How to evaluate start-ups and SMEs?
A study of French analysts IPO reports

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Abstract

This paper presents a study of the valuation methods used by analysts to price start-ups and Small and Midsize Enterprises (SMEs) before their Initial Public Offering (IPO). According to a sample of 203 analysts IPO reports on Euronext Paris, it is noted that analysts are restricted to using just a few valuation models for start-ups and SMEs, despite the multitude of available assessment methods. In contrast with the literature, the data strongly proved that the Discounted Cash Flow method (DCF) is the most widely used model for start-ups and SMEs while the real options model has never been used. Mostly, all the valuation methods overestimate the firm; therefore it was not possible to identify the most accurate method. Furthermore, the given estimates in the reports were closer to the stock price values one month after the IPO. Regressions prove that the choice of valuation method by analysts does not depend on the activity sector of the evaluated firm.

JEL classification: G32, G24

Keywords: valuation methods, analysts, IPO**,** start-up, SME

1. Introduction

The valuation of assets in general and firms in particular, is an extremely important task and is the key to any decision about the financial policy of the company. The study of the firm's value involves estimating it and identifying all factors likely to influence it, and in particular the value creation sources. Over the last 60 years or so, research on the determinants of a firm's value and its estimation have provided us with solid theoretical concepts used to better understand different problems. Thus, models established in the 50s (Gordon and Shapiro, 1956; Durand, 1957; Modigliani and Miller, 1958, 1961) have laid all the groundwork for the practice of firm valuation. Similarly, research on the impact of the capital structure and dividend policy on a company's value, raises questions on other value creation sources. Today, there have been a multitude of evaluation methods based on accounting or financial data about a company, as well as methods based on economic data in the market in which a company operates.

It is obvious that it is difficult to value a young and small firm that has not yet proved its worth and sometimes operating in an uncertain and innovative market. Clearly, the value of a start-up or an SME is the art of thwarting uncertainties. Financial analysts face a dilemma: on the one hand, it is necessary to evaluate the start-ups, since takers are ready to buy them (venture capital, IPO); On the other hand, traditional approaches present practical difficulties in implementing them and an incompatibility with start-up and SMEs' characteristics. The firm to be evaluated is no longer a collection of clearly identifiable physical assets or projects: what constitutes its value is its gray matter and therefore its ability to grow and open up to future markets. It is therefore necessary to evaluate the real options of the company, that is to say all the present and future decisions generating value.

In this paper, we study the valuation underwriters' reports of 203 IPOs on Euronext Paris during the period 2008–2014. This study addresses two research questions. First, we want to know which valuation models do analysts use during the IPO of a specific category of firm, start-up and SME, and how do they set the price of the offer, given estimates of the value? Second, we study which valuation models, as used by the analysts, provide the best estimate of the market price of a start-up or a SME at the time of the IPO, a month later, and three months later.

The paper proceeds as follows: section II presents a complete literature review on valuation methods. The debate on these methods and the hypotheses are discussed in section III. Section IV presents the methodology, the sample and describes the data. Results are discussed in section V, and section VI concludes the study with the main results.

2. Literature review on valuation methods

2.1. The theoretical approach to the firm's value

The value of a company is simply the value of its economic assets, in other words it is the market value of all industrial and commercial assets it owns.

There are two different approaches to calculating the value of a firm: a direct approach, which simply determines directly the value of economic assets, and an indirect approach, which values the various liabilities of the company (equity + debt), the sum of which, is the value of economic assets.

The choice of method evolves and converges to use more common fundamental parameters of the company to assess its economic assets.
According to financial theory, the value of any asset is defined as the present value of income flow that the asset is likely to generate in the future.

According to Durand (1957) and Modigliani and Miller (1961), the price of a given share must satisfy the following relationship:

$$p_j^t \times (1 + \rho^t) = d_j^t + p_j^{t+1}$$

$$p_j^t = \frac{d_j^t + p_j^{t+1}}{1 + \rho^t} \quad (1)$$

where

p_j^t is the price of a share of the firm j at the beginning of period t;
d_j^t is the dividend per share paid by firm j in period t;
ρ^t *is* the rate of return on equity.

According to this theory, an investor buys a financial security at a price P_0 when he hopes to raise future incomes with a total present value of V_0 such that $P_0 \leq V_0$. This relationship is based on certain assumptions, such as perfect capital markets, rational investors and the absence of uncertainty.

In other words, the purchase price of a financial security that the investor is willing to pay does not exceed the present value of money that he will receive later. We can speak in this case about a positive net present value of a financial security (the difference between the present value and market value).

According to this fundamental valuation principle, it is possible to base the valuation methods on what investors really capitalize when buying property. For example, the value of a company wholly depends on all of the cash flow generated later; in this case, we are talking about the discounted cash flow

approach, but when we try to determine the value of a share, it would be necessary to use the cash dividends (Williams, 1938; Gordon and Shapiro, 1956; Durand, 1957).

2.2. Elements affecting value

In the financial literature, several studies have focused on elements that could affect a firm's value, especially the financial structure, taxation and dividend policy.

Modigliani and Miller (1958, 1963) show that in a perfect market, the value of a company rather depends on cash flows that will be generated in the future, not in the way of distribution of these cash flows between shareholders and creditors. Miller (1977) and Myers (1977) state that there is no optimal capital structure that maximizes the market value of a company.
In addition, some studies show the opposite by putting evidences on market imperfections that affect the value of a company, such as bankruptcy costs (Brennan and Schwartz, 1978), investors' taxation (DeAngelo and Masulis, 1980), agency relations (Jensen and Meckling, 1976; Stulz, 1988; Diamond, 1989; Harris and Raviv, 1990; Hirshleifer and Thakor, 1992) and information asymmetry (Leland and Pyle, 1977; Myers and Majluf, 1984).

The impact of dividend policy on the value of a firm is is not definitively identified. In 1961, Modigliani and Miller showed that under the assumption of perfect markets, the current and the future dividend policy of a company does not affect its value. However, further studies show that the dividend policy is a relevant factor in assessing the value of a particular company in terms of taxation. Indeed, some authors support the idea that investors will demand higher returns on high-yield shares because dividends are taxed with a higher rate than capital gains (Brennan, 1970; Litzenberg and Ramaswamy, 1979, 1982). Moreover, the effect of dividend policy on a firm's value because of the tax benefit is strongly criticized by Black and Scholes (1974) and Miller and Scholes (1982), who argue that this effect is related to the information conveyed on the future prospects of the company.

The activity of the company and its investment policy, as explained in the study by Modigliani and Miller (1961), represent the basic elements in the company valuation. They show that the current value of the company depends on its operating revenues and its investment policy. They set up the following formula:

$$V_0 = \frac{V_t + X - I}{1 + k} \tag{2}$$

where

V_t is the value of the firm at time t ;
X is the operating income generated by the company during the period 1;
I is the value of investments made by the company during that year;
k is the rate of return required by investors.

Copeland et al. (1996) show that the economic profitability of a company, the rate of growth of the capital and of incomes are the fundamental variables in calculating a company's value.

The literature on firm valuation is abundant and is mainly based on the identification of key variables that influence the value of companies and those that are a source of creating value, but the findings of these studies are controversial.

2.3. Firm valuation methods

Research for estimating the value of a firm has expanded dramatically. In practice, the assessment is based on four broad categories of methods: (a) *Asset Value Method*; (b) *Forecasting Method*; (c) *Comparables Method*; and (d) *Real Options Theory*.

The Asset Value approach is to evaluate what a company has by making a simple algebraic sum of the market values of the various company assets. The Forecasting approach is based on what a company will bring by using the present value of future income that will be generated. The Comparables approach uses comparable assets already priced in the market, and can allow us to compare the company value with other companies. Finally, the Real Options Theory is used to evaluate investment projects.

a. Asset Value Model

The valuation of assets is controversial. A variety of financial and accounting approaches has been proposed, each with its own set of critics.

One way to value assets is on the basis of their costs. For example, the book value of a firm is based on the accounting value, calculated with costs less depreciation, associated with creating the firm's assets. But historical costs associated with creating businesses do not reflect true costs today, leading some financial accountants to argue that the value of a firm should be based on the replacement value of the assets it owns. Unfortunately, replacement costs are notoriously hard to estimate, especially for intangible assets like brand names, intellectual property and customer relationships. Consequently, both book values and replacement values ignore the value of intangibles.

Tollington (1995) and Rappaport (1983) explain that the difference between the book value and the market value of a firm is accounted for by intangible assets that are not recognized by standard accounting practices, to the extent that the market value of a firm is greater than the book or replacement values and the differences can be attributed to intangible assets not captured by current accounting practices (Simon and Sullivan, 1993; Lane and Jacobsen, 1995).

b. Forecasting Method

Valuation requires that a projection be made for the current value of all future cash flows hoped for by the shareholders. Since the future is uncertain, any intrinsic value will always be subjective and imprecise.

According to Reilly and Brown (2003), the discounted cash flow (DCF) method is the universally accepted approach to calculating the value of assets. Pratt (1998) defined the value of an asset as the total of all future cash flows for the owner, discounted with the opportunity cost rate, reflecting the risk inherent in the investment. This principle is universal in terms of both time and space.

