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Master Thesis

Preliminary Thesis Report - Capital Structure and IPO Market Timing in the US Tech Industry

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Preliminary Thesis Report

Norwegian Business School

- Capital Structure and IPO Market Timing in the U.S. Tech Industry -

GRA 19502 Master Thesis: Preliminary Report

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Abstract

This thesis aims at understanding whether tech firms attempt to time the market conditions when they first decide to go public in the U.S. and what are the reasons that motivate this decision. Furthermore, the challenge is to prove that these results hold in the long-term and that technology firms express a significantly different behaviour from the overall sample.

Section 1 of the report presents a brief introduction to the topic, section 2 describes the main literature that will be employed in our study and section 3 introduces the main hypothesis that will be tested. Section 4 and 5 finally present what and how data will be collected and the methodology used to test the hypothesis.

1. Introduction

Following the previous year's trend, 2016 has been characterized by a cold market for tech IPOs in the U.S. in terms of volume and size of the deals, as only $3 billion have been raised by a total of 21 offerings. These figures (Renaissance Capital, 2016) are significantly lower than the $32.5 billion raised in 2014, portraying 2016 as a year to forget for the different intermediaries involved in the transactions; on the other side, investors in the industry have benefitted of an average IPO return of 39.8%, the highest among all the IPOs' sectors.

Once again, this particular market context raises the need to explore the dynamics behind the capital structure decisions taken by firms' managers, a topic that has been at the centre of the financial debate for several decades and for which no general consensus has been reached yet. In particular, the relationship between the low issuance volumes and the apparent under-pricing in the issued stocks seems to support the Equity Market Timing Theory of Capital Structure, at least in its short-term version presented in Baker and Wurgler (2000). According to this theory, managers are able to identify certain windows of opportunity during which equity issuance is less costly due to mispricing, thus lowering the cost of equity and increasing the value of the firm.

The final objective of this thesis is indeed to provide evidence to the Market Timing Theory on the U.S. tech IPO sample, supporting the idea that managers tend to issue equity during hot market periods. Following the Guney and Iqbal-Hussain (2010) approach, the work will evolve in order to verify the Market Timing Theory in its entirety, as presented by Baker and Wurgler (2002). The goal is to understand the reasons that led many firms to time the market and investigating the long-term cumulative effects of market timing attempts on the financing policy.

Despite several studies have attempted to test the theory in different markets, few studies have provided industry-specific evidence. In particular, no study has looked at technology firms, which are characterized by lower levels of leverage (Aghion, Bond, Klemm and Marinescu, 2004) and are thus expected to attempt to time markets more significantly. Accepting the main hypothesis that the Market

Timing Theory holds and thus firms are more likely to take their financing decisions following mispricing patterns in their equity, the main research question of this thesis could then be synthesized as:

"Do tech firms time their IPOs in the U.S. and why do they do it?"

2. Literature Review

Capital structure is a highly discussed and controversial topic in the financial world and describes how a company sets its financing policy, balancing the relationship between debt and equity. The literature in the field is built around four main competing theories that have tried to explain the managers' decisions in terms of capital structure: the Trade-off Theory, the Pecking Order Theory, the Signalling Theory and the Market Timing Theory.

2.1 Trade-off Theory

Firstly, the Trade-off Theory is built on the research done by Modigliani and Miller (1963) and it explains that firms can trade-off debt- and equity-financing by balancing the costs and the benefits associated with these two sources of capital. Specifically, the costs are those linked to financial distress, asymmetric information and asset substitution, while the benefits arise from the tax shield of debt and the separation of ownership and control. In its more advanced versions, this theory suggest that it exists an optimal debt ratio that changes over time, due to the firm's variation of financial needs. As a result, managers will try to attain this level and thus the capital structure of the firm will evolve over time.

