Market timing and capital structure:

Evidence from a decomposition of the market-to-book ratio

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This study examines the impact of market timing on capital structure. Using a decomposition of the market-to-book ratio into misvaluation and growth opportunities, developed in Rhodes-Kropf, Robinson and Viswanathan (2005), I find that the negative relationship between the historical market-to-book ratio and leverage, documented in Baker and Wurgler (2002) cannot be only attributed to growth opportunities. It also reflects the persistent impact of past timing attempts.

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1. Introduction

Three major theories offer conflicting predictions about the determinants of firms' capital structures. The tradeoff theory states that firms adjust their capital structure over time, toward an optimal leverage resulting from balancing the costs and the benefits of debt financing (e.g. Jensen and Meckling (1976), Myers (1977), Stulz (1990)). The pecking order theory (Myers and Majluf (1984), Myers (1984)) is based on the existence of information asymmetry between managers and outside investors that cause external finance to be costly. This theory states that the relative costs of internal and external finance are the major determinants of firms' capital structures. As the costs of internal financing are lower than the costs of external financing, firms will prefer internal funds. When external financing is needed, firms will prefer debt then equity as a last resort, to meet their financial deficits.

A recent strand of the corporate finance literature focuses on the market timing theory. This theory posits that using their superior insider information, managers are able to take advantage of "windows of opportunities" to successfully time their equity offerings and that the timing of past securities issuance is a major determinant of current capital structures. In their prominent study, Baker and Wurgler (2002) assert that "capital structure is the cumulative outcome of past attempts to time the equity market". They construct the "external finance weighted average market-to-book" (henceforth M/B_{efwa}) to capture the market timing attempts: this variable takes high values when a firm raises external finance (equity or debt) at times where its market valuation is high and lower values otherwise. As they find the M/B_{efwa} to be negatively correlated with the leverage ratio, the authors argue that the effect of market timing is very persistent and that firms do not readjust their capital structure towards a target. Their results are difficult to reconcile with the traditional theories of capital structure.

The market timing theory, and particularly the empirical findings of Baker and Wurgler (2002) which are the focus of this paper, generated a heated debate. Evidence on market timing is supported by the Graham and Harvey's (2001) survey where stock mispricing appear to be "an important or very important consideration" in the decision of issuing equity for about two-thirds of CFOs. This observation is in line with a significant number of empirical studies that document that firms time their equity offerings and tend to issue equity following a stock price appreciation. Among others, Loughran and Ritter (1995), Pagano, Panetta, and Zingales (1998) show that firms tend to undertake IPOs when their industry market valuations are high. Marsh (1982), Lucas and McDonald (1990), Jung, Kim, and Stultz (1996) and Hovakimian, Opler and Titman (2001) find that seasoned equity offerings are strongly related to stock prices. Following Baker and Wurgler (2002) empirical results, academic interest in the impact of the timing of securities issuance on current capital structure has gained momentum.

Despite widespread agreement on the temporary effect of market timing on capital structure, the long-lasting impact of this phenomenon remains very controversial and a number of recent studies challenge Baker and Wurgler (2002) findings. Leary and Roberts (2005) argue that firms actively rebalance their leverage so that the impact of market timing vanishes within three to five years following equity issuances. They conclude that firms follow a dynamic tradeoff. Alti (2006) analyses the impact of initiating an IPO in a hot or a cold market, as a measure of market timing. He shows that the initial impact of hot issues markets on leverage is consequently balanced away whithin a two-years period. Flannery and Rangan (2006) and Kayhan and Titman (2007), also find that the impact of market timing is short-lived. Conversely, Fama and French (2002) and Welch (2004) provide evidence on a slow adjustment speed. More recently, Huang and Ritter (2007), using a time varying equity risk premium to capture the timing attempts, provide evidence on the persistent impact of Market timing on capital structure. They argue that firms adjust very slowly towards their target leverage.

The second controversy surrounding the market timing theory questions the relevance of the use of the historical market-to-book ratio to appropriately proxy for a firm's market timing attempts. Several papers (e.g. Kayhan and Titman (2007), Hovakimian (2006)) attest that the observed negative relationship between MB_{efwa} and leverage arises because the MB_{efwa} contains information about growth opportunities that is not adequately captured in current market-to-book. In particular, the market-to-book ratio is widely used as a proxy for firms' growth options, which should be negatively related to leverage. The pecking order theory predicts that firms with higher market to book ratios, which are likely to have higher growth opportunities, may issue equity to finance their current set of investments when they run out of their internal funds and of their debt capacity. According to the tradeoff theory, firms with higher growth opportunities keep lower leverage levels to keep their financial flexibility to avoid the underinvestment problem (Myers, 1977).

Therefore, to properly investigate the impact of market timing on capital structure, it is crucial to isolate misvaluation from the other components of market valuation such as the growth prospects. In this paper, I test the market timing theory using a more accurate measure of firms' misvaluations than the market-to-book ratio, that is not contaminated by growth opportunities. Following Rhodes-Kropf, Robinson and Viswanathan (2005, henceforth

RKRV), I breakdown the market-to-book ratio into three components: firm-specific error, time-series sector error and long-run value-to-book. RKRV measure firm-specific error as firm-specific deviations from valuations implied by contemporaneous sector multiples. This variable captures a firm's idyosyncratic misvaluation. Time-series sector error reflect the deviation of current sector multiples from long-term sector multiples. This component is meant to capture the misvaluation of a sector. The last component of the market-to-book which is the long-run value-to-book, measures the discrepancy between long-run sector multiples and book value. This component is intended to account for growth opportunities.

I subsequently compute the external finance weighted-averages of these three components to test whether the negative relationship between M/B_{efwa} and current capital structure documented in Baker and Wurgler (2002) arises because of the persistence of the market timing's impact or is simply driven by growth opportunities, as implied by traditional theories.

Overall, my empirical findings strongly support the market timing theory. Once the effects of growth opportunities isolated, the remaining component of M/B_{efwa} which reflects misvaluation shows a negative and persistent impact on leverage. Moreover, I provide evidence on the ability of the timing measure I use to properly capture misvaluation. This variable is unrelated to investment but positively associated with the firm's level of cash. These results are in opposition with the predictions of the tradeoff theory and the pecking order theory. Furthermore, the results support the idea that firms time their equity issues but also their debt issues. An equity issuance is preceded by a significant runup of the firm's specific-misvaluation component and is followed by a significant decline of this variable. Conversely, firms experience a decline of their overvaluation component before a debt issuance, immediately followed by a significant upward trend. These patterns are observable three years before and three years after a security issuance. While studies using the market-to-book ratio as a timing measure widely documented the former phenomenon, they failed in providing evidence on the timing of debt issues (Hovakimian (2006)). Finally, I find that equity issues are also timed to periods of high sector valuations. However, those market timers are also more likely to have negative newly retained earnings and they subsequently issue relatively more debt so that the initial impact of equity issues on leverage is offset. This result is puzzling and consistent with the conclusions of Alti (2006) regarding hot-markets firms.

The remainder of this paper proceeds as follows: Section 2 provides the methodology, Section 3 presents data, Section 4 presents the empirical results and Section 5 concludes.

2. Methodology

2.1. Previous mispricing measures

Baker and Wurgler's (2002) market timing theory states that a firm's capital structure is the cumulative outcome of past attempts to time the equity market. Their results show that the MB_{efwa} is negatively related to current leverage and consequently, that low leveraged firms are those who raised equity when their valuations were high, as measured by the market-to-book ratio, and vice versa for high leveraged firms. Subsequent empirical tests of the market timing theory (e.g. Hovakimian (2006) and Kayhan and Titman (2007)) demonstrated that the use of the market-to-book ratio to infer mispricing can be misleading. As a matter of fact, traditional theories commonly view the market-to-book ratio as a measure of a firm's set of investment opportunities, which when high, leads the firm to increase its equity issuances.

Several papers have used other methods to test for the impact of misvaluation on capital structure. A recent paper of Alti (2006), investigates the impact of timing attempts on changes in leverage by identifying as maket timers those firms that went public on hot markets. They document a short-living market timing impact. In particular, they find that hot market firms increase their leverage in the two years following their IPOs by issuing significantly more debt and less equity than cold-market firms. However such a test doesn't directly focus upon the misvaluation of the firm. If it captures misvaluation, it would be at best, some part of a firm's equity misvaluation that is shared by the whole market. Furthermore, this test is unable to quantify the extent of mispricing. Huang and Ritter (2007) point out that because of the IPO market cycles, it is important to control for the difference in market conditions and firm characteristics between hot and cold IPO firms. Other approaches use variables such as insider trading or analyst coverage to infer market timing. Yet, these measures are also noisy market timing proxies.

This paper uses a more direct measure of a firm's mispricing, based on the methodology developped by RKRV[2], that identifies stock misvaluation by filtering growth opportunities.

2.2. Market-to-book ratio decomposition

RKRV decompose the market-to-book ratio into market-to-value and value-to-book. While they use the market-to-book ratio for equity, this paper requires the decomposition of the market-to-book ratio of assets for purposes of accordance with Baker and Wurgler (2002) specification.

$$M/B \equiv M/V \times V/B \tag{1}$$

[2] RKRV (2005) implement a decomposition of the market-to-book ratio to study how valuation waves affect merger waves.

where, M is the firm's market value of assets, V is the true value of assets and B is the book value of assets. Market value is defined as the sum of equities' market value and book debt. Expressing Eq. (1) in logarithms gives :

$$m - b \equiv (m - v) + (v - b) \tag{2}$$

where m, v and b denote the logarithms of M, V and B, respectively.

The first component of Eq.(2) is intended to capture a firm's potential misvaluation. If markets perfectly anticipate the true value of the firm (by knowing its future growth opportunities, discount rates and cash flows), then there is no room for misvaluation and the first component will be equal to zero. Otherwise, if the markets overvalue (undervalue) the firm's true value, then (m – v) would be positive (negative). The second term of Eq.(2) captures the divergence between a firm's true value and the current book value of its assets. Thus, this term captures a firm's growth prospects. Furthermore, for a given firm, the misvaluation part of the market-to-book ratio incorporates a firm-specific component and a second misvaluation component, that is common to all firms of the same sector or market.

RKRV express the true value *v* as a linear function of firm-specific accounting information at time *t*, θ_{it}, and a vector of conditional accounting multiples, α. The three components of the market-to-book are thus estimated for a firm *i*, in a sector *j*, at time *t*, using this equation:

$$m_{it} - b_{it} = \underbrace{m_{it} - v(\theta_{it}; \alpha_{jt})}_{firm\text{–}specific\,error} + \underbrace{v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)}_{time\text{–}series\ \text{sector}\ error} + \underbrace{v(\theta_{it}; \alpha_j) - b_{it}}_{long\text{–}run\ value\,to\,book} \tag{3}$$

where, time *t* accounting multiples are represented by α_{jt}, while long-run multiples are represented by α_j.

