Tadeusz Dudycz*, Bogumiła Brycz*

WHAT DRIVES THE AMOUNT OF CAPITAL RAISED AT IPO? EVIDENCE FROM THE WARSAW STOCK EXCHANGE

This paper examines the impact of market timing and legal changes in 2005, aimed at aligning Polish regulations on financial markets with the EU standards, on the amount of capital raised at initial public offerings (IPOs) on the Warsaw Stock Exchange. We find that although during IPOs firms sell, on average, quite the same fraction of firm ownership regardless of the year of the IPO, they raise much more capital in hot rather than in cold-market conditions. We also find that firms going public in hot and cold markets as well as before and after the legal changes in 2005 do not differ significantly with regard to their profitability, leverage or liquidity ratios. The amount of money raised in hot and cold-market conditions is, however, determined by different factors. In cold-market conditions only the terms of share issue determine the amount of money raised at IPO. In hot-issue markets the size of the company is the most important factor and the financial situation of the companies and investor optimism also have a significant impact on the amount of money raised at IPO. On the other hand, contrary to the cold-market conditions, the terms of share issue are almost insignificant. The changes in the law did not affect the market timing phenomenon, but after 2005 an increasing role of profitability and investor optimism in the investors' evaluation of new share issues was observed.

Keywords: equity issue, market timing, IPO, initial public offering, Warsaw Stock Exchange, raising capital, WSE

JEL Classifications: G10, G12, G14, G18, O16

DOI: 10.15611/aoe.2017.2.03

1. INTRODUCTION

Going public is a dream for most entrepreneurial managers. The initial public offering (IPO) of a firm's stock is a significant event in the lifecycle of a firm. By going public, the firm increases its legitimacy in the business community, improves access to debt financing, and creates a means of exit for the major shareholders. However, by far the most important reason for going public is to obtain a significant amount of investment capital. The reasons for going public are linked to the type of shares being offered for sale to the public. From the three possibilities – primary offerings of new

---

* Faculty of Computer Science and Management, Wrocław University of Science and Technology.

shares, secondary sales of shares already held by insiders, and a combination of the two – it is only in the case of primary offerings and combined offerings that one of the reasons for going public is the need to obtain capital for new investments. Kim and Weisbach (2008) show that although the proportions between these possibilities differ between countries, the majority of IPOs involve primary offerings – the world average for primary-only IPOs is above 75%. The highest rate of primary-only offerings is in Asian countries, excluding Japan (more than 95% of the proceeds of the IPOs), and the lowest proportion of primary shares is in the European stock market (about 54% of the proceeds). This suggests that raising capital is an important reason for firms to go public. In this case the success of an IPO can be determined by the amount of capital that flows into the firm. This amount generally depends upon the favourable evaluation of the firm by the financial market, as well as the level of investor optimism. Lowry (2003) found that companies' demand for capital and the level of investor sentiment explain a significant amount of the variation in IPO volume. Starting with Taggart Jr. (1997), many researchers have shown that firms postpone their equity issuance if they know they are currently undervalued. If a bear market means that the value of a firm is too low, then they will delay their IPOs until a bull market offers more favourable pricing. Baker and Wurgler (2002) present four types of evidence for the market timing phenomenon. Firstly, the authors indicate that firms tend to issue equity instead of debt when market value is high, relative to book value and past market values, and tend to repurchase equity when market value is low. Secondly, the authors suggest that firms issue equity when the cost of equity is relatively low and repurchase equity when the cost is relatively high. Thirdly, they indicate that firms are more likely to issue equity when investors are optimistic and enthusiastic about earnings prospects. Fourthly, evidence comes from anonymous surveys in which managers admit to market timing. Market timing has two related implications for IPO firms. First, firms are more likely to go public when managers perceive the market conditions to be favourable. Second, firms going public when the market is favourable are likely to sell more equity than if the market conditions are unfavourable (Alti 2006).

The general objective of this paper is to analyse the impact of market timing on the amount of equity raised by IPO firms on the Warsaw Stock Exchange (WSE). In addition, we examine how the legal changes in 2005 concerning the functioning of Polish capital market influenced this phenomenon. The changes in the law in 2005 – one year after Poland's

accession to the European Union – aimed at aligning Polish regulations with the EU standards as well as improving the competitiveness of the financial market and its liberalization. A considerable body of literature exists on testing the theory of market timing, however to the authors' knowledge this phenomenon has not yet been investigated in the WSE. In some international research, the Polish market has even been excluded as one of the transition economies (see Kim & Weisbach, 2008). However, the WSE is one of the fastest growing capital markets and the largest stock exchange in Central and Eastern Europe. It is an important place to raise capital for companies but, due to its history and specificity, other factors can affect the amount of capital raised through IPOs on this market compared with those on developed capital markets. The originality of this paper is also the identification of the factors that could affect the amount of capital raised during IPO in hot and cold periods, and before and after the legal changes in 2005. Another important novelty is the use of new measures of the amount of capital raised at the IPO that were not used in the studies of other authors. The additional measures used in this paper, firstly, are insensitive to changes in debt and secondly, they better reflect the investors' point of view. More specifically, in previous studies the amount of equity issued at an IPO was most often measured as the IPO proceeds divided by total assets (at the end of the IPO year or at the beginning of the IPO year). In this paper we analyse the impact of market timing on the amount of capital raised at IPOs in four dimensions. In addition to the most common measure of the amount of capital raised at IPO (the proceeds from the sale of primary shares as a fraction of the total assets), we also use three additional measures. The first measure indicates the fraction of firm ownership sold via the issuance of primary shares, defined as the ratio of primary shares issued in the IPO to the total number of outstanding shares. The second measure indicates how much money the firm raises per each issued share, defined as the proceeds from the sale of primary shares divided by the number of primary shares issued in the IPO. The third measure indicates the percentage increase in equity capital after the IPO, defined as the proceeds from the sale of primary shares divided by the pre-IPO equity capital. In previous studies this aspect has not been investigated and we think that the percentage increase in equity capital should be the main measure of success in raising equity capital from stock markets. In this paper we also analyse the financial situation of hot versus cold-market IPO firms and, in addition to investigating the impact of market timing on the amount of capital raised at IPO, we also investigate the impact of other variables such as the size of companies, their profitability, leverage,

and liquidity, as well as the terms of share issue, economic conditions and investor optimism.

We find that firms that go public in hot markets can raise much more capital than those that go public in cold markets, although they sell quite the same fraction of the firms ownership. This means that choosing a suitable time should be a part of the strategy of companies deciding to go public. We also find that in hot-market conditions investors use different parameters to evaluate new share issues than in cold-market conditions. The legal changes in 2005 did not have impact on this phenomenon.

The remainder of the paper is organised as follows. Section 2 provides a literature review and the hypotheses for our investigation. Section 3 describes the data and variables used in this study. In Section 4 we present and discuss the empirical results and Section 5 concludes the paper.

2. LITERATURE REVIEW AND RESEARCH HYPOTHESES

Why do companies go public? There are a few hypotheses which differ in their assumptions on capital market efficiency and assumptions on what plays a crucial role in the decision to go public: firms' demand for capital or the market supply of equity (Lowry 2003). Consistent with the assumption that demand for capital plays a crucial role in a firm's decision to go public, Choe, Masulis, and Nanda (1993) indicate that the frequency of seasoned equity offerings is positively associated with economic conditions. Lowry (2003) finds that companies' demand for capital explains a substantial portion of the variation in IPO volume. Meluzin and Zinecker (2014) explore the factors that influence the decision to go public in Polish capital market and their survey results indicate raising external capital for further growth as an important reason for IPO. Kim and Weisbach (2005) find that primary offerings are the most common type of equity offerings for IPOs around the world and that they are correlated with a number of factors measuring the demand for capital. This evidence indicates that equity markets are a tool for raising capital to finance investments. There is also evidence for the hypothesis which is based on the assumption that the market is inefficient and concentrated on the market supply of equity instead of firms' demand for capital. This evidence shows that firms are more likely to go public when their market valuations are high relative to book or past market values, i.e. during periods when investors are too optimistic and overvalue firms. Taggart (1997) was one of the first to demonstrate this phenomenon. Ritter (1984), Ritter and Welch (2002), and Pástor and Veronesi (2005) find that

hot IPO markets have a higher IPO volume and more favourable market conditions than cold IPO markets. Thus in hot markets firms can go public with higher price-earnings and market-to-book ratio, and therefore they can issue more equity. Pagano, Panetta, and Zingales (1998) show that in the case of Italian firms the most important determinant of the decision to go public is the industry market-to-book ratio. They argue that the positive relationship between IPOs and the stock market valuations of firms in the same industry reflects entrepreneurs' attempts to time the market. Graham and Harvey (2001) find in their surveys that two-thirds of corporate executives agree that an important or very important consideration in issuing equity is the amount by which their stock is undervalued or overvalued. Lowry (2003) shows that the volume of IPOs is partly determined by proxies for investor sentiment. Derrien (2005) explores the impact of investor sentiment on IPO pricing. The author finds that individual investors' demand for IPO shares is strongly correlated with the market conditions prevailing at the time of the offering, it has a large impact on the IPO price, it is positively correlated with initial return and turnover, and it is negatively correlated with the long-term stock price performance of IPO shares. Alti (2006), using hot/cold market classification as a measure of market timing, finds that hot-market IPO firms issue substantially more equity than cold-market firms. Although Kim and Weisbach (2008) find evidence that equity offers are made to raise capital to finance investment (as mentioned above), they also find evidence that some equity offers are made to take advantage of high valuations. However, the authors indicate that when firms do so they are more likely to use secondary offerings so that shareholders and managers can profit personally, or if they do issue primary shares then they are more likely to hold the proceeds as cash. Other evidence demonstrates that firms tend to issue equity when the cost of equity is relatively low. Baker and Wurgler (2002) suggest that firms issuing securities depend on the relative costs: if the cost of equity is low relative to the cost of other forms of capital, they are more likely to issue equity. In turn, a survey of chief financial officers by Brau and Fawcett (2006) found that the desire to create an acquisition currency ranks as the most important reason for an IPO.

