Initial Public Offerings' (IPOs) Capital Structure Choice

Empirical analysis on Leverage Changes

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Table of Contents

List of figures

List of tables

Abbreviations

CAPEX	Capital Expenditures
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CRSP	Center for Research in Security Prices
EBITDA	Earnings before Interest Taxes Depreciation and Amortization
GVKEY	Global company key Identifier
IPO	Initial Public Offering
M/B	Market to Book
PPE	Property Plant and Equipment
R&D	Research and Development
SEC	Securities Exchange and Commission
SIC	Standard Industry Code
U.S.	United States of America
WRDS	Wharton Research Data Services

Abstract

This paper examines the capital structure changes in an IPO event and the persistence of any leverage changes in a subsequent years after the IPO. The goal is to examine if managers attempt to time the market via an IPO event and issue equity while enjoying temporarily high market valuations. Moreover, in case of existence of market timing impact, the persistence of the capital structure change is researched in years after the IPO. As last part, the impact of high use of preferred shares in pre-IPO year firms is examined in order to evaluate the sensitivity of new economy firms on market conditions. As a dependent variable the changes on book leverage is investigated in IPO year and the years following the IPO event. As independent variables five commonly used variables related to firm characteristics are used and one dummy variable related to the market conditions in the period of the IPO event. My results evidence the existence of market timing effect in IPO year and in years after the IPO, supporting the theory that firms' capital structure is highly related to market valuations and is a significant determinant on the choice of debt or equity financing when external capital needs arise.

Keywords: Capital Structure, Trade-off theory, Pecking order theory, Market timing, Initial public Offerings (IPOs), Leverage ratio, Preferred stock.

1. Introduction

1.1. Capital Structure - Main Theories

Corporate capital structure has been a long lasting topic that scholars try to solve for many decades. The choice between debt and equity financing is accompanied with many risks and opportunities for the firms' growth and involves many different and crucial parameters that need to be taken into account. Thus, any decision of restructuring company's capital structure can lead to great profits or huge losses. Much research has been done around the underlying drivers of capital structure choice in order to reach to a concrete conclusion.

Established by Modigliani & Miller (1958) theory, on the cost of corporate capital, stating that in perfect capital markets the capital structure choice is irrelevant to the firm's value and shareholders' wealth. In Modigliani & Miller (1958) theory in perfect capital markets under a set of assumptions with no taxes, no transaction costs, no agency costs, no direct or indirect cost of bankruptcy and no asymmetric information it is evidenced that the choice between debt and equity financing is irrelevant to the firm's value. However, releasing many of these assumptions and setting a realistic imperfect capital market conditions other theories were deployed documenting how capital structure choice affects firm's value.

Trade-off theory is a commonly recognized theories related to firms' capital structure. In trade-off theory, corporates set an optimal debt ratio and adjust their capital structure in a trade-off between benefits and costs of debt issuing (Myers, 1984). The underlying perception is that debt associates with an interest tax shield and mitigation of agency costs, which benefit firms by paying less taxes and control managers' overinvesting behavior (Myers, 1984). However, increasing debt to high levels comes with the risk of an increasing possibility of financial distress and bankruptcy. Thus, trade-off theory states that there is an optimal leverage ratio which firms set as target and try to adjust their capital structure accordingly in order to maximize value while enjoying interest tax deduction with low financial distress risk (Myers, 1984).

Another contender theory around capital structure choice is the pecking order theory. In pecking order theory firms do not set a target leverage ratio but follow a hierarchy when it comes to capital

financing (Myers & Majluf, 1984). Main driver of this theory is the asymmetric information between managers and investors related to the fair value of the firm. Due to this gap of knowledge between the two parties, external financing becomes more expensive for firms and thus internal financing is preferred over external financing (Myers & Majluf 1984). In more detail, when it capital financing needs arise, firms use firstly internal funds like cash and marketable securities and only once internal funds are not sufficient, they turn to external financing. In case of external financing, based on pecking order theory firms prefer to issue safer securities first (debt), then hybrid securities (i.e. convertible bonds) if possible, and then riskier securities (equity). Riskier securities like equity entail higher level of asymmetric information and investors interpret any equity issuance as a negative sign of firms' fair value. Moreover, investors believe that firms issue equity only when their stock is overvalued, and thus equity becomes more expensive for the firm to issue (Myers & Majluf, 1984). As a result, pecking order theory states that equity issuance, usually called as last resort option, becomes the financing choice only when firms have reached their debt capacity and they can only issue junk bonds.

A relatively new theory comparing to the ones mentioned above, is the market timing theory. In this theory neither a target leverage ratio nor asymmetric information is the underlying driver that leads to the financing choice. The main concept of market timing theory is that firms try to exploit temporary market conditions, at least assumed by the issuers, and issue equity when high market valuations prevail since equity is assumed to be relatively cheap and repurchase equity when low market valuations prevail. As a result, market timing theory states that "capital structure is the cumulative outcome of past attempts to time the equity market" (Baker & Wurgler, 2002).

Apparently, much research has been done over the years around capital structure theories trying to compose a solid theory able to predict firms' behavior but results are still inconclusive. Nevertheless, capital structure choice remains a hot topic with controversial theoretical research and empirical evidence. Thus, every attempt of empirical analysis can be of great interest and contribution to the capital structure "mystery".

My research is deployed on firms' IPO event and distinguishes IPOs between hot-market issuers and cold-market issuers by following the methodology of Alti's (2006) research on IPOs. Although this proxy shows some differences between hot and cold market issuers does not manage to capture the impact of market timing effect as it is insignificant in most of my research results. However,

the results indicate the existence of market timing effect in the IPO year and in subsequent years after the IPO based on the market to book ratio proxy. The negative relation between the market to book ratio, which is clearly a proxy used to measure the market timing effect, and the leverage changes show that firms consider to issue debt or equity according to temporary market valuations. Moreover, the positive relation between market to book ratio and the change on equity, strengthens the market timing theory by indicating that equity even if entails higher asymmetric information costs is preferred by high market to book ratio firms. Furthermore, this behavior from firms with high market to book ratio does not change in subsequent years after the IPO year showing a long time effect of market timing on capital structure and rejecting the theory of a target leverage ratio that firms try to reach over time. In the last part of the thesis, IPO event is investigated based on Dudley & James (2016) theory between firms with and without preferred shares in the pre-IPO year. Following their theory, I set a broader sample selection of firms by allowing firms with leverage above one and preferred shares in the pre-IPO year to enter the sample in order to investigate the sensitivity of market timing theory on the potential sample selection bias to old economy firms which rely more in debt and are more sensitive to market conditions. I split the ending sample in two groups, firms with preferred shares in the pre-IPO year and firms without. According to the Dudley & James (2016) firms without preferred shares in pre-IPO are more likely to be involved in a market timing attempt since have more debt capacity in comparison to firms with preferred shares in pre-IPO year which seem to be less able to issue debt due to higher losses history in pre-IPO year and negative earnings, and thus have very low or not at all debt capacity. The results have shown the robustness of market timing effect in IPO year since market to book ratio remains negative and significant on leverage changes and positive and significant on equity changes. This means that firms with or without preferred shares in the pre-IPO year follow the market timing theory and issue equity while enjoying high market valuations regardless their debt capacity.

1.2. IPO event and Capital Structure

In an attempt to empirically investigate firms' capital structure choice I focus in a specific financial event that affects essentially firm's capital structure. Initial Public Offering (hereafter: IPO) is the event when a private firm decides to go public and register to a stock exchange. Firms need to fill

in all required information and documentation and after it is approved by SEC (Securities Exchange and Commission) they are registered in a stock exchange and are available to trade publicly. This decision plays a critical role for the firm's future evolution and that is why managers take into consideration market conditions and make a thorough research, including market conditions, before the decision is taken. The underlying reason for a private firm to go public is the freedom associated with diverse funding sources which in turn boost firms' capabilities of expanding or investing more intensively in projects without facing the limitations of private capital sources. However, public firms' freedom on capital is also associated with more responsibilities as public firms are forced by government and tax authorities to disclose their financial statements performance, usually quarterly, in order to inform existing and potential future investors with all the details related to firm's underlying value and current condition. Moreover, public firms are also rated by rating agencies (the Big three credit rating agencies; Moody's, Standard & Poor's, Fitch Group) regarding their credibility and probability of future default on existing debt and provide investors with an independent general view about corporate future solvency.

Apparently, IPO event is an ideal event for empirical analysis on corporate capital structure changes and tracking potential market timing attempts, since it can lead to radical changes on capital structure composition. IPO investigation can contribute into assessing the underlying drivers of debt-equity changes of IPOs and the consequences of these changes in both short and long term.

Intrigued by earlier research, the aim of this thesis is to examine the market timing effect on capital structure choice of an IPO event. Following similar methodology with previous literature (Alti, (2006), Baker & Wurgler, (2002)) I try to distinguish potential market timing attempts via an IPO event. In the last part of thesis, further focus is paid on preferred shares interpretation as it seems playing an increasingly important role over time on capital structure choice for many private firms, especially young start-ups, since entails a big fraction of pre-IPO capital structure (Dudley & James, 2016). The objective is to draw a conclusion related to the possibility of private companies to time the market and the persistence, if any, of the leverage changes over the years of a firm's life after the IPO event. This paper is structured in four sections. First section includes introduction and prior literature research results on firms' capital structure and IPOs in particular. Section two includes sample criteria selection and methodology. Section three consists of results, discussion

on findings and robustness. Section four draws the conclusions based on results in section three and limitations on the research.

The main research question of this paper is:

To what extent market timing determines an IPO financing choice and what is the long-run impact on capital structure?

