market value for the companies in growth and low debt. These estimates, however, remain significant in the U.S. and largely in other developed countries.

(ii) The results that we get by introducing the "dirty surplus" in our regression model depend on the measure used. The "use" of a simplified measure of "dirty surplus" indicates positive association between a "dirty surplus" high positive and market value of equity. This link disappears, however, when the extent of "dirty surplus" incorporates all the information from the jobs and resources table. It should be emphasized finally that the introduction of these measures of "dirty surplus" does not alter the conclusion regarding the association between the book value of equity and market value.

The rest of the chapter is organized as follows. In section 2, we develop our model. Section 3 presents our data and some descriptive statistics. Section 4 describes the methods of calculation for the variables of growth and dirty surplus. Our results are presented in section 5 and section 6 concludes.

2. Problematic and model

2.1 The source of the model

If these associations are widely empirical, they have gained through the residual income valuation model (R.I.M.) theoretical support: Ohlson (Ohlson J. , 1995) or Feltham and Ohlson (Feltham & Ohlson, 1996), for example, propose a linear relationship between stock price, the book value per share, expected earnings per share, and finally a variable summarizing the effects of other information on upcoming results. The results of empirical test carried out by these models are mixed[7] . This is due to the restrictive assumption used: relationship called "clean surplus" satisfied and linear dynamics of expected residual earnings. It is delicate to summarize the dynamics of expected earnings with so few statistics: expected earnings per share and a constant coefficient of persistence. In many cases, the dynamics of earnings are more complex. The young companies generate small earnings, but expect high performance in a more distant future, performance, which may not always be maintained which therefore is more or less transitory. Companies having already started their growth phase emit high earnings for a significant number of years. Mature companies receive only modest rents more likely to be challenged by the pressure of the competitors. Companies in decline pass through period of varying length where residual results are negative. One of our hypothesis is that the association between the market value and accounting indicators deserves to be assessed taking into account the stage of growth in which the enterprise is. The objective of freedom from strict linear relationship suggested by Ohlson or Feltham and Ohlson has

[7] See for example (Dechow, Hutton, & Sloan, 1999), (Myers, 1999), (Lo & Lys, 2000), (Begley & Feltham, 2002), (Callen & Segal, 2005), (Choi, O'Hanlon, & Pope, 2006) .

been pursued in many publications[8]. The originality of this paper is inspired by a measure of growth , already used in accounting literature by Hribar and Yehuda (Hribar & Yehuda, 2008). Thus indirectly taking into account the importance of options of growth or abandon, we think to avoid some of the deficiencies highlighted by Holthausen and Watts (Holthausen & Watts, 2001).

Moreover, the hypothesis of "clean surplus" seems only rarely satisfied. In the framework of this study, we will take into account two effects from this observation. The first is that the accounting perimeter of the firms are in continuous evolution and it should approach the number correspond to same perimeters only. The second is that it is not impossible that the "dirty surplus" are itself associated with stock market values. On this last point, it is true that even if the latter may be important for some firms, their effect on the estimated coefficients of association remain an open question (Hand & Landsman, 2005), (Isidro, O'Hanlon, & Young, 2006).

2.2 The valuation model based on residual income and dirty surplus

The starting point is Ohlson model (Ohlson J. , 1995). The company owns, at the end of the period, a carrying book value of equity $\mathrm{B_t}$ and generates an accounting income $\mathrm{X_{t+1}}$for the subsequent period. Initially, we assume that the company operates in a framework of neutrality where the debt is neither a source of gains (taxes or agency benefits) nor a source of cost (default or agency cost). The earnings $\mathrm{X_{t+1}}$ does not particularly contain the economy of taxes related to debt financing. This restriction will be lifted later.

[8] Ainsi, Barth et al.(Barth, Beaver, & Landsman, 2001) note: “Studies that permit valuation coefficients to vary cross-sectionally or across components of equity book value and abnormal earnings are explicit attempts to control for nonlinearity, and can be viewed as being implicitly based on the nonlinearity in abnormal earnings in the Ohlson model … (Barth, Beaver, & Landsman, 1998) permits coefficients on earnings and equity book value to vary with financial health and industry membership. Permitting coefficients to vary cross-sectionally with these factors relaxes the linearity assumption in a particular way, and maintains linearity within each partitioning.”

Unlike the original model of Ohlson, we wanted to free ourselves from the hypothesis of “clean surplus” for two reasons. The first relates to the very definition of residual income X_t^a. It is estimated as the difference between income generated $X_t$and a capital charge equal to the products’ cost of capital r and the amount of equity in the balance sheet at the start of the period considered. In practice, we have a series of established incomes and balance sheets at the end of the period. Because of changes in the consolidation perimeter, it is not obvious that the balance sheet at the end of previous period corresponds to that of a balance sheet of opening of the considered period. Also, we introduce the concept of adjusted book value of equity $B_t^{'}$. It is equal to the book value recorded at the end of the period minus the published earnings and increased by free cash flow to shareholders (Free cash-flows for equities F_t). It is from this amount that the capital charge estimated is useful for calculating the residual income. We, thus, hope to have more homogeneous measures since the perimeter for the accounting calculation of X_{t+1} and $B_t^{'}$ are identical. Let us therefore:

$$\mathbf{B_t' = E_t[B_{t+1} - X_{t+1} + F_{t+1}]} \quad (1)$$

$$\mathbf{E_t[X_{t+1}^a] = E_t[X_{t+1}] - r \cdot B_t'} \quad (2)$$

From (1) and (2), we get:

$$\mathbf{E_t[X_{t+1}^a] = E_t[X_{t+1}] \cdot R - r \cdot E_t[BC_{t+1}]} \quad (3)$$

With $BC_{t+1} = B_{t+1} + F_{t+1}$ (book value cum free cash flows for equities) and $R = 1 + r$

We assume that these expected normalized residual earnings follow an autoregressive process. The autoregressive component of $E_t[X_{t+1}^a]$ is noted as $\omega. X_t^a$ where ω is a coefficient of persistence. It is amended by three variables:

- The first indicates the stage of growth of the company. To simplify the analytical developments, we retain only two stages that we designate by the stage of growth and stage of maturity. The generalization to numerous stages does not pose any problems but leads to cumbersome notations. In addition we borrow from Zhang (Zhang G. , 2000) , the assumption that the value attributable to growth opportunities that will be exploited in the long run is proportional to the capital invested: $a \cdot BC_t$. And we assume that least one enterprise is dependent on external financing, the greater is its ability to retain profit for its shareholders, the value created by its investments[9].We denote by a_m the wealth created per unit of capital in a state of maturity and $a_g$in a situation of growth.

- The second is the "dirty surplus"Φ_t.The sensitivity coefficient of residual income due to "dirty surplus" is found and noted as d. It is true that even if the "dirty surplus" may be important for certain firms, their effect remains an open question (Hand & Landsman, 2005), (Isidro, O'Hanlon, & Young, 2006). The variable Φ_t follows an autoregressive process, taking along those lines introduced by Ohlson linear dynamics: $E_t[\Phi_{t+1}] = \rho \cdot E_t[\Phi_t]$ where ρ measures the persistence of this "dirty surplus".

- The third is a variable of innovation N_t which translates information into residual income which is not reflected in the book values of common equity, net profits, the accounting indicators of growth opportunities and "dirty surplus". The variable N_t follows an autoregressive process: $E_t[N_{t+1}] = \gamma \cdot N_t$

[9] Although the assumption seems questionable since it implies that the more a company is of great size (large), the more it has the growth opportunities. As we then divide the amount of equity by total assets, it is the relative importance of equity which is linked to the creation or destruction of shareholder value.

Two indicators I_t^m and I_t^g designate the state of maturity or growth of the company at time t. The transition probabilities are assumed to be constant and respectively equal to $\mathrm{prob}(m,m) = 1$ and $\mathrm{prob}(g,g) = p$.The growth rate of book value of equity cum free cash flow are expected to differ according to the state of the firm (c_m or c_g). In the way of Feltham and Ohlson (Feltham & Ohlson, 1996), but in a different framework, our model is built around following dynamics:

$$\breve{\mathbf{X}}_{\mathbf{t+1}}^{\mathbf{a}} = \boldsymbol{\omega}.\mathbf{X}_{\mathbf{t}}^{\mathbf{a}} + \mathbf{I}_{\mathbf{t}}^{\mathbf{m}} \cdot \mathbf{a_m} \cdot \mathbf{BC_t} + \mathbf{I}_{\mathbf{t}}^{\mathbf{g}} \cdot \mathbf{a_g} \cdot \mathbf{BC_t} + \mathbf{d} \cdot \boldsymbol{\Phi}_{\mathbf{t}} + \mathbf{N_t} + \breve{\boldsymbol{\varepsilon}}_{\mathbf{1,t+1}} \quad (4)$$

$$\breve{\boldsymbol{\Phi}}_{\mathbf{t+1}} = \boldsymbol{\rho} \cdot \boldsymbol{\Phi}_{\mathbf{t}} + \breve{\boldsymbol{\varepsilon}}_{\mathbf{2,t+1}} \quad (5)$$

$$\breve{\mathbf{N}}_{\mathbf{t+1}} = \boldsymbol{\gamma} \cdot \mathbf{N_t} + \breve{\boldsymbol{\varepsilon}}_{\mathbf{3,t+1}} \quad (6)$$

$$\breve{\mathbf{BC}}_{\mathbf{t+1}} = \mathbf{c_m} \cdot \mathbf{BC_t} + \breve{\boldsymbol{\varepsilon}}_{\mathbf{4,t+1}} \quad \textbf{si } \mathbf{I}_{\mathbf{t}}^{\mathbf{m}} = \mathbf{1} \quad (7)$$

The fix parameters$0 < \omega < 1$, $0 < \gamma < 1$, $0 < \rho < 1$, a_m, a_g, c_m, c_g, p and d are determined by economic environment and accounting principle in use. By combining valuation model by actualized expected dividends, assuming a constant cost of capital and homogenous beliefs (see Annex-1) , we can write the market value of a company at maturity as a linear combination of the variables set out. To control the size effect, we divide each of the variable involved in valuation by total assets TA_t : $bc_t = \frac{BC_t}{TA_t}$ $x_t = \frac{X_t}{TA_t}$ $x_t^a = \frac{X_t^a}{TA_t}$ $\varphi_t = \frac{\Phi_t.}{TA_t}$. $\nu_t = \frac{N_t}{TA_t}$ and we get:

$$vc_0^m = \alpha_1^m \cdot bc_0 + \alpha_2 \cdot x_0 + \alpha_3 \cdot \varphi_0 + \alpha_4 \cdot \nu_0 \qquad (8)$$

With

$$vc_0 = \frac{V_0 + F_0}{TA_0}$$

Similarly, the market value of a growth company has the form:

$$vc_0^g = \alpha_1^g \cdot bc_0 + \alpha_2 \cdot x_0 + \alpha_3 \cdot \varphi_0 + \alpha_4 \cdot \nu_0 \qquad (9)$$

We have up till now assumed that the financing does not affect the value of the company (universe of type Modigliani and Miller).We lift this restriction and assume that debt D_0 affect the value of the firm through tax savings that it generates, the bankruptcy cost that it raises or gains and cost of agency which it may be associated with. We complement the previous model by the term $\alpha_0 \cdot \frac{D_0}{TA_0}$. The coefficient α_0 measures the leverage effect. It can be positive or negative depending upon the net impact of the debt on the market value of equity. In the remainder of the study, we distinguish companies of low leverage (LL) and high leverage (HL). They are designated in the model by indicator Li. The amount of debt is estimated by the difference between the total assets and value of equity[10]:$D_0 = TA_0 - BC_0$

Finally, for the rest of the study, we will retain a classification of firms in five growth stages within which we assume that the coefficient α_1 is constant for each level of financial leverage. We retain the general form:

$$vc_0 = \sum_{i=1}^{i=2} \alpha_{0,i} \cdot L_i + \left(\sum_i^2 \sum_{j=1}^{j=5} \alpha_{1,j,i} \cdot I_{j,i} - \sum_{i=1}^{i=2} \alpha_{0,i} \cdot L_i\right) \cdot bc_0 + \alpha_2 \cdot x_0 + \alpha_3 \cdot \varphi_0 + \alpha_4 \cdot \nu_0 \quad (10)$$

[10] To simplify the writing of the model, we take an approximation from the book value of equity cum Free Cash-Flows.

The coefficient $\alpha_{1,j,i}$ depends upon the stage of growth and financial leverage, $\alpha_{0,i}$ for financial leverage, α_2 for the cost of capital and the coefficient of persistence of residual income, α_3 for informational importance of "dirty surplus" and α_4 for the market expectation not contained in the presented accounting measures.

3. Data and descriptive statistics

3.1 Constitution of the samples

Our sample was compiled from the information available in early November 2008[11] in the database Thomson Financial Accounting Research Data and covering 15 countries for which the number of firms represented in this database is the highest. It contains both developed countries (Germany, Australia, Canada, France, Japan, United Kingdom and USA) and emerging countries (China, Korea, Hong Kong, India, Malaysia, Singapore, Taiwan, Thailand).The missing information between 1997 and 2007 have reduced the size of the sample. The widest sample contains all the companies for which eight basic data were available[12].The number of the companies retained (139,942 firm/years) are growing from 7149 in 1997 to 17,376 in 2007, mainly due to the coverage of countries other than USA and especially in emerging countries (for example for China and India, from 363 to 3,670).

Because of the special nature of their business and specific accounting rules that apply, we have eliminated the financial companies and banks, as well as the companies operating in the real estate. Thus, following the classification

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[11] It is possible that certain information have been ex-post modified by the data provider.

[12] Year end market capitalization(WS.YrEndMarketCap),Book value of equity (WS.TotalCommonEquity), Net Income (WS.NetIncome), Sales (WS.Sales), Dividend per share (WS.DividendsPerShare), Number of shares outstanding (WS.CommonSharesOutstanding), Total Assets (WS.TotalAssets) and Year end market capitalization in US dollars (WS.YrEndMarketCapUSD)

proposed by Fama and French into 49 sectors, companies belonging to sectors 45(Banks, Banking), 46(Insurance), 47(Real Estate) and 48 (Financial Trading) have been removed[13]. In total, as detailed in table1, this restriction has eliminated 26,626 observations from 139 942 for developed countries (the phenomenon being relatively marked for the United Kingdom 4 679 cases for 14 603 of data) and 7 068 of 56 536 for emerging countries, relatively, but less affected.

We, then, subtracted the small companies for which accounting information may be less reliable and for which forecast information were non-existent. The threshold was set at a market capitalization of at least U.S. $ 1million and a book value at least equal to this value. These eliminations are not concentrated in time, even if the thresholds are fixed. We thus retained for the rest of the study 100 491 firm/year for the developed countries (with a maximum of 12 449 firms in 2007 and a minimum of 5 498 in 1997) and 47 688 firm/ year for the emerging countries (with a maximum of 7 878 in 2007 and a minimum of 1 406 in 1997.)

As we have to estimate a relationship, which includes a capitalization of net income with a term of positive auto correlation, we restricted to cases where the earnings for the operating year were positive and therefore correlated positively with the expected earnings for the periods to come. The profitable companies represent an average proportion of 68.2% for our sample of companies for developed countries. This percentage has been declining over the period (81.8% to 66.3% decrease) and the disparities are high (43.9% for Australia and 49.9% for Canada against 80.8% for France and 80% for Japan). Regarding emerging markets the number of observations is increased to 38 482. The average

[13] The same has been done for the sector 49(Other Almost Nothing) .Finally, the ADR have not been taken into account.

percentage of profitable companies is very high: 80.7%. This average hides annual changes (71.2% in 1998 against 84.8% in 2007) and disparities among countries (70.7% for Hong Kong against 89.7 % for India).

In order to monitor the effect of the period in each country[14], we have selected only firms with the standard year end, seeing the majority of the companies for the country in question. Generally, this date is 31 December, except for Australia (30 June), Japan and India (31 March). The observations retained are then 10,657 for U.S., 21,290 for other developed countries and 20,604 for emerging countries[15].

[14] As an example, Thomson Financial appoints year 2007 as calendar year for a company whose end of the year is December 31, 2007 and the period 1st April 2006 -31st March, 2007 for a company whose operating year end is 31 March.

[15] When Information concerning tables of jobs and resources are necessary, the samples are reduced to 10 221 for the U.S., 12, 775 for other developed countries and 11,971 for emerging countries, respectively.

Table 1

Statistics describing the number of selected companies

Source: Worldscope (Thomson Financial).

Firms – Years remained	*USA*	*Germany*	*Australia*	*Canada*	*France*	*Japan*	*U.K*	*Korea*	*Hong Kong*	*Singapore*	*Taiwan*	*Malaysia*	*Thailand*	*China*	*India*
after elimination for missing data	59 607	7 204	9 718	9 318	6 292	33 200	14 603	7 660	7 757	4 224	9 051	7 041	3 827	9 989	6 987
after elimination of financial sectors	46 419	5 541	7 991	7 978	5 157	30 306	9 924	7 042	5 917	3 623	8 536	5 830	3 098	9 028	6 394
after elimination of firms of small size	37 149	5 247	7 075	7 110	4 892	30 031	8 987	6 811	5 594	3 521	8 500	5 648	2 887	8 771	5 956
After elimination of the firms of negative income	24 279	3 682	3 105	3 546	3 915	24 278	5 758	5 263	3 953	2 737	6 722	4 329	2 330	7 806	5 342
With basic information only															
after eliminating those for which the indicator of growth or dirty surplus could not be calculated	16 660	2 556	1 793	1 896	2 696	16 788	3 793	3 499	2 645	1 756	4 296	2 619	1 614	5 597	2 153
After the elimination of those having a year-end non-standard	10 657	2 148	1 337	1 534	2 106	12 514	1 651	3 296	1 561	1 104	4 287	1 562	1 493	5 578	1 723
after eliminating those with no known forecasts	8 451	1 173	798	1 176	1 314	5 043	1 266	759	762	465	1 023	594	634	1 539	725
Taking into account the information from the tables of jobs and resources															
after eliminating those for which the indicator of growth or dirty surplus could not be calculated	16 286	1 446	1 744	1 639	1 532	7 897	3 748	2 489	2 523	1 557	2 255	2 377	1 394	1 070	1 642
after removal of those with a non-standard year-end	10 221	1 205	1 289	1 177	1 211	6 266	1 627	2 340	1 456	943	2 247	1 405	1 273	1 042	1 265
after elimination of those with no known forecasts	8 117	795	772	969	866	3 848	1 225	637	731	422	919	551	533	563	622

3.2 Descriptive Statistics

Table 2 describes the characteristics of our key variables for parent population (all companies showing profit between 1997 and 2007). The average ratio of market value cum free cash-flows/ Total assets differs across countries. It is high on average for USA during this period (1.491) with respect to value taken in other developed countries (0.878) or in emerging countries (1.055) a test of difference between means indicates that these are significant (t-stat=52.696, p-value=0.000 against other developed countries and t-stat=30.791, p-value= 0.000 against emerging countries). The means conceal important disparities. As for other developed countries, Australia, Canada and the United Kingdom have high levels (1.442, 1.250 and 1.266) and Japan a very low level (0.672), Germany and France are located in the middle. This phenomenon is the same for emerging countries, where China (1.461) and India (1.184) are at the top and while Korea displays a low average ratio (0.632).

The study of the ratio book value of equity cum free cash flows/ Total Assets does not show any significant economic differences on average according to the geographical areas studied (U.S.A. : 0.521, other developed countries: 0.482 and emerging countries :0.553) even if these differences are statistically significant (t-stat= 15.575,p-value=0.000 for US against other developed countries t-stat= -12.983, p-value=0.000 for emerging countries against United States and t-stat= -28.930, p-value=0.000 emerging against other developed countries).

The average accounting profitability (Net income/ Total Assets) is significantly higher for the USA (0.070) as for other developed countries (0.046 with a mean test showing the t-stat values=47.499, p-value =0.000) and emerging countries(0.061 with a mean test showing the t-stat values=13.785,p-value=0.000). In the latter two cases, the situations by countries in these areas are disparate. Australia (0.085), United Kingdom and Canada show the highest performance and Japan has lagged behind (0.031). This is true for emerging countries led by Thailand (0.076) or Hong Kong and China (0.042) or Korea on the tail. The dispersions are higher in the USA and emerging countries.

The companies retained are the largest in U.S.A. The size, measured by the logarithm of the market capitalization in U.S. dollars, takes an average value of 6.775 against 5.376 in the case of other developed countries (a test of mean show t-stat=58.25, p-value=0.000) and 4.953 in the emerging countries (a test of mean reveals values t-stat=83.770, p-value=0.000). In the last two zones, appear some disparities among countries: thus , Australia displays a low average value (4.865) for other developed countries. China has the highest value in emerging countries; Thailand and Malaysia have the lowest values. In terms of dispersion measure, the standard deviation of the size is largest for U.S.A. (2.160) (1.952 for other developed countries and 1.645 for emerging countries). American sample covers the broadest spectrum of the companies.

The dividend policies are different, depending on the considered zones. For all these profitable companies, there is only USA where 48.6% of cases they pay dividends. This can be explained either because they distribute their capital more voluntarily by share buy-backs, or because their investors are more sophisticated, that they appreciate investments when they are profitable and settle their liquidity needs by transactions in their securities. The average statistics are much higher for other developed countries (84.6%) and emerging countries (74.9%), yet it is good to emphasis the strong national differences (61.9% for Canada against 92.4% for Japan or 58.4% for China against 89.9% for India).

Table 2

Descriptive Statistics

The observations relate only for profitable companies for which data of the balance sheet, income statement and dividend were available to the common year end, date for each country. The data come from Worldscope (Thomson Financial) and cover the period 1997-2007.

	Market value cum Dividends / Total Assets				
	Mean	Median	S.D	Q1	Q3
USA	1,491	1,051	1,383	0,615	1,830
Other developed countries	0,878	0,580	0,968	0,330	1,044
Emerging countries	1,055	0,722	1,086	0,407	1,279
	Book value cum Dividends / Total Assets				
	Mean	Median	S.D	Q1	Q3
USA	0,521	0,499	0,213	0,359	0,680
Other developed countries	0,482	0,468	0,207	0,326	0,635
Emerging countries	0,553	0,538	0,205	0,397	0,704
	Net Income / Total Assets				
	Mean	Median	S.D	Q1	Q3
USA	0,070	0,056	0,057	0,031	0,095
Other developed countries	0,046	0,033	0,046	0,016	0,060
Emerging countries	0,061	0,047	0,054	0,022	0,084
	Size				
	Mean	Median	S.D	Q1	Q3
USA	6,775	6,828	2,160	5,390	8,210
Other developed countries	5,376	5,115	1,952	3,951	6,594
Emerging countries	4,953	4,892	1,645	3,827	5,924
	Absence of dividend			No. Of observations	
	Frequency				
USA	51,4%			21 290	
Other developed countries	15,4%			20 604	
Emerging countries	25,1%			10 657	

4. Estimation of other explanatory variables

4.1 Measurement of the growth phase

To measure the indicator of the growth stage $I_{j,i}$ of equation (10), we followed a methodology inspired by Hribar and Yehuda (Hribar & Yehuda, 2008). We constructed a composite variable of growth, according to the three basic variables: the variation of sales over 2 year in%, the variation of book value of equity in excess of net income and the investment ratio over 2 years compared to the depreciation allowances during these operating years (see 8.2 Annex A-2).This composite variable was estimated for all the firms profitable or not and used to classify firms into 5 groups (BG big growth, FG fast growth, MG average growth, SG small growth and WG low growth).

Table 3

Breakdown of observations by class of phase of development cycle and zone.

The total number of observations is reduced because of variations in calculations over 2 years and accumulated normalized ranks. The sample covers the period 2000-2007. BG denotes the class of Big growth, FG fast growth , MG medium or average growth, SG and WG small growth and low growth. The population chosen is that corresponding to the model of calculation "Dividends".

	Big Growth	Fast Growth	Medium Growth	Small Growth	Weak Growth
	BG	FG	MG	SG	WG
Assignment rule according to the cumulative rank	$RC_{i,t} \geq 1{,}507$	$1{,}507 > RC_{i,t} \geq 1{,}130$	$1{,}130 > RC_{i,t} \geq 0{,}810$	$0{,}810 > RC_{i,t} \geq 0{,}472$	$RC_{i,t} < 0{,}472$
USA	19,8%	20,6%	20,7%	21,0%	17,9%
Other developed countries	7,9%	24,3%	15,6%	12,0%	40,3%
Emerging countries	19,4%	17,7%	18,0%	24,1%	20,8%

As shown in Table3, the profitable companies[16] of USA are somewhat fewer for extreme classes. By construction, the frequency was 20% for the initial population. It is 17.9% for the class of low growth (WG). Other developed

[16] The analysis here is that of measurement of growth obtained by using variation of net assets, not investments.

countries have more observations in the WG class(40.3%) and less in BG (7.9%) class, occurring over the period 2000-2007 and for this sample, on average, less dynamic than that of USA. This phenomenon concerns neither Australia nor Canada. It is present in Germany, France and UK, but it is pronounced in Japan (3.3% for BG and 48.4% for WG). In emerging countries, China is equipped with high (big) growth companies (30.7% for BG).

The classification of companies according to their financial leverage has been realized from the ratio $\frac{BC_t}{TA_t}$. The estimated median of American sample was used to divide all populations.

