MARKET TIMING AND ITS IMPACT ON
CAPITAL STRUCTURE: EVIDENCE FROM
SWITZERLAND

by

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LIST OF ABBREVIATIONS

IPO Initial Public Offering

SEO Seasoned Equity Offering

CHAPTER 1. INTRODUCTION

In its essence, market timing refers to the practice of issuing shares when their market value is high and repurchasing them when it is low (Baker & Wurgler, 2002). However, for the purposes of this study, it is more useful to define market timing as a tendency to conduct initial public offerings (IPOs) when the market is hot, meaning that there are many other firms trying to do the same (Alti, 2006).

There have been numerous empirical studies on market timing, starting from the last quarter of the 20th century. Early quantitative evidence of market timing had been provided by Taggart (1977) and Marsh (1982). Afterward, Ritter (1991) and Jegadeesh (2000) proved that market timing is successful. The most convincing evidence that market timing is considered to be an important factor in corporate financing decisions comes from the research paper by Graham & Harvey (2001). According to the authors, market timing is considered to be the most important factor by CFOs when making a decision regarding equity issues.

Despite the early attention towards market timing, its effect on capital structure remained largely unnoticed until the 2000s. The two most influential papers are the ones by Baker and Wurgler (2002) and Alti (2006). Baker and Wurgler (2002) studied the persistency of market timing on firms' leverage and found that firms that issue equity when the market is hot tend to have lower leverage. The effect remains even after a decade. It allowed them to formulate the market timing theory of capital structure, which defines capital structure as a cumulative outcome of attempts to time the market. However, Alti (2006) criticized their choice of market timing measure (market-to-book value). Using an alternative measure of market timing, the author provided evidence that the effect of market timing evaporates after two years.

Apart from its practical applications, the importance of market timing theory is also based on the fact that it contradicts two more traditional theories of capital structure. According to trade-off theory, a firm rebalances its capital structure to the optimal level when the marginal benefits of the debt are equal to its costs (Modigiani & Miller, 1958). Pecking order theory suggests that a firm will first try to use debt and internal equity due to the asymmetry of information (Myers & Majluf, 1984).

The empirical evidence of market timing effect on capital structure across countries has been contradictory and inconclusive. The generality of the theory, and specifically when considering European countries, has been put under doubt by Hogfeldt and Oborenko (2005). The authors argue that the effect of market timing is less significant or even absent in the case of a strong wedge between control and ownership rights, which is more common for European companies. Findings by Bruinshoofd and de Haan (2012) support these claims.

The goal of this study is to analyze the market timing effect on the capital structure of firms listed on SIX Swiss Exchange. It is the first quantitative study of market timing effect on capital structure for Swiss market.

The research attempts to answer the following questions.

Research question 1: Does market timing exist on Swiss stock exchange?

Research question 2: How persistent is the effect of market timing on the capital structure of firms listed on Swiss stock exchange?

The findings are expected to be similar to the ones provided by Hogfeldt and Oborenko (2005) and Bruinshoofd and de Haan (2012).

Hypothesis 1: Market timing is present on Swiss stock exchange.

Hypothesis 2: The effect of market timing on the capital structure of firms listed on Swiss stock exchange is insignificant.

This research uses an econometric model developed by Alti (2006). The data has been collected from Thomson Reuters Eikon and official websites of SIX Swiss Exchange.

The hot market is defined as months when the number of IPOs is above average. Using this approach, the results suggest that market timing is present on Swiss stock exchange. The effect of the hot market on the amount of IPO proceeds is statistically significant.

However, there is no evidence of the persistency of market timing effect on capital structure. Furthermore, even short-term effect is not observed. According to these results, the market timing theory of capital structure by Baker & Wurgler (2002) cannot be extended to firms on Swiss stock exchange.

The rest of this paper is organized in the following manner. Chapter 2 provides an overview of the existing research papers and relevant literature. Afterward, Chapter 3 explains the methodology employed in this research. Chapter 4 includes the description of the data. In Chapter 5 key findings are presented and analyzed. Finally, Chapter 6 focuses on the conclusions and suggestions for further research.

CHAPTER 2. LITERATURE REVIEW

2.1. Early studies on market timing

Equity market timing can be defined as an attempt to issue shares when their prices are high and repurchase them in the opposite situation (Baker & Wurgler, 2002). The purpose of such an attempt is to take advantage of temporary changes in the relative cost of equity.

Numerous studies showed evidence of market timing being a common practice in real corporate financial policy. According to Baker and Wurgler (2002), there are four types of early studies that provide evidence of market timing.

The first group of studies shows that firms prioritize issuing equity instead of debt when their market-to-book value is high. This behavior has been observed during initial public equity issues, secondary equity issues, and repurchases. Loughran, Ritter and Rydqvist (1994) found evidence that in 14 out of 15 markets firms tried to time their IPOs for periods of high market multiples. Furthermore, Pagano et al. (1998) determined the market-to-book ratio as the main factor that affects the probability of an IPO: an increase in the market-to-book ratio by one standard deviation was associated with a 25% increase in the odds of an IPO.

However, one of the earliest pieces of evidence of market timing comes not from the studies of IPOs, but seasoned equity offerings (SEOs). According to Taggart (1977), who studied corporate financing decisions of US firms in 1957-1972, changes in the market value of debt and equity were the key determinants of security issues. A similar conclusion was reached by Marsh (1982), who researched the choice between equity and long-term debt among UK companies. Hovakimian, Opler and Titman (2001) also provided evidence that firms tend to issue equity, instead of debt, when their share prices are high. Firms are also more likely to repurchase debt rather than equity.

The second group of studies provides evidence that market timing is successful on average. According to Ritter (1991), "hot issue" IPOs lead to low long-term returns for new investors, which indicated that management is successful in timing issues. A similar conclusion has been reached by Speiss and Affleck-Graves (1995) and Jegadeesh (2000): firms that issue equity when their market-to-book ratio is high tend to earn lower returns.