The first term ($m_{it} - v(\theta_{it};\alpha_{jt})$)measures the difference between the firm's market value and its fundamental value as implied by its accounting multiples θ_{it} and its sector j multiples α_{jt} measured at the valuation year *t*. This term represents the *firm-specific error*. The second term ($v(\theta_{it};\alpha_{jt}) - v(\theta_{it};\alpha_j)$) measures the difference between the firm's fundamental value conditional on contemporaneous accounting multiples and its value implied by its accounting information and long-run multiples. This term, called *time-series sector error,* reflects the whole sector misvaluation at time *t*. The third component ($v(\theta_{it};\alpha_j) - b_{it}$) measures the difference between the firm's valuation based on long-run multiples and its book value. This last component captures the firm's set of investment prospects at time *t.*

RKRV's methodology[3] for estimating *v,* is based on a popular valuation technique widely used in the accounting literature : the residual income model (Ohlson 1995). This model defines the firm's true value as the present value of the future abnormal earnings of the firm plus its book value.

$$M_t \equiv B_t + E_t \sum_{\tau=t+1}^{\infty} \frac{(ROA_\tau - r_\tau)B_{\tau-1}}{(1+r_\tau)^\tau} \qquad (4)$$

Where *ROA* is the return on assets and *r* the cost of capital.

The residual income model can be implemented using analyst earnings forecasts but this method can be problematic as analyst forecasts are likely to be biased toward more growth opportunities, as pointed out by RKRV and Ritter and Warr (2002).

[3] For details on the method, cf. RKRV (2005). As I discussed earlier, the difference between the original methodology that RKRV (2005) develop and the one in this paper is due to the use of the market and book values of assets instead of the market and book values equity.

Following RKRV, I estimate the market value of assets using the equation below:

$$M_t = \alpha_0 + \alpha_1 B_t + \alpha_2 NI_t \quad (5)$$

Estimating Eq. (5) requires some assumptions. The expected future *ROA* is a constant multiple of expected future discount rates, book assets and net income are growing at constant rates. The net income allows for capturing the value of intangibles that not contained in the book value of assets.

Expressing Eq. (5) in logarithms yields to:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt}\, b_{it} + \alpha_{2jt}\, Ln(NI)_{it}^{+} + \alpha_{3jt} I_{(<0)} Ln(NI)_{it}^{+} + \varepsilon_{it} \quad (6)$$

Where ln(NI)+ is the absolute value of net income and I<0 is an indicator function for observations with negative net income. This allows for taking into account the observations with negative net income, while estimating the equation above using logarithms.

To estimate Eq. (6) above, I run annual, cross-sectional regressions on firms grouped according to the 11 Fama and French industries (financial firms, that are firms of the 11th Fama and French indutry are not included).

The estimated value of $v(\theta_{it};\alpha_{jt})$ for a firm *i,* in a sector *j,* at time *t* is given by the fitted values from Eq. (6) above:

$$v(b_{it}, NI_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt}\, b_{it} + \hat{\alpha}_{2jt}\, Ln(NI)_{it}^{+} + \hat{\alpha}_{3jt} I_{(<0)} Ln(NI)_{it}^{+} \quad (7)$$

To compute the long-run sector multiples, I average over time, for each industry, the estimated values of the contemporaneous multiples : $\frac{1}{T}\sum \alpha_{kjt} = \overline{\alpha}_{kj}$, *k* = 0, 1, 2, 3.

$$v(b_{it}, NI_{it}; \overline{\alpha}_{0j}, \overline{\alpha}_{1j}, \overline{\alpha}_{2j}, \overline{\alpha}_{3j}) = \overline{\alpha}_{0j} + \overline{\alpha}_{1j}\, b_{it} + \overline{\alpha}_{2j}\, Ln(NI)_{it}^{+} + \overline{\alpha}_{3j} I_{(<0)} Ln(NI)_{it}^{+} \quad (8)$$

3. Data

3.1. Sample and variables construction

The initial sample comprises all firms on COMPUSTAT during the period 1986-2005. I restrict the sample to exclude financial firms with a Fama and French industry code 11, and observations for which variables that allow for the calculation of the three components of the market-to-book ratio[4] are lacking. The number of remaining observations in this sample is 103,600. This large sample allows for a more precise calculation of the previously mentioned α multiples. Table 1 displays the yearly number of firms and the number of firms for each industry, used to compute the market-to-book components.

I further form two samples: an IPO-time sample and a calendar time sample. The calendar time sample is initially formed by the firms of the sample described above. The IPO-time sample is the sub-set of the calendar-time sample that consists of all firms for which I could determine an IPO date from the SDC database. The sample is then restricted to firms that initiated their IPO between 1986 and 2004. Firms are dropped from the SDC sample if they have more than one IPO date reported. The IPO year, is the fiscal year during which the IPO takes place. Following Baker and Wurgler (2002), firms with a minimum book value of assets below $10 million, and firms without complete data on total assets between the IPO year (or the first year the firm entered COMPUSTAT for the calendar-time sample) and the year the firm exits COMPUSTAT are excluded from the samples. Firm-year observation outliers are dropped according to some criteria described below. Book equity (E) is defined as total asset (data item 6) minus total liabilities (data item 181) and preferred stock (data item 10) plus

[4] Observations with missing or negative data on book assets (data item 6), price (data item 199), and common shares outstanding (data item 25) or missing data on net income (data item 172).

deferred taxes (data item 35) and convertible debt (data item 79). If preferred stock is missing it is replaced with the redemption value of preferred stock (data item 56). Book debt (D) is defined as total assets minus book equity. Book leverage (D/A) is defined as book debt divided by total assets. Market equity is defined as the share price (data item 199) times common shares outstanding (data item 25). The market-to-book ratio (M/B) is defined as the market value of assets divided by total assets. The Market value of assets is the sum of total assets minus book equity plus market equity. Net equity issuance (e/A) is the change in book equity minus the change in balance sheet retained earnings (data item 36) divided by assets. Newly retained earnings (ΔRE/A) are defined as the change in retained earnings divided by assets. Net debt issuance (d/A) are defined as the residual change in assets divided by assets. Profitability (EBITDA/A) is defined as earnings before interest, taxes and depreciation (data item 13) divided by assets. Firm size (SIZE) is the logarithm of net sales (data item 12). Tangibility (PPE/A) is defined as net plant, property and equipment (data item 8) divided by assets. Capital expenditures (CAPEX/A) (data item 128) are scaled by total assets. Research and development expenses (RD/A) (data item 46) are divided by assets. CASH/A is the ratio of cash and short-term investments (data item 1) divided by assets. Observations are dropped if M/B is above 10. Observations with book leverage that exceeds 1 are also excluded. All the scaled variables, defined above, are by fiscal year end total assets.

3.2. Market timing measures

This section describes the construction of the previously outlined measures of market timing opportunity in more detail.

Baker and Wurgler (2002) introduced the external finance weighted-average market-to-book ratio as a proxy for market timing. They define it as follows:

$$M/B_{efwa,it} = \sum_{s=0}^{t} \frac{e_{is} + d_{is}}{\sum_{r=0}^{t} e_{ir} + d_{ir}} \cdot M/B_{is} \tag{9}$$

Where, 0 is the IPO date or the first year the firm entered COMPUSTAT. e and d denote the amount of net equity and net debt issued, respectively. Following Baker and Wurgler (2002), negative amounts of external finance are reset to zero.

As in Baker and Wurgler (2002), I use the external finance weighted-average. But as I decomposed the market-to-book, the weighting is based on each of the three components instead of the market-to-book itself. For computing purposes, the averaged variable must be positive. One way for getting positive variables is to use their exponential form. This also allows for having ratios similarly to an analysis based on the market-to- book ratio. Therefore the three external finance weighted averages are defined as follows:

- External finance weighted average firm-specific misvaluation:

$$Fmis_{efwa,it} = \sum_{s=0}^{t} \frac{e_{is} + d_{is}}{\sum_{r=0}^{t} e_{ir} + d_{ir}} \cdot Fmis_{is} \tag{10}$$

- External finance weighted average sector misvaluation:

$$Smis_{efwa,it} = \sum_{s=0}^{t} \frac{e_{is} + d_{is}}{\sum_{r=0}^{t} e_{ir} + d_{ir}} \cdot Smis_{is} \tag{11}$$

- External finance weighted average growth opportunities:

$$Growth_{efwa,it} = \sum_{s=0}^{t} \frac{e_{is} + d_{is}}{\sum_{r=0}^{t} e_{ir} + d_{ir}} \cdot Growth_{is} \tag{12}$$

Fmis$_{it}$ is the ratio of the firm's market value of assets divided by its estimated true value conditional on sector contemporaneous multiples. Fmis$_{it}$ is the exponential of the estimated firm-specific error.

$$Fmis_{it} = Exp\left(m_{it} - v\left(\theta_{it};\alpha_{jt}\right)\right) = \frac{M_{it}}{V\left(\theta_{it};\alpha_{jt}\right)} \tag{13}$$

Smis$_{it}$ is the ratio of the firm's estimated contemporaneous fundamental value of assets divided by its estimated long-run fundamental value. Smis$_{it}$ is the exponential of the estimated time-series sector-error.

$$Smis_{it} = Exp\left(v\left(\theta_{it};\alpha_{jt}\right) - v\left(\theta_{it};\alpha_{j}\right)\right) = \frac{V\left(\theta_{it};\alpha_{jt}\right)}{V\left(\theta_{it};\alpha_{j}\right)} \tag{14}$$

Growth$_{it}$ is the ratio of the firm's long-run fundamental value of assets divided by the book value of assets. Growth$_{it}$ is the exponential of the estimated long-run error.

$$Growth_{it} = Exp\left(v\left(\theta_{it};\alpha_{j}\right) - b_{it}\right) = \frac{V\left(\theta_{it};\alpha_{j}\right)}{B_{it}} \tag{15}$$

Observations where Fmis, Smis, Growth, Fmis$_{efwa}$, Smis$_{efwa}$, Growth$_{efwa}$ and M/B$_{efwa}$ are above 10 are excluded from the samples.

The M/B$_{efwa}$ is the weighted average of past market-to-book ratios. The weight for each year is the amount of external finance raised in that year relative to the total external finance raised by the firm since the IPO year. Subsequently, firms that issue securities when their valuations are high will tend to have high values of M/B$_{efwa}$. Baker and Wurgler (2002) report a negative relation between M/B$_{efwa}$ and current leverage. They interpret this relation as consistent with the hypothesis that firms time their securities issues and don't subsequently adjust their leverage to the target, so that the timing impact persists. Subsequent papers (e.g.