2.2 Pecking Order Theory

Secondly, the Pecking Order theory states that companies prioritize their source of financing by the associated cost and choose the alternative with the lowest flotation costs (Myers and Majluf, 1984). So, opposite to the Trade-off Theory, it insinuates a non-existent optimal target level of capital structure. This theory is built on the existence of asymmetric information, where managers have greater knowledge of the firm than outside investors. Therefore, the choice of internal and external financing is affected. In addition, asymmetric information leads an assertive and optimistic board to signal confidence by issuing debt over equity, implying an undervalued stock price. This means that issue of equity will only occur as a last resort when firms have reached their maximum debt capacity and are unable to raise more capital through debt issue. Put simply, the pecking order would start with internal financing, then advance to low-risk debt, riskier debt and finally financing by issuing equity.

2.3 Signalling Theory

Thirdly, the Signalling Theory, as presented in Ross (1977), states that the values of firms will rise with pre-issuance leverage, since increasing leverage increases the market's perception of value. However, while the empirical evidence supports such predictions of signalling theory as negative market reaction on leverage-decreasing transactions and positive reaction on leverage-increasing transactions (excluding debt issues), it does not support the market reaction to debt issues and negative correlation between debt and profitability. Moreover, this theory does not fit the considered sample, as tech companies are characterized by a low level of debt, often equal to zero before IPOs.

2.4 Market Timing Theory

Finally, the Market Timing Theory presented by Baker and Wurgler (2002) suggests that a company's current capital structure is strongly related to historical market values and that it is consequently the cumulative outcome of past attempts to time the equity market. Considering the short-term point of view presented in Baker and Wurgler (2000), the share of equity issues in total new equity and debt issues is a strong predictor of U.S. stock market returns as firms issue relatively more equity than debt just before periods of low market returns. As a consequence, managers are able to identify windows of opportunity during which equity issuance is less costly due to mispricing, increasing the value of the firm for existing shareholders by lowering the overall cost of capital of the firm at the expense of new shareholders. These findings provide evidence against semi-strong form efficiency in the capital markets, thus exposing it to the criticism of the supporters of this hypothesis.

While the evidence supporting this theory seems to hold in the short-term, some studies have raised doubts against to the long-term effects described by Baker and Wurgler (2002). With regards to IPOs, Alti (2006) has found that at the end of the second year following the IPO, the impact of market timing on leverage completely vanishes; also Guney and Iqbal-Hussain (2010) have tested the theory on the U.K. IPOs market and found that even though firms time their equity issues to exploit opportunities in favourable equity markets, this effect is temporary in nature and does not influence leverage levels in the long run.

Overall the Market Timing Theory seems to have a better explanatory power than the Trade-off and Pecking Order Theories, as equity issues are frequent and firms adjust very slowly toward target leverage (Huang and Ritter, 2005). However, there are doubts whether market timing would suffice as a stand-alone theory in explaining financing behaviour or would act as a bridge in closing the gaps existing in the current framework; Myers (2001) supports this point of view by suggesting that currently there is no universal theory to explain capital structure and there is no reason to expect one.

3. Hypothesis

The main research question *"Do tech firms time their IPOs in the U.S. and why do they do it?"* can be interpreted as the test of the two main hypothesis coming from Guney and Iqbal-Hussain (2010) on the U.S. tech IPOs sample, which test the significance of the Market Timing Theory and its impact on capital structure in the short-term. Two additional hypothesis should also be tested, as they provide support to describe the previous results: the long-run effect on the leverage levels and a comparison with IPOs in all the other industries.

3.1 Hypothesis 1

The first hypothesis aims at validating the main assumption behind the Market Timing Theory on the considered sample: firms would issue equity when managers believe that market conditions are relatively favourable. A direct implication of this assumption asserts that if firms issue equity when the IPO markets are hot, they would also sell more equity and thus be able to raise more capital relative to when markets are cold.

H_0: Firms time their equity issues to exploit opportunities in favourable equity markets.