2. Literature Review

2.1.Capital structure findings

There are many controversial theories around capital structure financing choice. Much research has been done in the past in order to conclude in one theory and find key determinants of capital structure choice but findings were not exclusive. Firm key characteristics like profitability, growth opportunities, tangible assets, size, R&D, industry leverage seem to play a significant role on the capital structure decision as are used commonly in previous literature research (Frank & Goyal, (2009), Rajan & Zingales, (1995), Lemmon et. al, (2008)). However, due to contradictory results the impact and the magnitude of the key determinants remains vague. Based on different firm characteristics and market conditions, trade-off theory, pecking order theory and market timing theory attempt to predict firms' behavior and the security, debt or equity, that firms decide to issue.

Fama & French (2002) focused on capital structure and firm profitability and investment opportunities. They found evidence that profitable firms use less external financing and satisfy investment opportunities by using internal funds first. Titman & Wessels (1988) and Rajan & Zingales (1995) found also a negative relationship between profitability and firm's market leverage. That is clearly a characteristic in favor of pecking order theory since it predicts that firms rely first in internal financing and only in case that internal funds are not sufficient, firms will turn to external financing. In contrast, trade-off theory fails to predict this behavior since it predicts that firms with high profitability should issue more debt in order to exploit the tax shield effect. Graham's (2000) findings stressing also the failure of trade-off theory by documenting that large profitable firms with low financial distress risk do not exploit tax benefits and use debt conservatively. Moreover, Fama & French (2002) found a negative relation between investment opportunities and debt. They evidenced that firms with high growth opportunities prefer to use equity instead of debt since financial distress is more likely and costly for high growth companies with volatile earnings. These results are opposed to pecking order theory predictions which state

that firms issue equity only when they have reached their debt capacity level. Trade-off theory manages to predict more successfully this behavior as high growth firms face higher financial distress costs, so try to keep low debt level. Frank & Goyal (2009) found also a negative relation between growth opportunities and leverage, interpreting it as evidence of growth firms' aversion on debt due to distress costs. Myers (1984) connected pecking order theory to investment opportunities by evidencing that firms try to balance current and future costs by controlling leverage and keeping it in low levels when future investing is expected to be intense. Since firms try to avoid issuing equity due to high level of asymmetric information controlling for debt capacity will help them to succeed their goal. In contrast, Jensen (1986) has found a positive relationship between profitability and leverage. He attributes this relationship on the fact that profitable firms face higher agency costs due to high free cash flows and by issuing debt they manage to tackle this problem since debt restricts managers' investment freedom. This behavior is in favor of trade-off theory supporting the existence of a target debt ratio that firms try to achieve on their capital structure.

Size is another proxy commonly used in literature for determining the capital structure. Fama & French (2002) have found a positive impact of size on debt level. They concluded that larger firms with less volatile earnings face less financial distress risks and use more leverage in their capital structure. Another important determinant of capital structure based on existing literature is the fraction of fixed assets to total assets. Tangibility, term used to express fixed assets fraction, is assumed to serve as a collateral and gives easier access to debt financing since tangible assets do not lose their value as much as intangible assets in case of a financial distress. Thus creditors are more willing to lend to companies with high tangibility (Rajan & Zingales, 1995). Harris & Raviv (1991) have also found a positive relationship between tangibility and debt. They argue that firms with more tangibility face less asymmetric information meaning that equity issue is less costly and more likely to happen than firms with low tangibility levels. Both capital structure theories predict this behavior as based on pecking order theory, less asymmetric information makes it easier for firms to issue debt when internal financing is not sufficient and trade-off theory predicts that mature firms with assets in place face less risk of defaulting in the future, thus issuing debt is more likely. Long & Malitz (1985) examined also the debt ratio in association with intangible assets. As a proxy for intangible assets used the R&D expenses, and found a negative relationship between intangible assets and debt. A behavior predicted by both capital structure theories as based on

trade-off theory, intangible assets can lose easily their value once a firm faces financial distress and based on pecking order theory intangible assets entail higher level of asymmetric information making debt issuance more costly.

Frank & Goyal (2007) examined the capital structure impact in association with the CEOs characteristics, ownership level and payment structure. Findings showed that CEOs having longer CEO tenure in the firm or have higher pay-for-performance compensation package, are associated with negative impact on debt level. In contrast, CEOs that have worked at more companies in the past or have an MBA degree or have high ownership level (more than 5%) are associated with higher debt level. The impact of CEOs behavior can also be connected with Graham & Harvey (2001) research in which they found that around 30% of respondents have a range of a target debt ratio. Controlling for industry leverage Frank & Goyal (2009) found that industries with high leverage have an impact on the firm's debt choice and affects positively firm's leverage level. Kayhan & Titman (2001) examined the impact of cash flows, investment expenditures and stock price history on debt ratio. They evidenced that historical prices have a strong influence on debt ratio and in many cases these effects are persistent for long period (at least 10 years). However, there is a slow reversal effect of debt ratio moving gradually towards a target leverage, a characteristic in line with trade-off theory. Hovakimian et al. (2001) found also strong evidence that when firms make adjustments on their capital structure tend to move towards a target debt ratio. Korteweg (2010) has evidenced a more dynamic form of trade-off theory by relating the adjustment costs of moving towards the target ratio. He argued that adjustment costs (costs of new debt or equity issuance) could be the reason that firms, only partially converge to a target leverage ratio. Meaning that firms set a more dynamic target leverage ratio which could mildly change over time if the adjustment costs of moving back to initial target ratio are higher than diverging from it. Welch (2004) examined also the relationship between debt ratio and historical stock price returns and found a negative relationship with market leverage. These results can be connected with the market timing theory which advocates that past performance of stock price influences the choice of debt or equity issuance.

Kisgen (2006) investigated the capital structure choice in relation to credit ratings. He found that firms close to a credit rating change, upgrade or downgrade, issue less debt than equity comparing to firms that credit rating is not likely to change. This behavior is linked with the change of debt

and equity costs associated to a credit rating change but is not directly linked with any of the traditional capital structure theories. Kisgen (2006) stressed the importance of credit ratings for potential investors since could be interpreted as extra information on the quality of the firm beyond the available public information. Baker & Wurgler (2002) evidenced that firms try to exploit temporary high market valuations and issue more equity than debt since the cost of equity is relatively cheaper and repurchase equity when market valuations are low. Based on their findings, they concluded that "capital structure is the accumulated outcome of past attempts to time the market". Flannery and Rangan (2006) also supported market timing theory as showed that firms are likely to issue stock after a period of high stock price.

Findings of many researches are convincing and indicate that equity market timing theory is the underlying reason of leverage changes and that the new capital structure composure stays relatively unchanged in long-run (Barkley & Wurgler, 2002, Lemmon et al., 2008). In contrast to this long lasting effect, Alti (2006) documented that equity market timing is responsible for change on leverage ratio but the impact of debt-equity change lasts for a short period and issuers try to offset the leverage change quickly by issuing more debt in subsequent years, so as to bring debt-equity ratio back to initial level. Alti's (2006) findings on Initial Public Offerings event support that market timing indeed affects capital structure but only in short term, totally offset by the end of second year after IPO year, and that in long-term trade-off theory, a target leverage ratio, is the one that firms follow and adjust their capital structure accordingly. Evidence from Kaplan and Zingales (1997) are in favor of pecking order theory as they showed that companies which are more profitable make excessive use of internal funding to finance their investments, despite the option of low cost external funding (debt issuing) since the risk of default is low.

In contrary, Graham (2000) showed that high profitable firms are significantly under-valued and they could benefit essentially by targeting on a leverage ratio and take on more debt as trade-off theory predicts. Malmendier & Tate (2008) showed that capital structure could be influenced by managers' overconfidence who issue more debt when financing needed because they assume that firm value is undervalued. Hackbarth (2008) supports these evidence by showing that debt level is higher for firms with overconfident managers. Graham & Harvey (2001) found also that CFOs rely significantly on past stock performance before they decide to issue equity. In anonymous surveys CFOs admitted that past stock performance is one of the most important drivers on the

external capital funding decision, another conclusion in favor of market timing impact on capital structure choice.

2.2. *IPOs prior findings*

Focusing on Initial Public Offerings (hereafter: IPOs) capital structure changes we conclude that literature results are also inconclusive. Capital structure can be even more complicated when it comes to IPOs. IPO event is a one-time event during firm's "life" and a unique opportunity to issue equity without incurring the impact of a negative signal to markets, thus it is likely to be associated with a capital structure theory. However, capital structure determinants are more complex to be examined since there is not so much information about the firm's past performance. Also, many firms due to their asset characteristics or due to limitations of financing covenants do not have the privilege of choice between debt or equity issue. Many firms that go public may have already reached their debt capacity and since they face even higher asymmetric information equity issuance could be the only choice (Dudley & James, 2016).

As previous literature have documented when it comes to IPOs capital structure examination, exclusion of firms with negative equity may be incorrectly applied as it could lead to sample bias towards old and mature firms (Dudley & James, 2016). Following Dudley & James (2016) approach, in the last part of the thesis focus is paid on preferred stock interpretation as it occupies a big portion of private firm assets and the treatment of it as debt or equity type security could lead to sample bias and controversial conclusions. In most papers, preferred stock is treated as debt since it has a liquidation priority comparing to common shares in case of a bankruptcy and provide fixed dividend payments to shareholders. These characteristics of preferred stocks induce many researchers to treat preferred stocks as debt and not as equity instrument (Alti, 2006, Baker & Wurgler, 2002). However, this decision comes along with a strong impact related to the IPOs final sample selection and can lead to adverse sample bias (Dudley & James, 2016). Based on previous literature in order to ensure a capital structure sample quality all firms that have negative equity prior the IPO year should not be included in the sample (Baker & Wurgler, 2002).