Kayhan and Titman (2007) Hovakimian (2006)) argue that the observed negative relation is due to the information about growth opportunities contained in M/B_{efwa}. In order to distinguish between these two competing interpretations, I run Baker and Wurgler's (2002) leverage regressions with the weighted average of the three components of the M/B. If the negative relation between M/B_{efwa} and leverage arises because of cumulative market timing attempts then one will observe that $Fmis_{efwa}$ or $Smis_{efwa}$ are negatively related to leverage. If the negative relation comes through the variable $Growth_{efwa}$ then one will conclude that M/B_{efwa} is a proxy for growth opportunities and the persistence hypothesis will be rejected.

3.3. Descriptive statistics

Table 2 reports the number of IPOs in the final IPO-sample, by year (Panel A.) and by industry (Panel B.) over the period 1986-2005. Not surprisingly, the bulk of the IPO activity occurred in the late nineties and in the technology industries. Nearly 50% of the IPO activity occurred between 1995 and 2000 and nearly 30% of the IPO firms belong to the technology industry (Fama and French industry code 6). After 2000, the number of IPOs falls by 77%.

Table 3 provides the time-series averages of the regression coefficients for the valuation model (Eq. (6)). The levels of R^2 indicate that the cross-sectional variation of the market value, within an industry and for a given year, is highly explained by the accounting variables of the model. The average estimated coefficients display a variation across the different industries. Utilities have the lowest $\overline{\alpha}_{0j}$ and the highest $\overline{\alpha}_{1j}$, consistently with these firms having lower levels of intangibles. Conversely, the opposite characteristic is shared by the medicine and technology industries for instance.

The characteristics of the IPO firms at the pre-offering fiscal year-end and over the subsequent years are reported in Table 4 Panel A. Panel B. reports the characteristics for the calendar-year sample. As documented in previous studies, firms experience a significant drop of their leverage at the IPO year. Panel A. shows that leverage sharply decreases from 64.4 percent at the end of the pre-IPO year to 35.5 at the end of the IPO year. It then slightly increases over the subsequent years. The financing activity at the IPO year is noteworthy. Firms raised huge amounts of equity: on average net equity issued represents 63.5 percent of their assets. The equity raised then, contributed to the repayment of debt, as the net debt issuance corresponds to -10.5 percent of assets. In comparison, Baker and Wurgler (2002) document 32 percent of net equity issuance at the IPO year and 0.6 percent of net debt issuance for their 1970-1999 sample firms. Firms rely more on debt finance in the year following the IPO but debt finance declines in the subsequent years. The table shows that equity issuance is the main source of external finance, which is obviously in contradiction with the pecking order hypothesis. Another feature is the negative sign of newly retained earnings. This may be attributed to firms from the technology industries that accumulate losses because of the creation of intangibles. But it may also be consistent with the view that periods of high levels of demand for IPOs also attract lower quality firms. Panel B shows that newly retained earnings are positive before 1996.

In terms of valuation variables, consistent with previous studies, firms experience a sharp decline of their M/B ratio at the IPO year. But this decline is mainly driven by the firm-specific misvaluation component that drops from 1.55 to 1.25. The sector-misvaluation component also declines in the year following the IPO. However, the growth component rises at the following year and steadily declines thereafter. The calendar year panel shows that the sector-misvaluation component perfectly reflects hot and cold periods. It peaks during the period 1996-2000. Over the next period, the M/B declines as well as its sector-misvaluation component. However, the firm-specific component is the highest over that period where interestingly, besides issuing equity firms pay back their debts and build financial slack. These findings are clearly supportive of the market timing theory.

4. Empirical findings

4.1. Market valuations around security issues

In this section I present firms characteristics regarding their market-to-book ratio and its three components around security issues. The purpose here is to gain insight into the ability of the error components to serve as market timing proxies. To do so, Table 5 compares the valuations prevailing at the IPO year to the valuations over the post-IPO years (Column 1) and to the valuations of a sample of non-IPO firms (Column2). The non-IPO sample comprises all firms of the calendar-year sample except IPO-firms at their IPO year. Table 5 shows that the average M/B is the highest at the IPO year with 2.70, whereas it drops to 1.98 on average over the subsequent years[5]. In comparison, the average ratio for non-IPO firms is 1.66. The error components and the long-run value to book component have a similar behavior to that of the M/B ratio. They peak at the IPO year and are significantly lower afterward. These characteristics suggest that the initiation of an IPO can be motivated by firm-specific overvaluation, by high industry valuations as well as high levels of growth opportunities. Hertzel and Li (2007) document similar characteristics for SEO firms. RKRV acknowlege that firm-specific error can be interpreted either as misvaluation or as firm-specific deviations from contemporaneous industry-average growth and discount rates.

[5] The means reported in this table differ slightly from those reported in Table 4. This is because in this Table, firms are not required to have available data on all the variables reported in Table 4.

Hertzel and Li (2007) provide evidence on the effectiveness of the error components to reflect misvaluation rather than such deviations. I tackle this issue in more detail, in section 4.3.2.

In a recent study, Hovakimian (2006) tests whether firms time their equity and debt issues to equity market conditions by comparing the M/B ratio at the beginning of the event year to the average M/B ratio prevailing three years prior and three years after the event year. His findings suggest that firms tend to issue equity when their M/B ratios are unusually high but fail to find a similar timing pattern for debt issuers. I run a similar set of tests using the M/B ratio and its components. The objective here is to examine if the patterns documented above for the IPO year hold for other equity issues and if debt issues exhibit timing patterns once market conditions are measured by the misvaluation components of the M/B ratio. A firm is defined as issuing equity (debt) when the ratio of net equity issues (debt) over total assets (e/A) (d/A) exceeds 5%. Table 6 reports the means of the M/B ratio and its components from three years prior to the event year, to three years after. The table shows a significant run-up of the M/B and each of the three components prior to an equity issue. However, with the exception of the firm-misvaluation component, all the other valuation variables exhibit a significant higher level at the end of the issuance year than at the beginning of the event year. The sector misvaluation component is even higher in the post-issuance period, suggesting that firms issue equity when the market becomes hot, but not at particularly high levels of industry valuations. The firm misvaluation component as well as the long-run value to book component experience a substantial decline after the equity issuance. These findings suggest that firms issue equity during hot periods, when their overvaluation peaks and at high levels of growth options. These results are consistent with market timing, and with the ability of the firm-specific misvaluation component to properly capture the timing attempts. Besides, the results point to an important shortcoming of using M/B ratio as a measure of market timing as it is obvious that the fluctuations of the M/B ratio are highly driven by the levels of growth opportunities.

Regarding debt issues, the evidence on market timing with respect to M/B ratio is mixed, and consistent with the findings of Hovakimian (2006). While the mean pre-debt issue M/B is lower than the mean M/B ratios prevailing in the previous years, it is also lower than its levels over the post-event years. It is interesting to note that the sector error component evolves in a similar manner than around equity issues. This trend implies that when industry valuations increase, not only firms issue equity but also debt. This puzzling pattern is unlikely to induce a negative relation whith leverage but it may explain the results documented by Alti (2006) who finds that firms that go public in hot markets issue important amounts of debt after the IPO and rebalance the impact of hot markets within a short time period. The GROWTH component evolves in the same way than the M/B ratio: at the time of the issuance, firms experienced a decline in the value of their growth options, but this decline persists afterward. Interestingly, the firm-specific misvaluation component drops in the debt issuance year and the trend significantly reverses right after the issuance year. Although the post-issue decline is not monotonic, the level prevailing at the issue year remains the lowest over the period [-3; +3]. These findings offer further evidence on the ability of the firm-specific misvaluation component to accurately capture timing attempts and on the impact of perceived misvaluation on leverage. Overall, the results that emerge from this section support the view that the observed behavior of the M/B ratio are likely to obtain due to growth opportunities which mask the effectiveness of the timing of the debt issues, for instance.

4.2. Short term impact of market timing on capital structure

The negative impact of market timing on annual changes in leverage has been widely documented in previous studies. This section analyses how the different components of M/B ratio relate to changes in leverage and whether their impact, if any, comes through equity issues, retained earnings or other changes in assets. To separately evaluate the effects of growth options and misvaluation, I run the following regression that controls for other determinants of leverage and industry fixed effets, in IPO-time.

$$(D/A)_t - (D/A)_{t-1} = \beta_0 + \beta_1 FMIS_{t-1} + \beta_2 SMIS_{t-1} + \beta_3 GROWTH_{t-1} + \beta_4 (PPE/A)_{t-1} + \beta_5 (EBITDA/A)_{t-1}$$

$$+ \beta_6 SIZE_{t-1} + \beta_7 (D/A)_{t-1} + \varepsilon_t \quad (16)$$

Tangible assets may be associated with positive changes in leverage as they may be used as collateral. The peching order theory predicts that firms with high levels of internal funds, as proxied by profitability, tend to have lower leverage ratios. Size may be associated with lower leverage if large firms face less information asymetry and therfore can issue more equity. Large firms may also be less likely to enter financial distress leading size to be associated with higher levels of debt financing. Lagged leverage is included to control for mecanical backward moves of leverage when it reaches one of its boudaries.

Panel A of Table 7 reports the regression coefficients for Eq. (16) and for the regression using M/B instead of its components for comparison purposes. The net impact of growth options on annual changes in leverage is significantly negative. Even after controlling for this variable, the net effect of firm-specific misvaluation is to lower leverage, suggesting that the well documented negative relationship between M/B and leverage comes through growth opportunities but also through perceived specific overvaluation. Interestingly, the effect of sector misvaluation is negative and highly significant at the IPO year, but it reverses in the following year and becomes insignificant afterward. This evidence complements the results documented by Alti (2006) for hot IPO-market firms. The table also shows that tangibility induces increase in leverage. Profitability tends to lower leverage, and the effect of size is to increase leverage but this effect is significant only in the IPO year.

The subsequent panels in Table 7 report the regression coefficients for the components of the change in leverage over the same set of explanatory variables. The annual change in leverage can be decomposed as follows:

$$\left(D/A\right)_t - \left(D/A\right)_{t-1} = -\left(e/A\right)_t - \left(\Delta RE/A\right)_t - E_{t-1}(1/A_t - 1/A_{t-1}) \qquad Eq. (17)$$

The first term in Eq. (17) is the negative of net equity issues. If firms time the equity market then the negative relation observed between misvaluation and leverage should come through equity issues. The second term is the negative of newly retained earnings. It allows to test whether the decline in leverage is due to increased retained earnings. The last term is the residual change in leverage which depends on total growth in assets from the combinaison of equity issues, debt issues, and newly retained earnings.

