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Master Thesis in Finance

IPO Underpricing in Eastern Europe
A study of moral hazard

Abstract

This paper sets out to investigate whether the size of IPO underpricing can be explained by moral hazard, measured by the level of investor protection. The study has been carried out in Eastern Europe during the post-communist era. In this thesis, I also examine whether the IPO underpricing differs between countries in the region and whether the degree of IPO underpricing has changed over the period. I can find no evidence that IPO underpricing is dependent on the level of investor protection. Furthermore, I find no conclusive evidence that IPO underpricing has differed between the countries in the sample examined. Instead, I find that IPO underpricing has lessened during the period examined, suggesting that factors other than moral hazard would better explain the size of IPO underpricing.

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1 Introduction

1.1 Introduction

In the last few years, the most interesting region in Europe as regards economic growth has been Central and Eastern Europe. Countries in the region have made the transition from communism to functioning democratic states and also the transition from socialist economies to market economies. After 50 years of communist rule with private enterprising banned, no operating financial markets and no financial legislation, the situation for most newly instated "democratic" governments was very difficult and the economic prospects looked bleak. Investors have found the region very interesting to invest in, but also risky, due to widespread moral hazard problems. This has largely been due to poor regulation or, in most cases, poor implementation of regulation.

This paper aims to study how firms in the region have been able to finance themselves by going public. In particular, the paper will look at how the firms have had to underprice their IPO due to the uncertain legal environment. IPO underpricing can be interpreted as being what the company has to leave on the table to entice investors to invest their money in the firm. In prior research, this has mostly been explained by information asymmetry. Information asymmetry can be divided into two major groups; moral hazard and adverse information. I will look at the problem from a moral hazard point of view, as the region has changed its financial laws and also how these are implemented during the period examined. To examine this, I will use the investor protection measure developed by La Porta et al. The adverse information angle of IPO underpricing will only be briefly touched upon, this being a chosen delimitation of the thesis.

This thesis contributes to current research by using legal factors in a quantitative study of IPOs, applying the investor protection measure developed by La Porta et al (1997) for explaining the size of IPO underpricing. Typically, papers on legal factors, including those written on legal issues in Eastern Europe, do not look especially at IPOs. Papers written on IPO underpricing generally do not look upon legal factors. Rather, they generally try to prove

the existence of underpricing and measure the size of it. Papers written about IPO underpricing have also been focused mainly on the US. Looking at other markets and especially emerging markets makes the study very interesting. Even though the paper will not compare Eastern Europe to the US, the reader can use the results from the thesis to compare with other literature.

1.2 Purpose

The main purpose of the paper will be to examine whether investor protection can explain the size of IPO underpricing. Numerous articles have shown that market capitalization is higher, creditor rights improve and liquidity is higher in markets with better investor protection. This entails that more efficient markets are achieved in the presence of better investor protection. Following this logic, better investor protection should give lower IPO underpricing, implying that in more efficient markets, firms should be able to attract investors without having to price their IPO below the current market value of the company.

The second purpose of the paper is to examine whether the size of IPO underpricing differs between the countries in the sample. It is known that investors demand a premium for investing in less developed markets, due to the country specific risk involved.

The third and final purpose of the thesis is to examine whether IPO underpricing has changed during the examined period, as the region as a whole has developed immensely.

1.3 Choice of Markets

The paper looks at IPOs in Central and Eastern Europe. The region has been delimited geographically to the west by Poland, Czech Republic, and former Yugoslavia, in the east by Russia and Ukraine, in the south by Bulgaria and in the north by the Baltic States. Former Soviet Republics in Caucasus, like Armenia and Azerbaijan, have not been included even though these countries technically could be included in the notion of Eastern Europe. Of the countries in the defined region, all where IPO activity has been found have been included. In many markets, even with numerous listings, there has not been what can be defined as any proper IPO activity. What is a suitable issue for this paper will be discussed in detail later in the paper.

Albania and Belarus have no exchanges and have therefore been immediately excluded. The Republic of Moldova has a very small exchange where no IPOs have been performed. All former Yugoslavian countries have been examined and no IPO activity has been found. In Croatia, for instance, many listings have been observed, but this is mainly due to a mandatory listing law for firms above a certain level of revenue. The final selection of countries is thus Poland, Czech Republic, Slovakia, Russia, Ukraine, Hungary, Latvia, Lithuania, Estonia, Romania and Bulgaria. Due to the size and also similarities of the markets, Latvia, Lithuania and Estonia will be treated together as the Baltic States.

2 Hypothesis and Method

2.1 Definitions

2.1.1 Definition of an IPO

An initial public offering (IPO) is defined as when a corporation's shares are first offered to public investors. This is the typical definition of the term, which will be used throughout the paper.

2.1.2 Definition of IPO Underpricing

IPO underpricing will be defined in following way: The difference between the closing price the first day of trade and the issue price of the IPO (described by Equation 2-1).

EQUATION 2-1

$$IPOUnderpricing = \frac{P_{Close} - P_{Issue}}{P_{Issue}}$$

Some researchers claim that IPO underpricing in underdeveloped markets should be estimated using the close price after the first week of trading instead of using first day closing price. The markets these researchers are referring to are markets that have volatility limits. None of the markets examined in the paper have such restrictions and therefore IPO underpricing will be estimated using the formula above.[1]

2.2 Background and proof to IPO Underpricing

As early as in the 1970s, researchers (notably Louge (1973) and Ibbotson (1975)) observed that the shares offered in an IPO tended to be underpriced. Most papers written on IPOs examine the US market, due to it being the most active market for IPOs. In later years, other markets have also been examined, including emerging markets.

[1] Ljungqvist (2005)

In the US, IPO underpricing has ranged between 10% and 20% since 1960. In the beginning of the 21st century, IPOs in the US were underpriced by an average of 40%. This period included the last year of the "IT boom" (the period is defined as the years 1998-2001).[2] During the "IT boom", researchers have calculated that in the US alone, IPOs were underpriced by more then $65 billion. This period was the biggest "hot issue market" to date, meaning that a large number of IPOs were performed during the period. Since the days of Louge and Ibbotson, a vast amount of research has been done to rationalize both the existence and size of IPO underpricing. Three main conclusions can be observed: the phenomenon is persistent over time, it occurs in all markets and the size of the underpricing has differed since the 1960s.[3] It is crucial that the reader understands that just a fundamental market miss valuation or some kind of risk premium is not able to explain a premium of 18.8%[4] or 21%[5] being given to the investor on the first day of trading.

2.3 Investor Protection and IPOs

The topics of law and finance have been closely linked by many researchers, especially how investor protection affects the interaction between markets, firms and investors. La Porta et al (1997) show that countries with better investor protection have larger financial markets, as regards both market capitalization and number of listings. These countries also saw higher interest from investors to invest in the stock market, more IPOs being performed and a more dispersed ownership of companies. Firms in countries with better investor protection also receive higher valuations compared to their assets.[6] The return from an investment, if only investor protection is considered a risk, is described in the equation below

EQUATION 2-2

$$\mathrm{Re}\,turn = p_1 * Expropriation + p_2 * ProceedsFromInvestment$$

The probability of an investor being expropriated (in case of expropriation, the proceeds are negative or at best zero) is denoted by p_1, while p_2 is the probability to receive the proceeds

[2] Ljungqvist (2005) p 1-3
[3] Ritter, J., Welch, I., 2002
[4] Ibid.
[5] Ljungqvist (2005)
[6] La Porta et al. (2002)

from the investment. Expropriation is a moral hazard problem, which includes governments seizing private property and majority owner expropriating smaller investors. This should not be confused with adverse information issues, like the management for their own gains knowingly marketing a firm to the public as better than it actually is. The combined probability of the two variables is equal to 1 ($p_1+p_2=1$). In countries with poor investor protection p_1 tends to be higher and p_2 is lower compared to more developed markets. If investors are assumed to be rational, they will not enter an investment if the expected return is negative. In the paper, the risk of being expropriated (p_1) will be measured by the Investor Protection rankings defined by La Porta et al. The components of the investor protection variables are disclosure index, extent of director liability and ease of shareholder suits index.

1. Disclosure index indicates which information has to be disclosed to the minority shareholders, i.e. does a transaction have to be mentioned in the annual report and/or which details of a transaction have to be disclosed.
2. Extent of director liability measures who, if anybody, in the board and the management is liable to pay for the damages caused by an unfruitful transaction. The measure also looks at whether the minority shareholders can void the transaction.
3. Ease of shareholder suits index measures what rights minority shareholders have when a legal process has been started. [7]

These measures are applied to a fictional transaction where one of the directors is found as a director on both sides of a transaction, both in the selling and buying firm. The fictional transaction is unfair to the assumed buying firm and the rights of the minority shareholder in the buying firm are examined. Investor protection rankings do not only include the actual laws of the country, but also how these are enforced. Pistor et al. (2000) show that investors react more to better enforcement of current laws than to the passing of new laws. The measure developed by La Porta et al. has become a standard for measuring investor protection, but has been criticized by some. Papers like Pistor et al. (2000) claim La Porta to include factors and assumptions in the investor protection measure that are not suitable for measuring investor protection in emerging markets. The critique is mostly pointed towards

[7] The World Bank (2006)

the measures including debtors, measures which will not be included in this thesis. Even with these critiques in mind, the investor protection in the paper will be measured using the method developed by La Porta et al., as this is the standard used by most researchers on the subject.

For countries where investor protection is lesser, the risk of expropriation (p_1 in formula 2-2) will be higher. To achieve a positive expected return, higher proceeds from the investment are needed. This is crucial for a rational investor to surrender their funds to the firm. For IPOs this means that in markets with poorer investor protection, the underpricing has to be greater in order to sustain interest for primary market transactions among investors. If underpricing is not sufficient, the expected return for the investor will be negative and the investor will not enter the market.

A second important framework developed by La Porta et al. used in this paper is dividing countries by legal origin using the categorization system of French, German, Anglo-Saxon and Scandinavian Origin.[8] The sample only includes countries with German and French legal origin. Explaining how these categories differ from each other is beyond the scope of this paper. As the purpose is to look at how the investor protection ranking differs between different legal origins, for the interested reader La Porta et al. (1997) is recommended. Of the categories included in the sample, countries with German legal origins provide better investor protection, also creditor and shareholders rights are better in these countries.[9]

2.4 Hypothesis

Three hypotheses will be examined in the paper:

1. IPO Underpricing lessens with better investor protection
2. IPO Underpricing differs between countries in the sample
3. IPO underpricing lessens in the later years of the period examined.

[8] La Porta et al. (1997). The difference between different legal origins has been discussed by La Porta et al. in prior papers, but La Porta et al. (1997) was the first to directly sort countries by their legal origin. It is first in La Porta et al. (2000) the Eastern European countries are included.

[9] La Porta et al (1996)

Most papers examined have shown that better investor protection leads to more efficient markets. Hence, it is assumed that better investor protection will lead to less underpricing. It is expected that underpricing will depend on which market the IPO has been made in. This hypothesis is based on the development of the markets looking at, for instance, liquidity, market capitalization, and number of listings. There is little doubt that the countries and also the markets in the sample have developed greatly during the 16 years after the transition; this has made some of the risks connected with investments in these markets lessen or disappear altogether. Consequently, it is expected that IPOs in the later periods in the sample are going to be less underpriced.

2.5 Regression Models

2.5.1 Model Specification

To examine the hypothesis, two linear regression models will be used. Linear regression models has been standard practice in previous research on the subject, including Ritter (2000). In the models used for examining the hypothesis, most of the variables are dummy variables, which by definition have a linear relationship. To fulfill the purpose of the paper and to answer the three questions posed in the hypothesis, two regression models will be used.