In case of IPOs though, it means that the ending sample may suffer from specific firm category bias since it excludes all firms with negative equity. On a further investigation it can be realized

that when it comes to IPOs the majority of firms with negative equity are usually start-ups which rely heavily on a staging finance and preferred shares are a big fraction of firm's assets (Dudley & James, 2016). As a result, excluding firms with negative equity before the IPO it carries a risk that the final sample includes mostly more old economy type big and established firms with lots of profits and excludes a significant amount of new economy start-ups (Dudley & James, 2006). In contrary, some would say that excluding firms that do not have debt financing option would lead to better sample results and more accurate market timing investigation on IPOs. In the end, capital structure research should be carried out on a sample of firms that have the option of issuing debt or equity in order to make sense (Baker & Wurgler, 2002). Following this choice Baker & Wurgler (2002) evidenced that market timing is the utmost driver that leads companies to the choice of equity or debt issuance. Moreover, it is shown that capital structure changes are persistent in the upcoming years after issuance and do not change rapidly (Baker & Wurgler, 2002). Finding similar results but short period impact, Alti (2006) has concluded that market timing may have a strong impact on capital structure choice but only in short period. In case of equity issuance choice due to high market valuations, firms seem to reverse the leverage drop by issuing soon debt in order to reach back to initial leverage ratio. Based on Alti's (2006) results the reversal attempt is so effective that by the end of the second year after the leverage drop has been offset totally. In contrast, Dudley & James (2016) evidenced that by adding firms with negative equity in pre-IPO year in the sample and treating preferred stock as equity there is no leverage transition around an IPO and firms do not seem to issue opportunistically equity (Dudley & James, 2016).

In summary, previous research has evidenced many contradictory results related to firms' capital structure behavior and theories associated with capital structure. As proved earlier, none of the theories can predict all firms' capital structure behaviors successfully and dominate as the proper theory of capital structure interpretation. Trade-off theory fails clearly to predict profitable firms' behavior since based on the theory, these firms should issue more debt to exploit higher levels of tax shield and as was documented on the literature this is not the case for profitable firms which rely heavily on internal funds. Pecking order theory predicts also successfully many capital structure behaviors but fails to predict behavior of high growth firms. In this case, based on pecking order theory, firms should issue equity only when they have reached debt capacity levels. But as

was evidenced on literature many firms prefer to issue equity even when debt capacity level is not reached yet. Trade-off theory predicts better this behavior by stating that these firms have more volatile earnings and a potential financial distress will be much more costly. Moreover, market timing theory predicts successfully high growth firms' behavior by attributing it as a chance for firms to exploit temporary high market valuations. On the other hand, market timing theory fails significantly to predict firms' capital structure behavior when market valuations are not over or undervalued comparing to fair values.

3. Research Hypotheses

According to prior literature review findings, I have formulated three hypotheses and I expect these hypothesis to hold for U.S. IPOs capital structure during the period 2000 – 2019.

Hypothesis 1: IPO event is highly related to market timing effect.

Based on prior findings (Baker &Wurgler, (2002) and Alti, (2006)) there is a strong impact of market valuation on IPOs capital structure choice. Managers try to exploit temporary fluctuations on cost of equity and issue shares when there are high market valuations as equity becomes relatively cheap to issue. For that reason, I expect to find higher percentage of equity issuance on IPO event during high market valuations comparing to low market valuations. Moreover, I expect to find a higher negative impact on leverage associated to market timing effect.

Hypothesis 2: Capital structure remains relatively unchanged in subsequent years after IPO event.

Baker & Wurgler (2002) examined the market timing effect on corporate capital structure and found that ending capital structure composure is highly related to past attempts to time the market. Moreover findings showed that the effect of market timing stays persistent over the years. On the

other hand, Alti (2006) found only a short-run impact of market timing on leverage levels. Based on the findings I expect to find no significant change of capital structure on subsequent years after the IPO event.

Hypothesis 3: Market timing impact on corporate capital structure is sensitive to sample selection and to specific treatment of preferred stock.

Dudley & James (2016) reviewed findings on market timing effect on capital structure and found that the results are sensitive to sample selection and preferred stock treatment. They evidenced that new economy firms rely heavily on preferred stock and the interpretation of preferred stock as debt security excludes a significant number of firms from the sample due to negative equity restrictions. As a result the final sample suffers from a bias on mature firm category. Once preferred stock is interpreted as equity on capital structure and all firms with negative equity and preferred shares in pre-IPO year are included in the sample the market timing effect disappears. Based on these findings I expect to find no market timing effect once firms with negative equity and preferred stock in pre-IPO year are included in the sample.

4. Data & Methodology

The following section describes the methodology used in the research to empirically test the hypotheses formulated in the previous section. Based on previous research, I use book leverage as the dependent variable in order to track potential capital structure changes and capture any market timing effect. My research is deployed in three parts. In first part, I present the means of IPOs and run regressions on book leverage in order to track any potential market timing effect on IPO issuance by splitting the sample into Hot and Cold market periods following Alti's (2006) methodology. Then, I investigate the duration, if any, of market timing effect in the years after the IPO period by running regressions on two successive years after the IPO year so as to draw a conclusion of short or long term effect. In third part, following Dudley & James (2016) research findings, I restate the definition of book debt by treating preferred stocks as equity instead of debt and including negative equity firms only when had preferred shares in their pre-IPO year capital structure. After this, I run regressions on book leverage in order to measure the sensitivity of market timing effect on a broader sample of firms and examine any potential sample bias towards mature firm type sample on the first part.

Variables used in the research are defined as follows. Book Debt is defined as total liabilities plus preferred stock minus deferred taxes and convertible debt. Book Equity is defined as total Assets minus book Debt. Then, book Leverage is defined as the ratio of book Debt over total Assets. Net Debt, is defined as the debt change in successive years over total Assets. Net equity is measured as the equity change minus the retained earnings change in successive years, over total assets. Net retained earnings change is measured as retained earnings change in successive years over total Assets. Market-to-Book ratio (M/B) is defined as book Debt and market Equity, over total Assets. Profitability is measured as earnings before interest, taxes, depreciation and amortization (EBITDA) over total Assets, Tangibility is the ratio of Property, Plant and Equipment (PPE) over total Assets, Size is the logarithm of Sales, Investments measured as the ratio of capital expenditures (CAPEX) over total Assets and Cash is measured as the ratio of Cash over total Assets. Except market to book ratio and size all other variables are estimated in percentages. More details related to the proxies used and the expected impact on capital structure changes are provided in methodology section.

4.1. Data Selection

My initial sample is collected from two data sources. First, I collect all firms listed in COMPUSTAT – Capital IQ. The time period applied is 2000-2019. Then, I take all IPOs sample that took place within this period from J. Ritter's website and included IPOs that were not included in his sample but found in WRDS database under the CRSP/Compustat merged section. After that, I merge the two final datasets by using the GVKEY as a unique identifier. The reason that I used the GVKEY as a key identifier is that it remains unchanged during the life of firms' listing so in this way I ensure that changes on name or cusip will not affect my sample. Afterwards, I edit my sample by setting some filters which help me avoid extreme outliers and be consistent with previous literature research restrictions. Firstly, I exclude all financial firms (SIC 4900-4999) and all utility firms (SIC 6000-6999) as their capital structure is likely to deviate significantly from rest firms in sample due to heavy regulations and special treatment. Secondly, I exclude all observations with no book assets or lower than 10 million at the end of the IPO fiscal year. Also, as in Alti's (2006) and Baker & Wurgler (2002) I drop observations with book leverage more than one since these firms have a negative equity and should not be taken into account. Furthermore, I drop all firms with market to book ratio higher than 10. After that, I exclude all firms with no asset and debt information before the IPO fiscal year as in that case I cannot run the comparison of leverage changes before and after the IPO fiscal year. Moreover, I drop observations with extreme outliers in each year regarding firm characteristics and all observations with values that exceed 100% in absolute values regarding net debt issues, d/A, net equity issues, e/A, change in retained earnings, ΔRE/A, Profitability, EBITDA/A, and Investments, CAPEX/A. It is worth to mention that the decision to drop all firm observations with leverage ratio above one results to a massive drop of pre-IPO observations (45% of initial pre-IPO sample). Thus, in the third part of my research, in order to examine the sensitivity of my results related to the sample selection bias, I restate the definition of debt by including firms with leverage above one only in case that had preferred shares in pre-IPO year and drop only the ones that their leverage ratio still exceeds one but had no preferred shares. As mentioned in introduction, in this way I will manage to analyze the sensitivity of the results and any possible bias of the ending sample selection towards mature type firms and will be able to analyze the capital structure changes in a wider sample including all firm types (Dudley & James, 2016).

4.2. Determinants of Capital Structure changes

This research is focused on the book leverage changes in year-end period as the dependent variable in order to track capital structure changes. As independent variables I use proxies that are commonly used in literature and have proved to have strong explanatory power on leverage changes (Rajan & Zingales, (1995), Harris & Raviv, (1991), Titman & Wessels, (1988), Baker & Wurgler, (2002), Frank & Goyal, (2003), Fama & French, (2002)). To control for firm characteristics I use five key determinants which seem capable of capturing the leverage changes. Moreover, in order to control for market conditions I use proxy Hot, a dummy variable as used by Alti (2006), which is related to the volume of IPOs issued on each period/month in comparison with a three-month moving median IPOs volume. This variable helps to distinguish periods that equity financing is assumed to be temporarily cheap and translate the period into hot or cold market period. More details on the key determinants and the use of them are provided below.

4.2.1. Firm characteristics determinants

- Market-to-Book ratio
    - As it is evidenced in literature market-to-book ratio is a proxy used as a future growth opportunities indicator. Firms with high M/B ratio are assumed to have high growth opportunities comparing to firms with low M/B ratio. Thus, a negative relation is expected between M/B ratio and leverage since firms with growth opportunities have more volatile earnings and refrain from debt issuance due to higher risks of financial distress in case of a downturn.