Panel B. shows that the three components of the M/B ratio are positively and significantly related to equity issues. The results reported in Panel C. show that firm-specific misvaluation is positively related to newly retained earnings but only in few years and this effect is small in comparison to the increase in net equity issues. The negative relation between the sector error component of M/B and newly retained earnings is noteworthy. As discussed above, this relation may be explained by the relative high number of IPOs of firms from the technology industry druing the period of this analysis. This negative relation is responsible for the positive or insignificant relation between sector overvaluation and changes in leverage. Finally, Panel D. shows that the M/B ratio and its three components are generally positively related to the residual changes in leverage, but this is likely to induce an increase in leverage. The results regarding the other variables are consistent with previous studies.

Overall, the results indicate that the impact of firm-specific misvaluation on changes in leverage is strong, and comes through equity issues. The results also show an important impact of growth opportunities on changes in leverage, consistent with the predictions of traditional theories of capital structure. However, the tradeoff theory predicts that a high M/B ratio is a sign of high levels of growth options and that the negative effect of M/B on leverage is due to growth firms' tendency to use more equity financing. Therefore, according to this theory, controlling for growth opportunities should result in an insignificant relation between the remaining components of M/B and net equity issues. The evidence presented in this section is in clear opposition with the predictions of the tradeoff theory, as the two components of misvaluation are strongly positively related to net equity issues.

4.3. Persistence of market timing on capital structure

The evidence documented so far, is consistent with a strong short-term impact of market timing on capital structure. Whether this impact is persistent and impacts leverage on the long-run is the main question of the debate. Baker and Wurgler (2002) show that the impact of market timing, measured by M/B_{efwa}, lasts about ten years. Subsequent studies find that this effect is not persistent and that the negative relation between M/B_{efwa} and leverage is likely to obtain due to the information about growth opportunities contained in Baker and Wurgler's (2002) measure of timing. For instance, Alti (2006) shows that the impact of hot market issues vanishes within two years and Hovakimian (2006) finds that M/B_{efwa} is positively related to various measures of investment and thereby argue that it is a proxy for firms' investment prospects. In this section, using the external finance weighted averages of the three components of M/B ratio defined in Eq. (10), Eq. (11) and Eq. (12), I investigate the relationship between maket timing and capital structure in a manner that is unlikely to be affected by growth opportunities. Finally, as a robustness check, I question the ability of my timing variables to properly capture timing attempts.

4.3.1. Leverage regressions

Table 8 reports results from the following OLS regression of leverage in IPO-time and for the 1986-2005 sample:

$$(D/A)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1}$$

$$+ \beta_6 GROWTH_{t-1} + \beta_7 (PPE/A)_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 SIZE_{t-1} + \varepsilon_t \qquad Eq. (18)$$

Petersen (2005) suggests that in the presence of a firm effect, the Rogers (1993) standard errors clustered by firm are more accurate that the OLS standard errors. Therefore I adjust the t-statistics for clustering by firm in the pooled sample (Column 5). The lagged values of the misvaluation variables and the growth variable are included to control for their contemporaneous correlations with leverage.

The following patterns emerge from Table 8. First, the external weighted average firm-specific misvaluation component is negative and highly significant over the ten-year period following the IPO and over the entire 1986-2005 period. Although the lagged FMIS is negative and significant at some years, its magnitude is lower than the magnitude of $FMIS_{efwa}$. This result suggests that the impact of market timing on capital structure remains highly persistent, even after specifically controlling for the effect of growth opportunities. It is therefore obvious that Baker and Wurgler (2002) results regarding the M/B_{efwa} are to some extent driven by market timing and not only by growth opportunities. However, in contrast with Baker and Wurgler (2002) results, the historical misvaluation variable is not always the most economically important variable. Growth opportunities, whether measured by the lagged or the historical variable exhibit a strong negative effect on leverage. The impact of the time-series sector error remains puzzling, consistenly with the discussions above. The effect of the external weighted average sector-error is either positive and significant or insignificant. To gain further insight on the post-IPO financing policy of hot-industries firms, I regressed net debt issues[6] on the same set of variables I used for the change in leverage regressions. The results show that firms with a high sector-error component of M/B issue substantially more debt in the years following the IPO than other firms. This pattern, along with the above documented negative newly retained earnings, offsets the negative impact of equity issues on leverage for these firms. The initial impact on leverage at the IPO year is even reversed afterward. This result is again consistent with the findings of Alti (2006) and point to the inability of these variables to adequately capture misvaluation. Recall that the firm-specific misvaluation component I use to measure the perceived misvaluation captures the deviations of the firm's market value from its value implied by contemporaneous sector multiples. Regarding the sector error, RKRV ackowledge that the calculation of this variable requires the use of ex post knowledge about valuation levels to infer misvaluation. Therefore, the interpretation of this variable as a proxy for misvaluation does not rest on the inability of market participants to make full use of available information. Misvaluation contained in this variable can not be attributed to behavioral biases but to asymmetric information between managers and investors. On the other hand, the calculation of the firm-specific error

[6] For brievety, the results are not reported but are available upon request.

component uses information, unkown to the external investors while available at the time of the calculation. It therefore captures perceived mispricing in the sense of the market timing theory.

Table 8 also indicates that the coefficients displayed by the other variables are generally consistent with findings in previous studies. Tangibility is positively related to leverage, consistent with the view that tangible assets may potentially serve as collateral and thereby facilitate debt financing. Profitable firms have relatively lower levels of leverage as they have, and larger firms have higher levels of leverage. Unreported analysis using M/B_{efwa} that attempt to replicate the results of Baker and Wurgler (2002) provide similar results as those documented by the authors. However, I find a negative and significant coefficient for M/B, that may be due to the differences between our two samples.

To gain further insight into the persistent impact of misvaluation on capital structure, following Baker and Wurgler (2002), I run regressions of the cumulative changes in leverage from the pre-IPO value on the same set of control variables as above plus the pre-IPO value of leverage.

$$(D/A)_t - (D/A)_{pre-ipo} = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1}$$

$$+ \beta_6 GROWTH_{t-1} + \beta_7 SIZE_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 (PPE/A)_{t-1} + \beta_{10} (D/A)_{pre-ipo} + \varepsilon_t \qquad Eq.\,(19)$$

If market timing has a permanent effect on capital structure, then its initial impact should be reflected in the cumulative changes in leverage from its pre-IPO level, in the post-IPO years. Table 9 shows that the impact of market timing lasts for at least ten years after the IPO. Even if there is a slight decrease after the year IPO+1, the magnitude of the coefficient of $FMIS_{efwa}$ is subsequently stronger and increases from year to year as timing attempts accumulate. The historical sector-error variable shows a negative and significant impact until

IPO+1 and then its overall impact on cumulative changes in leverage becomes insignificant. The impact is even positive in IPO+5. This result is consistent with the other results discussed above regarding this variable. The timing of equity issues due to high levels of growth opportunities also shows a persistence. Overall, the results documented in this section provide evidence on a long lasting impact of market timing attempts on capital structure. This evidence is consistent with recent findings of Huang and Ritter (2007) who demonstrate that the effects of past securities issues are long-lasting because firms adjust very slowly toward target leverage.

4.3.2. Investment and cash regressions

In this section, I run robustness tests to assess the validity of the misvaluation and growth variables I used in the previous section. Following Hovakimian (2006) I analyse whether the negative relation between my timing measure is a proxy for a firm's set of investment opportunities, by examining its impact on current investment. Table 10 reports the results from the following regressions:

$$(INV)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1} + \beta_6 GROWTH_{t-1}$$

$$+ \beta_7 CASH_{t-1} + \beta_8 SIZE_{t-1} + \beta_9 (EBITDA/A)_{t-1} + \beta_{10} (PPE/A)_{t-1} + \beta_{11} (D/A)_{t-1} + \varepsilon_t \qquad Eq.(20)$$

INV is investment and is measured by capital expenditures to total assets in Panel A., as the ratio of R&D expenses to total assets in Panel B. and as the change in non-cash assets to total assets. I use the same regressors as Hovakimian: size, tangibility, profitability plus financial slack: CASH and lagged leverage. I include $FMIS_{efwa}$, $SMIS_{efwa}$ and $GROWTH_{efwa}$ instead of

M/B_{efwa} and FMIS, SMIS, GROWTH instead of M/B. Following Hovakimian, I include slack to control for the possibility that the timing measure may be correlated to current investment because successful past market timers may have accumulated cash that can be used to fund current investment opportunities. I also include lagged leverage to control for the possibility that market timers may have lower current levels of leverage and hence can invest more by raising debt. The regressions also include Fama and French 11 industry dummies. Eq. (20) is estimated in IPO-time and over the sample period 1986-2007. For the IPO-time regressions t-statistics use heteroscedastic consistent standard errors. T-statistics are adjusted for clustering in the pooled regressions.

The three Panels of table 10 show that there is no relation between $FMIS_{efwa}$ and the different investment measures. This timing variable is negatively related to the growth in non-cash assets. It is neither significantly related to capital expenditures nor to R&D expenses, except for the year IPO+7 where it has a positive coefficient, but with a relatively weak magnitude. The historical growth variable doesn't appear to be correlated with the growth in non cash assets. However, it is generally positively related to capital expenditures. In addition, this variables has a strong positive impact on investment when measured by R&D expenses. The results regarding the historical sector-error variable suggest that this variable is unlikely to proxy for growth options, except for the pooled regression of capital expenditures. In unreported analysis, I replicate the investment tests of Hovakimian by using M/B_{efwa}. Accordingly, I find a positive relation between M/B_{efwa} and investment when measured by capital expenditures or R&D, as documented by Hovakimian. However it is important to note that when I include the industry dummies, the relation becomes insignificant, suggesting that either Hovakimian (2006) obtains his results because he underestimated the importance of industry fixed effects, or because of the differences between our samples.

I finally examine the extent to which these variable may be related to the level of cash. Past successful market timers are likely to have accumulated larger amounts of cash relatively to other firms. In contrast, firms with high levels of growth opportunities that issued equity to fund their financing needs are unlikely to have high levels of cash. I run the following regression to investigate the impact of $FMIS_{efwa}$, $SMIS_{efwa}$, and $GROWTH_{efwa}$ on current levels of cash and short term investments scaled by assets:

$$(CASH/A)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1}$$

$$+\beta_5 SMIS_{t-1} + \beta_6 GROWTH_{t-1} + \beta_7 SIZE_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 (PPE/A)_{t-1} + \beta_{10} (D/A)_{t-1} + \varepsilon_t \quad Eq.(21)$$

Table 11 shows that the impact of $FMIS_{efwa}$ is to significantly increase the amount of cash as a portion of total assets, whereas firms with high historical levels of growth opportunities have relatively lower levels of cash in the early period following the IPO. The coefficients become insignificant after the year IPO+5.

The results documented in this section regarding the investment and the cash regressions suggest that the “external weighted average” firm-specific error component of the M/B ratio is an accurate measure of market timing that is not contaminated by the firm’s set of investment opportunities.