Other studies focus on the factors that determine the amount of capital raised through IPOs. Kim and Weisbach (2005) find that the number of primary offerings significantly correlates with increases in inventory, net property, plant and equipment (PPE), capital expenditure, and research and development (R&D) expenditure up to four years after the IPO. The findings made by Celikyurt, Sevilir, and Shivdasani (2010) illustrate that the IPO

decision, subsequent equity and debt offerings, and acquisition activity are all closely linked. Zimmerman (2008) shows that top management teams' heterogeneity is positively related to the amount of capital raised through an IPO. Functional heterogeneity and educational heterogeneity were especially found to be positively and significantly related to the amount of capital raised. Zimmerman argues that the advantages associated with heterogeneity, i.e. breadth of perspective, experience, knowledge, insight, etc., positively signal that a firm is a good investment, and result in greater capital accumulations. Derrien and Kecskés (2009) study the importance of investor sentiment and economic fundamentals in explaining equity issuance activity, and conclude that while sentiment on its own matters for equity issuance, it matters relatively little, once they control for fundamentals. Collectively, all proxies for sentiment explain around 10 percentage points of the time-series variation of equity issuance beyond the roughly 40% explained by fundamentals. Deeds, Decarolis, and Coombs (1997) report a strong positive relationship between the total amount of capital raised by a firm's IPO and the scientific capabilities of the firm, including its location, the quality of the research staff, the number of products in development, the number of patents held by the firm, and the firm's prior spending on R&D. Amini (2013) examines the relevance of spatial proximity to London in explaining the amount of money raised by small British firms at IPO in the UK Alternative Investment Market. The obtained results suggest that proximity to London has a positive effect on the amount of money raised through IPO. In addition, the results suggest that firms with higher planned capital expenditure, higher total debt, and a higher proportion of equity offered at IPO raise more capital, whereas firms with a higher tax rate and higher level of insider ownership raise less money. Mousa, Wales, and Harper (2015) examine the influence of entrepreneurial orientation on the amount of capital raised by a young technology firm at IPO, and find that the entrepreneurial orientation, as signalled within the firm prospectus, has a negative relationship with the IPO value, but without top management team external board activities, stronger entrepreneurial orientation signals are found to positively impact the amount of funds raised at IPO. Ritter (2003) surveys the IPO literature focusing on the European IPO market. The author highlights the differences between the US and European IPO markets and indicates that a separate area of current research concerns IPOs from Eastern Europe.

On the basis of the above discussion, we formulate the following five hypotheses:

Hypothesis 1: Hot-market measuring by volume of IPOs is driven by highly favourable market conditions and high investor optimism.

Hypothesis 2: Hot and cold-market IPO firms do not differ in their financial situation.

Hypothesis 3: Market conditions do not affect the number of shares sold as a fraction of total shares outstanding.

Hypothesis 4: The amount of capital raised through IPO is driven by market conditions.

Hypothesis 5: The amount of capital raised through IPO is driven by different factors in hot versus cold-market conditions.

Hypothesis 6: The legal changes in 2005 aimed at aligning Polish regulations on financial markets with the EU standards did not affect the market timing phenomenon.

3. SAMPLE AND VARIABLES

The study is based on the sample of the IPO firms which went public on the Warsaw Stock Exchange from 1998 to 2011 (total number of IPOs reported in Panel A of Table 1). This initial sample of 454 IPOs was reduced by excluding:

a) financial institutions (e.g. banks and insurance companies),

b) IPOs which were not connected with new common stock issuance,

c) IPOs for which data was incomplete.

The final sample thus consists of 250 IPOs. Panel A of Table 1 shows the variations in the sample number of IPOs over these 14 years. As we can see, after the decline from 51 IPOs in 1998 to 5 and 6 in 2002 and 2003, respectively, before the financial and economic crisis the number of IPOs increased again to 81 in 2007.

The primary source of data used in this study was the Notoria Service, but because data in their database are sometimes incomplete or incorrect, other sources of data were used to supplement them, such as IPO prospectuses and annual reports available on the companies' websites and at www.gpwinfostrefa.pl.

The main focus of this study is the hot/cold market classification as a measure of market timing. We identify hot and cold markets on the basis of annual IPO volume. Hot (cold) markets are defined as the years in which the IPO volume is above (below) the median IPO volume across the sample period. Unlike other authors, e.g. Alti (2006), Helwege and Liang (2004), and Guney and Iqbal-Hussain (2010) use monthly IPO volume and take

Table 1

Sample characteristics

		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	1998–2011
Panel A																
Total number of IPOs		51	20	11	7	5	6	36	58	63	81	31	13	34	38	454
Market (H – hot, C – cold)		**H**	**C**	**C**	**C**	**C**	**C**	**H**	**H**	**H**	**H**	**C**	**C**	**H**	**H**	
Sample number of IPOs		26	15	9	5	2	5	24	22	26	52	22	9	21	12	250
The sample number of IPOs to the total number of IPOs [%]		51.0	75.0	81.8	71.4	40.0	83.3	66.7	37.9	41.3	64.2	71.0	69.2	61.8	31.6	55.1
GDP growth [%]		5.0	4.5	4.3	1.2	1.4	3.9	5.3	3.6	6.2	6.8	5.1	1.6	3.8	4.3	
WIG		12,795.6	18,083.6	17,847.6	13,922.2	14,366.7	20,820.1	26,636.2	35,600.8	50,411.8	55,648.5	27,228.6	39,986.0	47,489.9	37,595.4	
P/E		16.3	36.2	28.5	15.9	70.3	79	24.4	15.5	10.1	17.7	11	14.3	18.2	12.5	
P/BV		1.43	1.91	1.98	1.28	1.35	1.51	1.86	2.06	1.95	2.83	1.57	1.04	1.16	1.06	
VST (PLN million)		26,648	35,567	51,902	30,351	23,868	33,357	55,234	90,567	161,960	230,959	160,358	166,696	206,857	250,589	
Panel B																
Assets [PLN million]	Mean	44.4	142.5	596.2	36.1	86.1	134.9	130.5	1,044.6	116.8	100.1	496.1	2,723.6	129.7	115.2	334.3
	Median	34.6	52.5	39.4	36.8	86.1	122.0	74.2	52.4	53.3	61.9	29.0	69.9	93.9	96.3	52.4
	SD	35.2	172.4	1,158.3	33.2	52.8	57.0	212.7	3,134.6	169.6	152.2	1,868.1	7,158.3	146.2	85.6	1,767.5
	Min	5.8	9.5	10.4	3.5	48.7	59.6	7.1	1.0	0.9	4.7	3.2	41.5	10.2	19.9	0.9
	Max	168.2	523.7	3,465.7	85.6	123.4	212.3	1,061.1	14,564.7	652.9	756.1	8,789.0	21,762.1	508.3	242.4	21,762.1
Sales [PLN million]	Mean	90.4	235.8	174.0	39.6	269.4	162.8	107.3	966.3	144.0	114.9	343.6	1,243.6	90.6	98.1	257.6
	Median	58.7	78.5	63.1	8.0	269.4	189.3	49.2	77.7	50.0	52.1	26.8	36.5	53.7	69.2	54.3
	SD	100.0	260.9	249.5	61.2	299.5	85.1	221.2	2,215.7	257.2	132.8	1,072.9	3,190.0	114.5	88.5	978.5
	Min	6.4	17.2	0.7	0.0	57.7	58.0	4.5	2.6	0.8	3.3	4.3	0.0	0.5	4.0	0.0
	Max	497.7	802.3	793.4	143.8	481.2	264.5	1,099.5	8,447.5	983.4	578.9	4,983.9	9,704.4	525.9	310.4	9,704.4

Source: own calculations.

