“Market conditions, seasoned equity offerings and capital structure”

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Market conditions, seasoned equity offerings and capital structure

Abstract

The previous studies that examine the impact of market conditions on equity market activity have conflicting results. While Jalilvand and Harris (1984) show that equity markets become more active when interest rates are relatively low, Choe, Masulis and Nanda (1993) contend that business cycles rather than the level of interest rates explain the market activity. Also, there is no consensus on the capital structure implications of market timing. While Baker and Wurgler (2002) argue that market timing has a persistent impact on issuing firm's capital structure, more recent studies like Alti (2006) and Kayhan and Titman (2007), among others, show evidence of only a short-run (i.e. two- or three-year) impact. This study attempts to clarify the "market timing" issue by first testing the relation between the interest rates in the public bond markets and the seasoned equity offering (i.e. SEO) activity in the United States. The paper uses robust regressions and finds that while the level of interest rates does not explain the size of the SEO, it significantly explains the number of firms coming to the market. Firms time the market by choosing more favorable periods to do their equity offerings. Then, the study examines the long-run (i.e. two- to five-year) impact of SEO market timing on issuing firms' capital structure. The results show that SEO market timing does not seem to have a persistent impact on issuing firms' capital structure.

Keywords: seasoned equity offerings, market conditions, interest rates,·market timing, capital structure.
JEL Classification: G30, G32.

Introduction

The previous studies on equity market timing focus on either firm-specific variables like market-to-book ratio, or market-wide variables like "hot" markets to measure firms' timing attempts. Two of those studies, namely Jalilvand and Harris (1984) and Choe, Masulis and Nanda (1993), use the level of interest rates as a proxy for capital market conditions and examine the relation between interest rates and firms' financial activities. Theoretically, when the level of interest rates goes up, both cost of equity and cost of debt will go up. Therefore, one would expect equity issuers to avoid unfavorable market condition periods (i.e. periods of relatively high interest rates in this case). While Jalilvand and Harris (1984) confirm the impact of interest rates on firms' financial activities, interestingly, Choe, Masulis and Nanda (1993) reject the notion of a significant relation between the level of interest rates and equity market activity.

In order to clarify the issue, in this study, I focus on SEOs (i.e. seasoned equity offerings), and examine the impact of financial market conditions on managers' SEO decisions. I use the level of interest rates as a proxy for financial market conditions, and test for SEO market timing using the change in the level of interest rates over the last four, eight, or twelve quarters as my market timing variable. I expect to see more activity in favorable financial markets (i.e. when interest rates are lower relative to the recent rates) compared to unfavorable markets.

I measure SEO market activity in two ways: (1) market activity in terms of the number of firms coming to the SEO market; and (2) market activity in terms of the size (i.e. proceeds scaled by assets) of the offering. After controlling for firm-specific variables that are found to be the determinants of capital structure in previous studies like M/B (i.e. market-to-book ratio), size, profitability, tangibility and D/A (i.e. pre-issue leverage), I find that there is a significant relationship between the level of interest rates and the number of firms coming to the SEO market. The SEO market becomes more active when interest rates are relatively low. On the other hand, my results show that there is no significant relation between the level of interest rates and the size of the offering. Firms seem to time the market by choosing a more favorable period to do their offerings, but they do not do a significantly larger or smaller offering based on the market conditions.

Interestingly, when I examine the relation between the SEO market activity and the realized future rates, I find that the level of interest rates relative to the rates four, eight, or twelve quarters after the offering do also explain the number of SEOs in a given month. In other words, the SEO market becomes more active before interest rate run-ups. This finding may be an indication of managers' forecasting power regarding the future rates.

Although numerous studies show evidence of IPO and SEO market timing, there is no consensus on the capital structure implications of market timing. While Baker and Wurgler (2002) argue that market timing has a persistent impact on issuing firm's capital structure, more recent studies like Alti (2006) and Kayhan and Titman (2007) among others show evidence of only a short-run (i.e. two- or three-year) impact. In other words, while Baker

and Wurgler (2002) contend that firms do lower their leverage ratios permanently when they time their equity offerings, the more recent studies reject this hypothesis.

In order to contribute to this discussion, in the second part of this study, I examine the long-run (i.e. two- to five-year) impact of SEO market timing on issuing firms' capital structure. When firms choose more favorable periods to do their equity offerings, do they lower their leverage ratios in the long run? My results in this study show that SEO market timing does not have a persistent impact on the issuing firm's capital structure. I find that firms that choose more favorable periods (i.e. lower rate periods) do not have significantly lower or higher leverage ratios compared to the other firms in the long run (i.e. up to five years after the offering). Therefore, my findings here do support the more recent studies that show only a temporary impact on leverage.

To summarize, in this study, my first contribution to the literature is examining the link between the level of interest rates and the timing of seasoned equity offerings. My second contribution is examining the persistency of the impact of SEO market timing on issuing firms' capital structure. My third contribution is, in fact, a technical improvement over the previous studies, rather than an empirical argument. Since market timing is a behavioral phenomenon that examines a manager's decision on when to issue equity, studies that test for this behavior should include the most recent financial information available to the manager at the time. As such, in this study, I use quarterly financial statements rather than annual statements in all of my tests, and this hopefully improves the reliability of the results.

The remainder of the paper is organized as follows. Section 1 discusses the previous literature. Section 2 shows the hypotheses that are being tested. Section 3 includes data description and section 4 explains the methodology. Section 5 shows the results of the empirical tests. The final section concludes the paper.

1. Literature

Equity market timing is detected based on past stock returns in the earlier studies of Taggart (1977), Marsh (1982), Jalilvand and Harris (1984), and Asquith and Mullins (1986). More recent studies such as Rajan and Zingales (1995), Jung, Kim and Stulz (1996), Pagano, Panetta and Zingales (1998), and Hovakimian, Opler and Titman (2001) focus on the market-to-book ratio to capture timing attempts. The common finding in all these studies is the evidence of firms' timing behavior in the equity markets.

Two of these earlier studies, namely Jalilvand and Harris (1984) and Choe, Masulis and Nanda (1993), focus on the relation between the level of interest rates and firms' financing activities. While Jalilvand and Harris (1984) show that equity markets become more active when interest rates are relatively low, Choe, Masulis and Nanda (1993) show that, in expansionary phases of the business cycle, a larger number of firms issue common stock because they face lower adverse selection costs. They argue that while business cycle variables have significant explanatory power, interest rate variables are generally insignificant.

Bayless and Chaplinsky (1996) attempt to see whether there are windows of opportunities for seasoned equity offerings. They link the decision to issue seasoned equity with the costs of issue, windows of opportunity for equity issues that result at least partially from reduced levels of asymmetric information.

