Hopp, Christian; Dreher, Axel

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DO DIFFERENCES IN INSTITUTIONAL AND LEGAL ENVIRONMENTS EXPLAIN CROSS-COUNTRY VARIATIONS IN IPO UNDERPRICING?

CHRISTIAN HOPP
AXEL DREHER

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DO DIFFERENCES IN INSTITUTIONAL AND LEGAL ENVIRONMENTS EXPLAIN CROSS-COUNTRY VARIATIONS IN IPO UNDERPRICING?

Abstract

We empirically analyze the determinants of Initial Public Offering (IPO) underpricing using panel data for 29 countries over the period 1988-2005. Our hypotheses stress the importance of institutional and legal factors in explaining cross-country variations. We find that increased protection of shareholders and greater accounting transparency contribute negatively to variations in underpricing. When more information is available price discovery is facilitated, allowing for more effective corporate governance. Moreover, when equity markets perform well, investors anticipate companies and investment banks to time the market and require higher underpricing in return. Overall, we conclude that better investor protection and better institutional environments reduce the perceived risk of investing, and attenuate the problem of asymmetric information, thereby causing lower underpricing across countries.

JEL Code: G15, H2, G1.

Keywords: IPO underpricing, institutions, legal infrastructure, panel data.

Christian Hopp
University of Konstanz
Department of Economics
Chair of International Finance
Box D 147, Room F 256
78457 Konstanz
Germany
Christian.Hopp@uni-konstanz.de

Axel Dreher
ETH Zurich
KOF Swiss Economic Institute
Weinbergstr. 35
8092 Zurich
Switzerland
mail@axel-dreher.de

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1. Introduction

One form of raising capital is selling a company's shares on capital markets – i.e., going public. Going public is generally done through Initial Public Offering (IPO) where shares are sold to investors, usually at a price below those prevailing on the first day of trading (see Ibbotson (1975) for early evidence). As Ritter (2003) shows for a multitude of countries, underpricing is a phenomenon prevailing in almost all equity markets and, according to Ljungqvist (2006), pricing discounts vary to a huge extent over time. There are widespread theoretical arguments along with a multitude of empirical papers explaining the existence of underpricing in equity markets in various countries. Yet, evidence on the reasons for the changes in underpricing over time and especially across countries remains scarce.

As Sapienza et al. (1996) point out, there is a range of economic, legal, institutional and cultural differences influencing the environment in which corporate financing takes place. Building upon a dataset of 29 countries over the period 1988-2005 we analyze whether and to what extent these differences explain variations in IPO underpricing in our sample across countries and over time. The dataset includes the number of IPOs along with the corresponding aggregated level of underpricing on a yearly basis. The countries comprise nearly all established and developing financial markets ranging from Western Europe, to Asia, and the Americas.

We extend the literature on IPO underpricing and contribute to the growing literature on "law and finance" showing how legal and institutional environments affect equity markets. In a nutshell, our analysis supports some earlier single-country-studies showing that increased protection of shareholders and greater accounting transparency contributes negatively to variations in underpricing. According to our results, problems of asymmetric information can be resolved when countries enforce disclosure. Moreover, larger dispersion of "good" and "bad" governance among firms within a country fortifies the risks faced by outside investors. Additionally, our results suggest that countries characterized by more excessive compensation packages face greater agency problems and, respectively, higher levels of IPO underpricing.

The paper shows that the availability of information is one of the key determinants in resource allocation, while the quality of information plays a crucial role in reducing information asymmetries. As managerial self-interests and information asymmetries can increase external financing costs, we argue that better information can make corporate governance more efficient. Consequently, lower levels of underpricing are observed in countries with legal and institutional environments that allow for more efficient corporate governance through more informative stock prices.

With respect to shareholder protection we find that underpricing is higher when majority shareholders have more leeway to repress minority owners. Moreover, we find evidence that the availability of public information affects the observed level of IPO underpricing, consistent with the Winner's Curse model: Higher market returns prior to an IPO can attenuate the Winner's Curse and induce underwriters to price issues more conservatively to increase the chances of success (Rock (1986); Leite (2007)). Consequently, we document a positive impact of the market return (and the number of IPOs) on the corresponding level of IPO underpricing. When equity markets perform well, investors anticipate that companies and investment banks try to time the market when going public. Consequently, they require higher underpricing in return. Overall, we conclude that more effective legal systems and institutional environments attenuate the problem of asymmetric information, causing lower underpricing across countries. Arguably, guidance from policy makers can facilitate private contractual arrangements and improvements in the overall legal and institutional environment could reduce informational barriers in financial markets.

We proceed as follows. The next section provides some background on the causes of IPO underpricing. Section three elaborates on the factors that might contribute to the cross-country variations in underpricing and develops our hypotheses. The fourth section describes the data and method of estimation; in the fifth section we present the results of our analysis, while we discuss extensions in section six. The final section concludes.

2. Causes for IPO Underpricing

Underpricing relates to the fact that shares traded publicly for the first time substantially jump in price on the first trading day. Thus, investors are willing to pay higher prices for shares when trading begins than investors paid for their share allocation from the investment bank that accompanied the prospective IPO. As substantial amounts of money are left on the table when personal shares are sold too low and the prices for retained shares are diluted, underpricing is costly to firm owners (Ljungqvist (2006)). The academic literature points out several reasons for the prevailing existence of underpricing in capital markets. According to Ljungqvist (2006), IPO underpricing can in general be attributed to asymmetric information, institutional factors, control considerations and behavioral aspects. Ritter (1984) argues that underpricing is related to the ex ante uncertainty about the future value of a firm going public. Hence, the level of underpricing can be regarded as a compensation for the risk bearing of investors.

Models of asymmetric information assume that one of the involved parties during the process of taking a firm public is more informed than others thereby causing the underpricing of shares. Underpricing signaling models such as in Allen and Faulhaber (1989) assume that the issuer is better informed about the firm value than the investor. Welch (1989) argues that the issuer possesses more information about the true value of the company than potential investors thereby causing higher underpricing in equilibrium as a signal. This way, floated firms underprice their initial public offerings in order to ensure better terms for a secondary offering. Underpricing is used to signal firm quality and high-quality firms can make up for the money left on the table initially during a seasoned equity offering in the future. In contrast, Rock (1986) assumes that some investors typically have better information and can avoid participation in overvalued IPOs. Uninformed investors get more shares in overvalued IPOs leaving them worse off than informed investors. This Winner's Curse has to be offset by intentional underpricing in order to induce incentives for uninformed investors to continue participating in the IPO market. Leite (2007) generalizes Rock´s model and shows how market returns (or public information in general) can attenuate the Winner's Curse and induce underwriters to price issues more conservatively to increase the chances of success. Hence, he suggests that IPO returns should be positively influenced by recent market returns. Benveniste and Spindt (1989) argue that book-building allocations can be a mechanism that induces investors to report their information truthfully. Investors submitting reserved bids only receive a small number of shares, which deters them from misrepresenting information. Likewise, more aggressive investors cause the offer price to rise. Benveniste and Spindt show that in order to ensure truth telling and to meet the incentive compatibility constraint, underwriters have to commit to a certain amount of underpricing.

Benveniste et al. (2003) explain the occurrence of waves within the IPO market with underwriters' capacity to bundle IPOs over time by establishing networks of regular investors. Investors are compensated for the costs of generating information across a sequence of public offerings. Therefore, they argue, investment banks tend to specialize in industries, and companies tend to go public in industry specific waves. Ritter (2003) sets forth that due to the large fluctuations over time in the number of firms floated, market timing considerations seem to be more important than life-cycle considerations in determining when a firm goes public.

Ljungqvist (2006) emphasizes that information asymmetries cause the existence of underpricing while institutional factors affect the level/extent of underpricing. The notion that corporate insiders can ascertain actions to the detriment of ordinary investors is well established in the literature. As a response, the premium for outside investor rises

substantially to induce market participation (Daouk et al. (2007)). Correspondingly, IPO underpricing (as a form of pricing inefficiency) should be higher in countries where outside investors face more severe information disadvantages. Information frictions such as agency conflicts between investors and the issuing company/investment bank have a first order effect on underpricing. Owed to the fact that going public represents a wealth transfer from the IPO company to investors there exists a problem of rent seeking behavior that can induce shirking and side payments. These private benefits might also affect the size of the underpricing. Moreover, underpricing related gains accrue to institutional investors at the expense of uninformed retail investors. Under certain circumstances investors might even hold back favorable information in order to decrease the offering price and to benefit privately from price increases in the aftermath of the IPO. Ljungqvist and Wilhem (2003) document that with more discretion over the IPO allocation process, underwriters are giving shares away to people in the adjacency of the issuing firm. Lower levels of competition could induce underwriters to collude with issuing firms and existing shareholders such as venture capital providers during the course of the issuing procedures. Due to side payments, issuing firms are more willing to underprice their issues when compensated on secondary accounts for leaving money on the table. This way, the issuing firm loses money that executives gain on their personal accounts.

Moreover, there is a growing body of literature showing how the protection of shareholders (by the government and the regulatory body) impacts the effectiveness of corporate governance. Ibbotson (1975) argues that companies going public rely on underpricing in order to avoid future lawsuits from shareholders about possibly misrepresented information or too glorious future outlooks. Hughes and Thakor (1992) point out that intentional underpricing might serve as an insurance against such litigations. Ritter (2003) finds differences between European and American IPO markets with respect to the use of class action lawsuits. With the pending threat of taking firms to court for misrepresented information the incentives for corporate fraud and insider trading are reduced. Van der Goot (2003) and Keloharju (1993) present opposing results for the Netherlands and Finland, respectively. While legal risk is argued to be a cause for the observation that more reputable underwriters are more reluctant to take riskier firms public in the Netherlands this cannot be confirmed with Finnish firms where lawsuits are rare.

The environments in which the IPOs take place could therefore play a non-negligible role in determining the risk associated with investing in publicly traded stocks. Better environments for corporate governance enable firms to access capital markets on better terms.

Improvements in the governance of capital markets can lead to more efficient market pricing and correspondingly to lower costs of capital and lower IPO underpricing (Daouk et al. (2007)). La Porta et al. (1998) point out that rights granted to shareholders also depend on the legal rules of the jurisdiction in which a company operates and the corresponding shares are issued. They find evidence for differences in shareholder protection and the quality of law enforcement. La Porta et al. (2002) present evidence that securities laws matter for capital market development. According to their findings financial markets do not prosper based on market forces alone but rather need guidance from policy makers in order to facilitate private contractual arrangements. In this respect, the overall legal and institutional environments might have an impact on informational barriers in financial markets and could affect the extent to which underpricing might differ between countries.

While there is widespread empirical support with respect to the causes of IPO underpricing within specific countries, empirical evidence on the factors causing the level of underpricing to vary across countries and time remains scarce. In the following we will therefore elaborate on the factors that are likely to contribute to those variations in underpricing.

3. Determinants of Cross Country Variations in IPO Underpricing

3.1. Equity Capital Markets and IPO Pricing Mechanisms

Beck et al. (2004) analyze the important obstacles firms face in obtaining external capital. Their results stress the importance of capital market development on relieving financing constraints. Subrahmanyam and Titman (1999) argue that when stock markets are relatively small, information conveyed through stock prices is less accurate, which generally decreases the advantages of pending for public capital. As the stock market grows, however, the accuracy of information generally improves, yielding greater incentives for going public decisions. Benefits for firms are therefore larger in more liquid and developed capital markets. In general, more developed financial markets should facilitate the recycling of informed capital and encourage technological spill-overs. Michelacci and Suarez (2004) evince that in developed stock markets the flotation costs associated with raising outside equity should generally be lower and after market liquidity be higher, resulting in lower underpricing as a compensation for investors.