Table 2

Variable definitions

Variable	Definition
% shares sold	Fraction of firm ownership sold via the issuance of primary shares calculated as the number of primary shares issued in the IPO divided by the total number of shares outstanding (the total number of shares outstanding is the post-issue value)
Proceeds/A_{t-1}	Percentage increase in assets through the issuance of primary shares calculated as the IPO proceeds from the sale of primary shares divided by total assets at the beginning of the IPO year
Proceeds/SE_{t-1}	Percentage increase in shareholders' equity through the issuance of primary shares calculated as the IPO proceeds from the sale of primary shares divided by total shareholders' equity at the beginning of the IPO year (calculated as the difference between total assets and total liabilities)
(Proceeds/SE_{t-1})/ (% shares sold)	Percentage increase in shareholders' equity to the percentage of shares sold via the issuance of primary shares
Ln Assets	Natural logarithm of total assets
Ln Sales	Natural logarithm of net sales
ROS	Return on sales defined as EBIT divided by net sales at the beginning of the IPO year
ROA	Return on assets defined as EBIT divided by total assets
ROE	Return on equity defined as net income divided by shareholders' equity calculated as the difference between total assets and total liabilities
D/A	Debt ratio defined as total debt (the sum of current liabilities and long-term liabilities) divided by total assets
LD/LC	Long-term debt ratio defined as long-term liabilities divided by the sum of long-term debt and shareholders' equity
SE/FA	Shareholders' equity-to-fixed-assets ratio defined as shareholders' equity to total fixed assets
QR	Quick ratio defined as the sum of short-term investments and accounts receivable divided by current liabilities
CR	Cash ratio defined as short-term investments divided by current liabilities
IP/NV	Ratio of issue price to the nominal value of shares
BV/NV	Ratio of book value per share to the nominal value of shares
WIG	Value of the Warsaw Stock Exchange Index, which comprises all companies listed in the main market; the initial value of the WIG Index on 16 April 1991 was 1,000 points
WIG [%]	Rate of return on the WIG Index
GDP growth	GDP growth rate defined as the percentage change in gross domestic product during one year
P/E	Price-to-earnings ratio defined as market share price divided by earnings per share calculated as average for all companies listed in the WSE's main market
P/BV	Price to book ratio defined as market share price divided by book value per share calculated as an average for all companies listed in the WSE's main market
VST	Value of the session trading in shares in the WSE's main market

Source: own elaboration.

a 3-month moving average of the number of IPOs for each month, we use annual IPO volume because we think that the process of making the decision to go public takes a long time, beginning with the recognition of favourable market conditions and then taking action to go public (which may take longer than 6 months); although this approach is simpler, we believe that it is reasonable from a practical point of view (i.e. it has greater practical usefulness for managers). As indicated in Panel A of Table 1, in the initial sample of 454 IPOs, 361 occurred in hot years (86% of the total IPO volume), and 93 IPOs (14% of the total IPO volume) took place in cold years. Panel B of Table 1 reports the basic characteristics of the sample firms, such as the size of the companies measured by total assets and sales. The variables used in this study are defined in Table 2.

4. RESEARCH METHOD AND RESULTS

In the first step we investigate the relationship of market condition and investors' optimism with the total number of IPOs in Poland during 1998–2011. For this purpose we use GDP growth, P/E ratio, P/BV ratio, *VST,* and WIG as proxies for market condition and investor sentiment. Panel A of Table 1 shows the values of these variables over 14 years under study. The average GDP growth rate was 4.09% and the highest values of this indicator were before the financial crisis of 2006–2007. The average value of the WIG was 29,888 points, however at the beginning after the decline in 2001; the index continuously increased achieving nearly 55,648 points in 2007, but then dropped sharply to 27,229 points in 2008. The changes in the P/BV ratio and changes in the value of session trading in shares were similar to changes in the WIG. Table 3 shows the results of the Pearson and Spearman correlation analysis between the total number of IPOs and the proxies for market conditions and investor sentiment. Except for the Spearman correlation for P/BV ratio, all the correlations are statistically significant. We can see that GDP has the strongest relationship with the number of IPOs, which probably indicates a good future opportunity for investors. These results disagree with Bayless and Chaplinsky (1996) who argue that hot issue markets need not occur solely because of swings in GDP. Essentially, the high correlation between the WIG and P/BV ratio also indicates that investor optimism plays an important role in shaping financial policy. These findings correspond with the results of other researchers and confirm the first hypothesis that the most important determinants of the decision by Polish firms to go public are favourable market conditions and the high market

valuation of the offerings. A puzzling phenomenon is that the correlation between the number of IPOs and P/E ratio is negative, which is contrary to the findings of other studies.

Table 3

Correlation between the number of IPOs and market timing factors

Variables	IPO & GDP	IPO & P/E	IPO & P/BV	IPO & VST	IPO & WIG
Pearson R	0.7502 (0.0020)***	−0.5522 (0.0410)**	0.6069 (0.0210)**	0.5216 (0.0560)*	0.6734 (0.0080)***
Spearman R	0.7026 (0.0050)***	−0.5472 (0.0428)**	0.4329 (0.1220)	0.5780 (0.0303)**	0.5868 (0.0273)**
N	14	14	14	14	14

P-value are presented in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Source: own calculations.

The general objective of this paper is to analyse the impact of market timing on the success in raising equity capital through an IPO. The amount of money raised through IPOs can be measured using different variables. The most popular measure is the IPO proceeds from the sale of primary shares as a fraction of the total assets (Proceeds/A_{t-1}). However in this study we use two additional measures. The first measure is the IPO proceeds from the sale of primary shares as a fraction of the pre-IPO shareholders' equity (Proceeds/SE_{t-1}) which indicates the percentage increase in shareholders' equity after the IPO. The second measure is the percentage increase in shareholders' equity (Proceeds/SE_{t-1}) divided by the percentage of shares sold via the issuance of primary shares (% shares sold); thus, it indicates the percentage increase in shareholders' equity per each percentage of firm ownership sold at the IPO. Table 4 and Figure 1 show descriptive statistics for the variables used in the study to measure the equity issuance activity of IPO firms over the period 1998–2011. We can see that the year 2005 seems to be the borderline in issuance activity of the IPO firms. In that year there was a change in the law on the functioning of the Polish financial market. Therefore next we investigate the success in raising equity capital during an IPO taking into account both the timing phenomenon and the legal changes in 2005.

Because the success of IPO firms in raising equity capital can be determined by their financial condition, in the second step we investigate the financial condition of IPO firms in hot and cold markets before and after the

Table 4

Descriptive statistics of the yearly effect of equity issuance activity in the 1998–2011 period

	Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	1998-2011
	N	26	15	9	4	2	5	24	22	27	52	22	9	21	12	250
% Shares sold	Mean	29.1	24.2	28.3	26.8	22.1	27.9	28.7	25.7	26.3	24.1	18.1	18.1	21.4	17.3	24.4
	Median	24.6	20.0	23.7	21.7	22.1	22.9	28.9	27.2	25.9	20.0	17.7	15.5	20.3	17.2	21.9
	SD	18.9	18.3	12.9	16.0	20.6	13.4	10.6	13.4	11.7	12.8	9.5	12.5	9.5	8.4	13.3
	Min	8.6	4.9	14.7	13.8	7.5	14.8	13.3	5.1	9.1	6.3	0.4	2.7	3.5	7.4	0.4
	Max	84.2	61.9	50.0	50.0	36.7	46.7	55.3	50.0	54.0	53.1	38.6	46.4	36.6	30.1	84.2
K–W test	21.4348 (0.0648)															
Median test (Chi square)	17.4930 (0.1777)															
Proceeds/SE$_{t-1}$ [%]	Mean	98.6	118.4	90.1	133.0	75.3	118.3	207.7	196.3	416.5	268.2	138.0	44.3	117.7	87.8	191.5
	Median	56.6	59.5	67.5	101.1	75.3	125.6	185.6	63.3	229.1	188.8	101.2	32.1	76.9	76.7	111.7
	SD	99.3	169.3	79.9	101.3	57.3	43.7	160.5	322.6	498.8	242.1	126.5	38.5	94.3	56.7	254.9
	Min	8.5	7.0	14.7	49.4	34.8	72.6	22.5	16.6	37.3	25.7	1.3	3.1	9.5	25.1	1.3
	Max	405.2	636.2	282.0	280.4	115.8	176.6	636.9	1409.4	2341.7	1094.2	404.9	120.4	382.2	201.4	2341.7
K–W test	59.7917 (0.0000)															
Median test (Chi square)	37.1771 (0.0004)															
(Proceeds/SE$_{t-1}$)/ (% Shares sold)	Mean	3.4	5.5	3.5	4.9	3.9	4.9	6.5	8.5	17.4	10.8	7.6	2.3	6.6	5.7	8.1
	Median	2.3	2.8	2.9	5.1	3.9	5.2	5.7	4.1	8.8	9.0	5.0	2.0	3.7	6.4	4.9
	SD	2.9	7.6	3.4	1.9	1.0	2.2	4.3	16.9	22.6	7.5	7.3	1.1	7.9	3.2	11.0
	Min	0.2	0.5	0.7	2.5	3.2	1.6	1.3	0.8	2.5	0.0	1.2	1.1	1.1	1.6	0.0
	Max	10.9	30.7	11.9	6.9	4.6	7.5	16.1	81.5	106.0	38.4	29.8	4.8	35.7	11.2	106.0
K–W test	71.7898 (0.0000)															
Median test (Chi square)	50.5076 (0.0000)															
Proceeds/A$_{t-1}$ [%]	Mean	44.4	29.6	42.5	96.8	30.0	54.5	65.4	61.1	166.5	117.1	62.9	27.9	42.2	45.5	77.1
	Median	36.2	25.2	16.0	54.9	30.0	37.9	56.0	31.2	83.0	73.0	46.2	23.0	42.8	27.1	45.8
	SD	36.3	23.7	60.4	113.2	19.5	29.1	38.4	81.1	196.1	133.6	59.6	26.2	23.7	40.3	105.2
	Min	6.5	0.6	8.6	16.8	16.2	29.7	12.1	11.7	6.2	15.8	1.1	2.7	8.2	12.2	0.6
	Max	167.0	71.2	197.2	260.4	43.8	95.2	148.7	307.4	774.3	813.7	221.4	92.9	99.8	138.5	813.7
K–W test	52.2017 (0.0000)															
Median test (Chi square)	38.0653 (0.0003)															