The following model will be used to examine the first hypothesis, stating that IPO underpricing lessens with better investor protection: [10]

EQUATION 2-3

$$IpoUnderpricing = \alpha + \beta_1 AllIP_{i,t,C} + \beta_2 AllTU_i + \beta_3 LegalOrigin_i$$
$$+\delta_1 FirmSize_i + \delta_2 Oversubscription_i + \delta_3 ADR_i + \delta_4 \Pr ivatization_i + \delta_5 InternationalBank_i$$

The following regression model will be used to test the other two hypotheses:

[10] ALLIP is the variable for Investor protection and ALLTU is the variable for the liquidity

EQUATION 2-4

$$IpoUnderpricing = \alpha + \beta_1 CountryDummies_i + \beta_2 PeriodDummies_t + \beta_3 LegalOrigin_i + \delta_1 FirmSize_i + \delta_2 Oversubscription_i + \delta_3 ADR_i + \delta_4 Privatization_i + \delta_5 IntBank_i$$

2.5.2 Explanatory variables

Variable for legal origin: As in La Porta et al. (1997), countries are categorized into German, French, Anglo-Saxon and Scandinavian origin. The variable is a dummy variable. To avoid the dummy variable trap, the variable for German legal origin will be excluded. It is expected that the variable will have positive coefficient due to countries with German legal origin to have better investor protection[11], meaning that French legal origin will lead to higher IPO underpricing. In the table below it is shown which countries are classified in to the different legal systems:

French Legal Origin	German Legal Origin
Romania	Hungary
Russia	Latvia
Lithuania	Poland
Ukraine	Czech Republic
	Bulgaria
	Slovakia

The table shows the legal origin of countries included in the samples

Variable for Investor Protection: The data for investor protection have been assembled from various sources for the different years in the sample, as no single organization or researcher has measured this for every year in the sample. The scale by which investor protection has been measured has changed over the course of the years. To be able to compare investor protection over the whole period, investor protection for each country will be compared to the US. The investor protection rankings have been compared using the formula below (due to using sub-periods, the legal ranking for a sub-period will be the average of the rankings for the years in the sub-period):

[11] La Porta et al. (1996)

EQUATION 2-5

$$Inv\Pr o_{t,C} = \frac{Inv\Pr o_{t,C}}{Inv\Pr o_{t,US}}$$

Data that directly covers the years in which most IPOs have been performed has been found only for the years 1998, 2003, 2004 and 2005. To cover all years in the sample with the investor protection measure, interpolation and extrapolation will be used. For the years prior to 1997, no rankings have been found and extrapolation techniques are used to derive the ranking for these years. Each IPO observed has been given an investor protection measure based on the country and sub-period in which the IPO was performed ($InvPro_{i,t,C}$). To avoid the problems of perfect correlation with other variables, the aggregated measure of $InvPro_{i,t,C}$ will be used, derived by the formula below. To provide evidence for the hypothesis that better investor protection leads to lower IPO underpricing, the investor protection variable has to be estimated with a negative coefficient.

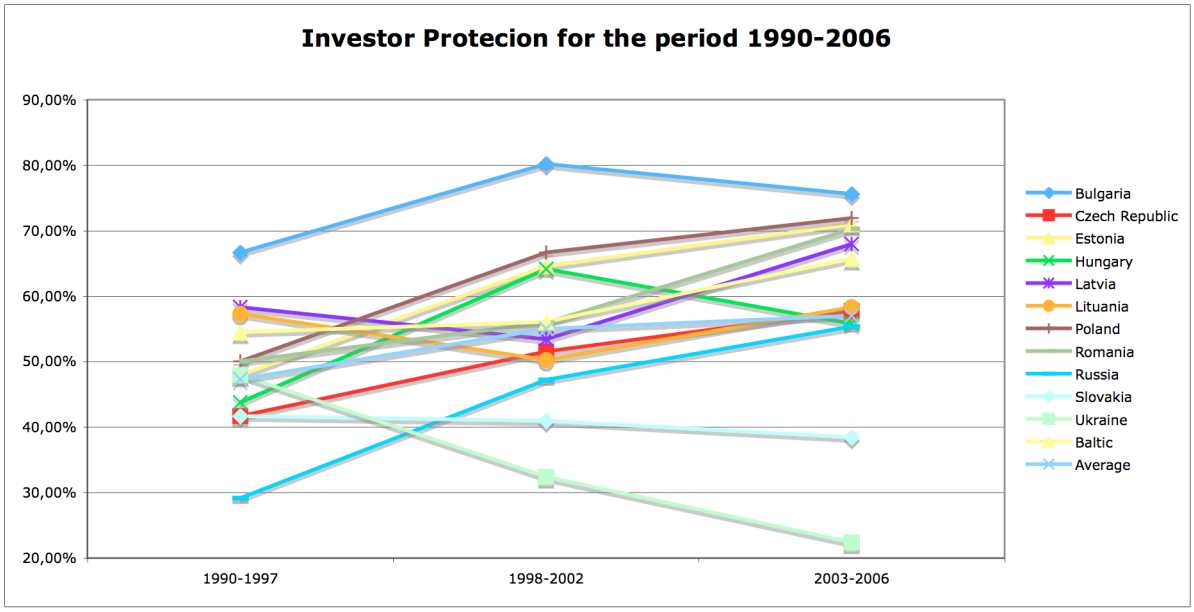
EQUATION 2-6

$$AllIP_i = \sum InvPro_{i,t,C}$$

The chart below show the legal protection in the countries in question compared to the legal protection in the US.[12]

12 $\frac{Legal\Pr otection_c}{Legalprotection_{US}}$

FIGURE 2.5-1



The figure shows the investor protection in the different countries over the whole period

The graph above shows that investor protection on average for these markets to be lower then for developed markets. The tendency over the period has been that investor protection has improved. The only two countries with lesser investor protection in the last period compared to the first are Ukraine and Slovakia.

Liquidity: Due to the critique brought forward by other researchers against the investor protection measure developed by La Porta et al., a liquidity measure will be used as a proxy for investor protection. Using liquidity as a proxy for investor protection is based on the inverse relation between investor protection and ownership concentration. La Porta et al. (1998) show that countries with poor investor protection have high ownership concentration. It can be assumed that in a market with low liquidity, free float will be low and therefore smaller investor will not be able to enter the market, which in turn leads to high ownership concentration.

The measure for liquidity used is turnover ratio, which is calculated using equation 2-7 (due to calculating with sub-periods the turnover ratio for each period will be calculated as the average of the years in the period):

EQUATION 2-7

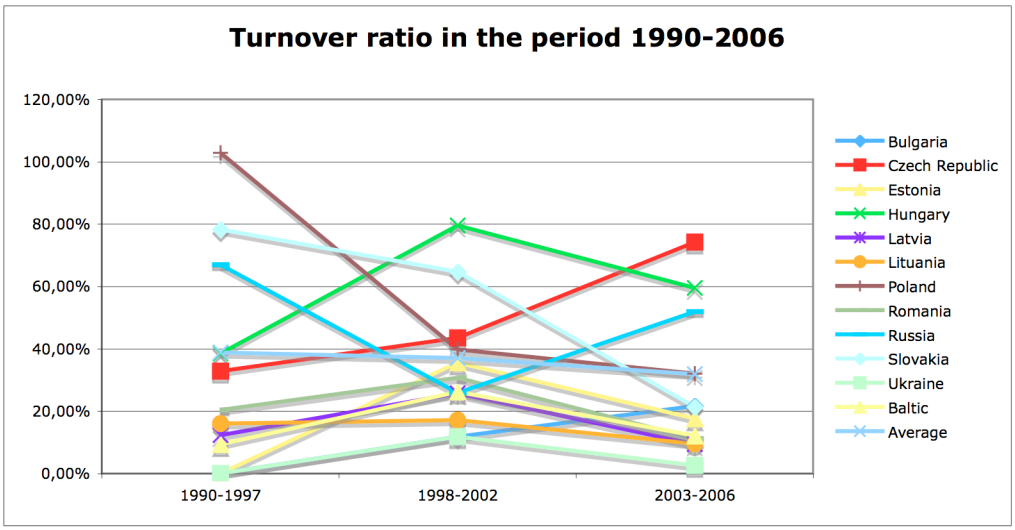
$$TurnoverRatio_{t,C} = \frac{TradingVolume_{t,C}}{MarketCapitalization_{t,C}}$$

As for the Investor Protection variable, each IPO in the sample is linked with the turnover ratio from the period and country in which the IPO was performed. In this case the aggregated measure will be used in the regression model. To provide proof for the first hypothesis stated, the coefficient needs to be estimated to be negative. That is, higher liquidity implies higher investor protection and therefore lower IPO underpricing.

EQUATION 2-8

$$\text{AllTU}_i = \sum TurnOverRatio_{i,t,C}$$

FIGURE 2.5-2



The figure shows the turnover ratio in the different countries over the whole period

Liquidity does not follow the same pattern as investor protection. On average the turnover ratio has diminished in the later periods. In many of the markets in the sample, the highest liquidity was observed when the markets opened. As the market development has progressed, the liquidity has decreased and stabilized at a lower level. The high turnover ratio in the early

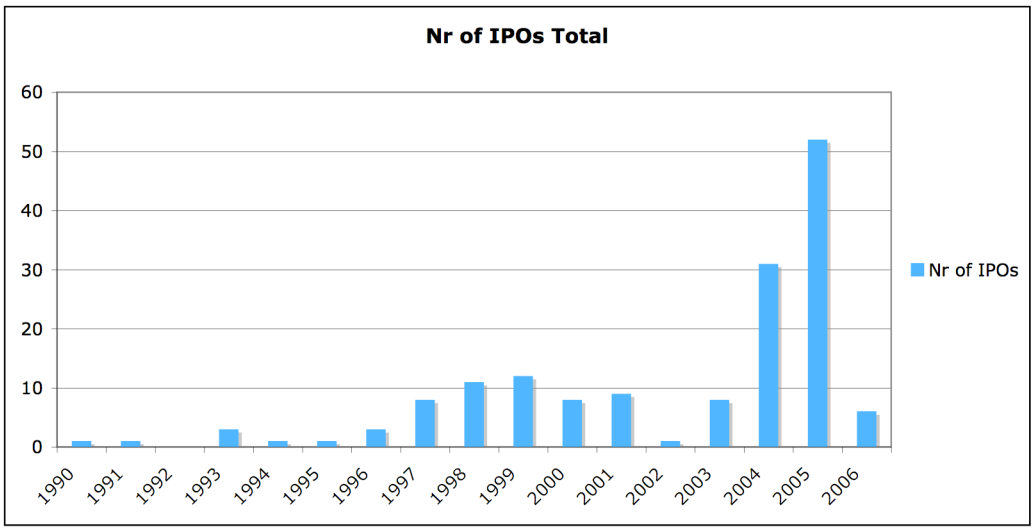
1990s can in part be explained by major ownership changes taking place, mainly state firms changed owners.

Variables for different countries (country dummies): To examine whether the country a firm origins from affects the IPO underpricing, variables have been created, dividing the IPOs in the sample by country of origin. If the coefficients are found to differ in size and sign this will provide proof for the second hypothesis that IPO underpricing differs between countries in the sample. The difference in size and sign of the coefficients will enable quantification of this difference.

The variable equals 1 when firm origins from the country in question and 0 otherwise. To avoid the dummy variable trap the variable for Poland will be excluded.