4.2 Measurement of "dirty surplus "

We estimated the "dirty surplus" φ_t two ways. The first is approximate but economical in data. The second is more precise but requires access to tables of jobs and resources which are not always available on Thomson Financial database. The sample is then reduced, especially for the emerging countries. The first definition, designated as the "method of dividends", is given by:

$$\varphi_t = \frac{\Delta \text{Book value of equity}_t}{TA_t} - x_t + \frac{\text{Dividends}_t}{TA_t}$$

The second definition from the items available on the database and incorporating the table of jobs and resources is given by:

$$\varphi_t = \frac{\Delta \text{Book value of equity}_t}{TA_t} - x_t + \frac{\text{Dividends}_t}{TA_t} + \frac{\Delta \text{Dividends payable}_t}{TA_t} - \frac{\text{Sale of Common stock}_t}{TA_t} + \frac{\text{Purchase of Common stock}_t}{TA_t}$$

It reports the changes in the equity in the balance sheet, net income, the flow of funds related to dividends, sale and purchase of shares adjusted by the liabilities accounts which reflects the lags in payment of dividends. The Annex A-3 provides an example of calculation of “dirty surplus.” This method is subsequently designated as “method of free cash flow.”

Since the effects of a “dirty surplus” positive or that of a “dirty surplus negative” can be different, we have not retained the assumption of constant coefficient α_3 in equation (10). For each method, we separated the total US sample (profitable or non profitable companies) in four sub-samples in the light of the ratio dirty surplus/Total assets: two sub-samples distinguishing between positive ratio values above and below its median and two sub-samples containing the negative ratios separate according to their median. By using the terminals proposed by American sample, we have reclassified the businesses of other countries into these four categories within which we have assumed the effect of “dirty surplus” fixed.

Table 4

Breakdown of observations by class of dirty surplus and zone.

The table shows the frequency of belonging to one of the classes for each geographical zone. The mode called "Dividends" of calculating the dirty surplus, used for this table, does not include cash flows other than dividends which may have affected the equity. The method known as the "free cash flow" is analyzed. The sample covers the period 2000-2007 and only the profitable companies.. Source : Worldscope (Thomson Financial).

	Dirty surplus négative		Dirty surplus positive	
	inferior	superior	inferior	superior
	DSNinf	DSNsup	DSPinf	DSPsup
According to the method of "dividends"				
USA	19,9%	18,3%	40,0%	21,8%
Other developed countries	8,8%	32,4%	45,2%	13,6%
Emerging countries	8,5%	28,9%	44,4%	18,2%
According to the method of « free cash-flows »				
USA	13,2%	15,3%	38,9%	32,6%
Other developed countries	18,1%	26,2%	36,4%	19,3%
Emerging countries	19,9%	27,1%	33,5%	19,5%

The fact of having removed the deficit companies in the USA results in the elimination of many companies which have "dirty surplus" positive high for the first estimation. Table 4 shows that the phenomenon disappears when the more accurate method called the "free cash flow" is used. The "dirty surplus" positive is more than the dirty surplus negative for these profitable companies, even after correction for the flows other than dividends.

4.3 Measurement of the income and variable representing other information

The equation (10) propose a relationship between market value (cum Free Cash-Flows) at the end of the period, the income of the preceding financial year and a variable taking into account the expectation of the evolution of the income in the year to come from other information as explained in the model. We have introduced in the tested model two measures: the earnings actually announced later and the consensus available at the end of the period concerning pervious earnings. The first measure is only available for the broader samples but to reduced information. Clearly the income of the past is not known at the end of period. The first measure suffers from noise introduced by the difference between market expectations and realizations. The second is affected by another problem. The market has the forecast made by financial analysts. But these are reported with a lag time by the IBES. In the latter case, the problem is of whether the market has fully or partially anticipated the forecast contained in the IBES consensus. To take into account this aspect of the problem, we have introduced an error variable equal to difference between the realized and forecast income. If the anticipation is complete, this error variable should affect the coefficient equal to that of forecast earnings but in opposite signs. If anticipation is zero, the coefficient should be non significant. If the market has the partial information, gap variable should intervene, but with a lower coefficient. The averages of these error variables show an optimism bias over the period for the U.S. market and other developed countries, -2.9% and -3.8% respectively (the average for the emerging countries is 0.4%)[17].

Finally, we have assumed that the variable υ_t representing other information is proportional to the change in expected income in a year compared to the past income. The latter are equal to the percentage change in expected earnings per share in the IBES consensus, multiplied by the ratio of net income to total assets.

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[17] This bias shows no links with measure of growth phase.

5. Regression Analyses: results

Through a first series of regression in each zone and taking into account the linear relationship between market value and book value we highlight the particular role that equity plays in the balance sheet. We then estimate a more complete model, derived from our theoretical model, where we integrate through dummy variables the combined effects of growth and indebtedness on the coefficients of association book value and market value of equity. Finally, we check whether the variables of dirty surplus and earning forecast complement the variable of interaction between book value, growth and financing.

5.1 The role of book value of equity in association with market value

Table 5 provides the estimation results of five different specifications between market value of equity, accounting and forecast earnings measures, book value of equity and different characteristics of the company, size and a measure of dividend policy. In order to facilitate the comparison between these different specifications, we used the sample, for all the estimates, that is used for the model more demanding in data. The results are presented for the three selected sub-samples and cover 8117 observations for the United States, 8475 observations for other developed countries and 4978 observations for the emerging countries.

Table 5

Place of the book value of equity in the associations between stock prices and accounting numbers

The explained variables are market value at the end of the period plus Free Cash-Flows to shareholders. The sample covers the period 2000 to 2007.The control variables year have been omitted in the presentation for more readability. The explanatory variables are the book value of equity plus the Free cash Flows(CP), Net income of the previous year(RP) or expected income in 31/12 (RNP), Earning forecast errors by analysts at year end (ERPN) and the expected changes in earnings by the analysts for the following year(VRN). All these variables are normalized by total assets. The other explanatory variables are the size (logarithm of market capitalization in US dollars) and the absence of dividend payments(NoDiv).The tests of comparisons of the models are of type Chow test for nested models and are of Vuong(1989) for non-nested models.

	USA (n=8 117)					Other developed countries (n=8 475)					Emerging countries (n=4 978)				
	Panel A – Estimation results														
Equation	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
R2	0,385	0,445	0,513	0,544	0,502	0,450	0,478	0,532	0,563	0,532	0,463	0,467	0,534	0,568	0,562
Constante	0,448	-0,308	-0,364	-0,675	-0,046	0,279	-0,092	-0,117	-0,293	0,109	0.333	0,176	0,099	-0,206	0,010
	*12,27 ** *	*-7,69 ** *	*-9,62 ** *	*-16,96 ** *	*-1,30*	*10.55 ** *	*-3.29** *	*-4,31** *	*-10,21 ** *	*4,29 ** *	*7,70 ** *	*3,789 ** *	*2,209 ** *	*-4,37 ** *	*0,240*
CP		1,822	1,590	1,632			0,964	0,834	1,013			0,419	0,342	0,540	
		*26,47 ** *	*23,62 ** *	*23,54 ** *			*20,546 ** *	*18,24 ** *	*21,96 ** *			*5,38 ** *	*4,74 ** *	*7,69 ** *	
RN	15,96	12,710				14,407	12,701				12.945	12,227			
	*42,65 ** *	*31,32 ** *				*38,24 ** *	*32,23 ** *				33,57 **	*27,40 ** *			
RNP			13,368	12,615	15,830			12,950	12,384	14,232			11,805	11,144	12,139
			*34,72 ** *	*32,17 ** *	*44,27 ** *			*36,31 ** *	*35,68 ** *	*42,69 ** *			*29,42 ** *	*28,72 ** *	*36,29 ** *
EPRN			-6,130	-6,204	-7,984			-7,131	-6,575	-7,889			-8,322	-7,313	-7,956
			*-7,82 ** *	*-8,12 ** *	*-9,50 ** *			*-9,26 ** *	*-8,54 ** *	*-9,57 ** *			*-12,44 ** *	*-11,16 ** *	*-12,05 ** *
Taille				0,135	0,098				0,108	0,088				0,144	0,135
				*16,44 ** *	*11,89 ** *				*20,11 ** *	*16,541 ** *				*17,70 ** *	*16,74 ** *
NoDiv				0,485	0,575				0,290	0,249				0,318	0,290
				*18,70 ** *	*20,90 ** *				*7,17 ** *	*5,95 ** *				*7,53 ** *	*6,70 ** *
VPRN			9,041	8,736	9,066			6,983	6,727	7,201			8,854	9,152	9,081
			*11,47 ** *	*11,19 ** *	*11,20 ** *			*9,17 ** *	*8,81 ** *	*9,02 ** *			*11,35 ** *	*11,46 ** *	*11,46 ** *
	Panel B – Tests of comparisons of models														
Models compared	*(2) vs (1)*	*(3) vs (2)*	*(4) vs (3)*	*(4) vs (5)*	*(3) vs (5)*	*(2) vs (1)*	*(3) vs (2)*	*(4) vs (3)*	*(4) vs (5)*	*(3) vs (5)*	*(2) vs (1)*	*(3) vs (2)*	*(4) vs (3)*	*(4) vs (5)*	*(3) vs (5)*
Test	*870,011*	*63,736*	*280,917*	*756,613*	*147,197*	*476,389*	*61,197*	*294,356*	*590,457*	*120,882*	*36,183*	*53,836*	*196,977*	*70,97*	*119,748*
P-value	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*	*0,000*

In the United States, the variable net income, realized or expected, has the highest degree of association with the market value. The obtained value of coefficient of association, 15.96 in first specification, is to be put in perspective of the response coefficient estimate 11.91 in a similar regression and normalization of the variables by total assets by Kothari and Zimmerman(1995) over the period 1952-1989. The gap between these two estimates may be linked to the fact that we have retained the data only for the profitable companies[18].

The introduction of the book value of equity significantly increases the R^2 (0.445 against 0.385), the comparison of two specifications on the basis of Fisher's test show a statistic equal to (F=870.01 and p-value of 0.00) but especially suggests that the first estimate of coefficient of association of net income suffered from a problem of missing variables. The coefficient jumps from 15.96 to 12.71, but the sign and the magnitude of the bias are in line with expectations[19]. The order of the magnitude of this statistics is only marginally affected by the inclusion of new variables in other specifications.

The coefficient associated with the book value of equity is high (1.82) and significantly larger than unity (t-stat=11.94), would suggest the example of Ohlson (1995) model. We find here a characteristic already observed in the literature (e.g., Dechow et al., (1999)). It is delicate to appreciate the value of this coefficient outside the adequate theoretical framework, note however that its value is found in a report from 1 to 7 with the coefficient of association of net income, report close to what present the literature, for example Collins et al (1997) (report a value of 6.3 after the results in Table 3, page 49). Substituting the expected income to realized income, the measure of forecasting error and

[18] See on the asymmetric behavior of the coefficient of association Hayn (1995). Note however that this difference may also find its origin in the evolution in time of association (Collins et al.(1997).

[19] It is remarkable to see that the application of the formula of omitted variable (Greene (1983), equation 8-4, Page 148) shows an estimate of the bias equal to 3.27, a value very close the gap between measured coefficient estimates of income,3.25.

that of the anticipation of the variation of earnings reinforces association with the income while maintaining the high coefficient (1.59) of book value of equity (equation 3). A test of Vuong(1989) also highlights the interest to substitute the earning forecast data to accounting earning data(Stat=63.73, p-value=0.00). The negative and significant coefficient in front of the forecast error(-6.13,t-sata= -7.83) suggests, however, that the association between market value of equity and forecast data is not completely naive: everything seems as though the association was partially corrected the forecast error committed by the analysts.

The control variable size and absence of dividends do not substantially alter the estimated coefficients (equation 4) but to increase the overall significant of model (F=280.91, p-value=0.00). These variables are significant. The size is positively related to value as well as the variable absence of dividends. In the latter case, as the sample includes only profitable companies, the absence of dividends may indicate the presence of profitable investment opportunities. Finally, the omission of the book value of equity in association relationship (equation5) decreases the R^2 and especially strongly affects the obtained coefficient for net income (15.83) in a pattern of omitted variable already mentioned previously. In the case of USA, the contribution of this variable may not be replaced by those of forecasting variables (the test of restriction on the coefficient of book value of equity show a statistic F=756.61 and a p-value of 0.00, which argues for the presence of this variable in the specification) or control variables (the test of Vuong(1989), with a statistic equal to 147.19 and a p-value of 0.00 indicates that the variable of size and absence of dividends cannot substitute the role played by the book value of equity even if the gain in terms of R^2 appears low (0.513 vs. 0.502)).

The results obtained for other developed countries and emerging countries suggest a more modest explanatory role of book value of equity. The coefficients are close to unity for the former and significantly lower than unity for emerging countries. The absence of this variable affects the associated coefficient of income which is, then, always higher (14.232 from equation 5 against 12.384 from equation 4 for other developed countries and 12.139 against 11.144 for emerging countries). Forecasting errors occur significantly for both populations with negative coefficients and much lower than the absolute value of those associated with the net income. In all these countries, the IBES consensus represents only a part of forecasting information taken into account by the market. The absence of dividends intervenes significantly, but the coefficient associated are significantly lower than that obtained in the United States (0.290 from equation 4 for other developed countries and 0.318 for emerging countries against 0.485 in the United States). The phenomenon of the absence of the dividend is perhaps less popular with companies in growth. The coefficient of size factors is significantly positive for these countries.

5.2 The association between phases of development, level of indebtedness and stock market values

The theoretical model developed in the first part of this article suggests that the association between book value and market value is affected by the growth and indebtedness. Tests concerning the various values of coefficients of associations stemming from linear regression, suggested by equation (10), permit to test the empirical implication of valuation model. To this end, the estimated regression model contains a number of interaction variables to distinguish the cases of low-leveraged firms (value greater than median) and highly leveraged (lower). The model estimated thus contains among all the explanatory variables the book value cum free cash flow as well as a variable of interaction HL.CP allowing to isolate the case of highly leveraged companies. In the same way, eight dummy variables were combined with normalized book value of equity cum free cash flow to identify the specific effects of various phases of growth, this conditional to two levels of selected debts, are BG.CP, FG.CP, MG.CP and SG.CP for level of growth big, fast, average and small and HL.BG.CP, HL.FG.CP, HL.MG.CP and HL.SG.CP for these same level of growth but for the businesses most heavily indebted. Finally, the dummy variable HL (high leverage) was introduced to distinguish the fixed effects specific to each sub-population.

The other variables introduced in the regression models are either suggested by equation (10), as the expected net income for the closed exercise (operating years), effect of dirty surplus, or listed as control variables, such as size and absence of dividends. Concerning the net income of the period, we assume in this test that the market is able to anticipate the final income of the closing exercise (period). Two dummy variables concerning the “dirty surplus”: one indicates the presence of a “dirty surplus” positive high (above the median of this sub-population) and the other “dirty surplus” particularly pronounces negative(less than the median of this sub-population). Dummy variables, finally, have been introduced to take into account the fixed effects relating to various years selected and, for the two sub-samples consisting of developed countries (outside U.S.) and emerging countries, differences may exist within selected countries.

Table 6 contains estimates obtained on the basis of a set of information reduced to balance sheet, income statements and dividends. The Panel (A) presents the estimation results for the restricted sample where the companies also followed by the financial analysts and having cash flow data.

Table 6

Effects of growth, leverage and dirty surplus in the absence of cash flow data and earnings forecasts.

The explained /response variables are stock market values at the end of the period plus the dividends. The explanatory variables are the accounting income of the previous year (RN) and the book value of equity plus dividends (CP).To correct the size effect, all variables were normalized by total assets. The dummy variable HL identifies the firm for which the leverage is greater than the median. The interaction variables BG,FG,MG and SG are used to describe the phases of growth. The other variables are the size (logarithm of the market capitalization in US dollar) and absence of dividend payments (NoDiv). The control variable year have been omitted for more readability. The results are presented for a restricted sample common to different specifications (Panel A) and an expanded sample allowed by the specification analyzed, here.

	USA	Other developed countries	Emerging countries	USA	Other developed countries	Emerging countries
	Panel A : Restricted sample			Panel B : Full sample		
Nb. obs.	8 117	8 475	4 978	10 657	21 290	20 604
R2	0,537	0,535	0,558	0,492	0,486	0,524
Cste	0,457	0,291	0,240	0,544	0,454	0,423
	*7,99***	*4,11 ***	*1,756*	*11,55***	*9,79 ***	*13,36 ***
HL	-0,435	*-0,408*	*-0,246*	-0,424	*-0,336*	*-0,364*
	*-8,633***	*-22,18***	*-9,12*	*-9,89 ***	*-32,90***	*-30,97 ***
RN	11,635	12,264	10,404	10,18	10,339	7,909
	*28,66 ***	*28,41 ***	*24,54 ***	*31,28 ***	*36,39 ***	*36,83 ***
CP	2,732	*1,270*	*1,135*	2,473	*0,741*	*0,936*
	*15,99***	*8,24***	*3,52***	*17,09***	*9,50 ***	*7,34***
HL.CP	-1,851	*-0,434*	*-0,607*	-1,612	*-0,062*	*-0,240*
	-8,98**	*-2,43***	*-1,32*	-8,92**	*-0,67*	*-1,38*
Dirty Surplus positive	0,379	0,196	0,174	0,391	0,228	0,105
	*11,46 ***	*7,09 ***	*5,12 ***	*13,06 ***	*11,41 ***	*6,28 ***
Dirty surplus négative	0,036	-0,047	0,052	0,042	-0,010	0,067
	1,29	*-1,68*	*1,23*	*1,64*	*-0,51*	*3,05 ***
Size	0,156	0,107	0,144	0,150	0,112	0,154
	*18,83 ***	*19,59 ***	*16,53 ***	*26,01 ***	*36,08 ***	*34,24 ***
NoDiv	0,377	0,373	0,318	0,396	0,307	0,308
	*15,65 ***	*8,88 ***	*7,69 ***	*18,50 ***	*14,58 ***	*20,21 ***
BG.CP	0,811	1,318	1,095	0,792	2,723	1,170
	*8,05 ***	*1,91**	*1,93**	*8,85 ***	*5,85 ***	*4,18**
FG.CP	0,383	0,853	1,463	0,403	0,842	0,976
	*4,18 ***	*2,00 ***	*2,65 ***	*4,93 ***	*2,83 ***	*3,97 ***
MG.CP	0,215	0,498	-0,099	0,163	0,632	0,397
	*2,54 ***	*1,52*	*-0,236*	*2,25 ***	*3,52 ***	*1,89*
SG.CP	0,118	0,414	-0,264	0,092	0,412	0,330
	1,48	*1,72*	*-0,58*	*1,34*	*2,88 ***	*1,57*
HL.BG.CP	-1,181	-1,152	-1,068	-1,055	-2,444	-0,518
	*-8,391 ***	*-1,46*	*-1,51*	*-7,99 ***	*-4,60 ***	*-1,57*
HL.FG.CP	-0,682	-1,230	-1,846	-0,646	-0,894	-0,999
	*-5,29 ***	*-2,368***	*-2,73 ***	*-5,51 ***	*-2,58***	*-3,31 ***
HL.MG.CP	-0,458	-0,739	0,010	-0,369	-1,003	-0,134
	*-3,82 ***	*-1,83*	*0,02*	*-3,47 ***	*-4,11 ***	*-0,50*
HL.SG.CP	-0,153	-0,523	0,168	-0,103	-0,587	-0,095
	-1,30	*-1,76*	*0,27*	*-0,98*	*-3,41 ***	*-0,35*

The coefficient of association between realized net income and market value is 11.635 for U.S.A., 12.264 for other developed countries and 10.404 for the emerging countries. The results are somewhat different from those put forward earlier; we can just note that values obtained here appear slightly smaller than those presented in table 5, the phenomenon probably due to the richer specification used here. We can, however, note that the coefficient of association not significantly different between the U.S. and other developed countries. (Z=1.06 and p-value= 0.288), the coefficient is slightly lower for emerging countries vis-à-vis two other samples (Z= -2.097 and p-value=0.036 with the United States and Z=-3.074 and p–value =0.002 with other developed countries). This may reflect a higher cost of capital, a lower persistence of abnormal earnings or a lower quality of accounting measures.

The role of the variable “dirty surplus” appears modest and significant only when the “dirty surplus” is positive. The average effect is 0.379 for the United States, 0.196 for other developed countries and 0.174 for emerging countries. The effect is significantly stronger in the United States than in other two samples (Z=4.245 and p-value=0.000 with other developed countries and Z=4.323 and p-value=0.00 with emerging countries, the positive impact of dirty surplus cannot be regarded as different for these (Z=0.502 and p-value=0.615).

The dummy variable HL (highly leveraged company) has negative significant coefficient for the USA (-0.435 t-stat=-8.63), the other developed countries (-0.408, t-stat=-22.18) and emerging countries (-0.246, t-stat=-9.12). The taking into account of this variable, for the United States, is to reduce a large extent positive and significant impact of the constant (0.457,t-stat=7.99), the net effect , although, economically most reduced, but remained significantly different from zero (F=75.681, p-value=0.00). The net effect is negative for other developed countries (F=96.574, p-value=0.000) and emerging countries (F=21.161, p-value= 0.014). The recourse to debt is, thus, at best very marginally associated with the creation of shareholder value; investments associated with these funds are less profitable or/ and cost related to high debts are considerable.

The association between book value of equity (cum the dividend) is significantly different in the United States for two sub-populations: 2.732 (t-stat=15.99) for U.S. companies with low leverage and 0.880 for other (F=24.395,p-value=0.000), the difference is significant at commonly accepted thresholds. We find the same distinction in the association of the book value of equity to market value for the sample of companies from other developed countries. The measures of association are equal to 1.270 (t-stat=8.24) for firms with low leverage and 0.836(F=21.272,p-value=0.000) for high leverage firms, the difference being significant (t-stat=-2.43). The same phenomenon does not appear significant, however, for the emerging countries where measures of association are equal to 1.135 (t-stat=3.52) for firms with low leverage and 0.528 (F=1.874, p-value=0.I71) for firms with massive use of debt, the difference is not statistically significant (t-stat=-1.32).

This economically and statistically significant asymmetry, for the United States and other developed countries, suggests that traditional measure of association with the book value of equity by the utilization of single coefficient suffers from a specification error. Recall that according to the equation (10) this coefficient reflects the difference between the positive effects of investment opportunities financed by equity and debt. We can think that for companies with low leverage, the effect of debt is positive (tax gain is greater than cost of default). Therefore, higher than 1 coefficient cannot find its origin except in the presence of highly valued opportunities.

The impact of growth on association with book value of equity is measured from a set of dummy variables concerning the importance of leverage and the phase of a growth cycle of the company. For companies with low leverage, the coefficient of association of the book value of equity is positive and significant except for the companies located in the lowest growth phase for which this coefficient may be considered as zero (1.118 with a t-stat 1.48). The association appears, also, much higher if the company is located in a positive phase of growth. The coefficient of association rises significantly for 0.168 (F=6.594, p-value=0.01) between the stages MG and FG and for 0.428 (F=46.08, p-value=0.00) between stages FG and HG. The gap of the coefficient values between stages of growth, is less favorable, for companies SG and MG and sensibly more reduced (0.097) and is not significantly different from zero (F=1.914, p-value=0.167).

This positive effect, of sustained growth on the association with book value of equity, cannot be observed for firms with high leverage (HL) for which the coefficient of associations is negatively either significant or insignificant. So, for the firms the most indebted and located in different growth phases HG, FG and MG, the net effect reflects a significant reduction in the degree of association with the book value of equity equal to -0.369, (F=93.06,p-value=0.00), -0.299 (F=26.764,p-value=0.00) and 0.243 (F=10.477, p-value=0.00), respectively. The effect of growth on the coefficient of association of the book value for firms located in the lowest growth phase is equal to -0.035 and appears insignificant (F=1.657,p-value=0.198). The evolution of degree of association between different phases of growth is also less marked than in the case of low leveraged firms: the difference does not appear highly significant than that of two highest stages of growth (F=12.4, p-value=0.00) and is not significant between phases' MG and FG (F=2.427, p-value=0.119) and it is just significant between phase SG and MG (F=4.113, p-value=0.036).

Figure 1

Effects of growth and leverage on the coefficient of association of book value equity and market value

The values were obtained by summing the coefficients shown in table 6,one of the 2 coefficients associated with the books value are multiplied by a dummy variable of leverage to one of the 5 coefficients associated with the book value are multiplied by one of the dummy variable of growth. The period covered is 2000-2007.

