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The Effect of Government Quality on IPO Underpricing: A Cross Country Analysis (1996–2022)

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ABSTRACT

Keywords: Initial Public Offering, Underpricing, Government Quality, Information Asymmetry

In this thesis I study whether a country's government quality has negative effects on the average level of underpricing in initial public offerings. To study this, I have collected data on the average level of first-day returns for 22 countries from 1996 to 2022, examining its relationship with four dimensions of government quality: control of corruption, government effectiveness, rule of law, and voice and accountability. I find significant evidence that these aspects of government quality are negatively associated with the average level of underpricing in a country. This study therefore suggests that enhancing these aspects could potentially reduce the average level of underpricing within a country. This thesis also addresses endogeneity and sample selection bias concerns, reinforcing the robustness of the observed relationship.

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CHAPTER 1 Introduction

Many studies have examined the phenomenon of the Initial Public Offering (hereafter: IPO), with particular attention to IPO underpricing. Defined as the difference between the issue price of a new share and the listing price on the first day of trading on the secondary market (Berk & DeMarzo, 2020), IPO underpricing represents a financial anomaly that exists globally. Despite its global occurrence, the extent of the level of underpricing varies massively across countries and regions. Understanding what explains these differences is vital for both researchers, trying to uncover underlying market dynamics, and investors who aim to effectively navigate through the complexities of this.

This thesis will embark on the influence of government quality on IPO underpricing across 22 countries over the time-period from 1996 to 2022, including 2 major financial events. This study will prove relevant to researchers interested in IPO underpricing across countries, but also to investors willing to engage in the IPO market, potentially helping them choose in which country they wish to commit. This study is pivotal for comprehending the broader national institutional context within which IPOs are priced and traded, shedding light on how governance factors shape investor perceptions and market outcomes. Overall, the findings will contribute to our understanding of how market behaviour and the role of government quality influences IPO pricing dynamics.

To analyse government quality, we test 4 different hypotheses, measuring different aspects of government quality, following Rothstein (2011). We test for the absence of corruption, government efficiency, rule of law and democracy as these offer a concise, yet comprehensive image of a country's quality of the government. We expect all 4 aspects to have a negative effect on the average level of underpricing.

To examine the effect of government quality on the average level of first day returns across countries, we implement control variables. We control for a country's legal origin by implementing a dummy variable. We distinguish a country's legal origin in civil law or common law, as countries with common law systems would exhibit lower levels of IPO underpricing compared to civil law systems. We also control for GDP per capita to control for developing countries as they tend to exhibit higher levels of IPO underpricing. We include proxies and interaction effects with the independent variables to isolate the effects of our moderator, information asymmetry. We use a hierarchical approach in our analysis. That implies one-on-one regressions with our independent variables (i), adding control variables (ii) and including proxies and interaction effects (iii).

To effectively analyse the effect of government quality on the average level of underpricing, we will use a quantitative approach. We perform a GLS regression, as these account for heteroskedasticity and autocorrelation.

Our results present significant effects of our independent variables on our dependent variable. Because of our hierarchical approach, we notice that adding control variables and proxies seems to improve the model's overall significance. Eventually, we find evidence for all 4 hypotheses and fail to reject them.

To test for the robustness of our results, we perform a sample re-estimation. Except for a moderate difference in magnitude, the conclusions about our results remain unchanged. We also correct for endogeneity, as our results may be driven by reverse causality or omitted variable bias. We find downward bias in 3 out of 4 independent variables. However, the correction shows support for our hypotheses, confirming our observed relationship.

The remainder of this thesis is structured as follows. Chapter 2 contains the theoretical framework in which I will briefly discuss relevant literature regarding the initial public offering (IPO), the phenomenon of IPO underpricing and government quality. At the end of this chapter, I will state my hypotheses. Chapter 3 will explain the data that I will use and will also include descriptive statistics and the correlation matrix. Chapter 4 will describe the methodology used to obtain our results. Chapter 5 will present my results, followed by a discussion in Chapter 6. Lastly, Chapter 7 will contain my conclusion, followed by the Appendix found at the end of this paper.