- Profitability
    - Measured as a percentage of EBITDA to total book value of assets. Profitability seems to play a key role on leverage as it is evidenced in literature. According to pecking order theory, profitability is expected to have a negative impact on leverage as the theory supports that more profitable firms prefer to use internal financing due to no asymmetric information costs and only in case that internal financing is insufficient to turn to external funding (Myers & Majluf 1984). However, Jensen (1986) documents that profitable firms face more agency costs and by increasing

debt levels helps to mitigate free cash flow costs. For that reason profitability impacts positively leverage. Evidence in most research are in favor of pecking order theory. Thus, I expect to find a negative relation between profitability and leverage.

- Tangibility
    - Asset tangibility is measured as a percentage of Plant-Property-Equipment over total assets. Based on literature tangibility is used as a collateral when firms want to issue debt. Fixed assets keep their liquidation value in case of a bankruptcy, so banks and other possible lenders provide financing easier comparing to firms with low ratio of tangible assets. Thus higher tangibility is expected to be associated with higher leverage.

- Size
    - Size is measured as a log of (net) sales. Based on literature big firms are more diversified and established with less risk of defaulting. Thus, size is expected to be positively related with leverage.

- Investments
    - Is measured as the ratio of capital expenditures (CAPEX) over total assets. This proxy controls for expenses incurred related to future investments and is expected to have a positive impact on leverage, as more investment opportunities urge for more capital needs.

4.2.2. Market conditions

- HOT
    - This proxy is related to Hot and Cold equity markets and controls for market conditions. I followed the same methodology used in Alti's (2006) paper to measure Hot proxy. The way of measuring hot, is based on volume of firms in a period. If the volume of firm issuers that went public in a month is above the median of a

three month moving window median (previous month, current month, next month) is assumed as a Hot equity market and should be associated with more equity issuance. In contrast, if volume of issuers in that period is below median is assumed a Cold equity market and equity issuance should not exceed the necessary level Alti (2006).

4.3. Regression Model

In order to measure the impact and the magnitude of the determinants mentioned above I use a regression model on book leverage change.

$$\frac{D}{A_t} - \frac{D}{A_{t-1}} = a + \beta_1 HOT + \beta_2 \frac{M}{B_t} + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 Size_{t-1} + \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 \frac{CAPEX}{A}_{t-1} + \beta_7 \frac{D}{A_{t-1}} + \varepsilon_t$$

On the left part of the equation is the change in leverage in a fiscal year-end and on the right part of equation control variables are included for market conditions and firm characteristics. Period *t* refers to the IPO year and period *t-1* refers to pre-IPO period, and each successive year period *t* refers to current year-end and period *t-1* is referred to the lagged year-end period. Proxy Hot, a dummy variable, which takes value 1 if it is a period with IPOs volume higher than the respective three-month median period and 0 otherwise. M/B ratio controls for firm's growth opportunities by measuring the ratio of market assets to book assets value. EBITDA/A controls for firm's profitability by measuring the ratio of earnings before interest taxes and depreciation over assets value. Size is measured by using the log of sales value which captures the firm's size. PPE/A is used as a proxy for tangibility of assets measured by a ratio of plant, property and equipment value over assets value. Investments is measured as the ratio of Capex over total Assets. The last proxy, lagged leverage, contributes in controlling for the impact of the rest variables. As Baker & Wurgler (2002) have advised, leverage can only move from zero up to one and the opposite. So when is close to the one boundary it can only move to the other direction, thus not including lagged leverage can dilute the impact of the rest variables.

5. Results

Table 1 reports the descriptive statistics of the book leverage changes, the net debt changes, the net equity changes and the net retained earnings changes for the whole sample. The mean values of the variables mentioned are reported for the year before the IPO, the IPO year and 5 successive years after the IPO. In this way I am tracking any potential changes and shifts to other securities issuance in each year. My results are consistent with the literature regarding the IPO leverage changes and the security chosen. As expected, book leverage drops significantly in the IPO year from 57% on average to 35% and the security responsible for this change is the issuance of equity. Average debt issuance contributes a minor part in the IPO year capital issuance. However, the book leverage increases steadily over the years after the IPO year and the average debt issuance keeps increasing. In contrast the equity issuance follows the opposite direction by decreasing each year over the years after the IPO. Change in retained earnings shows that profitability of firms that go public drops significantly in the years after the IPO.

Table 1

Summary Statistics of IPOs Capital Structure and Financing Security Choice (All Firms)

Book Leverage is estimated as the ratio of Book Debt divided by Total Assets (expressed in percentage), Market Leverage is estimated as the ratio of Book Debt divided by Total Assets minus Book Equity plus Market Equity (expressed in percentage), d/A is measured as the Book Debt change between successive years divided by Total Assets (expressed in percentage), e/A is estimated as the Book Equity change between successive years divided by Total Assets (expressed in percentage), ΔRE/A is estimated as the change in Retained Earnings between successive years divided by Total Assets (expressed in percentage).

All Firms	Number of Firms	Book Leverage %	d/A %	e/A %	ΔREA/A %
YEAR		Mean	Mean	Mean	Mean
Pre-IPO	1547	57.0	-	-	-
IPO	2496	36.1	3.1	35.3	-1.6
IPO + 1	2233	38.1	5.9	12.5	-9.6
IPO + 2	1882	40.4	4.9	10.6	-9.9
IPO + 3	1638	42.1	4.8	9.6	-7.7
IPO + 4	1419	43.0	3.5	8.6	-6.7
IPO + 5	1174	43.0	3.6	7.4	-5.8

In Table 2 I present the summary statistics of firm characteristics. Profitability, Tangibility, Investments, Cash are all expressed in percentages. Results show that, M/B ratio starts decreasing over the years after the IPO year. Profitability drops significantly during the IPO year, something that was already noticed from the change in retained earnings, and keeps being negative in successive years after the IPO year. Tangibility drops in IPO year probably due to the inflow of capital and allocation to current assets accounts but increases in next periods and Investments percentage drops after the IPO year. Size increases over the time which is an indication of age effect and Cash increases significantly during the IPO year as there is a high inflow of capital added to firm's assets and ending up in cash account and decreases in years after the IPO year.

Table 2

Summary Statistics of Leverage Determinants (All Firms)

Market to Book ratio is measured as Book Debt plus Market Equity divided by Total Assets, Profitability is measured as EBITDA divided by Total Assets (expressed in percentage), Tangibility is measured as Property, Plant and Equipment value divided by Total Assets (expressed in percentage), Size is measured as the logarithm of Sales value, and Investments is measured as the Capital Expenditures divided by Total Assets (expressed in percentage), Cash is measured as cash divided by Total Assets (expressed in percentage).

All Firms	Number of Firms	Market to Book	Profitability %	Tangibility %	Size	Investments %	Cash %
YEAR	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Pre-IPO	1547	-	3.4	39.6	2.1	8.0	18.1
IPO	2496	2.7	-1.5	28.3	2.1	6.5	29.8
IPO + 1	2233	2.4	-3.1	32.9	2.2	6.7	24.2
IPO + 2	1882	2.2	-1.4	37.1	2.3	5.8	22.1
IPO + 3	1638	2.2	0.0	39.7	2.4	5.4	21.0
IPO + 4	1419	2.1	1.4	41.7	2.4	5.2	19.5
IPO + 5	1174	2.0	2.9	44.5	2.5	5.2	18.7

As a next step I split the sample in two groups, Hot/Cold markets, and present the summary statistics of both groups for the same variables presented in Table 1 and in Table 2 in order to examine if there is any significant difference between the two groups. Figure 1 shows the distribution of IPOs volume from 2000 – 2019. In a total volume of 4,134 IPOs which took place

during that period, 73% of the IPOs were issued in a hot market period. This means that 3,118 firms went public when the market was assumed as hot by managers and only 1,016 firms went public during the Cold period. Table 3, shows the summary statistics of hot and cold market issuers. In contrast, to expectations both groups do not seem to differ significantly. In both groups Leverage drops around 20% in the IPO year and increases in next years. It is worth to mention that cold issuers seemed to be more levered in pre-IPO year, average leverage in pre-IPO year is 59% versus 57% of hot issuers' pre-IPO leverage ratio. Hot period issuers seem being around 2% less levered comparing to Cold issuers over the years but as a percentage change of leverage in both groups drops the same. Net debt changes in IPO year differ more between the two groups as hot issuers seem relying less in debt issues in the IPO year, only 2,7% against a 4,8% of debt issuance for cold issuers. Less reliance on debt issues can be confirmed by the net equity issuances which are higher for hot issuers by 2% more on average versus cold issuers. Also hot issuers' retained earnings are more negative on average versus cold issuers, a fact that can be linked with the perception that less profitable firms entering the market in hot periods as it is easier for these firms to raise capital during hot market periods (Alti, 2006). Another point to notice is that for both groups in the years after the IPO, equity issuances are much more limited and debt issuances increase significantly.