Variables for different periods: To examine the third hypothesis, the sample has been divided into three sub-periods: 1990-1997, 1998-2002 and 2003-2006 (only the first four months of 2006 have included in the sample). The sample has been divided into periods based on the number of IPOs observed in different years. Between 1990 and 1997, very few IPOs were performed per year (seen in graph 2-5.1). From 1998 onwards observing a high upswing in the number of IPOs performed. The year 2002 has been included to the second period as it is seen as the end of a cycle. The third period includes the two years when most IPOs have been performed, 2004 and 2005. To avoid the dummy variable trap, the period dummy for the sub-period 1990-1997 variable will not be included in the regression. To validate the hypothesis that underpricing lessens in later years, the coefficients of the period variables have to be found significant and negative. The coefficient of the period 2003-2006 has to be larger then the coefficient for the period 1998-2002.

FIGURE 2.5-3



The figure shows the number of IPOs done per year

2.5.3 Control Variables

Due to examining a very special region and period, local factors affecting the region during this period have been included.

ADR: The poor development and liquidity in the stock markets of Eastern and Central Europe has lead to many firms listing their shares on foreign exchanges (through ADRs/ADS/GDR). Firms in the sample choosing to list on foreign exchanges have mostly listed their shares on exchanges in London or Frankfurt. Some firms, especially Russian ones, have also chosen to list in New York. Listing on a foreign exchange leads to a firm accessing a more liquid market, a more diversified pool of investors and an easier access to funds. For the domestic exchanges, the effects are the opposite, market capitalization and liquidity is lost. The foreign exchanges typically have higher demands on firms listed than the domestic exchanges, especially concerning accounting standards and disclosure requirements.[13] The adherence to the higher listing requirements, which are typically in place to provide better investor protection, is a signal to the market that the firm is of better quality than an average firm in its home market. Putting this into the expropriation framework developed prior, by fulfilling the higher listing requirements, the risk for expropriation lessens. Hence, investors

[13] Claessens et al. (2002)

should request less premium for investing, meaning the IPO underpricing should decrease, which implies that it is expected that this coefficient will be estimated negative.

An ADR is in this paper defined as an issue first being made on a foreign exchange. In the case of the Russian firms, this condition will be relaxed, as many firms only list on a domestic exchange due to the legal requirements and shares are not actually traded. The ADR dummy equals 1 when the issue has been an ADR. I expect the underpricing to be less for firms doing their IPO on a foreign exchange.

Firm Size: Low liquidity and low capitalization on a market can also be an issue when making a larger issue, because it will be difficult for a small illiquid market to absorb a large amount of shares at once. Following simple supply and demand logic, investors' demand for shares is lower then the supply should lead to lower prices. The largest firms in the market normally make these large issues. Typically, these large issues have been state owned firms turning private. Hence, to fully subscribe a large IPO, the issue has to be more underpriced then a smaller issue. In conclusion, the firm size is positively correlated with IPO underpricing, meaning that the coefficient is expected to be positive.

Due to dealing with different countries and markets of different sizes, a relative measure will be used that makes it possible to compare across markets and time. The measure has been defined in equation 2-9:

EQUATION 2-9

$$FirmSize_i = \frac{Revenue_{i,t}}{GDP_{t,C}}$$

The measure shows the relative size of the firm compared to the whole economy of the country. If instead using market capitalization compared to total market capitalization of the exchange as the proxy for firm size, this would have been greatly biased towards large state firms from the largest markets in the sample, especially Russia.

Privatization: Privatization in Eastern Europe has been a very commonly discussed topic in the region. What has mostly been discussed is whether the governments have set prices too low. Studies done on the Polish market have shown that the underpricing of privatized firms is not higher then private firms taken public. [14] Megginson (2001) concluded in a worldwide study that the IPOs of privatized firms have been more underpriced than those of private firms.

As Megginson's study was done on a much larger sample, also including IPOs from other emerging regions around the world, the coefficient is expected to have a positive sign, implying that privatized firms are more underpriced than other firms. A privatization is defined as a firm that is brought to the market directly by the government or a government agency.

International Banks: Much research has discussed the role of the underwriter, arguing that the IPO is more underpriced because the underwriter has done a poor job of promoting the IPO. How well the underwriter has done their work is very difficult to measure. It can be argued that a well-known highly ranked international bank would be able to attract more attention to an IPO from a wider base of investors then a small domestic bank. Using an international bank as underwriter for its IPO a firm is also signaling both better quality and better investor protection to the market. The signal appears due to underwriters being repetitive players in the market and typically cannot afford to be affiliated promoting an IPO of lesser quality, which would lead to diminishing credibility amongst investor. Based on this the coefficient is expected to have a negative sign, implying that the involvement of an international bank leads to less underpricing. The International Bank variable equals one when a non-domestic bank has been involved in an issue.

Oversubscription: During the years of communism, all the exchanges in the region were closed. After opening again, the investor interest was fairly small, with trading commencing only in weekly sessions instead of daily, as is common practice on developed exchanges. In the course of collecting data it was often found that when performing an IPO, firms first

[14] Jelic and Brixton, (2003)

made available a certain number of shares. When observing that the IPO had been oversubscribed (demand for shares was higher than supply) a second tranche of the same IPO was launched before trading commenced in the first. This can be interpreted as a sign of low investor interest, and that firms first probed the investor environment before launching a full issue. An efficient way to attract investor interest and stand out from other investment alternatives was to underprice the issue and offer investors an upfront premium. Other researchers have looked at oversubscription as linked to adverse information. Most commonly known is the model put forward by Rock (1986).

Rock (1986) created the most commonly used framework for explaining IPO underpricing, based on adverse information. The model first divides investors into two groups: uninformed investors that will bid for every IPO in the market and informed investors that will only bid for profitable IPOs. This leads to uninformed investors receiving full allocation only in unprofitable IPOs, which is called the "Winner's Curse". In profitable IPOs, informed investors will also bid for the shares and uninformed investors will be crowded out. The latter situation will look like an oversubscription to an observer. Rock (1986) comes to the conclusion that all IPOs are expected to be underpriced, because it is in a company's best interest to keep all both types of investor in the primary market. It should be noted that underpricing is a loss on a firm level, but profitable on an aggregated level.

The oversubscription variable equals one when an issue is oversubscribed, meaning demand for shares have exceeded supply, measured on the first day of trading. Information for how many times each IPO has been oversubscribed has not been found. But as shown by Amihud, Hauser, and Kirsh (2003), issues are either highly oversubscribed or undersubscribed, which makes it more interesting to see only if the issue is oversubscribed, not by how much. It is expected that the coefficient will have a positive sign, meaning that IPOs that have raised high interest also are more underpriced.

2.5.4 Econometric Issues

Before starting to interpret the results of the regression, the regression models used have been controlled for the most common econometric sample issues. The dummy variable trap has been resolved by excluding one of the variables in each set of dummy variables to avoid

perfect collinearity. Among the country variables the Polish country variables will be removed and for the period dummy variables the period 1990-1997 will be removed. The removed variable in a dummy variable set is going to be the benchmark variable for the rest of the variables in the same set.

The first noticeable econometric issue observed is the large outliers, the most extreme being an underpricing of 620%, which is very far from the average of the sample and will lead to a bias towards high underpricing by raising standard deviation in the sample. This observation and four others will be filtered out from the sample in order to remove all observations more then three standard deviations from the mean; the largest underpricing used in the regression models examined will be of 105%. This will not drive the model to be biased towards large underpricing and this size of underpricing can be seen as fairly common.

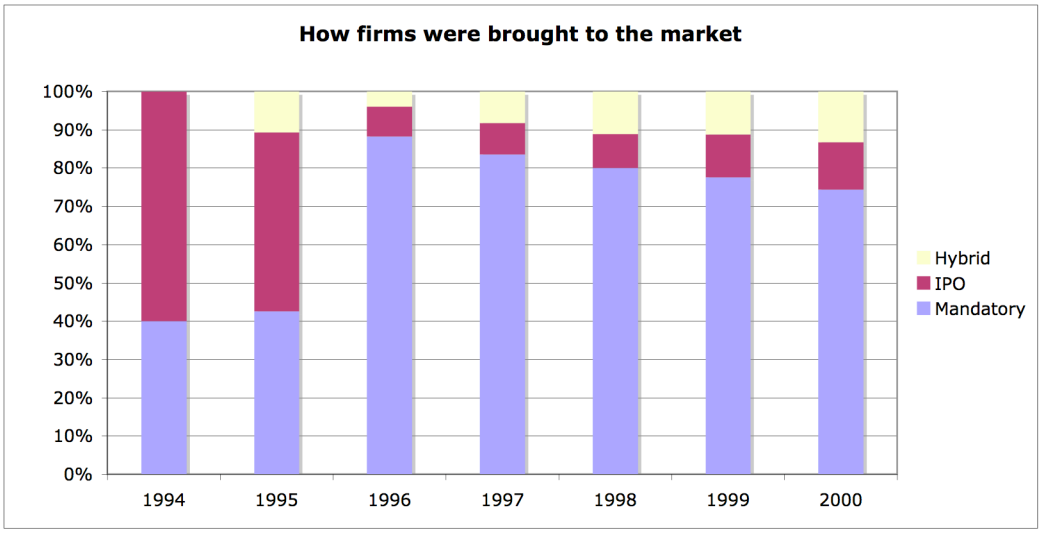
Multicollinearity is observed in the regression 2-4, especially when looking at the variable for French legal origin. The variable has a very high tolerance index, also the Russian and Romanian country variable are showing higher tolerance indexes. To mitigate this problem, the French legal origin variable is removed from the regression, as this model is used to examine the differences between the different countries and periods in the sample.

3 Data

3.1 Data Collection

In the sample, 156 IPOs from ten countries have been collected. This might seem like a small number but looking at figure 4.1-1, we can see that a very small percentage of firms are taken to the market as IPOs.

FIGURE 3.1-1



The figure shows how firms in Central and Eastern Europe were brought to the Stock Exchanges

For an issue to be included in the paper, two pieces of data are needed (from Equation 2-1): closing price for the first day and the issue price. Due to examining emerging markets, both these components have often been hard to find. Some sources of data may not note the first trading day or the issue price, much of the information have instead been found through looking at articles written regarding specific IPOs. This is also the way in which the information about oversubscription, privatization and if the issue is an ADR has been found. If the information is not found, the issue is assumed to not have the quality for which information has not been found.

Some issues have been excluded due to not having an issue price. This has been fairly common in the markets examined. A firm performs its IPO by releasing shares at an exchange and in trading selling out the shares. It could take up to a few weeks to finish

selling all the shares initially offered. Typically, the shares of the firm are sold to investors before the trading starts at a certain issue price. Another observation made when collecting the data is that many of the IPOs planed in 2002-2003 were pulled back at the last second due to poor investor interest, especially large privatizations. This is not surprising keeping in mind that this was the recession following one of the best bull markets ever observed and many firms were trying to catch the tail end of this for IPOs highly favorable market.

Many listings observed have been firms which previously have been traded on an OTC market. These listings cannot be included because they are not new issues and a market price already exits. If a sudden change in price is observed this should be attributed to a liquidity premium the shares receive by moving up into the primary list.