Discounted cash flow (DCF) analysis identifies the present value of an individual asset or portfolio of assets. This is equal to the discounted value of expected net future cash flows, with the discount reflecting the cost of waiting, risk and expected future inflation.
By combining assessments of both opportunity cost and risk, a discount rate is calculated for the analysis of the present value of anticipated future cash flows.
Risk becomes a significant factor when the financial decision being considered involves some statistically significant probability of loss. The calculation of risk factors beyond opportunity cost can often be very complex and imprecise, requiring the use of actuarial analysis methods and market analysis. Risk is generally included in DCF analysis according to the premise that investments should compensate the investor in proportion to the magnitude of the risk taken by investing. A large risk is justifiable when it has a high probability of producing a large return.
Following the stock market crash of 1929, DCF analysis gained popularity as a valuation method for stocks. Fisher (1930) and William (1938) formally expressed the DCF method in modern economic terms. Later, Gordon and Myron (1962) extended the William model by introducing a dividend growth component in the late 1950s and early 1960s.
Copeland, Koller and Murrin (2000), Rappaport (1998) and Hackel and Livnat (1992) were current pioneers in modelling the free cash flow to the firm, which is widely used to derive the value of the firm. Damodaran (2001) provides several approaches to estimate the value of a firm for which there are no comparable companies, no operating earnings and a limited amount of cash flow data.

c. Comparables Method

In absolute terms, the aim of the valuation is to calculate an intrinsic value for the asset based on cash flows, growth and risk. The objective of a relative valuation is to calculate the value of assets in relation to comparable assets in the market. The principle underlying relative valuation models is the single-price rule. According to this economic theory, two similar assets must be sold at the same price. A correct application of the relative valuation method involves two preconditions. Firstly, share prices

must be both standardized and comparable. Secondly, similar firms must be grouped together in order to make a comparison between some standard values in order to define their relative price.

According to Stowe et al. (2002), there are four methods frequently used in relative approaches: relative earnings valuation method, relative revenue valuation method, relative cash flow valuation method and relative asset valuation method.

d. Real Options Theory

Froidevaux (2004) claims that, the paradigm for 'real options' is already familiar to both academics and professionals in the financial world. Graham and Harvey (2001) conducted a poll of American firms and found that approximately 27% of financial directors already use real options to evaluate new investment projects.

The real options concept was introduced by Myers (1977). He extended the application of the idea from financial options to real assets. Since then, a number of scholars have taken an interest in the theory of real options:

Trigeorgis (1991), Nichols (1994) and Smit and Trigeorgis (1998, 2004) demonstrate that firms considering the possibility of organizing an IPO tend to invest in order to protect themselves.

Kogut (1991), Williams (1993), Kulatilaka and Perotti (1998), Grenadier (2000 a,b), Weeds (2002), Kranenburg, Perotti and Rossetto (2007) have produced work at the boundary between real options theory and game theory that can be applied to R&D, joint-ventures, real estate, electronics and pharmaceuticals. Real options have also featured in the literature on strategy (McGrath, 1997; Chi, 2000).

Hege (2001) says that start-ups require special treatment because traditional valuation methods would not be applicable to them, in particular because: a) these methods require a forecast of future flows, while the vast majority of start-ups engrange many losses at launch; (B) these start-ups do not have a sufficiently long history that it is possible to extract any forecast of profits and growth rates.

Some researchers have placed serious hopes on valuation methods based on real options, believing that they could be enough to close the gap between the rather low valuations obtained by the traditional DCF method and the values effectively observed in the stock markets.

In this line, many works have focused on the amazon.com company, which has become a practical case for researchers.

Schwartz and Moon (2000) applied the theory of real options to amazon-.com, based on dynamic modeling of sales and profit of a start-up by stochastic processes. Damodaran (2000) and Copeland et al. (2000) also study the case of amazon.com: while Damodaran applies a rather classical multiple approach, Copeland et al. (2000) model the actual expansion option by a simple decision tree.

e. Critics of Valuation Methods

In the literature, some studies have criticized these assessment approaches. For example, the *Net Asset Value* method is often criticized because it does not take into account the risk factor and the required return by investors. Chapelle (2002) and Copeland et al. (1996) criticize the *Reevaluated Net Assets* method, which reflects only the assets and liabilities of the balance sheet without taking into consideration the different investments made by the firm and the generated cash flows over time.

The *Forecasting* method seems to best reflect the value of a company despite the difficulties involved in estimating future cash flows and the liquidation value of the total assets on the distant horizon. This method uses different discount rates. It is necessary to distinguish between the cost of capital, the rate of return required by shareholders and the weighted average cost of capital. The cost of equity as a discount rate is the most commonly used.

The *Comparables* approach involves great difficulty in determining the reference sample to be used as a basis for this evaluation method. This problem becomes more pronounced for companies belonging to new sectors of the economy.

2.4. Appropriation of the analysts

To investigate the real use by professionals of the methods developed by academics, it is necessary to analyse in detail (content analysis) papers produced by these professionals. To our knowledge, only two categories of professionals publish their work and thus allow us to study their findings: financial analysts (sell-side analysts working for brokers) during the IPO (access to financial analyses, or access to certain chapters included in the prospectus in some countries, provides a lot of information on valuation methods) and financial experts, for listed company, during the squeeze-out (delisting of the stock exchange). The first apply the professional standards of their professional association: The *Association of Certified International Investment Analysts* (ACIIA) or the *Chartered Financial Analyst institute* (CFA). The latter are in some countries like France very framed by professional standards issued by the French Securities Regulator or *Autorité des Marchés Financiers* (AMF) and the courts.

According to the information available on the ACIIA and CFA Institute websites, there is a professional norm concerning financial analysts and the valuation of forms. We ascertained that the *Complete*

Examination Syllabus Contents of the ACIIA international examination (the 2008 version, the latest version available on the www.aciia.org site) contains a module on valuation: 'Valuation Model of Common Stock'. This module describes the Dividend Discount Model (zero-growth model, constant-growth model and multiple-growth model), the free cash flow model and the measures of relative value (price/earning ratio, price/book value ratio, price/cash flow ratio and price/sales ratio).

We studied the books recommended by the ACIIA organization and found that many pages are devoted to the Dividend Discount Model (DDM) model (the zero-growth model, the constant-growth model, the multiple-growth model and the three-stage DDM). There are few details on the DCF model but the enterprise value (EV) relative valuation and the real option models are not presented. Finally, there are no specifications on how to construct a comparable sample.

The *Global Body of Investment Knowledge* of the international CFA examination (2010 version, available from the www.cfa.org site) contains many modules entitled in the Study sessions 10, dispatched in readings 28, 33, 34, 35 and 36.

In Reading 28, '*Equity Valuation: Applications and Processes'*, we find that the CFA Institute candidate should be able to contrast absolute and relative valuation models, describe examples of each type of model and be able to describe sum-of-the-parts valuation and conglomerate discounts.

In Reading 33, '*Discounted Dividend Valuation'*, we find that the CFA Institute candidate should be able to calculate and interpret the value of a common stock using the dividend discount model for single and multiple-holding periods, calculate the value of a common stock using the Gordon growth model and explain the model's underlying assumptions, and should be able to explain the assumptions and justify the selection of the two-stage DDM, the H-model, the three-stage DDM, or spreadsheet modelling to value a company's common shares.

In Reading 34, '*Free Cash Flow Valuation'*, we find that the CFA Institute candidate should be able to compare the free cash flow to the firm (FCFF) and free cash flow to equity (FCFE) approaches to valuation, explain the appropriate adjustments to net income, earnings before interest and taxes (EBIT), earnings before interest, taxes, depreciation, and amortization (EBITDA), and cash flow from operations (CFO) to calculate FCFF and FCFE, describe approaches for forecasting FCFF and FCFE, explain the single-stage (stable growth), two-stage, and three-stage FCFF and FCFE models, and select and justify the appropriate model given a company's characteristics, estimate a company's value using the appropriate free cash flow model(s), explain the use of sensitivity analysis in FCFF and FCFE valuations, and describe approaches for calculating the terminal value in a multistage valuation model.

In Reading 35, '*Market-based Valuation: Price and Enterprise Value Multiples*', we find that the CFA Institute candidate should be able to calculate and interpret the justified price-to-earnings ratio (P/E), price-to-book ratio (P/B), and price-to-sales ratio (P/S) for a stock, based on forecasted fundamentals, evaluate a stock using the comparables method, and explain the importance of fundamentals in using the comparables method, calculate and interpret the P/E-to-growth ratio (PEG), and explain its use in relative valuation, explain alternative definitions of cash flow used in price and EV multiples, and describe limitations of each definition, calculate and interpret EV multiples, and evaluate the use of EV/EBITDA, and explain the use of the arithmetic mean, the harmonic mean, the weighted harmonic mean, and the median to describe the central tendency of a group of multiples.

Finally, in Reading 36 '*Residual Income Valuation'*, we find that the CFA Institute candidate should be able to calculate the intrinsic value of a common stock using the residual income model, and compare value recognition in residual income and other present value models, calculate and interpret the intrinsic value of a common stock using single-stage (constant-growth) and multistage residual income models.

Concerning the financial expert, and originating in the Paris Court of Appeal and later adopted in legislation and regulatory texts, notably those referring to squeeze-outs, Article 231-13 of the General Code of the AMF on procedures governing public offers indirectly refers to OPR-RO[1]s, explaining that the AMF examines 'prices and parity of exchange in function of the objective evaluation criteria generally used and the characteristics of the firm in question'. Section II of Article L. 433-4 of the Monetary and Financial Code on Obligatory Withdrawals states that 'the evaluation of securities (is) carried out according to objective methods which, in the case of the sale of shares, takes into account, using measurement techniques appropriate to specific cases, the value of the shares, the profits generated, quoted value, the existence of subsidiaries and future perspectives'.

According to the AMF, valuation methods fall into two broad categories:

- Analogical approaches, consisting of calculating the value of a firm in reference to comparable firms the value of which is already known, either because they are quoted on the stock exchange or because they have been the object of a recent transaction, the details of which have been rendered public.
- Intrinsic approaches consisting of determining the value of the firm based on profit and risk factors (cash flow, dividends, and, in some cases, net asset values).