In addition, Jagannathan and Sherman (2006) point out the importance of pricing mechanisms used in order to explain differences in IPO underpricing across countries. They analyze the use of different IPO pricing mechanisms in various countries and find that among

the countries that formerly used IPO auctions virtually all have abandoned the method. They argue that uniform and discriminatory auctions suffer from large fluctuations in the number of auction participants. Moreover, the free rider problem and the Winner's Curse make price discovery more difficult. As a consequence, this might contribute to inaccurate pricing. In addition, fees do not differ substantially between the different methods. With respect to the level of underpricing, Jagannathan and Sherman find that underpricing in fixed price auctions tends to be larger than underpricing under the auction or book building method. Their results are in line with Loughran et al. (1994) who show that the use of fixed price mechanisms induces a higher level of underpricing. Ritter (2003) argues that the use of book building gives underwriters discretion over the actual allocation of shares. Moreover, he points out that in the US underwriters were more and more relying on favourable analysts' recommendations with an increase of IPO valuations during the 90s resulting in a detrimental effect for the industry's competitiveness. The reduced competition increased underpricing as underwriters profited from allocating "hot" IPOs in return for commission business offered by investors.

In the following we will therefore test for the impact of financial market development on the extent of IPO underpricing, controlling for the going public mechanisms used. We derive the following hypothesis:

> **Hypothesis 1:** Greater development of equity capital markets reduces the perceived risk of investing in IPO and decreases the magnitude of IPO underpricing.

3.2. Efficiency of Banking Regulation

The institutional framework in which corporate financing takes place is likely to affect the efficiency of the capital raising process. The services offered by financial intermediaries and the structure of financial systems can impact the internal conflicts financial institutions are subject to. In general, floating companies to the market is done through the use of underwriters who take an intermediary role between the stock issuing company and potential new investors. In this respect underwriters advise the issuing firms on the pricing of the IPO. If underwriters receive a gratuity from issuers (the gross spread) and investors, instead of only receiving the gross spread, there is an incentive to recommend a lower offer price.

Moreover, if commission business can be generated in return for "leaving money on the table" underwriters can have an incentive to underprice new issues (Loughran and Ritter (2004)). Loughran and Ritter argue that during the dot.com bubble issuers placed more weight on future insider sales than on pure IPO proceeds. Hoberg (2003) shows that with increasing

market power of the underwriter more underpricing will occur in equilibrium. In addition, Loughran and Ritter (2004) point out that the magnitude of underpricing can be a function of increased incentives for side-payments. During the 90s underwriters were setting up personal brokerage accounts for Venture Capital providers and executives of issuing firms in order to allocate shares to them (a method also known as "Spinning"). This way, the banks sought to influence the issuer's choice of lead underwriters. However, Loughran and Ritter (2004) also argue that increased regulatory scrutiny has reduced the use of spinning substantially after the dot.com bubble burst.

Barth et al. (2004) provide insights into the competing views on government influences on the banking system. While the helping hand view sees governments as vital in screening entry and regulating the industry, the grabbing hand view stresses the negative impacts of government influences caused by corruption and economic inefficiency. Beck et al. (2003) examine the impact of banking supervision on the financing obstacles faced by corporations across countries. They find that firms in countries with strong official supervisory agencies that directly monitor banks tend to face greater financing obstacles. Moreover, powerful official supervision tends to increase firm reliance on special connections and corruption in raising external finance. Creating a supervisory agency that is independent of the government mitigates the adverse consequences of powerful supervision. Stronger financial institutions and more established banking supervision could contribute to lowering the costs of asymmetric information.

Rajan (1992) and Holmstrom and Tirole (1997) acknowledge the monitoring role of financial intermediaries in order to resolve the asymmetric information problems faced by outside investors. The role of underwriters and auditors in revealing information about the value of a firm going public plays a decisive role in the extent of IPO underpricing. Moreover, reductions in informational asymmetries can be achieved through the use of more reputable underwriters and/or auditors (Carter and Manaster (1990), Titman and Trueman (1986)). More experienced banks that are more active in the IPO market can obtain investors' cooperation more easily than less active underwriters, due to higher reputation (Ljungqvist (2006). Regulation and supervision could therefore help to lower the asymmetric information problem by controlling banks more closely. The trustworthier the information generated, the less pronounced would be the extent of observed underpricing. As banks perform the role as lead underwriters, and potentially market makers in the aftermath of the going public decision, we include information about the efficiency and stability of the banking system to

generate insights into the effects of the financial system on the extent of IPO underpricing. We derive the following hypothesis from these considerations:

> **Hypothesis 2:** More effective monitoring and regulatory oversight of banks reduces the level of asymmetric information between investors and issuers and therefore results in lower underpricing.

3.3. Accounting Transparency

The availability of information for investors is one of the key determinants in resource allocation and high-quality information plays a crucial role in reducing information asymmetries and mitigating potential agency conflicts (Bushman et al. (2004)). Inefficient capital budgeting could stem from costly external financing (driven by information asymmetries between managers and investors) or managers pursuing their self-interest instead of maximizing value (caused by a lack of efficient corporate governance). Grossman and Stiglitz (1980) conjecture that lower costs of private information should lead to more informative stock prices and disclosure therefore attenuates information and transaction costs. Durnev et al. (2004) set forth that corporate capital investments should become more efficient when stock prices are more informative and find evidence that more firm-specific variation in stock prices leads to more efficient capital budgeting decisions. More informative stock prices therefore convey more meaningful signals about the quality of managerial decisions, which facilitates the oversight of such decisions and makes corporate governance more effective. Additionally, Core et al. (1999) find evidence that firms with weaker governance structures exhibit more severe agency problems. Less efficient corporate governance structures lead to more excessive executive pay thereby causing firms to perform worse in terms of future operating and stock market performance.

In line with the argumentation in Durnev et al. (2004) we would expect that greater accounting transparency leads to more firm specific variation in stock prices and therefore more informative stock prices. As more informative stock prices should allow for more efficient governance of managerial decisions, we would expect agency conflicts to be soothed. Consequently, more information available about firms pending for outside equity reduces information asymmetries and one should observe lower levels of IPO underpricing to compensate outside investors. We therefore hypothesize:

Hypothesis 3: Greater corporate transparency and financial disclosure reduces information asymmetries and causes lower underpricing to compensate investors.

3.4. Legal Origin and Financial Institutions

Recent evidence suggests a strong effect of investor protection on the development of financial markets. More protective investment environments make investors more willing to invest and lead to higher firm valuations. La Porta et al. (2002) document that investors are willing to pay more for financial assets when being better protected by the legal system. Shleifer and Wolfenzon (2002) analyze the impact of investor protection on the going public decision. They show that firms would be larger, more valuable, and more plentiful, dividends would be higher (and diversion of profits lower), ownership concentration would be lower, and stock markets would be more developed in countries with better protection of shareholders.

Rights granted to shareholders also depend on the legal rules of the jurisdiction in which a company operates and the corresponding shares are issued. La Porta et al. (1998) find evidence for differences in shareholder protection and the quality of law enforcement. The results show that common-law countries have the strongest legal protection of investors, while French civil law countries have the weakest. Moreover, they find that small, diversified shareholders play a negligible role in countries with low shareholder protection. Shareholder rights become critical when managers abuse their information and power for their own interest.

Beck et al. (2001) point out that a country's legal origin helps to explain the development of its financial institutions. Legal systems differ in their ability to facilitate private exchanges and to support new financial and commercial transactions. A country cannot change its legal origin, but can, however, reform its judicial system by emphasizing the rights of outside investors, by providing more certain and efficient contract enforcement, and by creating a legal system that adapts more readily to changing economic conditions (Caprio et al. (2004)). For a given level of investor protection the incentives to adopt better governance mechanisms at a company level are an increasing function of the country’s economic and financial development. Better governance mechanisms enable firms to access capital markets on better terms (Doidge et al. (2004)). This is of utmost importance for firms with valuable growth opportunities that cannot be financed internally. However, corporate governance interacts with the overall constitution of law enforcement and investor protection.

Good corporate governance mechanisms on the firm level are rendered obsolete in countries with poor economic development and poor investor protection.

Given the systematic differences in the structure of legal systems and their corresponding enforcement we analyze how these differences might impact the level of underpricing in the countries under investigation. Hence, we formulate the following hypothesis:

> **Hypothesis 4:** More effective investor protection reduces the costs of information disadvantages and results in lower underpricing granted to investors.

4. Data and Method

4.1. Cross Country Variations in IPO Activity and Underpricing

Our dataset includes more than 500 country-year observations from 29 countries over the period 1988-2005. Owed to the fact that some of the data are not available for all countries in every year our panel data are unbalanced and the number of observations depends on the choice of explanatory variables. We aggregated the levels of IPO underpricing over all issues for each country within each year. Our dependent variable is the annual median level of IPO underpricing in percent for each country in the dataset. IPO underpricing is calculated as the difference between the offering price of publicly sold shares to investors and the price at which the same shares trade subsequently in the stock market. Our IPO data arise from various sources, shown in Appendix C.

Table 1 summarizes the total number of IPOs and the corresponding average and median level of underpricing over the period 1989-2005. Moreover, we report the maximum and minimum levels of underpricing. As can be seen, IPOs are underpriced in almost all countries. The table also shows that the number of companies going public varies widely across countries.

One can infer that especially the US with almost 6,600 IPOs over the period 1988-2005, the UK and China with around 800 and Japan with almost 1,200 IPOs are among the most active countries. According to the table, India shows the highest degree of underpricing, with an average first day trading return of almost 70%, followed by Malaysia with 56%. On the other end of the scale, countries with very low levels of underpricing are Taiwan and Austria. Based on the numbers presented in table 1, one can observe that countries substantially vary in the number of IPOs over the period 1988-2005 and, more importantly, in the average/median levels of underpricing. Due to the large dispersion in returns within a

given year we base our analysis on the median rather than the average level of underpricing. We included the maximum and minimum level of underpricing based on the median underpricing per year for each country. While countries like Japan, New Zealand and Malaysia show three-digit maximum percentage returns on the first day of trading, the UK, Austria, and Belgium, e.g., only report one-digit first day returns as the maximum per year. Apparently, first day returns are subject to large fluctuations over time and countries.

Table 1: Cross Country Variation of IPOs and IPO Underpricing

Country	(1) Number of IPOs	(2) Average Underpricing	(3) Median Underpricing	(4) Max. Underpricing	(5) Min. Underpricing	(6) Variation in IPO activity	(7) Variation in Underpricing
Australia	185	18.99%	15.68%	89.67%	-1.18%	9.44	23.00%
Austria	34	2.45%	-0.04%	6.34%	-18.71%	1.08	6.00%
Belgium	46	9.86%	4.69%	9.48%	2.17%	4.46	2.00%
Canada	684	34.19%	9.07%	18.00%	1.33%	28.84	6.00%
China	856	16.73%				62.19	
Denmark	33	11.74%	8.05%	16.31%	-2.74%	2.12	7.00%
Finland	44	14.06%	1.77%	20.58%	-13.42%	3.50	8.00%
France	462	12.25%	4.90%	15.50%	0.00%	27.21	4.00%
Germany	513	37.83%	14.59%	33.00%	-3.50%	43.44	8.00%
Greece	341	37.50%				14.81	
Hong Kong, China	343	6.77%	14.60%	40.72%	-1.31%	10.38	13.00%
India	168	66.06%	18.88%	39.00%	9.00%	21.45	10.00%
Indonesia	125	6.14%	8.70%	45.72%	-8.00%	8.55	15.00%
Ireland	6	9.78%	9.78%	22.86%	-0.44%	0.49	10.00%
Italy	183	14.88%	5.14%	59.80%	-3.71%	10.44	15.00%
Japan	1178	18.71%	33.03%	102.28%	2.82%	51.69	32.00%
Korea, Rep.	167	33.96%	39.70%	93.99%	0.00%	9.72	25.00%
Malaysia	182	56.24%	63.98%	137.47%	-12.07%	10.13	50.00%
Netherlands	88	13.96%	7.13%	21.85%	-4.32%	5.72	7.00%
New Zealand	30	11.96%	13.07%	135.12%	-24.00%	1.86	40.00%
Norway	81	10.40%	7.42%	53.85%	-7.42%	5.34	17.00%
Philippines	44	11.90%	15.63%	75.66%	-17.94%	3.32	23.00%
Portugal	14	17.59%	17.77%	28.71%	1.78%	1.31	11.00%
Singapore	178	10.52%	19.97%	75.06%	-19.60%	11.72	27.00%
Spain	75	14.66%	12.90%	18.90%	-9.45%	3.75	8.00%
Sweden	183	17.83%	9.30%	72.20%	-0.37%	10.46	18.00%
Switzerland	57	17.32%	8.33%	50.93%	-2.31%	4.16	14.00%
Taiwan	444	3.99%	2.41%	18.64%	-14.21%	27.19	9.00%
Thailand	196	14.81%	25.85%	62.67%	-23.33%	10.21	25.00%
United Kingdom	838	13.92%	7.81%	20.42%	2.61%	42.65	5.00%
United States	6554	22.06%	20.19%	72.05%	7.29%	226.27	15.00%

Notes: Table 1 reports the cross-country variations in IPO underpricing along with the overall number of IPOs during the period of investigation. Column 1 presents the total number of IPOs included in the dataset. Column 2 and 3 present the weighted average and weighted median level of underpricing, respectively. The yearly percentage returns are weighted by the corresponding number of IPOs in the given year to arrive at the number shown. Columns 6 and 7 show the standard deviation of the yearly number of IPOs and the corresponding variation in returns per country, respectively. In addition, columns 4 and 5 show the maximum and minimum yearly returns (based on the aggregated median levels).