Nevertheless, there are some authors who argue that low returns do not necessarily imply successful market timing. For example, Eckbo, Masulis and Norli (2000) claim that these findings are driven by the low risk of equity issuers. Fama (1998) challenges the relationship between market valuation at the time of IPO and long-term returns applying reasonable changes to the method of estimating returns and robustness checks.

The third group of studies suggests that firms conduct IPOs when investors are rather optimistic about future earnings. According to Rajan and Servaes (1997), more firms issue equity when analysts are optimistic about the growth prospects. In addition, the firms show better stock returns when analysts attributed to them lower growth potential. According to Teoh, Welch and Wong (1998), firms with high cash flows accruals in the same year they conduct IPO tend to perform poorly in terms of stock returns for three years. The same conclusion holds in the case of SEO as well.

The fourth group of studies analyzes financing decisions by relying on anonymous surveys of managers and, therefore, is the most convincing. Around 70% of CFOs stated that the overvaluation of the stock was an important factor in their decision to issue equity. Furthermore, equity prices were considered to be the most important factor out of 10 factors that are taken into account when deciding on issuing equity (Graham & Harvey, 2001).

2.2. Market timing theory of capital structure

Despite the fact that market timing has attracted a lot of attention since the last quarter of the 20th century, its effect on the capital structure has not been estimated until the early 2000s. Baker and Wurgler (2002) found that market timing had a significant and persistent effect on the capital structure.

The authors provided evidence that the firms that issued equity when the market valuation was low tended to have low leverage. The effect was persistent and lasted for over a decade.

In the light of these findings, the market timing theory of capital structure was formulated in the following way: "capital structure is the cumulative outcome of past attempts to time the equity market" (Baker & Wurgler, 2002, p.3).

However, the findings of Baker and Wurgler (2002) have been criticized by Alti (2006) because of their measure of market timing. Market-to-book ratio tends to correlate with underlying characteristics, such as long-term growth traits, which leads to low optimal leverage ratios. Emphasizing the need to isolate market timing in order to study its long-term effect on capital structure, the author chooses the "hot market" dummy variable as his measure of market timing. The hot market is defined by a higher-than-average number of issuers.

Alti (2006) reports a significant market timing effect in terms of the volume of proceeds from equity issues. He also finds the negative effect of market timing on leverage in short term. However, this effect evaporates within two years after IPO. Therefore, Alti (2006) concludes that even though market timing plays an important role in financing decisions, its effect on leverage targets is short-term. Similar conclusions have been reached by Kayhan and Titman (2006) as well as Leary and Roberts (2005).

2.3. Traditional theories of capital structure

Trade-off theory

According to Modigliani and Miller (1958), a firm will choose an optimal capital structure at a point when benefits of additional debt (tax shields) are equal to its costs (increased likelihood of financial distress, higher agency costs). In case of deviation from this equilibrium when issuing equity or debt, a firm will rebalance its capital structure until it returns to the optimal state.

Therefore, trade-off theory suggests only a short-term impact of market timing on the capital structure of a firm.

Pecking order theory

The pecking order theory focuses not on the optimal level of debt but rather on the costs of raising equity, which are driven by information asymmetry. According to Myers and Majluf (1984) information asymmetry arises due to the fact that managers know more about the value of a firm and its opportunities than outside investors. Furthermore, managers, acting in the interest of the old stockholders, may try to exploit new stockholders when issuing shares. Being aware of this possibility, rational outside investors will be willing to buy equity only at a discount. As a result, managers will avoid issuing equity to finance a firm's growth opportunities. Instead, they will first use internal funds, then debt, and finally equity only after exhausting other options.

Therefore, market timing theory, which suggests that for some firms it is more preferable to use equity rather than debt, contradicts the pecking order theory. However, it is possible to reconcile these theories, assuming that information asymmetry varies over time. More details on that will be provided in the following part.

Managerial entrenchment theory

According to Zwiebel (1996), firms with optimistic growth prospects and high valuation, while being more likely to issue equity, also create opportunites for managers to entrench

themselves. Entrenched investors will be less likely to raise debt, therefore not rebalancing the capital structure.

Even though the outcome of this theory is similar to the one of market timing theory, in this case, managers are exploiting existing investors, not new ones. While both explanations are likely to be true, it is not possible to test which one drives the changes in capital structure.

2.4. Two explanations of market timing effect on capital structure

Dynamic information asymmetry and time-varying mispricing can be used to explain the effect of market timing on capital structure.

As it was mentioned before, market timing can be justified by assuming that information asymmetry is not constant. According to research by Choe, Mansulis and Nanda (1993), adverse selection may vary across different time periods. The studies by Lucas and McDonald (1990) as well as Korajzyk, Lucas and McDonald (1992) provide evidence that adverse selection also varies across firms.

Therefore, if the cost of deviation from optimal cost structure is low compared to relative benefits from decreased information asymmetry, a firm may maintain its new capital structure. In that case, the long term effect of market timing on capital structure is observed.

Another explanation of the market timing effect relies on time-varying mispricing and an assumption of irrational investors. Under these conditions, firms issue equity if they believe that costs of equity are irrationally low. Frankel and Lee (1998) provide evidence that high market-to-book values are associated with increased expectations from investors. Even if firms reach correct valuation, there is no need to rebalance capital structure if there is no optimal level of leverage.

2.5. Enhanced pecking order theory

According to Hogfeldt and Oborenko (2005), a firm's financing decisions are largely dependent on ownership structure since it determines the difference in costs between external and internal equity. External equity is more costly due to the conflict of interest between managers and existing stockholders on the one side and new stockholders on the other one. This conflict is caused by the separation between control and ownership (Jensen & Meckling, 1976).

In the case of dispersed ownership, the cost differential is small when the market-to-book ratio is high. Therefore, management tends to use external financing through IPOs or SEOs. This behavior is strengthened when market mispricing is present since it allows managers to benefit their existing stockholders at the expense of new ones.

However, if cash flow and control rights are separated, it leads to a discount on equity. This discount creates a wedge between the cost of internal and external equity. This wedge enhances the pecking order, which was caused by the information asymmetry. As a result, market timing will be limited in such a case.