In numerous cases, the AMF requires that independent experts examine market transactions, notably OPR-ROs, which may involve conflicts of interest. The analysis of the independent expert is then

[1] OPR-RO **(**Offre Publique de Retrait-Retrait Obligatoire) : « squeeze-out »

compared to a number of value indicators, including the book value of the assets, the stock market price, transactions involving the firm's securities and the analysts' target prices.

To conclude, it seems that, based on the above information, experts and financial analysts must have a good knowledge and command of how to prepare an IPO or squeeze-out valuation.

3. Debate on valuation methods: hypothesis

3.1. Frequency of use

Valuation theorists have studied the theoretical properties of a number of models. Some of them have used arguments deriving from those properties to promote specific models.

Barker (1999) finds that analysts and fund managers rank the Price Earning (PE) model and the Dividend Yield Model as more important than the Discounted Cash Flow and Dividend Discount Models. These findings concerning the PE model confirm those of other studies using survey-based approaches, namely the study of Arnold and Moizer (1984) on the UK, as well as that of Pike et al. (1993) on Germany and the UK, and that of Block (1999) on the USA case.

Subsequently, this result was confirmed by Bradshaw (2002). He examined the content of 103 reports delivered by US analysts with a view to identifying how financial analysts justify their recommendations and price targets. He observed that PE and anticipated growth-based valuations were more frequently used than other approaches.

Penman (2001) recommends residual income valuation (RIV), in preference to DCF, while Copeland et al. (2000) recommend using *either* the DCF model *or* the RIV model. These authors demonstrate that DCF is most widely used in practice, but that RIV is growing in popularity. They also note that both methods, properly applied, result in the same valuation, and suggest that 'the choice is mostly driven by the instincts of the user'.

Palepu et al. (2000) adopt a balanced position; they note that properly constructed RIV and DCF models lead to identical valuations, but the preference for one approach over the other may depend on the ease of access to acceptable proxies for the model constructs.

Corradeti and Michineau (2002) observe a regression between the withdrawal price offered and the value obtained using each method of valuation in a study of a sample of 125 obligatory withdrawals between 1994 and 1997, focusing on the frequency with which individual valuation methods were used, and producing the following results:

Table a: The use frequency of valuation methods between 1994 and 1997 in France

Used Methods	Frequency of use
RNAV[2]	66%
Comparable stocks	53%
DCF	50%
Stock market price	44%
Preceding transaction	28%
Comparable transactions	25%
DDM	18%

Source : Corradeti and Michineau (2002)

Paré et al. (2004) showed that on average, four evaluation methods were used during the delisting on the Paris Stock Exchange in 2003 (ranging from one to eight different methods). The multi-criteria character, as prescribed by the regulations of the AMF and the various reminders of the Court of Appeal of Paris, seems to correspond to the reality of withdrawal operations. Three methods are used in more than eight out of ten: the historical stock price, discounted cash flows and market comparables. The methods related to the net assets and those using comparable transactions are present in 50% of the operations. The Bates method is used in less than 15% of the offers. Finally, other methods, such as discounted dividends, are rarely included in operations.

According to earlier studies, we find that there is a high preference for using comparable methods and specifically the PE method. In more recent studies, DCF and RIV are gaining popularity and becoming more commonly used. This observation leads us to the first hypothesis of this study on the frequency of using evaluation methods.

H_1: The evaluation methods are not used with the same frequency. Some methods are more popular than others for start-up and SME evaluation.

3.2. Accuracy of methods

At this stage, the question that arises is that of how to identify the most effective method of evaluation from among these different approaches.

A recurring result in research suggests that the multiples method based on forecasted results generate more accurate valuations than those based on historical results (Kim and Ritter, 1999; Lie and Lie, 2002; Liu, Nissim and Thomas, 2002). Several studies (Tse and Yaansah, 1999; Liu and Thomas

[2] Revalued Net Asset Valuation

2000) explain that provisional results include information concerning value that is not reflected in historical results.

A number of studies have compared the accuracy of comparable models with the accuracy of DCF. Kaplan and Ruback (1995) conclude that in highly leveraged transactions, DCF and the comparable method are both credible and useful. According to these authors, DCF is at least as efficient as the comparable method, based on firms in the same industry engaged in similar transactions.

Gilson, Hotchkiss and Ruback (2000) have shown that, for bankrupt firms, DCF and the comparables method demonstrate the same degree of accuracy and generate the same bias, but generally provide vague estimates. Having evaluated 45 firms recently quoted on the stock exchange in New Zealand, Berkman, Bradbury and Ferguson (2000) concluded that DCF and the comparable method attained the same degree of accuracy. Francis, Olsson, and Oswald (2000) demonstrate that the RIV method produces smaller valuation errors than the DCF and DDM models.

According to a study conducted on a sample of 209 French companies introduced to the unlisted securities market (*Second marché*) of the Paris stock exchange between January 1991 and December 2000, Fabre-Azema (2002) found that the use of fundamental variables, such as cash flows, economic profitability and the normative economic rate of return, is more effective than indirect methods based on dividend discount to evaluate firms.

H_2: There is an accurate valuation method that provides an efficient estimation of a start-up or a SME.

3.3. Activity sector of the firm

Some studies on valuation methods have focused on the possible link between the method used and the sector of the firm evaluated.

The study by Barker (1999) on models used by professional investors and analysts (UK) arrived at the following conclusions: the service, industrial and consumer goods sectors are PE ratio-valued, while the financial and utilities sectors are yield-valued. Finally, DCF, DDM and Beta analyses are rarely applied to investment decisions. Bradshaw (2002) compared analysts' reports both within and across industries. As in the previous study by Barker (1999), he found widespread use of PE models, but he also discovered that the attention given to PE models varies systematically across sectors.

Concerning the French market, the study of Fabre-Azema (2002) shows that the choice of valuating methods is changing and tends to converge towards using frequent fundamentals of a company to evaluate its asset. It appears that financial analysts use mainly three models: the Bates model (23.4%);

the discounted cash flow (20.5%); and the multiples method of market capitalization (35.4%). The choice of method used does not depend on the assessed corporate business sector but strongly depends on the year of assessment.

The principal insight provided by Demirakos, Strong and Walker's 2004 study is that analysts tend to adjust their valuation method to the circumstances of the firm in question and the industry in which it operates. The price earnings ratio (PER) model continues to be the most frequently used, but other types of analysis are also employed as and when required. In some cases, the DCF model is used; however, when more detailed analyses are needed, other models, such as price-to-sales multiples, growth options or profitability analyses, come into play. Another point made by the authors is that the RIV model is extremely limited.

H_3: Some valuation methods are more compatible with estimating a start-up or a SME value than others in a given sector. Therefore, they are frequently used and more efficient for this sector.

3.4. Size / age of the firm

A number of authors, including Levy (2001), have observed that the choice of one method rather than another depends to a large degree on the nature of the firm's assets. In effect, accounting techniques are more efficient in the valuation of tangible assets than intangible ones. Thus, the authors were unable to express a preference for one method over another and were not in a position to reject the notion that DCF and RIV were of equivalent value depending on the nature of the estimated firm.

Demirakos, Strong and Walker's (2004) study suggests that a detailed examination of analysts' reports makes for a better understanding of valuation practices. Indeed, the kind of valuation methods used by analysts to justify their recommendations depends on the firm's characteristics. Although the study focuses on industry, its findings can be extended to other sectors, notably technology and services.

Some branches of the economic literature have focused on the life cycle theory, especially on the birth of new firms and the death of old ones in specific industries. Life cycle models of a firm presuppose that firms develop in predictable ways, which makes it possible to segment their evolution into specific phases or time periods.

Smith et al. (1985) combine elements of the life cycle theory with elements from research on value in an analysis of accountancy techniques designed to measure performance in the initial stages of a firm's development.

Black (1998) demonstrates that in the start-up and growth phase, working cash flow is a much more relevant indicator than income, and that in the mature phase; income is a much better indicator than cash flow.

Thus, according to the literature, particular features of valuated firms may have an influence on the estimation method used. According to the data collected in our sample's reports, it was decided to use turnover as a measure of firm size and age at the time of the evaluation to refer to works on the firm's life cycle.

H_4: The age and/or the size of the start-up or the SME effect(s) the choice and the accuracy of the used method.

4. Sample and methodology

4.1. Description of the sample

This study is based on a sample of reports executed by analysts to evaluate French start-ups (young and fast-growing firms) and SMEs before their IPO.

Our sample includes 203 IPOs on the Marché Libre,[3] the Nouveau Marché[4] and Alternext (Euronext Paris)[5] from 2008 to 2014, for which valuation information is available.

Among all the IPOs on Nouveau Marché, Alternext and Marché Libre, we have included in the sample only firms for which the prospectus contained information on value estimates or firms for which a financial analysis was available on the website of the firm or on the website

[3] The Marché Libre was created in 1998, following the disappearance of the counter market. In 2003, it was defined by the AMF as an ambiguous market, under a public call activity to savings with purely contractual rules with Euronext and out of the AMF intervention field.

[4] The Nouveau Marché was created in 1996 to facilitate access to the financial market at start-up, young companies with high-growth potential but that had financing needs. At the same time the German Neuer Market and the British Alternative Investment Market were created. The goal of the Nouveau Marché was to make financing easier for young companies, financed upstream through venture capital and allow the investors to sell their shares on the Nouveau Marché after a few years of investment in young companies. The Nouveau Marché disappeared in 2005, following the creation of Alternext Eurolist C.