5. Conclusion

The market timing theory developped by Baker and Wurgler (2002) suggests that capital structure is the cumulative outcome of past attempts to time the market. Baker and

Wurgler (2002) report that the impact of the external finance weighted average market-to-book ratio on capital structure is highly persistent.

The objective of this study is to investigate whether the observed relationship results from the persistent impact of market timing or because of growth opportunities, as predicted by traditional capital structure theories.

Using a methodology developed by Rhodes-Kropf, Robinson and Viswanathan (2005), I decompose the market to book ratio into misvaluation and growth components to compute a timing variable that is not contamined by growth options. This variable is the external finance weighted average of the firm-specific mivaluation component of the market-to-book ratio.

Using a more accurate proxy for misvaluation, I document a long lasting impact of market timing on capital structure. Furthermore, I specifically rule out the possibility that the evidence provided in this analysis is obtained due to growth opportunities as the timing measure I use is unrelated to various measures of investment but positively related to the building up of financial slack.

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Table 1
Characteristics of the sample used in the valuation model.

Panel A: industry characteristics per year.

Year	Mean	Min	Max	N
1986	611	117	885	4767
1987	634	125	922	4889
1988	598	126	883	4651
1989	573	124	845	4502
1990	561	127	833	4435
1991	559	130	814	4455
1992	584	136	855	4659
1993	620	138	926	4911
1994	657	139	974	5178
1995	763	150	1199	5792
1996	853	142	1377	6292
1997	878	145	1443	6291
1998	866	141	1447	6088
1999	916	136	1609	6193
2000	939	109	1677	6110
2001	872	100	1546	5691
2002	803	96	1409	5304
2003	741	94	1293	4992
2004	718	96	1243	4836
2005	510	92	867	3564
Total	731	92	1677	103600

Panel B: yearly characteristics per industry

Industry	Mean	Min.	Max.	N
1	355	204	432	6934
2	156	97	195	3062
3	687	402	801	13473
4	242	181	290	4802
5	136	95	150	2690
6	1227	814	1677	23050
7	182	117	247	3443
8	179	92	236	3284
9	668	321	823	12978
10	640	368	780	12183
12	906	594	1099	17701
Total	731	92	1677	103600

Table 2
IPO activity over the period 1986-2005

Panel A: Yearly IPO-activity. This panel reports the number of IPO firms per year over the period 1986-2005 and the corresponding percentage in the IPO-sample.

Year	N	Percent.
1986	169	5.06
1987	160	4.79
1988	70	2.10
1989	61	1.83
1990	80	2.40
1991	149	4.46
1992	242	7.25
1993	290	8.69
1994	265	7.94
1995	255	7.64
1996	411	12.31
1997	282	8.45
1998	172	5.15
1999	200	5.99
2000	245	7.34
2001	56	1.68
2002	51	1.53
2003	44	1.32
2004	134	4.01
2005	2	0.06
Total	3,338	100.00

Panel B: IPO activity per industry. This panel reports the number of IPO-firms per Industry and the corresponding percentage in the IPO-sample.

Industry	N	Percent.
1	202	6.05
2	87	2.61
3	315	9.44
4	86	2.58
5	43	1.29
6	941	28.19
7	159	4.76
8	12	0.36
9	503	15.07
10	447	13.39
12	543	16.27
Total	3,338	100.00

Table 3
Market value regression.

This table reports the time-series averages of the estimated coefficients for the industry-year level regressions of the logarithm of the market value of assets (m). b is the logarithm of the book value of assets, $Ln(NI)^+$ is the logarithm of the absolute value of net income and $I_{(<0)}$ is an indicator variable for the negative values of net income. i, j and t stand for firm, industry and year, respectively. Fama-MacBeth standard errors are between brackets. R^2 is the time-series average R^2 for each industry.

	Fama and French industry classification										
Parameter	1	2	3	4	5	6	7	8	9	10	12
$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} Ln(NI)^+_{it} + \alpha_{3jt} I_{(<0)} Ln(NI)^+_{it} + \varepsilon_{it}$											
$E_t(\hat{\alpha}_0)$	1.15	1.33	1.24	1.08	1.51	1.51	1.44	0.61	1.18	1.78	1.47
	(0.07)	(0.1)	(0.09)	(0.12)	(0.07)	(0.08)	(0.09)	(0.07)	(0.08)	(0.05)	(0.1)
$E_t(\hat{\alpha}_1)$	0.73	0.69	0.72	0.77	0.66	0.69	0.78	0.88	0.74	0.65	0.67
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)
$E_t(\hat{\alpha}_2)$	0.29	0.29	0.26	0.20	0.32	0.31	0.15	0.10	0.26	0.33	0.29
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
$E_t(\hat{\alpha}_3)$	-0.13	-0.09	-0.09	-0.07	-0.08	-0.16	-0.03	0.00	-0.13	-0.11	-0.11
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
R^2	0.94	0.92	0.93	0.93	0.95	0.87	0.94	0.99	0.93	0.86	0.90

Table 4

Summary statistics of firms characteristics and financing decisions

This table reports the means and the standard deviations of firm characteristics, in IPO-time in Panel A and in calendar-time in panel B. *Book leverage D/A* is the ratio of book debt to total assets and is expressed in percentage terms. *Market-to-book ratio M/B* is defined as market value of assets plus book debt all divided by total assets. *FMIS* is the exponential of the firm-specific misvaluation component of the market to book ratio. *SMIS* is the exponential of the time-series sector error component. *GROWTH* is the exponential of the long-run value to book component. *Net equity issues e/A* is the change in book equity minus the change in retained earnings all divided by total assets and is expressed in percentage terms. *Net debt issues d/A* is the change in book debt over total assets. *Newly retained earnings* Δ*RE/A* is the change in retained earnings divided by total assets. *Size* is the natural logarithm of net sales. *Tangibility PPE/A* is the ratio net plant, property and equipment to total assets. *Profitability EBITDA/A* is earnings before interest, taxes, and depreciation divided by total assets. *CAPEX/A* is the ratio of capital expenditures to total assets. *RD/A* is the research and development expense divided by total assets. *CASH/A* is the ratio of cash and short-term investments to total assets. The sample excludes financial firms, firms with a minimum level of assets less than $10 million and outliers. All variables are in percentage terms except M/B, FMIS, SMIS, GROWTH and size.

Panel A. IPO-time sample

Year	N	D/A	M/B	FMIS	SMIS	GROW-TH	e/A	d/A	ΔRE/A	SIZE	PPE/A	EBITDA/A	CAPEX/A	RD/A	CASH/A
Pre-IPO	2,163	64.36	.	.	.	.	.	.	.	3.88	28.25	11.56	9.33	8.30	15.05
		(23.76)	.	.	.	.	.	.	.	(1.76)	(23.09)	(36.44)	(10.91)	(16.76)	(20.84)
IPO	2,768	35.53	2.75	1.55	1.06	1.76	63.55	-10.44	-4.04	4.01	21.17	7.14	8.01	5.38	33.54
		(22.91)	(1.73)	(0.97)	(0.27)	(0.54)	(47.35)	(32.24)	(25.14)	(1.66)	(20.87)	(21.19)	(9.81)	(9.12)	(29.96)
IPO+1	2,987	38.62	2.22	1.25	1.01	1.78	13.44	9.58	-7.05	4.38	24.15	4.48	9.13	6.91	26.28
		(23.12)	(1.56)	(0.77)	(0.19)	(0.56)	(27.54)	(16)	(36.89)	(1.58)	(21.66)	(25.58)	(10.25)	(12.55)	(26.76)
IPO+2	2,518	40.67	1.97	1.18	1.00	1.73	9.37	6.43	-9.75	4.58	25.66	4.41	7.94	7.38	23.41
		(23.18)	(1.44)	(0.8)	(0.21)	(0.59)	(23.8)	(16.67)	(46.38)	(1.58)	(22.29)	(23.96)	(8.99)	(13.48)	(25.54)
IPO+3	2,158	41.61	1.96	1.15	1.03	1.69	7.52	4.05	-6.74	4.75	25.98	5.73	6.91	7.41	22.15
		(22.92)	(1.48)	(0.72)	(0.22)	(0.58)	(18.4)	(16.66)	(30.46)	(1.54)	(22.29)	(20.84)	(7.81)	(13.21)	(24.55)
IPO+5	1,601	41.08	1.93	1.16	1.04	1.64	6.02	1.79	-3.44	4.96	25.40	6.43	6.12	7.07	22.96
		(22.96)	(1.4)	(0.76)	(0.17)	(0.57)	(47.91)	(16.69)	(49.95)	(1.59)	(22.03)	(18.52)	(7.07)	(12.42)	(25.15)
IPO+7	1,097	43.20	1.82	1.12	1.05	1.61	5.09	1.71	-1.61	5.28	27.20	8.72	6.08	5.79	19.62
		(23.17)	(1.37)	(0.73)	(0.19)	(0.58)	(17.16)	(21.36)	(23.00)	(1.61)	(21.87)	(17.25)	(6.87)	(10.92)	(22.63)

IPO+9	743	41.01	1.83	1.13	1.06	1.60	4.38	1.61	-1.96	5.46	26.69	9.04	5.81	5.43	19.54
		(22.45)	(1.3)	(0.73)	(0.2)	(0.57)	(16.23)	(14.53)	(19.34)	(1.63)	(21.83)	(16.44)	(6.13)	(9.79)	(22.24)
IPO+10	558	41.18	1.91	1.11	1.09	1.62	4.28	2.56	-0.12	5.65	28.23	10.45	6.22	5.10	18.13
		(21.16)	(1.31)	(0.66)	(0.19)	(0.53)	(15.71)	(13.88)	(16.99)	(1.59)	(22.34)	(15.51)	(6.42)	(9.46)	(21.53)

Panel B. Calendar-time sample

Year	N	D/A	M/B	FMIS	SMIS	GROW-TH	e/A	d/A	ΔRE/A	SIZE	PPE/A	EBITDA/A	CAPEX/A	RD/A	CASH/A
1987-1990	10,609	48.83	1.35	1.05	0.86	1.53	2.56	3.45	1.90	5.29	36.76	12.95	7.52	2.25	10.80
		(20.68)	(0.77)	(0.45)	(0.1)	(0.47)	(15.74)	(23.38)	(21.14)	(1.74)	(23.41)	(10.14)	(7.38)	(4.82)	(14.34)
1991-1995	14,258	47.61	1.62	1.05	1.03	1.52	5.99	1.61	1.06	5.47	35.31	12.75	7.15	2.84	11.57
		(20.5)	(1.05)	(0.52)	(0.12)	(0.49)	(17.77)	(18.81)	(14.07)	(1.72)	(23.75)	(11.16)	(7.05)	(6.79)	(15.73)
1996-2000	15,046	48.25	1.77	1.10	1.08	1.53	7.43	3.57	-0.34	5.68	32.22	11.15	7.40	3.43	12.89
		(21.45)	(1.31)	(0.7)	(0.22)	(0.51)	(24.31)	(23.94)	(20.42)	(1.77)	(23.58)	(14.39)	(7.85)	(8.62)	(18.34)
2001-2005	11,639	45.52	1.72	1.17	1.04	1.52	5.63	-1.45	-2.28	6.01	28.85	8.60	5.20	4.08	17.40
		(22.07)	(1.13)	(0.75)	(0.19)	(0.54)	(28.1)	(33.15)	(42.54)	(1.92)	(23.36)	(16.98)	(6.02)	(9.05)	(20.98)

Table 5

Decomposition of the market-to-book ratio at the firm level

This table reports the means of the market-to-book ratio and its components for the IPO sample, at the IPO year and at the post-IPO years, and for a sample of non-IPO firms. Columns (3) and (4) report the t-statistics for the tests: the market-to-book ratio and its components have the same means at the IPO year and during the subsequent years, and IPO firms have the same means than all non-IPO firms.