Hogfeldt and Oborenko (2005) formulated their theory in the following way: "new equity (rights issues or private placements) is issued only when internal equity and debt are insufficient while public offers are not used since compensating transfers from incumbents to external shareholders needed" (Högfeldt & Oborenko, 2005, p. 1).

Furthermore, since external financing will usually be used when debt or internal equity is not available, it can coincide with low market-to-book value. Therefore, enhanced pecking order theory even suggests the possibility of reversed market timing.

2.6. Empirical research of market timing effect on capital structure

Apart from the studies by Baker & Wurgler (2002) and Alti (2006), there is a significant body of empirical research. However, most studies have been conducted using datasets consisting of the US companies.

The findings provided from research in Europe raise doubts regarding the generality of market timing theory. The findings by Dong et al. (2012) and Bruinshoofd and de Haan (2012) suggest that the effect of market timing is not significant for European markets. The same conclusion is reached by Bie and de Haan (2007).

These findings are usually explained by a more concentrated ownership and a more common separation between control and cash flow rights for European firms (Bruinshoofd & de Haan, 2012).

2.7. Swiss financial system and ownership structure

Prior to the explanation of the study's relevance, the description of the market that is researched is required.

Switzerland possesses highly developed both stock market and banking structures. Taking into account its size and efficiency, Switzerland's financial system is considered to be market based (Demirguc-Kunt & Levine, 1999).

Switzerland has two stock exchanges: SIX Swiss Exchange and relatively small "Berne eXchange BX". SIX Swiss Exchange was founded in 1993 and is currently owned by 130 banks and 252 companies (six group, 2020). It is the third largest stock exchange in Europe in terms of tradeable shares with a trading turnover of CHF 1,752.4 billion (approximately EUR 1,637 billion).

Switzerland is an outlier among European countries since its ownership characteristics are quite different from the ones of its neighbors (Vatiero, 2016). The country is characterized by high dispersion of ownership while having much more concentrated control than common law countries like the US or the United Kingdom (Table A.1).

2.8. Relevance of the study

While the existence of market timing is not questioned anymore, the findings regarding the effect of market timing on capital structure remain contradictory. This study is an attempt to add to the existing body of literature in terms of scope and methodology.

First, as it was mentioned before, empirical research of market timing for European countries is relatively rare. Furthermore, to the best of my knowledge, there has been no quantitative study of market timing effect for firms listed on Swiss stock exchange.

Second, the question of the persistence of the market timing effect is still not resolved. The contradictions surrounding the traditional methodology raise the need to review results using a more reliable approach.

Lastly, adverse selection costs are time varying, which suggests that the same may be true for the market timing effect. This assumption is supported by the findings by Bruinshoofd and de Haan (2012), who concluded that the market timing effect was significant for European firms after the Information and communication technology (ICT) boom.

CHAPTER 3. METHODOLOGY

The methodology, which is employed in this paper, relies on the approach developed in two most influential papers that study the effect of market timing on the capital structure by Baker and Wurgler (2002) and Alti (2006).

First, the hypothesis regarding the presence of market timing on European market will be tested. After that, the analysis will proceed with testing both the short- and long-term effects of market timing on capital structure.

3.1. Hot market definition

A hot market is defined as a time period when there is a high number of firms conducting IPOs.

Following the approach suggested by Alti (2006), the hot and cold market is defined based on monthly IPO volume. First, the number of IPOs is calculated for each month. Afterward, a hot market dummy variable is created. It is equal to one in case a firm conducts an IPO when the number of IPOs in the given month is higher than the mean value for the entire period. In the opposite situation, the variable is equal to zero.

3.2. Presence of market timing

Given the favorable market conditions, more firms tend to conduct IPOs. Furthermore, they are likely to sell more equity. The first statement is implied in the definition of the hot market, which is used in this study. In order to test the second statement, the following cross-section regression is used.

$$Proceeds/A_t = \beta_0 + \beta_1 Hot + \beta_2 M/B_t + \beta_3 EBITDA/A_{t-1} + \beta_4 Size_{t-1} +$$
$$+ \beta_5 PPE/A_{t-1} + \beta_6 R\&D/A_{t-1} + \beta_7 RDD_{t-1} + \beta_8 D/A_{t-1} + u_t \qquad (1)$$

The dependent variable (Proceeds/At) is defined as the ratio of total IPO proceeds to a year-end value of a firm's total assets. The variable of interest is Hot, which was defined

above. A statistically significant and positive effect of the coefficient β1 would suggest the presence of market timing, thus supporting Hypothesis 1.

Control variables are interpreted in the following way:

- *M/B* – Market-to-Book ratio;
- *EBITDA/A* – EBITDA/Total Assets;
- *Size* – ln (Revenues);
- *PPE/A* – Property, plant & equipment/Total Assets;
- *R&D/A* – Research & Development expenses/Total Assets;
- *RDD* – dummy variable, which is equal to one if the data on R&D for a firm is missing;
- *D/A* – Debt/Total Assets.

These variables have been determined as key factors that impact financing decisions (Rajan & Zingales, 1995). They are also the ones employed by Alti (2006).

3.3. Short-term effect of market-timing on capital structure

Since the firms that conduct IPO during the hot market issue more equity, there should be a mechanical, short-term effect on the leverage ratio.

In order to estimate the short-term effect of market timing, the following regression is used.

$$Y_t = \beta_0 + \beta_1 Hot + \beta_2 M/B_t + \beta_3 EBITDA/A_{t-1} + \beta_4 Size_{t-1} + \beta_5 PPE/A_{t-1} +$$
$$\beta_6 R\&D/A_{t-1} + \beta_7 RDD_{t-1} + \beta_8 D/A_{t-1} + u_t \qquad (2)$$

Besides the change in the leverage, compared to the pre-IPO year, it can be decomposed further, as it was suggested by Alti (2006).

$$D/A_t - D/A_{t-1} = -e/A_{t-1} + (E/A)_{t-1} * (\Delta Cash + \Delta Other\ Assets))/A_t - \Delta RE/A_t \quad (3)$$

This decomposition provides an explanation regarding the structural changes in the leverage. It also shows how exactly the change in leverage was achieved. Net equity issue (e/A) and the second left-hand term in the equation above show how the proceeds from the issue are used. The proceeds can be used either to repay existing leverage or to increase the assets of a firm by increasing cash and other assets.