This table provides descriptive statistics for the four measures of capital raised at IPO depending on the year of the IPO. For each variable, the mean, median, standard deviation, minimum, and maximum are calculated. To test the differences between years, non-parametric Kruskal–Wallis (K–W) and median tests were used. P-values are presented in parentheses.

Source: own calculations.
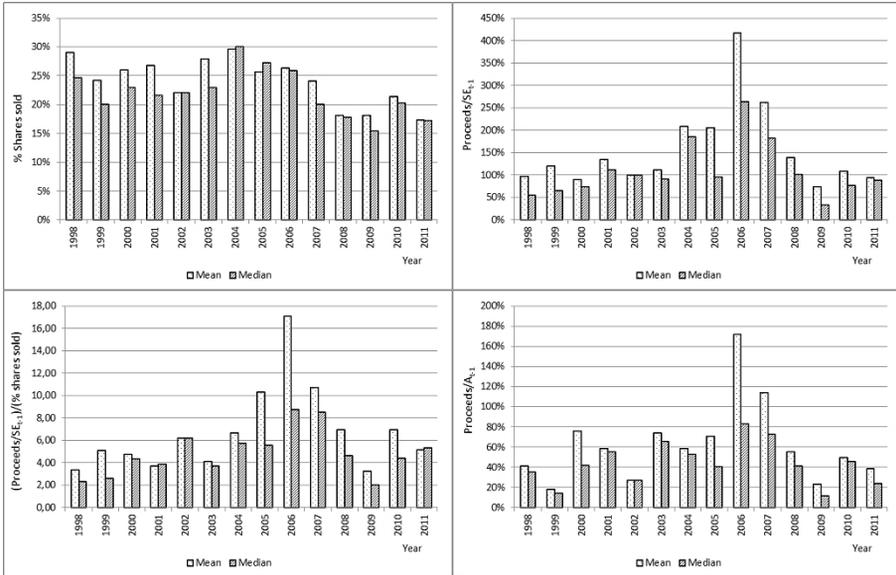
Figure 1. The yearly effect of equity issuance activity in the 1998–2011 period

Source: own elaboration.

change of the law. The findings presented in Table 5 show that firms going public during hot (H) and cold (C) periods as well as before (L_B) and after (L_A) the change of the law in 2005 do not differ substantially in their financial conditions and size. Apart from the liquidity ratios and return on sales, which depend on the type of industry, the differences in other ratios between hot and cold-market issuers are not statistically significant. Both hot and cold-market firms do not differ in terms of profitability and size. Table 5 also shows that hot and cold-market firms do not differ in the level of leverage and these results are in contrast to the findings of, for example, Alti (2006) and Guney and Iqbal-Hussain (2010), who find that hot-market IPO firms have lower levels of leverage than cold-market firms. This can mean that the timing of IPOs in Poland is not determined by the level of a firms' leverage. Firms going public before and after the change in the law also have a similar financial condition and the only statistically significant differences are for return on sales and leverage. We can also see that the impact of the changes in the law on the differences in the financial situation between hot and cold-market IPOs occurs in the case of return on sales and debt ratios.

In the next step we investigate in more detail the success of the sample firms in raising equity capital during an IPO.

Figure 1 and Table 4 show that companies doing an IPO in the Polish stock market sell quite the same fraction of firm ownership regardless of whether they go public in a hot or a cold market (we can see that the firms sell on average about 24% of total outstanding shares). The ratio of primary shares issued in an IPO to the total number of outstanding shares (% shares sold variable) is an exceptionally stable characteristic of IPO firms regardless of the year of IPO, although after 2005 we can observe a slight decline in the fraction of firm ownership sold at the IPO. Table 4 and Panel A of Table 6 report that the differences in the level of this ratio both between individual years and between the hot and cold-market firms are not statistically significant[1]. The results do not support the findings of other studies. For example, Alti (2006) indicates that hot-market issuers sell more shares at the IPO; specifically, the author reports that hot-market firms sell on average 23.96% of total outstanding shares while cold-market issuers sell 21.76%. The empirical results for the Polish IPO market may suggest that selling about 24% of total shares is optimal for issuers not to lose control of their companies, which may be more important for them than issuing more equity during hot-market periods. The findings of this section make the third hypothesis more probable.

IPO firms selling quite the same fraction of ownership can obtain much more capital in a hot than in a cold market. The second column of Panel A of Table 6 indicates that the proceeds from the sale of primary shares relative to the amount of pre-IPO shareholders' equity in hot-market periods are twice as much as in cold-market conditions. The third column of Panel A of Table 6 shows that the percentage increase in shareholders' equity per each percentage of firm ownership sold at the IPO is almost two times higher in hot-market periods than in cold-market periods, and the last column of the same table shows that the proceeds from the sale of primary shares relative to pre-IPO assets for hot-market issuers are almost twice as much as for cold-market issuers. We can see that the percentage increase in shareholders' equity is a measure which indicates the greatest success in raising capital by hot-market issuers compared with their cold-market counterparts. Panel A of Table 6 reports that the mean value of this measure is 220.6% for hot-market issuers and 110.6% for cold-market issuers. It seems that this is the best measure of success in raising equity capital, as it is independent of the level of leverage. However the differences between hot and cold-market issuers are highly significant in the case of each of these three measures of the

---

[1] We can see in Table 8 that using factorial ANOVA, which has more power than a simple *t*-test, this difference is statistically significant.

amount of money raised at IPO. Alti (2006) reports that the proceeds from the sale of primary shares are on average 53.76% of pre-IPO total assets for cold-market firms, while the same ratio for hot-market firms is 75.61%, which means a 40% increase relative to cold market issuers. Similarly, Çelik and Akarim (2013) report that in Turkey proceeds from the sale of primary shares are on average 68% of pre-IPO total assets for cold-market issuers and 98% for hot-market issuers, which means a 44% increase relative to cold-market firms. The same ratio for cold-market issuers in Poland is 48.2% and for hot-market issuers is 87.4%, i.e. an increase of 81% in the case of hot-market relative to cold-market firms. This means that when market conditions are favourable, Polish companies are able to raise a larger amount of capital than companies in other countries. However, as indicated in Table 1, in the 1998–2011 research period there were three hot-market periods and two cold-market periods. Figure 1 and Table 4 show that an especially large amount of money was raised in one of the three hot periods, i.e. in 2006–2007. Table 4 reports that in the most favourable market conditions, i.e. in 2006, proceeds from the sale of primary shares amounted to 166% of pre-IPO assets value. This means that there may be differences between individual periods of hot-market conditions as well as between individual periods of cold-market conditions. The results presented in this section confirm the fourth research hypothesis developed in this paper.

To test the fifth hypothesis, a regression analysis is conducted which models the determinants of the amount of capital raised by Polish companies through an IPO. The dependent variable is the amount of capital raised through the firm's IPO measured as (1) the ratio of primary shares issued in the IPO to the total number of outstanding shares (% shares sold), (2) the IPO proceeds from the sale of primary shares relative to the amount of pre-IPO shareholders' equity (Proceeds/SE_{t-1}), (3) the percentage increase in shareholders' equity to the percentage of shares sold via the issuance of primary shares ((Proceeds/SE_{t-1})/(% shares sold)), and (4) the IPO proceeds from the sale of primary shares relative to pre-IPO assets (Proceeds/A_{t-1}). The regression analysis is conducted with the following independent variables:

1. Size – we use two variables to examine whether the size of the companies influences the amount of capital raised in hot and cold-market conditions: total assets (Ln Assets) and sales revenue (Ln Sales).