4.2. Method of Estimation

In the following we analyze which factors contribute to the observable difference in IPO underpricing across countries and time.

Our equations take the following form:

$$under_{it} = \alpha + \mathrm{B}X_{it} + \eta_t + \varepsilon_{it} \ , \qquad (1)$$

where $under_{it}$ represents IPO underpricing, $\boldsymbol{X}_{it}$ is the vector of variables testing for our hypotheses, η_t are fixed period effects, while ε_{it} is the disturbance. As the hausman test favours the random effects specification over fixed effects – our models shown below include random effects. We also tested for serial correlation in the residuals, which does not seem to be an issue here.

The data for this study are drawn from a wide range of sources. Appendix A lists all variables with the exact sources and definitions, while table 2 reports descriptive statistics.

In our basic equation we control for general country characteristics, which are not directly attributable to one of the hypotheses but rather proxy for the overall state of a country's development. Our basic equation includes a country's average yearly market rate of return (based on log monthly returns), obtained from the MSCI Indices to control for previous stock market development that could impact market timing considerations for issuers in line with the "hot markets" phenomenon or the Winner's Curse model (Ljungqvist (2006)). The model also includes annual GDP growth, along with a variable indicating whether a program by the International Monetary Fund (IMF) has been in place for the corresponding country in a given year for at least 5 months. The GDP growth variable controls for the overall economic development that could potentially influence a country's attractiveness from the investors' perspective. The IMF variable controls for the economic environment – countries under IMF arrangements usually experience economic crises – and external pressure on economic policy. In addition, we also include the number of IPOs in a given year that enters the regression in natural logarithm. Initially, we also controlled for countries' regional and geographical characteristics, population growth, GDP per capita and the rate of unemployment. However, as these variables turned out to be completely insignificant, we do not include them in our base model. We test the stability of our results to the inclusion of these variables below.

Table 2: Descriptive Statistics

Variable	Mean	Minimum	Maximum	Std. Dev.
Access to equity	5.50	4.24	6.43	0.67
Accounting	73.41	56.00	85.00	7.28
Auction, dummy	0.32	0.00	1.00	0.47
Block premia	0.07	-0.01	0.38	0.09
Blocking of shares, dummy	0.59	0.00	1.00	0.49
Book bulding, dummy	0.87	0.00	1.00	0.34
Burden of proof	0.52	0.00	1.00	0.28
Civil law, dummy	0.68	0.00	1.00	0.47
Class action suit, dummy	0.43	0.00	1.00	0.50
Corporate profit tax	0.29	0.00	0.54	0.14
Corruption	9.08	3.00	12.00	2.43
Credit Regulation	8.08	5.46	9.90	0.96
Criminal sanctions, index	0.54	0.00	1.00	0.28
Deposit insurance scheme, dummy	0.86	0.00	1.00	0.35
Disclosure requirements	0.67	0.25	1.00	13.88
Economic growth	3.48	-7.36	12.26	2.91
Financial Supervisor, dummy	0.35	0.00	1.00	0.48
Fixed price, dummy	1	0	1	0.38
Foreign bank assets	0.09	0.00	0.33	0.10
Foreign-owned banks/total banks	0.24	0.02	0.62	0.16
Governance	81.40	65.58	100.00	11.43
Government stability	8.33	1.00	11.08	1.80
IMF program, dummy	0.05	0.00	1.00	0.23
Influence of the supervisor	0.63	0.00	1.00	0.48
Insider trading exists, dummy	4.89	2.90	6.20	0.81
Management stays during restructuring, dummy	0.31	0.00	1.00	0.46
Market Return	0.07	-0.73	1.08	0.28
Max. ownership restriction, dummy	0.29	0.00	1.00	0.46
New antidirectors index	3.02	0.00	5.00	1.28
Number of IPOs (log)	1.98	0	5.12	1.31
One share-one vote, dummy	0.19	0.00	1.00	0.39
Oppressed minority, dummy	0.46	0.00	1.00	0.50
Ownership concentration	0.41	0.18	0.58	0.13
R&D Disclosure	87.87	87.87	100.00	16.09
Registered American Dep. Rec.	8.19	0.00	41.00	10.04
Relative banking activity	6.55	1.37	29.96	6.08
S&P governance rating	55.66	27.21	75.70	10.83
Security business restrictions	1.51	1.00	3.00	0.58
Security of property rights	7.89	2.40	9.60	1.33
StDev S&P governance rating	10.55	3.24	35.11	6.44
Stock market total/GDP	0.72	0.06	3.11	0.56
Stock market traded/GDP	0.74	0.00	5.28	0.69
Stock Market Turnover	0.72	0.08	3.77	0.56
Votes to call ext. meeting	0.09	0.03	0.20	0.05
Year since insider trading is legal	1983	1966	1994	9.12

We classify all additional variables in groups that can be allocated to our four hypotheses introduced above. As a first step, we add all variables of one group to the basic equation and follow a general-to-specific approach to identify the most important determinants of underpricing. Clearly, general-to-specific regressions including all variables would be preferable. However – given the degrees of freedom available and the unbalanced nature of our sample – such procedure is infeasible. We test for the influence of omitted variable bias in further specifications and in our robustness analysis below. Specifically, we include the variables corresponding to the hypotheses formulated above and then delete that variable with the lowest level of significance. With the remaining variables, this procedure is repeated until all coefficients are significant at the 10 percent level at least. In a second step, we check whether any of the previously deleted variables would render significant when added again. These significant variables are step by step included. The two steps are repeated until a final model converges. Our next step consists in deriving a final model by combining the variables from the four equations and again following the general-to-specific procedure.[1]

4.3. Hypotheses and Explanatory Variables used

Hypothesis 1 expects the stage of development of equity capital markets to affect the level of IPO underpricing. To test this hypothesis we employ stock market capitalization to GDP and stock market value traded to GDP (both taken from Beck et al. (1999)). The stock market capitalization measures are used to proxy for the general stage of development of equity capital markets within a country. The more established capital markets are as a source of financing, the less risky the investment should be for individual and institutional investors alike. Additionally, we included the relative market efficiency (relative to the banking sector) and the stock market turnover ratio (both measures taken from Beck et al. (1999)) in order to proxy for the efficiency of equity capital markets. The less efficient equity markets function, the higher should underpricing be in order to compensate investors. With respect to the ease of obtaining public equity capital we included the equity markets access index created by Schwab et al. (1999). The index measures the extent to which business executives in a country judge the stock market to be open to new and medium-sized firms, with higher values indicating easier accessibility. In addition, we employ dummy variables measuring whether a

[1] Methodologically, we examine a wide array of potential influences on IPO underpricing for a vast number of countries. Although one might question the expansive approach taken in this paper, we believe that the interrelation between various legal and institutional characteristics calls for an extensive analysis of factors simultaneously influencing the extent of IPO underpricing. While a narrower focus might be more consistent with testing specific theoretical models (e.g. treating one issue separately), in order to gain insights into the driving forces of cross-country differences one needs to account for a multitude of potential influences at the same time.

country allows the use of (i) book building, (ii) fixed price auctions or (iii) auctions. As some countries allow all of the methods to be used, we can include all dummies at the same time – they are not mutually exclusive.

Hypothesis 2 ("effective regulation reduces underpricing") is tested employing an index collected by Gwartney and Lawson (2004).[2] This index relates to the regulation of credit markets (the ownership of banks; competition from foreign banks; the extension of credit to the private sector; avoidance of interest rate controls and excessive regulation leading to negative real interest rates; interest rate controls in general). One would expect regulation of the banking system in general to have a negative effect on underpricing as more regulation reduces the incentives for side payments and diminishes the level of asymmetric information between individual investors and the underwriting banks. The index ranges from 1-10, with higher values indicating "better" business environments. Furthermore, we include information about the differences in banking systems in general by including data from Barth, Caprio, and Levine (2004), who collected a comprehensive database on the regulation and supervision of banks in 107 countries. The data is based on surveys sent to national bank regulatory and supervisory authorities. In order to proxy for the effectiveness of banking supervision we included variables with respect to ownership restrictions, business activity restrictions, and characteristics of deposit insurance schemes. Barth et al. (2004) argue that deposit insurance schemes might limit the risk of bank runs and tighter official oversight could augment private sector monitoring of banks. Accordingly, we have included a variable measuring whether countries posses a deposit insurance scheme, as well as variables measuring the influence of the supervisor in taking specific corrective actions. Here, Barth et al. measure whether a supervisory agency might force a bank to change its internal structure. To proxy for better oversight of the financial sector we include a measure on the existence of a single financial supervisor. Furthermore, we include information about the regulation of banking activities, in particular restrictions on banks to engage in securities activities. Demirgüç-Kunt et al. (2000) find that foreign entry improves bank performance. With respect to competition we have therefore included information about the limitations on foreign bank entry/ownership and also the share of assets of foreign-owned banks in total banking assets and the number of foreign-owned banks in the total number of banks from Beck et al. (1999).

Turning to hypothesis 3 ("transparency reduces underpricing"), we take several measures from Bushman et al. (2004) in order to proxy for financial and governance disclosure: A measure indicating the inclusion of 90 accounting items in the balance sheet, the

[2] The original data are linearly interpolated to obtain yearly data.

disclosure requirements regarding R&D investments,[3] a measure referring to the governance and compensation structure of the firm[4] and the corporate transparency in terms of timeliness and frequency of reports. Higher values in all the indices indicate more disclosure/transparency. These measures supplement the disclosure requirements index provided by La Porta, Lopez-de-Silanes and Shleifer (2006).[5] All these measures should yield insights into the effect of accounting transparency on reducing information asymmetries between the firm and outside investors. As mentioned before we argue that more financial and governance transparency should be negatively related to the level of underpricing found in the corresponding countries. The availability of firm-specific information enhances the accountability for those governing the firm.

Moreover, to estimate the impact of the private benefits of control that larger stockholders might obtain on the level of underpricing we included the median block premium calculated in Dyck and Zingales (2004).[6] The higher the private benefits that controlling shareholders enjoy, the more pronounced the associated agency problems with new investors would be. As such, the higher the benefits of control are, the more underpricing would new investors crave for in order to be compensated for the additional risks. With respect to ownership concentration, Shleifer and Vishny (1986) point out the positive effect that concentration might have on the incentives of managers. However, they also acknowledge the potential diversification that might stem from a certain dispersion of ownership. Accordingly, we also include a measure of ownership concentration for the countries in our sample.