In their influential study, Baker and Wurgler (2002) show that firms try to time the equity markets by offering IPOs and SEOs when their market valuations are high compared to their recent historical values. They also show that low leverage firms are those that raised funds when their market valuations were high, as measured by the market-to-book ratio, while high leverage firms are those that raised funds when their market valuations were low. Interestingly, more recent studies like Alti (2006), Flannery and Rangan (2004), Hovakimian (2004), and Kayhan and Titman (2007) do not support Baker and Wurgler's (2002) findings. These studies confirm the timing attempts, but as opposed to Baker and Wurgler (2002), they show that, within a period of two years, the effect of market timing on a firm's capital structure disappears.

More recently, Antoniou, Guney and Paudyal (2008) examine how firms operating in capital market-oriented economies and bank-oriented economies determine their capital structure. They classify the UK and the US as capital market-oriented economies and France, Germany, and Japan as bank-oriented economies and find that the leverage ratio is positively affected by tangibility of assets and size of the firm, but negatively affected by firm profitability, growth opportunities, and share price performance in both types of economies. They show that the capital structure of a firm is heavily influenced by the economic environment (i.e. the institutions, the corporate governance practices, the tax systems, the borrower-lender relations, and the level of investor protection in the country in which the firm operates).

Alti and Sulaeman (2008) show that firms time the market only in response to high returns that coincide with strong institutional investor demand. They show that, when not accompanied by institutional purchases, stock price increases have little impact on the likelihood of equity issuance.

Dittmar and Dittmar (2008) analyze firms' equity issuance and repurchase decisions. They provide evidence that waves of corporate financing events are strongly correlated with the business cycle and are unlikely to be driven by the aggregate market timing. More specifically, they show that economic expansion reduces the cost of equity relative to the cost of debt, inducing firms to issue equity, and increases cash flow and also causes varying degrees of uncertainty, increasing stock repurchases.

Huang and Ritter (2009) examine firms' choice among equity and public debt, while using several explanatory variables that approximate for the relative cost of equity versus debt. They find that firms are more likely to issue equity instead of debt when the implied equity risk premium is lower, the first-day return of IPOs is higher, the closed-end fund discount is smaller, prior (future) market returns are higher (lower), and the expected default spread is higher.

Hennessy, Livdan and Miranda (2010) develop a dynamic equity signaling model, featuring new equity issues and repurchases, in which the firm can avoid mispricing completely. In their model, the signaling is through higher leverage and, consequently, higher bankruptcy costs. In equilibrium, firms with negative private information have negative leverage, issue equity, and overinvest. Firms signal positive information by substituting debt for equity. Default costs induce such firms to underinvest.

Yang (2010) creates a dynamic trade-off model of financing with difference in beliefs between the manager and investors. Yang (2010) shows that the market timing behavior by managers produces a much broader set of empirical predictions than generally associated with market timing such as high stock returns predicting equity issuance and the negative relationship between profitability and both book and market leverage ratios.

Morellec and Shürhoff (2011) develop a dynamic model of corporate investment and financing decisions in which corporate insiders have superior information about the firm's growth prospects. They show that firms with positive private information can credibly signal their type to outside investors using the timing of corporate actions and their debt-equity mix.

Guney and Iqbal-Hussein (2012) test for IPO market timing in the UK. They use the "hot" market dummy variable as their timing measure and show that firms go to the IPO market when the market is "hot". They show that although there is evidence of timing, this does not affect firms' leverage ratios in the long run.

Babenko, Tserlukevich and Wan (2012) demonstrate that firm's efforts to time the market by new equity sales and share repurchases asymmetrically affect current and future shareholders, leading to an agency problem. Current shareholders prefer repurchase timing and future shareholders prefer issuance timing. The authors show that managers of large firms tend to favor existing shareholders by timing the market primarily through share repurchases, whereas managers of small firms tend to favor future shareholders by timing the market through new issues. The authors also show that managers who time the market with repurchases are rewarded (with higher compensation), while managers who time the market with new issues are not rewarded.

2. Hypotheses

Since all investors (including prospective shareholders) would require higher returns from their investments when interest rates are generally high, one would expect capital markets (including the SEO market) to be less active. However, as mentioned above, the two previous studies that examine the relation between the interest rates and equity market activity have conflicting results.

The hypotheses of interest regarding the relation between the interest rates and SEO market activity are the following.

Hypothesis 1: More firms come to the SEO market when interest rates are relatively low.

Hypothesis 2: SEO firms, on average, issue more equity when interest rates are relatively low.

If I find evidence of timing in the SEO market, I will continue with my capital structure tests and examine the persistency of the impact of SEO market timing on issuing firms' capital structure. As mentioned in the previous sections, while Baker and Wurgler (2002) find a persistent impact on leverage, more recent studies (see Alti (2006) and Kayhan and Titman (2007) among others), find only a short-run impact.

The hypothesis of interest regarding the long-run impact of SEO market timing on capital structure is the following.

Hypothesis 3: Firms that go to the SEO market when interest rates are low have significantly lower leverage ratios in the long run.

3. Data

The initial sample consists of all SEOs that occurred between January 1, 1984 and December 31, 2004 reported by the Securities Data Company (SDC). These SEOs are all the US offerings done by the US firms. Figure 1 below shows the time distribution of SEOs by number. Since the US economy has grown by approximately three percent annually, I have adjusted the number of SEOs accordingly.