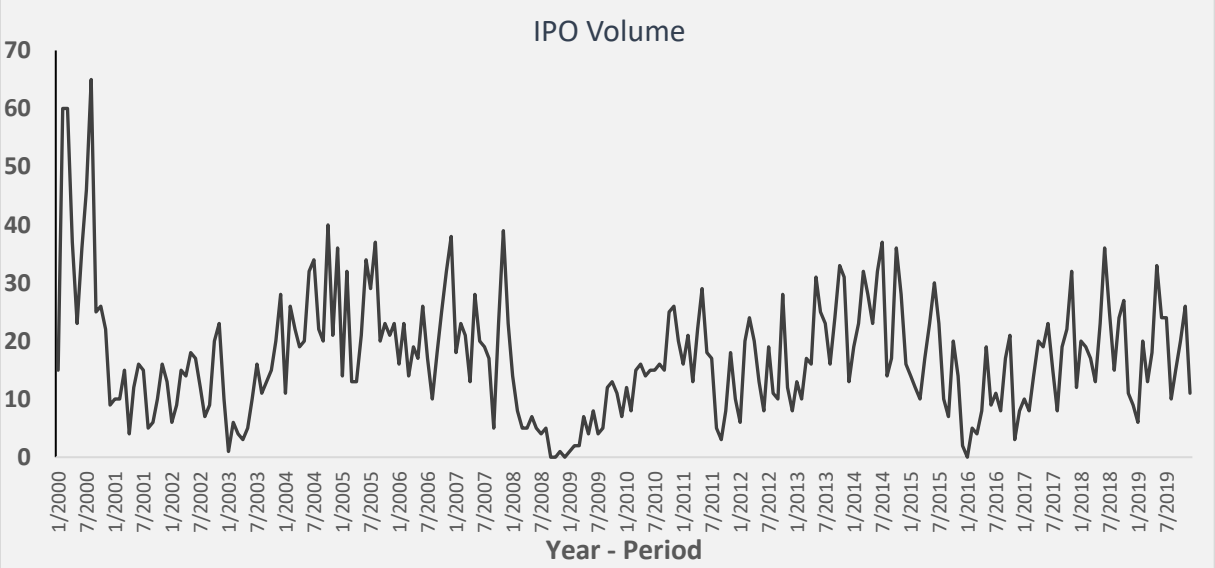

Figure 1

Sample Period: 2000 - 2019

Table 3

Summary Statistics of IPOs Capital Structure and Financing Security Choice (Hot/Cold)

Book Leverage is estimated as the ratio of Book Debt divided by Total Assets (expressed in percentage), Market Leverage is estimated as the ratio of Book Debt divided by Total Assets minus Book Equity plus Market Equity (expressed in percentage), d/A is measured as the Book Debt change between successive years divided by Total Assets (expressed in percentage), e/A is estimated as the Book Equity change between successive years divided by Total Assets (expressed in percentage), ΔRE/A is estimated as the change in Retained Earnings between successive years divided by Total Assets (expressed in percentage). Market is assumed as Hot when the month IPO volume exceeds the three-month median and Cold otherwise.

Hot/Cold	Number of Firms		Book Leverage %		d / A %		e / A %		ΔRE / A %	
YEAR	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold
Pre-IPO	1299	248	56.6	59.2	-	-	-	-	-	-
IPO	2107	389	35.6	38.9	2.7	4.8	35.6	33.4	-1.5	-1.1
IPO+1	1866	367	37.5	41.6	6.1	4.9	12.8	11.1	-9.7	-9.0
IPO+2	1568	314	39.9	42.8	4.9	4.6	11.1	8.3	-10.1	-8.9
IPO+3	1345	293	41.6	44.3	4.8	4.7	9.7	9.0	-7.9	-6.7
IPO+4	1171	248	42.7	44.4	3.8	2.2	9.0	6.9	-6.7	-6.6
IPO+5	972	202	42.7	44.4	2.6	2.5	7.4	7.5	-5.6	-6.5

Table 4 reports summary statistics on firm characteristics for the two groups. Both groups again do not show essential differences. Market to book ratio for both groups is similar over the years meaning that hot issuers do not seem having more growth opportunities than cold issuers. However, a difference can be noticed when it comes to profitability. Hot issuers seem less profitable as the mean for hot issuers is almost the same with Cold issuers in IPO year but remains lower over the years after the IPO year, supporting again the fact that hot market conditions attract less profitable firms (Alti, 2006). Moreover, hot market firms have less tangibility meaning that debt obtaining could be more difficult for hot issuers since tangibility serves as a collateral for debt issuance (Dudley & James, 2016). Investment level is similar in both groups meaning that both hot and cold issuers invest at similar level so higher capital raising cannot be attributed to higher investment activity of hot market firms. Cash is much higher for hot market firms (3,5% higher versus cold market firms) in the IPO year, meaning that due to favorable market conditions hot issuers have the chance to raise more equity and the higher proceeds can be reflected in cash. However, in years after IPO year both groups converge their cash levels to similar rates.

Table 4
Summary Statistics of Leverage Determinants (Hot/ Cold)

Market to Book ratio is measured as Book Debt plus Market Equity divided by Total Assets, Profitability is measured as EBITDA divided by Total Assets (expressed in percentage), Tangibility is measured as Property, Plant and Equipment value divided by Total Assets (expressed in percentage), Size is measured as the logarithm of Sales value, and Investments is measured as the Capital Expenditures divided by Total Assets (expressed in percentage), Cash is measured as cash divided by Total Assets (expressed in percentage). Market is assumed as Hot when the month IPO volume exceeds the three-month median and Cold otherwise.

Hot/Cold	Market to Book		Profitability %		Tangibility %		Size		Investments %		Cash %	
YEAR	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold	Hot	Cold
Pre-IPO	0.7	0.7	3.1	4.6	39.5	40.4	2.1	2.2	7.9	8.5	18.7	14.9
IPO	2.7	2.6	-1.5	-1.4	28.1	29.5	2.1	2.1	6.5	6.7	30.3	26.8
IPO+1	2.4	2.3	-3.3	-2.0	32.6	34.2	2.2	2.3	6.7	7.1	24.5	22.2
IPO+2	2.2	2.1	-1.6	-0.4	36.9	38.1	2.3	2.3	5.8	5.9	22.7	18.9
IPO+3	2.2	2.2	-0.2	1.1	39.9	39.2	2.3	2.4	5.4	5.3	21.3	19.5
IPO+4	2.1	2.0	1.4	1.5	41.5	42.6	2.4	2.5	5.2	5.3	19.7	18.5
IPO+5	2.0	2.2	2.7	3.9	43.8	47.6	2.5	2.5	5.1	5.9	18.7	18.5

In table 5 I run the regressions on the change of leverage, the level of current year leverage, change on net equity and change on retained earnings in the IPO year. As expected, the impact of hot market issues has a negative effect on the change on leverage. The coefficient of hot proxy is negative, -0,027, and significant meaning that there is a market timing effect and hot-market firms reduce their leverage more than cold-market firms in the IPO year. Firms try to exploit favorable market conditions due to market mispricing by issuing more equity during hot-market periods. Market to book ratio has also a negative impact on leverage changes due to favorable market conditions, with a significant coefficient of -0,018 meaning that higher growth firms are associated with higher decrease in leverage in IPO year as they try to exploit temporary high market valuations. The coefficient of profitability impacts negatively the change of leverage in IPO year, meaning that more profitable firms rely more on internal funds and raise external funds only if retained earnings are not sufficient. Size has a positive impact on leverage change, as higher sales are interpreted with more stable earnings and less possibility of financial distress, thus easier access to debt markets. Tangibility impacts positively the change of leverage but the coefficient is small

and insignificant. Investments level is related negatively with leverage changes but the coefficient is insignificant.

Similar results on signs and significance are found when the model is regressed on year-period leverage. Hot coefficient impacts leverage negatively and is significant at 5% significance level. Market to book ratio, profitability and size reduce leverage for the same reasons as in leverage changes. Coefficients are negative and significant for the three proxies indicating the fact of market timing in the IPO year. Tangibility and Investment level are negative and positive respectively but have no significant impact on leverage. In contrast, hot and market to book proxy become positive when the model is regressed on net equity changes. In line with market timing theory, hot market coefficient turns positive in IPO year but becomes insignificant meaning that equity capital raised in IPO year does not differ significantly between hot and cold market firms. Market to book ratio turns positive and the coefficient, 0.033, remains significant indicating a stronger relation of market valuations on equity issuance than hot/cold proxy. Profitability remains negative and significant, coefficient -0,089, as more profitable firms cover their financing needs with internal funds. Sizes has a negative and significant impact on equity changes, which could be interpreted as a fact that bigger firms have access to debt markets and prefer issuing debt due to lower asymmetric information than equity when external financing is needed. Coefficient of Investments becomes positive and significant (0,146), meaning that high investment expenses lead to equity issuance as in many cases financing cannot be covered fully by internal funds or debt raising. Lastly, results of the regression on retained earnings show that the only proxy remaining significant for the change on retained earnings is the profitability which is positively related (0,308). Both hot and market to book ratio coefficients have no significant impact on the change of retained earnings.