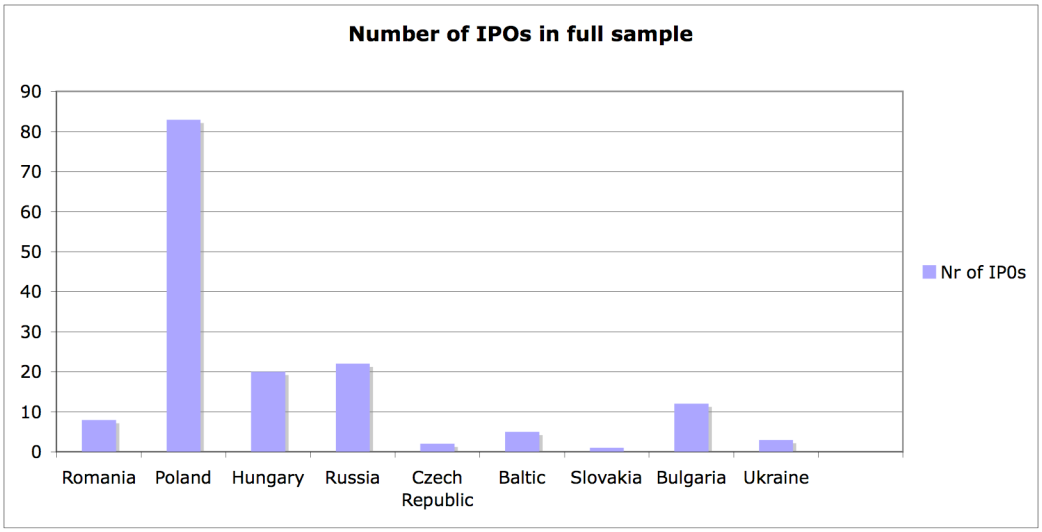
The issue price and close price have been collected using the databases Thomson DataStream Advance, Factiva and Zephyr. From these databases, information about oversubscription, privatization and international underwriters has also been collected. For Revenue and GDP data the databases Thomson DataStream Advance, Factiva and Orbis (only revenues) have been used. For some issues in the sample where the revenues have not been found, the country average has then been used. The only country in the sample seriously affected by this problem is Bulgaria. Data about on the specific exchanges as market capitalization, number of listings and liquidity has been attained from Emerging Markets Stock Market Factbook from various editions published in various years. For the Russian market also the market capitalization for the foreign listed stocks have been included as this is the standard procedure and it also better reflects the firms in the sample Most of the exchanges dealt with are and have been in a development phase; reliable market data has not easy to come by. To verify the data used typically if available it has been checked through two of the above-mentioned databases.

3.2 Description of the Sample

3.2.1 Number of IPOs per Country and Period

The sample comprises a total of 156 IPOs, of these most IPOs have been made in the Polish market. In figure 3.2-1 we can see how many IPOs have been done in each market.

FIGURE 3.2-1



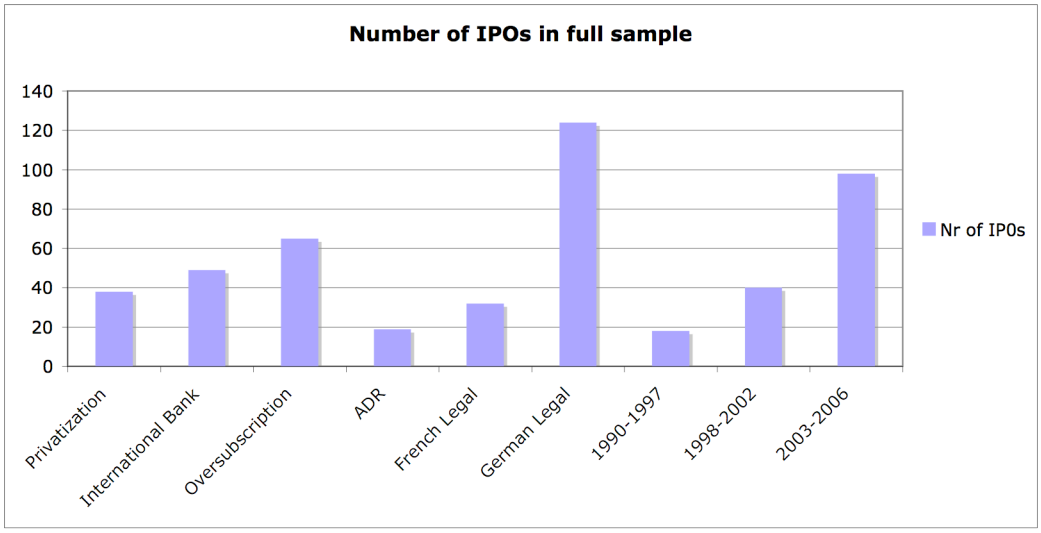
The figure shows how many IPOs have been done in each country

That most of the IPOs are conducted in Poland is not surprising, Poland being considered the most developed market in the region. Surprising is the dormant state of the Czech and Slovak markets, with these economies being considered developed and having ascended to the EU in the first wave. The explanation for this lies both in that these markets have been divided in to two separate smaller entities due to the independence of Slovakia and are by themselves fairly small. Also in these markets, to a larger extent than in others countries in the sample, large state firms have been sold to foreign investors instead of being taken public. An example of this is in the Czech Republic is selling Cesky Telecom to Telefonica in 2005[15]. Another explanation to the dormant state is tunneling, a phenomenon first brought to attention on a large scale in the Czech Republic. Many investors still associate the country with tunneling and therefore are more cautious before entering the Czech market. Tunneling is the process in which assets or value in a firm are extracted from the firm to an entity outside the balance sheet; a narrower and more commonly used definition is that a major shareholder or a manager does the extraction. Most forms of tunneling, like transfer pricing or other intra-firm transactions are usually perfectly legal. These are legal because firms can take advantage by moving profits around the firm i.e. tax[16], which benefits all shareholders. The legal forms of tunneling are usually observed in developed markets; in emerging markets

[15] Anderson R and Mulligan M, 1 April 2005, Financial Times
[16] Pohl et al. (2006)

tunneling often takes the form of fraud and theft.[17] There are two main forms of tunneling: financial and operational tunneling. Both forms of tunneling imply losses for minority shareholders or for any others then those doing the tunneling. Financial tunneling is most commonly done by freeze-outs and dilution of minor shareholders. This typically happens in markets where major shareholders can singlehandedly decide about releasing new shares or freeze out of minority shareholders. Financial tunneling is quite uncommon and also illegal in most markets. Operational tunneling is quite common even in developed markets. In developed markets, methods often used are internal pricing and managers and boards awarding themselves high salaries and bonuses, which extracts value from shareholders.[18]

FIGURE 3.2-2



The figure shows how many IPOs have been done, divided by the control variables

Legal origins have an incremental importance for the number of IPOs that done in a market, the vast majority of IPOs being done in markets of German legal origins. Only 32 of the IPOs have been done in countries with French legal origin. This result concurrs with La Porta et al. (1997) that concluded that fewer IPOs are performed in the markets of countries with French legal origin. Of the countries with French legal origin, Russian firms have bee most active on the primary market, out of these most have been ADRs. Russian firms performed 22 IPOs out of which 13 were ADRs, a remarkably low number for a economy of Russia's size. The high proportion of ADRs is explained by the weak development of the Russian financial markets,

[17] Claessens et al. (2002)
[18] Atanasov et al. (2005)

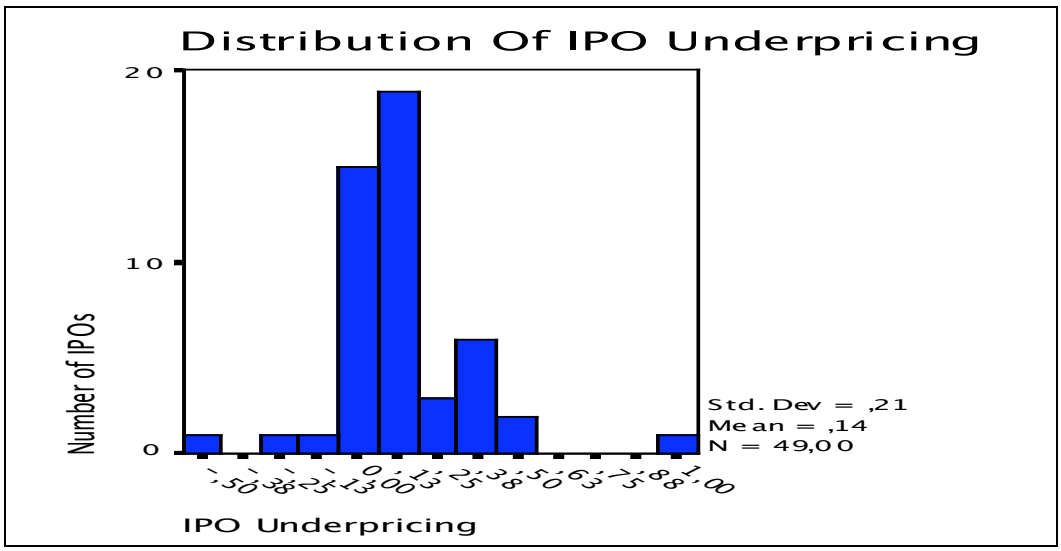
which have seen a very fragmented growth with many exchanges where none have been leading.

Only 38 IPOs in the sample were privatizations, an astonishingly low number of firms considering that private enterprise was banned before 1990. This supports the conclusion drawn by Dyck and Zingales (2005) that in countries with high private benefit extraction and high ownership concentration, fewer state owned firms would be privatized by public offering. Due this is inefficient and great value is lost in the process. Of the countries in the examined in this thesis Poland and Czech Republic were included in Dyck and Zingales study and both showed to be countries with high private benefit extraction.

3.2.2 Underpricing and Firm Size

The mean underpricing in the sample is 20.9%, ranging from -50% to 630%. The mean underpricing is about the same as has been observed on the US market by both Ljungqvist (2003) and Ritter (2001). This is not expected, as the expectation would be that emerging markets offer higher returns then developed market like the US. Looking at the distribution of the sample it is observed that 19 (12.2%) of the IPOs had negative underpricing, 9 (5.8%) had a zero return after first day of trade, 122 (78.2%) firms had an underpricing between 0 to 100% and only 6 (3.8%) were underpriced by more than 100%. This means that in 28 (17.9%) IPOs, investors made losses or no money on their investment in the first day of trade.

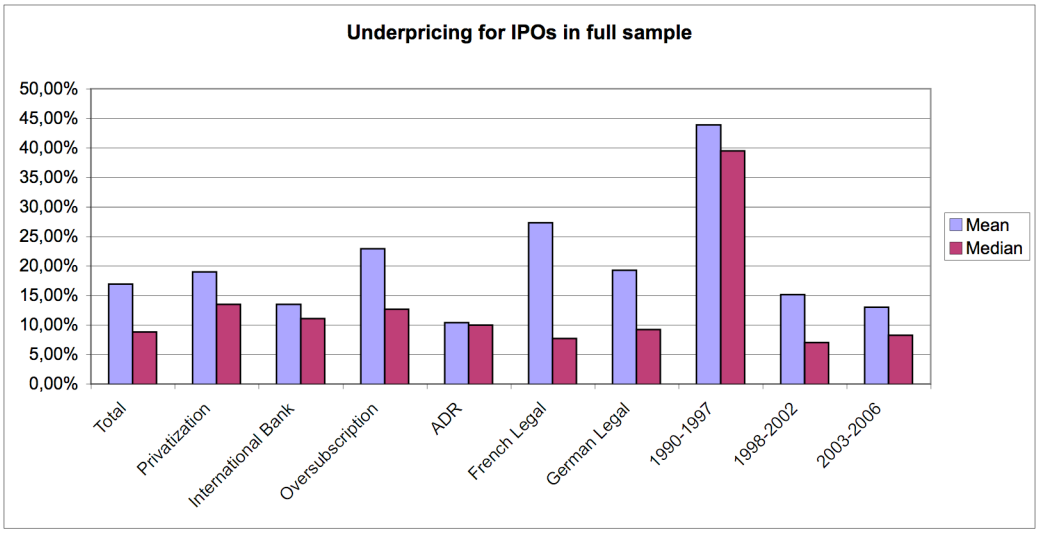
FIGURE 3.2-3



The figure shows the distribution of the IPO underpricing in the full sample (excluding the most extreme observation)

In figure 4.3-4 (with the most extreme observation of 620% underpricing being removed) we can observe the distribution of the IPO underpricing in the sample. The distribution observed is different than what was observed by Benveniste, Busaba, and Wilhelm (1996). They observed the distribution of IPO first-day returns to peak at zero and usually stay on the positive side. This was interpreted as an evidence for price stabilization occurring, which is common practice in some markets. Price stabilization means that if ever price should fall below issue price during first period of trading, the underwriter will actively try to push the price higher in the market. This can be interpreted as a money-back guarantee, where the minimum income for the investor is zero. The distribution observed for the sample in the paper can be interpreted as evidence that price stabilization has not been a common practice in the markets examined or that this has not been effective. This could also explain the lower than expected mean, as price stabilization would drive underpricing higher. The poor development of the bank systems in these countries could to some extent explain price stabilization not occurring.