Firms from countries with weaker investor protection have found a way to facilitate information acquisition for outside investors via the cross listing of shares in countries with stronger investor protection and greater financial transparency due to stricter disclosure requirements (Reese and Weisbach (2002)). As a matter of fact we also include the number of 2 and 3 level American Depository Receipts (ADR) to proxy for the extent to which firms make use of substitute mechanisms of corporate governance in order to overcome weaker

[3] Specifically: capital expenditure, subsidiaries, segment-product, segment-geographic, and accounting policy.
[4] Major shareholders, management information, list of board members and their affiliations, remuneration of directors and officers, and shares owned by directors and employees.
[5] The index incorporates information on the existence of prospectus requirements for issuing firms, whether compensation of directors and shareholder composition and inside ownership has to be disclosed in the prospectus, and whether information regarding contracts and transactions outside the ordinary course of business has to be disclosed.
[6] The block premium is the difference between the price per share paid for the control block and the exchange price two days after the announcement of the control transaction, divided by the exchange price and multiplied by the ratio of the proportion of cash flow rights represented in the controlling block.

rules within a country. Lastly, we also include the S&P transparency and governance rating along with its standard deviation for the countries in our sample.

In hypothesis 4 we argue that the protection of shareholder rights affects the perceived risk for investors in going public transactions and that differences in the legal system are important for the occurrence and magnitude of IPO underpricing. In order to test this hypothesis we employ a number of measures that are widely used in the recent empirical literature. Specifically, we employ Gwartney and Lawson's legal structure and security of property rights index (including judicial independence, protection of intellectual property rights, impartial courts, military interference and integrity of the legal system measures).[7] Moreover, we use the index of government stability and an index of perceived corruption provided by the International Country Risk Guide (2004). This indicator is based on the analysis of a worldwide network of experts. The index has a range from 0 – representing highest corruption – to 12 (no corruption).

The notion of considering stocks only as the present value of future cash flows falls short of taking into consideration the substantial rights that are attached in order to give shareholders substantial influence in controlling managerial decisions (Hart (1995)). As pointed out in La Porta et al. (1998) laws and the quality of enforcement are potentially important factors when analysing the rights and protection of shareholders. We therefore use various measures from La Porta et al. (1998) in order to test for the influence of legal environments on the magnitude of IPO underpricing. The antidirectors index measures how strongly the legal system favors minority shareholders over managers and/or dominant shareholders. We also included some of the subcomponents of the antidirectors index. For example, the blocking of shares prior to an annual meeting might make it difficult for minority shareholders to exert their voting rights over majority shareholders. Additionally, we included the number of votes to call an extraordinary shareholders meeting. The higher the required percentage is, the more difficult it becomes for minority shareholders to drive out management. In this light, we also included the oppressed minority measure indicating whether minority shareholders have legal means to pursue in case of fundamental changes within the company (e.g. mergers, asset dispositions etc.). Furthermore we have used the "management in restructuring" dummy to proxy for creditor power over equity holders. The threat of management dismissal during a phase of restructuring might enhance the creditors' position. Grossman and Hart (1988) argue that investors might be better protected when dividend rights are linked to voting rights – that is, companies are subject to one-share-one-

[7] Note that two of these sub-indices originate from the Global Competitiveness Report, while "integrity of the legal system" is from the International Country Risk Guide.

vote rules. Hence, we also include a dummy indicating whether countries are characterized by such rules. Lastly, we include a dummy measuring whether the corresponding country is characterized by common versus civil law.

As insider trading might pose a difficulty for outside investors to timely act upon and benefit from the information provided in the offering prospectus, we employed measures by Bhattacharya and Daouk (2002) on the existence of insider trading and from Schwab et al. (1999) on its prevalence. Furthermore, we employ various measures with respect to shareholder protection originating from La Porta, Lopez-de-Silanes and Shleifer (2006): An index of criminal sanctions, a dummy indicating whether investors have the opportunity to engage in class action suits against the issuing firm and the parties involved, and an index of disclosure requirements.

5. Results

While table 3 also reports the results for the base model and the individual hypotheses for reasons of transparency,[8] we confine our discussion to the final model. Table 3 presents the variables selected by the individual general-to-specific regressions (column 10) and the final model (column 11). Due to the unbalanced nature of our data the number of observations is reduced to 267, referring to 23 countries. Regarding the variables included in the base model, underpricing rises significantly with higher market returns and a larger number of firms going public within a given year. These results suggest that when equity markets perform well, investors anticipate companies and investment banks to try to time the market when going public, so they require higher underpricing in return. Moreover, the results indicate that countries under an IMF program are characterized by lower underpricing, probably in expectation of ameliorating investment conditions – the coefficient is however, only significant at the 10% level. GDP growth has no significant impact on underpricing in the final model.

[8] For each hypothesis, two sets of regressions are shown. The first includes the full number of variables we employ to test the respective hypothesis – the second contains the variables selected by the general-to-specific exercise.

Table 3: Determinants of IPO underpricing, general to specific, GLS, 1988-2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Base	Hypothesis 1		Hypothesis 2		Hypothesis 3	
Economic growth (t-1)	0.010	0.016	0.014	0.013	0.015	0.019	0.018
	(2.00)**	(3.42)***	(2.73)***	(2.14)**	(2.74)***	(2.78)***	(2.99)***
IMF program, dummy (t-1)	0.185	-0.079	-0.077	-0.075	-0.077	-0.086	-0.178
	(1.20)	(1.45)	(1.28)	(1.35)	(1.46)	(1.23)	(3.15)***
Market Return	0.240	0.132	0.133	0.155	0.154	0.193	0.162
	(3.66)***	(2.30)**	(2.46)**	(2.29)**	(2.42)**	(3.25)***	(2.95)***
Number of IPOs (log)	0.027	0.019	0.016	0.025	0.024	0.032	0.036
	(2.72)***	(2.36)**	(1.67)*	(3.88)***	(3.62)***	(2.87)***	(3.58)***
Stock market total/GDP		0.032					
		(0.78)					
Stock market traded/GDP		0.093	0.132				
		(1.60)	(3.62)***				
Stock Market Turnover		0.029					
		(0.73)					
Access to equity		-0.050	-0.075				
		(2.32)**	(2.78)***				
Relative market efficiency		-1.371					
		(0.74)					
Auction, dummy		0.067					
		(2.53)**					
Book bulding, dummy		-0.051					
		(1.12)					
Fixed price, dummy		0.013					
		(0.55)					
Security business restrictions				0.061	0.040		
				(2.22)**	(2.11)**		
Foreign-owned banks/total banks				-0.155	-0.122		
				(2.20)**	(2.10)**		
Deposit insurance scheme, dummy				-0.137	-0.133		
				(2.97)***	(3.67)***		
Credit Regulation				-0.041	-0.036		
				(2.75)***	(2.74)***		
Max. ownership restriction, dummy				-0.020			
				(0.56)			
Influence of the supervisor				0.001			
				(0.03)			
Foreign assets				0.283			
				(1.66)*			
Financial Supervisor, dummy				0.020			
				(0.94)			
Accounting						-0.015	-0.010
						(3.61)***	(3.77)***
Governance						0.004	0.004
						(3.50)***	(3.44)***
Disclosure requirements, index						0.315	0.280
						(3.58)***	(4.05)***
StDev S&P governance rating						0.008	0.006
						(1.96)*	(1.89)*
Ownership						-0.598	-0.442
						(2.52)**	(2.45)**
Corporate transparancy						-0.002	-0.002
						(2.59)***	(2.56)**
Registered American Dep. Rec.						-0.004	-0.003
						(2.89)***	(2.57)**
Disclosure requirements						0.002	
						(1.48)	
Block premia						-0.002	
						(0.01)	
S&P governance rating						0.001	
						(0.77)	
Observations	409	316	329	310	324	303	322
Countries	30	27	28	24	25	21	24
R^2 (within)	0.14	0.21	0.31	0.17	0.18	0.19	0.18
R^2 (between)	0.60	0.57	0.37	0.80	0.78	0.95	0.90
R^2 (overall)	0.19	0.30	0.25	0.33	0.32	0.40	0.39

Table 3 (continued)

	(8)	(9)	(10)	(11)
	Hypothesis 4		Full model	
Economic growth (t-1)	0.011	0.013	0.008	0.010
	(2.17)**	(2.67)***	(1.01)	(1.58)
IMF program, dummy (t-1)	-0.038	-0.023	-0.134	-0.106
	(0.56)	(0.44)	(1.89)*	(2.06)**
Market Return	0.127	0.168	0.171	0.167
	(2.31)**	(2.98)***	(2.80)***	(2.95)***
Number of IPOs (log)	0.011	0.022	0.022	0.026
	(1.03)	(3.47)***	(1.65)*	(2.51)**
Stock market traded/GDP			0.135	0.109
			(3.14)***	(3.25)***
Access to equity			-0.031	
			(0.84)	
Security business restrictions			0.059	0.043
			(1.48)	(1.99)**
Foreign-owned banks/total banks			-0.094	-0.241
			(0.79)	(3.60)***
Deposit insurance scheme, dummy			-0.065	
			(0.75)	
Credit Regulation			-0.003	
			(0.16)	
Accounting			-0.006	-0.008
			(1.50)	(4.07)***
Governance			0.002	0.003
			(0.83)	(2.69)***
Disclosure requirements, index			0.121	0.195
			(0.83)	(2.84)***
StDev S&P governance rating			0.004	0.005
			(0.96)	(1.79)*
Ownership			-0.167	
			(0.61)	
Corporate transparancy			-0.002	
			(1.07)	
Registered American Dep. Rec.			0.001	
			(0.20)	
Government stability	0.033	0.024	0.032	0.037
	(2.64)***	(2.42)**	(2.86)***	(3.85)***
One share-one vote, dummy	0.181	0.204	0.011	
	(2.34)**	(5.37)***	(0.16)	
Prevalence of insider trading	-0.075	-0.029	-0.015	
	(2.33)**	(2.33)**	(0.46)	
Security of property rights	0.040		-0.006	-0.008
	(1.49)		(1.50)	(4.07)***
Corruption	-0.006			
	(0.81)			
Oppressed minority, dummy	0.115			
	(1.55)			
Blocking of shares, dummy	0.121			
	(2.27)**			
Management stays during restructuring, dummy	0.034			
	(0.57)			
Votes to call ext. meeting	0.095			
	(0.37)			
Insider trading exists, dummy	-0.002			
	(1.23)			
Class action suit, dummy	0.115			
	(2.06)**			
Burden of proof	-0.087			
	(1.41)			
Criminal, index	0.009			
	(0.15)			
Civil law, dummy	0.055			
	(0.78)			
New antidirectors index	-0.063			
	(2.29)**			
Observations	333	368	253	267
Number of id	26	27	22	23
R^2 (within)	0.16	0.16	0.32	0.31
R^2 (between)	0.91	0.82	0.89	0.83
R^2 (overall)	0.35	0.32	0.47	0.46

Notes: *, **, *** denote significance at the 10%, 5%, and 1% level respectively. (Robust absolute) t-statistics are in parentheses. The results shown for each hypothesis present the coefficients and t-statistics for the first regressions estimated (including all explanatory variables) in the first column and the resulting final model for each hypothesis after the general to specific procedure laid out in section 4.2 in the respective second column. Column one presents the results for the base model. The remaining variables for each separate hypothesis are then included in the final model. The final column reports the results from general-to-specific based on this model. All regressions are estimated using random effects GLS. Tests for serial correlation in the error terms have been carried out as explained in section 4.2. Dummies for each year are included in all regressions but are omitted from the presentation in the table. All variables used are described in Appendix A.

Overall, the results of table 3 indicate support for some of our hypotheses, while clearly rejecting others. Regarding hypothesis 1 the results show that underpricing rises with higher values traded in the stock market (relative to GDP), at the one percent level of significance. This indicates that more established stock markets (in terms of volume) show a higher level of underpricing, clearly contradicting hypothesis 1. The positive coefficient of the stock market value traded could be a sign of increased demand for shares from a certain country due to more attractive market developments. Alternatively, Michelacci and Suarez (2004) acknowledge that more developed capital markets (or a relatively high reliance on equity capital markets) could induce younger firms to go public pre-maturely. Given the higher risks and the greater opacity of these firms underpricing could be higher (Gompers and Lerner (2002)). Evidence shows that in the US firms that go public are typically younger than their corresponding European counterparts (Fama and French (2001); Pagano et al. (1998)). Moreover, the ease of access to equity has the expected negative coefficient but does not turn out to be significant in the final model. Hence, there is no evidence (when controlling for other factors) that easy availability of outside equity reduces underpricing.