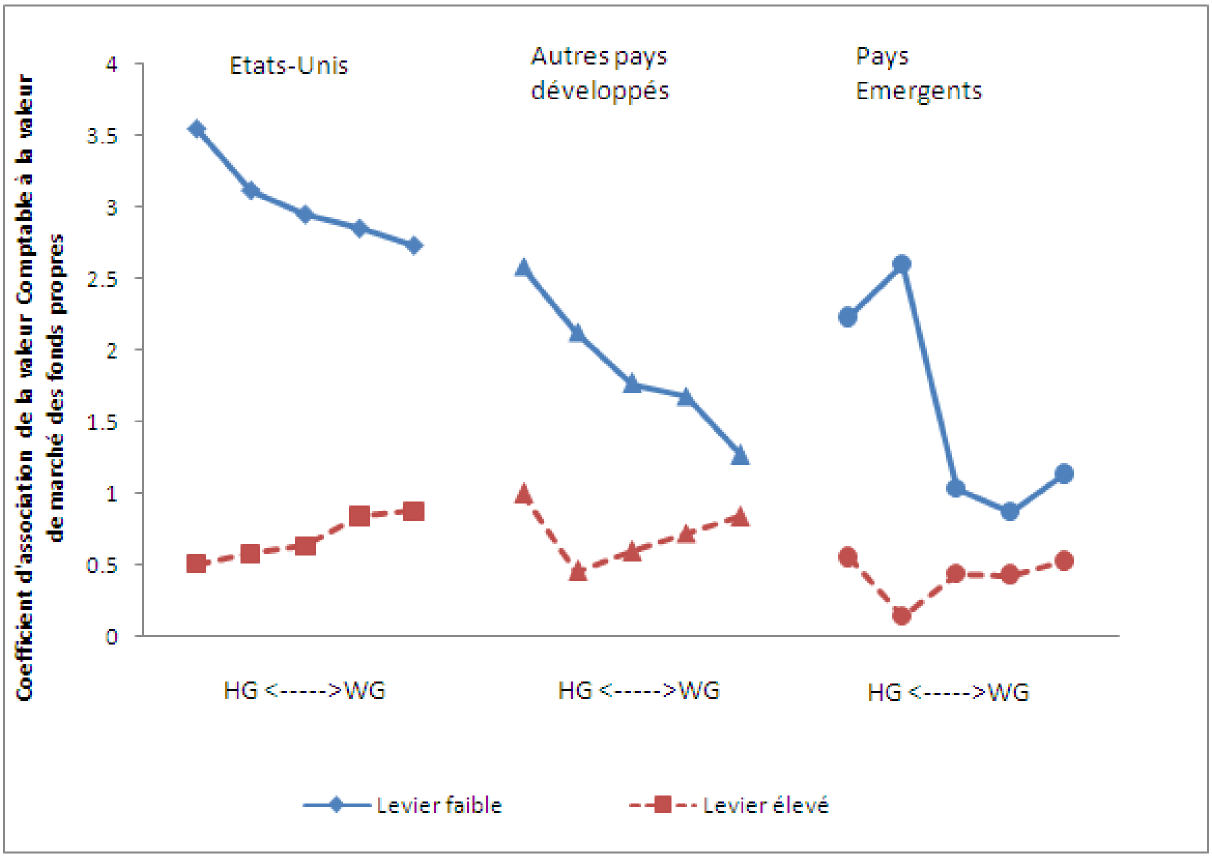

Figure 1 illustrates the relationship between the coefficient associated with the book value of equity and simultaneously belonging to a class of growth stage and a class of leverage. For the sensitivity total of the market value to book value, the coefficients for the class of growth were added to the class of leverage. The continuous curve shows the case of the firms with low leverage, and that in dotted the companies of high leverage.

Regarding the United States, we find the pattern described previously: a significantly higher association for firm not using or slightly using debt, the effect being more pronounced as the company is in a high growth phase. A similar pattern characterizes the situation of the companies in other developed countries. The growth effect on the coefficient of association appears quantitatively important, it is for example 1.318 (t-stat=1.91) for low debt firms and located in the highest growth phase (0.811(t-stat=8.05)) for American firms located in the same position, the difference is not, however, significant (Z statistics=0.727 and a p-value= 0.467). The total effect, however, appears more moderate to United States because of lower basic sensitivity of the book value of equity (1.270 for other developed countries against 2.732 for the United States, the difference being significant with a statistic Z=6.357 and a p-value=0.000). For emerging countries, the sense of evolution remains the same but the differences are much more modest and insignificant. It is not certain that accounting measure of growth that we use is sufficient to differentiate them.

Finally, the size and absence of dividends are positively and significantly associated to market value which confirms the previous results.

Panel B presents the results of estimating the same specification of the model but on the broadest sample that we have been possible to convene in the light of the information required in this specification. This sample includes 10 657 observations for the United Sates, 21 290 observations for other developed countries and 20 604 observations for emerging countries and permit to confront the hypothesis proposed by the theoretical model with significantly expanded empirical base, particularly for other developed countries and emerging countries, the size of the latter set being multiplied by four. None of the main results presented on the basis of the small sample seems to be questioned. The association of book value and market value of equity seems to a large extent depend on the growth phase in which the company is located and the modalities for financing of this growth.

5.3 The contribution of information provided by the table of jobs and resources

Table 7 contains the obtained estimates from the extended information to the elements of tables of jobs and resources. As previously, panel A presents the estimate results for restricted sample and common to different specifications. The results presented in panel B, focus on the sample, the widest view of information required in this specification.

Table 7

Effects of growth, leverage, and dirty surplus in the presence of cash flow data and in the absence of earnings forecasts

The explained variables are the stock market values at the end of the period plus Free Cash Flows for the shareholders. The explanatory variables are accounting income of the previous year (RN) and the book value of equity plus Free Cash Flows for the shareholders (CP).To correct the size effect, all variables were normalized by total assets. The dummy variable HL identifies the firm for which leverage is greater than median. The interaction variables BG,FG,MG and SG are used to describe the phases of growth. The other variables are size(log of market capitalization in U.S. dollar) and the absence of dividend payment (NoDiv).The control variables year have been omitted for readability. The results are presented for a small sample common to different specifications (Panel A) and an expanded sample allowed by the specification analyzed, here.

	USA	Other developed countries	Emerging countries	USA	Other developed countries	Emerging countries
	Panel A : Restricted sample			Panel B : Full sample		
Nb. obs.	8 117	8 475	4 978	10 221	12 775	11 971
R2	0,510	0,525	0,548	0,472	0,508	0,492
Cste	0,355	0,372	0,276	0,476	0,434	0,414
	*6,31***	*5,12 ***	*2,01 ***	*10,02***	*7,14 ***	*10,34 ***
HL	-0,353 *-7,37***	*-0,370* *-20,73***	*-0,222* *-8,19 ***	-0,380 *-9,30 ***	*-0,337* *-26,05***	-0,277 *-19,06 ***
RN	11,574	12,286	10,860	10,452	11,179	8,262
	*28,53 ***	*28,03 ***	*26,18 ***	*31,38 ***	*32,08 ***	*32,30 ***
CP	2,240 *14,36***	*1,178* *7,33***	*1,515* *4,59***	2,060 *15,30***	0,960 *7,55***	*1,064* *6,66***
HL.CP	-1,209 -6,08**	*-0,345* *-1,72*	*-0,832* *-1,70*	-1,071 -6,04**	-0,242 *-1,55*	*-0,294* *-1,27*
Dirty Surplus positive	*0,246*	-0,016	0,090	*0,241*	-0,012	0,042
	*9,00 ***	*-0,67*	*2,77 ***	*9,50 ***	*-0,62*	*2,06 ***
Dirty surplus négative	-0,062	-0,012	0,016	-0,061	-0,013	0,012
	*-2,08***	*-0,51*	*0,49*	*-2,21***	*-0,68*	*0,60*
Size	0,143	0,104	0,143	0,145	0,114	0,153
	*16,93 ***	*19,45 ***	*16,27 ***	*24,53 ***	*28,01 ***	*29,12 ***
NoDiv	0,442	0,416	0,322	0,453	0,337	0,314
	*17,58 ***	*9,48 ***	*7,72 ***	*20,26 ***	*12,08 ***	*15,02 ***
BG.CP	0,864	0,036	0,824	0,804	0,632	1,312
	*8,87 ***	*0,05*	*1,47*	*9,15 ***	*1,01*	*3,33*
FG.CP	0,393	0,392	-0,132	0,304	0,358	0,301
	*4,54 ***	*0,91*	*-0,26*	*3,99 ***	*1,03*	*1,13*
MG.CP	0,259	0,625	-0,012	0,133	0,821	0,308
	*3,26 ***	*2,29 ***	*-0,03*	*1,96 ***	*3,37 ***	*1,23*
SG.CP	0,077	0,434	-0,771	0,072	0,329	0,171
	1,06	*1,70*	*-1,62*	*1,10*	*1,64*	*0,63*
HL.BG.CP	-0,676	0,077	-1,232	-0,528	-0,729	-1,232
	*-4,11 ***	*0,10*	*-1,72*	*-3,43 ***	*-1,00*	*-2,66 ***
HL.FG.CP	-0,760	-0,562	-0,652	-0,589	-0,574	-0,675
	*-5,93 ***	*-1,11*	*-0,99*	*-4,98 ***	*-1,39*	*-1,94 **
HL.MG.CP	-0,627	-0,842	-0,372	-0,464	-0,941	-0,455
	*-5,07 ***	*-2,51 ***	*-0,55*	*-4,17 ***	*-3,30 ***	*-1,35*
HL.SG.CP	-0,218	-0,429	0,383	-0,197	-0,280	-0,543
	-1,90	*-1,41*	*0,58*	*-1,88*	*-1,20*	*-1,25*

As previously, dummy variable HL (companies with high leverage) have negative and significant coefficients in the estimates with respect to three considered zones, so, for businesses strongly using debt, the constant become zero, which is verified for United States (F=0.001,p-value=0.970), other developed countries (F=0.001,p-value=0.975) and the emerging countries (F=0.315,p-value=0.575). The association between book value of equity (cum free-cash flow) is different in the USA for two sub-populations: 2.240 for companies with low leverage, 1.031 for the other, the difference being significant (t-stat=-6.08). The difference of association of the book value of equity as per leverage, however, is more significant in the other developed countries (t-stat=-1.72) and the emerging countries (t-stat=-1.70).

For U.S., the interaction between growth and leverage previously identified are retained after changing the growth measure because of the use of cash flow data and introducing an alternative measure of “dirty surplus.” As previously, firms with low leverage and high growth have a coefficient of association much more important than that of companies with low leverage and low growth. Likewise, companies in high growth and low leverage have a coefficient much higher than companies with high growth and high leverage.

Such interaction between growth, leverage and degree of association of book value of equity and market value, however, not to be found more in other developed countries and emerging countries. With the exception of the firms of average growth from other developed countries, the coefficient present before different variables of interaction are not significantly different from zero.

The role of variable “dirty surplus” exists in the U.S.A. and emerging countries but disappears for other developed countries. The “dirty surplus” is not measured in the same way, in this case. Previously, it included all the capital increases which had been subtracted here. These operations are, perhaps, associated with other sources of value creation (equity financing of profitable investment, stock option policies etc.). This variable is also sensitive to the accounting rules in use which are very heterogeneous in other developed countries and, as well, in emerging countries.

Otherwise, the association with the income measure remains close to the estimates obtained in the absence of cash flow data; this is also the case for variables’ size and dividend policy.

The result presented in the panel B are based on the sample less demanding in terms of data and ultimately more broad: 10 221 firm-years for United States, 12 775 for other developed countries and 11 791 for the emerging countries. The estimates obtained in this framework do not call into question the previous results: For the United States, the association between book value of equity and market value is conditioned by the growth phase in which the company is located and the importance of its use of debt, regardless of the nature and quality of accounting information (end balance sheet data (Accruals vs. cash flow)). For other developed countries and emerging countries, it seems, instead, that an appropriate measure of cash flow can substitute for the measures of growth phase and leverage.

5.4 The contribution of the variables of forecasts of net income

The results presented in table 8 are obtained from a specification that incorporates the previous cash flow data, which replaces the given amount of net income, for a year ended expected net income and the evolution anticipated by the market for the following year. On the net income of the operating year, we assume that the market expectation is partly measured by the consensus, available at the end of operating year, based on IBES. In order to test the market's capacity to anticipate the forecasting errors contained in the data base, the ex post error was chosen.

Table 8

Effects of growth, leverage and dirty surplus in the presence of cash flow data and earnings forecast

The explained variables are stock market value at the end of the period plus Free Cash Flows for the shareholders. The explanatory variables are expected income in 31/12 (RNP), earnings forecast errors by analysts at year end, the expected change in income by analysts for the following year (VRN) and book value of equity plus Free Cash Flows (CP).To correct the size effect, all variables were normalized by total assets. The dummy variable identifies companies for which the financial leverage is higher than the median. The variables of interaction BG,FG,MG and SG are used to describe the phases of growth. The other variables are the size (logarithm of the market capitalization in US dollar) and the absence of dividend payment (NoDiv). The control variable year have been omitted for more readability.

	USA	Other developed countries	Emerging countries
Number of obs.	8117	8475	4978
R2	0,563	0,576	0,604
Variables	Coefficients *T*	Coefficients *t*	Coefficients *T*
Constant	0,264 *5,02***	0,241 *3,48 ***	0,057 *0,46*
HL	-0,361 *-8,11***	*-0,292* *-16,85***	*-0,179* *-7,24 ***
RNP	12,230 *31,27 ***	12,865 *31,99 ***	10,794 *28,24 ***
EPRN	-6,171 7,99 **	-6,810 -8,82 **	-6,703 -10,69 **
VRN	8,284 10,77 **	6,808 8,72 **	8,463 11,32 **
CP	2,118 *15,06***	*1,329* *6,91***	*1,393* *4,25***
HL.CP	-1,394 -7,50**	*-0,345* *-1,72*	*-1,135* *-2,22***
Dirty Surplus positive	*0,212* *8,23 ***	-0,016 *-0,68*	0,081 *2,72 ***
Dirty surplus negative	-0,055 *-1,83*	-0,021 *-0,92*	0,000 *0,17*
Size	0,129 *16,08 ***	0,104 *19,96 ***	0,157 *18,67 ***
NoDiv	0,403 *16,77 ***	0,327 *7,59 ***	0,322 *8,22 ***
BG.CP	0,651 *7,02 ***	-1,071 *-1,73*	0,185 *0,33*
FG.CP	0,240 *3,03 ***	0,001 *0,003*	-0,330 *-0,717*
MG.CP	0,112 *1,50*	0,414 *1,45*	-0,496 *-1,22*
SG.CP	-0,025 *-0,36*	0,150 *0,49*	-0,693 *-1,50*
HL.BG.CP	-0,511 *-3,17 ***	1,752 *2,09***	-0,369 *-0,52*
HL.FG.CP	-0,499 *-4,05 ***	0,022 *0,042*	-0,214 *-0,331*
HL.MG.CP	-0,410 *-3,51 ***	-0,348 *-0,98*	-0,399 *-0,58*
HL.SG.CP	-0,078 *-0,70*	-0,172 *-0,503*	0,568 *0,84*

The coefficient of association between expected income published by IBES at the end of the period is considerably higher than the previous estimates (12.230 for United States, 12.865 for other developed countries and 10.794 for emerging countries). It remains that this forecast only translates imperfect market expectations at the same time. The coefficient before the variable “forecast error” (-6.171 for U.S.A. -6.18 in other developed countries and -6.703 in emerging countries) is significantly different from zero. It is possible that it is due to the lag IBES publications (last update do not necessarily coincide with the closing date, the information provided by IBES, perhaps, are not fresh). It is also possible that it comes from the superiority of information reflected in prices compared to that contained in the IBES consensus[20]. Notwithstanding the limitations of this estimate of association between expected net income and market value, the coefficient of 12.230 suggests a higher persistence of residual income on average in the U.S.A. over the period 2000-2007. If ω takes a maximum value of 1, the coefficient $\alpha_2 = \frac{R \cdot \omega}{R - \omega}$ worth 12.230 indicates an average cost of capital 8.90%. Assuming a risk free rate, over the period, of the order 4.71%[21], the risk premium stood at 4.19%. With ω equal to 0.97, the risk premium would be only 0.39%.

The growth of expected income, for the following year, by financial analysts is reflected in the market valuation. The coefficient associated to this variable (8.284 for the U.S.A. 6.808 in other developed countries and 8.463 in emerging countries) is very significant. The growth variables, previously introduced, have not been sufficient to take into account the whole phenomenon. The expected

[20] Of the tests not published in this chapter, on association, 3 months after the end of the period give coefficients not significantly different from zero for this variable of “forecast error”..

[16] Source OECD : long-term rates US

2000	2001	2002	2003	2004	2005	2006	2007	Moyenne
6,03%	5,02%	4,61%	4,02%	4,27%	4,29%	4,79%	4,63%	4,71%

data extracted on 2009/03/16 17:41 from OECD.Stat changes in earnings, by analysts, have an informational effect. Its coefficient is lower than that which accompanies the income of the period. The theoretical model suggests that if this variation could be confused with the variation of innovation, the ratio $\frac{\alpha_2}{\alpha_3} = \omega \cdot (R - \gamma)$ should be less than R. In this case, their relationship is much higher. Only a part of the change in expected income can be regarded as a measurement of the variable of innovation.

The role of the variable " dirty surplus" for the USA remains very high valued but is absent in other developed countries, as we have noted in the preceding paragraph. Its effect remains for the emerging countries, but is economically small.

The dummy variable HL (high leverage company) retains negative significant coefficients (-0.361 for the USA, -0.292 for other developed countries and-0.179 for emerging countries) indicating net negative effects for the United States (F=4.334, p-value=0.037) and emerging countries (constant outside a dummy non significant, t-stat=0.46) or zero for other developed countries (F=0.683, p-value=0.409) negative for companies using debt heavily. The association between the book value and market value of equity (cum free-cash flow) is different for American companies: 2.118 for those with low leverage, 0.724 for others. A similar but less pronounced phenomenon appears for other developed countries, but is not significant. Finally, for emerging countries, the association is positive for low indebted companies but appears not significantly different from zero for most indebted companies (F=0.366, p-value=0.545).

The precedent link between the book value and market value remains similar to the United States, where we introduced dummy variables for the phases of the cycle of growth (BG, FG, MG, SM). For companies with low leverage classified under the category of the highest growth (BG), the coefficient of association with the book value is relatively to the category of lower growth (WG), significantly higher (0.651, t-stat=7.02). This gap decreases and remains significant for the following growth category (FG) (0.240,t-stat=3.03). The phenomenon is no more significant for the categories of growth, average (medium) (0.112, t-stat=1.50) and small (-0.025, t-stat=-0.36). This result cannot be observed for companies with high leverage. Here, the net effect on equity is not significantly different from zero for the firms located in the growth phases high (F=1.021, p-value=0.312), fast (F=3.600, p-value=0.058) and small(coefficient not significantly different from zero, t-stat= -0.70) and becomes negative for firms of average growth(-0.41,t-stat=3.51). No such effect appears for two other zones, and the majority of coefficients are not significant. For these two zones, an accounting indicator of growth does not add additional information in relation to the IBES consensus forecast.

6. Conclusion

Whatever the country, developed or emerging, net income appears as the accounting variable most strongly associated with market value. This being, the book value of equity brings, on its part, a valuable contribution; even if it is lower than that of net income. The most disturbing point is the instability of the coefficients associated with this variable. The traditional Ohlson model that combines these two numbers in a valuation equation predicts a coefficient between 0 and 1.The empirical results are far to validate this hypothesis. We suggest that this coefficient depends strongly on the growth phase of the company and her financing. It reflects, for each case, the ability of the company to create shareholder value from its investment and financing.

Our study shows that the in USA and many countries, growth measured from simple accounting indicators is associated with shareholder value creation when it is mainly financed by equity. Its effects are not discernible when the leverage is high. This observation means that the association between book value and market value is strong when growth is high but for the companies with low leverage, only. This result suggest that the book value multiples (market to book ratios) are difficult to use. They require at least very precise control conditions, regarding growth and financing. The case of emerging countries has not appeared more difficult to identify than the other developed countries. In the latter, the measure used for growth is proved even less effective. It is true that economic conditions were more heterogeneous over the period (Japan being the worst performing zone). Finally, accounting systems were still very diverse and had been assigned transition to IFRS to many countries but with different rhythms. This result calls for great prudence as it demands the inclusion of companies from different countries, even developed countries during the valuation from multiples.

The measures of coefficients of association between income and market value provide some complementary results. The empirical study suggests that in developed countries over the period 2000-2007, perceived persistence of residual income could be very high and average cost of capital could include a risk premium of the order 4.7%. The empirical results do not reject the hypothesis that on average, the cost of capital is higher for the emerging countries and the persistence of residual income lower. Finally, the variation expected by the analysts in net income for the coming year is a noisy indicator of the expected effects of growth. It owns a part of information, but an indicator of growth, like the one we used, can provide additional information.

ANNEXES

Annex A-1

Valuation of the company with growth cycle and dirty surplus

By combining the valuation model of discounted dividend and assuming a constant cost of capital and homogenous beliefs, we can write the value of the firm as[22] :

Eq. A-1

$$V_0 = B'_0 + \sum_{t=1}^{\infty} \frac{E_0[X_t - r \cdot B'_{t-1} + \Phi_t]}{R^t}$$

Where $E_0[\Phi_{t+1}] = E_0[B_{t+1} - B_t - X_{t+1} + F_{t+1}]$ represent the dirty surplus expected in t+1.We assume that the variable ν_t designating other information evolves according to the following equation:

Eq. A-2

$E_t[N_{t+1}] = \gamma \cdot N_t$

We put the following dynamics for the dirty surplus

Eq. A-3

$E_t[\Phi_{t+1}] = \rho \cdot E_t[\Phi_t]$

The parameters ω , γ and ρ are fixed and take values between 0 and 1. They are determined by the economic environment of the firm and the accounting principles used.

We assume that if the company is in growth state ($I_t^g = 1$), she has a probability p to remain ($I_{t+1}^g = 1$) and a probability $1 - p$ to move into a state of maturity

[22] from the following identity $0 = B'_0 + \sum_{t=1}^{\infty} \frac{\Delta B'_t - r \cdot B'_{t-1}}{R^t}$ and standard valuation equation $V_0 = \sum_{t=1}^{\infty} \frac{E_0[D_t]}{R^t}$

($\mathrm{I}_{t+1}^{m} = 1$). However, if it has reached a stage of maturity at a period, it can only remain in that state, the following period. In the growth phase and maturity, the book value of equity plus free cash flow and conditionally expected to the state in which the company is, put forward by the following equation

Eq. A-4

$$\mathrm{E}\left[\mathrm{BC}_{t+1}^{g}\right] = \mathrm{p} \cdot \mathrm{c_g} \cdot \mathrm{BC}_{t}^{g}$$

Eq. A-5

$$\mathrm{E}[\mathrm{BC}_{t+1}^{m}] = \mathrm{c_m} \cdot \mathrm{BC}_{t}^{m} + (1-\mathrm{p}) \cdot \mathrm{c_m} \cdot \mathrm{BC}_{t}^{g}$$

Finally, in this context, the dynamics of the residual earnings is defined by the linear system:

Eq. A-6

$$\begin{Vmatrix} E[x_{t+1}^{a}] \\ E[\mathrm{N}_{t+1}] \\ E[\Phi_{t+1}] \\ E[BC_{t+1}^{m}] \\ E\left[BC_{t+1}^{g}\right] \end{Vmatrix} = \|H\| \cdot \begin{Vmatrix} x_t^a \\ \mathrm{N}_t \\ \Phi_t \\ BC_t^m \\ BC_t^g \end{Vmatrix}$$

with $\|H\| = \begin{Vmatrix} \omega & 1 & d & a_m & a_g \\ 0 & \gamma & 0 & 0 & 0 \\ 0 & 0 & \rho & 0 & 0 \\ 0 & 0 & 0 & c_m & c_m \cdot (1-p) \\ 0 & 0 & 0 & 0 & c_g.p \end{Vmatrix}$

Knowing that

$$\|H\|^t = \begin{Vmatrix} \omega^t & \frac{\omega^t-\gamma^t}{\omega-\gamma} & d.\frac{\omega^t-\rho^t}{\omega-\rho} & a_m.\frac{\omega^t-c_m^t}{\omega-c_m} & a_g.\frac{\omega^t-(c_g.p)^t}{\omega-c_g.p} + a_m.\frac{c_m.(1-p)}{c_m-c_g.p}.\left[\frac{\omega^t-{c_m}^t}{\omega-c_m} - \frac{\omega^t-(c_g.p)^t}{\omega-c_g.p}\right] \\ 0 & \gamma^t & 0 & 0 & 0 \\ 0 & 0 & \rho^t & 0 & 0 \\ 0 & 0 & 0 & c_m^t & c_m.(1-p).\frac{{c_m}^t-(c_g.p)^t}{c_m-c_g.p} \\ 0 & 0 & 0 & 0 & (c_g.p)^t \end{Vmatrix}$$

Combining equation (A.1) to (A.8), we can derive the following RIM[23]
Eq. A-7

$$V_0^m = B_0 + \Phi_0 \cdot \rho + X_0 \cdot \frac{R \cdot \omega}{R-\omega} - (B_0 + F_0) \cdot \frac{r \cdot \omega}{R-\omega} + \mathrm{N}_0 \cdot \frac{1}{(R-\omega)} \cdot \frac{R}{(R-\gamma)} + \Phi_0 \cdot \frac{d}{(R-\omega)} \cdot \frac{R}{(R-\rho)} + (B_0 + F_0) \cdot \frac{a_m}{(R-\omega)} \cdot \frac{R}{(R-c_m)}$$