[5] Alternext is an organized trading platform established on 17 May 2005 by Euronext Paris (2006 by Euronext Brussels and Euronext Amsterdam and Euronext Lisbon in 2011) for small and medium-size enterprises in the euro area. Alternext is not a 'regulated market' as defined in the European Directive on services in investment and in the sense of Article L. 421-1 of the Monetary and Financial Code. Alternext was created to offer a quotation to small and medium-size enterprises wishing to raise capital in the euro-zone at a time when it was becoming increasingly difficult and expensive for companies to access regulated markets like the old Eurolist (now Euronext Paris and NYSE Euronext Paris), one of the regulated markets managed by Euronext Paris SA.

www.lemarchelibre.com (a French database that collects all information on firms listed on the Marché Libre). We excluded all IPOs of mutual funds, financial institutions and holding companies.

Table 1.a presents data on the final sample of the 203 IPOs. We have retained 203 IPOs with complete information on a total of 390 identified operations on the three markets during the period. Our final sample includes 42 firms listed on the Marché Libre, 54 firms listed on the Nouveau Marché and 107 firms listed on Alternext.
Some financial data on firms are also provided in **Table 1.a**, including the median and mean but also first and last decile.

Median turnover at IPO was 6.2 M€ but the smallest firms show only 1.8 M€. The firms in this sample are really SMEs. More interesting figures are the Average Annual Growth Rate of turnover (CAGR) for the period N-1 (last realized turnover) to N+3 (expected turnover 3 years after the IPO): on average those firms are expected to show a 52% increase in turnover per year: they are really high growth firm (start-up). The last decile shows a terrific 83% CAGR. Median realized Ebitda at IPO was 0.6 M€ (10% Ebitda margin) and only 16% of the firms were in loss. The median offer value is 1.8 M€ for a market capitalization of 10 M€.

The average age of these companies at their IPO was 10 years (median 7.16 years). Ninety per cent of firms were introduced at an age of less than 22 years and only 10% before one year's of existence.

In **Table 1.b**, the sample of start-up and SMEs were classified according to their sector activity. There are ten different sectors: computing, industry, trade, finance, consulting, health, telecommunication, transport, media and training (according to a decreasing frequency).

Computing sector is the dominant sector and makes up nearly one-quarter of the sample (24.63%). There was a tangible increase in appetite for tech start-up at that period. The technology sector is still the leading industry for start-ups expansion in France. Computing sector is followed by the industry and retail sectors, with respectively 39 and 34 firms of the sample. Each of the remaining sectors count for less than 10% of the sample's firms. The training sector is the least common one, the sample containing only three evaluation reports of firms in this sector.

4.2. Methodology

4.2.1. Content analysis

Content analysis involves categorizing elements of textual and narrative content into groups in function of certain criteria, with a view to transforming data into quantitative units capable of analysis (Weber, 1988). This method has been widely applied in articles examining approaches to the divulgation of financial information (Jones and Shoemaker, 1994; Previts et al., 1994; Abrahamson

and Amir, 1996; Rogers and Grant, 1997; Smith and Taffler, 2000) and of non-financial information (Gray et al., 1995; Deegan and Gordon, 1996; Campbell, 2000).

Next, we read in depth the prospectus of each IPO firm in the initial sample to identify all information concerning the IPO valuation methods. All IPOs, pre-IPO and post-IPO shares outstanding were hand-collected from prospectuses. We believe that it is important to use hand-collected data for shares outstanding because Ljungqvist and Wilhelm (2003) point out that there are several errors in this variable in the SDC database.
Consistent with recent research, Thomson One Banker is our source for first-day closing prices, 30-day closing prices, 60-day closing prices and 180-day closing price.

4.2.2. Regression model

We used the same methodology as Corradeti and Michineau (2002), who observed a simple regression between the withdrawal price offered and the value obtained using each method of valuation. They defined the existing relationship between the two variables, the general form of the supposed linear link between the dependent variable vector studied (the price), and each explanatory variable vector (the value obtained by the method used):

$$P^i = ß^0 + ß^1 M^i + \omega \quad (3)$$

where

P^i is the price;
M^i is the value obtained with the method studied;
$ß^0$ is the regression constant;
$ß^1$ is the regression coefficient of the explanatory variable;
ω is the term of error.

P^i is the dependent variable of the model and represents the share price offered at the IPO, the first-day closing price, the 30-day closing price, the 60-day closing price and the 180-day closing price; M^i is the value obtained with the method provided in the prospectus or the financial analysis. This is used as an independent variable in the model. We completed the Corradeti and Michineau regression (2002) by adding a set of control variables.
We proposed three types of control variables: the activity sector, the age and the size of the start-up or the SMEs. The regression model is as follows:

$$P^i = ß^0 + ß^1 M^i + ß^2 S^i + \omega \quad (4)$$

where

P^i is the price;
M^i is the value obtained with the method studied;
S^i is the control variables;
$ß^0$ is the regression constant;

$ß^1$ is the regression coefficient of the explanatory variable;
$ß^2$ is the regression coefficient of the control variables;
ω is the term of error.

5. Results

The analysts' reports propose an estimation of a start-up or a SME's value before its IPO. The firms' valuations are specially based on a variety of assessment methods. Each report uses between one and five valuation methods. Furthermore, the majority of reports (35.96%) are based on a single method. Nearly 30% of the estimates are justified by two methods and nearly 20% by 3 methods. The maximum number of methods used in a valuation report is five. We find nine cases among the sample with this number of methods (**Table 2.a**).

The analysts of this sample mainly used six valuation methods:

- The peer comparables method[6]
- The Discounted Cash Flow method (DCF)
- The Comparable Transactions method [7]
- The Dividend Discount Model (*DDM)* [8]
- The Multiple of Earnings method[9]
- The European Union of Accountants method (EUA)[10]

According to **Table 2.b**, the DCF method is the most frequently used method, being used in 71% of the reports' sample. This method is closely followed by the comparable transactions method, used in 101 of the 203 reports of the sample. The rest of the methods are less frequent and their percentage use

[6] The peer comparables method: to value a firm, we set up a reference group of listed firms with the same industrial risk (the same activity sector). For each of the selected sample firms, multiple aggregates of the income account are calculated: turnover, EBITDA, EBIT... The average multiples obtained are then applied to the corresponding aggregates of the company to be valued.

[7] The principle is the same as the peer comparables method: we constitute a benchmark of comparable transactions, that is to say, some acquisitions of firms in the same activity sector as the company to be valued. For each transaction, we determine multiple accounting aggregates. We calculate the average multiple but market capitalization is replaced in this case by the amount of the transaction.

[8] DDM: A procedure for valuing the price of a stock by using predicted dividends and discounting them back to present value. Value of stock = Dividend per share / (discount rate – dividend growth rate).

[9] The multiple of earnings method: the principle of this method is to consider that a firm's value is the profitability it gives off. Value of firm = Earning / i or Earning x M where i is annual rate of return anticipated in perpetuity and M is the multiple applied to the net profit of a firm to obtain its value.

[10] EUA method: this method is based on the capitalization of goodwill. The formula used is as follows: V = net book value + ½ capitalization of goodwill.

does not exceed 20%. The real options model has never been used by the analysts in the reports simple.

The question that arose at this stage was whether analysts tend to use specific valuation methods according to the activity sector of the evaluated start-ups and SMEs or if they choose the method according to their personal preference, so they use some methods more frequently than others. Based on the statistics on **Table 2.c,** the dominant method and most used in each sector is the DCF, with a percentage of use greater than 33% for each sector. The frequency of use of this method is clearly greater than the frequency of the other methods, except for the peer comparables method, where frequencies for some sectors remain close (finance, industry, computing and trade sector). The EUA method is not very common but 30% of its use is limited to the computing sector. For the industry sector, firms are mainly valuated by the DCF method and the peer comparables method, as each of these two methods is used in nearly 36% of the evaluation reports.

From these statistics, we note that the DCF is the most used method among all the sectors of the sample, followed closely by the peer comparables method. This result confirms Hypothesis $\mathbf{H_1}$. In fact, some methods are more popular than others and used in the majority of reports regardless of the activity sector of the estimated start-up or SME.

A valuation method is considered accurate and efficient when it gives a very close estimate of the fair value of a firm. Therefore, we tried to calculate the over / under valuation ratio of all the used methods in the sample. The ratio consists of dividing the estimated value of a specific method by the market value of the firm (at different dates of quotation). When this ratio is close to 1, the method is efficient. From **Table 3.a**, the most accurate methods for estimating the firm's value at IPO are the multiple of earnings method and the comparable transactions method, with a respective average ratio of 1.04 and 1.06. All other methods tend to overvalue estimated firms, with an overvalue rate of about 30% at IPO. The trend of overvaluation is confirmed for the other periods (1 month, 3/6/12 months after the IPO). The method of multiple earnings is a rarely used method in the sample's reports but offers the closest estimate to the market value. We cannot confirm the accuracy of this method because of the lack of observations.

From these statistics, we note that the DCF is the most used method in all the sectors of the sample, followed closely by the peer comparables method. This result confirms hypothesis $\mathbf{H_1}$. In fact, there are methods that are more popular than others, frequently used in the majority of reports regardless of the activity sector of the estimated firm.

Thereafter, we were interested in the accuracy of assessment methods according to the activity sector of the valuated firms (**Table 3.b**). The DCF method is the most used but it is a method that overestimates firms in each sector of the sample (except for the finance sector, where the ratio is close to 1). The limited comparables method undervalues the health and consulting sectors companies but

overstates companies in the other sectors. With regard to the DDM method, the best estimation is noted for the trade sector (the value of the ratio is 1.03 at IPO and 1.13 one month after the IPO). This method overestimates firms except for those in the transport and media sector. Likewise for the EUA method, the undervaluation is noted for the health and consulting sectors. Estimations of this method are fairly accurate (with a ratio close to 1) for the computing and trade sectors. For other methods (comparable transactions and earning multiples), the number of uses in each sector is less than 5, which is too small to judge the effectiveness and accuracy of the method.