With respect to hypothesis 2, the results show that restricting the business activities of commercial banks has a positive impact on the level of underpricing (at the 5% level). Restricting banks to jointly engage in underwriting, brokering and dealing of securities appears to limit the price discovery in the going public process and elevates the level of underpricing. Additionally, the competition brought in by foreign banks (number of foreign banks to number of total banks) has the expected negative impact on underpricing (at the 5 percent level). The result suggests evidence for the claim of Carter and Manaster (1990) who point out the certifying role of more established underwriters for the reduction of information asymmetries during the going public process. Secondly, the competition brought in through foreign entrants could also reduce the incentive for established incumbents to engage in self-dealing and could help to self-regulate the market, thereby depleting information asymmetries.

According to Hypothesis 3, greater transparency on the corporate level should lead to more firm specific variation in stock prices and therefore to more informative stock prices. The results show that the accounting rating of countries (with respect to the inclusion or omission of a wide variety of items) has a negative and significant impact on IPO underpricing (at the 1% level). When firms are forced to disclose items in their annual report, problems of asymmetric information are alleviated. Moreover, one can infer that the standard deviation of the S&P governance and transparency rating has a positive and significant effect. The higher the dispersion of governance and transparency among firms in the country, the higher the risks faced by outside investors. Correspondingly, we observe an increase in underpricing as a response. For the disclosure requirements index of La Porta et al. (2006) the results show that higher values increase underpricing. Bushee and Noe (2000) document that improvements in disclosure rankings could result in higher levels of transient ownership and correspondingly lead to higher levels of stock volatility. Accordingly, in the absence of clear information on composite investment holdings and periods, it could be that the results are driven by changes in institutional holdings as a response to improvements in financial disclosure.

A similar effect can be found for the impact of compensation and shareholdings disclosure (Governance) that has a positive and significant impact on the observed level of underpricing. Given the data we cannot rule out the possibility that countries with in general more excessive compensation packages are more prone to pass and implement laws and regulations dealing with the issues at hand. Accordingly, more disclosure could be driven by more severe problems with excessive compensation packages and correspondingly our results suggest that countries with higher levels of executive compensation face more severe levels of underpricing.

Regarding hypothesis 4, the results show underpricing to rise significantly with government stability, at the one percent level of significance. Interestingly, more stable governments contribute positively to the premium that investors demand when investing in IPOs in those countries. In this light, the results could suggest that more stable governments might enjoy more private benefits in the economy and that therefore the level of underpricing might be higher.

Turning to the economic impact of these significant determinants of underpricing, an increase in the market return by one percentage point increases underpricing by 0.17 percentage points. This amounts to a standardized (beta-) coefficient of almost 0.22. An increase in GDP growth by one standard deviation increases underpricing by 0.15 standard

deviations. The corresponding beta coefficients for the other significant variables are -0.10 (IMF program), 0.18 (number of IPOs), 0.37 (stock market traded), 0.11 (security business restrictions), -0.17 (foreign-owned banks), -0.30 (accounting), 0.16 (governance), 0.18 (disclosure requirements), 0.15 (Stdev S&P governance rating), and 0.34 (government stability).

Regarding the insignificant coefficients, our results show that stock market turnover, stock market traded/GDP and relative market efficiency do not affect underpricing and turn out to be insignificant in the full model. With respect to the use of fixed price auctions, book building and/or auctions in general, our results show that pricing mechanisms do not significantly contribute to the variations in underpricing across countries.

With respect to the variables indicating supervision of the banking system (taken from Barth et al. 2004) we find that neither ownership restrictions nor assets owned by foreign banks have any impact on underpricing variations. Concerning the role of the supervisor, the coefficient associated with the dummy for the influence of the supervisors in taking corrective actions and the dummy indicating whether a single financial supervisor exists are not significant at conventional levels. Additionally, the maximum ownership restriction does not have any impact on underpricing. The initial results indicate that underpricing declines significantly with deposit insurance schemes (at the one percent level of significance). The coefficient does, however, turn out to be insignificant in the final model. There is thus no evidence that a more protective financial system has a negative impact on the level of underpricing in the corresponding countries. The same holds true for stricter regulation of credit markets, where we can observe a negative and significant coefficient for the first regressions estimated, but not in the final model, when controlling for other characteristics.

Considering the impact of accounting transparency on IPO underpricing, ownership concentration within the firms has a negative and highly significant coefficient in the first models, but turns out insignificant when we control for other variables in the final model. We do not find any robust evidence that countries with a generally higher concentration of ownership exhibit lower levels of underpricing. Moreover, the block premium turns out to be insignificant as well. There is no evidence that more private benefits that controlling shareholders might enjoy contribute negatively to the agency conflicts with outside investors. The S&P governance rating is not significant, while the standard deviation of this measure is positive and significant as pointed out earlier. This suggests, that the dispersion – but not the overall level – of “good” and “bad” corporate governance within a country increases the risk faced by outside investors resulting in larger underpricing. The number of 2 and 3 level ADRs

has no significant impact on underpricing (though the coefficient has the expected negative sign and is significant in columns 6 and 7 of table 3). We also find a negative and significant coefficient for the corporate transparency measure in columns 6 and 7, but not for the final model. There is not robust evidence that the frequency of reports and the timeliness of information provided have an impact on the level of underpricing when controlling for other factors.

Regarding the legal environment and the impact of corporate governance on explaining variations in the level of underpricing, hypothesis 4 expects that more effective legal systems and better firm level governance should reduce risk for outside investors and be associated with lower underpricing. However, the results show that none of the procedural legal variables turns out significant. Neither the dummy variable that is one when a class action lawsuit is available nor the index measuring the procedural difficulty (Burden of Proof) in recovering losses from directors of the issuer, distributors and accountants in a civil liability case for losses due to misleading statements in the prospectus, or the criminal sanctions that can be imposed on the issuer, distributor, and accountant affect the level of underpricing, and the same holds true for the level of corruption and the anti-director index. We also do not find significant differences between civil and common-law countries regarding the level of underpricing.

The results also show that insider trading does not reduce the compensation for new outside investors. With respect to the rights of minority shareholders we find that neither the dummy for the oppression of minority shareholders nor the measures indicating the possibility to block shares before the annual meeting, the dummy that indicates whether management might stay during restructuring, and the number of votes to call an extraordinary meeting seem to have an influence on IPO underpricing. None of these coefficients is significant at conventional levels.

To summarize our results, there is some support for the hypothesis that the stage of development of equity capital markets affects the observed level of underpricing. Moreover, the results show that the efficiency of regulation and greater accounting transparency can help to reduce the level of underpricing. We do, however, find only slight evidence for an impact of legal infrastructures on the extent of IPO underpricing.

In the next section, we test for the robustness of these results.

6. Test for robustness

We examine the robustness of our model with Extreme Bounds Analysis (EBA), which is standard procedure in the recent empirical literature.[9] More than 10.000 specifications with different combinations of control variables are analyzed. The EBA approach is described in detail in Appendix B. Following Sala-i-Martin (1997), we consider the impact of our explanatory variables on IPO underpricing to be robust if the fraction of the cumulative distribution function lying on one side of zero (CDF(0)) exceeds 0.90.[10] We include all variables in the EBA that have been included in the general-to-specific exercise above.

We present three sets of results. The first set includes our baseline variables in the model and adds all additional variables in combinations of up to three to the regressions. In the second set, the variables included in the full model of column 11 in table 3 are always included in the regressions, while the remaining variables are again added in combinations of up to three. Finally, we report the results for the additional variables when included to the full model one at the time, and again including all other variables in combinations of up to three variables.

Tables 4 and 5 show the results. As can be seen from the upper part of table 4, the base model performs quite well, with the CDF(0) of all three variables being above 0.9. Moreover, the market return and the economic growth variable are significant at the five percent level in almost all of the 10,700 regressions estimated. The log number of IPOs is significant in 77 percent of these regressions. The exception is the IMF program dummy, with a CDF(0) fairly below the critical value; in only 12 percent of the regressions the coefficient is significant at the five percent level. However, when included in the full model the IMF dummy is significantly negative in 90 percent of the regressions estimated with a CDF(0) of 0.97. The lower part of table 4 contains the results for the full model. Again, most of the variables appear to be extremely robust to the inclusion of additional variables. With no exception, the CDF(0) exceeds 0.9, in most cases even 0.95 (the critical threshold suggested in Sturm and de Haan (2005)). Only the economic growth and the governance variable with a CDF(0) of 0.94, the disclosures requirement index and the security business restrictions variables with a

[9] See, e.g. Sala-i-Martin (1997), Fernández, Ley and Steel (2001), Sturm, Berger and de Haan (2005), and Sturm and de Haan (2005).

[10] Sala-i-Martin (1997) proposes using the (integrated) likelihood to construct a weighted CDF(0). However, the varying number of observations in the regressions due to missing observations in some of the variables poses a problem. Sturm and de Haan (2001) show that as a result this goodness of fit measure may not be a good indicator of the probability that a model is the true model and the weights constructed in this way are not equivariant for linear transformations in the dependent variable. Hence, changing scales will result in rather different outcomes and conclusions. We therefore restrict our attention to the unweighted version. Furthermore, for technical reasons – in particular our unbalanced panel setup – we are unable to use the extension of this approach called Bayesian Averaging of Classical Estimates (BACE) as introduced by Sala-i-Martin, Doppelhofer and Miller (2004).

CDF(0) of 0.93 are slightly below the critical value suggested in Sturm and de Haan. They are, however, significant at the five percent level at least in between 61 to 69 percent of all regressions run. We conclude that with the exception of the IMF program variable for the base model, our model is extremely robust to the inclusion of additional variables.

Table 4: Extreme Bounds Analysis, main variables

	(1) Avg. Beta	(2) Avg.Std.Err.	(3) % Sign.	(4) CDF(0)	(5) lower Bound	(6) upper Bound
Base model						
Economic growth (t-1)	0.018	0.004	1.00	1.00	-0.001	0.045
Return	0.156	0.053	1.00	1.00	-0.028	0.352
Number of IPOs (log)	0.022	0.010	0.80	0.97	-0.022	0.072
IMF program, dummy (t-1)	-0.070	0.062	0.12	0.85	-0.321	0.136
Full model						
Government stability	0.035	0.011	1.00	1.00	0.002	0.066
Stock market total/GDP	0.134	0.033	1.00	1.00	-0.053	0.358
Return	0.165	0.058	1.00	1.00	-0.010	0.311
Accounting	-0.009	0.003	0.98	0.99	-0.028	0.007
Number of IPOs (log)	0.025	0.011	0.99	0.99	-0.009	0.063
Foreign-owned banks/total banks	-0.229	0.093	0.96	0.99	-0.790	0.169
StDev S&P governance rating	0.005	0.002	0.94	0.98	-0.006	0.015
IMF program, dummy (t-1)	-0.120	0.060	0.90	0.97	-0.374	0.054
Economic growth (t-1)	0.009	0.005	0.69	0.94	-0.014	0.025
Governance	0.003	0.002	0.63	0.94	-0.007	0.015
Disclosure requirements	0.184	0.107	0.61	0.93	-0.509	0.936
Security business restrictions	0.044	0.027	0.63	0.93	-0.152	0.251

Notes: Table 4 reports results for the Extreme Bounds Analysis estimated with random effects GLS. The Results for the base (full) model are based on 10,700 (5,488) combinations with 343 (252) observations, on average. Dummies for each year are included in all regressions but not shown in the table. The upper part of the table presents the results for the base model while the lower part presents the results for the variables generated for the final model shown in table 2 (stemming from the general to specific procedure). Columns 2 and 3 present the average beta and standard error generated from all estimated combinations, respectively. Column 4 indicates the percentage of estimations in which a variable is significantly different from zero at the 5% level and column 5 indicates the unweighted cumulative distribution function (CDF(0)), i.e. the fraction of the cumulative distribution function lying on one side of zero. Columns 6 and 7 report the extreme bounds for the corresponding variable. Variables are sorted according to their CDF(0).