All components of the equation are used as the dependent variable in the equation above:

- $D/A_t - D/A_{t-1}$ – change in leverage, compared to the pre-IPO year;
- D/A_t - leverage ratio in the IPO year;
- $-e/A_{t-1}$ – the negative value of the net equity issues;
- $\Delta Cash/A_t$ – change in cash-to-assets ratio;
- $\Delta Other\ Assets/A_t$ – change in other assets-to-total assets ratio;
- $\Delta RE/A_t$ – change in retained earning-to-assets ratio.

3.4. Long-term effect of market timing on capital structure

In order to determine the persistency of market timing effect on capital structure, it is necessary to determine whether this effect is reversed in the following years.

This question can be answered using the following regression:

$$Y_t = \beta_0 + \beta_1 Hot + \beta_2 M/B_{t-1} + \beta_3 EBITDA/A_{t-1} + \beta_4 Size_{t-1} + \beta_5 PPE/A_{t-1} + \beta_6 R\&D/A_{t-1} + \beta_7 RDD_{t-1} + \beta_8 D/A_{PRE-IPO} + u_t \qquad (4)$$

The dependent variables in this case are following:

- $D/A_t - D/A_{t-1}$ – cumulative change in leverage;
- D/A_t – absolute leverage.

In both cases, the regression is run for the following one and two years after the IPO. In case the effect of Hot market dummy variable remains statistically positive, the regression is run for the following years as well.

CHAPTER 4. DATA

The primary data has been extracted from Thomson Reuters Eikon. The dataset is restricted to the period from December 2000 to December 2017 due to the issues regarding the availability of data. Furthermore, the dataset includes only the firms for which the data has been available at least for 1 year before the IPO date. The observations with negative proceeds from an issue of equity are also dropped as either an outlier or typo.

The additional data on IPO dates has been collected from the official website of Swiss stock exchange.

The relevant variables and their descriptions, according to Thomson Reuters Eikon, are provided below.

- Total assets – the sum of Total non-current assets and Total current assets;
- Total liabilities – all current & non-current liabilities, including both short-term and long-term debt;
- Total debt – the combination of short-term and long-term interest bearing liabilities;
- Net property, plant and equipment – a gross value of PPE less accumulated depreciation;
- Net proceeds from equity issues – the total amount received from the issue of common and preferred stock;
- Net sales or revenue – gross sales and other operating revenue less discounts, return and allowances;
- Research and development expenses – expenses for research and development of new products and services;
- Capital expenditures – the total expenditures for long-term assets;
- EBITDA – the earnings before interest, tax, depreciation and amortization;

- Retained earnings – the part of net income that was not distributed to shareholders;
- Market value – the share price multiplied by the number of shares in issue;
- Common dividends – the amount paid to shareholders, including extra and special dividends as well;
- Cash – the sum of cash and short-term investments;
- Industry – industry classification according to Thomson Reuters Eikon.

The variable of interest is Hot dummy variable, which is described in the previous chapter. The dataset consists of 216 monthly periods (Figure 1). With the mean number of IPOs per month being equal to 0.58, 85 periods are defined as the Hot market (39% of the total number of periods).

Figure 1. IPO statistics on SIX Swiss Exchange, 2000-2017
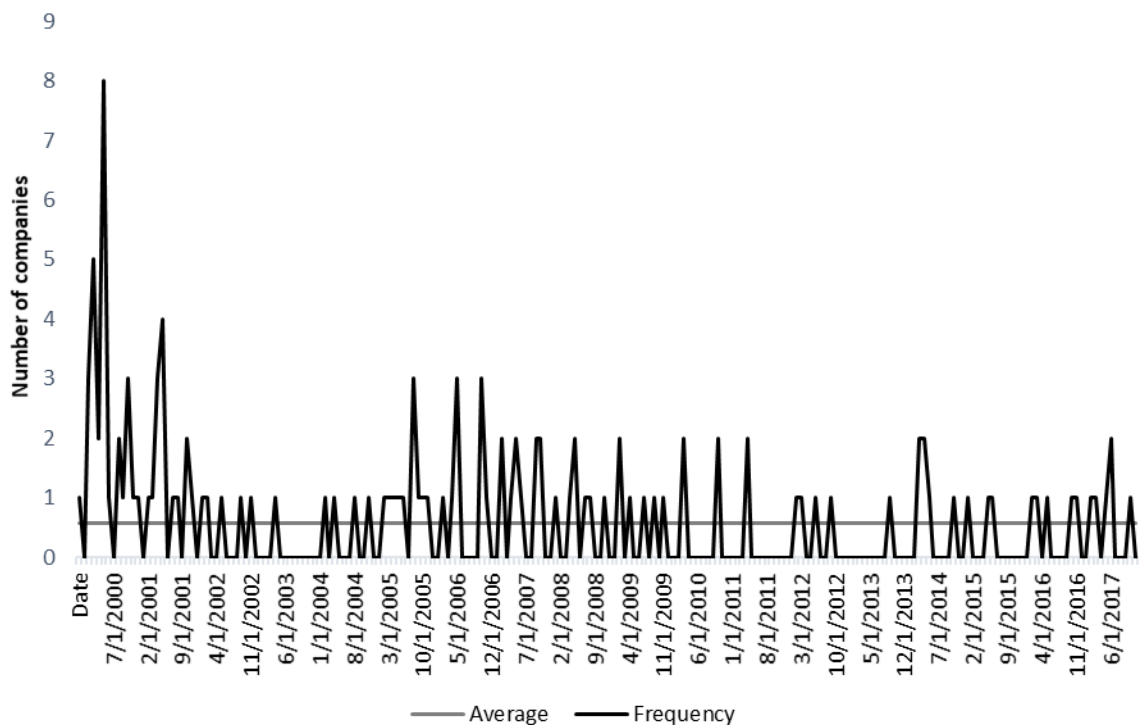
Source: Thomson Reuters Eikon, SIX Swiss Exchange

The summary statistics regarding other relevant variables are presented in Table 1. The results are similar to the ones obtained by Alti (2006): the amount of cash increases in the IPO year and declines afterward; M/B declines after IPO.