H_1: Firms *do not* time their equity issues to exploit opportunities in favourable equity markets.

3.2 Hypothesis 2

Given that the first hypothesis has been verified, the second one aims at studying the impact of the timing attempts on the firms' capital structure, analysing the changes directly in accounting variables such as leverage, investment level and profitability. The aim is to understand why managers try to time hot IPO markets by looking at the pre- and post-issuance effects on key balance sheet items and by comparing these results in hot and cold markets.

H_0: Hot market firms have significantly lower levels of leverage and poorer investment opportunities during the IPO and subsequent years, resulting in their profitability levels to be significantly lower than cold market firms.

H_1: Hot market firms *do not* have significantly lower levels of leverage and poorer investment opportunities during the IPO and subsequent years; their profitability levels *are not* significantly lower than cold market firms.

3.3 Hypothesis 3

The third hypothesis expresses the necessity to test the long-term effect of the market timing attempts, as the current literature does not completely agree on the results. On one hand, one of the first formulations of the theory by Baker and Wurgler (2002) claims that capital structure is the cumulative outcome of past attempts to time the equity market, supporting the long-run impact hypothesis. On the other hand, the more recent researches by Alti (2006) and Guney and Iqbal-Hussain (2010) on the U.S. and U.K. IPOs samples respectively provide evidence that hot market IPO firms undo timing attempts by increasing their leverage levels in the immediate two periods after going public.

H_0: The effect of the market timing attempts on the capital structure is temporary in nature and doesn't influence leverage levels in the long run.

H_1: The effect of the market timing attempts on the capital structure has a *long-term* impact and it influences leverage levels over time.

3.4 Hypothesis 4

Finally, in order to prove and support the relevance of conducting this research on the technology sample, the firms in this industry should be proved to have a significantly different relationship between aggregated issuance volumes and timing attempts. Specifically, tech companies, due to the lower level of leverage (Aghion, Bond, Klemm and Marinescu, 2004), are expected to have a more pronounced effect and to support the Market Timing Theory more strongly when compared to the overall sample.

H_0: The attempts to time markets are more evident in the technology IPOs when compared to the whole IPOs sample.

H_1: The attempts to time markets are *not statistically different* in the technology IPOs when compared to the whole IPOs sample.

4. Data

The study looks at market timing in the U.S. tech IPO events, combining the data strictly related to the deals with the information coming from the balance sheets of the firms; the first set will be obtained from Thomson Reuters SDC Platinum, while the second set will come from the CRSP database and it will polished of the data that do not concern IPO events.

The sample comprises of all the firms that went public from the 1st January 1982 to the 31st December 2016 in the U.S. markets, where IPO dates are assumed as the first month the share price becomes available. The sample is then further narrowed to include tech firms only, where technology firms are defined by their SIC codes as in Loughran and Ritter (2004) and Ritter (2016). The 35-year length chosen for the sample should include a sufficient number of observations and, on a practical ground, it allows to consider several events such as the first tech IPOs (including Microsoft in 1986), the dot-com bubble of the early 2000s, the financial crisis of 2008 with the resulting credit crunch and finally the large Internet and Software IPOs of the current decade.

The main variables are obtained by rescaling the income statement and balance sheet items that will be potentially considered in the study and summarized in Table 1.

Table 1

Book Leverage (D/A)	Book debt divided by total assets.
Market-to-book ratio (M/B)	Ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets.
Profitability (EBITDA/A)	Earnings before interest, taxes and depreciation over total assets.
SIZE	Logarithm of net sales in millions of 1982 pounds for the IPO data set.