Table 5: Extreme Bounds Analysis, additional variables, full model

Variable	(1) Avg. Beta	(2) Avg.Std.Err.	(3) % Sign.	(4) CDF(0)	(5) lower Bound	(6) upper Bound	(7) Avg. Obs.
Corruption	-0.02	0.01	0.92	0.98	-0.05	0.01	252
Blocking of shares, dummy	0.08	0.05	0.59	0.95	-0.09	0.27	247
Relative market efficiency	-2.69	1.79	0.31	0.92	-10.15	3.47	252
Insider trading exists, dummy	0.00	0.00	0.20	0.90	-0.01	0.00	252
R&D Disclosure	0.00	0.00	0.28	0.89	0.00	0.01	252
Stock Market Turnover	-0.05	0.04	0.11	0.85	-0.22	0.10	252
Civil law, dummy	-0.07	0.06	0.07	0.85	-0.44	0.19	247
Corporate transparancy	0.00	0.00	0.00	0.80	-0.01	0.01	252
Credit Regulation	-0.02	0.02	0.03	0.77	-0.09	0.09	252
Oppressed minority, dummy	0.03	0.04	0.01	0.74	-0.17	0.30	247
Block premia	0.15	0.23	0.01	0.73	-1.41	1.76	241
Burden of proof	-0.03	0.06	0.00	0.66	-0.30	0.34	252
Prevalence of insider trading	0.01	0.03	0.00	0.66	-0.10	0.13	252
Auction, dummy	0.01	0.03	0.00	0.65	-0.14	0.15	243
One share-one vote, dummy	0.02	0.06	0.00	0.64	-0.40	0.30	247
Fixed price, dummy	0.01	0.04	0.00	0.63	-0.32	0.32	243
S&P governance rating	0.00	0.00	0.00	0.63	-0.01	0.02	252
Financial Supervisor, dummy	0.01	0.04	0.01	0.63	-0.26	0.25	252
Ownership	-0.07	0.22	0.00	0.63	-1.54	1.07	247
Book bulding, dummy	0.03	0.06	0.02	0.62	-0.36	0.60	243
Stock market total/GDP	0.03	0.05	0.05	0.62	-0.21	0.25	252
New antidirectors index	0.00	0.01	0.00	0.62	-0.07	0.08	247
Influence of the supervisor	-0.01	0.04	0.01	0.61	-0.21	0.15	252
Security of property rights	0.00	0.02	0.00	0.61	-0.08	0.08	252
Votes to call ext. meeting	-0.09	0.32	0.00	0.61	-2.10	1.79	237
Access to equity	-0.01	0.04	0.00	0.60	-0.33	0.29	252
Foreign assets	0.07	0.26	0.02	0.59	-1.77	2.15	252
Registered American Dep. Rec.	0.00	0.00	0.00	0.58	-0.01	0.01	252
Class action suit, dummy	0.01	0.03	0.01	0.57	-0.16	0.22	252
Deposit insurance scheme, dummy	-0.01	0.06	0.00	0.55	-0.79	0.37	252
Management stays during restructuring, dummy	-0.01	0.05	0.00	0.53	-0.41	0.31	247
Criminal, index	0.01	0.06	0.00	0.52	-0.34	0.47	252
Max. ownership restriction, dummy	0.00	0.05	0.00	0.51	-0.40	0.23	241

Notes: Table 5 reports results for the Extreme Bounds Analysis estimated with random effects GLS. Dummies for each year are included in all regressions but not shown in the table. Columns 2 and 3 present the average beta and standard error generated from all combinations estimated, respectively. Column 4 indicates the percentage of estimations in which the included variable is significantly different from zero at the 5% level and column 5 indicates the unweighted cumulative distribution function (CDF(0)), i.e. the fraction of the cumulative distribution function lying on one side of zero. Columns 6 and 7 report the extreme bounds for the corresponding variable.

Finally, table 5 shows that two additional variables pass the CDF(0) threshold of 0.95 and one additional variable passes the CDF(0) threshold of 0.9. Table 5 reveals that the level of corruption with a CDF(0) of 0.98 is significant (at the five percent level at least) in 92 percent of the regressions and has a negative coefficient (higher values of this measure indicate less corruption), indicating that countries with a more pronounced problem of corruption suffer from more severe problems of asymmetric information between firms going public and outside investors. This is in line with the previous literature, showing corruption to reduce investment and foreign direct investment (Mauro (1996); Smarzynska and Wei (2000)).

The blocking of shares dummy is positive and significant (in 59% of the regressions with a CDF(0) of 0.95) while the relative market efficiency is negative and significant (in

31% of the regressions with a CDF(0) of 0.92). So there is evidence that more power disparity towards large shareholders seems to leave minority shareholders worse off and results in higher underpricing. With the possibility to block shares before the annual meeting minority shareholders are at a disadvantage to larger shareholders. Not being able to exercise voting power attached to their shares therefore causes higher underpricing required by new investors. Moreover, a more efficient stock market resulting in lower costs of capital and potentially more liquidity helps to facilitate corporate governance in the aftermath of the IPO leading to lower levels of IPO underpricing. The variable indicating that insider trading exists also passes the CDF(0) threshold of 0.90 but is economically marginal and only statistically significant at the five percent level at least in 20 percent of the regressions estimated.

Additionally, the results show that the disclosure of R&D investments is slightly below the CDF(0) threshold of 0.9 and significant in 28 percent of the regressions estimated. In the absence of timely information and due to the high uncertainty associated with intangible capital investments, R&D activities could intensify the information asymmetry between issuing firms and potential investors. The results could be related to the fact that countries with more R&D intensive industries have incentives to provide more disclosure with respect to these activities. In the absence of suitable proxies, the disclosure of R&D might be related to the overall engagement of countries in R&D activities exhibiting the well-documented valuation bias of R&D intensive industries (Gompers and Lerner (2002); Guo (2004); Chan et al. (2001); Aboody and Lev (2000)).

Overall, we conclude that the results of our final model are fairly robust to the inclusion of additional variables.

7. Conclusion

In this paper we analyze the institutional and legal determinants of IPO underpricing across countries and time. Our results show that underpricing rises significantly when market returns are generally higher, implying market momentum. When equity markets perform well, investors anticipate that companies and investment banks try to time the market when going public and therefore require a higher underpricing in return.

Furthermore, we investigate the importance of equity capital market development and the corresponding impact on the extent of underpricing. The results suggest that with a higher importance of the stock market relative to the overall level of GDP one can observe higher underpricing. While we hypothesized a higher stage of development to be associated with less underpricing, our results show the exact opposite. This provides evidence in favour of

Michelacci and Suarez (2004), acknowledging more developed capital markets (or a relatively high reliance on equity capital markets) to induce firms to go public pre-maturely. The higher risks and greater opacity of these firms could result in higher underpricing. Regarding relative market efficiency we found that underpricing in more developed and comparably efficient markets (characterized by greater liquidity and lower costs of capital) is lower. Additionally, our results suggest that entry of foreign banks can help to self-regulate and to contribute to less pricing inefficiencies caused by asymmetric information. Restrictions on business activities are found to have an adverse effect and even aggravate the extent of IPO underpricing.

With respect to the role of information presentation and dissemination we find that corporate transparency can help to attenuate information asymmetries. Greater accounting transparency increases firm specific stock price variations and makes stock prices more informative for investors. Consequently, this enables more effective corporate governance and causes lower underpricing. We also point out that some of the variables might pick up differing related effects, namely the heavier reliance on information dissemination to deal with excessive compensation packages and the fostered disclosure of R&D investments. Accordingly, we interpret our findings in the light that countries with more excessive compensation packages (and therefore higher need to promote transparency) and a more pronounced level of R&D activity (and correspondingly more disclosure of R&D activity in the annual reports) are characterized by more severe information asymmetries between firms going public and outside investors. Accordingly, we find higher levels of IPO underpricing in these countries.

Concerning the impact of differences in institutional and legal environment in IPO underpricing, we document that the protection of shareholders affects the perceived risk of investing. While we find evidence that more stable governments are associated with higher underpricing (possibly due to greater incentives for accumulating private benefits and awarding cronies) we also inferred that the protection of minority shareholders has a significant impact in reducing the observed levels of IPO underpricing. Here, one can infer that more effective legal systems and environments for corporate governance reduce the perceived risk of investing and decrease the corresponding level of underpricing. Lastly, we find that corruption works to the detriment of equity investors and document that the legal possibility for large shareholder to overturn minority shareholder through blocking of shares prior to annual meetings could induce higher levels of underpricing, as these rulings create more leeway for blockholders.

Overall we find evidence on which factors influence variations in underpricing across countries and time. We attribute them mainly to differences in the stage of development and regulation of equity markets, to variations in accounting transparency influencing the dissemination and interpretation of information generated and to discrepancies in legal and institutional environments affecting the effectiveness of firm level corporate governance. While we do not consider our analysis to be exhaustive, we believe that our results present an early step in analyzing how regulatory, legal and institutional environments shape financial markets and affect the perceived risk of investing.

For future research, it might be a rewarding task to further investigate which additional factors impact cross-country variations in IPO underpricing. Ljungqvist (2006) points out that firms going public might signal firm quality via increased initial underpricing and might recoup the money initially left on the table when coming back to raise money in subsequent offerings. Given the lack of data we did not pursue an analysis of seasoned equity offerings in this paper. However, it could well be that the pricing of seasoned equity offerings might have an impact on the level of underpricing observed. Additionally, Guiso et al. (2006) analyze the role of culture as a potential determinant of economic outcomes. It might be interesting to test how systematic differences in people's preferences and beliefs interact with the legal and institutional infrastructure of countries. Possibly, this might enrich our understanding of economic phenomena by analyzing cultural and institutional characteristics of investment environments simultaneously.

References

Allen, Franklin, and Gerald R. Faulhaber. 1989. Signaling by Underpricing in the IPO Market. *Journal of Financial Economics* 23: 303-323.

Aboody, David and Baruch Lev, 2000. Information Asymmetry, R&D, and Insider Gains, *The Journal of Finance*, 55: 2747-2766.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross E. Levine. 1999. A New Database on Financial Development and Structure. World Bank Policy Research Working Paper No. 2146.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross E. Levine. 2001. Law, Politics, and Finance. World Bank Policy Research Working Paper No. 2585.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross E. Levine. 2003. Bank Supervision and Corporate Finance. World Bank Policy Research Working Paper No. 3042.

Beck, Thorsten, Asli Demirgüç-Kunt, and Ross E. Levine. 2004. Law and Firms' Access to Finance. World Bank Policy Research Working Paper No. 3194.

Benveniste, Lawrence M., and Paul A. Spindt. 1989. How Investment Bankers Determine the Offer Price and Allocation of New Issues. *Journal of Financial Economics* 24: 343-361.

Benveniste, Lawrence M., Alexander Ljungqvist, William J. Wilhelm Jr., and Xiaoyun Yu. 2003. Evidence of Information Spillovers in the Production of Investment Banking Services. *The Journal of Finance* 58: 577-608.

Bhattacharya, Utpal, and Hazem Daouk. 2002. The World Price of Insider Trading. *Journal of Finance* 57: 75-108.

Bushee, Brian, and Christopher Noe. 2000. Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility. *Journal of Accounting Research* 38, Supplemental: 171-202.

Bushman, Robert, Joseph Piotroski, and Abbie Smith. 2004. What determines Corporate Transparency? *Journal of Accounting Research* 42: 207-252.

Barth, James, Gerard Caprio, and Ross Levine, 2004. Bank regulation and supervision: what works best?, Journal of Financial Intermediation, 13: 205 – 248.

Caprio, Gerard, Luc A. Laeven, and Ross E. Levine. 2003. Governance and Bank Valuation. World Bank Working Paper No. 3202.

Carter, Richard B., and Steven Manaster. 1990. Initial Public Offerings and Underwriter Reputation. *The Journal of Finance* 45: 1045-1067.