FIGURE 3.2-4



The figure shows the IPO Underpricing for the full sample, divided by the control variables

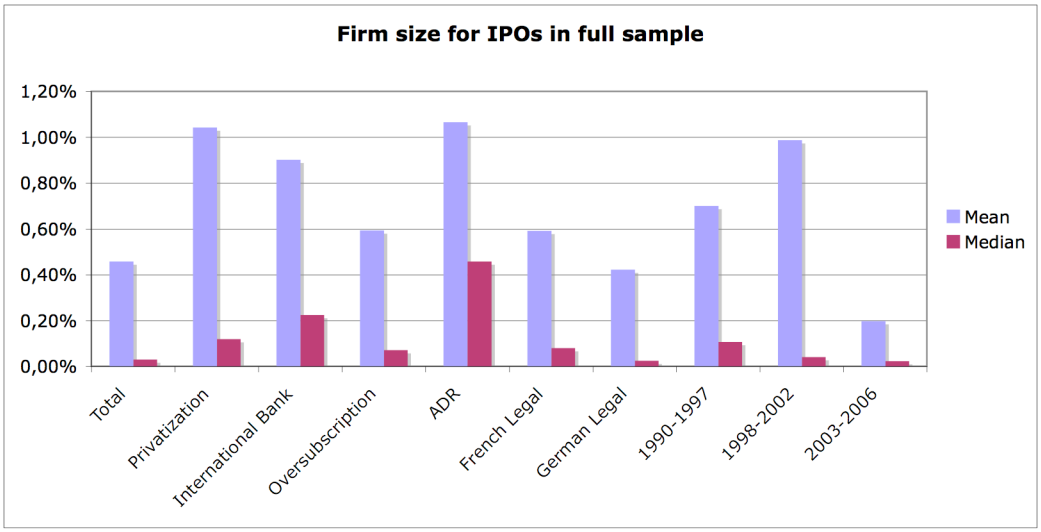
In figure 3.2-4, we can see a breakdown of the total sample into both the control variables and periods. It can be observed that IPOs that have been privatized firms, oversubscribed or have been performed in the period 1990-1997 are more underpriced than the average IPO in the sample. In the graph, a Ukrainian oversubscribed privatization with an underpricing of 635% has been excluded, as this would yield unnaturally high values for the subcategories affected. Even without the outlier, the difference between the average of the period 1990-1997 and the average of the full sample is almost 30%, suggesting a major change in the region over the last two periods.

Privatization has been a well discussed topic in the region, in the result we can see that the average underpricing for IPOs of privatized firms is higher than that of a private firms. This contradicts the results of the Jelic and Brixton study of the Polish Market[19], but agrees with Megginson (2001). Oversubscribed firms on average also have a higher underpricing. The possible explanation to this is two-fold as the firm could attract investor attention by setting the issue price lower, but it could also be that higher interest pushes the price upwards when trading commenced and therefore this interest also produces a higher underpricing.

[19] Jelic and Brixton, (2003)

Worth to note is that IPOs underwritten by a non-domestic underwriter or that have been performed as ADRs are less underpriced then an average IPO. This implies that investors need less premium when an international counterparty is involved, be this just the underwriter or that the whole issue is taken abroad. Researchers have claimed that listing on a foreign exchange is a signal from the firm that it is of better quality then an average firm; the same or a similar signal is projected to the market through the hiring of an international advisor that brings in more experience and exposure to a wider range of and more qualitative investors.

FIGURE 3.2-5

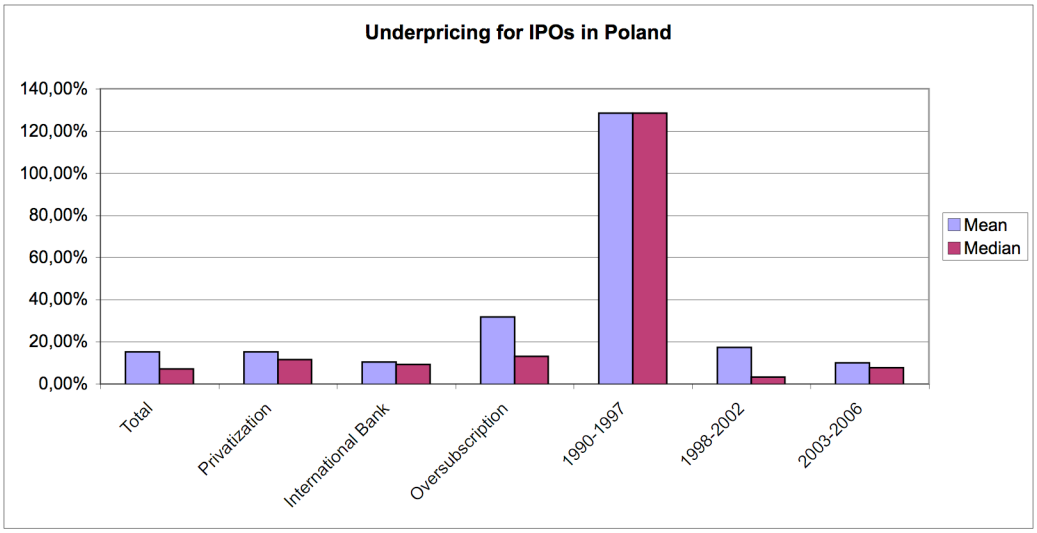


The figure shows Firm Size for IPOs in the full sample, divided into the control variables

In figure 3.2-5 we can see the size of the firms in the sample. At first glance, we observe a large difference between median and mean, which implies that very large firms are pushing the mean upwards. In this case, using the median gives a more correct analysis of the market. Firms doing ADRs are clearly the largest in the sample. This is expected, as these firms saw the need to list on a larger and more liquid exchange in order to best take advantage of the stock market. We can also observe that it is usually larger firms bringing in international underwriters, which is also expected both due to the costs associated with hiring an international bank and also the disinterest from these banks to do small transactions. Unanticipated is that firms issuing in the first period are larger than those issuing in the following periods. This may be explained by GDP falling drastically in the first year of transition in the early 1990s.

3.2.3 Poland

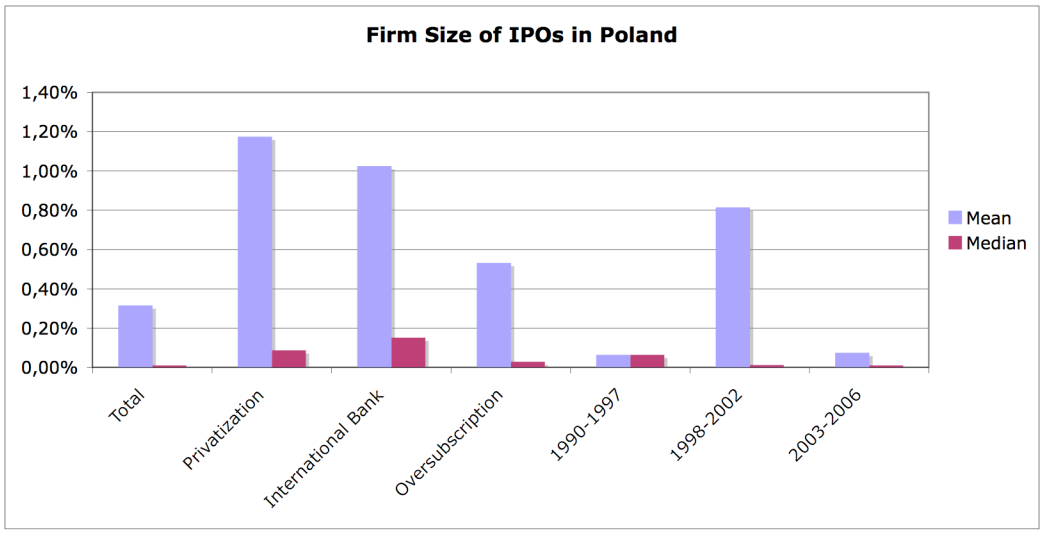
FIGURE 3.2-6



The figure shows the Underpricing for IPOs in Poland, divided by the control variables

There are 83 Polish IPOs in the sample, clearly the most amongst the countries examined. The mean underpricing is 15%, the underpricing ranging between -50% and 214%. Remarkably, IPOs in the second period are more underpriced than the average not observed in the total sample. Oversubscribed IPOs and IPOs underwritten by a non-domestic bank are more underpriced than the average, which can be seen in figure 3.2-6. That the Polish market is the most developed in the region can be seen through the fact that even with large firms in the market, no firms have chosen to debut there shares on a foreign exchange. After their IPOs, some firms have chosen to list internationally.

FIGURE 3.2-7

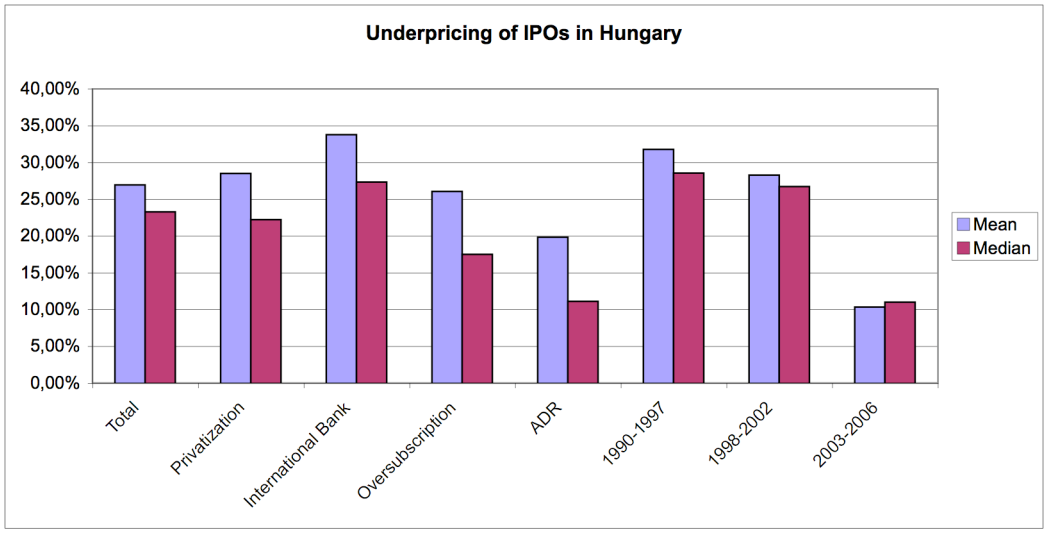


The figure shows Firm Size for IPOs in Poland, divided into the control variables

The size of the firms in Poland can be seen in figure 3.2-7, here too the median will be used for comparing the different subtypes in the sample. The largest firms in the Polish primary market have used international underwriters concurring with results observed in the total sample. Also privatized firms are much larger then the average firm performing an IPO. It is also observed here that the firms performing IPOs in the first period are relatively larger than in the later periods.