Table 3.c summarizes the characteristics of the over / under valuation ratio of the methods' sample to better understand their trend. At the IPO, the comparable transactions method, despite a low number of observations, achieves the best performance in estimating the value of the start-ups and SMEs. The EV/MV ratio has an average of 1.06 and a median of 1. Extreme values (max and min) remain quite distant, with a greater overvaluation error than the undervaluation one.

The DCF and the peer comparables method, which are the most frequently used methods, have almost the same statistical characteristics with a respective average of assessment error of 30% and 47%. To compare between these two methods, the median of the peer comparables method is much closer to 1, but the overvaluation error is very high (the highest maximum ratio among all methods).

By calculating the same statistics of the ratio EV/MV a month after the IPO, we note that the estimates given by all methods are more accurate. The mean and the median of the ratio are closer to 1, but the extreme values remain fairly stables, with an error over / under estimation with the same magnitude of that seen at the IPO.

After 3 months of the IPO, there is a slight increase of the average and the median of the different methods' ratios and the gap between the extreme values (max and min) widens considerably. This is mainly due to changes in the quotation value of the company and their reaction to the market. The decrease or increase in prices may be temporary and depend on exogenous factors to the firms.

To sum up, the most frequently used methods are not necessarily the most accurate. On average, all methods tend to overestimate the valuated firms but if we look at what is happening in each sector, we find that all methods can both overestimate or underestimate companies from different sectors. The values provided by the assessment methods are closer to the quoted values one month after the IPO rather than those at the IPO.

Thus, we can deduct that hypothesis $\mathbf{H_2}$ is not confirmed. Among all the valuation approaches used in this sample, there is no one more accurate method for evaluating firms but some methods are a little better than others, with an average and a median of the EV/MV ratio very close to 1 and errors of over / under valuations having different magnitudes.

We performed regressions of the start-ups and SMEs' quotation values at different dates (IPO, 1/3/6/12 months after the IPO) with the values estimated by the valuation methods, in order to focus on the ability of these methods to explain the fair value of these firms. The coefficients of all the methods are highly significant (at 1%) with a very high R^2. The multiple earning method presents the most pronounced explanatory power but the number of observations (15) is too small to be able to generalize this result.

In second position, we found the DCF method with a positive and significant coefficient and an R^2 greater than 70%, knowing that it is the most commonly used method of the sample. The peer comparables method also presents good results, with a positive and significant coefficient (around 0.6) for all periods of regression.

Therefore, it appears that the DCF and the peer comparables method, with a quite significant number of uses, present a very strong explanatory power to estimate the real value of a firm.
To test the third and fourth hypotheses, we performed regressions of the market value according to the estimated value provided by the valuation method and the various firm characteristics, such as size, age, and activity sector. It was found that there is no effect of the age and size of a firm on its market value (**Table 4.a**, **4.b** and **4.c**). Therefore, $\mathbf{H_4}$ hypothesis is rejected. On the other hand, the sector variable may affect the market value of some valuation methods. Indeed, we find that the regressions with the estimated values using the comparable transactions method product a positive and significant influence of the firm's activity sector on its market value at different quotation dates (IPO, 1 month, 3 months after the IPO). For the DDM method, we note that a few sectors, such as transport industry and consulting, have a positive and significant effect on the market value of the valued firms.
Unfortunately, the DDM and the comparable transactions method are rarely used in the reports of the sample, which prevents us from ruling on the results. Thus, the $\mathbf{H_3}$ hypothesis that some valuation approaches are better suited to firms of a specific activity sector cannot be confirmed.

6. Conclusion

In this paper, we studied the valuation methods used by the underwriters of 203 IPOs of start-ups and SMEs on Euronext Paris (including the Nouveau Marché and the Marché Libre) during the period 2008–2014. We tried to provide answers to some research questions about the frequency and the accuracy of the valuation methods. Despite the multitude of existing evaluation models presented in the literature review, this study reveals that analysts tend to use only a small number of methods. They rarely use certain methods, leaving some approaches as the real options method recommended by the literature to value start-ups and SMEs. According to the data, it is proven that DCF is the most popular assessment model, which contrasts with earlier work.

Various studies have examined the accuracy of valuation models. Some of these studies focus on multiples valuation, and provide mixed results in which multiples have the highest valuation accuracy (Kim and Ritter, 1999; and Liu, Nissim and Thomas, 2002). Some studies compare the accuracy of multiples valuation and discounted cash flow valuation. Our study strongly indicates that all the used valuation models overestimate the value of the firm; therefore it was not possible to identify the most accurate method. Furthermore, the estimations by valuation models were closer to the stock price values one month after the IPO.

From the regression of the market value of the firms using the estimated value and some control variables, such as the activity sector, the size and the age of the firm at the IPO, we notice that all valuation method estimates provide a significant contribution to the firms' stock exchange values. The size and age of the company seem to have no effect on the value and the sector turns out to be a significant factor only for the comparable transactions method.

This paper makes two contributions to the literature. Our first observation is that, in contrast with earlier work (e.g. Barker, 1999; Block, 1999; Bradshaw, 2002; and Demirakos et al. 2004), the DCF is the most used assessment model by analysts to value start-ups and SMEs and the real options model was ignored by analysts despite the recommendation of literature. Our second contribution is that we use the real world estimates in this paper to evaluate the accuracy of valuation models in the context of IPO price, unlike Kim and Ritter (1999) and Berkman, Bradbury and Ferguson (2000) who used ex-post values estimated by academics.

ANNEXE

Table 1.a. Characteristics of the sample

This table summarizes some characteristics of 203 start-ups and SMEs' sample. In the first part, we give the distribution of firms according to their market stock exchange. The second part provides some statistics, especially the age at the IPO (the number of years between the date of creation and the date of the first quotation), the realized turnover published the year before the IPO, the expected turnover anticipated by the financial analyst for the year N + 3 after the IPO, Expected CAGR (Average Annual Growth Rate of turnover for the period N-1 to N+3), Realized Ebitda (N-1) published the year before the IPO, Percentage of firms in deficit at the IPO, Amount of the capital increase during the IPO and the Market capitalization of the firm at the IPO (Number of shares at the IPO x offer price).

Market	Number of operations studied	Number of firms in the sample
Marché Libre	90	42
Nouveau Marché	114	54
Altenext	186	107
Total	390	203

Characteristics	Mean	Median	Percentile 10%	Percentile 90%
Age	10.56	7.16	0.98	21.87
Realized Turnover (N-1)	13 871 769	6 219 267	1 283 620	37 037 500
Expected Turnover (N+3)	123 481 127	19 521 000	1 964 241	87 239 000
Expected CAGR	51%	42%	12%	83%
Realized Ebitda (N-1)	1 948 665	609 234	-70 500	6 392 000
% loss firms	16%			
Capital increase	3 783 631	1 800 000	314 972	9 751 200
Market capitalisation (at IPO)	18 865 720	10 300 000	4 020 000	44 120 000

Table 1.b. Number of firms by sectors

This table presents a classification of the sample (start-ups and SMEs) by their activity sectors. We identify 10 different sectors and we calculate the number and the percentage of firms in each sector.

Sectors	Nbre of firms	%
Computing	50	24.63%
Telecommunication	11	5.42%
Transport	9	4.43%
Health	12	5.91%
Finance	19	9.36%
Industry	39	19.21%
Training	3	1.48%
Retail/Trade	34	16.75%
Consulting	19	9.36%
Media	7	3.45%
Total firms	203	100.00%

Table 2.a. Frequency of valuation methods by analyst report

This table presents the number of valuation methods used in the analysts' reports. A report can contain at the minimum 1 valuation method and at the maximum 5 valuation methods. The table shows also the percentage of reports for each number of valuation methods used.

	Nbr of methods per report	Nbr of reports	% Of reports by nbr of methods
Number of valuation methods used in analysts' reports	1	73	35.96%
	2	60	29.56%
	3	39	19.21%
	4	22	10.84%
	5	9	4.43%
Total of reports		203	100.00%

Table 2.b. Frequency of valuation methods

This table counts the number of use of each valuation method in 203 reports by the analysts. There are 6 main valuation methods ranked by the use frequency.

Valuation Methods	Nber of use	% of use	Rank
DCF	145	71.4%	1
Peer Comp	101	49.8%	2
DDM	34	16.7%	4
Comp Trans	20	9.9%	5
Mul Earnings	15	7.4%	6
EUA method	42	20.7%	3

Table 2.c. Frequency of valuation methods according to the activity sector

This table presents the frequency of using each valuation model, taking in to account, the activity sector of the evaluated start-up or SME. According the sample of the studied reports, we recognize 6 principle valuation methods and 10 activity sectors.

Sectors	DCF	Peer Comp	DDM	EUA meth	Comp Trans	Mul Earnings	Total
Computing	34	23	6	13	4	2	82
Telecom	8	5	1	2	1	0	17
Transport	6	4	4	2	1	1	18
Health	10	6	0	3	0	1	20
Finance	12	11	4	3	4	2	36
Industry	26	26	8	8	2	2	72
Training	3	0	1	0	0	0	4
Retail/Trade	24	16	5	5	3	5	58
Consulting	16	9	3	5	2	1	36
Media	6	1	1	1	2	0	11
Total	145	101	33	42	19	14	354

Table 3.a. Over/Under valuation ratio mean

This table captures the mean of the over/under valuation for the different methods by calculating the ratio EV/MV. EV represents the estimated value of the start-up or the SMEs by the analysts using a given valuation method, and MV is the market the market value of the firm at precise dates: at the IPO, 1 month after the IPO, 3 months after the IPO, 6 months after the IPO and 1year after the IPO.