Chan, Louis, Josef Lakonishok, and Theodore Sougiannis, 2001. The Stock Market Valuation of Research and Development Expenditures. *The Journal of Finance*, 56: 2431–2456.

Core, John, Robert Holthausen, and David Larcker. 1999. Corporate Governance, chief executive officer compensation, and firm performance. *Journal of Financial Economics* 51: 371-406.

Daouk, Hazem, Charles Lee, and David Ng. 2007. Capital market governance: How do security laws affect market performance? *Journal of Corporate Finance* 12: 560-593.

Demirgüç-Kunt, Asli, Torsten Beck, and Ross Levine, 2000. A New Database on the Structure and Development of the Financial Sector, *World Bank Economic Review*, 14: 597 – 605.

Doidge, Craig, Andrew Karolyi, and René Stulz. 2004. Why do countries matter so much for corporate governance? European Corporate Governance Institute Finance Working Paper No. 50/2004.

Dreher, Axel. 2006. IMF and Economic Growth: The Effects of Programs, Loans, and Compliance with Conditionality. *World Development* 34: 5: 769-788.

Drobetz, Wolfgang., Matthias Kammermann, and Urs Wälchli, 2005, Long-Run Performance of Initial Public Offerings: The Evidence for Switzerland, *Schmalenbach Business Review,* 59: 253-275

Durnev, Art, Randall Morck, and Bernard Yeung. 2004. Value Enhancing Capital Budgeting and Firm-specific Stock Return Variation. *Journal of Finance* 59: 65-105.

Dyck, Alexander, and Luigi Zingales, 2004. Private Benefits of Control: An International Comparison, *Journal of Finance*, 59: 537 – 600.

Fama, Eugene, and Kenneth French. 2001. Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay? *Journal of Financial Economics* 60: 3–43.

Fernández, Carmen, Eduardo Ley, and Mark F. J. Steel. 2001. Model uncertainty in cross-country growth regressions. *Journal of Applied Econometrics* 16: 563-576.

Gompers, Paul, and Josh Lerner. 2002. *The Venture Capital Cycle*. Cambridge, MA: MIT Press.

Grossman, Sanford, and Joseph Stiglitz. 1980. On the Impossibility of Informationally Efficient Markets. *American Economic Review* 70: 393-408.

Grossman, Sanford, and Oliver Hart, 1988. One Share/One Vote and the Market for Corporate Control. *Journal of Financial Economics*, 20: 175 – 202.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2006. Does Culture Affect Economic Outcomes? *Journal of Economic Perspectives* 20: 2: 23-48.

Guo, Hui, 2004. Limited Stock Market Participation and Asset Prices in a Dynamic Economy, *Journal of Financial and Quantitative Analysis*, *39*: 495-516.

Gwartney, James, and Robert Lawson. 2004. Economic Freedom of the World, Annual Report. http://www. freetheworld.com.

Hart, Oliver, 1995. Corporate Governance: Some Theory and Implications. *The Economic Journal*, 105: 678 – 689.

Hoberg, Gerard. 2003. Strategic Underwriting in Initial Public Offerings. Working Paper, Yale University.

Holmstrom, Bengt, and Jean Tirole. 1997. Financial Intermediation, Loanable Funds, and the Real Sector. *Quarterly Journal of Economics* 112: 663–691.

Hughes, Patricia J., and Anjan V. Thakor. 1992. Litigation Risk, Intermediation, and the Underpricing of Initial Public Offerings. *Review of Financial Studies* 5: 709-742.

Ibbotson, Roger G. 1975. Price Performance of Common Stock New Issues. *Journal of Financial Economics* 2: 235-272.

International Country Risk Guide. 2004. The PRS Group, New York.

Jagannathan, Ravi and Ann Sherman. 2006. Why Do IPO Auctions Fail? Working Paper, University of Notre-Dame.

Kehloharju, Matti. 1993. The Winner's curse, legal liability and the long run performance of initial public offerings. *Journal of Financial Economics* 34: 251-277.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny. 1998. Law and Finance. *Journal of Political Economy* 106: 6: 1113 –1156.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2002. Investor Protection and Corporate Valuation. *Journal of Finance* 57: 3: 1147-1170.

La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer. 2006. What Works in Securities Laws? *The Journal of Finance* 61: 1: 1-32.

Leamer, Edward E. 1983. Let's take the con out of econometrics. *American Economic Review* 73: 31-43.

Leite, Tore. 2007. Adverse Selection, public information and underpricing in IPOs. *Journal of Corporate Finance*, forthcoming.

Levine, Ross E., and David Renelt. 1992. A sensitivity analysis of cross-country growth regressions. *American Economic Review* 82: 942-963.

Ljungqvist, Alexander, and William J. Wilhelm. 2003. IPO Pricing in the Dot-Com Bubble. *Journal of Finance* 58: 723-752.

Ljungqvist, Alexander. 2006. IPO Underpricing. In *Handbook of Empirical Corporate Finance*, ed. B. Espen Eckbo, Amsterdam: North-Holland.

Loughran, Tim, Jay R. Ritter, and Kristian Rydqvist. 1994. Initial Public Offerings: International Insights. *Pacific-Basin Finance Journal* 2: 165-199.

Loughran, Tim, and Jay R. Ritter. 2004. Why Has IPO Underpricing Increased Over Time. *Financial Management* 33: 5-37.

Mauro, Paolo. 1996. The Effects of Corruption on Growth, Investment, and Government Expenditure. International Monetary Fund, IMF Working Paper WP/96/98, Washington, D.C.

Michelacci, Claudio, and Javier Suarez. 2004. Business Creation and the Stock Market. *Review of Economic Studies* 71: 2: 459-481.

Nounis, Christos, 2005. The Greek IPO Initial Returns And The Price Cap Constraints: Evidence from the Athens Stock Exchange (1994-2003), Working Paper, National and Kapodistrian University of Athens.

Pagano, Marco, Fabio Panetta, and Luigi Zingales. 1998. Why Do Companies Go Public? An Empirical Analysis. *Journal of Finance* 53: 27–64.

Pandey, Anil, 2005, Initial Returns, Long Run Performance, and Characteristics of Issuers: Differences in Indian IPOs following fixed price and book building Processes, Working Paper, Indian Institute of Management.

Rajan, Raghuram. 1992. Insiders and Outsiders: the Choice between Informed and Arm's-Length Debt. *Journal of Finance* 47: 1367–1400.

Ritter, Jay R. 1984. The 'Hot Issue' Market of 1980. *Journal of Business* 57: 2: 215-40.

Ritter, Jay R. 2003. Investment Banking and Securities Issuance. In *Handbook of the Economics of Finance*, ed. George M. Constantinides, Milton Harris, and René Stulz, 255-306. Amsterdam: North-Holland.

Rock, Kevin. 1986. Why New Issues Are Underpriced. *Journal of Financial Economics* 15: 187-212.

Sapienza, Harry, Sophie Manigart, and Wim Vermeir. 1996. Venture Capitalist Governance and Value-Added in Four Countries. *Journal of Business Venturing* 11: 439-470.

Sala-i-Martin, Xavier. 1997. I Just Ran Two Millions Regressions. *American Economic Review* 87: 178-183.

Sala-i-Martin, Xavier, Gernot Doppelhofer and Ronald I. Miller. 2004. Determinants of long-term growth: A Bayesian averaging of classical estimates (BACE) approach. *American Economic Review* 94: 813–835.

Shleifer, Andrei, and Robert Vishny, 1986. Large Shareholders and Corporate Control. *Journal of Political Economy*, 94: 461 – 488.

Shleifer, Andrei, and Daniel Wolfenzon. 2002. Investor Protection and Equity Markets. *Journal of Financial Economics* 66: 1: 3-27.

Schwab, Klaus, Peter Conrnelius, and Michael E. Porter, 1999. *The Global Competitiveness Report*. New York: Oxford University Press.

Smarzynska, Beata K. and Shang-Jin Wei. 2000. Corruption and Composition of Foreign Direct Investment: Firm Level Evidence. NBER Working Paper No. 7969, National Bureau of Economic Research, Cambridge.

Sturm, Jan-Egbert, and Jakob de Haan. 2001. How Robust is Sala-i-Martin's Robustness Analysis. University of Groningen, mimeo.

Sturm, Jan-Egbert, and Jakob de Haan. 2005. Determinants of Long-term Growth: New Results Applying Robust Estimation and Extreme Bounds Analysis. *Empirical Economics* 30: 3: 597-617.

Sturm, Jan-Egbert, Helge Berger, and Jakob de Haan. 2005. Which Variables Explain Decisions on IMF Credit? An Extreme Bounds Analysis. *Economics & Politics* 17: 2: 177-213.

Subrahmanyam, Avanidhar, and Sheridan Titman. 1999. The Going Public Decision and the Development of Financial Markets. *Journal of Finance* 54: 1045–1082.

Temple, Jonathan. 2000. Growth Regressions and What the Textbooks Don't Tell You. *Bulletin of Economic Research* 52: 181-205.

Titman, Sheridan, and Brett Trueman. 1986. Information Quality and the Valuation of New Issues. *Journal of Accounting and Economics* 8: 159-172.

Van der Goot, Tjalling. 2003. Risk, the quality of intermediaries and legal liability in the Netherlands IPO market. *International Review of Law and Economics* 23: 2: 121-140.

Reese, William, and Michael Weisbach, 2002. Protection of Minority Shareholder Interests, Cross-Listings in the United States, and Subsequent Equity Offerings. *Journal of Financial Economics* 66: 65-104.

Welch, Ivo. 1989. Seasoned Offerings, Imitation Costs, and the Underpricing of Initial Public Offerings. *Journal of Finance* 44, 421-449.

World Bank, 2006. World Development Indicators, CD-Rom, Washington, DC.

Appendix A: Description and Sources of Variables

Base Model

Variable	Description	Source
Economic growth	Annual GDP Growth.	World Bank, WDI (2006)
IMF program, dummy	Indicates whether an IMF program has been in effect for at least five months.	Dreher (2006)
Market Return	Stock market return of the MSCI Index for the corresponding country.	MSCI Indices for developed and emerging markets
LogIpo	Annual Number of IPOs. Enters the regression as the log.	See Data Sources for the dependent variable in Appendix C.