Adding F_0 to each member of the equation, it becomes:
Eq. A-8

$$VC_0^m = \alpha_1^m \cdot BC_0 + \alpha_2 \cdot X_0 + \alpha_3 \cdot \Phi_0 + \alpha_4 \cdot \mathrm{N}_0$$

with

$$\boldsymbol{VC_0 = V_0 + F_0} \qquad \boldsymbol{BC_0 = B_0 + F_0}$$

$$\boldsymbol{\alpha_1^m = 1 - \frac{r \cdot \omega}{R-\omega} + \frac{a_m}{(R-\omega)} \cdot \frac{R}{(R-c_m)}} \qquad \boldsymbol{\alpha_2 = \frac{R \cdot \omega}{R-\omega}}$$

$$\boldsymbol{\alpha_3 = \rho + \frac{d}{(R-\omega)} \cdot \frac{R}{(R-\rho)}} \qquad \boldsymbol{\alpha_4 = \frac{1}{(R-\omega)} \cdot \frac{R}{(R-\gamma)}}$$

For the growth companies, we get:
Eq. A-9

$$V_0^g = B_0 + \Phi_0 \cdot \rho + X_0 \cdot \frac{R \cdot \omega}{R-\omega} - (B_0 + F_0) \cdot \frac{r \cdot \omega}{R-\omega} + \mathrm{N}_0 \cdot \frac{1}{(R-\omega)} \cdot \frac{R}{(R-\gamma)} + \Phi_0 \cdot \frac{d}{(R-\omega)} \cdot \frac{R}{(R-\rho)} + (B_0 + F_0) \cdot \left[\frac{a_g}{(R-\omega)} \cdot \frac{R}{(R-p \cdot c_g)} + \frac{a_m}{(R-\omega)} \cdot \frac{R}{(R-c_m)} \cdot \frac{c_m \cdot (1-p)}{(R-p \cdot c_g)}\right]$$

Adding F_0 to each member of the equation, it becomes:
Eq.A-10

$$VC_0^m = \alpha_1^g \cdot BC_0 + \alpha_2 \cdot X_0 + \alpha_3 \cdot \Phi_0 + \alpha_4 \cdot \mathrm{N}_0$$

with

$$\boldsymbol{VC_0 = V_0 + F_0} \qquad \boldsymbol{BC_0 = B_0 + F_0}$$

$$\boldsymbol{\alpha_1^g = 1 - \frac{r \cdot \omega}{R-\omega} + \frac{1}{(R-\omega)} \cdot \frac{R}{(R-c_m)} \cdot \left[a_m + \frac{(a_g - a_m) \cdot (R-c_m) + (c_g - c_m) \cdot a_m \cdot p}{(R - p \cdot c_g)}\right]} \qquad \boldsymbol{\alpha_2 = \frac{R \cdot \omega}{R-\omega}}$$

$$\boldsymbol{\alpha_3 = \rho + \frac{d}{(R-\omega)} \cdot \frac{R}{(R-\rho)}} \qquad \boldsymbol{\alpha_4 = \frac{1}{(R-\omega)} \cdot \frac{R}{(R-\gamma)}}$$

[23] Noting that $B_0' = B_0 + E_0[\Phi_1] = B_0 + \Phi_0 \cdot \rho$

Notation used

V_t	Market value
VC_t	Market value cum free cash-Flows
B_t	book value
TA_t	Total assets
BC_t	Book value cum free cash-Flows
$B_t^{'}$	Book value (corrected)
X_t	Expected income
X_t^a	Expected abnormal income
D_t	Dividends
F_t	Cash flows for shareholders expected variation of short-term income by analysts
ν_t	Expected variation of short-term income by analysts
φ_t	Expected dirty surplus
r	Cost of capital
R	=1+*r*
ω	Coefficient of persistence of X_t^a
γ	Coefficient of persistence of ϑ_t
ρ	Coefficient of persistence of φ_t
c_m	Coefficient of growth for the firm in maturity
a_m	Creation of value proportional to equity for firms in maturity
c_g	Coefficient of growth for the firm in growth
a_g	Creation of value proportional to equity for firms in growth
p	The probability that the company in growth rest

Annex A-2

Method of calculation of the synthetic variable of growth and company rank according to their stage of growth

The synthetic variable y: is defined by:

$$y_{i,t} = \sum_{j=1}^{j=3} \frac{\left(x_{i,j,t} - \overline{x_{j,t}}\right)}{\sigma_{j,t}}$$

With

$$x_1 = \frac{\text{Sales}_t}{\text{Sales}_{t-2}} - 1$$

$$x_2 = \frac{\text{Equities}_t - \text{Equities}_{t-2} - \text{Net Income}_t - \text{Net Income}_{t-1}}{\text{Equities}_{t-2}}$$

$$x_3 = \frac{\text{Capital Expenditures}_t + \text{Capital Expenditures}_{t-1}}{\text{Depreciation}_t + \text{Depreciations}_{t-1}}$$

The calculation of the third ratio requires knowledge of investment. This data comes from the table of Jobs and resources and is not available systematically, especially for emerging countries. Also, we have used the two measures of investments. The first (A) is directly derived from the balance sheet; it is the annual variation in the capital plus depreciation and amortization. The second (B) is provided by the table of jobs and resources. We, thus, use two measures for the variable of growth, depending on the value adopted for the third ratio.

These three ratios can take extreme values, insignificant and likely to affect seriously the estimates of the composite variable. For the data from USA, we have truncated their values using the first decile as the minimum and the bottom decile as a maximum, the population of reference being the whole profitable or not profitable firm. For other countries, we conducted this analysis, and that which follows, from the point of view an American analyst. Also we have truncated value by taking the same extremes as found for the U.S.A population (for the change in sales over 2 years: -24.4% and 140.9 % for the variation in excess equity: -40.6% and 186.1% and for the third ratio variation of net fixed assets[24]on depreciation: -65.9% and 234.0%). Finally, in order to aggregate them, we calculated their centered and reduced (standardized) value for the U.S.A. For other countries, we used the mean and standard deviation estimated in the U.S.A market (i.e., 34.8% and 49.6% for the first ratio, 26.4% and 66.6% for the second and 47.6% and 91.4% for the third.). Their sum means the synthetic variable of growth.

For the USA, the companies are then classified each year t based on the synthetic variable y. Their rank is normalized by the number of the observations of the year and noted $R_{i,t}$. For other countries, we extended our comparison with the USA and we have assigned to each individual company annual normalized rank which corresponds to normalized rank that the American company had whose value of the synthetic variable was the nearest that year. In order to take into account persistent phenomenon, we have preferred an aggregate measure over 2 years: $RC_{i,t} = R_{i,t} + R_{i,t-1}$

For the USA, we finally placed the firm-year (taking into account all firms that are profitable or not) by quintile according to this variable$RC_{i,t}$. For other countries, by extending the perspective of an American analyst, we have classified by incorporating the bounds of the population of U.S firms.

[24] The same procedure was followed when we used a small sample of data from tables of jobs and resources and the investments have been substituted for changes in net assets. To simplify the discussion, we have not detailed the similar procedure.

Annex A-3

Exemple of calculation of dirty surplus

		Y2006	Y2005
+	WS.NetIncome	2 869	
	WS.TotalCommonEquity	20 718	19 198
-	Variation WS.TotalCommonEquity	1 520	
-	WS.CommonDividendsCash	664	
	WS.DividendsPayable	0	0
-	Variation WS.DividendsPayable	0	
+	WS.SaleOfComAndPfdStkCFStmt	85	
-	WS.PurchOfComAndPfdStkCFStmt	131	
=	**Dirty surplus**	**639**	

Chapter 3: What is the impact of abnormal earnings growth on the market valuation of the companies? An international comparison.

Chapter 3: What is the impact of abnormal earnings growth on the market valuation of the companies? An international comparison.

1. Introduction

Our study examines the relationship between the market price of a share, expected earnings and its expected growth for the next two years because they are the very value drivers, followed by the financial community through the P/E ratio and PEG ratio, for example. We raise this by a double question: knowing that the form of association[25] between stock price and expected earnings per share depends on the type of growth of the company, (i) that brings short term increases in expected earnings by financial analysts to explain differences in stock market value (ii) can an indicator of growth built on historical accounting data correct the bias introduced by previous measure?

The interest in this subject is primarily motivated by practical considerations. Investments in the international equity markets have become significant for fund managers worldwide. The use of methods based on comparison of basic observed ratios, for listed companies, between stock prices and expected earnings per share is often considered the most powerful: "EPS forecasts represented substantially better summary measures of value than did OCF forecasts in all five countries examined, and this relative superiority was observed in most industries " (Liu, Nissim, & Thomas, 2007). Understanding the link between market value and expected earnings is likely to illuminate the

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[25] Our approach is consistent with the current accounting literature called, the association. We take the proposal put forward by Barth et al (Barth, Beaver, & Landsman, 2001) : "*an accounting amount is defined as value relevant if it has a predicted association with equity market values*" (p.79) and their following remark; "*accounting information can be value relevant but not decision relevant if it is superseded by more timely information*". We make no assumption regarding the efficiency of stock markets. Our study fits in the course of all those interested to price levels and not their changes.

investment process in countries where information is more difficult to collect for foreign investors.

The second motivation is of theoretical nature. It focuses on the relationship between book values and market values. The valuation models based on abnormal earnings growth (A.E.G.) provide support to the link between expected future earnings, expected dividends and market values. The pioneering model of Ohlson and Juettner-Nauroth (Ohlson & Juettner-Nauroth, 2005) claims that only the expected earnings for the next two-years and expected dividend are sufficient. The empirical evidence is not conducive to this hypothesis (Gode & Mohanram, 2003), (Penman, 2005). The question is whether an extension of the model A.E.G.(Abnormal Earnings Growth) proposing more fine decomposition of the abnormal earnings growth in volume and intensity provides a better estimate of the link between expected earnings and stock price of a share.

We begin our study with a theoretical extension of the model A.E.G. Aware of the fact that the models of type AEG are complex in their inner mechanics (Brief, 2007), we want to make development of the profitability in the form of a progressive realization of a set of growth opportunities. To do this, we take an idea developed by Walker and Wang (2003) in a different context, that of R.I.M. (Residual Income Models). As Walker and Wang, we bring together the microeconomic analysis and modeling of accounting earnings. But we do so as a part of valuation based on taking into account expected earnings and especially their growth.

The second part of the study is empirical. Three samples are formed over the period 1998-2008. They include American companies, firms from other developed countries (Germany, Australia, Canada, France, Japan, and the United

Kingdom) and a set from emerging countries (China, Korea, Hong Kong, India, Malaysia, Singapore, Taiwan and Thailand). Our objective is to provide an international comparison. From historical accounting data, we build a synthetic indicator of growth by company. We, then, proceed to estimate our model by incorporating the variables of expected earnings (in level and in variation), this synthetic variable of growth and other control variables. The objective is to verify (1) that the anticipated effects of abnormal earnings growth are limited in time, (2) that the inclusion of the synthetic variable for growth makes a significant correction when the variable of growth in the short-term alone is insufficient, (3) that the values implicit of cost of capital are acceptable from an economic stand point.

Our empirical study allows to establish the following results:

(i) Whatever the geographical zone, expected earnings per share remains, the variable most strongly associated with the stock market values. But, the coefficients are higher in developed countries than in emerging countries. The valuation of profits is affected by different levels of their persistence and more generally of risk.

The expected change in earning per share is significantly associated with the market value of a share (especially for developed countries) but its persistence is limited (especially in emerging countries). This last result contrary to the intuition which would like the expected growth being greater in emerging countries, the PEG is a better tool of valuation in these countries. The PER and PEG ratios combine in valuation essentially, within developed countries.

(ii) These two indicators must be supplemented to avoid either over valuation or under valuation. Taking into account the intensity of the growth through historical accounting indicators provides a part of the missing information. The corrections are mostly positive (insufficient to take into account the growth potential by the increase of expected earnings, especially in emerging countries) and more rarely negative (low persistence of the intensity of the expected pension, rather in parts of developed countries).

(iii) At the international level, the expected implied rates of return are significantly higher in emerging countries than in developed countries.

The rest of the paper is organized as follows. In Section 2, we develop our model; Section 3 presents our data and some descriptive statistics. Section 4 describes the methods of calculation of the variable of growth. Our results are presented in Section 5 and Section 6 concludes.

2. Problematic and model:

2.1 The sources of model:

We take an idea developed by Walker and Wang (2003) in a different framework. Walker and Wang approach the microeconomic analysis and modeling of company's accounting earnings particularly the R.I.M. (Residual Income Model). They studied several forms of competition and provided, among other, a representation of the dynamic followed by the residual income in a world of perfect competition. We propose a similar extension but applied to the model AEG (Abnormal Earning Growth) proposed by Ohlson and Juettner-Neuroth (2005).

We preferred to place our study in the current A.E.G. model because its point of departure is linked to an empirical observation. The accounting variable best associated with market value is expected earnings (Ohlson & Gao, 2006). Unlike the R.I.M. model that bases valuation on the book value of equity, the A.E.G.

model anchors valuation in the capitalization of expected earnings (Ohlson J.A., 2005).

The progress in the modeling requires a description of the dynamics of this earnings. Ohlson and Juettner Neuroth postulate that the annual variation in the expected abnormal earnings (income in excess of the remuneration of reinvested cost of capital) follows an autoregressive process of order 1. Not only, no theoretical justification is advanced to support this hypothesis, but this is certainly very restrictive, as it gives only expected incomes very close a role in valuation.

The purpose of this article is to extend the analysis of Walker and Wang to the model of Ohlson and Juettner Neuroth in the framework of a pure and perfect competition and an unbiased accounting. The originality of this paper is inspired by a measure of growth, already used in accounting literature by Hribar and Yehuda (Hribar & Yehuda, 2008). Thus indirectly taking into account the expected rents, we, partly, believe to avoid some of the shortcomings highlighted by Holthausen and Watts (Holthausen and Watts, 2001).

2.2 The valuation model from abnormal earnings growth and growth opportunities

First we assume that the price of a share P_0 is equal to the sum of free cash flow received by shareholders $E_0\left[\widetilde{FPS}_t\right]$ discounted at a required rate r :

$$P_0 = \sum_{t=1}^{\infty} \frac{E_0\left[\widetilde{FPS}_t\right]}{(1+r)^t} \quad (11)$$

Without loss of generality, it is possible to write the same price P_0 by incorporating the following expected earnings per share $E_0[\widetilde{EPS}_t]$:

$$P_0 = \frac{E_0[\widetilde{EPS}_1]}{r} + \frac{1}{r} \cdot \sum_{t=1}^{\infty} \frac{(E_0[\widetilde{EPS}_{t+1}] - E_0[\widetilde{EPS}_t]) - r \cdot (E_0[\widetilde{EPS}_t] - E_0[\widetilde{FPS}_t])}{(1+r)^t} \quad (12)$$

A second hypothesis, the variation in earnings has two sources: the variation in the value of a rent and reinvestment of undistributed profits. The complementary hypothesis of the reinvestment of the latter at the rate r guarantees the neutrality of the dividend policy. By designating, intensity of expected rent by a_t and q_t its extent, we put:

$$EPS_{t+1} - EPS_t = a_{t+1} \cdot q_{t+1} - a_t \cdot q_t + (EPS_t - FPS_t) \cdot r \quad (13)$$

This particular set of assumptions used to express the price of a share based on the expected income, the required rate of return and expected values of the parameters defining the future rent:

$$P_0 = \frac{E_0[\widetilde{EPS}_1]}{r} + \frac{1}{r} \cdot \sum_{t=1}^{\infty} \frac{(E_0[\tilde{a}_{t+1} \cdot \tilde{q}_{t+1}] - E_0[\tilde{a}_t \cdot \tilde{q}_t])}{(1+r)^t} \quad (4)$$

To complete the model, we adopt a third hypothesis that the variables a_t and q_t follow linear informational dynamics described in (5).The intensity of the rent $\tilde{a}_{t+1}$ is decomposed into a part depending on its past value $\delta \cdot a_t$ and a white noise $\tilde{\varepsilon}_{1,t+1}$.

Its persistence is measured by the parameter δ (with the condition $0 < \delta < 1$ to take into account the effects of competition). The extent of the rent $\tilde{q}_{t+1}$ is a function of its trajectory $\bar{q}_{t+1}$ and a gap which it decomposes into a corrective movement back toward the track $\gamma \cdot (1+c) \cdot (q_t - \bar{q}_t)$ and a white noise $\tilde{\varepsilon}_{2,t+1}$. The coefficient γ measures the intensity of the restoring force to the track $\bar{q}_t$. The trajectory $\bar{q}_t$ of the extent of the rent grows at a rate c to take account of the growth. Finally, the two white noises embedded in these movements are assumed to be independent: there is no link between variations of intensity and variations of the extent of the rent.

$$\tilde{a}_{t+1} = \delta \cdot a_t + \tilde{\varepsilon}_{1,t+1}$$
$$\tilde{q}_{t+1} - \bar{q}_{t+1} = \gamma \cdot (1+c) \cdot (q_t - \bar{q}_t) + \tilde{\varepsilon}_{2,t+1} \quad (5)$$
$$\bar{q}_{t+1} = \bar{q}_t \cdot (1+c)$$
$$\operatorname{cov}\left(\tilde{\varepsilon}_{1,t+s_1}, \tilde{\varepsilon}_{2,t+s_2}\right) = 0 \quad \forall s_1, s_2$$

This set of assumptions allows to write the following relationship (see annex 1)

$$P_0 = \left\{E_0\left[\widetilde{CEPS}_2\right] - (1+g) \cdot E_0\left[\widetilde{EPS}_1\right]\right\} \cdot \frac{1}{r} \cdot \frac{1}{r-g} + \bar{q}_1 \cdot E_0[\tilde{a}_1] \cdot \frac{1}{r} \cdot \frac{h}{r-g} \quad (6)$$

with :

$$g = (1+c) \cdot \delta \cdot \gamma - 1$$
$$h = (1+c) \cdot \delta \cdot (1-\gamma) \cdot [\delta \cdot (1+c) - 1]$$
$$\widetilde{CEPS}_2 = \widetilde{EPS}_2 + r \cdot \widetilde{FPS}_1$$

The primary interest of this model is to retain the general form of popular valuation models, taking as anchoring the expected earnings per share. For example, if $\delta = \gamma = 1$, it reduces to the model of Ohlson Juettner-Nauroth which is only a special case. Assuming again that $E_0\left[\widetilde{EPS}_2\right] = (1+c) \cdot E_0\left[\widetilde{EPS}_1\right]$, we find the standard model of Gordon and Shapiro.

The second interest of this model is mainly to clarify the value of the coefficient included in the autoregressive dynamics of abnormal earnings growth. It is not solely equal to the expected rate of growth in the long run, as in Ohlson & Juettner-Nauroth. It takes into account the value creation potential of the firm, the speed with which the latter will be realized (γ) and its ability to persist (δ).

The third interest is to show that under what conditions a valuation based only on expected earnings $\widetilde{\mathrm{EPS}}_1$ and $\widetilde{\mathrm{EPS}}_2$ may suffice. It is necessary that the term h is near to zero or that $\delta \cdot (1 + c) = 1$. Conversely, when the ability to generate value is not persistent ($\delta < (1 + c)^{-1}$), a model of type AEG overestimates the share. When the enterprise is only at the beginning of growth ($\bar{q}_1$high), its implementation very progressive (γ low) and its ability to create value very persistent ($\delta > (1 + c)^{-1}$), then a model of type AEG is very incomplete. Its explanatory power is weak and suffers from the absence of key variables.

2.3 The specification of the model tested

From an empirical point of view, the measures selected for $E_0\left[\widetilde{\mathrm{EPS}}_1\right]$ and $E_0\left[\widetilde{\mathrm{EPS}}_2\right]$ are the medians forecasts of earnings per share retained by IBES, noted EPS_1 and EPS_2. The measure chosen for $E_0[\tilde{F}_1]$ is the median forecast adopted by IBES for dividend per share, noted DPS_1. We do not have any direct forecast for $\bar{q}_1 \cdot E_0[\tilde{a}_1]$. The objective of this study is to test the explanatory power of several approximations:

$$\bar{q}_1 \cdot E_0[\tilde{a}_1] = \sum_{k=1}^{k=N} \alpha_k \cdot Y_k \cdot \mathrm{TAPS}_0 \quad (7)$$

Where k is one of the N variables potentially correlated with the expected abnormal earnings growth, Y_k knowing that α_k is a measure of its expected impact on the evolution of the earnings and TAPS_0 total assets per share. P_0 is the share price in the beginning of the year. The variablesP_0, EPS_1, EPS_2 and

DPS_1 were divided by $TAPS_0$, to be normalized. Finally, the model was completed by the inclusion of a control variable for size measured by log of market capitalization in U.S. dollars. The following specification was chosen:

$$\frac{P_0}{TAPS_0} = \beta_0 + \beta_1 \cdot \frac{EPS_1}{TAPS_0} + \beta_2 \cdot \frac{EPS_2 - EPS_1 + r \cdot DPS_1}{TAPS_0} + \sum_{k=1}^{k=N} \beta_{k+2} \cdot Y_k + \beta_{N+3} \cdot \ln(CB_0) + \tilde{\epsilon} \quad (8)$$

One of the main limits of this specification is that it only takes the average values for r and g with in each country. Note that according to the theoretical model we should have $r = \sqrt{\left(\frac{\beta_1}{2 \cdot \beta_2}\right)^2 + \frac{1}{\beta_2}} - \frac{\beta_1}{2 \cdot \beta_2}$ and $g = -\frac{\beta_1}{\beta_2}$.

3. Data and Descriptive Statistics

3.1 Constitution of the samples

Our sample was compiled from the information available in early July 2009[26] in the data base Thomson Financial Accounting Research data and covering 18 countries for which the number of firms represented in this database was the highest. It contains both the developed countries (Germany, Australia, Canada, France, Italy, Japan, United Kingdom, Sweden and USA) and emerging countries (Brazil, China, Korea, Hong Kong, India, Malaysia, Singapore, Taiwan, Thailand)[27]. In order to study the period 2001-2008 between the two crisises, it was necessary to collect the data over the period 1998-2008. In effect some variables appear in the form of annual variations, other as average of past performance. Missing information, especially for forecast of earning per share, reduced the sample size.

[26] It is possible that some information has been modified ex post by the data provider.
[27] Initially, South Africa and India were included in the sample. The too few and too limited of forecast data in recent years has forced us to eliminate these two countries.

Table1 : Selection of sample

This table presents the modalities of selection of companies studied. The period of selection extends from 1998 to 2008.The data comes from Worldscope and IBES databases provided by Thomson Financial. The securities initially selected for all concerned countries are those considered by Thomson Financial as active or inactive, in order to limit the "survivorship" bias. Numbers of these securities correspond to firms effectively disappeared, to not listed companies or yet to particular categories of securities issued. The selection process consisted of a search of market values year after year of these companies and to retain only the firms years for which this information was available. In order to have uniform accounting periods by country, we have selected only those companies that adopted the most usual year end date for each country. By following the sector classification proposed by Fama and French (49), we have eliminated all societies of financial sectors and real estate (45-49) and the companies from which the sector was not identified. The following selection consisted of to retain only the firms for which accounting data and earnings per share forecast, necessary for the study was available.

	Active and inactive in the database Thomson Financial	Number of firms whose fiscal year end date is known	The most frequent end of year for the country	Number of firms having this year end date	Percentage of firms with this year end date	Number of firms with a code FF sector less than 45	Number of companies with market capitalizations available at least for one year	Number of firms / year with known market capitalizations between 1998 and 2008	Number of firms / year with the known book values used between 1998 and 2008	Number of firms/ year with equity &capitalization in excess of 1 million $ between 1998 &2008	Number of firms / year with positive net income between 1998 and 2008	Number of firms / year with positive net income between 2001 and 2008	Number of firms/ year with EPS forecasts available between 2001 and 2008
USA	28 013	8 574	December	6 086	70.98%	4 531	4 217	32190	30 888	25 127	15 910	12 078	5 940
Germany	29 096	7 075	December	6 739	95,3%	6 066	546	4 624	2 457	2 386	1 807	1 424	705
Australia	17 369	2 733	June	1 975	72,3%	1 660	1 376	8 163	6 668	5 831	2 613	2 287	851
Canada	20 176	5 665	December	5 076	89,6%	4 282	937	6 342	3 962	3 790	2 168	1 778	840
France	27 856	5 750	December	4 781	83,1%	4 131	470	4 099	2 534	2 417	1 924	1 603	812
Italy	13 825	1 705	December	1 640	96,2%	1 422	210	1 648	1 287	1 280	967	762	356
Japan	36 774	5 604	March	2 969	53,0%	2 652	2 564	24 453	10 979	10 876	9 176	8 167	3 818
United Kindom	38 141	7 201	December	3 976	55,2%	3 454	702	4 869	4 771	4 316	2 650	2 107	985
Sweden	11 050	1 772	December	1 633	92,2%	1 441	309	2 276	1 054	1 048	776	599	409
Other developed countries	*194 287*	*37 505*		*28 789*		*25 108*	*7 114*	*56 474*	*33 712*	*31 944*	*22 081*	*18 727*	*8 776*
Brazil	21 722	7 335	December	7 318	99,8%	6 615	250	1 957	1 008	974	787	647	252
China	23 521	4 437	December	4 381	98,7%	4 081	1 768	10 682	2 493	2 421	2 047	1 672	381
Korea	1 804	1 091	December	998	91,5%	956	948	7 691	5 603	5 482	4 235	3 570	376
Hong Kong	7 155	1 240	December	805	64,9%	624	469	3 787	3 565	3 390	2 378	2 020	675
Indonesia	888	716	December	716	100,0%	570	274	2 228	2 049	1 781	1 362	1 139	232
Malaisia	1 938	1 450	December	918	63,3%	794	510	3 859	3 188	3 073	2 338	1 962	519
Singapore	6 053	1 610	December	1 146	71,2%	1 014	354	2 564	2 128	2 066	1 581	1 319	340
Taiwan	3 754	1 894	December	1 891	99,8%	1 795	1 418	9 725	4 605	4 589	3 630	3 071	628
Thailand	1 084	800	December	755	94,4%	641	413	3 191	2 618	2 444	1 944	1 606	424
Emerging countries	*67 919*	*20 573*		*18 928*		*17 090*	*6 404*	*45 684*	*27 257*	*26 220*	*20 302*	*17 006*	*3 827*

In order to constitute a homogenous sample within each of the country as regards of the accounting years, we selected only the companies with year-end corresponding to the date most widely used in the country. Generally, it is the 31 December, with the exception of Australia (end of June) and Japan (end of March). This requirement generally seems not very constraining. The percentage of companies respecting this practice is most often above 90%. However, there are two major exceptions among the developed countries (Japan and United Kingdom, where the percentage is around 50%). Similarly, Hong Kong and Malaysia have smaller proportions (about 60%). The financial and real estate companies whose accounting standards are often specific and not comparable were eliminated. We could raise within the Thomson Financial database only the market capitalization for 7 114 companies of the other developed countries and 6 404 companies of emerging countries, for a total firms-year respectively equal to 56 474 and 45 684. Companies are not, therefore, present for all years. If we compare these figures to theoretical value of firms-year with a continuous presence over 11 years, we obtain a frequency of occurrence of 72% for other developed countries and 65% for emerging countries. This last sample is, therefore, somewhat less dense.