EV/MV	IPO	IPO+1m	IPO+3m	IPO+6m	IPO+12m
DCF	1.47	1.35	1.43	1.55	2.10
Peer Comp	1.29	1.21	1.28	1.25	2.04
DDM	1.46	1.39	1.50	1.52	3.17
EUA method	1.30	1.26	1.20	1.08	1.43
Comp Trans	1.06	1.09	1.24	1.50	1.77
Mul Earnings	1.04	1.00	1.01	0.96	1.13

Table 3.b. Ratio of over /under valuation according to the activity sector

This table captures the over/under valuation of the different methods according to the activity sector. This ratio EV/MV prensents the estimated value divided by the market value of the firm at different dates: at the IPO, 1 month after the IPO and 3 months after the IPO.

	DCF			Peer Comp			DDM			EUA method			Comp Trans			Mul Earnings		
Sctors	IPO	+1m	+3m	IPO	+1m	+3m	IPO	+1m	+3m	IPO	+1m	+3m	IPO	+1m	+3m	IPO	+1m	+3m
Computing	1.54	1.45	1.50	1.46	1.30	1.43	1.19	1.19	1.29	1.19	1.12	1.07	0.77	0.89	0.84	1.36	1.12	1.19
Telecom	1.62	1.50	1.38	1.32	1.46	1.19	1.96	1.99	1.45	1.53	1.84	1.57	1.32	1.34	0.98	-	-	-
Transport	1.43	1.27	1.67	1.25	1.28	1.78	0.95	0.95	1.36	1.49	1.45	1.29	3.46	3.72	7.75	0.86	1.00	0.77
Health	1.22	1.07	1.30	0.85	0.87	0.88	-	-	-	0.76	0.79	0.80	-	-	-	0.52	0.49	0.49
Finance	1.12	1.16	1.16	1.08	1.08	1.17	1.59	1.80	2.40	1.26	1.43	1.30	0.88	1.04	0.93	1.17	1.09	1.25
Industry	1.78	1.47	1.50	1.52	1.38	1.41	2.23	1.83	1.76	1.96	1.85	1.70	0.75	0.71	0.59	0.93	0.83	0.83
Training	1.55	1.48	1.51	-	-	-	1.52	1.12	1.18	-	-	-	-	-	-	-	-	-
Retail/Trade	1.43	1.33	1.36	1.21	1.12	1.17	1.03	1.13	1.17	1.18	1.15	1.22	1.05	0.94	0.95	1.41	1.32	1.40
consulting	1.44	1.19	1.48	0.98	0.90	1.04	1.49	1.41	1.41	0.82	0.79	0.77	0.94	0.87	0.87	0.87	1.08	0.90
Media	1.72	1.36	1.46	1.12	0.87	1.09	0.26	0.24	0.27	1.18	0.91	1.15	1.02	0.97	0.96	-	-	-

Table 3.c. Statistics of over /under valuation ratio

This table summarizes some statistics of the over/under valuation ratio for the different methods used in this sample. The statistics are: the number of observations, the mean, standard deviation, the median, the maximum value and the minimum value. This statistics are calculated at different dates: at the IPO, 1 month after the IPO, 3 months after the IPO.

- At the IPO

Methods	Nbr	Mean	σ	Median	Max	Min
DCF	145	1.47	0.83	1.31	6.11	0.18
Peer Comp	101	1.29	1.03	1.04	7.02	0.17
DDM	34	1.46	0.97	1.32	5.74	0.26
Comp Trans	20	1.06	0.65	1.00	3.46	0.29
Mul Earnings	15	1.04	0.63	0.87	2.89	0.31
EUA method	42	1.30	1.20	1.06	6.57	0.17

- 1 month after the IPO

Methods	Nbr	Mean	σ	Median	Max	Min
DCF	144	1.35	0.83	1.20	6.11	0.16
Peer Comp	92	1.21	0.94	0.97	7.02	0.16
DDM	34	1.39	0.79	1.30	4.38	0.24
Comp Trans	20	1.09	0.74	0.93	3.72	0.27
Mul Earnings	15	1.00	0.63	0.96	2.75	0.16
EUA method	42	1.26	1.18	0.93	6.57	0.16

- 3 months after the IPO

Methods	Nbr	Mean	σ	Median	Max	Min
DCF	143	1.43	1.01	1.21	8.56	0.15
Peer Comp	92	1.28	1.24	0.97	9.82	0.12
DDM	34	1.50	1.02	1.30	4.79	0.27
Comp Trans	20	1.24	1.61	0.93	7.75	0.25
Mul Earnings	15	1.01	0.75	0.86	3.21	0.19
EUA method	42	1.20	1.42	0.94	9.19	0.14

Table 4.a. Regression of the Market value by the Estimated value and the characteristics of the firms (at the IPO)

This table presents OLS regressions of the market value at the IPO of the valuated start-ups and SMEs. The sample comprises 203 valuation reports where the firm's values could be estimated by 6 different valuation methods. The regression explains the relationship between the market value and the estimated value, the company's activity sector and its characteristics (size and age). (*, **, *** Significant at the 10%, 5% and 1% levels, respectively).

	DCF	Peer Comp	DDM	EUA method	Comp Transact	Mul Earnings
Method	0.675***	0.586***	0.788***	0.741***	0.936***	0.646
	(0.0377)	(0.0449)	(0.149)	(0.146)	(0.0742)	(0.414)
Seize	-0.278	0.341	0.0906	0.493	-0.0134	0.816
	(0.872)	(0.995)	(2.231)	(1.564)	(1.412)	(2.696)
Age	0.00614	-0.0518	-0.0476	-0.101	0.148	0.0953
	(0.0473)	(0.043)7	(0.144)	(0.0855)	(0.123)	(0.251)
Sect Comput	1.013	3.361	12.20*	-1.029	26.59***	-5.535
	(2.948)	(2.88)	(6.817)	(5.069)	(3.835)	(14.46)
Sect comm	0.248	-0.415	5.733	-7.126	28.18***	-8.002
	(3.862)	(3.332)	(7.137)	(6.578)	(3.833)	(19.18)
Sect transp	-	-	25.90***	-0.826	-	-
			(8.611)	(5.547)		
Sect health	1.569	2.382	9.593	0.304	36.34***	-6.401
	(3.384)	(3.121)	(8.694)	(5.304)	(3.967)	(15.27)
Sect finance	5.056	3.173	-	1.42	28.08***	-
	(3.321)	(3.205)		(5.518)	(4.215)	
Sect industry	1.636	3.488	13.45*	3.022	27.99***	-5.456
	(3.08)	(2.845)	(6.895)	(4.996)	(4.51)	(15.58)
Sect traning	1.083	5.664	11.05	-	29.49***	-
	(5.521)	(5.417)	(7.689)		(4.004)	
Sect distrib	0.136	0.446	11.49	-0.281	27.90***	-10.7
	(3.077)	(2.908)	(6.934)	(4.89)	(3.773)	(16.4)
Sect consulting	2.328	4.017	16.79**	6.993	25.39***	-6.752
	(3.332)	(3.084)	(7.696)	(5.169)	(3.149)	(16.97)
Sect media	0.419	2.634	-	-	-	-
	(3.852)	(3.531)				
Constant	1.573	-0.763	-12.22	-0.483	-27.67**	2.915
	(6.148)	(7.211)	(17.59)	(12.38)	(10.13)	(26.19)
Observations	144	92	34	42	20	15
R-squared	0.728	0.716	0.615	0.599	0.972	0.918
Ajusted R^2	0.704	0.673	0.423	0.453	0.933	0.771
F-Statistic	29.28	16.62	3.2	4.081	24.91	6.242
Log Likelihood	-469.7	-265.8	-99.58	-115.1	-35.69	-34.21

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.b. Regression of the Market value by the Estimated value and the characteristics of the firms (1 month after the IPO)

This table presents OLS regressions of the market value published one month after the IPO of the valuated start-ups and SMEs. The sample comprises 203 valuation reports where the firm's values could be estimated by 6 different valuation methods. The regression explains the relationship between the market value and the estimated value, the company's activity sector and its characteristics (size and age). (*, **, *** Significant at the 10%, 5% and 1% levels, respectively).