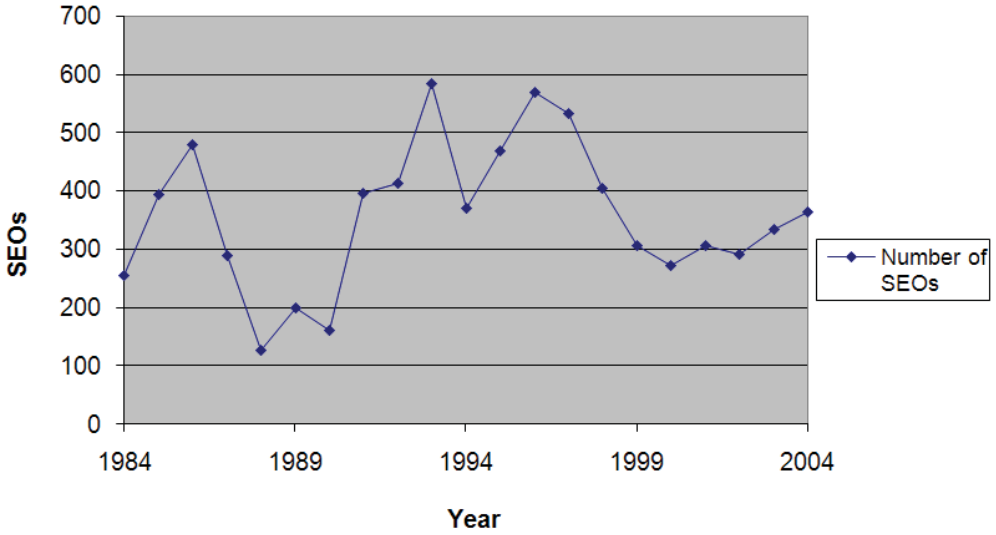

Fig. 1. Number of SEOs over time

There were two recessions in the US during this sample period. The first one started in July 1990 and ended in March 1991, and the second one started in March 2001 and ended in November 2001. When we look at Figure 1, we can see that during these two recessionary periods, the SEO activity was relatively low. The number of firms coming to the market was low in 1988, 1989, and 1990. It was also low in 1999, 2000, and after. Therefore, we can conclude that the number of SEOs are low during both recessions (i.e. Figure 1 supports Choe, Masulis and Nanda (1993)).

Figure 2 below shows the time distribution of SEOs by size. To measure size, I use proceeds scaled by assets (i.e. *Proceeds*/A_t). Since the inflation rate is approximately three percent annually, I have adjusted the proceeds accordingly.

Here, we see that there is probably no relation between the recessionary periods and issue size. The median size of SEOs went up continuously from 1984 through 1997. So, the 1990 recession does not seem to affect the size of the SEOs. There was a small drop in 1998 and then a big jump in 1999 in terms of issue size. In 1990, the issue size still went up. Starting from 2001, it went down. So, we cannot really say that 2000 recession affects the issue size. Here, we conclude that there is no relation between recessionary periods and issue size.

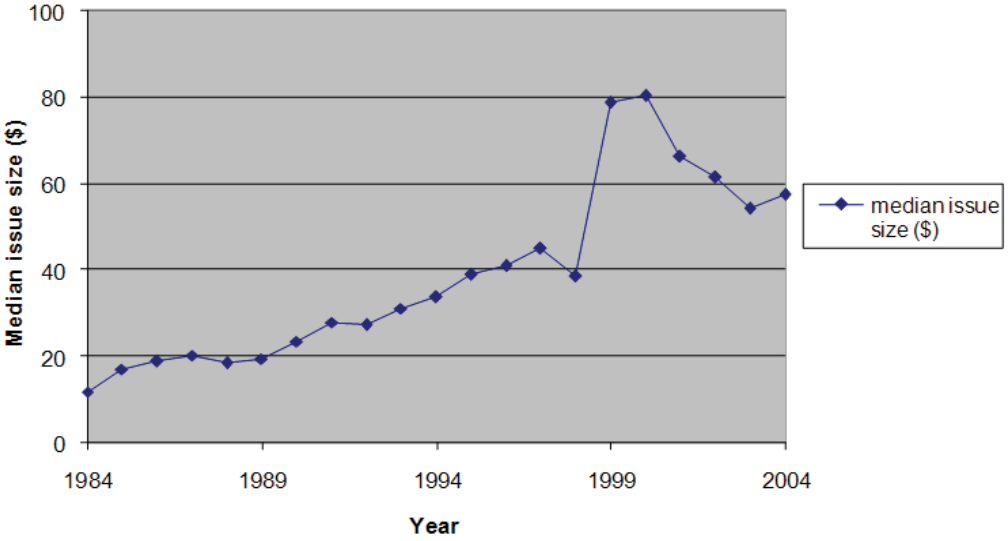

Fig. 2. Median issue size over time

As in the previous studies, I restricted the sample to exclude financial firms, unit offers, and firms with book values of assets below $10 million dollars in 2004. To minimize the influence of outliers, observations with a market-to-book ratio greater than 10, book leverage (*D*/*A*) greater than 1, and earnings before interest, taxes, and depreciation scaled by assets (*EBITDA*/*A*) greater than 1 are dropped. Since financing choices of subsidiary companies may be motivated by the parent companies' own needs, all subsidiary companies are dropped from the sample. The final sample consist of 4,324 SEOs.

Table 1 shows the industry composition of the sample firms. As we can see from the table, almost half of the issuers are "manufacturing" firms.

Table 1. Industry composition for the SEO firms

Industry	Number of issuers	% in total
Agriculture	27	0.62
Co-generation	2	0.05
Construction	45	1.04
Electric service	87	2.01
Gas distribution	88	2.04
Healthcare	175	4.05
Leisure	84	1.94
Manufacturing	1918	44.36
Mtg securities	1	0.02
Natural resource	221	5.11
Oil/gas pipeline	19	0.44
Other services	28	0.65
Pers/bus/rep svc	759	17.55
Radio/TV/telecom	137	3.17
Regional agency	3	0.07
Restaurant/hotel	138	3.19
Retail	146	3.38
Sanitation	55	1.27
Telephone/commun	79	1.83
Transportation	139	3.21
Water supply	23	0.53
Wholesale	150	3.47
Total	4324	100.00

Table 2 shows the summary statistics for issue and firms characteristics for the final sample. The median values of "net proceeds less fees" and "net proceeds less fees and expenses" are $35.80 million and $35.34 million, respectively. The median "gross spread" (i.e. the fees that the underwriters receive) is $0.91 million. The median of "gross spread (%)" is 6.00% meaning that 6% of the principal amount is charged as a fee by the underwriter.

The firm characteristics are as reported in the most recent quarterly financial statements. The median values of assets, current liabilities, long-term debt, and retained earnings are $101.06 million, $1.15 million, $6.67 million, and $2.70 million, respectively. The median value of sales for the sample firms is $22.27 million.

Table 2. Issue and firm characteristics (all in million $ except for "gross spread %")

	Mean	Median	St. dev.
Net proceeds less fees	67.81	35.80	133.72
Net proceeds less fees & expenses	67.29	35.34	132.57
Gross spread	0.99	0.91	0.45
Gross spread (%)	5.94	6.00	1.53
Assets	917.34	101.06	6737.12
Current liabilities	59.45	1.15	1089.19
Long-term debt	266.58	6.67	1844.70
Retained earnings	61.76	2.70	597.13
Sales	179.00	22.27	1339.87

4. Methodology

The main variable in the empirical tests is "*YS*" (i.e. yield spread). I use the SDC bond yields data to calculate this variable. In each of my regressions, "*YS*" becomes one of the six yield spread variables that I have created. These six yield spread variables are: (1) the change in the corporate bond yields over the previous 4 quarters (i.e. H4); (2) the change in the corporate bond yields over the previous 8 quarters (i.e. H8); (3) the change in the corporate bond yields over the previous 12 quarters (i.e. H12); (4) the change in the corporate bond yields over the next 4 quarters (i.e. F4); (5) the change in the corporate bond yields over the next 8 quarters (i.e. F8); and (6) the change in the corporate bond yields over the next 12 quarters (i.e. F12). "*YS*" is a monthly variable since I am comparing the rates in the issue month to the rates 12 months, 24 months, or 36 months before the issue month, or to the realized rates 12 months, 24 months, or 36 months after the issue month.