The availability of accounting data required to estimate the variables used in the study further reduced the sample size. The loss of the number of observation is equivalent for the two sub populations (other developed countries and emerging countries), or about 40%. For the rest of the study, we selected only profitable companies. They are more numerous in emerging countries (77%) than among other developed countries (69%). Finally, the greatest loss of observation comes from the limited number of forecasts for earning per share available on IBES during this period. The coverage rate is 47% for other developed countries and only 23% for the emerging countries.

Table 2 : The observation components of sample

This table shows the numbers of observations by country and by year of the companies studied . The sample contains for all the countries only the firms whose year end is standard for the country (usually, 31December, except for Australia 30 June and Japan 31 March). The study period extends to 2001 to 2008.The data come from the databases Worldscope and IBES provided by Thomson Financial.

	2 008	2 007	2 006	2 005	2 004	2 003	2 002	2 001	Total
USA	832	1 019	930	891	789	641	430	408	5 940
Germany	84	118	118	104	93	73	64	51	705
Australia	169	158	134	109	109	67	56	49	851
Canada	147	154	152	119	96	73	50	49	840
France	82	149	150	124	97	77	69	64	812
Italy	52	62	54	55	47	39	27	20	356
Japan	569	590	557	520	556	439	359	228	3 818
United Kingdom	144	175	149	148	118	102	84	65	985
Sweden	62	65	60	57	50	41	34	40	409
Other developed countries	*1 309*	*1 471*	*1 374*	*1 236*	*1 166*	*911*	*743*	*566*	*8 776*
Brazil	38	42	35	33	32	29	17	26	252
China	62	68	67	48	51	35	22	28	381
Korea	48	71	55	46	44	31	63	18	376
Hong Kong	87	121	97	96	90	78	56	50	675
Indonesia	32	42	34	32	29	23	21	19	232
Malaisia	95	93	76	64	66	55	42	28	519
Singapore	40	69	54	46	52	38	28	13	340
Taiwan	46	130	125	92	80	54	72	29	628
Thailand	52	68	58	61	65	63	32	25	424
Emerging countries	*500*	*704*	*601*	*518*	*509*	*406*	*353*	*236*	*3 827*
Total	1 809	2 175	1 975	1 754	1 675	1 317	1 096	802	12 603

In total, we have 12 603 firm years distributed for 8 776 to other developed countries and 3 827 for emerging countries. The number of observations is increasing over the period: 802 in 2001 and 1809 in 2008 but relatively stable from 2004 to 2008.The maximum is 2175 in 2007, just before the last financial crisis.

3.2 Descriptive statistics

The average stock market values normalized by total assets[28] are substantially similar for emerging countries (1.09) and other developed countries (1.10). The medians are lower because of the asymmetry of the distributions associated with positive signs of this measure. Within groups, the averages are significantly different: the highest for Australia (1.47) and Indonesia (1.36) and the lowest for Italy and Japan (0.84) and Korea (0.77). The mean and median are higher in the case of USA (1.55 and 1.13 respectively), reflecting a higher capitalization and /or greater indebtedness over this period.

[28] Measured by the item WS.YrEndMarketCap divided by the item WS.TotalAssets of Worldscope database from Thomson Reuters

Table 3 : Descriptive Statistics

This table presents the synthesis of the values taken in the sample by the 3 basic selected variable used in the chosen model, i.e., market capitalization at year end, expected earnings per share for the coming year and expected earnings growth for the following year . All these variables are normalized by total assets for the first, by total assets divided by number of shares for the following two. The table also present a measure of the size of companies selected through the natural logarithm of the market capitalization. The sample contain for all the countries only the companies whose year end is 31 December (30 June for Australia and 31 March for Japan). The study period extends from 2001-2008. The data come from Worldscope and IBES databases provided by Thomson Financial.

Panel A :

	Market capitalization / Total assets			Expected EPS / Total Assets per share			Eaxpected EPS Variation / Total Assets per sahre		
	Mean	Median	S.D	Mean	Median	S.D	Mean	Median	S.D
USA	*1.55*	*1.13*	*1.37*	*0.10*	*0.08*	*0.09*	*0.018*	*0.012*	*0.026*
Germany	1,11	0,72	1,19	0,07	0,06	0,06	0,012	0,008	0,015
Australia	1,47	1,06	1,36	0,11	0,08	0,10	0,017	0,010	0,036
Canada	1,11	0,90	0,80	0,08	0,06	0,06	0,009	0,005	0,027
France	0,99	0,70	0,93	0,07	0,05	0,04	0,009	0,007	0,012
Italy	0,84	0,67	0,66	0,05	0,05	0,03	0,007	0,006	0,008
Japan	0,84	0,64	0,68	0,04	0,04	0,03	0,006	0,004	0,007
United Kingdom	1,23	0,96	0,96	0,09	0,07	0,07	0,009	0,007	0,023
Sweden	1,22	0,98	1,03	0,09	0,08	0,05	0,012	0,010	0,018
Mean	*1,10*	*0,83*	*0,95*	*0,075*	*0,061*	*0,055*	*0,010*	*0,007*	*0,018*
Brazil	0,96	0,77	0,72	0,14	0,09	0,37	0,021	0,015	0,031
China	1,11	0,76	1,14	0,08	0,07	0,06	0,012	0,007	0,022
Korea	0,77	0,55	0,80	0,08	0,07	0,06	0,012	0,008	0,021
Hong-Kong	1,24	0,90	1,06	0,09	0,08	0,07	0,014	0,009	0,027
Indonesia	1,36	0,82	1,58	0,13	0,11	0,10	0,015	0,013	0,028
Malaysia	1,09	0,75	1,11	0,10	0,08	0,07	0,011	0,009	0,016
Singapore	1,01	0,81	0,73	0,10	0,09	0,06	0,017	0,013	0,021
Taiwan	1,27	0,97	1,02	0,11	0,10	0,08	0,012	0,008	0,031
Thaïlande	0,98	0,77	0,79	0,10	0,08	0,06	0,011	0,009	0,021
Mean	*1,09*	*0,79*	*0,99*	*0,103*	*0,086*	*0,103*	*0,014*	*0,010*	*0,024*

Panel B :

	Size	Variation of sales over 2 years in %			Variation over 2 year of book value of equity in excess of net income in %			Ratio of invetsment over 2 years compared to depreciation allowances		
	Mean	Mean	Median	S.D	Mean	Median	S.D	Mean	Median	S.D
USA	*7.72*	*0.39*	*0.25*	*0.51*	*0.10*	*-0.02*	*0.68*	*1.35*	*1.10*	*0.87*
Germany	6,91	0.22	0.16	0.31	-0.02	-0.08	0.33	1.14	1.02	0.63
Australia	6,05	0.69	0.33	1.26	0.28	-0.06	1.27	2.04	1.30	2.70
Canada	7,14	0.56	0.29	0.95	0.15	-0.05	0.67	1.88	1.42	1.72
France	7,00	0.25	0.16	0.34	0.02	-0.08	0.41	1.22	1.12	0.69
Italy	7,37	0.25	0.17	0.34	-0.08	-0.12	0.25	1.23	1.00	0.81
Japan	7,21	0.13	0.10	0.17	0.01	-0.02	0.13	1.20	1.10	0.56
United Kingdom	6,96	0.35	0.21	0.62	0.03	-0.11	0.73	1.26	1.02	0.93
Sweden	6,77	0.31	0.20	0.47	-0.03	-0.13	0.52	0.99	0.90	0.58
Mean	*6,93*	*0.34*	*0.20*	*0.56*	*0.04*	*-0.08*	*0.54*	*1.37*	*1.11*	*1.08*
Brazil	7,65	0.43	0.35	0.35	-0.09	-0.16	0.55	1.71	1.50	0.93
China	6,97	0.61	0.48	0.53	0.03	-0.04	0.23	2.48	2.19	1.58
Korea	7,37	0.27	0.23	0.29	-0.02	-0.04	0.24	1.64	1.39	1.00
Hong-Kong	6,93	0.51	0.34	0.69	0.13	-0.05	0.71	2.40	1.68	2.07
Indonesia	6,32	0.51	0.41	0.41	-0.03	-0.09	0.56	1.88	1.63	1.16
Malaysia	5,44	0.40	0.28	0.46	-0.01	-0.05	0.23	1.85	1.49	1.30
Singapore	5,83	0.45	0.34	0.50	-0.01	-0.07	0.35	1.90	1.51	1.25
Taiwan	6,95	0.48	0.40	0.44	-0.05	-0.07	0.23	1.79	1.57	1.13
Thaïlande	5,63	0.34	0.25	0.36	-0.09	-0.14	0.32	1.66	1.38	1.25
Mean	*6,57*	*0.45*	*0.34*	*0.45*	*-0.02*	*-0.08*	*0.38*	*1.93*	*1.59*	*1.30*

The return[29] appear higher for the emerging countries (0.103) and USA (1.01) than for other developed countries (0.075) if we consider expected earnings per share normalized by total assets per share. Brazil emerges as the best performing country (0.14) and Japan as the least (0.04). The ratio of the expected change in earnings per share normalized by total assets per share[30] reinforces this impression. It is higher for the USA (0.018) and emerging (0.014) than for other developed countries (0.10), Brazil and Japan still occupying the same places.

The sample firms belonging to other developed countries are sized[31] a little larger than those of emerging countries, but smaller than the American ones. The companies are significantly smaller for Malaysia, Thailand and Singapore.

The accounting measures of past growth were selected based on the methodology inspired by Hribar and Yehuda (Hribar & Yehuda, 2008). Three basic variables were measured: the variation of sales over 2 years in %, variation of book value of equity in excess of net income in%, and the ratio of investment over 2 years compared to past depreciation during these past years[32]. According to the first and the third indicator, the emerging countries have experienced the sharpest growth.

These variables measuring the past growth have been combined into a synthetic indicator which varies from 0 (lowest growth) to 1 (highest growth). The detailed calculation of this indicator is given in Annex 2.

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[29] Measured by the item IBH.EPSMedianFYR1 divided by (WS.TotalAssets/ WS.CommonSharesOutstanding) of the databases Worldscope and IBES from Thomson Reuters

[30] Measured by the difference of IBH.EPSMedianFYR2 and IBH.EPSMedianFYR1 ,divided by (WS.TotalAssets/ WS.CommonSharesOutstanding) of the databases Worldscope and IBES fromThomson Reuters

[31] Measured by the logarithm of market capitalization in USD: WS.YrEndMarketCapUSD of Worldscope database from Thomson Reuters.

[32] Respectively measured by the items WS.Sales, WS.TotalCommonEquity, WS.NetIncome, and WS.CapitalExpendituresCFStmt WS.DepreciationDeplAmortExpense of Worldscope database from Thomson Reuters

4. The empirical results

We comment, in the first paragraph, the different level of association between market values, expected earnings and their expected variation while omitting the supposed impact of dividends. We, then, discuss the possible effects of the bias associated with used forecasts. Finally, we propose a series of estimates of the expected implicit rates of return derived from these association relations.

4.1 Association between market values and expected earnings without taking into account dividends

The estimation of the equation (8) requires a preliminary measurement of the rate r to calculate the abnormal earnings growth. Since this rate is not directly observable and that it intervenes in the calculation of expected earnings per share cum dividend, we initially ignore the impact of $r \cdot DPS_1$. Table 4 provides an estimate for 18 countries studied. Expected earnings per share for the next year are significantly associated with stock prices in all countries. The primary role of expected earnings in valuation is therefore general, even if the intensity of the association varies considerably (8.77 on average for emerging countries against 6.81 for the USA and 12.10 for other developed countries).

Table 4 : Association between market values, expected earnings and growth

This table presents the estimated values of the coefficients and their T for a regression model whose dependent variable is market capitalization at year end normalized by total assets, and the independent variables are expected earnings per share for the coming year and expected earnings growth for the following year normalized by total assets per share and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable. The regressions were carried out by country with dummies by period. The coefficients T were calculated from “heteroskedasticity consistent standard errors “. The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by ThomsonFinancial.The observations belonging to extreme percentiles for the dependent variable and the first two independent variables have been eliminated. Finally, we have conserved companies appearing at least three times during the period.

	EPS1		EPS2-EPS1		Growth Rank		Size				
	b1	T	b2	T	b3	T	b4	T	R2	F	Number of Observations
USA	6.810	21.356	15.629	14.187	-0.047	-1.014	-0.022	-3.423	0.423	354.609	5 333
Germany	12.922	15.080	32.073	5.353	0.040	0.416	0.092	6.495	0.751	158.052	588
Australia	8.916	10.496	12.206	3.717	0.273	2.423	0.114	6.775	0.642	111.390	695
Canada	8.085	15.259	8.533	6.033	-0.349	-3.772	0.073	6.599	0.545	71.331	667
France	14.564	17.328	21.376	6.792	0.028	0.341	0.068	7.762	0.704	148.086	698
Italy	13.253	17.161	23.849	5.985	0.071	0.931	0.054	4.579	0.760	84.716	307
Japan	15.635	50.469	21.149	13.787	0.188	9.095	0.056	12.805	0.745	900.015	3 400
United Kingdom	9.975	11.951	17.493	7.509	-0.102	-1.038	0.119	10.035	0.577	104.262	852
Sweden	13.479	23.884	21.653	5.786	-0.196	-1.494	0.058	4.253	0.750	96.495	365
Other developed countries	12.104		19.792		-0.006		0.079				7 572
Brazil	4.729	4.475	1.384	0.695	0.114	0.836	0.162	5.514	0.436	13.862	209
China	6.136	4.962	11.447	2.025	0.160	0.907	0.106	3.719	0.313	11.049	279
Korea	9.325	8.367	6.084	2.828	0.147	1.105	-0.036	-1.826	0.601	33.479	256
Hong-Kong	8.865	14.432	9.473	5.853	0.454	3.972	0.181	10.894	0.568	64.672	552
Indonesia	10.333	9.111	9.736	3.336	0.326	2.280	0.158	4.835	0.801	70.107	203
Malaysia	11.706	23.695	-0.412	-0.183	0.331	4.116	0.108	4.326	0.772	120.188	402
Singapore	9.595	13.413	12.575	4.776	0.003	0.022	0.202	11.016	0.691	47.254	244
Taïwan	10.048	27.407	8.152	6.129	0.042	0.649	0.099	7.136	0.821	173.904	430
Thaïland	8.204	10.124	6.868	2.858	0.224	2.612	0.134	7.656	0.657	56.446	336
Emerging countries	8.771		7.256		0.200		0.124				2 911

The increase in earnings per share is significantly associated with market value in the case of developed countries but this is not always true in case of emerging countries (the coefficients are not significant for Brazil and Malaysia). The average of these coefficients is 15.63 for USA, 19.79 for other developed countries and 26.7 for emerging countries.

The coefficient associated with the composite measure of growth are mostly negative and non significant in developed countries (-0.047 for the USA and on average -0.006 for others), with a notable exception of Japan (0.188). This coefficient is positive on average in emerging markets (0.200) but significant only for Hong Kong, Indonesia, Malaysia and Thailand. Note that according to the equation (6), the expected sign for this variable depends on that of the term h. It can be positive and negative according to the degree of persistence and depending on the rate of growth (c), speed (γ)and the ability to persist (δ) which characterize the value creation potential of the firm. When it is negative (positive), only the capitalization of the expected increase in the short-term earnings tends to over value (under value) the share and this factor has made the necessary correction. The empirical results suggest that during this period, growth in short terms earnings were not sustainable over a long period (except Japan, which displays very poor performance). In contrast, on average, in the emerging countries, the short-term variation of earnings does not fully realize long-term growth potential.

The coefficients of the variable size are significant in all countries. But it is negative in the USA (-0.022) and in Korea and positive in emerging countries (0.124) or other developed countries (0.079). The American sample is large and one that offer the greatest variety of business sizes.

Table 5 : Association between market values and growth with fixed effects

This table presents the estimated values of the coefficients and their T for a regression model whose dependent variable is market capitalization at year-end normalized by total assets, and independent variables are expected earnings per share for the coming year and expected earnings growth for the following year normalized by total assets per share, and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable. The regression were carried out by country by panel data with fixed effects (dummies by firm and by period).The coefficients T were calculated from clustered standard errors. The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial. The observations belonging to extreme percentiles for the dependent variables and the first two independent variables have been eliminated. Finally, we have conserved companies appearing at least three times during the period.

	EPS1		EPS2-EPS1		Growth Rank		Size				
	b1	T	b2	T	b3	T	b4	T	R2	F	Nbr.of observations
USA	3.162	11.659	4.988	12.048	0.348	6.832	0.780	29.782	0.900	26.802	5 333
Germany	7.605	4.279	17.640	4.235	0.203	1.840	0.545	6.908	0,899	34.862	588
Australia	7.613	11.736	3.084	2.087	0.456	6.344	0.530	9.572	0,926	49.336	695
Canada	5.879	8.789	4.230	4.910	0.262	5.200	0.384	7.065	0,872	24.678	667
France	7.268	13.433	12.749	8.584	0.234	4.127	0.444	11.640	0.923	45.090	698
Italy	8.095	9.962	9.869	3.767	0.418	5.883	0.421	13.445	0.932	51.461	307
Japan	5.705	13.474	8.967	12.460	0.162	7.853	0.563	16.742	0.924	56.002	3 400
United Kingdom	5.842	6.207	10.234	7.396	0.237	3.569	0.481	11.818	0.863	26.862	852
Sweden	8.204	18.565	9.501	5.751	0.159	3.242	0.350	7.792	0.911	40.737	365
Other developed countries	7.026		9.534		0.266		0.465				7 572
Brazil	1.641	3.384	0.282	0.382	0.338	2.477	0.554	8.802	0.891	27.875	209
China	4.044	4.622	6.853	1.971	0.400	2.658	0.584	8.428	0,835	15.574	279
Korea	4.570	4.119	3.318	2.141	0.012	0.171	0.356	8.684	0.919	34.538	256
Hong-Kong	5.173	8.154	3.621	4.398	0.053	0.585	0.693	10.261	0.883	30.842	552
Indonesia	8.608	7.536	8.781	3.094	0.565	5.277	0.456	4.650	0.891	28.461	203
Malaysia	7.204	10.301	0.743	1.967	0.287	4.845	0.466	12.121	0.948	62.395	402
Singapore	7.432	9.352	8.713	3.153	-0.035	-0.400	0.342	5.015	0.897	27.752	244
Taïwan	6.423	7.963	5.993	3.936	0.117	1.073	0.459	4.533	0.910	34.094	430
Thaïlande	3.420	5.268	1.678	0.982	0.279	3.220	0.554	9.667	0.926	43.557	336
Emerging countries	5.391		4.442		0.224		0.496				2 911

The panel fixed effects study complements these results. The variable expected earnings per share is always significant. The coefficients, here, are also high but lower than in the previous study (5.39 on average for emerging countries against 3.16 for the USA and 7.03 for other developed countries). For one company, when its expected earnings per share increases. Its value increases marginally. This applies to the increase in earnings per share in developed countries where it is significantly associated with market value (4.99 for USA and 9.53 for other developed countries). But it is far from being in all the emerging countries (the coefficients are weak and not significant for Brazil, Malaysia and Thailand). The coefficients associated with the composite variable for growth are positive and significant for all developed countries. They capture the positive effect of growth for the same organization (the term h becoming either less negative or more positive for the same company, according to its sign). This result is extended to a part of emerging countries (Brazil, China, Indonesia, Malaysia and Thailand).

4.2 Quality of forecasts and association of variables.

The coverage of various stocks by financial analysts is certainly uneven in quantity and quality according to the countries concerned. It is not, therefore, clear that the EPS forecast reported by IBES constitute a measure of market expectations, endowed with a homogeneous quality. Table 6 provides a series of measures of forecast errors characterizing each country at the end of the period. The average absolute error represents 4.76% of average a score in USA, 12.01% in other developed countries and 14.42% in emerging countries. The quality of forecasts is significantly higher in the USA. The disparities among countries are strong: Italy and Brazil have the highest values, while Australia and Taiwan have the lowest. The average error is positive, suggesting that analysts are pessimistic before publication of earnings, either because they have been conducted by the management (“earning guidance”) or because they are encouraged not to displease the firms: 0.93% of average score in USA, 2.95 % for other developed countries and 0.57% for emerging countries. However, disparities are very large among countries. The averages are thus negative for Australia and Japan and for more than half of emerging countries. It is possible that analysts' behaviors are very heterogeneous. If during this period FD regulation had, for example, prompted financial analysts to no longer express an unfounded optimism to USA, the situation had been different in other countries. Therefore, it is possible that the market holds expectations for the coming earnings per share, in some cases exceed the forecast reported by IBES, and in other lower. The quality of estimates of association links between expected earnings and market value is affected.

Table 6 : Forecast errors and initial optimism

This table presents the forecast errors for earnings per share for the year studied. The errors are estimated from the available year end forecast. The values were normalized by total assets per share. The mean values provide an estimate of bias, that of absolute values a measure of precision. These mean values were divided by the ratio of expected EPS divided by total assets per share to obtain a measure of earnings in %. This estimate was preferred to the mean of relative errors, given the presence of low values for certain earnings per share. The initial optimism is measured by the ratio: difference between earnings per share forecast at the beginning of the year and EPS realized in the previous year, divided by total assets per share at the beginning of the year. The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial. The sample is that used in Table 4, except for the measurement of initial optimism which lack certain observations because of the lag of a year.

	Error = (EPS real- EPS expected) / Total assets per share				EPS expected / Total assets per share	Ratios compared to mean expected EPS		Initial optimism	
	Value		Absolute value		Value	Mean Error / Mean value	S.D	Value	
	Mean	S.D	Mean	S.D	Mean	Mean		Mean	S.D
USA	0.09%	1.55%	0.46%	1.48%	9.68%	0.93%	4.76%	17.22%	35.23%
Germany	0.28%	1.50%	0.89%	1.24%	6.97%	4.05%	12.69%	20.05%	83.92%
Australia	-0.04%	1.97%	0.88%	1.77%	10.50%	-0.39%	8.37%	20.46%	54.34%
Canada	0.01%	1.24%	0.67%	1.05%	7.23%	0.18%	9.28%	14.44%	41.55%
France	0.35%	1.74%	0.87%	1.55%	6.30%	5.57%	13.79%	10.53%	40.20%
Italy	0.47%	2.55%	1.00%	2.40%	5.45%	8.63%	18.27%	5.56%	54.94%
Japan	-0.03%	0.77%	0.44%	0.63%	4.36%	-0.75%	10.14%	20.47%	47.92%
United Kingdom	0.21%	1.84%	0.96%	1.59%	7.91%	2.61%	12.09%	12.02%	30.50%
Sweden	0.31%	1.76%	0.96%	1.50%	8.36%	3.72%	11.47%	16.79%	57.87%
Other developed countries	0.20%	1.67%	0.83%	1.47%	7.13%	2.95%	12.01%	15.04%	51.40%
Brazil	0.24%	3.76%	1.88%	3.27%	10.57%	2.24%	17.82%	39.33%	267.16%
China	-0.11%	1.51%	0.86%	1.25%	7.44%	-1.49%	11.60%	14.24%	34.24%
Korea	-0.01%	1.53%	1.00%	1.16%	7.32%	-0.13%	13.68%	15.96%	38.80%
Hong Kong	0.00%	2.91%	1.37%	2.57%	8.95%	-0.05%	15.31%	14.35%	41.79%
Indonesia	-0.57%	4.23%	2.10%	3.71%	12.25%	-4.63%	17.17%	16.97%	42.54%
Malaysia	0.43%	4.00%	1.50%	3.73%	9.16%	4.68%	16.34%	13.91%	50.46%
Singapore	0.51%	4.46%	1.48%	4.23%	9.38%	5.47%	15.84%	11.18%	41.84%
Taiwan	-0.15%	1.76%	1.05%	1.42%	10.76%	-1.43%	9.75%	15.40%	29.62%
Thailand	0.04%	1.87%	1.13%	1.50%	9.20%	0.45%	12.26%	16.80%	50.44%
Emerging countries	0.04%	2.89%	1.38%	2.54%	9.45%	0.57%	14.42%	17.57%	66.32%

The analysts' behavior can vary according to the forecast horizon, within the same country. The more it is distant, the more it is difficult to verify the acuteness and the more it is easy to be optimistic. Bartov, Givoly, & Hayn (2002) suggest that analysts have an interest in optimism at the beginning of the year and then to revise gradually their forecasts to end the year in the pessimistic situation. They accumulate the advantage of revealing flattering long term forecasts without exposing business leaders to announce disappointing realized results. To characterize possible initial optimism, we have calculated the gap in the beginning of the year between the forecast earnings and last known earning per share, which is to say that of the past year. All these measured have been normalized by total assets per share. The averages shown in table 6 reflect general optimism: the expected evolution expressed in % of average earnings for concerned countries is of 17.22% in USA, 15.4% in other developed countries and 17.57% in emerging countries.