2. Profitability – we use three profitability ratios: return on sales (ROS), return on assets (ROA), and return on equity (ROE).

3. Leverage – we use three variables to examine whether the level of leverage affects the amount of capital raised in hot and cold-market conditions: debt ratio (D/A), long-term debt ratio (LD/LC), and shareholders' equity to fixed assets ratio (SE/FA).

4. Liquidity – we use two liquidity ratios: quick ratio (QR) and cash ratio (CR).

5. Terms of issue – we use two variables to examine whether the terms of share issue influence the amount of capital raised in hot and cold-market conditions: the ratio of issue price to the nominal value of shares (IP/NV) and the ratio of book value per share to the nominal value of shares (BV/NV).

6. Economic conditions – GDP growth rate (GDP growth) is used in the model as a proxy to measure economic conditions.

7. Investor optimism – We use three variables as proxies for investor optimism: rate of return on WIG Index (WIG [%]), price to earnings ratio (P/E), and price to book value ratio (P/BV).

8. Dummy variable T captures the market timing effect. In order to grasp which explanatory variables are statistically significant in explaining the dependent variable, the dummy variable T is coded both as a zero if the firm goes public in a hot year and one otherwise (H = 0; C = 1), and as a one if the firm goes public in a hot year and zero otherwise (H = 1; C = 0).

In order to investigate whether multicollinearity is present among the variables, the correlation coefficients between the variables are considered. Finally, after excluding explanatory variables highly correlated with each other and slightly correlated with dependent variables, the following independent variables are included in our regression models: total assets (Ln Assets), return on equity (ROE), debt ratio (D/A), ratio of issue price to the nominal value of shares (IP/NV), rate of return on WIG Index (WIG [%]) and dummy variable T, as well as the interactions between the dummy variable T and the other variables.

Panel B of Table 6 presents the results of the regression analysis. In the hot-market periods two variables are statistically significant in explaining the fraction of firm ownership sold through the IPO: the size of the companies and terms of share issue. The coefficients of both variables are negative. The reasons that larger firms sell a smaller fraction of firm ownership could be due to the stage of their business life cycle and insufficient future investment opportunities. The possibility of obtaining a higher ratio of issue price to the nominal value of shares (IP/NV) encourages companies to sell a lower percentage of total outstanding shares, which seems to be rational because

they can raise more money per each issued share. However, the adjusted R^2 is quite low, suggesting that the cumulative effect of these variables is quite weak in explaining the fraction of firm ownership sold through the IPO. In the cold-market periods only leverage ratio is slightly statistically significant in explaining the fraction of firm ownership sold through the IPO. The interactions are not statistically significant, meaning that market timing does not affect the explanatory power of the other variables.

In the next three models in Panel B of Table 6 there are five highly significant determinants of the amount of money raised through the IPO in hot markets: size, profitability, leverage, investor optimism, market timing, as well as the interactions between the market timing and the other significant determinants. Market timing has the greatest power in explaining the dependent variables in the three models. This indicates that choosing a suitable time should be a part of strategy of companies deciding to go public. The size of the companies has less, albeit negative, correlation with the amount of money raised through the IPO in hot-market conditions. As already mentioned, large firms can be assessed by investors on the basis of their stage in their business life cycle. Investors may be afraid that large firms who are at the top of their life cycle do not have enough growth potential and can use raised capital to finance current operations, current assets, to reduce leverage, etc., which do not provide any opportunity for high growth in the future but this parameter has strong and statistically significant power only in hot periods. Profitability is the next highly significant factor positively correlated with the amount of money raised at the IPO but mainly in hot-market conditions. In cold periods profitability has a statistically significant power in explaining only one dependent variable, i.e. the percentage increase in shareholders' equity per each percentage of firm ownership sold at the IPO. The level of profitability reflects how efficiently companies use their resources and we can see that this variable is one of the most important factors to investors in determining the attractiveness of the investment in the shares issued at IPO in hot-market conditions. This suggests that investors use pre-IPO profitability as a strong predictor of the ability of firms to operate successfully after the offering. Investor sentiment is the next factor which influences the amount of capital raised at IPO but also only in hot markets. More favourable market conditions mean that investors better assess the offers, and therefore firms can raise more capital. This is consistent with the findings of other researchers. Leverage can also shape the financial image of the companies; however it has less power in explaining the amount of money raised at IPO.

Table 5

Comparison of hot and cold-market IPO firms before and after the legal changes in terms of their financial condition

	Law/Market		$Ln\ Sales_{t-1}$	$Ln\ Assets_{t-1}$	$ROS_{t-1}\ [\%]$	$ROA_{t-1}\ [\%]$	$ROE_{t-1}\ [\%]$	D/A_{t-1}	LD/LC_{t-1}	SE/FA_{t-1}	CR_{t-1}	QR_{t-1}
N	L_B		107	107	105	107	107	107	107	107	106	106
	L_A		142	143	142	143	143	143	143	143	142	142
	H		184	184	184	184	184	184	184	184	183	183
	C		65	66	63	66	66	66	66	66	65	65
	L_B	H	72	72	72	72	72	72	72	72	72	72
		C	35	35	33	35	35	35	35	35	34	34
	L_A	H	112	112	112	112	112	112	112	112	111	111
		C	30	31	30	31	31	31	31	31	31	31
Mean	L_B		11.13	11.03	0.07	0.13	0.19	0.53	0.14	1.52	0.35	1.25
	L_A		10.77	10.94	-0.32	0.13	0.26	0.52	0.17	2.83	0.45	1.37
	H		10.91	10.91	10.6	13.6	23.5	0.53	0.16	2.35	0.35	1.20
	C		10.97	11.17	−92.2	11.9	20.2	0.49	0.16	2.04	0.56	1.66
	L_B	H	11.13	10.95	0.10	0.13	0.18	0.51	0.12	1.45	0.28	1.12
		C	11.15	11.19	0.00	0.13	0.20	0.56	0.19	1.66	0.50	1.52
	L_A	H	10.78	10.88	0.11	0.14	0.27	0.55	0.18	2.93	0.40	1.24
		C	10.76	11.15	-1.94	0.11	0.20	0.40	0.13	2.46	0.62	1.80
Median	L_B		11.10	10.79	0.09	0.11	0.19	0.52	0.05	1.23	0.10	0.96
	L_A		10.82	11.00	0.09	0.10	0.19	0.58	0.12	1.12	0.17	1.02
	H		10.85	10.90	8.9	10.2	19.0	0.57	0.07	1.15	0.14	0.96
	C		10.90	10.96	9.7	11.9	19.7	0.48	0.09	1.21	0.19	1.13
	L_B	H	11.05	10.67	0.09	0.11	0.17	0.51	0.04	1.22	0.10	0.96
		C	11.27	10.91	0.10	0.12	0.23	0.53	0.09	1.24	0.11	1.06
	L_A	H	10.86	11.02	0.09	0.10	0.21	0.60	0.12	1.12	0.16	0.98
		C	10.30	10.90	0.09	0.12	0.15	0.40	0.09	1.08	0.24	1.25

SD	LB		1.70	1.50	0.36	0.12	0.24	0.23	0.20	1.67	0.80	1.11
	LA		1.66	1.50	5.21	0.16	0.33	0.21	0.17	9.93	0.93	1.37
	H		1.50	1.41	39.9	14.6	31.6	0.21	0.18	8.60	0.64	0.99
	C		2.14	1.72	779.9	13.1	24.0	0.24	0.21	3.68	1.34	1.79
	LB	H	1.49	1.53	0.11	0.10	0.22	0.22	0.18	1.74	0.52	0.77
		C	2.10	1.45	0.62	0.16	0.27	0.24	0.25	1.55	1.20	1.59
	LA	H	1.49	1.33	0.50	0.17	0.36	0.20	0.18	10.91	0.71	1.11
		C	2.22	2.01	11.30	0.09	0.20	0.21	0.14	5.13	1.49	2.00
Levene's test			2.4010 (0.068)*	1.2992 (0.275)	9.6928 (0.000)***	1.2403 (0.296)	1.0724 (0.361)	0.6911 (0.558)	2.4981 (0.060)*	3.6167 (0.014)**	2.0912 (0.102)	3.7416 (0.012)**
Factorial ANOVA	L		2.272 (0.133)	0.07 (0.790)	2.8062 (0.095)*	0.0753 (0.784)	1.1299 (0.289)	3.770 (0.053)*	0.0001 (0.993)	1.0728 (0.301)	0.9583 (0.329)	1.2285 (0.269)
	M		0 (1.000)	1.4 (0.238)	3.4678 (0.064)*	0.6323 (0.427)	0.2784 (0.598)	2.082 (0.150)	0.2110 (0.646)	0.0139 (0.906)	2.9355 (0.088)*	6.9723 (0.009)***
	M*L		0.007 (0.933)	0.01 (0.923)	2.8481 (0.093)*	0.6103 (0.435)	1.1545 (0.284)	11.088 (0.001)***	4.8161 (0.029)**	0.0965 (0.756)	0.0007 (0.979)	0.1783 (0.673)

This table reports the descriptive statistics of the financial ratios of firms debuted in hot and cold markets before and after the legal changes in 2005. The period t denotes the IPO year . In order to test the differences between hot and cold-market IPOs, factorial ANOVA was used. P-values are presented in parentheses. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

Source: own calculations.