Tangibility of assets (PPE/A)	Net plant, property and equipment over total assets.
R&D/A	Research and development expenses scaled by total assets.
RDD	A dummy variable which takes the value of one when R&D is missing in the database.
INV/A	Capital expenditure divided by total assets.
DIV/E	Cash dividends paid divided by the book equity.
CASH/A	Cash and short-term investments scaled by total assets.
Net Debt Issues (d/A)	Changes in book debt over total assets.
Net Equity Issues (e/A)	Changes in book equity minus the change in retained earnings divided over total assets.
Newly Retained Earnings (ΔRE/A)	Change in retained earnings divide scaled by total assets.
Equity Market Timing Effect (HOT)	Dummy variable equal to 1 in months where the IPO volume is above the median across the given period.
Capital Raised During Equity Issue (Proceeds/A)	Proceeds from the sale of equities scaled by year-end total assets.

5. Methodology

The aim of the research is to test the four hypothesis presented in section 3 by using time series regressions with the variables described in section 4. More specifically, we will study the relationship between the Equity Market Timing Effect expressed by the dummy HOT and the other variables.

5.1 Hypothesis 1

Our first hypothesis is based around the theory that firms issue equity when managers believe the market conditions are relatively favourable. In order to test this, we have to examine the difference in the amount of capital raised by hot and cold market firms. However, this result may be influenced by dissimilarities in the characteristics of these firms. So, to investigate this difference the following regression is run:

$$Y_t = \alpha + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 SIZE_{t-1} + \beta_5 \frac{PPE}{A}_{t-1}$$
$$+ \beta_6 \frac{R\&D}{A}_{t-1} + \beta_7 RDD_{t-1} + \beta_8 \frac{D}{A_{t-1}} + \varepsilon_t$$

where the variables are described in Table 1.

By running this regression, we want to see if there is an indication that firms attempt to time the market and if firms tend to raise more proceeds when they go public in hot markets compared to cold. We expect the results to show that hot market firms will have a tendency of both lower performance and need for external financing. This will indicate that firms exploit a window of opportunity to raise capital, thus showing that market timing is the motivation behind an IPO rather than financing and investing needs.

5.2 Hypothesis 2

The second hypothesis tests the impact of timing attempts on the firms' capital structure, dissecting the changes in the balance sheet. Nevertheless, a test on the leverage significance in tech firms is required before jumping into any consideration, as it is common in the industry to maintain debt equal to zero or at

low levels (Aghion, Bond, Klemm and Marinescu, 2004). The change in capital structure can then be expressed as the difference in Book Leverage (D/A) between the pre-IPO and IPO years and represented in the following regression equation:

$$\frac{D}{A_t} - \frac{D}{A_{t-1}} = \alpha + \beta_1 HOT + \beta_2 \frac{M}{B}_t + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 SIZE_{t-1} + \beta_5 \frac{PPE}{A}_{t-1}$$
$$+ \beta_6 \frac{R\&D}{A}_{t-1} + \beta_7 RDD_{t-1} + \beta_8 \frac{D}{A_{t-1}} + \varepsilon_t$$

The main hypothesis can be tested by analysing the sign and testing the significance of the coefficient β_1, thus looking at the relationship between the change in capital structure and the hot market dummy variable. Then, in order to explore the changes in the other balance sheet items, the change in leverage can be decomposed by the following equation:

$$\frac{D}{A_t} - \frac{D}{A_{t-1}} = -\frac{e}{A_t} + \frac{E}{A_{t-1}} \times \frac{(\Delta Cash + \Delta Other\ Assets)}{A}_t - \frac{\Delta RE}{A}_t$$

where the first term expresses whether firms use equity to retire debt or purchase assets, the second one captures the increase in assets and the third one represents the change in retained earnings. The expectations, as presented in Guney and Iqbal-Hussain (2010), are that firms issue more equity and less debt in hot markets and that, while cold market firms tend to invest in long-term assets, hot market firms raise more capital than needed and accumulate it into cash reserves.