Table 5
Regression Analysis
(IPO Year)

Time period 2000-2019. The dependent variable is mentioned at the top of each column and all regressions are referred to the period of IPO year. Market is assumed as Hot when the month IPO volume exceeds the three-month period moving median and Cold otherwise. T-Statistic is reported in parenthesis. The model used in regression is

$$Y = a + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 Size_{t-1} + \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 Investments_{t-1} + \beta_7 \frac{D}{A}_{t-1} + \varepsilon_t$$

	$\frac{D}{A_t} - \frac{D}{A_{t-1}}$	$\frac{D}{A_t}$	e/A_t	$\Delta RE/A_t$
HOT	-0.027**	-0.033**	0.014	0.010
	(-2.02)	(-2.23)	(0.80)	(-1.28)
M/B_t	-0.018***	-0.018***	0.033***	-0.002
	(-5.89)	(-5.12)	(8.09)	(-1.09)
$Profitability_{t-1}$	-0.147***	-0.165***	-0.089***	0.308***
	(-6.02)	(-6.05)	(-2.80)	(16.21)
$Size_{t-1}$	0.114***	0.148***	-0.188***	0.008
	(17.19)	(20.74)	(-21.67)	(1.63)
$Tangibility_{t-1}$	0.023	-0.012	-0.030	-0.021
	(1.65)	(-0.77)	(-1.60)	(-1.94)
$Investments_{t-1}$	-0.016	0.058	0.146**	0.042
	(-0.35)	(1.10)	(2.34)	(1.13)
$\frac{D}{A_{t-1}}$	-0.635***	-	0.265***	0.038***
	(-31.85)		(10.16)	(2.46)
Constant	0.011	0.163	0.517	-0.078
R^2	0.4959	0.3150	0.4241	0.2174

In table 6 I run the same regression for two successive years after the IPO year in order to investigate the persistence of the IPO firms' capital structure choice. As it can be noticed, hot coefficient remains negative for the IPO+1 and IPO+2 year indicating that hot-market firms continue reducing their leverage ratio more comparing to cold-market firms, but the coefficient is insignificant. This indicates that the hot market impact had a weak effect in IPO year that is already gone in years after the IPO. The impact of market to book ratio remains negative and significant on the change of leverage, -0,006 and -0,004 in years IPO+1 and IPO+2 respectively, showing that firms with high market valuations continue reducing leverage in years after the IPO. Profitability remains negative and significant for both years after the IPO indicating again the fact that profitable firms remain averse to debt issuance levels and prefer using first internal financing over external. Size is positive for both years but insignificant for the IPO+2 year meaning that firms with higher sales have less volatile earnings and issue more debt. Tangibility is positively related with leverage changes but insignificant in IPO+2 year, indicating that it serves as a collateral when debt capital needs to be raised. Investment level is positive but insignificant in both years after the IPO.

Net equity changes are positively impacted by hot-market coefficient in years after the IPO but the hot coefficient (0,008 and 0,025) is insignificant for both years. The insignificance of hot coefficient in both cases of leverage and net equity changes indicates that hot markets do not have a strong impact on IPOs capital issuance. This could explain also the small differences found in means when distinguishing between hot and cold market firms. On the other hand, market to book ratio seems having a stronger and more resilient impact over years since it remains positive and significant to equity changes for both years after the IPO indicating that there is a market timing effect that firms with high market evaluations try to exploit consistently.

Table 6
Regression Analysis
(IPO+1 & IPO+2)

Time period 2000-2019. The dependent variable is mentioned at the top of each column and all regressions are referred to the years after the IPO. Market is assumed as Hot when the month IPO volume exceeds the three-month period moving median and Cold otherwise. In parenthesis is reported the t-Statistic. The model used to the regression is

$$Y = a + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 Size_{t-1} + \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 Investments_{t-1} + \beta_7 \frac{D}{A}_{t-1} + \varepsilon_t$$

	$\frac{D}{A_t} - \frac{D}{A_{t-1}}$		$\frac{D}{A_t}$		e/A_t		$\Delta RE/A_t$	
	IPO+1	IPO+2	IPO+1	IPO+2	IPO+1	IPO+2	IPO+1	IPO+2
HOT	-0.000	-0.002	-0.026***	-0.022	0.008	0.025	-0.002	-0.004
	(-0.06)	(-0.31)	(-2.14)	(-1.73)	(0.79)	(2.44)	(-0.21)	(-0.43)
M/B_t	-0.006***	-0.004***	-0.007***	-0.005	0.024***	0.027***	0.012***	0.015***
	(-3.95)	(-2.58)	(-2.42)	(-1.57)	(9.93)	(10.58)	(5.43)	(6.67)
$Profitability_{t-1}$	-0.124***	-0.086***	-0.286***	-0.279***	-0.339***	-0.401***	0.788***	0.730***
	(-7.02)	(-5.85)	(-9.78)	(-9.66)	(-13.47)	(-16.63)	(34.56)	(33.51)
$Size_{t-1}$	0.015***	0.006	0.142***	0.153***	-0.050***	-0.017***	0.030***	0.027***
	(3.32)	(1.56)	(21.82)	(20.04)	(-7.96)	(-2.52)	(5.25)	(4.19)
$Tangibility_{t-1}$	0.059***	0.017	0.144***	0.178***	0.002***	0.009	-0.040***	-0.030***
	(5.89)	(1.86)	(8.62)	(10.12)	(0.15)	(0.64)	(-3.10)	(-2.26)
$Investments_{t-1}$	0.027	0.033	-0.033	-0.167***	0.070***	0.101*	0.044	0.043
	(0.92)	(0.99)	(-0.69)	(-2.57)	(1.70)	(1.89)	(1.20)	(0.89)
$\frac{D}{A_{t-1}}$	-0.186***	-0.094***	-	-	0.093***	0.022	0.012	0.005
	(-13.40)	(-7.44)			(4.71)	(1.08)	(0.66)	(0.29)
Constant	0.057	0.045	0.099	0.049	0.125	0.044	-0.187	-0.178

R^2	0.1337	0.0691	0.2929	0.2930	0.2883	0.3032	0.5573	0.5834

In table 7 I split the sample period in two sub-periods 2000-2009 and 2010-2019 so as to examine if there is any difference on the impact of the model proxies between the two decades. The results indicate the fact that the type of firms going public changed over time. This means that new economy firms emerging more and more over the years and these firms are likely to have low or no debt capacity meaning that are less sensitive to market conditions (Dudley & James, 2016). In the first sub-sample in period 2000-2009 the coefficient of hot is negative and significant indicating that leverage change is reduced more by hot-market firms in IPO year. Market to book ratio is also negative and significant and has stronger impact during the first sub-sample period. In contrast, the hot proxy remains negative but becomes insignificant during the second sub-sample period meaning that hot-market firms do not reduce their leverage change significantly more than cold markets in the IPO year. Market to book ratio remains negative and significant but the magnitude of the proxy is reduced indicating the less sensitivity on market conditions for new economy firms. Profitability is negative and significant for both periods indicating the negative impact of retained earnings on leverage. Size coefficient is positive and significant as stability of sales gives easier access to debt markets. Tangibility is positive but the coefficient is significant only for the first sub-sample period and investment coefficient is insignificant. The impact of hot coefficient on net equity changes is positive for both sub-sample periods but insignificant indicating again a weak relation of hot-markets impact on equity. On the other hand, Market to book ratio has a positive and significant impact in both sub-sample periods, showing that growth opportunities indicator is a proxy with significant relation to equity changes and able to capture market timing effect in general.

Table 7
Regression Analysis
(IPO Year: Sub-Periods)

Time period 2000-2019. The dependent variable is mentioned at the top of each column and all regressions are referred to the period of IPO year. Market is assumed as Hot when the month IPO volume exceeds the three-month period moving median and Cold otherwise. T-Statistic is reported in parenthesis. The model used in regression is

$$Y = a + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 Size_{t-1} + \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 Investments_{t-1} + \beta_7 \frac{D}{A}_{t-1} + \varepsilon_t$$

	$\frac{D}{A}_t - \frac{D}{A}_{t-1}$	$\frac{D}{A}_t - \frac{D}{A}_{t-1}$	e/A_t	e/A_t
	2000-2009	2010-2019	2000-2009	2010-2019
HOT	-0.032**	-0.022	0.028	0.002
	(-1.99)	(-0.95)	(1.30)	(0.10)
M/B_t	-0.020***	-0.017***	0.029***	0.040***
	(-4.50)	(-3.52)	(5.21)	(6.61)
$Profitability_{t-1}$	-0.165***	-0.114***	-0.080*	-0.094**
	(-5.13)	(-3.05)	(-1.89)	(-1.96)
$Size_{t-1}$	0.112***	0.108***	-0.191***	-0.170***
	(13.68)	(10.74)	(-16.07)	(-13.11)
$Tangibility_{t-1}$	0.041**	0.002	-0.086	0.041
	(0.54)	(0.09)	(-3.35)	(1.54)
$Investments_{t-1}$	0.030	-0.080	0.121	0.184
	(0.46)	(-1.04)	(1.54)	(1.92)
$\frac{D}{A}_{t-1}$	0.347***	0.384***	0.237***	0.299***
	(13.85)	(12.28)	(6.90)	(7.61)
Constant	0.005	0.039	0.578	0.394
R^2	0.4455	0.4759	0.4411	0.4116

6. Discussion

So far results have indicated that hot-markets proxy fails to capture market timing effect. Since the beginning of the research the minor differences among the hot and cold market issuers on firm characteristics have showed that volume of IPO issuers in a period is not a strong indication of market timing effect. Even if the hot proxy has an effect in line with market timing theory, the fact that most of the times the coefficient of the proxy is insignificant indicates the minor impact on leverage changes. However, the market timing effect in IPOs event seems to be existing and is better captured by market to book ratio proxy. Most notably, market to book ratio proxy remains a strong indicator of market timing effect in all regressions. In line with other researches (i.e. Baker & Wurgler, (2002)) firms with high market to book ratio have a negative impact on leverage changes which is evidence of firms' attempt to time the market. In that case, firms try to exploit their temporary high market valuation by raising equity capital. The coefficient of market to book ratio has a negative and significant impact on leverage changes in the IPO year and a positive and significant impact on net equity issuances. These results support the theory that firms with high growth opportunities, at least as interpreted by the markets, and overvalued or undervalued stock, at least as perceived by the managers, issue more equity than their counterparts with lower market to book ratio even if they were able to issue debt in many cases. Moreover, these firms as interpreted by trade-off theory have probably more to lose in case of a financial distress and remain averse to debt issuance by issuing equity when capital needs arise in order to finance their investment opportunities (Baker & Wurgler, 2002). Proxy for profitability results also to a strong and significant negative impact on leverage changes. In line with pecking order theory, profitability has a negative impact on leverage changes indicating the fact that firms prefer to cover financial needs by using internal funds in order to avoid the costs of information asymmetry associated with external funds (Myers, 1974). For that reason, profitability has a negative impact on both leverage changes in IPO year and equity issuances. Size has a positive and significant impact on leverage changes supporting the theory since level of sales gives easier access to debt when firms need to raise capital. Tangibility affects positively the leverage changes but the coefficient is insignificant. Similar results for investment levels as it affects negatively the leverage changes but the effect is insignificant in the IPO year. According to the IPO year results, my first hypothesis stating that IPO event is highly related to market timing effect, proved to be true as firms with high market to book ratio reduce more their leverage ratio and increase their equity

issuance significantly more even if they had the choice to issue debt instead of equity, which is an indication of market timing.