CHAPTER 2 Theoretical Framework

2.1 IPO Theoretical Background

An Initial Public Offering is the process in which a privately owned company lists common shares of stock on a stock exchange, enabling entry into the financial market (Reed, 2000). Previous research shows that conducting IPOs has been one of the most prominent ways of raising capital. The act of going public enhances the company's prestige and could bring indirect benefits, such as hiring capability or increased market image and visibility. The purpose of this is that it allows existing promoters and venture capitalists to get an opportunity to diversify their investments and to book capital gains (Haralayya, Vibhute, & Basha, 2022). However, the investors' opportunity to diversify their investments is also one of the major disadvantages of an IPO, as this leads to more widely dispersed equity holders (Berk & DeMarzo, 2020). After the decision to go public, an underwriter, usually an investment banking firm, manages the offering and design structure. This includes the types of shares to be offered and the mechanics the underwriter will use to sell the stock. Underwriters require that initial pre-IPO shareholders do not sell their stock for a pre-determined period, usually 180 days. This is called the "Lock-up Period".

While IPOs have emerged as a vehicle for venture capitalists to exit their investments, research indicates that IPOs are commonly utilized for financing purposes. The biggest advantage of this way of financing, is the ability to acquire large amounts of funds at once, which can then be used for investment purposes or the repayment of debt (Wanat, Sarniak, & Mikołajczak, 2019). A substantial body of literature exists on IPO's and underpricing, where the latter will be addressed in the following paragraph. The scope of the relevant literature is extensive, with conclusions varying significantly across firms, across time and across countries. The variation between countries is high (Bigus & Dreyer, 2023) and continued interest has arisen to tests exploiting cross-country differences in institutional frameworks regarding IPOs (Ljungqvist, 2007). This is why we are interested in investigating these dynamics on the country level.

2.2 IPO Underpricing

IPOs can either be over, or underpriced. IPO underpricing is the difference between the issue price of a new share and the listing price on the first day of trading on the secondary market. The secondary market is defined as the market where shares are traded among investors, after the issuance, such as in the form of an IPO, in the primary market has occurred (Berk & DeMarzo, 2020). Relevant scientific literature distinguishes between ex-ante underpricing, before the IPO and ex-post underpricing, after the IPO. Whereas ex-ante underpricing is the difference between the expected price on the secondary market and the issue price, the ex-post underpricing is defined as the difference between the realized first trading price and the issue price (Haralayya, Vibhute, & Basha, 2022). If the issue happens to be underpriced, it benefits the investors, because they are able to earn more return on their equity shares. If the issue happens to be overpriced, the exact opposite occurs, and investors lose out.

2.2.1 Early Investigations

Over the years, there has been growing evidence that IPOs tend to be underpriced. Reilly and Hatfield (1969) were the first to find evidence for this phenomenon and found that investors in new-stock issues on average experience superior short- and long-run returns in 53 US-based firms during the 1963-1966 period. They attribute this to the downward bias underwriters will have in pricing their new stock issues. As a result, investors enjoy superior short and long-term returns relative to the market.

Logue (1973) also finds the phenomenon of underpricing in his results. He claims that this is due to the minimization of an investment banker's (i.e. underwriters) costs and risks, gaining him favour with investors and losing the favour of issuers. Yet, he argues that it remains unanswered as to why underwriters underprice their stock and give up potential profits and to what extent these relationships between investors and investment bankers exist.

Ibbotson (1975) documented a positive mean initial performance of unseasoned new issues, with no departures from market efficiency. Hence, his results too suggest that new issue offerings are underpriced. Despite this conclusion, no clear explanation for this is provided, and it remains unclear whether issuers suffer losses or whether they are compensated by underwriters.

Ritter (1984) contributes to the previous literature by confirming the tendency for IPOs to be underpriced, this being about 10% on average for established firms. He also finds a positive relationship between the degree of uncertainty about a security's value and the degree of expected underpricing. Hence, the smaller the uncertainty about a firm's value, the smaller the amount of expected money to compensate investors.