Hypothesis 1

Variable	Description	Source
Stock market total/GDP	Stock market capitalization to GDP.	Beck et al. (1999)
Stock market traded/GDP	Stock market total value traded to GDP.	Beck et al. (1999)
Stock Market Turnover	Stock market turnover ratio.	Beck et al. (1999)
Access to equity	Index of the extent to which business executives in a country agree with the statement "Stock markets are open to new firms and medium-sized firms." Scale from 1 (strongly agree) though 7 (strongly disagree).	Schwab et al. (1999)
Relative market efficiency	Efficiency of stock markets relative to the banking sector (Total value traded as share of GDP * overhead costs).	Beck et al. (1999)
Auction, dummy	Dummy Variable equalling one when auctions as a mechanism for taking companies public are permitted by law and zero otherwise.	Jagannathan and Sherman (2006)
Book building, dummy	Dummy Variable equalling one when book building as a mechanism for taking companies public is permitted by law and zero otherwise.	Jagannathan and Sherman (2006)
Fixed price, dummy	Dummy Variable equalling one when fixed price auctions as a mechanism for taking companies public are permitted by law and zero otherwise.	Jagannathan and Sherman (2006)

Hypothesis 2

Variable	Description	Source
Credit Regulation	Credit Market Regulations. Includes: ownership of banks: percentage of deposits held in privately owned banks; competition: domestic banks face competition from foreign banks (CGR); extension of credit: percentage of credit extended to private sector; avoidance of interest rate controls and regulations that lead to negative real interest rates, and interest rate controls: interest rate controls on bank deposits and/or loans are freely determined by the market (CGR).	Gwartney and Lawson (2004): Economic Freedom of the World, Those sub indices marked with (CGR) are from the Global Competitiveness Report
Foreign Bank Assets	Share of assets of foreign-owned banks in total banking assets; average over 1990-95.	Beck et al. (1999)
Foreign-owned banks/total banks	Number of foreign-owned banks to total number of banks; average over 1990-95.	Beck et al. (1999)

Max. Ownership Restriction, Dummy	Indicates whether there is a maximum percentage of bank capital that can be owned by a single owner. Question 2.1 in Survey.	Barth et al. (2004)
Security Business Restrictions	Measures the extent to which banks may engage in underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry. Unrestricted = 1 = full range of activities can be conducted directly in the bank; Permitted = 2 = full range of activities can be conducted, but some or all must be conducted in subsidiaries; Restricted = 3 = less than full range of activities can be conducted in the bank or subsidiaries; and Prohibited = 4 = the activity cannot be conducted in either the bank or subsidiaries. Higher values more restrictive.	Barth et al. (2004)
Deposit Insurance Scheme, Dummy	Indicates whether a deposit insurance scheme exists. Question 8.1 in the survey.	Barth et al. (2004)
Influence of the Supervisor, Dummy	Indicates whether the supervisory authority can force a bank to change its internal organizational structure. Question 6.1 in the survey.	Barth et al. (2004)
Single Financial Supervisor, Dummy	Indicates whether there is a single financial supervisory agency for the financial sector. Question 12.1.2 in the survey.	Barth et al. (2004)

Hypothesis 3

Variable	Description	Source
Ownership Concentration	The average percentage of common shares owned by the three largest shareholders in the 10 largest nonfinancial, privately owned domestic firms in a given country. A firm is considered privately owned if the state is not a known shareholder in it.	La Porta et al. (1998)
Corporate transparency	Average ranking of the answers to the following interim reporting questions: Ea (frequency of reports), Ed–Ef (count of disclosed items), and Eb (consolidation of interim reports).	Bushman et al. (2004).
R&D Disclosure Requirements	Average ranking of the answers to the following questions: A6g (R&D), B3f (capital expenditure), Ca (subsidiaries),Cb (segment-product), Cc (segment-geographic), and D1 (accounting policy).	Bushman et al. (2004).
Block premia	The block premia is computed taking the difference between the price per share paid for the control block and the exchange price two days after the announcement of the control transaction, dividing by the exchange price and multiplying by the ratio of the proportion of cash flow rights represented in the controlling block. Here the sample median is used.	Dyck and Zingales (2004)

Accounting	Index created by examining and rating companies' 1995 annual reports on their inclusion or omission of 90 items. These items fall into seven categories: general information, income statements, balance sheets, funds flow statement, accounting standards, stock data, and special items. A minimum of 3 companies in each country were studied.	Bushman et al. (2004)
Governance	Average ranking of the answers to the following questions: B2a (range of shareholdings), B2b (major shareholders), Ce (management information), Cf (list of board members and their affiliations), Cg (remuneration of directors and officers), and Ch (shares owned by directors and employees).	Bushman et al. (2004)
S&P Governance Rating	Measures firm-level governance attributes adopted by firms and attributes imposed on firms through legislation and regulation. Scores are for the year 2000.	Doidge et al. (2004)
StDev S&P Governance Rating	Standard Deviation of S&P Governance Rating. Scores are for the year 2000.	Doidge et al. (2004)
Registered American Depository Receipts	Number of firms with New York Stock Exchange (NYSE) or NASDAQ traded ("Level 2 or 3") ADR programs. Scores are for the year 2000.	Doidge et al. (2004)
Disclosure requirements, index	Index of disclosure requirements with respect to the Prospect; Compensation; Shareholders; Inside ownership; Contracts Irregular; and Transactions.	La Porta et al. (2006)

Hypothesis 4

Variable	Description	Source
Security of property rights	Legal Structure and Security of Property Rights. Includes: Judicial independence: the judiciary is independent and not subject to interference by the government or parties in disputes (GCR); Impartial courts: A trusted legal framework exists for private businesses to challenge the legality of government actions or regulation (GCR); Protection of intellectual property (GCR); Military interference in rule of law and the political process (ICRG), and Integrity of the legal system (ICRG).	Gwartney and Lawson (2004): Economic Freedom of the World, Those sub indices marked with (CGR) are from the Global Competitiveness Report and those with (ICRG) are from the International Country Risk Guide.
Prevalence of insider trading	Prevalence of insider trading (1=pervasive; 7=extremely rare).	Schwab et al. (1999)
Government Stability	Government stability, annual averages.	International Country Risk Guide
Civil law, dummy	Dummy variable equalling one when country is from a civil law origin and zero otherwise.	La Porta et al. (1998)
Corruption	Measures corruption in the political system as a threat to foreign investment based on the analysis of a worldwide network of experts. Range 0 (highest corruption) to 12 (no corruption).	International Country Risk Guide
Insider trading exists, dummy	Year when insider-trading laws were first instituted.	Bhattacharya and Daouk, (2002)

Class action suit, dummy	A dummy variable equalling 1 if a class action suit is available and zero otherwise.	La Porta et al. (2006)
Burden of proof	The index measures the procedural difficulty in recovering losses from directors of the Issuer, distributors and accountants in a civil liability case for losses due to misleading statements in the prospectus.	La Porta et al. (2006)
Criminal Sanctions, index	The index of criminal sanctions with respect to the Criminal director; Criminal distributor; and Criminal accountant.	La Porta et al. (2006)
New antidirectors index	This index of Anti-director rights is formed by adding one when: (1) the country allows shareholders to mail their proxy vote; (2) shareholders are not required to deposit their shares prior to the general shareholders‘ meeting; (3) cumulative voting or proportional representation of minorities on the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders‘ meeting is less than or equal to ten percent (the sample median); or (6) when shareholders have preemptive rights that can only be waved by a shareholders meeting. The range for the index is from zero to six.	La Porta et al. (1998)
One-Share-One Vote, Dummy	Equals one if the company law or commercial code of the country requires that ordinary shares carry one vote per share, and zero otherwise. Equivalently, this variable equals one when the law prohibits the existence of both multiple-voting and nonvoting ordinary shares and does not allow firms to set a maximum number of votes per shareholder irrespective of the number of shares owned, and zero otherwise.	La Porta et al. (1998)
Oppressed Minority, Dummy	Equals one if the company law or commercial code grants minority shareholders either a judicial venue to challenge the decisions of management or of the assembly or the right to step out of the company by requiring the company to purchase their shares when they object to certain fundamental changes, such as mergers, asset dispositions, and changes in the articles of incorporation. The variable equals zero otherwise. Minority shareholders are defined as those shareholders who own 10 percent of share capital or less.	La Porta et al. (1998)
Blocking of Shares, Dummy	Equals one if the company law or commercial code does not allow firms to require that shareholders deposit their shares prior to a general shareholders' meeting, thus preventing them from selling those shares for a number of days, and zero otherwise.	La Porta et al. (1998)

Management stays during restructuring, Dummy	Equals one when an official appointed by the court, or by the creditors, is responsible for the operation of the business during reorganization. Equivalently, this variable equals one if the debtor does not keep the administration of its property pending the resolution of the reorganization process. Equals zero otherwise.	La Porta et al. (1998)
Votes to Call extraordinary Meeting	The minimum percentage of ownership of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting; it ranges from 1 to 33 percent.	La Porta et al. (1998)

Appendix B: Extreme Bounds Analysis (EBA)

To examine both the sensitivity of our baseline model and the coefficients of our explanatory variables of interest to changes in the model specification we apply (variants) of the so-called Extreme Bounds Analysis (EBA) as suggested by Leamer (1983) and Levine and Renelt (1992). EBA has been widely used in the economic growth literature.[11] The central difficulty in this research – which also applies to the research topic of the present paper – is that several different models may all seem reasonable given the data, but yield different conclusions about the parameters of interest. The EBA can be exemplified as follows. Equations of the following general form are estimated:

$$Y = \alpha M + \beta F + \gamma Z + u, \tag{2}$$

where Y is the dependent variable; M is a vector of 'standard' explanatory variables; F is the variable of interest; Z is a vector of up to three possible additional explanatory variables, which according to the literature may be related to the dependent variable; and u is an error term. The extreme bounds test for variable F states that if the lower extreme bound for β – i.e. the lowest value for β minus two standard deviations – is negative, while the upper extreme bound for β – i.e. the highest value for β plus two standard deviations – is positive, the variable F is not robustly related to Y.

As argued by Temple (2000), it is rare in empirical research that we can say with certainty that one model dominates all other possibilities in all dimensions. In these circumstances, it makes sense to provide information about how sensitive the findings are to alternative modelling choices. The EBA provides a relatively simple means of doing exactly this. Still, the EBA has been criticized in the literature. Sala-i-Martin (1997) argues that the test applied in the Extreme Bounds Analysis poses too rigid a threshold in most cases. If the distribution of β has some positive and some negative support, then one is bound to find at least one regression for which the estimated coefficient changes sign if enough regressions are run. We will therefore not only report the extreme bounds, but also the percentage of the regressions in which the coefficient of the variable F is significantly different from zero at the 5 percent level. Moreover, instead of analyzing just the extreme bounds of the estimates of the coefficient of a particular variable, we follow Sala-i-Martin's (1997) suggestion to analyze the entire distribution. Following this suggestion, we not only report the unweighted parameter estimate of β and its standard deviation but also the unweighted cumulative distribution function (CDF(0)), i.e. the fraction of the cumulative distribution function lying on one side of zero. We will base our conclusions on the Sala-i-Martin variant of the EBA.

[11] See, e.g. Levine and Renelt (1992), Sala-i-Martin (1997).

Appendix C: Data Sources

Josef Schuster of IPOX has provided country Level IPO Data for the following countries: Austria, Australia, Belgium, Denmark, Finland, France, Germany, Hong-Kong, Indonesia, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Malaysia, Philippines, Portugal, Singapore, South Korea, Spain, Sweden, Taiwan, Thailand, United Kingdom.

About IPOX Schuster:
IPOX Schuster LLC is an independent, research-driven financial services firm specializing in financial products design related to global IPOs. The underlying philosophy involves classifying IPOs as a separate equity sector for a substantial period of time in aftermarket trading. The main product is the series of IPOX(r) IPO Indexes, a set of 17 indexes encompassing an index technology which allows for scaleable, investable and sustainable exposure into global IPO performance. The company has its roots in academic work on IPOs pursued in the Financial Markets Group (FMG) at the London School of Economics (LSE). IPOX Schuster LLC was officially incorporated in 2004. Since then, an increasing number of buy- and sell-side clients have been endorsing IPOX by distributing IPOX-linked products or by using IPOX products for benchmarking purposes. These include ABN Amro Bank, Banco Santander, First Trust Portfolios, Lehman Brothers, Macquarie Bank, Millennium Partners, UBS or Van Kampen Investments. Highly experienced professionals maintain the global range of IPOX Indexes on a real-time basis with Standard & Poor's acting as the calculation agent.

IPO Underpricing Data for Greece is from Christos Nounis, The Greek IPO Initial Returns And The Price Cap Constraints: Evidence from the Athens Stock Exchange (1994-2003), 2005, Working Paper, National and Kapodistrian University of Athens.

IPO Underpricing Data for Switzerland is from Drobetz, W., M. Kammermann, and U. Wälchli, 2005, "Long-Run Performance of Initial Public Offerings: The Evidence for Switzerland, *Schmalenbach Business Review, Vol.* 59 (*Zeitschrift für betriebswirtschaftliche Forschung*), pp. 253-275.

Indian Data is from A. Pandey, 2005, "Initial Returns, Long Run Performance, and Characteristics of Issuers: Differences in Indian IPOs following fixed price and book building Processes, Working Paper, Indian Institute of Management.

Australian Data has been provided by Li-Anne Woo, Bond University, Australia.

Underpricing Data for China from 1993-2001 is from Junbo Wang, City University of Hong Kong.

Underpricing Data for Canada has been provided my Jean-Marc Suret and Cecile Carpentier, Laval University, Quebec.

US Data is from Jay R. Ritter, http://bear.cba.ufl.edu/ritter/ipodata.htm.

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