Following the regression results in IPO+1 and IPO+2 years I notice similar results. Starting with hot-market proxy, I see that it has no impact on leverage changes in years following the IPO and the coefficient is insignificant in all cases except the one when is regressed on leverage level in IPO+1 which affects negatively the leverage changes and is significant. Apart from that, the minor impact of hot-market proxy and the insignificance in most regression results confirms the fact of a weak relation between the hot-market periods and market timing effect. In contrast, market to book ratio remains significant during the two successive years after the IPO year and the impact on leverage and equity changes is the same as in IPO year, negative and positive respectively. This shows that high market to book ratio firms continue issuing equity in order to finance their growth needs and as a conscequence, their leverage drops even more meaning that high market to book ratio firms do not try to reverse their leverage ratio to a target leverage immediately after the IPO year as resulted in Alti's (2006) research. In contrast, high market to book ratio firms keep leverage low over the years after the IPO weakening more the theory of a target leverage that firms try to reach closer over the years as trade-off theory indicates. The persistence of negative impact of market to book ratio proxy on leverage changes and positive impact on equity changes over the subsequent years after the IPO support the theory of Baker & Wurgler (2002) which states that there is no target leverage ratio that firms try to reach and firms' capital structure is a "cumulative outcome of past attempts to time the market" (Baker & Wurgler, 2002). Moreover, their results showed a long-run effect of market timing on leverage drop which lasts for successive years after the IPO year. My results are closer to the market timing theory as hot-market proxy fails to predict changes on leverage and equity issuance but market to book ratio remains a strong indicator of predicting capital structure choice among firms. On top of that, the remaining negative impact of market to book ratio proxy on leverage change and the positive impact on equity changes, strengthens the interpretation of existing market timing effect and opportunistic capital issuance choice based on market valuations over the years and rejects the trade-off theory predictions that firms have a target leverage that try to reach closer over time. If this was the case, the negative impact of market to book ratio on leverage in the IPO year should be reversed in successive years and these firms should have started issuing more debt to offset the higher leverage drop on their capital structure in the IPO year. As a result, the coefficient of market to book ratio should have

been changed to positive in IPO+1 or IPO+2 years, and as it is showed, this is not the case. Pecking order theory fails also to interpret this behavior as the theory predicts that financing needs are covered first by internal funds and in case that internal funds are not sufficient then firms turn to external funds but still with a preference on debt over equity due to lower asymmetric information costs. Apparently this is not the case in my results, firms with high market to book ratio are the ones which are in urgent need of external funds as they are assumed as high growth opportunity firms with many available net positive value investments. It is showed though, that these firms prefer to issue equity and keep debt issuance low in order to cover their external capital needs which is opposed to pecking order theory predictions. Profitability has also consistent results with literature and stays negative and significant over the years after the IPO year. This confirms the fact that profitable firms show high preference to internal fund when it comes to capital needs and issue external funds only if investment opportunities are higher than their internal financing. Proxy for size has the same effect on years after the IPO by impacting positively the change on leverage. This impact is consistent with the theory that established firms with stable sales have easier access to debt markets and for that reason prefer to issue debt when external financing needs arise. Thus, the impact of size is negative and significant on equity indicating that, firms prefer debt over equity financing as debt associates with lower asymmetric information costs. Tangibility shows a stronger effect in years after the IPO year than during the IPO year. The impact of tangibility is positive and significant on leverage changes showing that more tangible assets can serve as a collateral over time and make the debt capital raising easier and cheaper. Investment proxy relates positively with leverage changes in years after the IPO year but insignificant meaning that, even if in line with theory, level of capital expenditures does not influence the choice of security issuance decision significantly. Thus, according to the results, it can be concluded that market timing effect has a long-run impact in the subsequent years after the IPO year and as the second hypothesis was framed, capital structure remains relatively unchanged in subsequent years after the IPO event.

Results in table 7 indicate the potential shift of firm type to new economy firms that go public over the years. As Dudley & James (2016) have showed hot-market effect has less strong impact on leverage changes when regressed in more recent years in the past. This means that firms that went public in the further past had usually debt capacity and were more sensitive on debt and equity market conditions. However, as Dudley & James (2016) support, emerging new economy type firms have usually low or no debt capacity, thus, are less sensitive to market conditions regarding

the choice of debt and equity financing. My results are close to this theory, as I find a negative and significant impact of hot coefficient in first sample sub-period (2000-2009) but insignificant on the second sample sub-period (2010-2019). On the other hand, market to book ratio impact remains unchanged by affecting negatively leverage changes and positively equity changes in both periods with a significant effect. As a result, market timing effect remains significant in IPO event regardless the economy type firms. Profitability also impacts negatively both leverage changes and equity changes with a significant impact in both sample sub-periods. Tangibility and Investments have insignificant impact in both leverage changes and equity changes.

6.1. Research Limitations

Empirical research on leverage in IPO year and the year after, indicated a negative relation between market to book ratio and leverage changes and a positive relation between market to book ratio and equity changes. However, there is further research that needs to be done which could indicate another proxy with even stronger relation to IPOs capital structure choice. One of the limitations of the paper is the absence of a direct proxy related to debt capacity level of firms. As it is indicated by previous literature preferred shares occupy a significant part of pre-IPO capital structure and could be connected closely with the debt capacity level of firms (Dudley & James, 2016). Dudley & James (2016) showed that firms with preferred shares are firms with higher losses in pre-IPO year and are more likely to have less debt capacity, thus are less sensitive to market conditions as debt is not an easy financing option for them. A research of a proxy which could be linked directly with debt capacity of firms could shed some light on the availability of firms' choice between equity and debt financing in the IPO year which would also be connected to the pre-IPO firm specific conditions.

7. Robustness

As last part of the research I follow Dudley & James (2016) methodology and define preferred shares as equity and not as debt security. In this way, I include a significant portion of pre-IPO firms (2,595 pre-IPO firms versus 1,547 when preferred shares are allocated as debt and leverage restriction is applied) with leverage above one which are excluded from the sample in the first part of research due to leverage restrictions. First, I define debt as total liabilities minus preferred shares, deferred taxes and convertible debt and I drop firm observations only if their leverage exceeds one and had no preferred shares in their pre-IPO capital structure. Also I drop all variable extreme outliers. By following these looser restrictions I include 45% more pre-IPO firm observations. Out of the sample of leverage above one that is dropped in the first part, 84% of these firms had preferred shares, indicating that preferred shares are highly used by new economy type firms. Preferred shares occupy a significant proportion of assets in the pre-IPO year for most new economy firms and are usually converted in equity in the IPO year (Kaplan & Stromberg, 2003). However, the characteristics of fixed dividend payments and liquidity priority in case of bankruptcy tend to allocate preferred shares as debt security. This allocation results in a negative equity in the pre-IPO year and under the limitation of leverage below one all these firm observations are not included in the sample. However, the reason for the high use of preferred shares in the pre-IPO year capital structure is driven mostly from the fact that new economy type firms like start-ups use preferred stocks as an attractive security for potential investors since this security gives the option to be converted in equity in case of a successful IPO and has a liquidity priority in case of a failure which makes the investment choice safer for investors. Thus, almost 90% of firms with preferred shares in the pre-IPO year convert preferred shares to common equity in the IPO year as Kaplan & Stromberg (2003) showed. For that reason, the restriction of leverage below one is likely to lead to a sample bias and ends up to a final sample with a majority of old economy mature type firms with higher debt capacity and more sensitivity to debt and equity market conditions. By allowing firm observations with leverage above one the sample becomes broader and includes all types of firms. In table 8 the summary statistics of firms with and without preferred shares are presented related to firm characteristics between these two groups. Pre-IPO characteristics reveal some big differences between the two groups which could be linked to their financing needs, debt capacity level and market conditions sensitivity. By allowing firms to enter the sample without controlling for leverage and negative equity restrictions book leverage becomes

negative for firms with pre-IPO preferred shares which is driven by the fact that under the new definition of book debt preferred shares are allocated as equity. Profitability is highly negative for firms with preferred shares in pre-IPO year comparing to firms without preferred shares. Firms with preferred shares in pre-IPO year are less tangible than firms without preferred shares in pre-IPO year by 40% less and size is higher for firms without preferred shares in pre-IPO year. All these firms characteristics indicate the fact of higher financing needs of firms with preferred shares when they go public than firms without preferred shares in pre-IPO year which seem being more profitable having higher tangibility and higher level of sales. This shows that firms without preferred shares in pre-IPO year are more likely to have higher level of debt capacity and have easier access on debt financing, meaning that these firms are more sensitive to market conditions than firms with preferred shares in pre-IPO year which are likely to face more struggle of getting access to debt financing due to higher negative earnings in pre-IPO year. Moreover, it is worth mentioning that the firm characteristics differences found in IPO year between firms with preferred shares in pre-IPO year and firms without preferred shares remain consistent over the years after the IPO year. Firms with preferred shares in pre-IPO year continue being less levered, having higher market to book ratio, being less profitable, less tangible and smaller in size comparing to firms without preferred shares in pre-IPO year as results have shown.