Loughran, Ritter and Rydqvist (1994) provide international insight into IPOs. They analyse differences in underpricing in binding regulations, contractual mechanisms and characteristics of firms going public for fifteen countries. Their evidence confirms underpricing in the short run and suggests that average underpricing tends to be higher if (i) the degree of government interference is higher, (ii) the earlier in the process of going public the offering price is set and (iii) the riskier the firms going public are. Furthermore, they also conclude that developing countries seem to exhibit higher levels of underpricing than developed countries.

Ibbotson and Ritter (1995) document three different anomalies associated with the process of going public in many countries. The most prominent two being the frequent incidence of large initial returns accruing to investors in IPOs of common stock (i.e. underpricing) and the existence of hot issue markets. To explain the frequent incidence of large initial returns, Ibbotson and Ritter (1995) name a total of eleven hypotheses. We distinguish the most important ones as the signalling hypothesis, the costly information acquisition hypothesis and the ownership dispersion hypothesis. The signalling hypothesis states that firms purposely underprice new issues to leave a good taste with investors, allowing them to sell future offerings at a higher price. Secondly, the costly acquisition hypothesis, roughly similar to the market incompleteness hypothesis, states that companies compensate investors through underpricing, to induce them to reveal their valuations, confirming the relationship observed by Ritter (1984). Lastly, the

ownership dispersion hypothesis asserts that firms may intentionally underprice their shares to disperse ownership and make it more difficult for outsiders to challenge management. However, this is mentioned by Berk and DeMarzo (2020) as a major disadvantage of IPOs. Ibbotson and Ritter (1995) attribute the existence of hot issue markets to specific industries or to the investors' assumption of positive autocorrelation in initial returns on IPOs.

La Porta et al. (1997) show that civil law legal systems, compared to common law legal systems, have the weakest investor protection and least developed capital markets. Other researchers, like Engelen and Van Essen (2010) show that countries with weaker investor protection (i.e. common law countries) and a less developed legal framework exhibit, on average, more underpricing. Hence, Bigus and Dreyer (2023) state that we should then also expect lower levels of underpricing in common law countries.

Ljungqvist (2007) distinguishes four theories for underpricing, these being (i) asymmetric information across investors, (ii) institutional reasons, to explain cross-country differences, (iii) control considerations, for using auction mechanisms to price and allocate IPOs and (iv) behavioural approaches. Furthermore, he too contributed to previous studies by confirming IPOs to be underpriced in virtually all countries.

Another well-known explanation for underpricing is the winner's curse. This form of adverse selection arises when demand for shares from other investors is low, potentially resulting in a less successful IPO. This effect can be significant enough that investing in every IPO would no longer yield above-market returns. Consequently, underwriters may feel compelled to underprice issues on average (Berk & DeMarzo, 2020).

2.2.2 Recent Empirical Studies

Banerjee, Dai and Shrestha (2011) performed a cross-country analysis to try and explain differences in underpricing. Eventually, they show that underpricing is higher in countries with higher levels of information asymmetry, lower home country bias among investors, less effective contract enforcement mechanisms, and more accessible legal resources.

Marcato and Zheng (2021) investigate the impact of political uncertainty on underpricing across countries. They conclude that the level of underpricing is higher in the pre- and post-election years. Furthermore, they show that country institutions do not directly affect initial returns, but that they may mitigate the impact of political uncertainty on underpricing. They also show that a more market-friendly political environment, represented by a centrist government and higher public expenditure, directly reduces initial returns and can moderate the higher underpricing in pre-election years.

Bigus and Dreyer (2023) also performed a cross-country analysis and found that higher levels of country-level accounting enforcement are associated with lower levels of underpricing. They argue that stricter country-level accounting enforcement restricts incentives to manage earnings prior to and after an IPO, which leads to lower information asymmetry. This decreases investors' uncertainty about realizing a sufficient rate of return, which justifies a lower level of underpricing.

2.3 Government Quality

A longstanding topic of debate revolves around the definition of quality of government. Kaufmann, Kraay and Zoido-Lobatón (2000) were one of the first to define this topic. They define governance as the traditions and institutions that determine how authority is exercised in a country. This definition includes (i) the process by which a government is selected, held accountable, monitored and replaced, (ii) the capacity of a government to manage resources efficiently and enforce and implement policies and regulations, and lastly, (iii) the respect of citizens and the state towards governance institutions.