	DCF	Peer Comp	DDM	EUA method	Comp Transact	Mul Earnings
Method	0.655***	0.613***	0.843***	0.822***	0.997***	0.64
	(0.0408)	(0.0493)	(0.147)	(0.179)	(0.096)	(0.533)
Seize	-0.645	0.475	0.189	1.301	-0.116	2.233
	(0.943)	(1.093)	(2.198)	(1.923)	(1.825)	(3.471)
Age	-0.0437	-0.0615	-0.0446	-0.106	-0.0196	0.215
	(0.0511)	(0.048)	(0.142)	(0.105)	(0.16)	(0.323)
Sect Comput	2.243	4.247	13.40*	-0.964	29.36***	-7.244
	(3.189)	(3.163)	(6.718)	(6.233)	(4.959)	(18.62)
Sect comm	1.412	0.62	3.722	-7.723	30.35***	-7.434
	(4.177)	(3.659)	(7.033)	(8.087)	(4.955)	(24.69)
Sect transp	-	-	26.28***	-1.3	-	-
			(8.486)	(6.821)		
Sect health	3.509	4.257	11.7	1.839	41.23***	-8.786
	(3.66)	(3.427)	(8.568)	(6.521)	(5.13)	(19.66)
Sect finance	6.001*	3.653	-	1.902	29.63***	-
	(3.592)	(3.519)		(6.785)	(5.45)	
Sect industry	3.984	4.189	14.22**	3.197	29.54***	-9.366
	(3.331)	(3.125)	(6.794)	(6.143)	(5.832)	(20.06)
Sect traning	2.596	6.44	11.48	-	32.35***	-
	(5.972)	(5.948)	(7.577)		(5.177)	
Sect distrib	2.493	0.493	11.90*	-1.88	27.36***	-16.03
	(3.328)	(3.193)	(6.833)	(6.012)	(4.878)	(21.11)
Sect consulting	2.557	3.558	17.86**	7.739	27.68***	-12.52
	(3.603)	(3.387)	(7.584)	(6.355)	(4.071)	(21.85)
Sect media	2.221	4.423	-	-	-	-
	(4.166)	(3.877)				
Constant	4.76	-1.824	-13.94	-5.949	-28.08*	-3.989
	(6.65)	(7.918)	(17.34)	(15.23)	(13.09)	(33.71)
Observations	144	92	34	42	20	15
R-squared	0.688	0.701	0.647	0.535	0.963	0.891
Ajusted R^2	0.66	0.656	0.471	0.364	0.911	0.694
F-Statistic	24.1	15.47	3.672	3.132	18.71	4.534
Log Likelihood	-481	-274.4	-99.08	-123.8	-40.83	-38

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4.c. Regression of the Market value by the Estimated value and the characteristics of the firms (3 months after the IPO)

This table presents OLS regressions of the market value published three months after the IPO of the valuated start-ups and SMEs. The sample comprises 203 valuation reports where the firm's values could be estimated by 6 different valuation methods. The regression explains the relationship between the market value and the estimated value, the company's activity sector and its characteristics (size and age). (*, **, *** Significant at the 10%, 5% and 1% levels, respectively).

	DCF	Peer Comp	DDM	EUA method	Comp Transact	Mul Earnings
Method	0.695***	0.593***	0.695***	0.830***	1.057***	0.712
	(0.0509)	(0.0491)	(0.173)	(0.198)	(0.0804)	(0.442)
Seize	-1.643	-0.655	-0.0892	-0.111	-0.465	1.416
	(1.177)	(1.089)	(2.594)	(2.126)	(1.529)	(2.876)
Age	-0.0513	-0.0484	-0.0463	-0.15	0.142	0.139
	(0.0638)	(0.0478)	(0.168)	(0.116)	(0.134)	(0.267)
Sect Comput	-2.121	6.483**	9.072	-2.255	39.06***	-5.538
	(6.622)	(3.151)	(7.927)	(6.891)	(4.154)	(15.42)
Sect comm	-3.184	2.44	1.423	-8.092	39.81***	-5.184
	(7.449)	(3.646)	(8.299)	(8.941)	(4.151)	(20.46)
Sect transp	-4.526	-	24.00**	-3.131	-	-
	(7.454)		(10.01)	(7.54)		
Sect health	-0.644	6.239*	10.46	0.125	49.09***	-6.482
	(7.04)	(3.414)	(10.11)	(7.21)	(4.297)	(16.29)
Sect finance	2.067	6.998**	-	2.135	39.23***	-
	(6.968)	(3.506)		(7.501)	(4.564)	
Sect industry	0.874	6.609**	12.54	1.395	38.92***	-5.129
	(6.586)	(3.113)	(8.017)	(6.791)	(4.884)	(16.62)
Sect traning	-	9.468	9.685	-	40.43***	-
		(5.926)	(8.941)		(4.336)	
Sect distrib	-0.514	3.426	7.687	-2.028	37.66***	-12.14
	(6.662)	(3.181)	(8.063)	(6.646)	(4.086)	(17.49)
Sect consulting	-1.929	5.603	11.96	6.609	35.08***	-7.781
	(6.981)	(3.374)	(8.95)	(7.026)	(3.41)	(18.1)
Sect media	-2.395	5.847	-	-	-	-
	(7.407)	(3.863)				
Constant	14.74	3.441	-6.969	5.262	-35.99**	-1.415
	(10.94)	(7.889)	(20.46)	(16.83)	(10.97)	(27.93)
Observations	143	92	34	42	20	15
R-squared	0.619	0.692	0.518	0.515	0.973	0.919
Ajusted R^2	0.584	0.646	0.277	0.336	0.936	0.773
F-Statistic	17.64	14.82	2.15	2.89	26.45	6.292
Log Likelihood	-509.3	-274	-104.7	-128	-37.28	-35.17

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Regression of the Market value by the Estimated value

This table presents OLS ((Ordinary Least Squares) regressions of the market value (at the IPO, at the IPO, 1 month after the IPO, 3 months after the IPO, 6 months after the IPO and 1year after the IPO) of the valuated start-ups and SMEs. The sample comprises 203 analysts' reports where firms are evaluated by 6 different valuation methods. (*, **, *** Significant at the 10%, 5% and 1% levels, respectively).

	IPO	IPO+1m	IPO+3m	IPO+6m	IPO+12m	Av coef	Av rank
DCF	0.682***	0.668***	0.709***	0.623***	0.756***	0.6876	
Ajusted R^2	0.714	0.671	0.597	0.546	0.575		
Observations	144	144	143	142	140		
Method Rank	2	2	3	2	2		2.2
Peer Comp	0.593***	0.625***	0.603***	0.526***	0.509***	0.5712	
Ajusted R^2	0.668	0.647	0.625	0.512	0.467		
Observations	92	92	92	91	90		
Method Rank	3	3	2	3	3		2.8
DDM	0.561***	0.584***	0.494***	0.500***	0.518***	0.5314	
Ajusted R^2	0.37	0.379	0.258	0.328	0.274		
Sample Seize	34	34	34	34	34		
Method Rank	5	5	6	5	5		5.2
Comp Transact	0.580***	0.617***	0.550***	0.485***	0.562***	0.5588	
Ajusted R^2	0.571	0.504	0.398	0.331	0.412		
Observations	20	20	20	20	20		
Method Rank	4	4	4	4	4		4
EUA **method**	0.649***	0.678***	0.705***	0.651***	0.528**	0.6422	
Ajusted R^2	0.366	0.307	0.265	0.198	0.117		
Observations	42	42	42	42	41		
Method Rank	6	6	5	6	6		5.8
Mul Earnings	0.807***	0.873***	0.859***	0.858***	0.999***	0.8792	
Ajusted R^2	0.892	0.829	0.873	0.835	0.846		
Observations	15	15	15	15	14		
Method Rank	1	1	1	1	1		1

References

Abrahamson, E., Amir, E. (1996). The information content of the president's letter to shareholders. *Journal of Business Finance & Accounting.* 23 (8): 1157-1182.

Arnold, J., Moizer, P. (1984). A Survey of the Methods Used by U.K. Analysts to Appraise Investments in Ordinary Shares. *Accounting & Business Research* 14 (55): 113-124.

Baldwin, C. (1987). Preemption vs flexibility in new product introduction. *Unpublished working paper*. Harvard Business School.

Barker, R. (1999). The role of dividends in valuation models used by analysts and fund managers. *The European Accounting Review* 8 (2): 195-218.

Berkman, H., Bradhury, M.E., Ferguson, J. (2000). The Accuracy of Price-Earnings and Discounted Cash Flow Methods of IPO Equity Valuation. *Journal of International Financial Management and Accounting* 11: 71-83.

Black, F., Scholes, M. (1974). The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns. *Journal of Financial Economics* 1: 1-22.

Black, L. E. (1998). Life-cycle impacts on the incremental value-relevance of earnings and cash flow measures. *Journal of Financial Statement Analysis* 4: 40–56.

Block, S., (1999). A Study of Financial Analysts: Practice and Theory. *Financial Analysts Journal* (July/August): 86-95.

Bradshaw, M. (2002). The Use of Target Prices to Justify Sell-Side Analysts' Stock Recommendations. *Accounting Horizons* 16 (I): 27-4.

Brennan M. (1970), Taxes, Market Valuation and Corporate Financial Policy, *National Tax Journal,* December: 417-427.

Brennan, M., Schwartz, E. (1978). Corporate Income Taxes, Valuation, and the Problem of Capital Structure. *Journal of Business*, 51, p. 103-114.

Campbell, D. J. (2000). Legitimacy theory or managerial reality construction? Corporate social disclosure in Marks and Spencer Plc corporate reports, 1969-1997. *Accounting Forum* 24(1): 80-100.

Chapelle (de la) P. (2002), *L'Evaluation des Entreprises*, Economica.

Chi, T. (2000), Option to acquire or divest a joint venture. *Strategic Management Journal* 21 (6): 665-688.

Copeland T., Koller T., Murrin J. (1996). Valuation, Measuring and Managing the Value of Compagnies Second Edition, New York, *John Wiley & Sons, Inc.*

Copeland, T., Koller, T., Murin, J. (2000). Valuation: Measuring and Managing the Value of Companies, Third edition, New York, *John Wiley & Sons, Inc.*

Corradeti, V., Michineau, O. (2002), Les modalités de fixation du prix d'offre des OPR-RO (2000-2002), mémoire de DESS, Université de Rennes 1.

Damodaran, A. (2000). The Dark Side of Valuation: Firms with no Earnings, no History and no Comparables. Can Amazon.com be Valued?, *Mimeo, New York University, Stern School*.

Damodaran, A. (2001). The Dark Side of Valuation: Valuing Old Tech, New Tech, and New Economy Companies, Prentice Hall.

DeAngelo H., Masulis R. (1980), Optimal Capital Structure Under Corporate and Personal Taxation, *Journal of Financial Economics* 13: 137-151.

Demirakos, E., Strong, N., Walker, M. (2004). What valuation models do analysts use? *Accounting Horizons* 18: 221-240.