Table 1. Summary statistics of firm's characteristics

The key statistics (quantity, mean and standard deviation) are provided for the following variables: leverage ratio, market-to-book ratio, net equity proceeds, change in retained earnings, EBITDA, natural logarithm of sales (size), property, plant and equipment (PPE), research and development expenses, change in cash and short-term investments. Summary statistics are reported for the year prior to IPO, IPO year and two years following the IPO for all variables, except for market-to-book ratio, which is not avaialble prior to IPO due to sample construction process

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		D/A	M/B	e/A	$\Delta RE/A$	EBITDA/A	SIZE	PPE/A	R&D/A	$\Delta Cash/A$
	No.	246	0	110	110	183	237	230	296	137
Pre-IPO	Mean	0.6412		0.1112	-0.0805	0.0443	11.9876	0.2581	0.0093	-0.0020
	St. dev.	0.41		0.55	0.66	0.49	2.00	0.25	0.06	0.21
	No.	304	278	171	171	240	295	290	295	205
IPO	Mean	0.5421	2.3073	0.1650	0.0172	0.0841	12.1464	0.2418	0.0061	0.1202
	St. dev.	0.26	5.31	0.32	0.24	0.16	1.84	0.24	0.03	0.20
	No.	322	306	230	230	261	313	310	305	252
IPO+1	Mean	0.5504	2.0898	-0.0128	0.0134	0.0740	12.2357	0.2651	0.0075	-0.0298
	St. dev.	0.25	6.52	0.39	0.27	0.19	1.82	0.26	0.04	0.19
	No.	332	320	246	246	280	322	321	316	274
IPO+2	Mean	0.5736	1.5638	0.0157	-0.0968	-0.0026	12.3741	0.2850	0.0112	-0.0243
	St. dev.	0.25	1.41	0.20	1.17	1.09	1.84	0.26	0.09	0.21

CHAPTER 5. RESULTS

5.1. Presence of market timing effect on Swiss stock exchange

In order to determine the existence of market timing, Hot dummy variable was regressed on the Proceeds-to-Total Assets ratio, using Equation 1. The set of control variables was previously described in Chapter 3.

According to the results presented in Table 2, the effect of market timing on the amount of proceeds raised is positive and statistically significant at a 5% confidence level. Therefore, Hypothesis 1 is supported. Market timing is present on Swiss stock exchange.

However, higher proceeds can be explained by higher equity prices during the hot market or larger stake of equity offered, or both. It is also impossible to determine whether managers actively attempt to time the market.

Size and EBITDA/Assets are statistically significant at 10% confidence level. Their effect is negative. This result is in line with the findings by Alti (2006) and the pecking order theory. Larger companies may have more cash to finance their needs from internal sources (Myers, 2001). Same argument holds for more profitable companies.

Table 2. Market timing and its effect on the amount raised from IPO

The results of the following regression are reported:

$$Yt = \beta_0 + \beta_1 * HOT + \beta_2 * M/B_t + \beta_3 * EBITDA/A_{t-1} + \beta_4 * SIZE_{t-1} + \beta_5 * PPE/A_{t-1} + \beta_6 * R\&D/A_{t-1} + \beta_7 * ifR\&D_{t-1} + \beta_8 * D/A_{t-1} + u_t$$

The dependent variable is the ratio of total proceeds from IPO to closing total assets in the year of IPO. Industry fixed effects are estimated but not reported. The value for constant term is also not provided.

Proceeds/A $_{it}$	Coef.
Hot	**0.246 ****
	(2.12)
M/B_t	0.0160
	(0.82)
$EBITDA/A_{t-1}$	-0.105 *
	(-1.74)
$SIZE_{t-1}$	-0.0548 *
	(-1.80)
PPE/A_{t-1}	-0.247
	(-1.07)
$R\&D/A_{t-1}$	-0.296
	(-0.32)
$ifR\&D_{t-1}$	-0.149
	(-1.28)
D/A_{t-1}	0.0418
	(0.26)
No. of observations	117
R^2	0.949

Robust t statistics reported in parentheses

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

5.2. Short-term effect of market timing on capital structure

The results of capital structure regression (Equation 2) are provided in Table 3.

The effect of market timing is insignificant in all cases. However, if the management tried to exploit the fluctuations in the relative cost of equity, at least a mechanical effect on leverage should have been observed. Instead, the results are in line

with the existing body of literature on market timing in continental Europe and the enhanced pecking order theory by Hogfeldt and Oborenko (2005).

The market timing theory of capital structure cannot be generalized for Swiss market. On the contrary, the results suggest the presence of the enhanced pecking order theory.

Therefore, Hypothesis 2 is accepted. Market timing effect does not have even a short-term impact on the capital structure of a firm.

The effect of market timing is also insignificant in the case of net equity issued. These results suggest that the management is not trying to time the market or is unable to do such a thing.

5.3. Long-term effect of market timing on capital structure

The results of the regression (Equation 4) are presented in Table 4.

Given the absence of short-term effect, it is not surprising that there is also no effect of market timing on the capital structure for the following years. According to the results presented in Table 4, the effect of Hot dummy variable is insignificant both in the first and the second year following IPO.

Table 3. Short-term effect of market timing on capital structure

The results of the following regression are reported:

$$Y_t = \beta_0 + \beta_1 * HOT + \beta_2 * M/B_t + \beta_3 * EBITDA/A_{t-1} + \beta_4 * SIZE_{t-1} + \beta_5 * PPE/A_{t-1} + \beta_6 * R\&D/A_{t-1} + \beta_7 * ifR\&D_{t-1} + \beta_8 * D/A_{t-1} + u_t$$

Y_t is a change in leverage ratio following the IPO, absolute leverage in IPO year, net equity proceeds, change in cash and short-term investments, change in other assets and change in retained earnings in Columns 1-6, respectively. Industry fixed effects are estimated but not reported. The value for constant term is also not provided.