The presence of a bias in the beginning of a period and a possibly different bias at the end of the period doubly affects the measurement of the expected variation of earnings per share. If the forecast for one year is optimistic and the short-term pessimistic, the variation between the two overestimates the progression really expected by the market. If the short-term forecast is infected with a sense of optimism, but that of one year is little concerned the same variation under estimates the actually anticipated growth. Finally, if only the forecast in the short term is biased, the impact is identical on both variables: expected earnings and anticipated growth and these variables are found correlated. To isolate the most severe effects of these manipulations of forecasts, we are inspired by the method used by Tian (2009). We isolated, in each country, the forecast likely to be most affected by manipulation. To do this, we have used two criteria. First, the forecast (firm-year) must be initially optimistic (the expected earnings early in the year are higher than the earnings per share published last year). Second, the revision of the forecast during the period must be abnormally pessimistic. To determine this second point, we have regressed, for each country, the variation of the forecasts during the period (normalized by total assets per share) on the stock return over the same period in order to eliminate the impact of the information taken into account by the market. We, then, calculated the forecasting residuals and we considered that if these residuals were negative and positive initial optimism, then we were faced with a case which could be suspected of strong manipulation. Table 7 resumed the regression carried out in table 4 but by combining a dummy variable taking the value 1 in a suspected case of manipulation and variables related to earnings and variation of earnings.

Table 7 : Association between market values, expected earnings, growth and manipulation of forecasts

This tables table presents the estimated values of the coefficients and their T for a regression model whose dependent variable is market capitalization at year end normalized by total assets, and independent variables are expected earnings per share for the coming year and expected earnings growth for the following year normalized by total assets per share and a synthetic variable measuring the past growth. The size was introduced as a control variable. The dummy variable Dm takes the value 1 if a manipulation index has been estimated. The regressions were carried out by country with dummies by period. The coefficients T were calculated from "heteroskedasticity consistent standard errors ".The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial. The observations belonging to extreme percentiles for the dependent variables and the first two independent variables were eliminated. Finally, we have conserved companies appearing at least three times during the period.

	EPS_1		EPS_1*D_m		EPS_2-EPS_1		EPS_2-EPS_1*D_m		Growth Rank		Size				
	b_1	T	B_{1m}	T	B_2	T	B_{2m}	T	b_3	T	b_4	T	R2	F	Number of Obs.
USA	7.466	21.679	1.634	2.859	17.299	13.712	-0.025	-0.009	-0.117	-2.279	0.028	3.521	0.463	433.489	5 533
Germany	12.409	13.778	5.618	1.594	36.372	5.322	-27.435	-2.920	0.062	0.632	0.090	6.564	0.751	158.052	588
Australia	9.320	10.590	-1.520	-1.092	12.076	4.345	-0.155	-0.013	0.251	2.234	0.113	6.831	0.642	111.390	695
Canada	8.056	14.982	0.573	0.759	7.784	4.824	2.266	0.671	-0.333	-3.559	0.073	6.646	0.545	71.331	667
France	14.431	16.952	-0.340	-0.304	22.804	6.355	-7.080	-1.317	0.034	0.422	0.065	7.556	0.704	148.086	698
Italy	12.949	16.314	1.658	1.285	25.930	5.640	-8.797	-1.255	0.062	0.791	0.056	4.563	0.760	84.716	307
Japan	15.510	47.160	0.694	1.293	22.000	13.032	-3.115	-0.930	0.187	9.076	0.057	12.252	0.745	900.015	3 400
United Kingdom	10.070	11.782	0.072	0.075	16.733	5.910	3.082	0.701	-0.103	-1.059	0.120	10.163	0.577	104.262	852
Sweden	13.431	23.827	0.118	0.099	21.988	5.282	-1.788	-0.297	-0.190	-1.511	0.057	4.233	0.750	96.495	365
Other developed countries	12.022		0.859		20.711		-5.378		-0.004		0.079				7 572
Brazil	4.210	3.481	0.929	0.837	-1.138	-0.235	3.661	0.683	0.121	0.880	0.151	5.332	0.436	13.862	209
China	6.088	4.836	-0.426	-0.233	8.651	2.541	8.448	0.533	0.160	0.904	0.108	3.629	0.313	11.049	279
Korea	9.549	8.959	-2.615	-2.061	7.916	2.855	-2.347	-0.754	0.150	1.163	-0.036	-1.839	0.601	33.479	256
Hong Kong	8.447	14.082	2.908	2.256	9.213	5.516	-2.716	-0.535	0.467	4.172	0.187	11.351	0.568	64.672	552
Indonesia	9.474	10.728	2.380	1.376	7.647	4.402	1.798	0.228	0.331	2.286	0.164	4.977	0.801	70.107	203
Malaysia	11.734	20.009	-0.114	-0.151	-0.648	-0.255	0.717	0.173	0.330	4.006	0.108	4.292	0.772	120.188	402
Singapore	9.590	14.592	2.080	1.165	12.042	5.283	-1.830	-0.230	0.039	0.335	0.209	11.209	0.691	47.254	244
Taiwan	9.984	27.565	-0.152	-0.269	6.428	6.004	8.716	2.758	0.056	0.876	0.098	7.447	0.821	173.904	430
Thailand	8.207	10.109	0.325	0.276	6.853	2.736	0.706	0.116	0.225	2.607	0.135	7.520	0.657	56.446	336
Emerging countries	8.587		0.591		6.329		1.906		0.209		0.125				2 911

The results obtained in the American market are as per expectations (in the expected direction). The suspected cases of manipulation of the forecasts are associated with a coefficient of valuation of expected earnings significantly higher (a difference of 1.634). The market "would correct" the under estimation by the analysts. The coefficient associated to expected variations of earnings is negative but non significant (-0.025). The correction coefficients related to growth is negative (-0.177) but becomes significant. In contrast, the effects are negligible for other developed countries (with the exception of Germany).The lack of results may be due to the small size of samples or less elaborated forecasts management by analysts.

4.3 Estimation of expected implied rate of return(of capital) by country over the period

Taking into account the dividend per share in the estimation of equation (8) requires knowledge of the expected rate of return r. Moreover, if the theoretical model is verified; the same rate r should be equal to $\sqrt{\left(\frac{\beta_1}{2\cdot\beta_2}\right)^2+\frac{1}{\beta_2}}-\frac{\beta_1}{2\cdot\beta_2}$. To avoid having to assume zero dividends and thereby introducing a bias in the estimation of the expected implicit rate of return, we proceed iteratively until this implicit rate for the country concerned is equal to that which we used to calculate the abnormal earnings growth. The estimates of the rate r and g were obtained from the coefficients of β_1 and β_2,only. This allows avoiding taking into account the effects related to the manipulation of forecasts. It is likely that in these cases, the market "corrects" the analysts' forecasts and the coefficient obtained would be affected by this correction (see (Easton & Sommers, 2007)).

Table 8: Expected implicit rates of return as a function of market value, expected earnings and growth

This tables presents the estimated values for the coefficients and their T for a regression model whose dependent variable is market capitalization at year-end normalized by total assets, and the independent variables are the earnings per share for the coming year and increase in expected earnings for the following year plus the income generated by the reinvestment of dividends and normalized by total assets per share, the same variable multiplied by a dummy variable indicating the suspected manipulation of forecast and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable, as well as dummy variable for each reporting year.The regression were carried out by country, but taking into account all the years. The coefficients for year dummies are not reported. The coefficients T were calculated from “heteroskedasticity consistent standard errors “. The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial.

	EPS_1		$[EPS_1]*D_m$		EPS_2-EPS_1+r.DPS_1		$[EPS_2$-EPS_1+r.$DPS_1]*D_m$		Growth Rank		Size			Implicites measures		Nbre of obs.
	β_1	T	β_{1m}	T	β_2	T	β_{2m}	T	β_3	T	β_4	T	R^2	r	g	
USA	7.265	21.071	1.697	2.810	17.883	14.174	-0.113	-0.039	-0.140	-2.720	0.022	2.843	0.472	10.9%	-0.406	5 533
Germany	11.849	12.093	6.057	1.677	34.672	5.255	-25.987	-2.825	0.024	0.250	0.088	6.296	0.747	7.0%	-0.342	588
Australia	8.564	9.436	-1.473	-1.155	13.690	4.659	1.101	0.103	0.172	1.551	0.117	7.548	0.667	10.1%	-0.626	695
Canada	7.894	14.504	0.608	0.782	7.478	4.376	2.823	0.823	-0.359	-3.738	0.073	6.585	0.544	11.4%	-1.056	667
France	13.862	16.126	-0.079	-0.064	23.977	6.650	-8.138	-1.483	0.016	0.199	0.063	7.482	0.710	6.5%	-0.578	698
Italy	11.536	13.738	2.882	1.916	29.489	4.583	-13.781	-1.952	0.018	0.236	0.054	4.574	0.772	7.3%	-0.390	307
Japan	15.252	44.817	0.703	1.241	22.295	12.253	-3.101	-0.944	0.180	8.772	0.057	12.348	0.746	6.0%	-0.684	3 400
United Kingdom	9.646	11.235	0.123	0.121	17.487	6.180	2.328	0.549	-0.164	-1.659	0.117	10.066	0.585	8.9%	-0.549	852
Sweden	12.539	22.766	0.211	0.177	23.422	5.558	-2.114	-0.332	-0.226	-1.818	0.054	4.132	0.763	7.0%	-0.535	365
Other developed countries	11.393		1.129		21.564		-5.859		-0.042		0.078			8.0%	-0.595	7 172
Brazil	2.959	2.168	1.013	0.870	4.400	1.580	1.843	0.563	0.141	1.030	0.148	5.188	0.488	24.7%	-0.673	209
China	5.449	4.258	-2.071	-0.687	8.860	2.883	14.428	0.798	0.160	0.908	0.110	3.747	0.328	14.8%	-0.615	279
Korea	9.314	8.547	-2.574	-1.967	8.250	3.167	-2.282	-0.731	0.138	1.098	-0.037	-1.857	0.627	9.9%	-1.129	256
Hong Kong	7.652	12.866	2.325	1.574	11.551	6.691	-0.238	-0.044	0.432	4.031	0.188	11.488	0.598	11.2%	-0.662	552
Indonesia	8.870	11.636	1.684	0.962	8.740	4.383	4.698	0.672	0.284	1.980	0.152	4.844	0.831	10.2%	-1.015	203
Malaysia	10.925	17.689	0.253	0.281	5.415	2.278	-2.913	-0.707	0.353	4.279	0.113	4.620	0.775	8.8%	-2.018	402
Singapore	8.850	12.679	3.264	1.910	13.770	6.503	-6.916	-1.141	-0.016	-0.142	0.205	11.005	0.707	9.8%	-0.643	244
Taiwan	9.644	26.248	-0.438	-0.684	6.491	6.109	7.982	2.433	0.019	0.290	0.096	7.290	0.828	9.7%	-1.486	430
Thailand	7.428	9.397	0.610	0.501	8.501	3.643	-0.132	-0.022	0.204	2.419	0.136	7.691	0.668	11.9%	-0.874	336
Emerging countries	7.899		0.452		8.442		1.830		0.191		0.123			12.3%	-1.013	2 911

The results obtained in paragraph 4.1 are confirmed. In all countries expected earnings by the analysts is strongly associated with market value. The coefficients vary across geographic zones (7.27 in USA, 11.39 for other developed countries and 7.90 for emerging countries). The increase in earnings per share is strongly associated with market value in the case of other developed countries but this is not always the case in emerging countries. In the case of developed countries, using a PEG[33] based heuristics helps to improve the analysis of the market value of securities, beyond the information provided by the forward PE ratio. These two determinants can lead to overvaluation and require correction (case of USA and Canada where the coefficients associated with the composite variable of growth is significantly negative) and more rarely to an undervaluation (Japan). The results are mixed for emerging countries. The information content of the expected abnormal increase in earnings per share appears more limited. The coefficients associated are much lower (not meaningful for Brazil). The links between market value and earnings are more difficult to identify solely from the next two years earnings per share forecast. The reason can come from lower quality financial analysis. But also, the values are certainly dependent on other factors describing the growth opportunities in a long term. The historical measurements of the past growth are of little use (coefficients significant in 3 cases out of 9). The traditional valuation's heuristics should, therefore, be handled with much more prudence in these environments.

The model appears to capture a hierarchy of expected rates of return, although estimates for emerging markets remain very imprecise, country by country. The estimates of expected rates of return are respectively of 10.9% for USA, 8% for other developed countries and 12.3% for the emerging countries. Within the last

[33] It is not , here , expected earnings per share but a measure of abnormal growth.

two zones, the estimates vary across countries. For developed countries, the expected returns are lowest in Japan (6.0%) and in the Euro zone (6.5% for France and 7% for Germany) and the highest in Canada (11.4%) and Australia (10.1%). Among emerging countries, Brazil (24.7%) and China (14.8%) topped. Malaysia (8.8%), Taiwan (9.7%), Singapore (9.8%) and Korea (9.9%) are in the tail. The implicit values of the parameter g which governs the abnormal earnings growth are strongly negative (-0.406 for USA, on average of -0.595 for developed countries and 1.013 for emerging countries[34] (-0.083 if we limit the extreme value to -1). It is interesting to note that no estimates approach the hypothesis advanced by Ohlson and Juettner-Nauroth, namely a positive value close to a long-term rate of growth.

5. Robustness tests

The valuation of assets depends in the model used on the discount rate required by the market. Initially, we study the effects of two factors associated in the literature to the discount rate, the book to market ratios and the size. Then, we take into account the differences in precision in the earnings per share forecast. On the one hand, we can assume that the more the forecasts are imprecise, the higher the risk. On the other hand, the more forecasts are precise, the more consensuses of analysts are close to market expectations. In both cases the measures of association should be affected. We, then, assume that the coefficients of persistence (δ) and speed (γ) that characterize this model may differ if the abnormal growth is positive, or if it is negative. We replicate the test on a sub-sample composed solely of positive expected variations. Finally, we conduct a direct estimate of the coefficient g which governs the dynamics of the abnormal growth in earnings per share and compare with the implicit estimates derived from the model.

[34] This factor cannot be below -1, according to our model. No value appears significantly lower, except the case of Malaysia.

5.1 Implied rate of return and risk factors

We classified the companies of each country into two subcategories, those whose studied factor was low and others with a high studied factor. The same method was used for the Book-to-Market ratio and for the size. As these ratios vary country by country and year by year, we chose to classify by companies and not by firm-year to avoid introducing the bias related to the period. The classification is carried out according to the following protocol. For each country, firms in the sample 2008 were divided into two groups around the median of a used indicator (BM ratio or size). The same companies were taken in 2007. For those contained therein; the average ratio was performed for each of the sub groups. If a company appears in 2007 and does not exist in the sample in 2008, it is classified in the sub-population to whom it is the nearest (the smallest distance from its indicator compared to the two averages). The classification is retained for the following. The same approach is repeated in 2006 and beyond. Thus, for each of the indicator (BM ratio or size), once a company is classified in her country as big or small. The classification has the advantage of being independent of years and the inconvenience of not taking into account a possible change in the characteristics of the company over the period.

Table 9 : Expected implicit rates of return by country and risk factors

This table presents the estimated values of the first two coefficients and their T for a regression model whose dependent variables is market capitalization at year-end normalized by total assets, and the independent variables are the expected earnings per share for coming year and expected increase in earnings for the following year plus the income generated by the reinvestment of dividends and normalized by total assets per share, the same variables multiplied by a dummy variable indicating the suspected manipulation of forecasts and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable, as well as dummy variables for each reporting year. The regression were carried out by country, but taking into account all the years. The coefficients T were calculated from "heteroskedasticity consistent standard errors ". The study period extends from 2001 to 2008. The data come from Worldscope and IBES databases provided by Thomson Financial.

Panel A : With partition of the samples according to the Book to Market ratio

	Low BM ratio							High BM ratio						
	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.
	β_1	T	β_2	T	*r*	*g*		β_1	T	β_2	T	*r*	*g*	
USA	6.272	14.696	17.484	11.081	12.0%	-0.359	3 338	2.920	12.139	4.524	6.368	24.8%	-0.646	2 195
Germany	10.963	9.225	40.292	5.225	7.2%	-0.272	349	8.129	12.224	6.211	2.276	11.3%	-1.309	239
Australia	7.590	6.931	12.799	3.910	11.1%	-0.593	405	5.241	6.735	4.502	1.552	16.7%	-1.164	290
Canada	6.555	9.101	8.079	3.615	13.1%	-0.811	361	5.806	11.833	2.272	2.104	16.2%	-2.556	306
France	13.714	12.491	27.881	5.593	6.5%	-0.492	386	8.201	13.285	7.279	3.650	11.1%	-1.127	312
Italy	8.745	13.028	6.761	2.575	10.6%	-1.294	179	15.468	13.684	18.228	2.507	6.0%	-0.849	128
Japan	16.081	37.295	24.938	11.310	5.7%	-0.645	1 848	9.177	24.815	9.647	6.354	9.9%	-0.951	1 552
United Kingdom	3.668	11.507	8.578	8.645	18.9%	-0.428	440	6.865	6.412	15.764	5.360	11.5%	-0.436	412
Sweden	10.518	11.997	37.076	6.154	7.5%	-0.284	188	8.287	14.176	5.544	3.153	11.2%	-1.495	177
Other developed countries	9.729		20.801		10.1%	-0.602	4 156	8.397		8.681		11.7%	-1.236	3 416
Brazil	3.789	2.423	3.757	1.058	21.7%	-1.008	117	0.067	0.090	3.325	1.432	53.9%	-0.020	92
China	2.229	1.212	6.951	1.614	25.2%	-0.321	161	4.860	8.535	1.426	0.804	19.5%	-3.409	118
Korea	10.001	6.925	5.383	1.673	9.5%	-1.858	146	4.491	4.880	5.087	3.763	18.4%	-0.883	110
Hong Kong	6.193	8.490	11.296	5.268	13.0%	-0.548	313	4.364	10.192	1.597	1.221	21.3%	-2.732	239
Indonesia	9.884	11.678	10.855	4.274	9.2%	-0.911	128	3.819	9.396	2.110	1.744	23.2%	-1.810	75
Malaysia	10.729	11.770	5.534	1.531	8.9%	-1.939	240	4.789	12.720	-0.019	-0.162	nc	nc	162
Singapore	9.935	8.075	8.209	2.229	9.3%	-1.210	137	3.748	6.704	5.624	3.276	20.4%	-0.666	107
Taiwan	9.949	16.932	6.161	3.874	9.5%	-1.615	189	6.330	19.591	3.018	4.323	14.8%	-2.097	241
Thailand	6.808	6.206	8.278	2.279	12.7%	-0.823	194	5.273	14.138	4.168	3.592	16.8%	-1.265	142
Emerging countries	7.724		7.380		13.2%	-1.137	1 625	4.193		2.926		23.5%	-1.610	1 286

Panel B : With partition of the samples according to size

	Small Firms							Big Firms						
	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.
	β_1	T	β_2	T	r	g		β_1	T	β_2	T	r	g	
USA	6.936	13.418	18.152	11.131	11.2%	-0.382	2 918	7.593	17.393	16.569	8.706	10.7%	-0.458	2 615
Germany	10.201	10.032	25.146	3.783	8.2%	-0.406	341	12.122	6.710	53.316	4.529	6.4%	-0.227	247
Australia	10.401	9.885	11.123	3.281	8.8%	-0.935	349	6.83	4.980	19.765	3.727	11.1%	-0.347	346
Canada	7.428	13.037	7.964	3.709	11.9%	-0.933	343	8.568	8.473	6.417	2.218	10.8%	-1.335	324
France	11.919	17.888	17.179	4.353	7.6%	-0.694	413	15.507	9.198	41.920	5.796	5.6%	-0.370	285
Italy	6.969	11.699	7.934	3.578	12.6%	-0.878	156	14.737	16.977	17.979	2.903	6.3%	-0.820	151
Japan	13.674	33.516	19.878	10.399	6.7%	-0.688	1 883	17.126	34.827	29.650	10.543	5.3%	-0.578	1 857
United Kingdom	10.406	7.473	13.069	3.739	8.7%	-0.796	406	9.317	8.426	20.204	4.780	9.0%	-0.461	446
Sweden	11.389	10.511	21.894	4.138	7.7%	-0.520	165	13.657	19.670	27.908	3.822	6.5%	-0.489	200
Other developed countries	10.298		15.523		9.0%	-0.731	4 056	12.233		27.145		7.6%	-0.578	3 856
Brazil	0.931	0.688	2.895	1.208	44.9%	-0.322	93	3.426	2.492	8.343	3.318	19.7%	-0.411	116
China	6.119	3.043	2.323	0.478	15.4%	-2.635	145	6.956	4.098	8.221	2.200	12.5%	-0.846	134
Korea	9.063	4.045	11.000	3.411	9.9%	-0.824	128	9.595	9.470	4.784	1.696	9.9%	-2.006	128
Hong Kong	6.695	7.945	8.402	5.016	12.9%	-0.797	296	8.217	9.708	20.053	5.657	9.8%	-0.410	256
Indonesia	3.683	10.188	0.103	0.106	27.0%	nc	95	10.327	13.454	12.168	5.190	8.8%	-0.849	108
Malaysia	8.849	13.668	4.298	1.926	10.7%	-2.059	202	11.833	14.970	10.075	2.549	7.9%	-1.175	200
Singapore	8.275	10.099	12.690	5.711	10.4%	-0.652	134	10.054	6.982	17.810	2.458	8.6%	-0.565	110
Taiwan	9.330	23.828	4.709	3.706	10.2%	-1.982	245	10.089	16.081	9.468	7.369	9.1%	-1.066	185
Thailand	6.339	9.621	3.244	1.951	14.7%	-1.954	195	7.272	4.758	20.317	4.391	10.6%	-0.358	141
Emerging countries	6.587		5.518		17.3%	-1.403	1 533	8.641		12.360		10.8%	-0.854	1 378

Companies with the ratio “book to market” high generally have a low coefficient associated with expected earnings (exceptions are Italy and United Kingdom for developed countries and China for emerging countries): 2.92 against 6.27 to USA, 8.40 against 9.73 for other developed countries and 4.19 against 7.72 for the emerging countries. The observation is consistent with two explanations: (i) the PER are lower for these companies, (ii) the weight of PER is more reduced in the valuation of shares. The test does not make it possible to decide between these two reasons. The same observation can be made for the coefficient associated with the expected abnormal variation of earnings per share. We have 4.52 against 17.48 for the USA, 8.68 against 20.80 for other developed countries and 2.93 against 7.38 for emerging (with the exception of Italy and United Kingdom). The contribution of amended PEG in the valuation is certainly very reduced for these populations which probably contain many businesses of extremely poor performance. The expected implied rates of return are high for companies with the high “book to market” ratio in the three geographic zones. This hierarchy is consistent with the presence of a stronger risk factor for these sub-samples, although the rate obtained for US companies in a high ratio seems extremely high (24.8%). Finally, the synthetic coefficient g, linked to persistence (δ) and the speed (γ) of abnormal growth is lower for firms of “ book to Market” ratio high. This is consistent with the presence of fewer opportunities for growth, even in the existence of deceleration of expected abnormal earnings.

Companies of big size as a general rule have a higher coefficient associated with expected earnings (the only exceptions are Australia and United Kingdom): 7.59 against 6.94 for USA, 12.23 against 10.30 for other developed countries and 8.64 against 6.59 for the emerging countries. The observation is compatible with two explanations: (i) the PER are higher for these companies, (ii) the weight of PER is greater in the valuation of shares. The same observation cannot be carried out for the coefficient associated with the expected abnormal variation of earnings per share. We have a smaller coefficient for large companies in USA (16.57 against 18.15) and the opposite in the other two zones (27.15 against 15.52 for other developed countries and 12.36 against 5.52 for emerging), with two exceptions Canada and Korea. It is possible that the U.S. sample contains relatively more small performing businesses, for which the market has more visibility on their future growth. The expected implied rate of return is greater for small businesses within the 3 geographic zones. This hierarchy is consistent with the presence of a risk factor related to the size, but the difference between the obtained rates for US companies is low (10.7% against 11.2%). Finally, the synthetic coefficient g, linked to persistence (δ) and speed (γ) of abnormal growth is lower for small firms in other developed countries and emerging countries and slightly higher in USA. This is consistent with the presence of more numerous growth firms in the American sub-sample of small companies.