More specifically, H4 is the difference between the issue month interest rates and the rates 4 quarters (i.e. 12 months) before, H8 is the difference between the issue month interest rates and the rates 8 quarters before (i.e. 24 months), and H12 is the difference between the issue month interest rates and the rates 12 quarters (i.e. 36 months) before. Similarly, F4 is the difference between the interest rates 4 quarters (i.e. 12 months) ahead and the issue month rates, F8 is the difference between the interest rates 8 quarters (i.e. 24 months) ahead and the issue month rates, and F12 is the difference between the interest rates 12 quarters (i.e. 36 months) ahead and the issue month rates.

H4, H8, and H12 are historical interest rate variables. Managers know the level of past interest rates and the current level of interest rates; there-

fore, they can compare the current rates to the rates in the recent past and make a decision based on this information. In other words, since they know the current interest rates and the past rates, they can base their decision on this information (i.e. they can time the market). On the other hand, F4, F8, and F12 are future realized interest rate variables. I will use them to see if, ex-post, managers are successful in choosing the right time for their offerings compared to the future realized rates.

To test for the timing of SEOs in terms of the amount issued (i.e. SEO proceeds scaled by assets), the following regression model is used. This regression equation as well as the other equations (i.e. equations 2, 3, and 4), are cross sectional with monthly timing since the "*YS*" variable is measured monthly.

$$\begin{aligned} SEOProceeds/A_t &= c_0 + c_1 YS_t + c_2 (M/B)_t + \\ &+ c_3 (Profitability)_t + c_4 (Size)_t + \\ &+ c_5 (Tangibility)_t + c_6 (D/A)_t + \\ &+ c_7 Recession_t + \varepsilon_t, \end{aligned} \quad (1)$$

where the dependent variable $SEOProceeds/A_t$ is the dollar proceeds scaled by assets for each SEO, and the independent variable "*YS*" (i.e. yield spread) is H4, H8, or H12. "*t*" denotes the end of the issue month. Since Choe, Masulis and Nanda (1993) find that recessionary periods affect market activity, I control for the two recessionary periods in my sample period. The *Recession* variable in this equation is a dummy variable that takes the value "1" if the issue month is in either the July 1990-March 1991 period or the March 2001-November 2001 period, and "0" otherwise. All other variables are as explained in Table 3. Here, I expect to find negative coefficients for H4, H8, and H12, because if firms are timing the market, they should issue less equity in periods of higher rates (compared to the recent past).

To test for the timing of SEOs in terms of the number of firms coming to the market, the following regression model is used:

$$\begin{aligned} Y_t &= c_0 + c_1 YS_t + c_2 (M/B)_t + \\ &+ c_3 (Profitability)_t + c_4 (Size)_t + \\ &+ c_5 (Tangibility)_t + c_6 (D/A)_t + \\ &+ c_7 Recession_t + \varepsilon_t, \end{aligned} \quad (2)$$

where the dependent variable Y_t is either monthly issues (i.e. the detrended, standardized number of monthly issues), or 3-month moving average of detrended number of monthly issues (i.e. to take care of seasonality). Since the economy had grown by approximately three percent during the sample period, I use a monthly detrending factor of 0.25%. The explanatory variable "*YS*" (i.e. yield spread) is H4, H8, or H12. Here, I expect to find negative coefficients for these three interest rate variables, because if firms are timing the market, they should try to avoid issuing equity in periods of higher rates (compared to the recent past). In other words, I expect fewer SEOs when the rates are high compared to the recent past.

In order to see if firms are actually able to choose a more favorable period (in terms of interest rates) compared to the future periods, I use F4, F8, or F12 as the yield spread variable "*YS*" in equation (2). Here, I try to see if firms are able to predict the future rates and time their SEOs accordingly. Since these variables are created as the difference between the future realized rates and the current rates, I expect to find positive coefficients for F4, F8, and F12. In other words, if firms are successful in estimating the future rates, then we should see more SEOs when the future realized rates are high compared to the current rates.

To check for robustness, I use the following model:

$$\begin{aligned} (\Delta Issues)_{t-x} &= c_0 + c_1 YS_t + c_2 (M/B)_t + \\ &+ c_3 (Profitability)_t + c_4 (Size)_t + \\ &+ c_5 (Tangibility)_t + c_6 (D/A)_t + \\ &+ c_7 Recession_t + \sum_{i=2}^{12} d_i m_{i,t} + \varepsilon_t, \end{aligned} \quad (3)$$

where the dependent variable is $(\Delta Issues)_{t-x}$, where x = 1,2,3….12. It is the change in the detrended, standardized number of monthly issues over the previous 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months (i.e. lag1, lag2, etc.). The independent variable, "*YS*" (i.e. yield spread), is H4, H8, H12, F4, F8, or F12. To take care of the seasonality effect, I use the variable "$m_{i,t}$" that represents 11 monthly dummies starting from February. All other variables are as explained in the previous tables. In these regressions where I use the lagged changes in the detrended, standardized number of SEOs, as in equation (2), I expect to find negative coefficients for H4, H8, and H12, and positive coefficients for F4, F8, and F12.

If there is evidence of timing, the following model will be used for the capital structure tests:

$$\begin{aligned} (D/A)_z - (D/A)_t &= c_0 + c_1 YS_t + c_2 (M/B)_t + \\ &+ c_3 (Profitability)_t + c_4 (Size)_t + \\ &+ c_5 (Tangibility)_t + c_6 (D/A)_t + \\ &+ c_7 Recession_t + \varepsilon_t, \end{aligned} \quad (4)$$

where the dependent variable is the cumulative change in book leverage from the issue month through the end of quarters Issue + 8, Issue + 12, Issue + 16, and Issue + 20. In other words, the impact of an SEO on the issuing firm's book leverage over the next 2, 3, 4, and 5 years are estimated. All explanatory variables are as explained in the previous tables. The independent variable, "*YS*" (i.e. yield spread), is H4 or H8.

5. Empirical results

Table 3 shows the summary statistics for the variables used in the empirical analyses.