3.2.4 Hungary

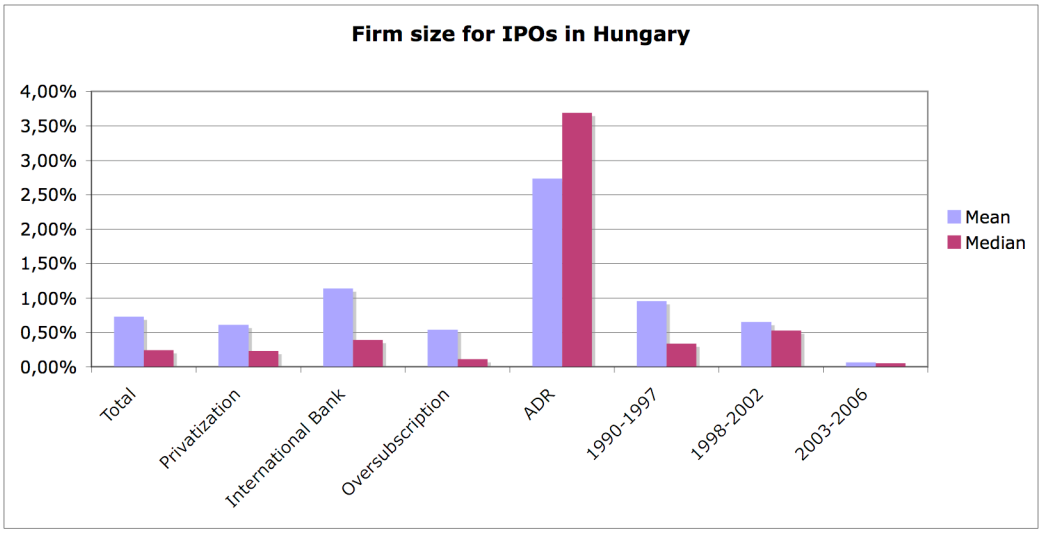
FIGURE 3.2-8



The figure shows the Underpricing for IPOs in Hungary, divided by the control variables

Hungary has the highest mean underpricing of the more developed economies in the sample. The mean underpricing is 27%, with a range from 1% to102%. Hungary is the only country examined where most IPOs have been done in the first period. Providing an explanation to the higher mean underpricing observed, as seen in the total sample, IPOs in the first period are more overpriced then in later periods. Unanticipated non-domestically underwritten IPOs are more underpriced then the average Hungarian IPO, this can be seen in figure 3.2-8.

FIGURE 3.2-9

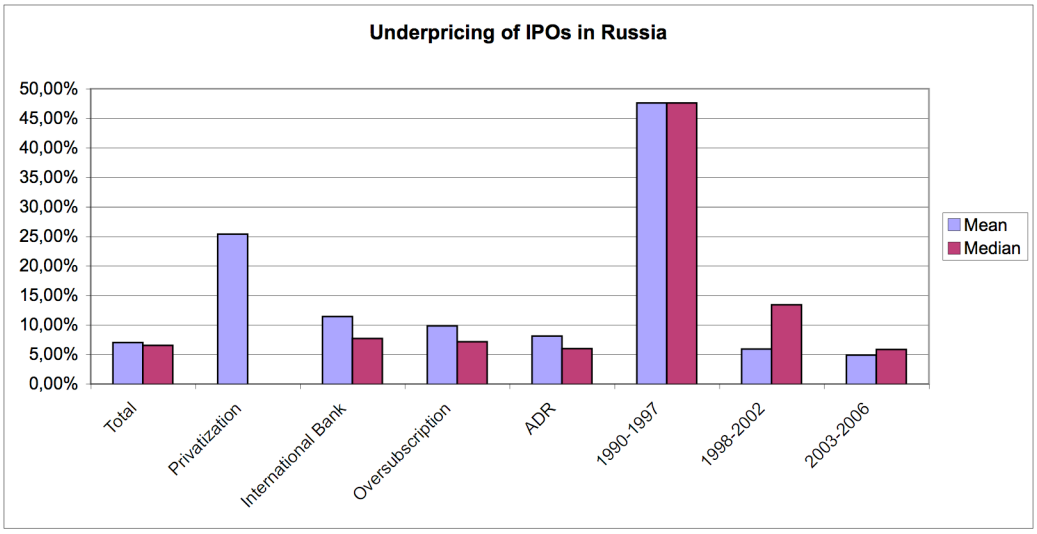


The figure shows Firm Size for IPOs in Hungary, divided into the control variables

The Hungarian firms in the sample are much larger than average also in all subcategories for the whole sample, comparing both mean and median (observed in figure 3.2-9). Most Hungarian firms performed their IPO in the first period when firms on average for the sample were larger as observed in the total sample. Remarkably, Hungarian firms performing their IPO in the second period are larger then those performed in the first period. The three Hungarian ADRs have also been of considerable size.

3.2.5 Russia

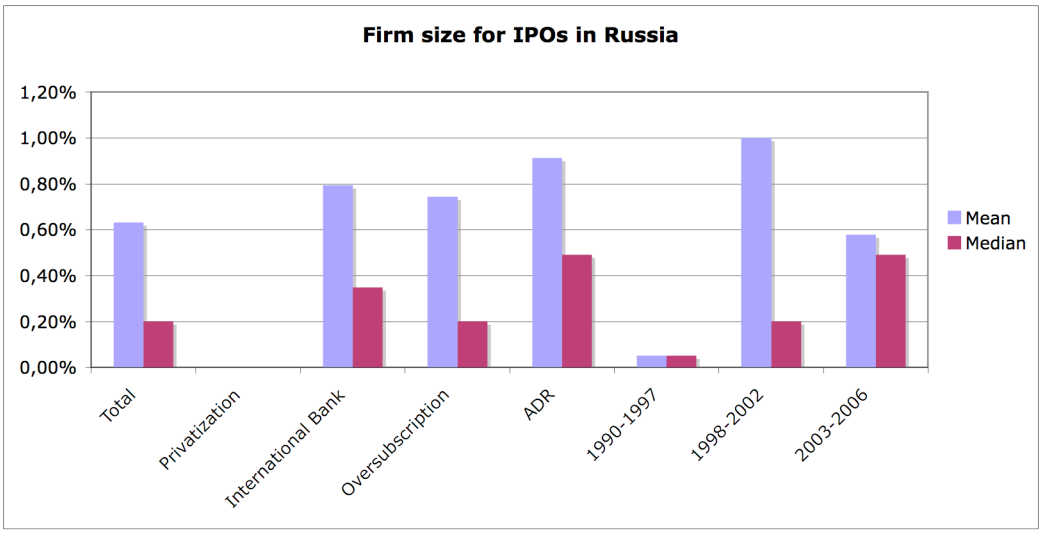
FIGURE 3.2-10



The figure shows the Underpricing for IPOs in Russia, divided by the control variables

The sample contains 22 Russian IPOs, with a mean of 7% underpricing and a range between -29% and 48%. The underpricing observed is much lower than for the average in the sample, which can be due to most of the issues being ADRs. As seen before for the total sample, these issues are less underpriced (which can be seen in figure 3.2-10). The other results as regards Russian firms are not significant due to micronumerosity.

FIGURE 3.2-11

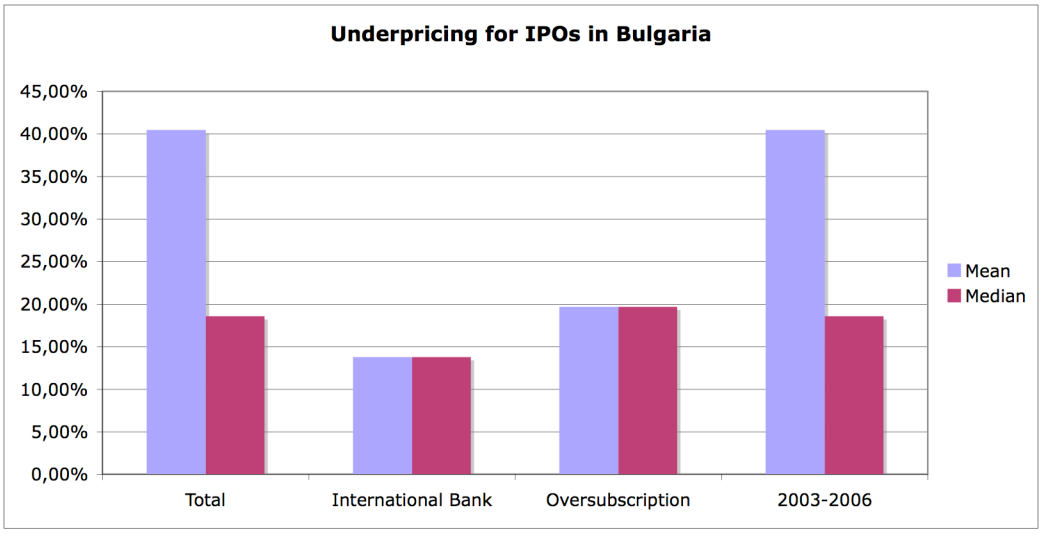


The figure shows Firm Size for IPOs in Russia, divided into the control variables

Russian firms in the sample are larger than the average in the sample, seen in figure 3.2-11. As for the whole sample, firms using international underwriters and those doing ADRs are larger than the average firms. Notable is that firms performing their IPO in the last period are larger than in the previous periods. This can be explained by most IPOs in this period being large ADR issues.

3.2.6 Bulgaria

FIGURE 3.2-12



The figure shows the Underpricing for IPOs in Bulgaria, divided by the control variables

In the sample, 12 Bulgarian IPOs are found. All of these have been done between 2003 and 2006. The mean underpricing is 40%, ranging from -7% to 220%. Both the high mean underpricing and the lack of IPOs prior to 2003 can be explained by a law issued in 2002 banning financial tunneling, i.e. freeze out of minority shareholders and dilution. To convince investors to surrender their money, if at any time their assets could be frozen out or be diluted by major shareholders, seems an almost impossible task. The law of 2002 dealt only with the financial tunneling, but still permitted operational tunneling. Permitting operational tunneling implies a higher risk for investors to not receive all of the proceeds from their investment. This higher risk of expropriation could explain why investors require larger underpricing when investing into Bulgarian IPOs[20].