5.3 Hypothesis 3

In the third hypothesis we want to test the long-term effect of the market timing attempt. To analyse this, we run the following regression:

$$\frac{D}{A_t} - \frac{D}{A}_{PRE-IPO}$$
$$= \alpha + \beta_1 HOT + \beta_2 \frac{M}{B}_{t-1} + \beta_3 \frac{EBITDA}{A}_{t-1} + \beta_4 SIZE_{t-1}$$
$$+ \beta_5 \frac{PPE}{A}_{t-1} + \beta_6 \frac{R\&D}{A}_{t-1} + \beta_7 RDD + \beta_8 \frac{D}{A_{t-1}} + \varepsilon_t$$

Whether or not this hypothesis holds will be reflected in the HOT variable. This dummy variable explains the difference in current leverage levels and pre-issue levels and it is studied over time. The forecasted results agree with the results by Guney and Iqbal-Hussain (2010) and Alti (2006), expecting that the relationship will not be significant after the first 2 periods.

5.4 Hypothesis 4

Finally, in order to test the last hypothesis, a model similar to the one adopted for the first hypothesis is required. However, in this specific case we test the differences in the amount of raised proceeds, performance and need for external financing between hot and cold markets in the tech and overall samples, expecting to have higher discrepancies in technology firms.

6. Reference List

Aghion, P., Bond, S., Klemm, A. & Marinescu, I. (2004). "Technology and Financial Structure: Are Innovative Firms Different?". *Journal of the European Economic Association*, 2(2-3): 277-288.

Alti, A. (2006). "How Persistent Is the Impact of Market Timing on Capital Structure?". *The Journal of Finance*, Vol. LXI, No. 4: 1681-1710.

Baker, M. & Wurgler, J. (2000). "The Equity Share in New Issues and Aggregate Stock Returns". *The Journal of Finance*, Vol. LV, No. 5: 2219-2258.

Baker, M. & Wurgler, J. (2002). "Market Timing and Capital Structure". *The Journal of Finance*, Vol. LVII, No. 1: 1-32.

Guney, Y. & Iqbal-Hussain, H. (2010). "Capital Structure and IPO Market Timing in the UK". *Behavioural Finance Working Group Conference: Fairness, Trust and Emotions in Finance*: 1-34.

Huang, R. & Ritter, J.R. (2005). "Testing the Market Timing Theory of Capital Structure". *Journal of Financial and Quantitative Analysis*.

Loughran, T. & Ritter, J.R. (2004). "Why Has IPO Underpricing Changed Over Time?". *Financial Management*, Autumn 2004: 5-37.

Miglo, A. (2010). "The Pecking Order, Trade-off, Signaling, and Market-Timing Theories of Capital Structure: a Review". *SSRN Electronic Journal*.

Modigliani, F. & Miller, M.H. (1963). "Corporate Income Taxes and the Cost of Capital: A Correction". *The American Economic Review*, Vol. 53, No. 3: 433-443.

Myers, S.C. & Majluf, N.S. (1984). "Corporate financing and investment decisions when firms have information that investors do no have". *Journal of Financial Economics*, Vol. 13, No. 2: 187-221.

Myers, S.C. (2001). "Capital Structure". *The Journal of Economic Perspectives*, Vol. 15, No. 2: 81-102.

Renaissance Capital IPO Intelligence. (2016). "US IPO Market: 2016 Annual Review". Retrieved from http://www.renaissancecapital.com.

Ritter, J.R. (2016). "Initial Public Offerings: Technology Stock IPOs". Retrieved from https://site.warrington.ufl.edu/.

Ross, S.A. (1977). "The determination of financial structure: the incentive-signalling approach". *The Bell Journal of Economics*, Vol. 8, No. 1: 23-40.

7. Progression Plan

February

- Finish the Preliminary Thesis Report

March

- Prepare presentation
- Meet with the supervisor and determine the research model
- Start to gather and structure the data

April

- Complete the reworking of the data and start testing

April/May

- Commence the writing

June

- Complete the first draft by the 20th of June

June/July

- Correct and improve the Thesis after receiving feedbacks