Table 3. Summary statistics for the variables

Variable	Median	Mean	St. Dev.
Size	3.02	3.15	1.84
Tangibility	0.24	0.33	0.26
Profitability	0.31	0.34	0.23
M/B	1.81	2.26	1.70
D/A	0.29	0.31	0.24
SEOProceeds/A$_t$	0.35	0.41	0.32
Observations	4324		

Notes: The sample covers all seasoned equity offerings from January 1984 through December 2004. *Size* is the natural logarithm of sales (Item 2). *Tangibility* is measured as net property, plant, and equipment (Item 42)/total assets (Item 44). *Profitability* is EBITDA (Item 21)/total assets (Item 44). The market-to-book ratio is the (total assets – book value of equity + market value of equity)/total assets. The debt-to-asset ratio is long-term debt (Item 51) + short-term debt (Item 45)/total assets. *SEOProceeds/A$_t$* is the total equity proceeds scaled by end-of-month total assets.

Table 4 presents the Pearson's correlation coefficients among the explanatory variables used in the analysis. As we can see from the table, the correlations are fairly low (i.e. the highest one in absolute value is -0.41). Due to the similarity of the results and the lack of space, the correlation coefficients for the other interest rate variables (i.e. H8, H12, F4, F8, and F12) are not reported. The variance inflation factors range from 1.00 to 1.46.

Table 4. Pearson's correlation coefficients

Variable	*Size*	*Tangibility*	*Profitability*	*M/B*	*D/A*	H4
Size	1.00					
Tangibility	0.18	1.00				
Profitability	0.16	-0.28	1.00			
M/B	-0.37	-0.38	0.15	1.00		
D/A	0.20	0.35	-0.12	-0.41	1.00	
H4	0.01	-0.004	-0.03	0.04	0.003	1.00

Table 5 shows the results of the regressions, where *SEOProceeds* is explained by H4, H8, or H12, as well as the firm-specific control variables *M/B*, *Profitability*, *Size*, *Tangibility*, *D/A*, and the *Recession* dummy (equation (1)). As we can see from the table, none of the interest rate variables are significant at the 10% level. The regression coefficients for H4, H8, and H12 are -0.01 (*t*-statistic = -1.46), 0.003 (*t*-statistic = 0.77), and 0.005 (*t*-statistic = 1.48), respectively. We can conclude from the table that the change in the level of interest rates over the last four, eight, or twelve quarters is not a significant predictor of SEO size. The recessions also do not explain the issue size.

Table 5. The impact of market conditions on *SEOProceeds*

Regression analysis			
Dependent variable: *SEOProceeds/A$_t$*			
Model	(1)	(2)	(3)
Intercept	0.33 (22.49)	0.34 (22.36)	0.34 (22.13)
H4	-0.01 (-1.42)	-	-
H8	-	0.003 (0.90)	-
H12	-	-	0.005 (1.47)
M/B	0.07 (27.88)	0.07 (27.62)	0.07 (27.52)
Profitability	0.37 (20.27)	0.37 (20.36)	0.37 (20.37)
Size	-0.07 (-29.65)	-0.07 (-29.71)	-0.07 (-29.75)
Tangibility	-0.08 (-4.73)	-0.08 (-4.70)	-0.08 (-4.69)
D/A	0.07 (3.95)	0.07 (3.92)	0.07 (3.90)
Recession	0.02 (0.85)	0.03 (1.02)	0.02 (0.88)
Adj. R^2	0.5070	0.5068	0.5070
N	3586	3586	3586

Notes: Robust *t*-statistics are in parentheses. The dependent variable is *SEOProceeds* scaled by assets for each offering.

Table 6 shows the results of the regressions that examine the impact of the interest rates on the number of firms coming to the market (equation (2)). My dependent variable is either the detrended, standardized number of monthly issues or the 3-month moving average of the detrended number of monthly issues. My explanatory variables are the five firm-specific control variables, the *Recession* dummy, and the "*YS*" (i.e. yield spread) variable. While the yield spread variable "*YS*" is H4, H8, or H12 in Panel A, it is F4, F8, or F12 in Panel B.

Table 6. The impact of market conditions on SEO activity

For each variable Y_t, Panel A and Panel B report the coefficients of regressions of the form

$$Y_t = c_0 + c_1 YS_t + c_2 (M/B)_t + c_3 (Profitability)_t + c_4 (Size)_t + c_5 (Tangibility)_t + c_6 (D/A)_t + c_7 Recession_t + \varepsilon_t.$$

Panel A shows the results for historical yield spreads whereas Panel B shows the results for future yield spreads. Robust *t*-statistics are in parentheses. The dependent variable Y_t is either monthly issues (i.e. the detrended, standardized number of monthly issues), or 3-month moving average of detrended number of monthly issues. "*YS*" is H4, H8, or H12 (i.e. the increase in the rates over the previous four, eight, or twelve quarters) in Panel A. In Panel B, "*YS*" (i.e. yield spread) is F4, F8, or F12 (i.e. the increase in the rates over the next four, eight, or twelve quarters).

Panel A. Market timing effects on SEO activity (past rates)						
	Monthly issues	3-month moving average	Monthly issues	3-month moving average	Monthly issues	3-month moving averege
H4	-0.041 (-2.82)	-1.809 (-3.91)	-	-	-	-
H8	-	-	-0.173 (-13.47)	-6.296 (-15.40)	-	-
H12	-	-	-	-	-0.023 (-1.88)	-0.375 (-0.96)
M/B	-0.002 (-0.18)	0.114 (0.36)	0.009 (0.92)	0.494 (1.58)	-0.001 (-0.14)	0.077 (0.24)
Profitability	0.088 (1.28)	3.015 (1.37)	0.088 (1.31)	3.074 (1.44)	0.094 (1.37)	3.348 (1.52)
Size	-0.040 (-4.67)	-1.469 (-5.30)	-0.034 (-3.98)	-1.231 (-4.57)	-0.041 (-4.69)	-1.497 (-5.39)
Tangibility	-0.086 (-1.37)	-2.640 (-1.31)	-0.111 (-1.80)	-3.534 (-1.81)	-0.089 (-1.41)	-2.669 (-1.32)
D/A	0.125 (1.89)	4.044 (1.91)	0.117 (1.81)	3.727 (1.82)	0.123 (1.86)	3.910 (1.84)
Recession	-1.317 (-12.87)	-48.871 (-14.92)	-1.488 (-14.78)	-55.041 (-17.17)	-1.302 (-12.73)	-48.357 (-14.74)
Adj. R^2	0.2524	0.1688	0.2870	0.2173	0.2515	0.1655
N	3586	3586	3586	3586	3586	3586
Panel B. Market timing effects on SEO activity (future rates)						
	Monthly issues	3-month moving average	Monthly issues	3-month moving average	Monthly issues	3-month moving average
F4	0.148 (9.53)	5.069 (10.23)	-	-	-	-
F8	-	-	0.029 (2.16)	0.638 (1.48)	-	-
F12	-	-	-	-	0.238 (18.06)	8.279 (19.79)
M/B	-0.017 (-1.72)	-0.429 (-1.34)	-0.005 (-0.46)	0.018 (0.05)	-0.007 (-0.72)	-0.079 (-0.26)
Profitability	0.149 (2.19)	5.200 (2.39)	0.100 (1.46)	3.465 (1.57)	0.100 (1.53)	3.524 (1.69)
Size	-0.046 (-5.36)	-1.666 (-6.08)	-0.042 (-4.86)	-1.526 (-5.49)	-0.041 (-4.98)	-1.508 (-5.72)
Tangibility	-0.065 (-1.05)	-1.921 (-0.96)	-0.080 (-1.27)	-2.499 (-1.24)	-0.066 (-1.10)	-1.952 (-1.02)
D/A	0.093 (1.42)	2.910 (1.39)	0.117 (1.77)	3.797 (1.79)	0.084 (1.33)	2.601 (1.29)
Recession	-1.216 (-11.98)	-45.309 (-13.95)	-1.278 (-12.39)	-47.803 (-14.46)	-1.102 (-11.17)	-41.284 (-13.17)
Adj. R^2	0.2693	0.1890	0.2517	0.1658	0.3135	0.2478
N	3586	3586	3586	3586	3586	3586