	(1) $(D/A)_{IPO} - (D/A)_{Pre-IPO}$	(2) Absolute D/A	(3) e/A	(4) $\Delta Cash/A$	(5) $\Delta Other\ Assets/A$	(6) $\Delta Ret.\ Earnings/A$
Hot	**0.0108**	**0.0307**	**0.104**	**0.0115**	**0.0373**	**-0.0255**
	(0.38)	**(0.86)**	**(1.35)**	**(0.38)**	**(0.96)**	**(-0.74)**
M/B_t	0.0000167	0.000247	-0.0255 **	-0.00266	0.000430	0.00701
	(0.02)	(0.25)	(-2.57)	(-1.21)	(0.44)	(1.41)
$EBITDA/A_{t-1}$	0.214 ***	-0.120 ***	-0.126	0.0305	-0.0761	0.276 ***
	(2.87)	(-4.36)	(-0.87)	(0.43)	(-0.95)	(3.70)
$SIZE_{t-1}$	0.0261 ***	0.0414 ***	-0.00882	-0.000999	0.00534	-0.00715
	(2.93)	(3.64)	(-0.65)	(-0.11)	(0.32)	(-1.18)
PPE/A_{t-1}	0.0855	0.104	-0.296 **	-0.0894	-0.104	0.0683
	(1.03)	(0.92)	(-2.05)	(-0.92)	(-0.88)	(0.82)
$R\&D/A_{t-1}$	0.152	0.354	-0.849	-0.316	0.305	-0.567
	(0.72)	(1.45)	(-1.13)	(-0.59)	(0.77)	(-1.39)
$ifR\&D_{t-1}$	-0.0471	0.000276	0.0553	-0.0369	-0.0279	0.00902
	(-0.91)	(0.01)	(0.68)	(-0.73)	(-0.46)	(0.21)
D/A_{t-1}	-0.593		0.104	-0.0160	0.0155	0.139 *
	="(-0.92)"		(0.64)	(-0.22)	(0.19)	(1.83)
No. of observations	163	163	120	157	157	120
R^2	0.940	0.953	0.867	0.684	0.667	0.930

t statistics in parentheses; industry fixed effects are not reported in the table

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

Table 4. Long-term effect of market timing on capital structure

The results of the following regression are reported:

$$Y_t = \beta_0 + \beta_1 * HOT + \beta_2 * M/B_{t-1} + \beta_3 * EBITDA/A_{t-1} + \beta_4 * SIZE_{t-1} + \beta_5 * PPE/A_{t-1} + \beta_6 * R\&D/A_{t-1} + \beta_7 * ifR\&D_{t-1} + \beta_8 * D/A_{Pre-IPO} + u_t$$

Yt is a change in leverage ratio following the IPO and absolute leverage in IPO year for IPO+1 and IPO+2 years in Columns 1-4, respectively. Industry fixed effects are estimated but not reported. The value for constant term is also not provided.

	(1)	(2)	(3)	(4)
	$(D/A)_{IPO} - (D/A)_{Pre-IPO}$		Absolute D/A	
t	IPO+1	IPO+2	IPO+1	IPO+2
Hot	**0.0268**	**0.0327**	**0.0358**	**0.0674**
	(1.13)	**(1.24)**	**(1.20)**	**="(1.40)"**
M/B_t	-0.000550	-0.00105	-0.00131	-0.000846
	(-0.71)	(-1.66)	(-0.86)	(-0.88)
$EBITDA/A_{t-1}$	-0.580 ***	-0.290 ***	-0.463 *	-0.122
	(-3.20)	(-2.02)	(-1.76)	(-0.76)
$SIZE_{t-1}$	0.0325 ***	0.0244 ***	0.0456 ***	0.0364 ***
	(4.52)	(2.90)	(5.22)	(4.03)
PPE/A_{t-1}	0.112	0.138 *	0.0872	0.147 *
	(1.59)	(1.91)	(0.87)	(1.67)
$R\&D/A_{t-1}$	0.130	0.0992	-0.133	-0.0224
	(0.48)	(0.21)	(-0.31)	(-0.05)
$ifR\&D_{t-1}$	-0.0295	-0.0563	0.0225	0.0346
	(-0.68)	(-1.37)	(0.46)	(0.85)
$D/A_{PRE-IPO}$	-0.489	-0.533	-	-
	="(-1.13)"	="(-0.98)"	-	-
No. of observations	172	181	212	242
R^2	0.783	0.739	0.936	0.937

Robust t statistics in parentheses

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

5.4. Robustness check

Figure 2. IPO statistics on SIX Swiss Exchange, 2000-2017 (6 months)
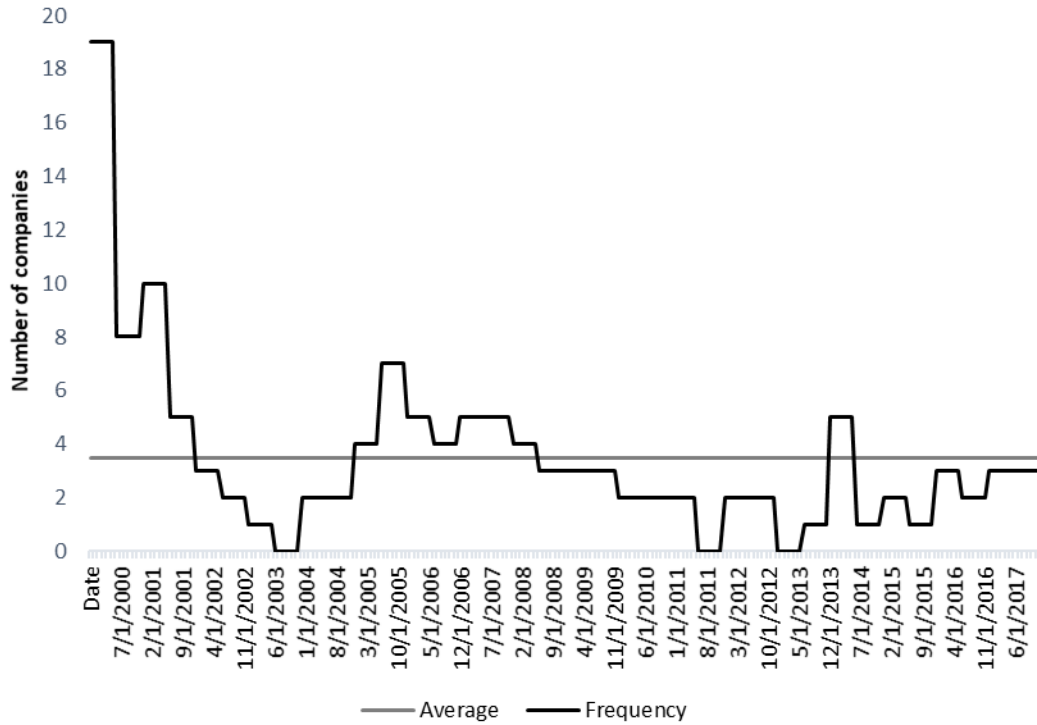
Source: Thomson Reuters Eikon, SIX Swiss Exchange