		IPO year	Post-IPO years	Non-IPO firms	t	
		(1)	(2)	(3)	(2)-(1)	(3)-(1)
$(M/B)_{it}$	Market-to-book	2.70	1.98	1.66	-25.52	-49.11
$M_{it} / V(\theta_{it};\alpha_{jt})$	firm-specific error	1.52	1.18	1.10	-23.34	-36.67
$V(\theta_{it};\alpha_{jt})/V(\theta_{it};\alpha_j)$	Sector-error	1.06	1.04	1.01	-4.79	-14.84
$V(\theta_{it};\alpha_j)/B_{it}$	Long-run value to book	1.76	1.68	1.55	-7.16	-21.28
N		3338	18943	61460		

Table 6

Market valuations around security issues

This table reports the means of the market-to-book ratio and its components around the year of equity issuance (Panel A) and debt issuance (Panel B). A firm is defined as an equity (debt) issuer if e/A (d/A) >=5%. Columns (3) (5) (7) and (9) report the t-statistics for the tests: Y(-1) = Y(t), where Y is M/B, firm-specific error FMIS, sector error SMIS or long-run value to book Growth. t= -3, -2, 0, +1, +2, +3, and t = -1 is the beginning of the event year. To be included in the sample, a firm must survive over the seven years.

Panel A. Market valuations around equity issues

Year t	M/B		FMIS		SMIS		GROWTH	
(-1)	1.903		1.202		1.021		1.623	
(-3)	1.805	(3.89)	1.168	(2.05)	0.997	(4.28)	1.603	(1.84)
(-2)	1.807	(4.5)	1.157	(2.95)	1.007	(2.45)	1.611	(1.18)
(0)	1.952	(-2.53)	1.219	(-0.98)	1.028	(-1.43)	1.642	(-1.8)
(1)	1.831	(2.74)	1.162	(2.4)	1.023	(-0.4)	1.593	(2.62)
(2)	1.792	(4.01)	1.155	(2.52)	1.041	(-3.17)	1.572	(4.36)
(3)	1.798	(3.82)	1.121	(4.67)	1.055	(-6.15)	1.582	(3.48)
N	2142		2142		2142		2142	

Panel B. Market valuations around debt issues

Year t	M/B		FMIS		SMIS		GROWTH	
(-1)	1.581		1.054		1.004		1.522	
(-3)	1.615	(-3.72)	1.081	(-4.66)	0.982	(10.71)	1.537	(-3.06)
(-2)	1.591	(-1.54)	1.068	(-2.55)	0.987	(9.07)	1.532	(-2.33)
(0)	1.535	(6.26)	1.090	(-6.01)	1.010	(-2.95)	1.451	(16.4)
(1)	1.519	(6.94)	1.075	(-3.15)	1.017	(-5.63)	1.450	(13.97)
(2)	1.527	(5.36)	1.078	(-3.39)	1.032	(-10.34)	1.440	(15.23)
(3)	1.535	(4.29)	1.073	(-2.62)	1.045	(-15.3)	1.444	(13.85)
N	7296		7296		7296		7296	

Table 7
Short term impact of market timing on capital structure

This table reports the coefficients from the regressions of the annual changes in leverage in Panel A, and its components in the following Panels.

$$(D/A)_t - (D/A)_{t-1} = \beta_0 + \beta_1 FMIS_{t-1} + \beta_2 SMIS_{t-1} + \beta_3 GROWTH_{t-1} + \beta_4 (PPE/A)_{t-1} + \beta_5 (EBITDA/A)_{t-1} + \beta_6 SIZE_{t-1} + \beta_7 (D/A)_{t-1} + \varepsilon_t$$

$$(D/A)_t - (D/A)_{t-1} = -(e/A)_t - (\Delta RE/A)_t - E_{t-1}(1/A_t - 1/A_{t-1})$$

Panel A. Annual change in leverage:

	IPO	IPO+1	IPO+3	IPO+5	IPO+10	IPO	IPO+1	IPO+3	IPO+5	IPO+10
$(M/B)_{t-1}$	.	.	.	.	.	-2.371	-0.942	-0.953	-0.833	-1.620
	.	.	.	.	.	(3.50)***	(3.73)***	(4.70)***	(3.90)***	(3.66)***
$(FMIS)_{t-1}$	-3.790	-1.813	-1.260	-1.344	-2.150	.	.	.	.	.
	(4.08)***	(7.39)***	(3.41)***	(3.68)***	(4.40)***	.	.	.	.	.
$(SMIS)_{t-1}$	-6.608	2.053	0.499	-1.588	-1.619	.	.	.	.	.
	(3.85)***	(3.80)***	(0.59)	(1.62)	(0.77)	.	.	.	.	.
$(GROWTH)_{t-1}$	-7.868	-3.024	-2.396	-2.848	-3.445	.	.	.	.	.
	(3.58)***	(3.95)***	(3.76)***	(8.26)***	(2.39)**	.	.	.	.	.
$(PPE/A)_{t-1}$	0.013	0.031	0.042	0.042	0.037	0.025	0.036	0.042	0.043	0.039
	(0.28)	(2.00)*	(8.13)***	(2.90)**	(1.65)	(0.52)	(2.16)*	(6.92)***	(2.84)**	(1.70)
$(EBITDA/A)_{t-1}$	-0.032	-0.072	-0.082	-0.042	-0.005	-0.047	-0.090	-0.075	-0.043	-0.026
	(2.05)*	(3.99)***	(5.69)***	(2.42)**	(0.18)	(3.60)***	(4.76)***	(4.68)***	(2.64)**	(1.19)
$SIZE_{t-1}$	4.488	-0.382	0.199	0.370	0.050	4.758	-0.254	0.304	0.502	0.205
	(7.21)***	(1.05)	(0.84)	(1.77)	(0.12)	(8.07)***	(0.76)	(1.33)	(2.49)**	(0.57)
N	2038	2899	2212	1612	567	2038	2899	2212	1612	567
Adj. R^2	0.54	0.14	0.09	0.09	0.13	0.53	0.13	0.09	0.08	0.13

Panel B. Net equity issues

	IPO	IPO+1	IPO+3	IPO+5	IPO+10	IPO	IPO+1	IPO+3	IPO+5	IPO+10
$(M/B)_{t-1}$	.	.	.	.	.	4.056	3.808	4.651	4.253	4.799
	.	.	.	.	.	(7.36)***	(13.83)***	(6.41)***	(21.24)***	(3.35)***
$(FMIS)_{t-1}$	6.265	5.418	6.595	5.990	5.236	.	.	.	.	.
	(8.39)***	(9.66)***	(5.70)***	(8.36)***	(2.81)**	.	.	.	.	.
$(SMIS)_{t-1}$	22.961	20.965	6.046	10.936	3.906	.	.	.	.	.
	(5.40)***	(4.90)***	(3.72)***	(16.43)***	(1.01)	.	.	.	.	.
$(GROWTH)_{t-1}$	9.711	8.386	9.021	9.620	13.410	.	.	.	.	.
	(4.50)***	(10.72)***	(5.00)***	(9.87)***	(3.01)**	.	.	.	.	.
$(PPE/A)_{t-1}$	-0.030	0.080	0.055	0.059	0.050	-0.043	0.074	0.056	0.060	0.036
	(0.58)	(3.11)**	(4.61)***	(1.91)*	(2.99)**	(0.76)	(3.04)**	(4.01)***	(1.66)	(1.76)
$(EBITDA/A)_{t-1}$	-0.155	-0.352	-0.276	-0.335	-0.525	-0.164	-0.386	-0.300	-0.347	-0.414
	(1.69)	(6.61)***	(3.82)***	(5.36)***	(3.51)***	(1.65)	(6.14)***	(3.93)***	(5.86)***	(3.60)***
$SIZE_{t-1}$	-7.673	-0.976	-0.589	-0.287	0.194	-7.784	-1.026	-0.795	-0.621	-0.680
	(11.03)***	(6.29)***	(2.64)**	(0.62)	(0.45)	(11.31)***	(8.63)***	(4.15)***	(1.63)	(1.84)*
N	1920	2870	2180	1589	555	1920	2870	2180	1589	555
Adj. R^2	0.43	0.26	0.30	0.23	0.36	0.41	0.24	0.31	0.23	0.35

Panel C. Newly retained earnings

	IPO	IPO+1	IPO+3	IPO+5	IPO+10	IPO	IPO+1	IPO+3	IPO+5	IPO+10
$(M/B)_{t-1}$	.	.	.	.	.	-0.491	0.256	1.289	0.495	0.641
	.	.	.	.	.	(3.76)***	(0.74)	(3.97)***	(5.36)***	(0.83)
$(FMIS)_{t-1}$	-0.151	1.612	1.836	0.522	1.515	.	.	.	.	.
	(0.57)	(2.94)**	(4.70)***	(0.85)	(1.66)	.	.	.	.	.
$(SMIS)_{t-1}$	-9.655	-27.099	-6.716	-1.522	-0.587	.	.	.	.	.
	(3.97)***	(4.58)***	(2.75)**	(0.81)	(0.19)	.	.	.	.	.
$(GROWTH)_{t-1}$	-3.629	0.660	2.530	2.379	-0.086	.	.	.	.	.
	(2.09)*	(0.27)	(1.35)	(3.66)***	(0.02)	.	.	.	.	.
$(PPE/A)_{t-1}$	-0.016	-0.031	-0.051	-0.038	-0.058	-0.009	-0.035	-0.048	-0.038	-0.056
	(0.93)	(2.03)*	(3.38)***	(2.00)*	(2.67)**	(0.65)	(1.83)*	(2.91)**	(2.20)*	(3.50)***
$(EBITDA/A)_{t-1}$	0.214	0.868	0.816	0.610	0.716	0.215	0.948	0.800	0.614	0.697
	(1.95)*	(11.98)***	(9.95)***	(18.70)***	(4.98)***	(1.93)*	(8.57)***	(10.79)***	(18.51)***	(6.29)***
$SIZE_{t-1}$	-0.018	0.549	-0.876	0.853	0.550	0.069	0.332	-0.991	0.692	0.706
	(0.08)	(1.92)*	(0.64)	(3.11)**	(1.67)	(0.22)	(0.90)	(0.67)	(2.41)**	(1.29)
N	1920	2870	2180	1589	555	1920	2870	2180	1589	555
Adj. R^2	0.14	0.37	0.33	0.33	0.39	0.13	0.33	0.33	0.33	0.39