Panel A shows that five out of six regression coefficients reported for H4, H8, and H12 are significant at the 1% level. For detrended, standardized number of monthly issues, the regression coefficient for H4 is -0.034 and it is significant at the 1% level (*t*-statistic = -2.32). For the three-month moving average, the coefficient for H4 is -1.569 and it is also significant at the 1% level (*t*-statistic = -3.29). The corresponding coefficients for H8 are -0.148 and -5.355, which are both significant at the 1% level (*t*-statistics are -11.26 and -12.70, respectively). On the other hand, while the first coefficient for H12 is -0.026 and significant (*t*-statistic = -2.11), the second coefficient is -0.504 and insignificant (*t*-statistic = -1.25). From Panel A, we can conclude that the level of interest rates up to three years ago is a significant predictor

of the number of firms coming to the SEO market. The *Recession* dummy is negative and significant, meaning that market activity is lower during recessions. This is in line with Choe, Masulis and Nanda (1993).

Panel B shows that the regression coefficients for F4, F8, and F12 are all positive and significant as expected. For example, for detrended, standardized number of monthly issues, the regression coefficient for F4 is 0.165 and it is significant at the 1% level (*t*-statistic is 10.49). For the three-month moving average, the coefficient for F4 is 5.717 and it is also significant at the 1% level (*t*-statistic is 11.29). We have similar results for F8 and F12. From Panel B, we can conclude that, SEO firms are successful in timing their issues with respect to the future realized rates. The *Recession* dummy is again negative and significant.

Table 7 shows the results of the robustness tests (equation (3)). Due to space limitations, only the results for the interest rate variables are reported. Again, Panel A shows the results for H4, H8, and H12, and Panel B shows the results for F4, F8, and F12. Panel A shows that the lagged changes in the detrended, standardized number of monthly issues over the previous 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months (i.e. lag1, lag2, etc.) are successfully explained by H4, H8, and H12. Almost all the coefficients are negative and significant. When we look at Panel B, we can see that all the regression coefficients for F4, F8, and F12 are positive and significant (as expected). To summarize, the robustness tests generally support the results in Table 6.

Table 7. SEO market timing (robustness tests)

The table reports the coefficients of regressions of the form

$$(\Delta Issues)_{t-x} = c_0 + c_1 YS_t + c_2\left(M/B\right)_t + c_3\left(Profitability\right)_t + c_4(Size)_t + c_5\left(Tangibility\right)_t + c_6\left(D/A\right)_t + c_7 Recession_t + \sum_{i=2}^{12} d_i m_{i,t} + \varepsilon_t.$$

The dependent variable, $\Delta Issues$, is the change in the detrended, standardized number of monthly issues over the previous 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 months (i.e. lag1, lag2, etc.). The independent variable, "*YS*" (i.e. yield spread), is either H4 (i.e. the increase in the rates over the previous four quarters), H8 (i.e. the increase in the rates over the previous eight quarters), or H12 (i.e. the increase in the rates over the previous twelve quarters) in Panel A. In Panel B, "*YS*" (i.e. yield spread) is either F4 (i.e. the increase in the rates over the next four quarters), F8 (i.e. the increase in the rates over the next eight quarters), or F12 (i.e. the increase in the rates over the next twelve quarters). $M_{i,t}$ represents 11 monthly dummies starting from February. All other variables are as explained in the previous tables. Only the regression coefficients of the yield spread variables H4, H8, H12, F4, F8, and F12 are shown in the table. The time subscript *t* denotes the end of the issue quarter. Robust *t*-statistics are in parentheses.