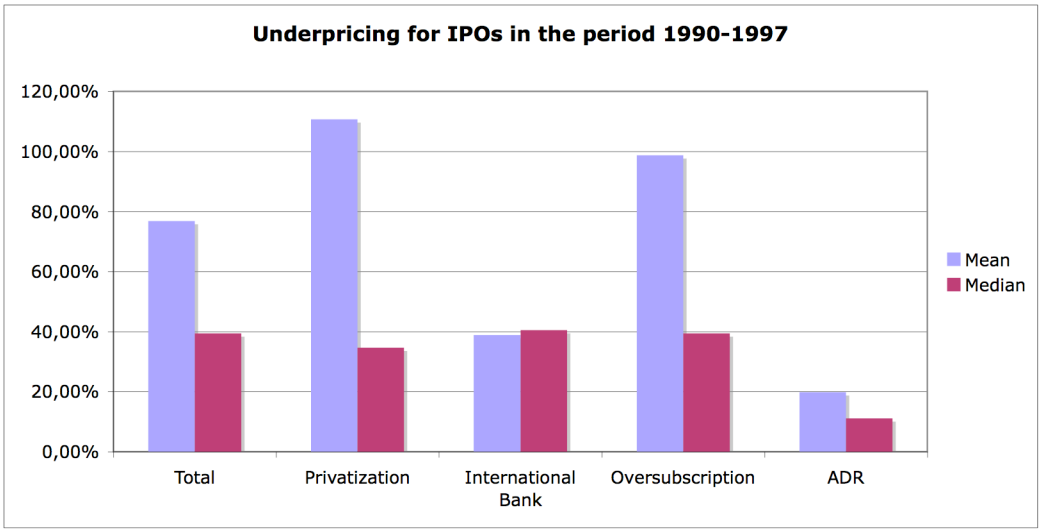
[20] Atanasov et al. (2005)

3.2.7 Smaller countries

The rest of the countries examined have seen very few IPOs and the results from these markets will be discussed in this section. Slovakia and Ukraine have the highest median underpricing, around 10%, which is somewhat higher then for the average sample. In the other countries the underpricing matched the median for the whole sample. Because very few IPOs were observed in these markets, the subtypes will not be looked at in details as for more developed markets. An interesting observation is the size of Czech firms, which are considerably larger than the average. This can be interpreted as that the entry barriers for performing an IPO in the Czech Republic being higher then in other countries, both due to firm size observed and to the low number of IPOs performed.

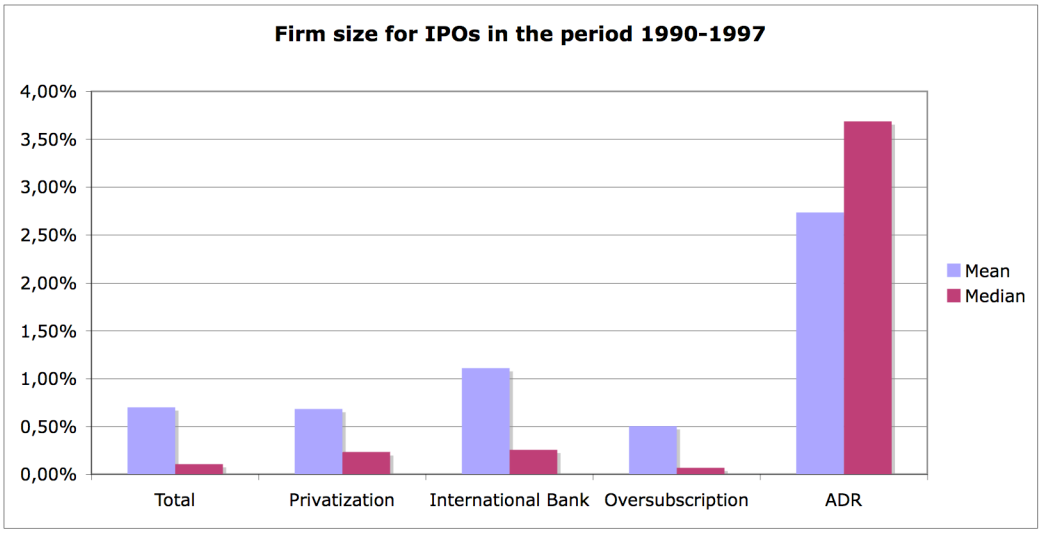
3.2.8 Periods

FIGURE 3.2-13



The figure shows the Underpricing for IPOs in the period 1990-1997, divided by the control variables

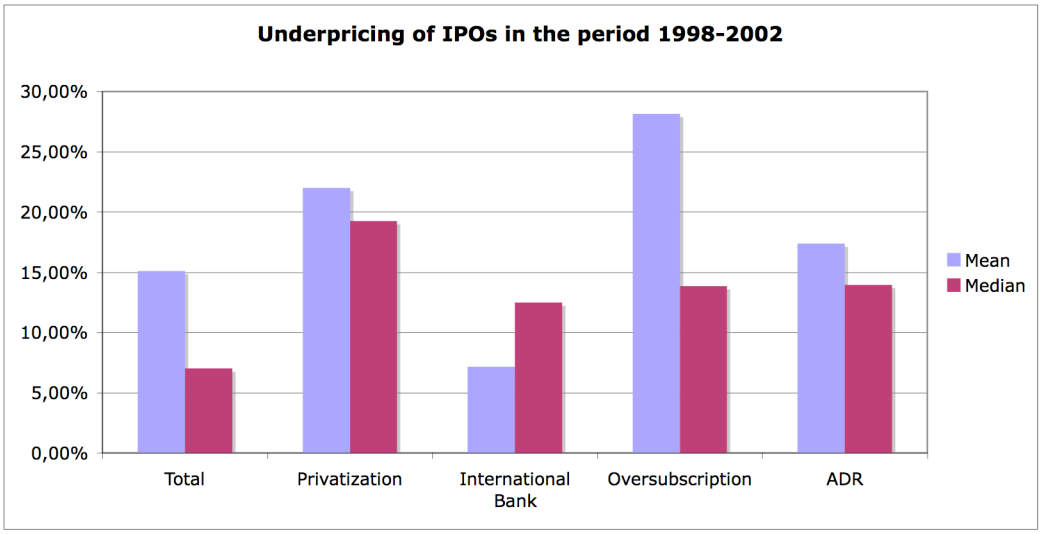
FIGURE 3.2-14



The figure shows Firm Size for IPOs in the period 1990-1997, divided into the control variables

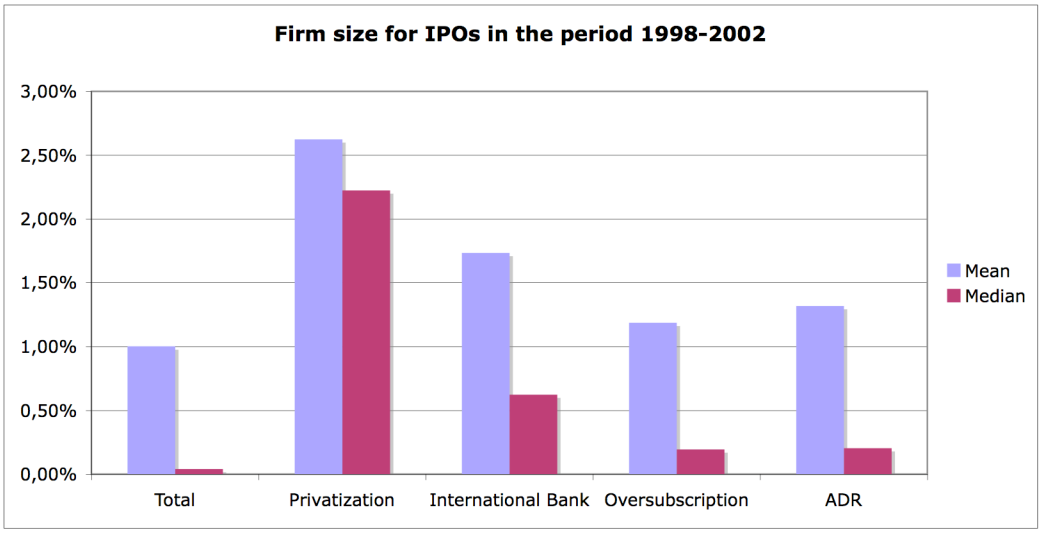
As previously concluded, the underpricing in the period 1990-1997 is higher than the average in the sample. Looking in figure 3.2-13 we observe that this higher underpricing can be seen for all the subtypes of IPOs defined, besides ADRs. The underpricing for ADRs in the period is much lower, ADR firms are also considerably larger than the average firm in the period.

FIGURE 3.2-15



The figure shows the underpricing for IPOs in the period 1990-1997, divided by the control variables

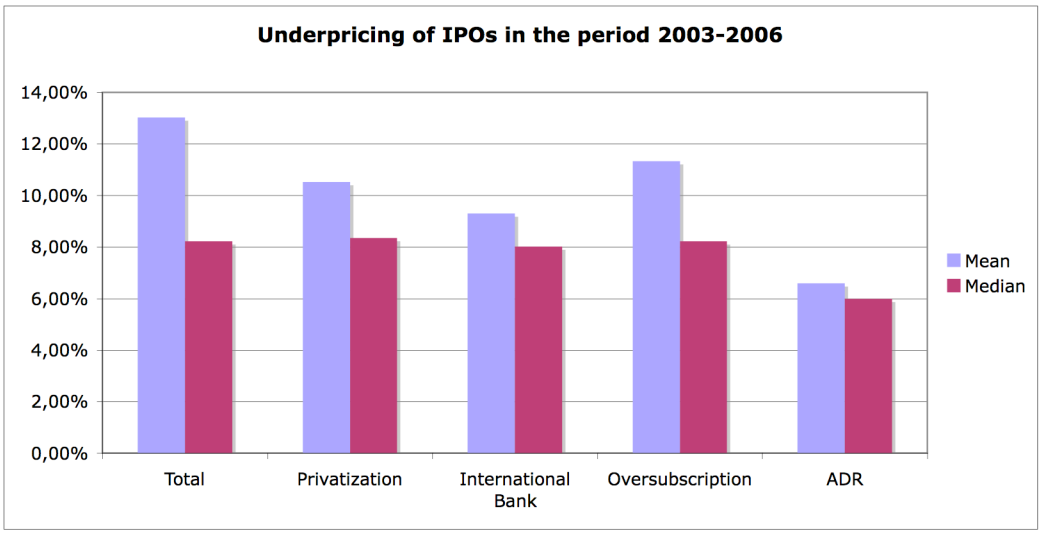
FIGURE 3.2-16



The figure shows firm size for IPOs in the period 1998-2002, divided into the control variables

The underpricing is observed in the second period is lower then in the first period. From figure 3.2-15 we see that privatization in this period were highly underpriced. Also oversubscribed and ADRs were more underpriced then the average. In the second period, the largest privatizations were performed observed in graph 3.2-16. Also observing that in this period privatizations were the most underpriced as these illiquid markets were flooded with shares from these large issues. Noteworthy is the difference in size seen between the firms listing on a non-domestic exchange and firms using an international underwriter, the first category being much larger. Because the size measure is not an absolute scale of size, this should not be interpreted, as international banks have not underwritten the largest IPOs in the region in absolute terms, which would be expected.

FIGURE 3.2-17



The figure shows the underpricing for IPOs in the period 1990-1997, divided by the control variables

FIGURE 3.2-18

The figure shows firm size for IPOs in the period 2003-2006, divided into the control variables

In the last period in the sample, the underpricing differs very little among the different subtypes of IPOs. The size of the firms in the different subtypes differs quite a lot, with ADR firms being the largest, seen in figure 22. It can be observed that the firms are much smaller in this period than in the two previous periods. The explanation can be that most of the major privatizations have already been made or have been sold to strategic investors, like most of the state-owned oil and telecom companies.

4 Results

4.1 Investor Protection and Liquidity Variables

The table below presents the regression results from equation 2-2. Starting at the top of the table low R^2 values are observed. Suggesting that the model does not explain much of the variation observed in the sample. Continuing further down in the table few estimates are found statistically significant. Three variables are found significant: the two period variables and the firm size variable. In line with expectations the signs for the periods are negative. The results conquer with the mean and median observed in the sample. The firm size variable suggests that if the firm size increases by 1%, then underpricing rises by approximately 3%.