The robustness of obtained results is tested using an alternative definition of the hot market. First, the hot market is alternatively defined as a 6-month period where the number of firms conducting IPO is above average (Figure 2). Then, the same procedure is applied to a 1-year period (Figure A.1).

The number of companies conducting IPOs each year are presented in Figure 2. The hot market is observed in 2000-2001, 2005-2007 and 2014.

The results of regressions with alternative hot market definitions are presented in Table 5. The previously obtained results are robust: the same effect of market timing on the proceeds is observed while there is no significant effect on book leverage.

Table 5. Robustness test results

The results of the following regressions are reported:

$$Yt = \beta0 + \beta1 * HOT + \beta2 * M/Bt + \beta3 * EBITDA/At\text{-}1 + \beta4 * SIZEt\text{-}1 + \beta5 * PPE/At\text{-}1 + \beta6 * R\&D/At\text{-}1 + \beta7 * ifR\&Dt\text{-}1 + \beta8 * D/At\text{-}1 + ut$$

$$Yt = \beta0 + \beta1 * HOT + \beta2 * M/Bt\text{-}1 + \beta3 * EBITDA/At\text{-}1 + \beta4 * SIZEt\text{-}1 + \beta5 * PPE/At\text{-}1 + \beta6 * R\&D/At\text{-}1 + \beta7 * ifR\&Dt\text{-}1 + \beta8 * D/APre\text{-}IPO + ut$$

		$Proceeds/A_{it}$	$(D/A)_{IPO} - (D/A)_{Pre\text{-}IPO}$	
			IPO+1	IPO+2
IPO$_{average\text{-}6m}$	*Hot*	**0.0908**	**-0.0187**	**-0.0004**
	t-statistics	(1.52)	(-0.75)	(-0.01)
	No.	73	172	181
	R^2	0.891	0.7821	0.861
IPO$_{average\text{-}1y}$	*Hot*	**0.0601**	**0.0249**	**0.0194**
	t-statistics	(0.80)	(0.93)	(0.67)
	No.	73	172	181
	R^2	0.879	0.782	0.737

Robust t statistics in parentheses

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

5.5. Comparison with the existing body of literature

As it was mentioned before, the most influential works on market timing are based on samples consisting of US firms. Dispersed ownership and close relationship between ownership and cash flow rights are typical traits of these firms, unlike their European counterparts.

Therefore, for the purposes of comparison, the studies, which are conducted using samples of firms from European countries, should be used. According to Bruinshoofd and de Haan (2012), the studies of market timing theory in Europe are quite scarce and tend not to provide convincing results. However, it is still crucial to put the findings of this paper in the context of the existing literature.

The paper by Bruinshoofd and de Haan (2012) studied the market timing theory using a sample of firms from Europe and the UK and then comparing the results with the findings originated from US firms. Their results suggested a lack of effect of market timing on leverage for European companies while the opposite situation was observed in the US. Furthermore, the observed effect of market timing is negative: European firms increased their long-term debt when their shares were overpriced.

According to Hogfeldt and Oborenko (2005), the market timing theory of capital structure cannot be generalized to Swedish market. The authors found no statistically significant relationship between the leverage and hot market. Instead, they concluded that IPOs tend to be driven by a lack of other sources of financing. As a result, Swedish firms tend to rebalance their capital structure after the equity issues. Furthermore, Hogfeldt and Oborenko (2005) argued that their findings can be generalized to the rest of continental Europe, which is also characterized by a significant wedge between ownership and control rights.

Similar conclusions were reached by de Bie and de Haan (2007), who studied the market timing theory of capital structure using a sample of Dutch firms. According to their

findings, the effect of market timing on capital structure is not significant. However, they do find evidence of market timing itself since the effect of market timing on the proceeds raised is positive and statistically significant. More specifically, firms issued 9.2% equity above the median when their market-to-book ratio was above average.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

The goal of this research paper was to study market timing on Swiss stock exchange. More specifically, two research questions were formulated:

Research question 1: Does market timing exists on Swiss stock exchange?

Research question 2: How persistent is the effect of market timing on the capital structure of firms listed on Swiss stock exchange?

The existing body of literature provided conflicting results on both of these questions. Market timing theory was formulated by Baker and Wurgler (2002), who defined capital structure as a cumulative outcome of previous attempts to time the market. According to the authors, market timing had a significant and lasting impact on the leverage of a firm. More specifically, the authors found that firms that issued their equity when the market was hot had a lower leverage ratio. The effect remained for up to ten years.

However, their findings were questioned with respect to the paper's methodology by Alti (2006), who argued that the market timing will have only a short-term impact once the improved methodology is applied.

Furthermore, the generalization of the results to European countries was questioned by Hogfeldt and Oborenko (2005), who suggested enhanced pecking order theory. The authors argued that due to a significant wedge between the control and ownership rights, European firms will use equity financing only in case other sources of financing are not available. Studies by Bruinshoofd and de Haan (2012) and de Bie and de Haan (2007) support these findings.