Panel A. Market timing effects on SEO activity (past rates)													
		Lag1	Lag2	Lag3	Lag4	Lag5	Lag6	Lag7	Lag8	Lag9	Lag10	Lag11	Lag12
H4	Coef.	-0.093	-0.090	-0.139	-0.173	-0.207	-0.246	-0.250	-0.283	-0.302	-0.292	-0.290	-0.292
	t-stat.	(-6.47)	(-7.24)	(-10.3)	(-11.7)	(-14.2)	(-17.0)	(-17.8)	(-20.7)	(-22.4)	(-22.7)	(-22.0)	(-19.7)
	Adj. R^2	0.4602	0.5317	0.4156	0.3598	0.3485	0.3150	0.2964	0.3191	0.3985	0.4246	0.2743	0.1334
	N	3586											
H8	Coef.	0.001	-0.011	-0.039	-0.043	-0.027	-0.041	-0.059	-0.072	-0.092	-0.108	-0.139	-0.205
	t-stat.	(0.08)	(-1.01)	(-3.17)	(-3.12)	(-1.97)	(-3.03)	(-4.41)	(-5.50)	(-7.08)	(-8.73)	(-11.0)	(-14.9)
	Adj. R^2	0.4539	0.5249	0.3999	0.3370	0.3126	0.2616	0.2383	0.2436	0.3231	0.3550	0.2033	0.0951
	N	3586											
H12	Coef.	-0.049	-0.045	-0.059	-0.050	-0.067	-0.087	-0.100	-0.083	-0.086	-0.066	-0.055	-0.052
	t-stat.	(-4.05)	(-4.21)	(-5.15)	(-3.89)	(-5.30)	(-6.91)	(-8.09)	(-6.84)	(-7.14)	(-5.73)	(-4.63)	(-3.93)
	Adj. R^2	0.4564	0.5271	0.4026	0.3380	0.3173	0.2694	0.2480	0.2471	0.3232	0.3472	0.1812	0.0430
	N	3586											
Panel B. Market timing effects on SEO activity (future rates)													
		Lag1	Lag2	Lag3	Lag4	Lag5	Lag6	Lag7	Lag8	Lag9	Lag10	Lag11	Lag12
F4	Coef.	0.067	0.075	0.096	0.142	0.174	0.178	0.195	0.220	0.242	0.219	0.228	0.264
	t-stat.	(4.28)	(5.57)	(6.51)	(8.82)	(10.90)	(11.13)	(12.53)	(14.42)	(16.04)	(15.20)	(15.45)	(16.19)
	Adj. R^2	0.4566	0.5289	0.4053	0.3494	0.3341	0.2845	0.2664	0.2792	0.3597	0.3813	0.2279	0.1046
	N	3586											
F8	Coef.	0.083	0.066	0.059	0.065	0.083	0.055	0.049	0.037	0.037	0.031	0.022	0.028
	t-stat.	(6.15)	(5.66)	(4.66)	(4.68)	(5.94)	(3.91)	(3.61)	(2.76)	(2.82)	(2.44)	(1.68)	(1.92)
	Adj. R^2	0.4596	0.5290	0.4018	0.3393	0.3186	0.2628	0.2370	0.2389	0.3151	0.3423	0.1769	0.0398
	N	3586											
F12	Coef.	0.085	0.107	0.133	0.115	0.155	0.169	0.166	0.116	0.124	0.123	0.141	0.160
	t-stat.	(6.19)	(9.05)	(10.41)	(8.12)	(11.07)	(12.09)	(12.11)	(8.50)	(9.15)	(9.57)	(10.69)	(11.01)
	Adj. R^2	0.4597	0.5354	0.4159	0.3473	0.3347	0.2888	0.2644	0.2523	0.3293	0.3577	0.2018	0.0704
	N	3586											

The results of the capital structure tests (equation (4)) are reported in Table 8. While the first four columns show the results for H4, the last four columns show the findings for H8. As we can see from the table neither H4 nor H8 can explain the change in the leverage ratios of the SEO firms in the long-run (the coefficients range from -0.002 to 0.007, and they are all insignificant at the 10% level). In other words, H4 or H8 does not seem to explain the changes in the leverage ratios of the SEO firms eight, twelve, sixteen, or twenty quarters after the issue. The findings in the earlier tables suggest that firms time their SEOs by comparing the current rates to the rates four or eight quarters before. Here, the results in Table 8 suggest that SEO market timing does not have a persistent impact on the issuing firms' leverage ratios. This finding is in line with the more recent studies that find only a short-run impact on leverage. The *Recession* dummy is negative and significant, meaning that firms that do their equity offerings during a recession tend to have lower leverage ratios in the long run.

Conclusion

Theoretically, one would expect capital markets to be less active when market conditions are less favorable (i.e. when interest rates are relatively high). While Jalilvand and Harris (1984) confirm the impact of interest rates on firms' financial activities, Choe, Masulis and Nanda (1993) provide evidence that rejects the relation between interest rates and equity market activity.

In this study, to clarify the issue, I use a comprehensive sample of US seasoned equity offerings and test for the impact of interest rates on SEO market activity. I classify SEO market activity into two categories: (1) market activity in terms of the number of firms coming to the SEO market; and (2) market activity in terms of the size (i.e. proceeds scaled by assets) of the offering. While the results are insignificant for the impact of interest rates on the size of the SEO, I find strong evidence of timing in terms of the number of firms coming to the SEO market. More specifically, I find that the level of interest rates relative to the rates four, eight, or twelve quarters before is a significant predictor of the number of SEOs in a given month. Firms seem to time the market by choosing more favorable periods to do their equity offerings. Therefore, my results here are in line with Jalilvand and Harris's (1984) findings.

Table 8. Persistence of the impact of SEO market timing on capital structure

Columns 2-5 report the coefficients of regressions of the form

$$(D/A)_z - (D/A)_t = c_0 + c_1 YS_t + c_2 (M/B)_t + c_3 (Profitability)_t + c_4 (Size)_t + c_5 (Tangibility)_t + c_6 (D/A)_t + c_7 Recession_t + \varepsilon_t.$$

The dependent variable is the cumulative change in book leverage from the issue month through the end of quarters Issue + 8, Issue + 12, Issue + 16, and Issue + 20. In other words, the impact of a seasoned equity offering on the issuing firm's book leverage over the next 2, 3, 4, and 5 years are estimated. All explanatory variables are as explained in the previous tables. The last four columns include H8 as the market timing variable instead of H4. The time subscript *t* denotes the end of the issue quarter. Robust *t*-statistics are in parentheses.

Dependent variable: $(D/A)_z - (D/A)_t$								
z	Issue + 8	Issue + 12	Issue + 16	Issue + 20	Issue + 8	Issue + 12	Issue + 16	Issue + 20
H4	0.001 (0.16)	0.0004 (0.11)	0.001 (0.14)	0.006 (0.98)	-	-	-	-
H8	-	-	-	-	-0.001 (-0.38)	-0.003 (-0.83)	-0.004 (-0.96)	-0.004 (-0.68)
M/B	-0.015 (-5.19)	-0.014 (-4.36)	-0.014 (-3.35)	-0.019 (-3.74)	-0.015 (-5.16)	-0.014 (-4.33)	-0.014 (-3.30)	-0.019 (-3.70)
Profitability	-0.145 (-8.15)	-0.146 (-7.15)	-0.132 (-5.26)	-0.148 (-4.72)	-0.145 (-8.14)	-0.146 (-7.13)	-0.132 (-5.25)	-0.148 (-4.70)
Size	0.008 (3.86)	0.006 (2.33)	0.004 (1.26)	-0.001 (-0.31)	0.009 (3.88)	0.006 (2.38)	0.004 (1.32)	-0.001 (-0.23)
Tangibility	0.052 (3.26)	0.044 (2.38)	0.041 (1.81)	0.018 (0.64)	0.052 (3.26)	0.043 (2.36)	0.040 (1.79)	0.019 (0.67)
D/A	-0.468 (-27.46)	-0.452 (-22.92)	-0.465 (-18.89)	-0.453 (-14.53)	-0.468 (-27.46)	-0.452 (-22.93)	-0.466 (-18.92)	-0.455 (-14.56)
Recession	-0.067 (-2.93)	-0.084 (-3.25)	-0.082 (-2.55)	-0.084 (-2.14)	-0.069 (-2.96)	-0.087 (-3.35)	-0.087 (-2.67)	-0.090 (-2.27)
Adj. R^2	0.2325	0.1908	0.1487	0.1039	0.2325	0.1910	0.1490	0.1036
N	2730	2472	2238	2040	2730	2472	2238	2040

The results are also in line with Choe, Masulis and Nanda (1993). The recessions seem to explain the number of firms coming to the market (but not the size of the issue). In recessionary periods, fewer firms come to the SEO market.