Table 6

Cross sectional analysis of the impact of market timing effects on the amount of capital raised through IPO

	% Shares Sold		Proceeds/SE$_{(t-1)}$ [%]		(Proceeds/SE$_{(t-1)}$)/ (% Shares Sold)		Proceeds/A$_{(t-1)}$ [%]	
Market	H	C	H	C	H	C	H	C
Panel A: Mean value								
N	184	66	184	66	184	66	184	66
Mean	25.3	22.3	220.6	110.5	9.2	5.4	87.4	48.2
Trimmed mean 5%	24.5	21.7	178.5	97.4	7.4	4.6	68.7	41.6
SD	13.1	13.7	283.3	118.2	12.2	5.95	116.8	53.2
Median	23.8	19.8	134.0	75.6	6.4	3.1	49.8	29.6
Student's *t*-test	1.5918 (0.11270)		3.05854 (0.00247)***		2.42716 (0.01593)**		2.63036 (0.00906)***	
F	1.089 (0.6502)		5.748 0.0000***		4.203 0.0000***		4.830 0.0000***	
Panel B: Regression analysis								
Timing coding	H=0; C=1	H=1; C=0	H=0; C=1	H=1; C=0	H=0; C=1	H=1; C=0	H=0; C=1	H=1; C=0
Ln Assets$_{t-1}$	-0.246*** (0.080)	-0.145 (0.112)	-0.463*** (0.060)	-0.072 (0.084)	-0.345*** (0.062)	-0.071 (0.086)	-0.522*** (0.066)	-0.148 (0.092)
ROE$_{t-1}$	-0.068 (0.073)	-0.265 (0.162)	0.403*** (0.055)	0.095 (0.121)	0.471*** (0.056)	0.265** (0.125)	0.285*** (0.133)	-0.047 (0.133)
(D/A)$_{t-1}$	0.116 (0.076)	0.217* (0.116)	0.227*** (0.057)	0.097 (0.087)	0.179*** (0.059)	0.071 (0.089)	-0.204*** (0.063)	-0.077 (0.095)
IP/NV	-0.187*** (0.066)	-0.040 (0.219)	-0.052 (0.050)	0.286* (0.164)	0.037 (0.051)	0.333** (0.169)	-0.022 (0.054)	0.345** (0.179)
WIG$_t$ [%]	0.060 (0.105)	0.102 (0.085)	0.386*** (0.078)	-0.017 (0.064)	0.360*** (0.081)	-0.044 (0.066)	0.394*** (0.086)	-0.023 (0.070)
Timing (T)	-0.469 (0.467)	0.469 (0.467)	-1.122*** (0.350)	1.122*** (0.350)	-0.753** (0.361)	0.753** (0.361)	-1.325*** (0.383)	1.325*** (0.383)
Ln Assets$_{t-1}$ × T	0.337 (0.459)	-0.334 (0.455)	1.306*** (0.344)	-1.295*** (0.341)	0.916** (0.355)	-0.907** (0.352)	1.250*** (0.377)	-1.239*** (0.373)

$\text{ROE}_{t-1} \times T$	-0.100	0.191	-0.157**	0.300**	-0.105	0.200	-0.169**	0.323**
	(0.091)	(0.173)	(0.068)	(0.130)	(0.070)	(0.134)	(0.074)	(0.142)
$(D/A)_{t-1} \times T$	0.116	-0.137	-0.148	0.176	-0.124	0.147	0.146	-0.173
	(0.159)	(0.188)	(0.119)	(0.141)	(0.123)	(0.146)	(0.130)	(0.154)
$IP/NV \times T$	0.045	-0.143	0.103**	-0.328**	0.091*	-0.288*	0.112*	-0.358*
	(0.070)	(0.222)	(0.052)	(0.166)	(0.054)	(0.172)	(0.057)	(0.182)
$WIG_t\,[\%] \times T$	0.032	-0.027	-0.310***	0.258***	-0.312***	0.260***	-0.321***	0.267***
	(0.104)	(0.087)	(0.078)	(0.065)	(0.080)	(0.067)	(0.085)	(0.071)
R	0.349		0.712		0.689		0.640	
R^2	0.122		0.507		0.475		0.410	
Adjusted R^2	0.081		0.485		0.451		0.383	
$F(11,238)$	3.000		22.278		19.575		15.025	

Panel A reports the mean values of each variable Y_t for hot and cold-market firms and the *t*-value of their difference (*p*-values are reported in parentheses). The period *t* denotes the IPO year.

The results of the regressions from the following model are reported in Panel B:

$$Y_t = \alpha + \beta_1 \ln Assets_{t-1} + \beta_2 ROE_{t-1} + \beta_3 \left(\frac{D}{A}\right)_{t-1} + \beta_4 \frac{IP}{NV} + \beta_5\, WIG_t[\%] + \beta_6 T + \cdots$$

$$+ \beta_7 (\ln Assets_{t-1} \times T) + \beta_8 (ROE_{t-1} \times T) + \beta_9 \left(\left(\frac{D}{A}\right)_{t-1} \times T\right) + \beta_{10}\left(\frac{IP}{NV} \times T\right) + \beta_{11}(WIG_t[\%] \times T) + \varepsilon_t$$

The constant term is not reported. The standard errors that are robust to heteroskedasticity are reported in parentheses. (*), (**), and (***) indicate that coefficients are significant at 10, 5, and 1 per cent levels of significance, respectively.

Source: own calculations.

Moreover, it explains the variables Proceeds/SE$_{t-1}$ and Proceeds/A$_{t-1}$ in different ways. In the former case its coefficient is positive, and in the latter case it is negative. This is probably because investors do not look directly at this ratio and its impact is indirect. When the debt-to-assets ratio increases, the shareholders' equity-to-assets ratio decreases, therefore when the same amount of IPO proceeds (which depends on other factors) is divided by shareholders' equity, it increases, but when divided by the amount of total assets, it decreases. Thus, although leverage is one of the common factors determining the financial image of companies, it seems that investors determine the attractiveness of the investment in IPOs on the basis of the size of the companies but not on the basis of leverage. In cold-market conditions the amount of money raised through the IPO is not determined by so many variables. The results in Table 6 indicate that in cold markets when investor optimism is low and, as a result, their activity is weak and takes the form of usual operations, terms of share issue are the main factor correlated with the amount of capital raised at IPO. The higher the issue price relative to the nominal value of shares, the larger the amount of capital firms can raise at IPO. In cold-market periods the financial standing of the IPO firms (measured by profitability and leverage) generally does not explain the amount of capital raised at IPO measured both in relation to the amount of pre-IPO shareholders' equity and to total assets.

Examining the impact of the legal changes in 2005 on the success of share issuance, we can see in Panel A of Table 7 that after the changes in the law the fraction of firm ownership sold at the IPO decreases while the amount of capital raised through the IPO (the last three measures) increases. The differences between the mean values of these parameters before and after the legal changes are statistically significant. Of course in practice the percentage of shares sold in the offering and the amount of capital raised in the offering could interact. Issuers expecting the success of the issuance could decide to sell fewer shares because the shares could ensure that they raised the expected amount of capital. It is difficult to determine which factors contributed to the increase in the amount of capital raised at the IPO after the legal changes in 2005. On the one hand, in the years 2006–2007 there was an unprecedented boom on the Warsaw Stock Exchange which is clearly visible in Figure 1. On the other hand, in cold markets the median values of the three measures of the amount of capital raised at the IPO are almost at the same level before and after the legal changes, as shown in Table 8. This suggests that the increase in the amount of capital raised at the IPO after the changes in the law occurred due to the extremely high bull market.