Deegan, C., Gordon, B. (1996). A study of the environmental disclosure practices of Australian corporations. *Accounting and business research.* 26(3): 187-199.

Diamond, D. (1989). Reputation Acquisition in Debt Markets. *Journal of Political Economy* 97: 828-862.

Durand, D. (1957). Growth Stocks and the Petersburg Paradox, *Journal of Finance* 12: 348-363.

Fabre-Azema, F. (2002). Etude des méthodes d'évaluation employées par les analystes financiers lors des introductions sur le Second Marché de bourse de Paris, *Cahiers du CEREG*

Fisher, I., (1930), The Theory of Interest, *McMillan Co.*, New York

Francis, J., P. Olsson, Oswald, D. (2000). Comparing the Accuracy and Explainability of Dividend, Free Cash Flow and Abnormal Earnings Equity Value Estimates. *Journal of Accounting Research* (Spring): 45-70.

Froidevaux, P. S. (2004). Fundamental Equity Valuation Stock Selection based on Discounted Cash Flow. Dissertation thesis, University of Fribourg, Switzerland.

Gilson, S.C., Hotchkiss, E.S., Ruback, R.S. (2000). Valuation of Bankrupt Firms. *Review of Financial Studies* 13 (1): 43–74.

Gordon M., Myron J. (1962), The Investment, Financing, and Valuation of the Corporation. Homewood, IL: R. D. Irwin.

Gordon, M., Shapiro, E. (1956). Capital Equipment Analysis: The Required Rate of Profit. *Management Science* 3: 102-110.

Graham, J. R., C. R. Harvey. (2001), The theory and practice of corporate finance: Evidence from the field, *Journal of Financial Economics* 60: 187-243.

Gray, R., Kouhy, R., Lavers, S. (1995). Corporate social and environmental reporting: A review of the literature and a longitudinal study of UK disclosure. *Accounting, Auditing & Accountability Journal* 8(2): 47-77.

Hackel, K. S., Livnat, J. (1992). Cash Flow and Security Analysis, Homewood, Business One Irwin.

Harris, M., Raviv, A. (1990). Capital Structure and the Informational Role of Debt. *The Journal of Finance* 45: 321-349.

Hege U. (2001) L'évaluation et le financement des start-up Internet, *Revue économique* 7(52) : 291-312.

Hirshleifer, D., Thakor, A. (1992). Managerial Conservatism, Project Choice, and Debt. *Review of Financial Studies* 5: 437-470.

Jensen, M., Meckling, W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure. *Journal of Financial Economics* 3: 305-360.

Jones, M. J., Shoemaker, P. A. (1994). Accounting narratives: A review of empirical studies of content and readability. *Journal of Accounting Literature* 13(1): 142-184.

Kim, M., Ritter, J. (1999). Valuing IPOs. *Journal of Financial Economics* 53: 409-437.

Kaplan, S., Ruback, R. (1995). The Valuation of Cash Flow Forecasts: An Empirical Analysis. *The Journal of Finance*, 50 (4): 1059-1093.

Kogut, B. (1991), Joint ventures and the option to expand and acquire. *Management Science*, 37 (1): 19-33.

Kulatilaka, N., Perotti, E. (1998). Strategic growth options. *Management Science*, 44 (8): 1021-1031.

Lane, V., Jacobsen, R. (1995). Stock Market Reactions to Brand Extension Announcements: The Effects of Brand Attitude and Familiarity. *Journal of Marketing* 59 (January): 63-77.

Leland H., Pyle D. (1977). Information Asymmetric, Financial Structure, and Financial Intermediation. *Journal of Finance* 32: 371-388.

Levy, A. (2001). Why does capital structure choice vary with macroeconomic conditions? *Unpublished working paper*. Haas School of Business, U.C. Berkeley.

Lie, E, Lie, H. (2002). Multiple used to estimate corporate value. *Financial Analysts Journal* 58: 44-54.

Litzenberger R., Ramaswany K. (1979). The Effect of Personal Taxes and Dividends on Common Stock Prices: Taxes Effects or Information Effects ? *Journal of Financial Economics* 7: 163-196.

Litzenberger, R., Ramaswamy, K. (1982). The Effects of Dividends on Common Stock Priees: Tax Effects or Information Effects? *Journal of Finance* 37(2): 429-443.

Liu, J., Nissim, D., Thomas, J. (2002). Equity valuation using multiples. *Journal of Accounting Research* 40: 135 – 172.

Liu J., Thomas J. (2000). Stock Returns and Accounting Earnings. *Journal of Accounting Research* 38 (Spring): 71-101.

Ljungqvist, A.P., Wilhelm, W.J. (2003). IPO pricing in the dot-com bubble. *Journal of Finance* 58: 723-752.

McGrath, R. (1997). A real options logic for initiating technology positioning investments. *Academy of Management Review*, 22 (4): 974-996.

Miller, M. (1977). Debt and Taxes. *Journal of Finance* 32: 261-275.

Miller, M., Modigliani, F. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *American Economic Review* 48: 261-297.

Miller, M., Modigliani, F. (1961). Dividend Policy, Growth, and the Valuation of Shares, *Journal of Business* 34: 411-433.

Miller, M., Modigliani, F. (1963). Corporate Income Taxes and the Cost of Capital. *American Economic Review* 53: 433-443.

Miller, M., Scholes, M. (1982). Dividends and Taxes: Some Empirical Evidence. *Journal of Political Economy* 90: 1118-1141.

Myers, S.C. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics* (5): 147-175.

Myers, S., Majluf, N. (1984). Corporate Financing and Investment Decisions When Firms Have Informations that Investors do not Have. *Journal of Financial Economics*. (13): 187-221.

Nichols, N. (1994). Scientific management at Merck. *Harvard Business Review*, 72 (1): 88- 99.

Palepu K., Healy, P., Bernard, V. (2000), Business Analysis and Valuation. Cincinnati, Ohio: South Western.

Paré, J.L., Marrot , O. (2004), Quelle méthode d'évaluation pour sortir de la Bourse , Echanges, Juin 2004, (211) : 45-46

Penman, S. (2001). On comparing cash flow and accrual accounting models for use in equity valuation: A response to Lundholm and O'Keefe (CAR, Summer 2001), *Contemporary Accounting Research* 18: 681- 692.

Penman, S., Sougiannis, T. (1998). A Comparison of Dividend, Cash-Flow and Earnings Approaches to Equity Valuation. *Contemporary Accounting Research* 3: 343-384.

Previts, G., Bricker, R., Robinson, T., Young, S. (1994). A Content Analysis of Sell-Side Financial Analyst Company Reports. *Accounting Horizons*, (8): 55–70.

Pike, R., Meerjanssen, J., Chadwick, L. (1993). The appraisal of ordinary shares by investment analysts in the UK and Germany. *Accounting and Business Research,* (23): 489-499.

Pratt, M. G. (1998). To be or not to be ? Central questions in organizational identification. In D.A. Whetten, & P. C.Godfrey (Eds.), Identity in organizations: Developing theory through conversations : 171–207.

Rappaport, A. (1983). Corporate Performance Standards and Shareholder Value. *Journal of Business Strategy* 4 (Spring): 28-38.

Rappaport, A. (1998), Creating Shareholder Value, New York, *The Free Press*.

Reilly, F. K., Brown, K. C. (2003). Investment analysis and portfolio management, *Thomson, South-Western*, Seventh Edition, 2003

Rogers, R. K., Grant, J. (1997). Content analysis of information cited in reports of sell-side financial analysts (digest summary)." *Journal of Financial Statement Analysis* 3(1): 17-30.

Simon, C. J., Sullivan, M. (1993). The Measurement and Determinants of Brand Equity: A Financial Approach. *Marketing Science*, 12 (Winter): 28-52.

Smit, H., Trigeorgis, L. (1998). Growth options, competition and strategy: an answer to the market valuation puzzle? In: L. Trigeorgis (Ed.), Real options strategies: Concepts, models, and industry applications. Risk Books.

Smit, H., Trigeorgis, L. (2004). Strategic investment: options and games. *Princeton: Princeton University Press.*

Smith, K., Mitchell, T., Summer, C. (1985). Top level management priorities in different stages of the organizational life cycle. *Academy of Management ,Journal* (*28)*: 799-820.

Smith, M., Taffler, R. J. (2000). The chairman's statement-A content analysis of discretionary narrative disclosures. *Accounting, Auditing & Accountability Journal* 13(5): 624-647.

Stowe J., Robinson T., Pinto J., McLeavey D. (2002). Analysis of equity investments: valuation, *United Book Press*, INC. Baltimore, August 2002

Tollington, A. (1995). Brand Accounting and the Marketing Interface. *Management Accounting*, 73 (July/August): 58-59.

Trigeorgis, L. (1991). A Log-Transformed Binomial Numerical Analysis Method for Valuing Complex Multi-Option Investments. *Journal of Financial and Quantitative Analysis* (26): 309-326.

Tse S. Y., Yaansah R. A. (1999). An Analys is of Historical and Future Oriented Information in Accounting-Based Security Valuation Models. *Contemporary Accounting Research*, 16 (2): 347–380.

Stulz R. (1988). Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control. *Journal of Financial Economics* 20: 25-54.

Schwartz, E.S., Moon M. (2000). Rational Pricing of Internet Companies, *Financial Analysts Journal*, 62-75.

Weber, R. P. (1988). Basic content analysis. Sage University Paper Series on Quantitative Applications in the Social Sciences. Series No. 07-049. *Sage: Beverly Hills, CA and London*.

Williams J. (1938), *The Theory of Investment Value*, Harvard University Press.

Williams J. (1993). Equilibrium and options on real assets. *Review of Financial Studies* (6): 825-850.