Panel D. Residual change in assets										
	IPO	IPO+1	IPO+3	IPO+5	IPO+10	IPO	IPO+1	IPO+3	IPO+5	IPO+10
$(M/B)_{t-1}$	.	.	.	.	.	1.226	3.102	4.989	3.914	3.774
	.	.	.	.	.	(10.09)***	(6.75)***	(8.10)***	(14.48)***	(7.28)***
$(FMIS)_{t-1}$	2.288	5.192	7.179	5.139	4.545	.	.	.	.	.
	(6.87)***	(4.41)***	(5.97)***	(7.49)***	(6.08)***	.	.	.	.	.
$(SMIS)_{t-1}$	5.954	-4.359	-0.179	7.990	1.753	.	.	.	.	.
	(7.58)***	(1.92)*	(0.11)	(5.10)***	(0.36)	.	.	.	.	.
$(GROWTH)_{t-1}$	-1.917	5.865	9.135	9.099	9.705	.	.	.	.	.
	(5.20)***	(1.86)*	(3.99)***	(8.72)***	(2.82)**	.	.	.	.	.
$(PPE/A)_{t-1}$	-0.041	0.075	0.045	0.062	0.023	-0.032	0.070	0.048	0.063	0.013
	(4.41)***	(3.03)**	(2.31)**	(3.29)***	(0.82)	(4.11)***	(3.21)***	(2.16)*	(2.93)**	(0.55)
$(EBITDA/A)_{t-1}$	0.019	0.443	0.460	0.233	0.186	-0.002	0.472	0.429	0.223	0.255
	(1.90)*	(9.68)***	(4.13)***	(3.58)***	(2.38)**	(0.28)	(7.29)***	(4.19)***	(3.77)***	(3.74)***
$SIZE_{t-1}$	-3.285	-0.804	-1.312	0.955	0.798	-3.037	-0.937	-1.527	0.596	0.251
	(21.17)***	(1.35)	(0.96)	(2.01)*	(2.55)**	(16.14)***	(1.54)	(1.04)	(1.43)	(0.52)
N	1920	2870	2180	1589	555	1920	2870	2180	1589	555
Adj. R^2	0.75	0.16	0.20	0.16	0.19	0.74	0.16	0.21	0.16	0.19

Table 8
Determinants of leverage
This table reports coefficients from the following regression of leverage:

$$(D/A)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1}$$

$$+\beta_6 GROWTH_{t-1} + \beta_7 (PPE/A)_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 SIZE_{t-1} + \varepsilon_t$$

Leverage D/A is book debt over total assets. *FMIS*, *SMIS* and *GROWTH* are the exponential of the three components of the market-to-book ratio: *firm-specific misvaluation, sector-error and long-run value to book*, respectively. $(FMIS)_{efwa}$, $(SMIS)_{efwa}$ and $(GROWTH)_{efwa}$ are the external finance weighted averages of FMIS, SMIS and GROWTH respectively. *Tangibility PPE/A*, is defined as net property, plant and equipment to total assets. *Profitability EBITDA/A* is earnings before interest, taxes, and depreciation divided by total assets. *Size* is the natural logarithm of net sales. D/A, PPE/A and EBITDA/A are in percentage terms. Fama and French 11 industry dummies are included. For the IPO-time regressions t-statistics use heteroscedastic consistent standard errors. T-statistics are adjusted for clustering in the calendar-time regression.

Year	IPO+1	IPO+3	IPO+5	IPO+10	1986-2005
$(FMIS)_{efwa, t-1}$	-4.212	-3.062	-4.896	-7.186	-3.262
	(11.18)***	(5.02)***	(6.53)***	(4.51)***	(8.55)***
$(SMIS)_{efwa, t-1}$	-0.994	1.541	9.188	-4.953	10.508
	(0.62)	(0.65)	(3.06)***	(0.94)	(9.69)***
$(GROWTH)_{efwa, t-1}$	-7.452	-2.819	-4.647	-11.852	-8.388
	(7.55)***	(2.27)**	(3.18)***	(4.13)***	(14.88)***
$(FMIS)_{t-1}$	.	-2.497	-1.734	0.642	-1.291
	.	(3.65)***	(2.69)***	(0.48)	(4.78)***
$(SMIS)_{t-1}$	.	1.855	-6.681	3.059	-4.884
	.	(0.77)	(2.66)***	(0.61)	(7.18)***
$(GROWTH)_{t-1}$	.	-4.290	-3.680	-3.132	-5.428
	.	(3.51)***	(2.89)***	(1.29)	(12.99)***
$(PPE/A)_{t-1}$	0.145	0.163	0.162	0.070	0.017
	(6.11)***	(6.79)***	(6.21)***	(1.60)	(1.45)
$(EBITDA/A)_{t-1}$	-0.136	-0.215	-0.264	-0.104	-0.159
	(4.90)***	(6.53)***	(8.16)***	(1.24)	(10.21)***
$SIZE_{t-1}$	4.725	4.159	3.855	2.661	2.597
	(15.30)***	(11.03)***	(9.56)***	(3.93)***	(19.30)***
N	2,506	2,170	1,593	554	45,815
Adj-R^2	0.37	0.30	0.31	0.28	0.25

Table 9
Persistence of the impact of market timing on capital structure

This table reports coefficients from the following regression of leverage:

$$(D/A)_t - (D/A)_{pre-ipo} = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1}$$

$$+\beta_6 GROWTH_{t-1} + \beta_7 SIZE_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 (PPE/A)_{t-1} + \beta_{10} (D/A)_{pre-ipo} + \varepsilon_t$$

Leverage D/A is book debt over total assets, $(D/A)_{IPO-1}$ is the pre-IPO year leverage. *FMIS*, *SMIS* and *GROWTH* are the exponential of the three components of the market-to-book ratio: *firm-specific misvaluation*, *sector-error and long-run value to book*, respectively. $(FMIS)_{efwa}$, $(SMIS)_{efwa}$ and $(GROWTH)_{efwa}$ are the external finance weighted averages of FMIS, SMIS and GROWTH respectively. *Tangibility PPE/A*, is defined as net property, plant and equipment to total assets. *Profitability EBITDA/A* is earnings before interest, taxes, and depreciation divided by total assets. *Size* is the natural logarithm of net sales. D/A, PPE/A and EBITDA/A are in percentage terms. Fama and French 11 industry dummies are included. For the IPO-time regressions t-statistics use heteroscedastic consistent standard errors. T-statistics are adjusted for clustering in the calendar-time regression.

Year	IPO+1	IPO+3	IPO+5	IPO+10
$(FMIS)_{efwa, t-1}$	-5.044	-2.574	-5.123	-7.391
	(11.35)***	(3.25)***	(5.94)***	(3.28)***
$(SMIS)_{efwa, t-1}$	-4.480	0.283	6.345	1.331
	(2.12)**	(0.10)	(1.69)*	(0.13)
$(GROWTH)_{efwa, t-1}$	-8.675	-3.217	-4.986	-16.140
	(7.34)***	(2.09)**	(2.76)***	(4.31)***
$(FMIS)_{t-1}$	.	-2.593	-1.272	1.298
	.	(3.54)***	(1.54)	(0.64)
$(SMIS)_{t-1}$	.	1.634	-4.453	1.810
	.	(0.60)	(1.49)	(0.30)
$(GROWTH)_{t-1}$	.	-4.348	-4.366	0.034
	.	(2.97)***	(2.90)***	(0.01)
$SIZE_{t-1}$	3.808	3.756	3.344	1.914
	(11.10)***	(8.30)***	(7.08)***	(2.41)**
$(EBITDA/A)_{t-1}$	-0.153	-0.268	-0.272	-0.278
	(3.45)***	(5.84)***	(6.67)***	(2.95)***
$(PPE/A)_{t-1}$	0.103	0.114	0.143	0.098
	(4.39)***	(4.14)***	(4.91)***	(1.95)*
$(D/A)_{ipo-1}$	-0.741	-0.745	-0.815	-0.837
	(38.11)***	(31.28)***	(29.98)***	(17.87)***
N	1,789	1,440	1,072	375
Adj. R^2	0.52	0.51	0.52	0.52

Table 10
Investment Regressions
This table reports coefficients from the following regression of investment:

$$(INV)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1} + \beta_5 SMIS_{t-1} + \beta_6 GROWTH_{t-1}$$

$$+\beta_7 CASH_{t-1} + \beta_8 SIZE_{t-1} + \beta_9 (EBITDA/A)_{t-1} + \beta_{10} (PPE/A)_{t-1} + \beta_{11} (D/A)_{t-1} + \varepsilon_t$$

Investment INV is measured by *capital expenditures* to total assets (%) in Panel A., or by *R&D expenses RD/A* (%) in panel B., or as *the change in total assets excluding cash and short term investments* to total assets (%). *Leverage D/A* is book debt over total assets. *FMIS*, *SMIS* and *GROWTH* are the exponential of the three components of the market-to-book ratio: *firm-specific misvaluation, sector-error and long-run value to book*, respectively. $(FMIS)_{efwa}$, $(SMIS)_{efwa}$ and $(GROWTH)_{efwa}$ are the external finance weighted averages of FMIS, SMIS and GROWTH respectively. *Tangibility PPE/A*, is defined as net property, plant and equipment to total assets. *Profitability EBITDA/A* is earnings before interest, taxes, and depreciation divided by total assets. *Size* is the natural logarithm of net sales. D/A, PPE/A and EBITDA/A are in percentage terms. *CASH* is Cash & short term investments to total assets (%). Fama and French 11 industry dummies are included. For the IPO-time regressions t-statistics use heteroscedastic consistent standard errors. T-statistics are adjusted for clustering in the calendar-time regression.