To analyse the factors that could affect the amount of capital raised at the IPO, the regression analysis is repeated in Panel B of Table 7, but with the legal changes effect in place of the market timing effect. The dummy variable L captures the legal changes effect and it is coded both as a zero if the firm goes public before the legal changes and one otherwise ($L_B = 0$; $L_A = 1$), and as a one if the firm goes public before the legal changes and zero otherwise ($L_B = 1$; $L_A = 0$). We can see that in all models the size of the company is the only factor that has a negative correlation with the dependent variables, both before and after the legal changes. This means, as was explained earlier, that investors prefer to invest in smaller companies. Another very puzzling phenomenon is the increasing role of profitability and investor optimism in explaining the amount of capital raised at the IPO after the changes in the law. Before the changes in 2005 both of the factors were not statistically significant. In turn, leverage was a statistically significant factor for the amount of capital raised at the IPO before the changes in the law, except for the last dependent variable (Proceeds/A_{t-1}). After these changes leverage is an important factor only for the last dependent variable. This means that it had a greater importance in the investors' evaluation of new share issues in the latter period. Its coefficient is, however, negative and the possible reason for this fact was explained earlier.

Table 8 presents the results of examining both the market timing effect and legal changes effect on the success in raising capital through IPO. Panel A of Table 8 shows that the differences in mean values of all dependent variables between hot and cold markets are statistically significant, and the differences in mean values of almost all dependent variables (except Proceeds/$SE_{(t-1)}$) before and after the changes in the law are statistically significant as well. However, the effect of the interaction between the market timing and the changes in the law is not statistically significant, meaning that the changes in 2005 had no effect on the timing phenomenon. The regression analysis in Panel B of Table 8 confirms this observation showing that although the effect of each factor (market timing and law changes) is statistically significant, the explanatory power of the models are very low, and thus the value of the dependent variables cannot be predicted only on the basis of belonging to a particular period. The results presented in this section confirm the six research hypothesis developed in this paper.

Table 7

Cross sectional analysis of the impact of the changes in law on the amount of capital raised through IPO

	% Shares Sold		Proceeds/SE$_{(t-1)}$ [%]		(Proceeds/SE$_{(t-1)}$) / (% Shares Sold)		Proceeds/A$_{(t-1)}$ [%]	
Law	L$_B$	L$_A$	L$_B$	L$_A$	L$_B$	L$_A$	L$_B$	L$_A$
Panel A: Mean value								
N	107	143	107	143	107	143	107	143
Mean	0.27	0.22	1.47	2.25	5.69	10.03	0.52	0.95
Trimmed mean 5%	0.27	0.22	1.21	1.81	4.55	8.30	0.45	0.75
SD	0.15	0.12	1.89	2.91	8.66	12.20	0.54	1.28
Median	0.25	0.20	0.91	1.36	3.75	6.74	0.40	0.53
Student's *t*-test	9.664 (0.002)***		5.819 (0.017)**		9.836 (0.002)***		10.625 (0.001)***	
F	1.645 (0.006)***		2.378 (0.000)***		1.982 (0.000)***		5.635 (0.000)***	
Panel B: Regression analysis								
Law coding	L$_B$=0; L$_A$=1	L$_B$=1; L$_A$=0	L$_B$=0; L$_A$=1	L$_B$=1; L$_A$=0	L$_B$=0; L$_A$=1	L$_B$=1; L$_A$=0	L$_B$=0; L$_A$=1	L$_B$=1; L$_A$=0
Ln Assets$_{t-1}$	-0.180* (0.094)	-0.236*** (0.088)	-0.294*** (0.074)	-0.342*** (0.069)	-0.288*** (0.073)	-0.195*** (0.068)	-0.267*** (0.080)	-0.513*** (0.075)
ROE$_{t-1}$	-0.046 (0.116)	-0.098 (0.081)	-0.043 (0.091)	0.510*** (0.064)	0.007 (0.090)	0.622*** (0.063)	0.013 (0.099)	0.282*** (0.069)
D/A$_{t-1}$	0.238*** (0.093)	0.068 (0.083)	0.307*** (0.072)	0.111* (0.065)	0.232*** (0.072)	0.102 (0.065)	-0.019 (0.079)	-0.252*** (0.071)
IP/NV	-0.593** (0.281)	-0.101 (0.065)	0.050 (0.219)	-0.069 (0.051)	0.224 (0.217)	-0.006 (0.051)	0.007 (0.239)	-0.015 (0.056)
WIG$_t$ [%]	-0.081 (0.120)	0.153** (0.072)	0.125 (0.094)	0.209*** (0.057)	0.152 (0.093)	0.144** (0.056)	0.080 (0.102)	0.230*** (0.062)
Law (L)	0.178 (0.484)	-0.178 (0.484)	0.358 (0.379)	-0.358 (0.379)	-0.209 (0.375)	0.209 (0.375)	1.241*** (0.412)	-1.241** (0.412)

Ln Assets$_{t-1}$ × L	-0.208	0.209	-0.180	0.180	0.342	-0.343	-0.909**	0.912**
	(0.475)	(0.476)	(0.371)	(0.373)	(0.367)	(0.369)	(0.404)	(0.406)
ROE$_{t-1}$ × L	-0.049	0.031	0.524***	-0.336***	0.582***	-0.373***	0.254**	-0.163**
	(0.134)	(0.086)	(0.105)	(0.067)	(0.104)	(0.067)	(0.114)	(0.073)
D/A$_{t-1}$ × L	-0.238	0.235	-0.273**	0.271**	-0.181	0.179	-0.325**	0.321**
	(0.173)	(0.172)	(0.136)	(0.134)	(0.134)	(0.133)	(0.148)	(0.146)
IP/NV × L	0.490*	-0.113*	-0.118	0.027	-0.229	0.053	-0.022	0.005
	(0.287)	(0.066)	(0.224)	(0.052)	(0.222)	(0.051)	(0.244)	(0.056)
WIG$_t$ [%] × L	0.198*	-0.143*	0.071	-0.051	-0.007	0.005	0.126	-0.091
	(0.118)	(0.086)	(0.092)	(0.067)	(0.091)	(0.066)	(0.101)	(0.073)
R	0.391		0.694		0.702		0.621	
R^2	0.153		0.482		0.492		0.385	
Adjusted R^2	0.114		0.458		0.469		0.357	
F(11,238)	3.901		20.094		20.984		13.559	

Panel A reports the mean values of each variable Y_t for firms going public before and after the legal changes in 2005 and the *t*-value of their difference (*p*-values are reported in parentheses). The period *t* denotes the IPO year.

The results of the regressions from the following model are reported in Panel B:

$$Y_t = \alpha + \beta_1 \ln Assets_{t-1} + \beta_2 \left(\frac{D}{A}\right)_{t-1} + \beta_4 WIG_t[\%] + \beta_5 \frac{IP}{NP} + \beta_6 L + \beta_7 \left(\ln Assets_{(t-1)} \times L\right) + \cdots$$

$$+ \beta_8 (ROE_{t-1} \times L) + \beta_9 \left(\left(\frac{D}{A}\right)_{t-1} \times L\right) + \beta_{10}(WIG_t[\%] \times L) + \beta_{11}\left(\frac{IP}{NP} \times L\right) + \varepsilon_t$$

The constant term is not reported. The standard errors that are robust to heteroskedasticity are reported in parentheses. (*), (**), and (***) indicate that coefficients are significant at 10, 5, and 1 per cent levels of significance, respectively.

Source: own calculations.

T. DUDYCZ, B. BRYCZ

Table 8

Market timing effects and the law changes' effects on issuance activity of IPO firms

	Law/ Market		% Shares Sold	Proceeds/SE$_{(t-1)}$ [%]	(Proceeds/SE$_{(t-1)}$) / (% Shares Sold)	Proceeds/A$_{(t-1)}$ [%]
Panel A: Mean value						
N	L$_B$	H	72	72	72	72
		C	35	35	35	35
	L$_A$	H	112	112	112	112
		C	31	31	31	31
Mean	L$_B$	H	0.28	1.65	6.15	0.56
		C	0.26	1.10	4.75	0.44
	L$_A$	H	0.23	2.56	11.12	1.07
		C	0.18	1.11	6.08	0.53
SD	L$_B$	H	0.15	2.12	9.89	0.55
		C	0.15	1.22	5.32	0.53
	L$_A$	H	0.12	3.16	13.15	1.40
		C	0.10	1.16	6.61	0.54
Median	L$_B$	H	0.28	0.96	4.06	0.41
		C	0.22	0.78	3.16	0.30
	L$_A$	H	0.21	1.59	7.87	0.57
		C	0.17	0.74	2.61	0.32
Levene's test			2.9307 (0.0342)**	5.2092 (0.0017)***	8.6266 (0.0000)***	3.1022 (0.0273)**
Factorial ANOVA	L		11.2225 (0.0009)***	1.6371 (0.2019)	4.1189 (0.0435)**	4.0343 (0.0457)**
	M		4.0541 (0.0452)**	7.7369 (0.0058)***	4.2891 (0.0394)**	5.1306 (0.0244)**
	L*M		0.6398 (0.4246)	1.6047 (0.2064)	1.3762 (0.2419)	2.0516 (0.1533)
Panel B: Regression analysis						
Regression	L		0.0316 (0.0009)***	-0.2302 (0.2019)	-1.5771 (0.0435)**	-0.1484 (0.0457)**
	M		0.0190 (0.0452)**	0.5003 (0.0058)***	1.6093 (0.0394)**	0.1673 (0.0244)**
	L*M		-0.0075 (0.4246)	-0.2279 (0.2064)	-0.9116 (0.2419)	-0.1058 (0.1533)
R			0.236	0.243	0.245	0.262
R^2			0.056	0.059	0.060	0.069
Adj. R^2			0.044	0.048	0.049	0.057
F(3,246)			4.838	5.149	5.242	6.045

Panel A reports the mean values of each variable Y_t for hot and cold firms going public before and after the legal changes in 2005, and the *t*-value of their difference (*p*-values are reported in parentheses). The period *t* denotes the IPO year.