Table 8
Summary Statistics of Preferred Share Firms

Book Debt is defined as Total Liabilities minus Preferred shares, Deferred taxes and Convertible debt. Book Leverage is measured as Book Debt over Total Assets (expressed in percentages). Market to Book ratio is measured as Book Debt plus Market Equity divided by Total Assets, Profitability is measured as EBITDA divided by Total Assets (expressed in percentage), Tangibility is measured as Property, Plant and Equipment value divided by Total Assets (expressed in percentage), Size is measured as the logarithm of Sales value, and Investments is measured as the Capital Expenditures divided by Total Assets (expressed in percentage). PRE indicates firms with preferred shares in their pre-IPO capital structure and NOPRE indicates firms without preferred shares in their pre-IPO capital structure.

PRE/ NOPRE	Book Leverage		Market to Book		Profitability %		Tangibility %		Size	
YEAR	PRE	NOPRE	PRE	NOPRE	PRE	NOPRE	PRE	NOPRE	PRE	NOPRE
Pre-IPO	-103	54.4	-	-	-31.6	5.7	27.2	44.26	1.59	2.24
IPO	29.9	36.1	3.09	2.14	-11.3	5.3	18.8	38.4	1.8	2.3

IPO+1	34.8	42.1	2.7	1.9	-16.9	3.6	22.6	45.7	1.9	2.4
IPO+2	38.3	46.7	2.5	1.8	-16.1	4.1	26.7	50.4	1.9	2.5
IPO+3	41.6	47.2	2.7	1.7	-13.5	3.9	29.8	52.4	2.1	2.6

In table 9 I run the regressions on leverage changes and equity changes in the IPO year for both firms with preferred shares in the pre-IPO year and firms without preferred shares in the pre-IPO year. As earlier results showed hot-market proxy does not predict changes in leverage at a significant level. Market to book ratio impacts negatively the leverage changes in the IPO year and has a strong and significant impact for both groups but higher negative impact for firms with preferred shares in the pre-IPO year meaning that firms with high market to book ratio issue less debt. Coefficient of profitability is negative for both groups showing that firms in both groups rely on internal financing when is sufficient. Size increases leverage for both groups as it serves as an indicator of less risk for firms to face financial distress. Tangibility effect is positive on leverage changes as it is used as a collateral for firms when want to issue debt. Investments coefficient is negative for both groups but significant only for the group with preferred shares in pre-IPO year meaning that high investments reduce leverage as firms stay averse to leverage in order to avoid risk of bankruptcy which costs more in fast growing firms. Reaching to equity changes coefficient of hot is negative and insignificant showing that there is no relation between equity issuance and hot market conditions. Market to book ratio is significant for both groups and impacts positively the change in equity, confirming again the fact that firms with high market valuation take an advantage of it by issuing more equity instead of debt. Profitability seems being significantly negative only for group of firms with preferred shares in pre-IPO year showing that profitable firms use internal funds first. Size affects negatively the equity issuance as firms with high sales can easily issue debt without facing the high asymmetric information costs of equity issuances. Investment coefficient is positive and significant in both groups showing that firms with high level of investments issue more equity. However, investment coefficient is higher for firms with preferred shares in the pre-IPO year showing that these firms are likely to have low debt capacity, thus issuing debt is not as easy as firms without preferred shares in the pre-IPO year which have a positive but lower investment coefficient. Overall, once the restriction of leverage is not applied results seem robust to earlier findings. Moreover, as earlier, hot-market proxy does not have a

significant impact in any of the two groups, market to book ratio seems being robust and remains negative and significant on leverage changes, and positive and significant on equity changes. This results to the rejection of my third hypothesis that market timing is sensitive to a sample selection and the treatment on preferred shares. As it is evidenced market timing effect remains negative and significant even after re-defining the book debt and including preferred shares as part of equity. Profitability also remains negative and significant, confirming the theory that firms prefer using internal funds over external financing whenever is possible. Size is also robust since it impacts positively leverage changes and negatively equity changes. Tangibility has similar impact as size as it can be used as a collateral once firms want to raise external capital. Investment coefficient has a negative impact on leverage changes which could be interpreted as risk aversion on debt due to future financial distress concern and is positively related with equity changes meaning that fast growing firms cannot cover financing needs fully with debt and in many cases issue equity in order to finance their investments.

Table 9
Regression Analysis
(IPO Year: with and without preferred shares)

Time period 2000-2019. The dependent variable is mentioned at the top of each column and all regressions are referred to the period of IPO year. Market is assumed as Hot when the month IPO volume exceeds the three-month period moving median and Cold otherwise. T-Statistic is reported in parenthesis. The model used in regression is

$$Y = a + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 Size_{t-1} + \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 Investments_{t-1} + \beta_7 \frac{D}{A}_{t-1} + \varepsilon_t$$

	$\frac{D}{A}_t - \frac{D}{A}_{t-1}$	$\frac{D}{A}_t - \frac{D}{A}_{t-1}$	e/A_t	e/A_t
	PREF	NOPREF	PREF	NOPREF
HOT	0.024	-0.003	-0.052	-0.020
	(1.09)	(-0.22)	(-1.09)	(-0.68)
M/B_t	-0.018***	-0.008**	0.003***	0.023***
	(-4.38)	(-2.19)	(-0.41)	(3.08)
$Profitability_{t-1}$	-0.069***	-0.046**	-0.167***	0.015
	(-4.93)	(-2.25)	(-6.52)	(0.96)
$Size_{t-1}$	0.099***	0.101***	-0.215***	-0.218***

	(9.10)	(13.84)	(-9.45)	(-14.81)
$Tangibility_{t-1}$	0.100**	-0.008	-0.103	-0.061**
	(2.89)	(-0.54)	(-1.35)	(-2.04)
$Investments_{t-1}$	-0.350***	-0.025	0.871***	0.227**
	(-3.09)	(-1.04)	(3.54)	(2.22)
$\frac{D}{A_{t-1}}$	0.932***	-0.574***	0.201***	0.260***
	(-121.57)	(-24.73)	(15.40)	(5.61)
Constant	0.097	0.006	0.665	0.614
R^2	0.9385	0.4336	0.2139	0.2820

8. Conclusion

Overall, market timing theory seems existing in IPO events. However, the distinction between hot and cold markets fails to capture the market timing effect on firms that go public. Even if the coefficient of hot proxy follows the expected positive impact on equity changes and negative impact on leverage changes, has an insignificant impact in most of the regression results confirming the fact that it is not a proper proxy of capturing marketing effect. In contrast, market to book ratio has a strong negative impact on leverage changes and a positive impact on equity changes in IPO year in all regression results, evidencing that firms with high market valuations prefer issuing equity instead of debt capital when need external funds for covering their growth opportunities and net positive value investments. This behavior cannot be explained by pecking order theory which predicts that firms with external financing needs, prefer issuing debt over equity due to higher asymmetric information costs associated with equity issuances. Furthermore, according to pecking order theory, firms turn to equity issuance only in case of reaching their debt capacity level but as it has been showed firms with low debt levels continue issuing equity even when had the chance to issue debt without increasing the possibility of a potential bankruptcy. Trade-off theory gives a better explanation to the choice of equity issuing instead of debt by predicting that firms with high market to book ratio try to keep leverage ratio low deliberately because of more volatile earnings and higher probability of financial distress. In case of a financial distress, firms with high growth opportunities can lose more and forgo investment opportunities that will never show up again. However, if trade-off theory predictions are applicable, the fact that high market to book ratio firms issue more equity and their leverage ratio drops more in the IPO year should be an indication of a reverse behavior in the subsequent years after the IPO. In order to converge back to their target leverage, firms which reduced their leverage ratio more in the IPO year should issue more debt and increase their leverage more in the upcoming years. As it is evidenced this is not the case, firms with high market to book ratio continue lowering their leverage ratio in IPO+1 and IPO+2 years meaning that they diverge even more from their target leverage over the years after the IPO which is opposite to the trade-off theory predictions. My results are more in line with Baker & Wurgler (2002) theory stating that firms with high market values consistently issue more equity instead of debt. Moreover, firms that enjoy high market values do not try to move closer to a target leverage shortly after the equity issuance in IPO year. Thus, their

capital structure is calibrated over the years as a result of past attempts to time the market based on temporary high or low market valuations opportunities.

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Appendices

Appendix I. Variable Description

Variable	Description
Book Debt	Total Assets – Book Equity
Book Equity	Total Assets – Total Liabilities – Preferred stock + Deferred taxes + Convertible debt
Book Assets	Book Debt + Book Equity
Market Equity	Annual Stock price (Fiscal) * Number of Shares Outstanding
Market Assets	Book Debt+ Market Equity
Book Leverage	Book Debt / Total Assets
Market Leverage	Book Debt / (Total Assets-Book Equity + Market Equity)
Market to Book	(Book Debt + Market Equity) / Total Assets
Profitability	EBITDA / Total Assets
Tangibility	Property, Plant and Equipment / Total Assets
Size	Logarithm of Sales
Investment	CAPEX / Total Assets
Cash	Cash / Total Assets
d/A	(Book Debt (t) – Book Debt (t-1)) / Total Assets (t)
e/A	(((Book Equity (t) – Book Equity (t-1)) – (Retained Earnings (t) – Retained Earnings (t-1))) / Total Assets (t)
ΔRE/A	(Retained Earnings (t) – Retained Earnings (t-1)) / Total Assets (t)

Appendix II. Independent variables and control variables

Firm characteristics	Description	Expected relation
Hot (cold)	Dummy distinguishing between IPO Volume above (below) the median volume in a 3-month period.	Negative
Market-to-Book	Fraction of Book Debt + Market Equity divided by Book Debt+ Book Equity	Negative
Profitability	Fraction of EBITDA divided by Total Assets	Negative
Tangibility	Fraction of PPE (property plant and equipment) divided by Total Assets	Positive
Size	Logarithm of Sales	Positive
Investment	Fraction of CAPEX divided by Total Assets	Positive