Given the fact that no previous quantitative research of market timing was conducted for Swiss companies, this paper represents a valuable addition to the existing

body of literature. Using an advanced methodology and a more recent sample further adds to the relevance of the research.

Using the methodology suggested by Alti (2006), the findings provided evidence of the existence of market timing on Swiss stock exchange. The firms that issued their equity when the market was hot had higher proceeds than the ones that conducted IPOs during the cold market. Therefore, Hypothesis 1 was supported.

However, the effect of market timing on capital structure was not observed. There was no statistically significant effect of market timing on the leverage ratio in two years following the IPO. The effect was observed neither in the short-term, nor long-term, which allows us to support Hypothesis 2 as well.

These results are in line with the findings from other European countries by Hogfeldt and Oborenko (2005) and Bruinshoofd and de Haan (2012). The absence of market timing effect can be explained by the pecking order theory and more concentrated ownership.

Further research may benefit from looking into the relationship between concentrated ownership and market timing theory in more detail.

Comparison of results among European firms, using the same methodology, or integrating ownership into the empirical model may be employed for this purpose. Even though it is outside of the scope of this research, ownership structure and separation of control and cash flow rights has been mentioned as important factors for European firms, especially in the context of enhanced pecking order theory by Hogfeldt and Oborenko (2005).

In addition, the time-varying properties of market timing may be taken into account by studying the effect of market timing on capital structure in different periods. Time-

varying adverse selection costs have been considered as one of the explanations for the market timing by Maung (2014).

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APPENDIX

Table A.1. Ownership and control characteristics

The table provides data on coefficients for Cash Flow Rights, Control Rights, Wedge between them and Proportion of Widely held companies (with no controlling shareholder)
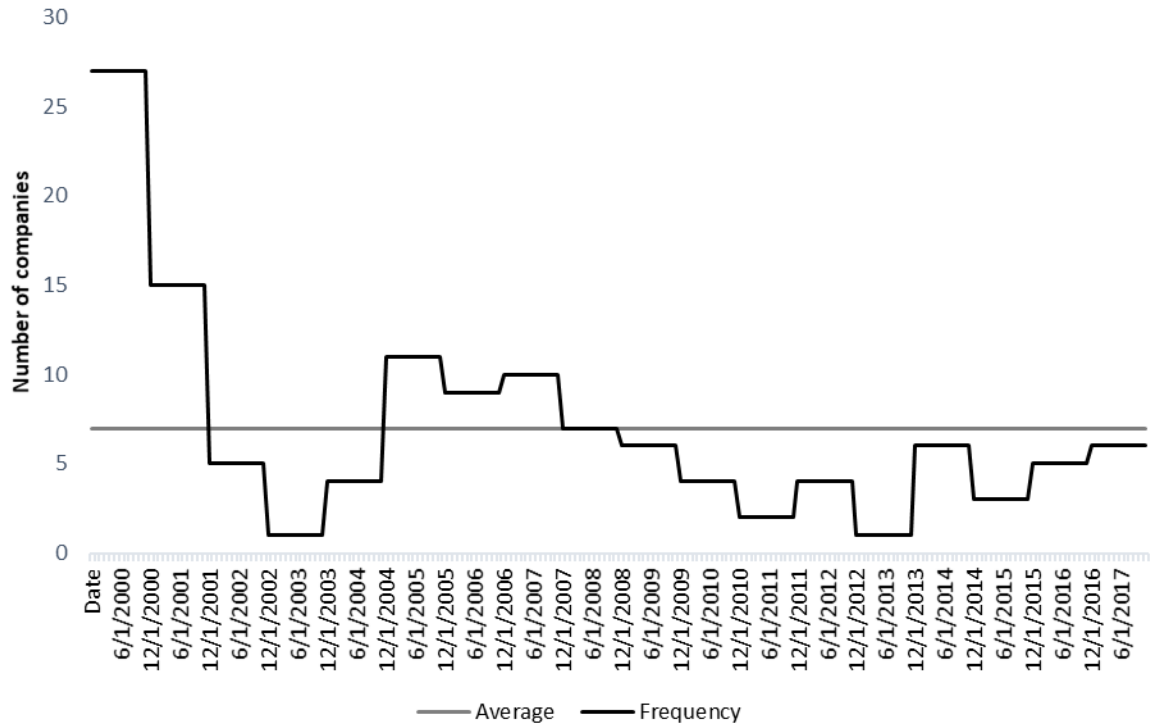
1. Widely held is an average of 20 largest domestic firms indicating presence of a controlling shareholder (with 20% of voting rights as a criterion of control). The variable equals one in absence of a controlling shareholder. Data from La Porta, Lopez-de-Silanes & Shleifer (1999)

2. Control rights and cash flow rights are defined as a share of voting rights or share of contrl rights, respectively, which are owned by controlling shareholder. The data is provided by La Porta, Lopez-de-Silanes, Shleifer & Vishny (2002). Wedge is the difference between Cash flow rights and Control rights

Country	Cash Flow Rights	Control Rights	Wedge	Widely held
Austria	0.47	0.56	0.1	0.05
Belgium	0.29	0.39	0.1	0.05
Germany	0.3	0.37	0.07	0.5
Denmark	0.3	0.41	0.1	0.4
Spain	0.26	0.33	0.07	0.35
Finland	0.3	0.38	0.08	0.35
France	0.23	0.37	0.13	0.6
Greece	0.48	0.52	0.04	0.1
Italy	0.35	0.51	0.16	0.2
Netherlands	0.33	0.7	0.37	0.3
Norway	0.27	0.34	0.07	0.25
Portugal	0.46	0.49	0.03	0.1
Sweden	0.12	0.32	0.19	0.25
Switzerland	**0.34**	**0.46**	**0.12**	**0.6**
Mean Europe	0.32	0.44	0.12	0.29
United Kingdom	0.14	0.25	0.1	1
United States	0.2	0.21	0.01	0.8

Figure A.1. The number of IPOs on Swiss stock market (frequency = 1 year)

Source: Thomson Reuters Eikon, SIX Swiss Exchange