The results of the regressions from the following model are reported in Panel B:

$$Y_t = \alpha + \beta_1 M + \beta_2 L + \beta_3 (M \times L) + \varepsilon_t.$$

The constant term is not reported. The standard errors that are robust to heteroskedasticity are reported in parentheses. (*), (**), and (***) indicate that coefficients are significant at 10, 5, and 1 per cent levels of significance, respectively.

Source: own calculations.

CONCLUSIONS

The WSE ranks tenth among the European stock exchanges in terms of market capitalisation. It is one of the fastest-growing capital markets and the largest stock exchange in Central and Eastern Europe. The WSE is mainly a place for Polish companies to raise capital but is also used by companies from Central and Eastern Europe, the UK and the USA.

The general objective of this paper is to analyse the impact of market timing on the amount of equity raised by IPO firms on the WSE, as well as the impact of the changes in the law in 2005 on this phenomenon. The empirical analysis indicates that companies doing an IPO on the WSE sell, on average, quite the same fraction of firm ownership regardless of the year of the IPO and that the differences between individual years are not statistically significant. This may suggest that the most important concern for issuers is to keep control of their companies. Some researchers indicate that firms which go public in hot markets are in a worse financial condition than their cold market counterparts. This study does not confirm this phenomenon for the WSE. Regardless of the period of the IPO, firms are characterised by relatively high profitability, fairly conservative asset financing, and low excess liquidity. However, the choice of time period is essential for success in raising a large amount of capital at IPO. On the WSE, as in other markets, the best periods to raise equity capital occur when the Polish economy is achieving a high GDP growth rate. Slightly less important, but still significant, is investor optimism reflected both in high firm valuations and in investors activity. In these periods, IPOs can expect to raise, on average, twice as much money (relative to pre-IPO shareholders' equity) as in periods of low GDP growth and investor pessimism. In this regard the WSE is more sensitive to changes in economic environment than other stock exchanges. From this perspective, waiting for favourable market conditions before going public seems to be a very reasonable strategy. The change from cold to hot-market conditions enables companies to raise much more capital through an IPO, but the amount of money raised in these two market conditions is determined by different factors. In cold-market conditions only the terms of share issue are the factor determining the amount of money raised at IPO and the financial situation of companies is almost insignificant. In hot-market conditions the amount of money raised at IPO, to a large extent, is affected by different factors. The size of companies affects the amount of money raised during hot markets the most and its power in explaining this parameter is much stronger than in cold markets. This may suggest that

investors seek companies with high growth potential and they may be afraid that large firms which are at the top of their life cycle have lost their ability to grow further. The financial situation of companies and investor optimism also have a significant correlation with the amount of money raised at IPO during hot-market conditions, but, contrary to cold-market conditions, the terms of share issue are almost insignificant.

In 2005 there were changes in the law concerning the functioning of the Polish financial market. These changes aimed at aligning Polish regulations with the EU standards, improving the competitiveness and liberalization of the financial market. These changes, however, did not have impact on the market timing phenomenon. After the changes in the law the amount of capital raised at the IPO increased but only in hot markets, suggesting that this increase was due to the extremely high bull market. What is interesting, the power of profitability and rate of return on the WIG Index in explaining the amount of capital raised at the IPO increased after the changes in 2005, meaning that these parameters began to play a greater role for investors in assessing new share issues than before the law was changed.

REFERENCES

Alti, A., *How Persistent is the Impact of Market Timing on Capital Structure?*, "The Journal of Finance", 61(4), pp. 1681–1710, 2006.

Amini, S., *The Amount of Raised Capital by Small IPOs: Spatial Effect on the UK Alternative Investment Market,* "International Journal of Entrepreneurial Behaviour & Research", 19(3), pp. 344–358, 2013.

Baker, M., Wurgler, J., *Market Timing and Capital Structure*, "The Journal of Finance", 57(1), pp. 1–32, 2002.

Bayless, M., Chaplinsky S., *Is There a Window of Opportunity for Seasoned Equity Issuance?*, "The Journal of Finance", 51(1), pp. 253–278, 1996.

Brau, J. C., Fawcett, S. E., *Initial Public Offerings: An Analysis of Theory and Practice*, "The Journal of Finance", 61(1), pp. 399–436, 2006.

Çelik, S., Akarim, Y. D., *Does Market Timing Drive Capital Structure? Empirical Evidence from an Emerging Market*, "International Journal of Economics and Financial Issues", 3(1), pp. 140–152, 2013.

Celikyurt, U., Sevilir, M., Shivdasani, A., *Going Public to Acquire? The Acquisition Motive in IPOs*, "Journal of Financial Economics", 96(3), pp. 345–363, 2010.

Choe, H., Masulis, R. W., Nanda, V. (1993). *Common Stock Offerings Across the Business Cycle: Theory and Evidence*, "Journal of Empirical Finance", 1(1), pp. 3–31, 1993.

Deeds, D. L., Decarolis, D., Coombs, J. E., *The Impact of Firm Specific Capabilities on the Amount of Capital Raised in an Initial Public Offering: Evidence from the Biotechnology Industry*, "Journal of Business Venturing", 12(1), pp. 31–46, 1997.

Derrien, F., *IPO Pricing in "Hot" Market Conditions: Who Leaves Money on the Table?*, "The Journal of Finance", 60(1), pp. 487–521, 2005.

Derrien, F., Kecskés, A., *How Much Does Investor Sentiment Really Matter for Equity Issuance Activity?*, "European Financial Management", 15(4), pp. 787–813, 2009.

Graham, J. R., Harvey, C. R., *The Theory and Practice of Corporate Finance: Evidence from the Field*, "Journal of Financial Economics", 60, pp. 187–243, 2001.

Guney, Y., Iqbal-Hussain, H., *Capital Structure and IPO Market Timing in the UK* [in:] *Behavioural Finance Working Group Conference: Fairness, Trust and Emotions in Finance*, pp. 1–34. London, UK, 2010.

Helwege, J., Liang, N., *Initial Public Offerings in Hot and Cold Markets*, "Journal of Financial and Quantitative Analysis", 39, pp. 541–569, 2004.

Kim, W., Weisbach, M. S., *Do Firms Go Public to Raise Capital?* Working Paper 11197, http://www.nber.org/papers/w11197, 2005.

Kim, W., Weisbach, M. S. (2008). *Motivations for Public Equity Offers: An International Perspective*, "Journal of Financial Economics", 87(2), pp. 281–307, 2008.

Lowry, M., *Why Does IPO Volume Fluctuate So Much?*, "Journal of Financial Economics", 67(1), pp. 3–40, 2003.

Meluzin, T., Zinecker, M., *Reasons for IPO Implementation: Empirical Evidence from the Polish Capital Market*, "Inzinerine Ekonomika-Engineering Economics", 25(3), pp. 294––301, 2014.

Mousa, F.-T., Wales, W. J., Harper, S. R., *When Less Is More: EO's Influence upon Funds Raised by Young Technology Firms at IPO*, "Journal of Business Research", 68(2), pp. 306–313, 2015.

Pagano, M., Panetta, F., Zingales, L., *Why Do Companies Go Public? An Empirical Analysis*, "The Journal of Finance", 53(1), pp. 27–64, 1998.

Pástor, L., Veronesi, P., *Rational IPO Waves*, "The Journal of Finance", 60(4), pp. 1713––1757, 2005.

Ritter, J. R., *The "Hot Issue" Market of 1980*, "The Journal of Business", 57(2), pp. 215–240, 1984.

Ritter, J. R., *Differences between European and American IPO Markets*, "European Financial Management", 9(4), pp. 421–434, 2003.

Ritter, J. R., Welch, I., *A Review of IPO Activity, Pricing, and Allocations*, "The Journal of Finance", 57(4), pp. 1795–1828, 2002.

Taggart, R. A., Jr., *A Model of Corporate Financing Decisions*, "The Journal of Finance", 32(5), pp. 1467–1484, 1977.

Zimmerman, M. A., *The Influence of Top Management Team Heterogeneity on the Capital Raised through an Initial Public Offering*, "Entrepreneurship Theory and Practice", 32(3), pp. 391–414, 2008.