Panel B. Capital expenditures

Year	IPO+1	IPO+3	IPO+5	IPO+7	IPO+10	1986-2005
$(FMIS)_{efwa, t-1}$	.	-0.213	-0.212	0.050	0.028	-0.108
		(1.42)	(1.32)	(0.17)	(0.05)	(1.34)
$(SMIS)_{efwa, t-1}$	.	0.438	0.109	-0.766	-2.344	0.748
		(0.76)	(0.19)	(0.96)	(1.97)**	(2.81)***
$(GROWTH)_{efwa, t-1}$	.	0.285	0.722	0.994	0.283	0.221
		(0.97)	(2.20)**	(2.51)**	(0.43)	(1.75)*
$(FMIS)_{t-1}$	0.624	1.107	1.020	0.792	0.589	0.984
	(3.98)***	(5.93)***	(5.45)***	(3.34)***	(1.56)	(14.63)***
$(SMIS)_{t-1}$	2.840	1.587	0.669	1.298	0.964	1.377
	(4.85)***	(2.26)**	(0.95)	(2.34)**	(0.84)	(6.18)***
$(GROWTH)_{t-1}$	0.921	1.267	1.371	1.106	1.387	1.311
	(2.28)**	(4.89)***	(4.68)***	(3.10)***	(1.94)*	(13.04)***
$(CASH/A)_{t-1}$	0.034	0.016	-0.000	0.018	0.007	0.022
	(3.79)***	(1.63)	(0.02)	(1.31)	(0.49)	(5.59)***
$SIZE_{t-1}$	-0.740	0.010	0.173	-0.048	0.025	-0.299
	(4.22)***	(0.08)	(1.30)	(0.28)	(0.12)	(7.91)***
$(EBITDA/A)_{t-1}$	0.035	0.048	0.038	0.080	0.031	0.077
	(3.47)***	(6.03)***	(3.15)***	(4.64)***	(0.85)	(11.46)***
$(PPE/A)_{t-1}$	0.299	0.186	0.166	0.153	0.158	0.152
	(21.03)***	(17.03)***	(13.64)***	(11.99)***	(11.87)***	(36.69)***
$(D/A)_{t-1}$	-0.026	-0.019	-0.028	-0.007	-0.032	-0.011
	(2.18)**	(1.90)*	(3.13)***	(0.51)	(2.25)**	(3.28)***
N	2522	2209	1615	1106	565	-3.319
Adj. R^2	0.35	0.35	0.37	0.35	0.36	0.32

(Table 10) Panel B. R&D expenses

Year	IPO+1	IPO+3	IPO+5	IPO+7	IPO+10	1986-2005
$(FMIS)_{efwa, t-1}$	.	-0.389	0.516	1.699	1.116	0.220
	.	(1.04)	(1.09)	(2.03)**	(1.46)	(1.17)
$(SMIS)_{efwa, t-1}$	.	-5.148	-4.371	-5.384	-4.457	-2.520
	.	(3.44)***	(2.82)***	(2.19)**	(1.81)*	(4.82)***
$(GROWTH)_{efwa, t-1}$	.	2.259	3.694	5.295	1.561	1.628
	.	(2.79)***	(3.66)***	(3.66)***	(1.16)	(5.67)***
$(FMIS)_{t-1}$	0.267	1.184	0.842	0.270	1.270	0.980
	(0.91)	(3.03)***	(1.71)*	(0.45)	(1.96)*	(6.00)***
$(SMIS)_{t-1}$	-1.981	4.412	2.648	2.819	4.946	1.908
	(1.80)*	(2.75)***	(1.38)	(1.38)	(1.58)	(5.17)***
$(GROWTH)_{t-1}$	4.376	4.232	1.536	-0.389	2.575	3.032
	(5.16)***	(5.29)***	(1.51)	(0.41)	(1.21)	(10.40)***
$(CASH/A)_{t-1}$	0.082	0.121	0.130	0.114	0.092	0.109
	(5.09)***	(5.63)***	(5.66)***	(4.62)***	(2.98)***	(12.02)***
$SIZE_{t-1}$	-0.539	-0.927	-0.309	-0.531	-0.521	0.012
	(1.98)**	(2.76)***	(0.88)	(1.55)	(1.46)	(0.20)
$(EBITDA/A)_{t-1}$	-0.199	-0.189	-0.233	-0.202	-0.290	-0.265
	(8.24)***	(6.75)***	(5.72)***	(4.41)***	(3.45)***	(15.79)***
$(PPE/A)_{t-1}$	-0.021	-0.003	0.011	0.006	0.021	0.017
	(1.55)	(0.22)	(0.80)	(0.35)	(1.14)	(3.39)***
(D/A)t-1	0.036	0.057	0.054	0.048	0.022	0.016
	(2.35)**	(2.63)***	(3.11)***	(1.73)*	(0.78)	(2.73)***
N	1617	1439	1039	697	359	24568
Adj. R^2	0.42	0.48	0.50	0.51	0.59	0.48

(Table 10) Panel C. Growth in non-cash assets

Year	IPO+1	IPO+3	IPO+5	IPO+7	IPO+10	1986-2005
$(FMIS)_{efwa,\ t-1}$	.	-0.837	-3.527	-3.491	-4.445	-2.677
	.	(0.83)	(3.77)***	(2.44)**	(2.18)**	(3.81)***
$(SMIS)_{efwa,\ t-1}$	.	0.337	-2.062	-1.087	8.721	-6.688
	.	(0.06)	(0.78)	(0.25)	(1.60)	(0.89)
$(GROWTH)_{efwa,\ t-1}$	.	6.489	0.077	-0.839	-6.746	4.490
	.	(2.44)**	(0.05)	(0.39)	(2.14)**	(1.17)
$(FMIS)_{t-1}$	3.964	5.905	5.514	5.793	6.423	4.849
	(6.31)***	(6.47)***	(6.12)***	(6.23)***	(3.55)***	(4.63)***
$(SMIS)_{t-1}$	4.352	5.041	14.023	0.817	7.140	13.344
	(0.88)	(0.58)	(4.99)***	(0.20)	(1.27)	(1.59)
$(GROWTH)_{t-1}$	4.121	4.108	8.698	9.006	14.004	5.860
	(2.94)***	(2.09)**	(5.71)***	(5.29)***	(4.70)***	(6.09)***
$(CASH/A)_{t-1}$	0.068	0.248	0.129	0.026	0.051	0.131
	(1.47)	(4.72)***	(3.32)***	(0.66)	(0.81)	(3.71)***
$SIZE_{t-1}$	-1.758	-1.020	1.912	2.279	1.981	0.004
	(3.63)***	(1.45)	(3.40)***	(2.21)**	(1.82)*	(0.01)
$(EBITDA/A)_{t-1}$	0.340	0.527	0.245	0.191	0.131	0.466
	(5.31)***	(6.59)***	(5.20)***	(3.13)***	(1.29)	(8.18)***
$(PPE/A)_{t-1}$	0.083	0.129	0.087	0.044	0.145	0.116
	(2.74)***	(2.92)***	(2.68)***	(0.99)	(2.91)***	(2.37)**
$(D/A)_{t-1}$	-0.022	0.012	-0.143	-0.213	-0.120	-0.163
	(0.59)	(0.20)	(4.44)***	(3.84)***	(1.83)*	(2.50)**
N	2564	2240	1633	1121	572	-23.965
Adj. R^2	0.11	0.15	0.15	0.13	0.10	0.01

Table 11
Cash regressions
This table reports coefficients from the following regression of cash:

$$(CASH/A)_t = \beta_0 + \beta_1 FMIS_{efwa,t-1} + \beta_2 SMIS_{efwa,t-1} + \beta_3 GROWTH_{efwa,t-1} + \beta_4 FMIS_{t-1}$$

$$+\beta_5 SMIS_{t-1} + \beta_6 GROWTH_{t-1} + \beta_7 SIZE_{t-1} + \beta_8 (EBITDA/A)_{t-1} + \beta_9 (PPE/A)_{t-1} + \beta_{10} (D/A)_{t-1} + \varepsilon_t$$

CASH is Cash & short term investments to total assets (%). *FMIS, SMIS* and *GROWTH* are the exponential of the three components of the market-to-book ratio: *firm-specific misvaluation, sector-error and long-run value to book*, respectively. *(FMIS)$_{efwa}$, (SMIS)$_{efwa}$* and *(GROWTH)$_{efwa}$* are the external finance weighted averages of FMIS, SMIS and GROWTH respectively. *Tangibility PPE/A*, is defined as net property, plant and equipment to total assets. *Profitability EBITDA/A* is earnings before interest, taxes, and depreciation divided by total assets. *Size* is the natural logarithm of net sales. *Leverage D/A* is book debt over total assets. D/A, PPE/A and EBITDA/A are in percentage terms.. Fama and French 11 industry dummies are included. For the IPO-time regressions t-statistics use heteroscedastic consistent standard errors. T-statistics are adjusted for clustering in the calendar-time regression.

Year	IPO+1	IPO+3	IPO+5	IPO+7	IPO+10	1986-2005
$(FMIS)_{efwa,\ t-1}$	.	2.666	3.885	2.998	4.049	2.240
	.	(4.23)***	(6.20)***	(3.00)***	(2.56)**	(6.83)***
$(SMIS)_{efwa,\ t-1}$	.	-0.200	-3.101	-0.605	9.865	-1.437
	.	(0.09)	(1.07)	(0.17)	(2.23)**	(1.97)**
$(GROWTH)_{efwa,\ t-1}$	.	-3.295	-3.186	0.319	4.102	0.487
	.	(2.91)***	(2.19)**	(0.18)	(1.56)	(1.19)
$(FMIS)_{t-1}$	3.593	3.084	3.919	4.000	5.187	3.331
	(8.01)***	(4.69)***	(5.52)***	(4.48)***	(3.58)***	(14.79)***
$(SMIS)_{t-1}$	-0.733	-3.120	8.003	-1.090	0.954	4.192
	(0.42)	(1.39)	(3.55)***	(0.41)	(0.25)	(8.31)***
$(GROWTH)_{t-1}$	5.390	6.996	6.649	5.336	6.043	5.698
	(5.31)***	(6.62)***	(5.48)***	(3.50)***	(3.16)***	(16.71)***
$SIZE_{t-1}$	-2.636	-2.194	-3.587	-2.518	-2.578	-0.842
	(7.89)***	(6.73)***	(9.17)***	(6.05)***	(5.03)***	(9.04)***
$(EBITDA/A)_{t-1}$	-0.249	-0.256	-0.246	-0.271	-0.295	-0.304
	(7.62)***	(8.25)***	(7.00)***	(5.83)***	(4.39)***	(20.14)***
$(PPE/A)_{t-1}$	-0.215	-0.170	-0.180	-0.171	-0.200	-0.137
	(11.67)***	(10.47)***	(9.34)***	(8.62)***	(7.01)***	(20.34)***
(D/A)t-1	-0.227	-0.254	-0.203	-0.208	-0.163	-0.220
	(10.81)***	(12.92)***	(8.92)***	(7.81)***	(5.15)***	(27.45)***
N	2564	2240	1633	1121	572	14.603
Adj. R^2	0.56	0.57	0.57	0.54	0.54	0.45