R Square	**Adjusted R Square**		
0,185	0,127		
	Coefficients	**T-statistic**	**Significance**
(Constant)	0,235	1,504	0,135
Firmsize	2,966	2,065	0,041**
Privatization	0,033	0,836	0,405
International Bank	-0,005	-0,122	0,903
Oversubscription	0,038	1,108	0,270
ADR	-0,021	-0,315	0,753
1998-2002	-0,268	-3,573	0,000**
2003-2006	-0,212	-2,633	0,009**
French Legal Origin	-0,032	-0,602	0,548
ALLIP	0,111	0,418	0,677
ALLTU	-0,006	-0,056	0,953

The table shows the results of regression model from Equation 2-2
* Significant at 10% level
** Significant at 5% level

Both the investor protection variable and turnover ratio variable are statistically insignificant and investor protection has a positive sign, which is surprising considering at prior research. With the low significance levels, however, this result should not be considered. The legal origin variable also is deemed statistically insignificant.

As many of the variables were found statistically insignificant, a backward regression technique has been used to remove statically insignificant variables. Backward elimination is

an alternative option to a normal regression of starting with all variables in the equation, then eliminating independents one at a time until such an elimination makes a significant difference in R-squared, variables are removed from the model on the basis of a F-test. Eight regression models were estimated with one variable removed in each. In the tables below we can observe the change in R^2 value and results from the backward regression. In the final model, firm size and the two period variables are found significant, concurring with results observed before. The investor protection variable is included until model 4 removing this variable leads to a large shift in the adjusted R^2 value. This suggests that its explanatory power is higher than first suggested by the low significance level estimated in the linear regression. The French legal origin variable is in the second to last model (model 7) estimated to be highly significant, the sign for the estimated coefficient varies throughout the course of the backward regression. Results from this variable are quite inconclusive; the only conclusion drawn is that the variable has some explanatory power.

Model	R Square	Adjusted R Square
1	0,185	0,127
2	0,1850	0,1330
3	0,1850	0,1390
4	0,1840	0,1440
5	0,1810	0,1470
6	0,1770	0,1480
7	0,1700	0,1470
8	0,1550	0,1380

Model	1		2		3		4		5		6		7		8	
	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig	Beta	Sig
(Constant)	0,235	0,135	0,231	0,093*	0,228	0,091	0,206	0,089*	0,281	0,000**	0,293	0,000**	0,314	0,000*	0,308	0,000**
Firmsize	2,966	0,041**	2,968	0,040**	2,944	0,039**	2,820	0,042**	2,803	0,042	3,119	0,020**	3,216	0,016*	3,045	0,023**
Privatization	0,033	0,405	0,033	0,396	0,033	0,392	0,035	0,357	0,034	0,372						
International Bank	-0,005	0,903	-0,005	0,898												
Oversubscription	0,038	0,270	0,038	0,266	0,037	0,260	0,036	0,262	0,034	0,291	0,036	0,261				
ADR	-0,021	0,753	-0,021	0,753	-0,024	0,707										
1998-2002	-0,268	0,000**	-0,268	0,000**	-0,269	0,000**	-0,274	0,000**	-0,242	0,000**	-0,246	0,000**	-0,253	0,000**	-0,256	0,000**
2003-2006	-0,212	0,009**	-0,213	0,009**	-0,213	0,008**	-0,221	0,004**	-0,182	0,001**	-0,188	0,000**	-0,198	0,000**	-0,205	0,000**
French Legal Origin	-0,032	0,548	-0,032	0,547	-0,032	0,547	-0,036	0,483	-0,059	0,136	-0,066	0,090*	-0,060	0,117		
ALLIP	0,111	0,677	0,115	0,658	0,119	0,643	0,161	0,485								
ALLTU	**-0,006**	**0,955**														

The table shows the results of the backward regression.
* Significant at 10% level
** Significant at 5% level

4.2 Country and Period Variables

The table below presents the results from regression 2-3. The same pattern as in the in regression 2-2 can be observed: low R^2 value and few significant estimates. Five variables have been estimated significant; the Bulgarian country variable, both period variables, the firm size variable and the intercept. The period and firm size variable are highly significant; the results suggesting that underpricing is lower in the later periods in the sample and that larger firms are more underpriced. In accordance with the results from regression 2-2, both size and signs of the significant coefficients are in concurrence. The results suggest Bulgarian IPOs are performing 15.7% better in first day trading compared to Polish IPOs (this being the benchmark variable).

R Square	**Adjusted R Square**		
.225	.139		
	Coefficients	**T-statistic**	**Significance**
(Constant)	0,1785	3,429	.001**
Firm Size	0,6097	1,914	.058*
Privatization	4.447E-02	1,089	.278
International Bank	-4.259E-03	-0,100	.920
Oversubscription	5.279E-02	1,490	.139
ADR	-5.521E-02	-0,742	.459
1998-2002	-.231	-3,134	.002**
2003-2006	-.187	-2,600	.010**
Romania	-4.007E-02	-0,566	.573
Hungary	2.054E-02	0,310	.757
Russia	-1.742E-02	-0,282	.779
Czech Republic	-6.361E-02	-0,450	.653
Baltic	3.909E-03	0,043	.966
Slovakia	8.968E-02	0,440	.660
Ukraine	9.333E-02	0,608	.544
Bulgaria	.157	2,472	.015**

The table shows the results of regression model from Equation 4-7
* Significant at 10% level
** Significant at 5% level

5 Discussion

5.1 Low R^2 Values

The results from both regression models estimated show very low R^2 and adjusted R^2 values, in the range of 0.2. From an econometric point of view this means that the explanatory variables explain only a small percentage of the variance in the sample. The most common cause for this is model misspecification. One explanation to model misspecification is that the variables included have a relationship that is not linear. This is an explanation that in this case seems very unlikely, as most of the variables are dummy variables and most prior researchers have also used linear model. A more plausible explanation of the misspecification is exclusion of explanatory variables. As this paper's purpose is to investigate the effect of investor protection on the size of IPO underpricing, other explanations have not been included. Another possible reason for such low R^2 values, not to be neglected, is the stochastic quality that IPO underpricing might have. It could be difficult near impossible to model IPO underpricing, as many of these returns may be stochastic movements and not systematical movements dictated by market conditions. This could explain why not one explanation has been found for the underpricing, and instead multiple explanations have been found for different aspects of the phenomenon.

5.2 Investor Protection

Results from the regression show that investor protection cannot explain the size of IPO underpricing. The investor protection measure developed by La Porta et al. has been criticized by Pistor (2000) to cover aspects not relevant for emerging markets such as the markets in Eastern Europe. Assuming the critics to be right, the results from the regression can be seen as inconclusive. As the measure used is not the true measure of investor protection in the region. In light of this it seems very peculiar that Bulgaria has the highest investor protection ranking of the countries in the sample, although the country permitted financial tunneling until 2002. The components included in the investor protection measure seem to not include intra-company illegal transactions. These types of transactions have caused much loss to shareholder wealth in this region. Not including these transactions adds

an unnatural “inflation” to legal rankings in countries with problems due to tunneling or other intra-company transaction decreasing shareholder wealth.

The results from the period variables show that underpricing has decreased during the latter period, which implies that other changes in the region have had a larger impact on IPO underpricing. An important change is that the region has become more politically stable in recent years, with many of the states joining the EU. The macroeconomic conditions have also improved as GDP and international funds allocated to the region have increased dramatically. International institutional investors, i.e. large pension funds, have also become increasingly interested in the region, which has lead to an improvement in market conditions.

Results of the period variables also show that IPOs in the second period are less underpriced then those in the third period. The period from 2003 onwards was a clear hot issue period. International studies have shown that IPOs performed in the hot issue period have been more underpriced, i.e. during 1998-2001 the average underpricing was 40%.[21] This explains why IPOs are less underpriced in the second period, which was much less of a hot issue period then the third period.

The results from the backward regression suggest that legal origin better can explain the size of underpricing then investor protection. The results are inconclusive and it is not possible to say what affect the legal origin has over IPO underpricing. The range of the coefficient is +/- 0.5%, which implies that the difference between different legal origins is negligible.

5.3 Country of Origin

The results show that IPOs performed by Bulgarian firms are underpriced by an average of 15.7%. This is explained to some extent by that the country did not have anti-tunneling laws before 2002 and even then it just banned banning financial tunneling. Allowing operational tunneling may lead to investors demanding an extra premium compensating for the loss involved with tunneling.

[21] Ljungkvist

All other country variables have been found to be insignificant, which could be explained by the following reasons:

1. **Micronumerosity:** In some of the countries only one or a few IPOs have been done, which makes it nearly impossible to achieve statistically significant results even if there is in fact a difference. This means that even with the few significant results, the hypothesis that there is a difference between the countries cannot be rejected.
2. **Investors treating their investment on a firm-by-firm basis:** Instead of looking on a country basis, evaluating political risk for each country. Investors appraise the risk of expropriation of each firm apart, explained by both tunneling problems and soft budget constraints being more firm then country specific problems. Even if these problems plagued the whole economy, some firms in particular were most affected. This is not a moral hazard issue, but instead an adverse information problem. As each individual firm knows how its finances actually look but the investors do not have this information, leading to information advantages for the firm.

The most astonishing result among the country variables is Hungary. The mean and the median of the Hungarian market were much higher then observed in the full sample. Micronumerosity is not an issue, with over 20 IPOs done in the Hungarian market, while only 12 in Bulgaria that showed significant results.

5.4 Control Variables

The results from the included control variables showed that larger firms are more underpriced than small firms. This can be attributed to liquidity factors on the local exchanges as it is more likely for large firms to make large issues and supply of shares then become larger then the demand for shares. The results of the firm size variable is contradicted by that both ADR and Privatization were found insignificant. The largest firms in the sample are firms that have performed their IPOs on non-domestic markets or are privatized firms. This could be explained by statistical reasons as there is a firm size variable for each IPO while few firms have performed ADRs or been privatized, even if a difference exits the sample could be too

small to detect it. This makes the results from the firm size variable difficult to interpret, in any other way then that large firms are more underpriced.

It is surprising that all other control variables are estimated insignificant. Examining both the mean and median it is expected that oversubscribed and privatized IPOs should be more underpriced and that ADRs should be less underpriced. An explanation could be that the full sample is too small and small differences will not be picked up in a quantitative study.

6 Conclusion

The main purpose of the paper has been to examine whether moral hazard factors measured by investor protection can explain the size of the IPO underpricing. Evidence for investor protection having a significant effect has not been found. A weak link was found between legal origin and IPO underpricing, suggesting that French legal origin leads to higher underpricing. Whether this result is sample or region specific cannot be said due to not having found other studies looking at IPO underpricing in this context.

The second stated hypothesis was to examine whether the country of origin has significance for the size for the underpricing, which also proved to be not be a significant explanatory factor. By looking at the mean and median underpricing, a clear difference between the underpricing in different countries could be observed, but this was proven to not be statistically significant.

The third purpose was to investigate whether the underpricing had changed with time. It was shown that the later two periods had lower underpricing then the first period. This shows that the general economic and politic development in the region during the period has affected the underpricing and also that the improvements in legal factors have not been the most important development concerning IPO underpricing.

The overall conclusion is that moral hazard measured by investor protection does not explain IPO underpricing. Instead, explanations about adverse information seem more plausible and models like the one developed by Rock (1986) are more likely to explain IPO underpricing. This is explained by the fact that many of the problems investors face when investing in emerging markets are firm specific, not country specific. Also, explanations relating to economic psychology could be interesting in these markets as herd mentality is often observed and panic spreads extremely quickly in bad periods.

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