5.2 Implied return and precision of forecasts

The precision with which the analysts forecast the earnings per share can have a double influence on the parameter of the valuation model. On one hand, the more the analysts' forecasts are accurate, the greater the correlation with market expectations. The measurement errors in dependent variables are reduced. On the other hand, the forecast error may be related to risk of the share. The more it is difficult to predict the earnings, the more high is the risk of a share. In this case, one can hypothesize that the rate of return required by shareholders should be higher.

The forecast error is measured by the absolute value of the difference between the consensus of analysts at a year and the final earnings reported by IBES, so benefitting from homogenous measurement. The difference is normalized, as is always the case, by the value of a share in the beginning of year. For each country separately, the companies were ranked according to these normalized differences in two groups: those with high precision (values below the median) and those with low precision.

Table 10 : Expected implicit rates of return by country and forecast accuracy

This table presents the estimated values for the first two coefficients and their T for a regression model whose dependent variable is market capitalization at year-end normalized by total assets , and the independent variables are the expected earnings per share for the coming year and expected earnings growth for the for the following year plus the income generated by the reinvestment of dividends and normalized by total assets per share, the same variables multiplied by a dummy variable indicating the suspected manipulation of the forecast and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable, as well as dummy variables for each reporting year. The regressions were carried out by country, but taking into account all the years. The coefficients T were calculated from "heteroskedasticity consistent standard errors ".The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial.

	High Precision							Low Precision						
	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.	EPS_1		EPS_2-EPS_1+r.DPS_1		Implicites measures		Nbre of obs.
	β_1	T	β_2	T	r	g		β_1	T	β_2	T	r	g	
USA	8.378	11.686	25.307	7.988	9.3%	-0.331	2 396	6.533	15.954	16.314	12.351	11.8%	-0.400	3 137
Germany	13.101	11.191	23.294	2.702	6.8%	-0.562	321	10.364	8.198	39.355	4.784	7.5%	-0.263	267
Australia	9.459	11.584	29.451	8.031	8.4%	-0.321	405	8.144	7.669	12.304	4.117	10.6%	-0.662	309
Canada	10.296	11.480	15.613	5.556	8.6%	-0.659	392	6.627	9.628	6.200	3.391	13.4%	-1.069	275
France	16.182	14.264	22.251	3.704	5.7%	-0.727	391	12.510	11.214	23.693	5.046	7.1%	-0.528	307
Italy	12.670	23.010	3.279	1.558	7.7%	-3.864	154	10.775	13.050	33.554	7.035	7.5%	-0.321	153
Japan	16.325	26.352	16.722	5.282	5.8%	-0.976	1 713	13.671	27.589	21.966	10.201	6.6%	-0.622	1 687
United Kingdom	8.235	9.232	12.775	2.191	10.4%	-0.645	440	9.920	7.437	17.683	5.780	8.7%	-0.561	412
Sweden	11.808	17.732	17.280	6.546	7.6%	-0.683	190	12.726	15.213	25.594	4.813	6.9%	-0.497	175
Other developed countries	12.260		17.583		7.6%	-1.055	4 006	10.592		22.544		8.5%	-0.565	3 585
Brazil	4.172	2.136	2.780	0.521	21.0%	-1.506	105	1.971	1.202	6.594	2.142	26.8%	-0.299	104
China	0.836	0.224	-1.165	-0.096	nc	nc	130	8.890	9.437	8.733	2.859	10.2%	-1.018	149
Korea	13.323	7.408	3.946	0.802	7.3%	-3.377	121	8.994	5.980	6.987	3.205	10.3%	-1.287	135
Hong Kong	7.945	7.099	19.689	4.594	10.1%	-0.404	301	7.426	11.607	9.397	5.138	11.7%	-0.790	251
Indonesia	8.194	9.205	4.133	1.903	11.5%	-1.983	115	8.482	7.935	9.436	3.154	10.6%	-0.899	88
Malaysia	11.351	18.135	6.274	2.196	8.4%	-1.809	214	10.947	11.801	5.581	1.537	8.7%	-1.961	188
Singapore	10.690	8.751	14.396	4.371	8.4%	-0.743	137	7.443	8.694	14.479	8.105	11.1%	-0.514	107
Taiwan	9.167	19.838	9.557	7.870	9.9%	-0.959	215	10.023	18.455	5.154	3.615	9.5%	-1.945	215
Thailand	7.915	7.917	7.184	3.123	11.4%	-1.102	181	7.345	6.358	9.696	2.737	11.8%	-0.758	155
Emerging countries	8.177		7.422		11.0%	-1.485	1 519	7.947		8.451		12.3%	-1.052	1 392

The table 10 shows that in developed countries, the coefficient associated to expected earnings is higher when the precision is high (8.38 against 6.53 in the USA, 12.26 against 10.59 in other developed countries except the United Kingdom and Sweden). The differences are not significant in emerging countries. This may be due to a lower rate of return required by shareholders and therefore a higher PER or a better measure of expected earnings. The effect is less noticeable for emerging countries where in general the link between the market value and expected earnings by the analysts is less strong.

The expected effect on the coefficient associated with the abnormal variation of earnings is more ambiguous. On the one side, if the forecast error is correlated with a risk factor, the lower rate of return increases the value of the coefficient. It is the same if the variation expected by the market is measured with less error. On the other hand, it is possible that the companies whose performances are most difficult to predict are those who benefit from more opportunities for growth. If these last are persistent, then the parameter g of the model is larger and the coefficient associated higher. But it is also possible that the reverse is true. We see in the table 10 that in the USA the coefficient is greater when the precision is high (25.31 against 16.31) and that it is smaller in other developed countries (17.58 against 22.54 with the exception of Australia and Canada) and in most emerging countries.

5.3 Measure of association and implied rate of return when the expected variation of earnings is positive

The coefficient of persistence (δ) and speed (γ) that characterize the model may differ if the abnormal growth is positive, or if it is negative. By estimating a single coefficient by country associated with abnormal variation of earnings, we ignore this potential difference and possibly bias estimates. We have isolated the observations where the variations in expected earnings are positive and replicate the estimates provided in table 8. The number of cases where this variation is positive is too small to allow the realization of a test. The results given in table 11 makes clear that the factors associated with expected earnings are very similar to those obtained previously: 7.31 against 7.27 in USA, 11.36 against 11.39 in other developed countries 8.07 against 7.90 in emerging countries. If the coefficients associated with the abnormal growth of earnings per share are generally higher in developed countries than in table 8, the differences are not significant (18.29 against 17.88 in the USA, 24.82 against 21.56 for other developed countries and 9.32 against 8.44 in emerging countries). The presence of cases where the expected variation is negative has not been sufficient to affect the estimates. Consequently, the implied rate of return and rate g are very close.

Table 11 : Association between market values, expected earnings, growth with positive expected variation of earnings

This table presents the estimated values of coefficients and their T for a regression model whose dependent variable is market capitalization at year-end normalized by total assets, and the independent variables are the expected earnings per share for the coming year expected earnings growth for the following year normalized by total assets per share and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable. The dummy variable Dm takes the value 1 if an index manipulation has been estimated. The regressions were carried out by country with dummies by period. The coefficients T were calculated from "heteroskedasticity consistent standard errors". The study period extends from 2001 to 2008 .The data come from the Worldscope and IBES databases provided by Thomson Financial. The observations belonging to extreme percentile for the dependent variable and the first two independent variables have been eliminated and companies appearing at least 3 times during the periods conserved. Finally, only the cases where expected abnormal earnings were positive were selected.

	EPS_1		$[EPS_1]*D_m$		EPS_2-$EPS_1+r.DPS_1$		$[EPS_2$-$EPS_1+r.DPS_1]*D_m$		Growth Rank		Size			Implicites measures		Nbre of obs.
	β_1	T	β_{1m}	T	β_2	T	β_{2m}	T	β_3	T	β_4	T	R^2	*r*	*g*	
USA	7.306	18.052	1.162	1.142	18.294	11.290	1.508	0.407	-0.175	-3.112	0.033	3.873	0.468	10.8%	-0.399	4 997
Germany	11.559	10.633	6.875	4.439	37.809	7.448	-28.518	-2.573	-0.003	-0.029	0.094	6.525	0.762	7.0%	-0.306	556
Australia	9.115	5.976	5.300	1.294	13.492	2.934	-22.493	-1.313	0.083	0.838	0.125	7.673	0.690	9.6%	-0.676	643
Canada	8.028	9.560	1.329	1.055	8.819	3.154	1.406	0.278	-0.424	-3.807	0.076	5.840	0.565	11.1%	-0.910	480
France	14.032	12.941	-0.177	-0.122	25.814	5.050	-7.545	-1.122	0.026	0.311	0.071	7.803	0.718	6.4%	-0.544	649
Italy	12.285	12.713	1.608	0.856	32.744	6.722	-6.015	-0.707	0.103	1.325	0.081	6.573	0.811	6.9%	-0.375	276
Japan	15.021	10.713	0.868	1.243	25.596	13.037	-3.993	-1.038	0.180	8.333	0.063	12.674	0.748	6.0%	-0.587	3 091
United Kingdom	9.275	9.470	-0.163	-0.118	23.530	6.782	2.034	0.383	-0.118	-1.122	0.110	8.320	0.625	8.8%	-0.394	746
Sweden	11.573	12.086	1.856	0.884	30.723	4.202	-8.736	-0.879	-0.155	-1.261	0.067	4.623	0.768	7.2%	-0.377	332
Other developed countries	*11.361*		*2.187*		*24.816*		*-9.233*		*-0.039*		*0.086*			*7.9%*	*-0.521*	*6 773*
Brazil	1.945	1.253	2.914	1.874	7.382	3.044	-3.094	-0.940	0.161	1.058	0.156	4.731	0.505	25.9%	-0.263	175
China	6.258	3.847	-5.465	-1.220	4.118	0.805	29.311	1.253	0.080	0.385	0.110	3.028	0.327	14.6%	-1.520	226
Korea	9.235	7.443	-2.132	-1.220	7.031	1.853	-2.428	-0.588	0.168	1.210	-0.045	-2.135	0.609	10.1%	-1.313	213
Hong Kong	6.890	8.730	2.656	1.498	15.051	5.439	-1.640	-0.251	0.510	4.423	0.202	11.051	0.593	11.6%	-0.458	482
Indonesia	8.469	7.122	2.808	1.331	13.641	3.067	-0.937	-0.109	0.157	0.899	0.171	4.925	0.845	10.1%	-0.621	165
Malaysia	11.154	15.094	-0.195	-0.178	3.802	1.361	-0.660	-0.136	0.395	4.533	0.113	4.349	0.775	8.7%	-2.934	369
Singapore	9.622	10.289	2.349	1.029	11.528	3.618	-3.226	-0.401	0.002	0.018	0.213	10.709	0.705	9.3%	-0.835	220
Taiwan	9.896	18.545	-1.012	-1.270	6.519	3.935	9.971	3.148	0.003	0.032	0.122	7.324	0.845	9.5%	-1.518	316
Thailand	7.369	7.756	2.261	1.081	9.626	2.756	-4.071	-0.586	0.244	2.524	0.153	7.623	0.675	11.8%	-0.766	286
Emerging countries	*7.871*		*0.465*		*8.744*		*2.581*		*0.191*		*0.133*			*12.4%*	*-1.136*	*2 452*
except China	*8.073*		*1.206*		*9.323*		*-0.761*		*0.205*		*0.136*			*12.1%*	*-1.089*	*2 226*

5.4 Direct estimates of the rates of persistence of the abnormal earnings growth

One of the results presented in tables 8 and 11 concerns the dynamics of the "abnormal" growth of earnings per share. Contrary to the hypothesis advanced by Ohlson and Juettner-Nauroth (2005), the theoretical model developed in section 2 suggests that this abnormal growth does not necessarily follow a constant increase in the long term, but on the contrary guided by various dynamics of which some are compatible with limited persistence. The implicit measures that are derived from the estimates of the associated coefficients of expected earnings and from expected abnormal growth are all consistent with the hypothesis of limited persistence (the negative parameter g). In order to complement this empirical result, we proceeded to the estimation of an autoregressive model with a lag of one year for expected abnormal variation. The need to dispose of consecutive measurement has reduced the size of the sample. The table 12 provides the obtained results.

Tableau 12 : Direct estimates of the rate of persistence of abnormal earnings growth

This table presents the estimated values of the coefficients and their T for a regression model whose dependent variable is expected variation of abnormal earnings EPS2-EPS1+r.DPS1, normalized by total assets per share, and the independent variable is the same variable but shifted by one period. The sample is identical to that of table 11.The estimates of cost of capital have been included. The coefficients T were calculated from “heteroskedasticity consistent standard errors “.The study period extends from 2001 to 2008.The data come from Worldscope and IBES databases provided by Thomson Financial.

	EPS_2-EPS_1+*r*.DPS_1				Table 11	Nombre of observations
	β_1	T	R^2	*g*	g implicite	
USA	0.606	24.945	0.460	-0.394	-0.399	3 165
Germany	0.556	9.056	0.367	-0.444	-0.306	413
Australia	0.601	5.504	0.450	-0.399	-0.676	490
Canada	0.595	5.635	0.334	-0.405	-0.910	360
France	0.617	11.492	0.410	-0.383	-0.544	477
Italy	0.624	11.729	0.461	-0.376	-0.375	209
Japan	0.519	19.169	0.310	-0.481	-0.587	2 177
United Kingdom	0.806	11.008	0.557	-0.194	-0.394	538
Sweden	0.772	9.934	0.585	-0.228	-0.377	243
Other developed countries	*0.636*			*-0.364*	*-0.521*	*4 907*
Brazil	0.605	9.289	0.415	-0.395	-0.263	111
China	0.404	4.643	0.231	-0.596	-1.520	137
Korea	0.466	4.360	0.255	-0.534	-1.313	130
Hong Kong	0.688	12.156	0.567	-0.312	-0.458	345
Indonesia	0.738	9.349	0.459	-0.272	-0.621	120
Malaysia	0.540	5.709	0.355	-0.460	-2.934	253
Singapore	0.579	7.804	0.314	-0.421	-0.835	158
Taiwan	0.439	8.639	0.352	-0.561	-1.518	193
Thailand	0.450	6.979	0.331	-0.550	-0.766	189
Emerging countries	*0.545*			*-0.456*	*-1.136*	*1 636*

It can be noted that for the most important sample, the USA, the two estimates of g are very close (-0.394 and -0.399). In the case of other developed countries, the direct estimate is higher than implicit (-0.364 and -0.521), while remaining in the order of the magnitude not too far, except for Canada. In the case of emerging countries, the differences are more marked (-0.456 and -1.136) and especially the found implicit values are smaller than -1. As the implicit values of the g are obtained from the relation $g = -\frac{\beta_1}{\beta_2}$, the errors contained in the implicit values most certainly come from an under valuation of the coefficient β_2 attached to the abnormal growth. The values found in emerging countries and Canada are low in comparison to those obtained in other countries, growth in earnings per share is less well anticipated by the consensus of the analysts. It is also noted that these samples are small in size.

6. Conclusion

The model of the type AEG (for example, (Ohlson & Juettner-Nauroth, 2005), (Ohlson & Gao, 2006)) provide a parsimonious way of valuing shares by referring to two variables: expected earnings per share and its expected “abnormal” growth. This paper shows that in the context of an international comparison, estimates of these two variables obtained from two years forecasts prepared by financial analysts (source: IBES) are significantly associated with the market values, at least in developed countries. In the latter case, the expected earnings per share in 2 years has an information content that complements a forecasting year. This observation is less evident in the case of the most emerging countries.

The theoretical model that we developed suggests that a valuation based on only these two variables can lead to an under valuation or over valuation according the type of growth experienced by the companies. Using a synthetic measure based on past accounting data, we show that in some countries (for example

USA, Canada), a model of type AEG can lead to over valuation of companies who have experienced a strong growth in the recent past. The past dynamics cannot be prolonged over a long period and a negative correction term is applied to these companies. In contrast, for others, the growth has not yet led to an increase in earnings per share, enough to account for all the value creation potential of these firms. In most of the emerging countries but also for certainly different reasons in Japan, a positive corrective term is proposed. The study outlines the limitation of AEG models to explain the stock market values.

The results suggest that the abnormal growth of earning per share is unlikely to perpetuate by following a constant pace of progress as was initially suggested by Ohlson and Juettner-Naurauth. On a regular basis, the process that seems to best describe the expected evolution of this variable is autoregressive in nature with limited persistence. The estimates for developed countries are coherent on average (around 0.6 to USA and somewhat less for other developed countries). They remain very inaccurate in the case of emerging countries, but still very low. By suggesting to use a long term rate of growth, O J-N contribute to propose specification of the models' AEG strongly over estimating the values of shares. In addition, by accepting these more complex dynamics for the expected variation of abnormal earnings per share, we can deduce using the models' AEG implicit values for the rate of return expected by investors. The results emphasize that these estimates remain consistent with the various commonly recognized factors of risk. Finally, we conclude with a practical remark: the combined use of two heuristics that practitioners frequently use in valuation, namely the PE ratio and PEG ratio is justified in the context of developed countries and unfortunately less powerful in emerging countries.

Annex 1 :

Defining the value of a share as the sum of free cash flow expected by shareholders and discounted at a required rate :

$$\boldsymbol{P_t} = \sum_{s=1}^{\infty} \frac{E_t[\widetilde{FPS}_s]}{(1+r)^s} \quad \text{(A14)}$$

Utilizing the general results and without economic content, obtained under the condition

$\lim_{s\to\infty} \frac{X_{t+s}}{(1+r)^s} = 0$

$$\boldsymbol{0} = \frac{X_{t+1}}{r} + \sum_{s=1}^{\infty} \frac{\left[\frac{X_{t+s+1}}{r} - \frac{X_{t+s}}{r}\right] - \frac{X_{t+s}}{r} \cdot r}{(1+r)^s} \quad \text{(A2)}$$

Adding (A1) and (A2) and replacing $\boldsymbol{X_t}$ by $E_0[\widetilde{EPS}_t]$. We get after simplification:

$$\boldsymbol{P_t} = \frac{E_t[\widetilde{EPS}_{t+1}]}{r} + \frac{1}{r} \cdot \sum_{s=1}^{\infty} \frac{E_t[\widetilde{EPS}_{t+s+1}] - E_t[\widetilde{EPS}_{t+s}] - (E_t[\widetilde{EPS}_{t+s}] - E_t[\widetilde{FPS}_{t+s}]) \cdot r}{(1+r)^s} \quad \text{(A3)}$$

Suppose that the dynamics of earnings per share is described by the following equation:

$$\mathbf{EPS_{t+1} - EPS_t = a_{t+1} \cdot q_{t+1} - a_t \cdot q_t + (EPS_t - FPS_t) \cdot r} \quad \text{(A4)}$$

Introducing (A4) in (A3), we get:

$$\boldsymbol{P_t} = \frac{E_0[\widetilde{EPS}_{t+1}]}{r} + \frac{1}{r} \cdot \sum_{s=1}^{\infty} \frac{E_t[\tilde{a}_{t+s+1} \cdot \tilde{q}_{t+s+1}] - E_t[\tilde{a}_{t+s} \cdot \tilde{q}_{t+s}]}{(1+r)^s} \quad \text{(A5)}$$

Suppose that the coefficients $\mathbf{a_t}$ measure the intensity of expected rent at t and $\mathbf{q_t}$ its extent following the linear information dynamics :

$$\begin{aligned}
&\tilde{a}_{t+1} = \delta \cdot a_t + \tilde{\varepsilon}_{1,t+1} \\
&\tilde{q}_{t+1} - \bar{q}_{t+1} = \gamma \cdot (1 + c) \cdot (q_t - \bar{q}_t) + \tilde{\varepsilon}_{2,t+1} \quad \text{(A6)} \\
&\bar{q}_{t+1} = \bar{q}_t \cdot (1 + c) \\
&cov(\tilde{\varepsilon}_{1,t+s_1}, \tilde{\varepsilon}_{2,t+s_2}) = 0 \quad \forall s_1, s_2
\end{aligned}$$

Noting $\tilde{Q}_t = \tilde{q}_t - \bar{q}_t$. We have :

$$E_t[\tilde{a}_{t+s+1} \cdot \tilde{q}_{t+s+1}] = E_t[\tilde{a}_{t+s+1}] \cdot \bar{q}_{t+s+1} + E_t\left[\tilde{a}_{t+s+1} \cdot \tilde{Q}_{t+s+1}\right]$$

Given the hypothesis of zero covariance, we have:

$$E_t\left[\tilde{a}_{t+s+1} \cdot \tilde{Q}_{t+s+1}\right] = E_t[\tilde{a}_{t+s+1}] \cdot E_t\left[\tilde{Q}_{t+s+1}\right]$$

Defining the matrix $\underline{W}$ as:

$$\underline{W} = \begin{vmatrix} \delta \cdot (1+c) & 0 \\ 0 & \delta \cdot (1+c) \cdot \gamma \end{vmatrix}$$

The system (A6) permit to write:

$$\begin{vmatrix} E_t[\tilde{a}_{t+s+1} \cdot \bar{q}_{t+s+1}] \\ E_t\left[\tilde{a}_{t+s+1} \cdot \tilde{Q}_{t+s+1}\right] \end{vmatrix} = \underline{W} \cdot \begin{vmatrix} E_t[\tilde{a}_{t+s} \cdot \bar{q}_{t+s}] \\ E_t\left[\tilde{a}_{t+s} \cdot \tilde{Q}_{t+s}\right] \end{vmatrix} \quad \text{(A7)}$$

Let:

$$\boldsymbol{G_t} = \boldsymbol{P_t} - \frac{\boldsymbol{E_t}[\widetilde{\boldsymbol{EPS}}_{\boldsymbol{t+1}}]}{\boldsymbol{r}} = \frac{\boldsymbol{1}}{\boldsymbol{r}} \cdot \sum_{\boldsymbol{s=1}}^{\infty} \frac{\boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+s+1}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+s+1}}] - \boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+s}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+s}}]}{(\boldsymbol{1+r})^{\boldsymbol{s}}} \quad \text{(A8)}$$

It follows from (A8) the following equality:

$$(\boldsymbol{1}+\boldsymbol{r}) \cdot \boldsymbol{G_t} = \frac{\boldsymbol{1}}{\boldsymbol{r}} \cdot \{\boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+2}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+2}}] - \boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+1}}]\} + \frac{\boldsymbol{1}}{\boldsymbol{r}} \cdot \sum_{\boldsymbol{s=2}}^{\infty} \frac{\boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+s+1}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+s+1}}] - \boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+s}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+s}}]}{(\boldsymbol{1+r})^{\boldsymbol{s-1}}}$$
$$= \frac{1}{r} \cdot \{E_t[\tilde{a}_{t+2} \cdot \tilde{q}_{t+2}] - E_t[\tilde{a}_{t+1} \cdot \tilde{q}_{t+1}]\} + E_t\left[\tilde{G}_{t+1}\right] \quad \text{(A9)}$$

Writing $E_t[\tilde{a}_{t+2} \cdot \tilde{q}_{t+2}]$ et $E_t[\tilde{a}_{t+1} \cdot \tilde{q}_{t+1}]$ as a function of $E_t[\tilde{a}_{t+1}]$, $\bar{q}_{t+1}$ et $E_t\left[\tilde{a}_{t+1} \cdot \tilde{Q}_{t+1}\right]$:

$$\boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+2}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+2}}] = \boldsymbol{\delta} \cdot (\boldsymbol{1}+\boldsymbol{c}) \cdot \bar{\boldsymbol{q}}_{\boldsymbol{t+1}} \cdot \boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}}] + \boldsymbol{\delta} \cdot (\boldsymbol{1}+\boldsymbol{c}) \cdot \boldsymbol{\gamma} \cdot \boldsymbol{E_t}\left[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}} \cdot \tilde{\boldsymbol{Q}}_{\boldsymbol{t+1}}\right]$$

$$\boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}} \cdot \tilde{\boldsymbol{q}}_{\boldsymbol{t+1}}] = \bar{\boldsymbol{q}}_{\boldsymbol{t+1}} \cdot \boldsymbol{E_t}[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}}] + \boldsymbol{E_t}\left[\tilde{\boldsymbol{a}}_{\boldsymbol{t+1}} \cdot \tilde{\boldsymbol{Q}}_{\boldsymbol{t+1}}\right]$$

Let :

$$G_t = |\beta_1 \quad \beta_2| \cdot \begin{vmatrix} \bar{q}_{t+1} \cdot E_t[\tilde{a}_{t+1}] \\ E_t\left[\tilde{a}_{t+1} \cdot \tilde{Q}_{t+1}\right] \end{vmatrix} \quad \text{(A10)}$$