When I examined the relation between the SEO market activity and the realized future interest rates, I found that the level of interest rates relative to the rates four, eight, or twelve quarters after the offering did also explain the number of SEOs in a given month. This finding implies that the SEO market becomes more active before interest rate run-ups.

As we know, the previous studies that examine the impact of market timing on capital structure have conflicting results. While Baker and Wurgler (2002) show that equity market timing has a persistent impact on capital structure, other studies (see Alti (2006) and Kayhan and Titman (2007) among others) find only a short-run (i.e. two- or three-year) impact. In this study, to clarify the issue, I examine the impact of the level of interest rates (relative to four or eight quarters before the offering) on the issuing firms' leverage ratios. If firms choose a more favorable period for their offerings, does this have a persistent impact on their capital structure? My empirical tests show that the change in the interest rates over the previous four quarters (i.e. H4) and eight quarters (i.e. H8) do not explain the SEO firms' leverage ratios in the long run (i.e. up to five years after the offering). This result is in line with Alti (2006), Kayhan and Titman (2007), and others that show evidence of only a short-run impact on leverage. The recessions, on the other hand, explain the issuers' leverage ratios in the long run. The SEO firms that have completed their offering during a recession tend to have significantly lower leverage ratios in the long run.

The findings in this study have important implications for financial managers. After seeing these results, they will know that there will be a bigger competition in the market when the rates are relatively low. This realization will enable them to better plan their future offerings. Also, by looking at these results, financial managers will know that timing the SEO market generally does not alter firms' capital structure.

These findings raise several interesting questions for future research. First, although I examine the relation between market conditions at the time of the offering and leverage, I do not investigate the impact of market conditions on firm value. It would be interesting to investigate empirically the relation between the interest rates at the time of the offering and firm value. Second, it would be interesting to quantify the impact of the changes in interest rates on cost of equity and cost of debt in IPO, SEO, public debt, private placement, and syndicated loan markets. After empirically examining the impact of interest rates on cost of capital, firms' choice between these financing alternatives can be examined under different scenarios. Finally, the link between business cycles, interest rates, and cost of capital can be investigated. If the economy is expanding or contracting, what are the implications for cost of equity and cost of debt? Do firms behave differently in the capital markets in different phases of the business cycle? I am sure these issues will be further explored in the near future.

References

1. Alti, A. (2006). How persistent is the impact of market timing on capital structure? *Journal of Finance*, 61 (1) pp. 681-1710.
2. Alti, A. and Sulaeman, J. (2008). When do high stock returns trigger equity issues? Available at SSRN: http://ssrn.com/abstract=972223.
3. Antoniou, A., Guney, Y. and Paudyal, K. (2008). The determinants of capital structure: Capital market-oriented versus bank-oriented institutions, *Journal of Financial Quantitative Analysis*, 43, pp. 59-92.
4. Asquith, P. and Mullins, D.W. (1986). Equity issues and offering dilution, *Journal of Financial Economics*, 15, pp. 61-89.
5. Babenko, I., Tserlukevich, Y. and Wan, P. (2012). *Agency implications of equity market timing*, Washington University in St. Louis Working Paper.
6. Baker, M. and Wurgler, J. (2002). Market timing and capital structure, *Journal of Finance*, 57, pp. 1-32.
7. Bayless, M. and Chaplinsky, S. (1996). Is there a window of opportunity for seasoned equity issuance? *Journal of Finance*, 51, pp. 253-278.
8. Choe, H., Masulis, R.W. and Nanda, V. (1993). Common stock offerings across the business cycle: Theory and evidence, *Journal of Empirical Finance*, 1, pp. 3-31.
9. Dittmar, A. and Dittmar, R. (2008). The timing of financing decisions: An examination of the correlation in financing waves, *Journal of Financial Economics*, 90, pp. 59-83.
10. Flannery, M.J. and Rangan, K.P. (2005). Partial adjustment and target capital structures, *Journal of Financial Economics*, 79, pp. 469-506.
11. Guney, Y. and Iqbal-Hussein, H. (2012). Capital structure and IPO market timing in the UK, University of Hull Working Paper.

12. Hennessy, C., Livdan, D. and Miranda, B. (2010). Repeated signaling and firm dynamics, *Review of Financial Studies*, 23, pp. 1981-2023.
13. Hovakimian, A. (2005). Are observed capital structures determined by equity market timing? *Journal of Financial and Quantitative Analysis*, 41, pp. 221-243.
14. Hovakimian, A., Opler, T. and Titman, S. (2001). The debt-equity choice, *Journal of Financial and Quantitative Analysis*, 36, pp. 1-24.
15. Huang, R. and Ritter, J. (2009). Testing the theories of capital structure and estimating the speed of adjustment, *Journal of Financial and Quantitative Analysis*, 44, pp. 237-271.
16. Jalilvand, A. and Harris, R.S. (1984). Corporate behavior in adjusting to capital structure and dividend targets: An econometric study, *Journal of Finance*, 39, pp. 127-145.
17. Jung, K., Kim, Y. and Stulz, R.M. (1996). Timing, investment opportunities, managerial discretion, and the security issue decision, *Journal of Financial Economics*, 42, pp. 159-185.
18. Kayhan, A. and Titman, S. (2007). Firms' histories and their capital structure, *Journal of Financial Economics*, 83, pp. 1-32.
19. Marsh, P. (1982). The choice between equity and debt: An empirical study, *Journal of Finance*, 37, pp. 121-144.
20. Morellec, E. and Schürhoff, N. (2011). Corporate investment and financing under asymmetric information, *Journal of Financial Economics*, 99, pp. 262-288.
21. Pagano, M., Panetta, F. and Zingales, L. (1998). Why do companies go public? An empirical analysis, *Journal of Finance*, 53, pp. 27-64.
22. Rajan, R.G. and Zingales, L. (1995). What do we know about capital structure? Some evidence from international data, *Journal of Finance*, 50, pp. 1421-1460.
23. Taggart, R.A. (1977). A model of corporate financing decisions, *Journal of Finance*, 32, pp. 1467-1484.
24. Yang, B. (2010). *A Dynamic Model of Corporate Financing with Market Timing*, Georgia State University Working Paper.