Introducing (A10) and (A7) in (A9) and noting $\underline{I}$ a unitary matrix , we obtain:

$$(1+r) \cdot G_t = (1+r) \cdot |\beta_1 \quad \beta_2| \cdot \underline{I} \cdot \begin{vmatrix} \bar{q}_{t+1} \cdot E_t[\tilde{a}_{t+1}] \\ E_t\left[\tilde{a}_{t+1} \cdot \tilde{Q}_{t+1}\right] \end{vmatrix}$$

$$(1+r)\cdot G_t = \begin{vmatrix}\frac{1}{r} & \frac{1}{r}\end{vmatrix}\cdot \underline{W}\cdot \begin{vmatrix}\bar{q}_{t+1}\cdot E_t[\tilde{a}_{t+1}]\\ E_t[\tilde{a}_{t+1}\cdot \tilde{Q}_{t+1}]\end{vmatrix} - \begin{vmatrix}\frac{1}{r} & \frac{1}{r}\end{vmatrix}\cdot \underline{I}\cdot \begin{vmatrix}\bar{q}_{t+1}\cdot E_t[\tilde{a}_{t+1}]\\ E_t[\tilde{a}_{t+1}\cdot \tilde{Q}_{t+1}]\end{vmatrix} + |\beta_1 \quad \beta_2|\cdot \underline{W}\cdot \begin{vmatrix}\bar{q}_{t+1}\cdot E_t[\tilde{a}_{t+1}]\\ E_t[\tilde{a}_{t+1}\cdot \tilde{Q}_{t+1}]\end{vmatrix}$$

Equating the two expressions and rearranging terms, we obtain

$$|\beta_1 \quad \beta_2|\cdot \underline{R-W}\cdot \begin{vmatrix}\bar{q}_{t+1}\cdot E_t[\tilde{a}_{t+1}]\\ E_t[\tilde{a}_{t+1}\cdot \tilde{Q}_{t+1}]\end{vmatrix} = \begin{vmatrix}\frac{1}{r} & \frac{1}{r}\end{vmatrix}\cdot \underline{W-I}\cdot \begin{vmatrix}\bar{q}_{t+1}\cdot E_t[\tilde{a}_{t+1}]\\ E_t[\tilde{a}_{t+1}\cdot \tilde{Q}_{t+1}]\end{vmatrix} \quad \text{(A11)}$$

with

$$\underline{R-W} = \begin{vmatrix}1+r-\delta\cdot(1+c) & 0\\ 0 & 1+r-\delta\cdot(1+c)\cdot\gamma\end{vmatrix}$$

and

$$\underline{W-I} = \begin{vmatrix}\delta\cdot(1+c)-1 & 0\\ 0 & \delta\cdot(1+c)\cdot\gamma-1\end{vmatrix}$$

The valuation equation (A10) is independent of time. So (A11) implies:

$$|\beta_1 \quad \beta_2|\cdot \underline{R-W} = \begin{vmatrix}\frac{1}{r} & \frac{1}{r}\end{vmatrix}\cdot \underline{W-I}$$

It follows that:

$$|\beta_1 \quad \beta_2| = \begin{vmatrix}\frac{1}{r} & \frac{1}{r}\end{vmatrix}\cdot \underline{W-I}\cdot \underline{R-W}^{-1} \quad \text{(A12)}$$

The calculation gives the following solution:

$$\beta_1 = \frac{1}{r}\cdot\frac{\delta\cdot(1+c)-1}{1+r-\delta\cdot(1+c)} \quad \text{(A13)}$$
$$\beta_2 = \frac{1}{r}\cdot\frac{\delta\cdot(1+c)\cdot\gamma-1}{1+r-\delta\cdot(1+c)\cdot\gamma}$$

By introducing (A13) in (A8), we can express the value of the company:

$$\boldsymbol{P_t} = \frac{\boldsymbol{E_t[\widetilde{EPS}_{t+1}]}}{\boldsymbol{r}} + \frac{\boldsymbol{1}}{\boldsymbol{r}}\cdot\left[\frac{\boldsymbol{\delta\cdot(1+c)-1}}{\boldsymbol{1+r-\delta\cdot(1+c)}}\right]\cdot\boldsymbol{\bar{q}_{t+1}}\cdot\boldsymbol{E_t[\tilde{a}_{t+1}]} + \frac{\boldsymbol{1}}{\boldsymbol{r}}\cdot\left[\frac{\boldsymbol{\delta\cdot(1+c)\cdot\gamma-1}}{\boldsymbol{1+r-\delta\cdot(1+c)\cdot\gamma}}\right]\cdot\boldsymbol{E_t[\tilde{a}_{t+1}\cdot\tilde{Q}_{t+1}]} \quad \text{(A14)}$$

Or as well

$$\boldsymbol{P_t} = \frac{\boldsymbol{E_t[\widetilde{EPS}_{t+1}]}}{\boldsymbol{r}} + \frac{\boldsymbol{1}}{\boldsymbol{r}}\cdot\left[\frac{\boldsymbol{1-\delta\cdot(1+c)\cdot\gamma}}{\boldsymbol{1+r-\delta\cdot(1+c)\cdot\gamma}} - \frac{\boldsymbol{1-\delta\cdot(1+c)}}{\boldsymbol{1+r-\delta\cdot(1+c)}}\right]\cdot\boldsymbol{\bar{q}_{t+1}}\cdot\boldsymbol{E_t[\tilde{a}_{t+1}]} - \frac{\boldsymbol{1}}{\boldsymbol{r}}\cdot\left[\frac{\boldsymbol{1-\delta\cdot(1+c)\cdot\gamma}}{\boldsymbol{1+r-\delta\cdot(1+c)\cdot\gamma}}\right]\cdot\boldsymbol{E_t[\tilde{a}_{t+1}\cdot\tilde{q}_{t+1}]}$$

Finally, clarifying the expected variation of earnings per share with the help of (A4) and of dynamic (A6):

$$
\begin{aligned}
&E_t\left[\widetilde{EPS}_{t+2}\right] - E_t\left[\widetilde{EPS}_{t+1}\right] \\
&\qquad = \left\{E_t\left[\widetilde{EPS}_{t+1}\right] - E_t\left[\widetilde{FPS}_{t+1}\right]\right\} \cdot r + [\delta \cdot (1+c) - 1] \cdot \bar{q}_{t+1} \cdot E_t[\tilde{a}_{t+1}] \\
&\qquad + [\delta \cdot (1+c) \cdot \gamma - 1] \cdot E_t\left[\tilde{a}_{t+1} \cdot \tilde{Q}_{t+1}\right]
\end{aligned}
$$

Introducing this result in (A14), we get :

$$
\begin{aligned}
\boldsymbol{P_t} = {} & \boldsymbol{E_t\left[\widetilde{EPS}_{t+1}\right] \cdot \frac{1}{r} \cdot \frac{1-\delta\cdot(1+c)\cdot\gamma}{1+r-\delta\cdot(1+c)\cdot\gamma} + \left\{E_t\left[\widetilde{EPS}_{t+2}\right] - E_t\left[\widetilde{EPS}_{t+1}\right]\right\} \cdot \frac{1}{r} \cdot \frac{1}{1+r-\delta\cdot(1+c)\cdot\gamma}} + \\
& \boldsymbol{E_t\left[\widetilde{FPS}_{t+1}\right] \cdot \frac{1}{1+r-\delta\cdot(1+c)\cdot\gamma} + \bar{q}_{t+1} \cdot E_t[\tilde{a}_{t+1}] \cdot \frac{1}{r} \cdot \left[\frac{\delta\cdot(1+c)\cdot(\delta\cdot(1+c)-1)\cdot(1-\gamma)}{1+r-\delta\cdot(1+c)\cdot\gamma}\right]} \quad \text{(A15)}
\end{aligned}
$$

Finally, let $g = (1+c) \cdot \delta \cdot \gamma - 1$, $h = (1+c) \cdot \delta \cdot (1-\gamma) \cdot [\delta \cdot (1+c) - 1]$ and $\widetilde{CEPS}_{t+2} = \widetilde{EPS}_{t+2} + r \cdot \widetilde{FPS}_{t+1}$ then in rearranging the terms, we obtain :

$$
\boldsymbol{P_t} = \boldsymbol{\left\{E_t\left[\widetilde{CEPS}_{t+2}\right] - (1+g) \cdot E_t\left[\widetilde{EPS}_{t+1}\right]\right\} \cdot \frac{1}{r} \cdot \frac{1}{r-g} + \bar{q}_{t+1} \cdot E_t[\tilde{a}_{t+1}] \cdot \frac{1}{r} \cdot \frac{h}{r-g}} \quad \text{(A16)}
$$

Annex-2

Method of calculation of the synthetic variable of growth and company rank according to their stage of growth

The synthetic variable y: is defined by:

$$y_{i,t} = \sum_{j=1}^{j=3} \frac{\left(x_{i,j,t} - \overline{x_{j,t}}\right)}{\sigma_{j,t}}$$

With

$$x_1 = \frac{Sales_t}{Sales_{t-2}} - 1$$

$$x_2 = \frac{Equities_t - Equities_{t-2} - Net\ Income_t - Net\ Income_{t-1}}{Equities_{t-2}}$$

$$x_3 = \frac{Capital\ Expenditures_t + Capital\ Expenditures_{t-1}}{Depreciation_t + Depreciations_{t-1}}$$

We have truncated their values using the fifth percentile as minimum and ninety fifth percentile as a maximum. The reference populations are all profitable firms of the country concerned. In order to aggregate them; we calculated their values centered and reduced by country. The sum of the variable refers to synthetic growth.

Companies are then classified each year t as a function of this synthetic variable y.Their rank is normalized by the number of observations of the year and noted $R_{i,t}$. In order to take into account the persistent phenomenon, we have preferred an aggregate measure over two years: $RC_{i,t} = (R_{i,t} + R_{i,t-1})/2$. Finally, to facilitate interpretation, we calculated : $1 - RC_{i,t}$.

Table Annexe 1 : Association between market values , expected earnings , growth and manipulations of forecast – study in panel with fixed effects.

This table presents the estimated values of the coefficient and their T for a regression model whose dependent variable is market capitalization at year-end normalized by total assets per share, and independent variables are expected earnings per share for the coming year and expected growth in earnings for the following year normalized by total assets per share and a synthetic accounting variable measuring the past growth. The size was introduced as a control variable. The dummy variable Dm takes the value 1 if and index manipulation has been estimated. The regression were carried out by country in panel data with fixed effects (dummies by firm and by period).The coefficient T were calculated from clustered standard errors.The study period extends 2001 to 2008.The data come from Worldscope and IBES database provided by Thomson Financial.The observations belonging to extreme percentiles for the dependent variable and the first two independent variables were eliminated. Finally, companies appearing at least three times during the period have been conserved.

	EPS_1		EPS_1*D_m		EPS_2-EPS_1		EPS_2-EPS_1*D_m		Growth Rank		Size				
	b_1	T	B_{1m}	T	B_2	T	B_{2m}	T	b_3	T	b_4	T	R2	F	Nbr. Of Observations
USA	3.297	11.220	1.344	4.529	5.027	12.616	2.222	2.599	0.291	7.373	0.847	26.731	0.904	29.466	5 533
Germany	7.483	4.349	5.627	2.474	20.470	3.795	-16.456	-2.297	0.215	1.936	0.539	6.858	0,901	34.932	588
Australia	7.580	11.690	-0.036	-0.053	2.261	1.752	3.131	0.787	0.439	6.778	0.520	9.398	0,927	48.848	695
Canada	6.168	9.224	1.031	2.170	3.806	3.753	0.680	0.336	0.235	4.413	0.368	6.968	0,879	25.385	667
France	7.371	13.930	0.120	0.159	12.470	8.590	1.587	0.723	0.232	4.083	0.445	11.243	0.923	44.385	698
Italy	8.106	9.028	0.171	0.153	10.078	2.490	-0.526	-0.098	0.416	5.516	0.421	12.719	0.932	49.497	307
Japan	5.549	13.304	0.898	3.756	10.513	8.760	-5.084	-1.852	0.163	8.044	0.566	17.202	0.926	56.079	3 400
United Kingdom	5.818	6.425	0.764	2.316	10.942	7.389	-2.182	-0.904	0.234	3.556	0.479	11.726	0.864	26.548	852
Sweden	8.311	23.411	-0.147	-0.249	8.492	4.693	5.077	1.926	0.139	2.929	0.350	8.644	0.912	39.920	365
Other developed countries	7.048		1.054		9.879		-1.721		0.259		0.461				7 572
Brazil	1.025	3.557	1.082	2.016	1.876	3.227	-2.227	-1.627	0.345	2.478	0.553	8.602	0.894	27.477	209
China	4.324	6.780	0.272	0.268	0.634	0.219	17.001	2.868	0.411	2.409	0.575	9.585	0,849	16.680	279
Korea	4.663	4.260	0.077	0.192	2.890	1.661	1.315	0.970	0.008	0.118	0.352	9.076	0.919	33.289	256
Hong Kong	5.288	8.129	3.229	3.611	3.993	4.332	-2.729	-1.067	0.038	0.379	0.653	10.955	0.893	33.591	552
Indonesia	7.447	8.748	2.430	2.232	6.233	4.230	5.857	1.228	0.482	3.595	0.422	4.279	0.914	35.208	203
Malaysia	7.233	9.907	0.504	0.872	1.676	1.174	-2.195	-0.624	0.277	3.971	0.459	10.891	0.948	60.945	402
Singapore	7.607	8.196	2.609	9.934	9.778	3.178	-5.276	-1.817	-0.004	-0.054	0.336	5.610	0.903	28.300	244
Taiwan	6.832	9.296	-0.411	-1.223	4.697	3.257	7.285	7.113	0.123	1.068	0.413	4.600	0.915	35.548	430
Thailand	3.522	4.842	1.103	1.044	1.728	1.014	1.118	0.574	0.283	3.159	0.552	9.336	0.927	42.365	336
Emerging countries	5.327		1.211		3.723		2.239		0.218		0.479				2 911

Table Annexe 2: Comparaison of realized and expected rate of growth of EPS

This table presents the rate of growth of earnings per share as they were anticipated by the consensus an earlier year and rate of growth realized. To limit the effects of extreme values on the mean calculation, the estimates were confined to -2 and 2 respectively. The study period extends from 2001 to 2008. The data come from Worlscope and IBES databases provided by Thomson Financial.The observations come from the baseline described in Table 3.The number of observations was reduced due to the one-year lag between forecast and realization.

	Rate of growth realized	Rate of growth expected	Difference	Nbr. Of Observations
USA	22.61%	24.96%	-2.34%	4 465
Germany	27.37%	31.59%	-4.22%	573
Australia	17.70%	24.76%	-7.06%	686
Canada	23.20%	23.63%	-0.43%	637
France	20.17%	24.11%	-3.94%	701
Italy	18.73%	21.45%	-2.72%	308
Japan	24.37%	27.18%	-2.80%	3 023
United Kingdom	20.38%	19.16%	1.23%	822
Sweden	20.82%	27.31%	-6.49%	349
Other developed countries	*21.59%*	*24.90%*	*-3.30%*	*7 099*
Brazil	27.98%	31.35%	-3.37%	200
China	24.40%	20.15%	4.25%	288
Korea	18.45%	25.90%	-7.45%	228
Hong Kong	18.09%	17.51%	0.59%	547
Indonesia	22.58%	25.96%	-3.38%	191
Malaysia	19.91%	23.09%	-3.18%	378
Singapore	20.04%	21.84%	-1.80%	263
Taiwan	18.85%	19.83%	-0.98%	432
Thailand	18.21%	18.06%	0.16%	328
Emerging countries	*20.95%*	*22.63%*	*-1.68%*	*2 855*

General Conclusion

In this research work, two different approaches have been studied to check the link between accounting and forecast data to securities market value. Both approaches have been thoroughly discussed with their empirical findings in chapter 2 and chapter 3, respectively. In chapter 2, the following two questions have been asked:

(i) Is the degree of association between book value and market value of equity a function of growth conditions and mode of financing of the firm?

(ii) Are these forms of association invariant around the world?

Our results suggest that whatever the country, developed or emerging, net income appears as the accounting variable most strongly associated with the market value. The book value of equity brings, on its part, a valuable contribution even if it is lower than that of net income. The most disturbing point is the instability of the coefficients associated with this variable. The traditional Ohlson (Ohlson J.,1995) model that contain these two numbers in a valuation equation predicts a coefficient between 0 and 1.The empirical results are far to validate this hypothesis. We suggest that this coefficient depends strongly on the growth phase of the company and her financing. Our study shows that in the USA and many countries growth measured from simple accounting indicators is associated with shareholders' value creation when it is mainly financed by equity. Its effects are not discernible when leverage is high. This observation means that the association between book value and market value is strong when growth is high but for the companies with low leverage, only. This result suggests that the book value multiple (market to book ratio) are difficult to use. They require at least very precise control conditions, regarding growth and financing. The case of emerging countries has not appeared more difficult to identify than the other developed countries. In the latter, the measured used for growth is proved even less effective. In sum we can say: (i) in all geographical areas, net income is the variable most strongly associated with the market value. (ii) The introduction of book value of equity not only increases the explanatory power of the model but also modifies significantly the estimates of earnings and market values. (iii) Taking into account the book value of equity in direct linear for is insufficient. We show on one hand that the measurement used to characterize the phase of growth of the firm reflects the nonlinear nature of association between book value of equity and market value may be fundamentally different in the case of high and low indebted firms. (iv) Two results emerge internationally, the low debt and high growth firms are better valued by investors during the period. When companies are in debt the growth in earnings does not systematically reflect by the increase in market value of equity. These results validate the prediction of our model. We finally check whether the variable of financial analysts' provisions and "dirty surplus" reflect the effect of expected growth. Our results suggest that: (a) the information concerning the forecast of expected earnings for the operating year and its variation provided by the analysts for the following year enhances the explanatory power of our regression. Their introduction in the regression model decreases the coefficients of association estimated previously between book value and market value for the companies in growth and low debt. These estimates, however, remain significant in the USA and largely in other developed countries. (b) The results that we get by introducing the "dirty surplus" in our regression model depend upon the measured used. The "use" of a simplified measure of "dirty surplus" indicates positive association between a "dirty surplus" high positive and market value of equity. This link disappears, however, when the extent of "dirty surplus" incorporates all the information from job and resource table.

It should be emphasized finally that the introduction of these measure of "dirty surplus" does not alter the conclusion regarding the association between the book value of equity and market value.

The following two questions have been asked for the research work in chapter 3.

(i) Knowing that the form of association between stock price and expected earnings per share depends on the type of growth of the company that brings short term increases in expected earnings by financial analysts to explain differences in stock market values.

(ii) Can an indicator of growth build on historical accounting data corrects the bias introduced by previous measure?

The model of type A.E.G (for example, (Ohlson & Juettner-Nauroth, 2005), (Ohlson & Gao, 2006) provide a parsimonious way of valuing share by referring to two variables: expected earnings per share and its expected "abnormal" growth. We show that in the context of an international comparison, estimates of these two variables obtained from two years forecast prepared by financial analysts are significantly associated with the market value at least in developed countries.

The theoretical model that we develop suggest that a valuation based on only these two variables can lead to an under valuation or over valuation according to the type of growth experienced by the companies. Using a synthetic measure based on the past accounting data, we show that in some countries (for example USA, Canada), a model of type A.E.G. can lead to over valuation of companies who have experienced a strong growth in recent past. The past dynamics cannot be prolonged over a long period and a negative correction term is applied to these companies. In contrast, for others, the growth has not yet lead to an increase in earnings per share, enough to account for all the value creation potential of these firms. In most of the emerging countries and for Japan, a positive corrective term is proposed. Our work outlines the limitations of AEG models to explain the stock market values.

The results suggest that the abnormal growth of earnings per share is unlikely to perpetuate by following a constant pace of progress as was initially brought to mind by Ohlson and Juettner-Nauroth. On a regular basis, the process that seems to best describe the expected evolution of this variable is autoregressive in nature with limited persistence. The estimates for the developed countries are coherent on average (around 0.6 to USA and somewhat less for other developed countries). They remain very inaccurate in the case of emerging countries. By suggesting to use a long term rate of growth, O J-N contribute to propose specification of the models' AEG strongly over estimating the values of shares. In additions, by accepting these more complex dynamics for the expected variation of abnormal earnings per share, we can deduce using the models' AEG implicit values for the rate of return expected by investors. The results emphasize that these estimates remain consistent with the various commonly recognized factors of risk. In sum we can say:

(i) Whatever the geographical zone, expected earnings per share remains the variable most strongly associated with the stock market values. But, the coefficients are higher in developed countries than in emerging countries. The valuation of profits is affected by different levels of their persistence and more generally of risk.

The expected change in earnings per share is significantly associated with the market value of a share (especially for developed countries) but its persistence is limited (especially in emerging countries). This last result contrary to the intuition which would like the expected growth being greater in emerging countries, the PEG is a better tool of valuation in these countries. The PER and PEG ratios combine in valuation essentially, with in developed countries.

(ii) These two indicators must be supplemented to avoid either over valuation or under valuation. Taking into account the intensity of the growth through historical accounting indicators provides a part of missing information. The corrections are mostly positive (insufficient to take into account the growth potential by the increase of expected earnings, especially in emerging countries) and more rarely negative.

(iii) At the international level, the expected implied rates of return are significantly higher in emerging countries than in developed countries.

This dissertation's research work is subject to certain limitations. The most important among them is differences in accounting standards. Accounting systems are very diverse in countries studied and have been assigned transition to IFRS in many countries but with different rhythms. In this dissertation context, this means value relevance of accounting data may be subject to country specific accounting norms. Our access to this type of data remained limited as we, in our studies, relied on Thomson Accounting Research data base. Access to this type of data possibly brings more refinement to results obtained throughout this assignment. Another possible extension to this work can be to analyze whether the country factor dominates the industry factor in explaining the individual securities.

Summary

Annexes

Chapter 1

Chapter 2

Chapter 3

Tables and Figures

Chapter2

Chapter3

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Association entre rentabilités boursières et rentabilités comptables sur les marchés émergents

Résumé
Cette thèse de doctorat s'intéresse fondamentalement au traitement de la question suivante : quelle forme d'association entre les données comptables et les valeurs de marché subsiste dans le contexte de forte volatilité et de haut risque propre aux marchés émergents ? Pour atteindre ce but, deux modèles ont été utilisés dans ce travail : le modèle d'évaluation par les résultats résiduels (ou residual income model R.I.M) et celui de l'évaluation par la croissance anormale des résultats (ou abnormal earnings growth A.E.G).
Dans cette étude, un modèle de type R.I.M. est développé avec des hypothèses particulières concernant la capacité de l'entreprise à créer de la valeur et ses implications ont été testées empiriquement sur un échantillon comprenant des entreprises provenant d'Amérique du Nord, d'autres pays développés et d'un ensemble de pays émergents sur la période 2000-2007. Les résultats obtenus soulignent que le degré d'association entre les valeurs comptables et les valeurs de marché dépend du stade de croissance et des modes de financement utilisés par les firmes. Si les indicateurs comptables de croissance et d'endettement apportent une information complémentaire significative dans les pays développés, leur contribution est très modeste dans le cas des pays émergents.
Le développement d'un modèle d'évaluation de type AEG (initialement proposé par Ohlson & Juettner-Nauroth), incluant une modélisation de l'évolution des rentes attendues compatible avec des conditions de concurrence pure et parfaite nous permet de proposer une relation testable entre la valeur de marché d'une action, le résultat net par action attendu dans un an, son taux de croissance à court terme et un ensemble de variables comptables composant un indicateur synthétique de croissance de l'entreprise. Nos résultats montrent (1) que l'accroissement attendu du bénéfice par action est associé significativement au cours boursier (surtout pour les pays développés), (2) mais que, comme le suggère notre modèle, la persistance de ses effets est limitée (surtout pour les pays émergents), (3) que lorsque la dynamique de la croissance est plus complexe, l'inclusion d'une variable synthétique apporte un terme correctif significatif (4) et enfin que le coût du capital implicite est sensiblement plus élevé pour les pays émergents que pour les pays développés.

Mots clefs français : Marchés émergents, étude d'association, résultat résiduel, valeur comptable, croissance anormale, coût du capital

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Abstract
This dissertation on emerging markets is driven by one fundamental question, i.e., is there any association between accounting data and market values in high risk and volatile emerging markets. To this end, two models, residual income valuation (R.I.M) and abnormal earnings growth (A.E.G), have been explored in this work.
In the first study, a model of type Residual Income Valuation is developed and its implications are empirically tested on sample consisting of American companies, developed countries apart from USA and emerging countries over the period 2000-2007. The results show that in most of countries studied, the association between the book value and market value of equity significantly depends on the stage of growth and the method of financing characterizing the company.
The development of a valuation model of type Abnormal Earnings Growth Model (by Ohlson & Juettner-Nauroth), including modeling of evolution of expected relationship between market value of a share, expected earnings per share in a year, its rate of growth in short-term and a set of accounting variable composing a synthetic indicator of growth of company, is studied in the second research work of this dissertation. Our results show that (1) expected increase in earnings per share are significantly associated with stock prices (especially for developed countries), (2) but, as suggested by our model, the persistence of its effects is limited (especially for emerging countries), (3) when the dynamics of growth are more complex, inclusion of a synthetic variable can make a significant correction term (4) and finally the implied cost of capital is significantly higher for emerging countries than for developed countries.

Keywords : Emerging markets, residual income, association studies, book value, abnormal earnings, cost of capital

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