Rothstein and Teorell (2008) argue that this definition is too broad, as it includes both access and exercise to power and fails to distinguish between the content of specific policy programs and governing procedures. Rothstein (2011) herself tries to conceptualize quality of government and eventually identifies four factors that a definition should include: absence of corruption, rule of law, democracy and government efficiency. Eventually, she proposes the following definition: "the impartiality of the government", which we will follow throughout this study.

2.3.1 Early Studies

Hooper, Sim and Uppal (2005) explore the relationship between governance and stock market performance on a global scale. Their results demonstrate the quality of governance institutions as being positively associated with financial market performance and support the view that quality of governance reduces both transaction costs and agency costs. This confirms previous literature from Porta et al. (1999) that a "good government" is associated with efficiency.

Theory suggests that decentralization may influence the quality of the government. Treisman (2002) suggest that certain types of decentralization may have adverse effects on the government quality. However, he emphasizes that this does not imply centralization is always the remedy, as decentralization often serves other important functions such as interethnic cooperation.

Svallfors (2013) finds a clear effect of government quality on attitudes towards taxes and social spending. Moreover, he finds that government quality conditions the impact of egalitarianism on attitudes to public policies. Hence, his paper supports the notion that public support for welfare policies and taxation is heavily contingent upon the quality of institutions through which they are delivered.

Charron and Lapuente (2013) find a significant relationship between historical factors, specifically historical constraints on the executive, and regional government quality today. They conclude that historical factors play a key role in explaining the variation of government quality in the EU region, confirming previous literature by Tabellini (2010).

2.3.2 Recent Empirical Studies

Houqe, Monem and van Zijl (2012) examine the association between the country-level government quality and a firms' choice of external auditors. They show that the quality of a government of a country has a significant positive effect on the likelihood of choosing Big 4 auditors by firms in that country. They conclude that government quality is an important determinant of financial reporting quality.

Charron, Lapuente and Annoni (2019) measure the quality of government in the EU region across time. They conclude that geographic and historical legacies matter in determining the quality of government, but they do not fully determine the quality of government in a region. In line with previous literature, the quality of government is a generally stable characteristic of the region, besides notable changes.

Citro, Cuadrado-Ballesteros, & Bisogno (2019 investigate the relationship between budget transparency and governance quality across 59 countries. Their findings show simultaneous causality. Budget transparency could be retained as a tool which can contribute to improving the quality of governance, where a greater level of transparency reduces informational asymmetries, following the agency and public choice theory. Moreover, politicians are motivated to document and clarify the results of their implemented policies. Their findings also suggest that disparities in socio-economic factors, can play a part in understanding the levels of governance quality and budget transparency.

2.4 Hypotheses

To state our hypotheses, we use the definition of the quality of a government provided by Rothstein (2011) as stated in 2.2. We distinguish four different areas in which we posit a hypothesis. To measure the effect of government quality on underpricing, we use these same four areas.

Hoque and Mu (2021) find that the underpricing of IPOs is lower under the Sponsorship System compared to the Approval System in China. After all, their results show that a reduction of state control increases the efficiency of the Chinese IPO market. Chen et al. (2017) provide country-level evidence that heterogeneous institutional environments help to explain the cross-country underpricing. They find that countries with higher economic freedom, especially higher financial freedom, exhibit significantly fewer underpricing problems. Duong et al. (2022) explore the relationship between democracy and underpricing across 45 countries and conclude this to be negative. They find that the effect is weaker for firms audited by Big 4 auditing firms. In addition, they find that higher levels of democracy exhibit lower levels of information asymmetry, moderating a reduction in underpricing.

H1: At the cross-country level, democracy reduces underpricing

Liu, Uchida and Gao (2014) find that underpricing is negatively associated with the protection of (property) rights using Chinese data. Their results underscore the implication that improvements in the legal environment reduce underpricing. These results are supported by other literature such as Kyere (2020), which finds that stronger investor protection laws correspond with lower underpricing. Engelen and Van Essen (2010) confirm this and show a negative relationship between a country's legal framework and the underpricing of IPOs. We therefore introduce the following hypothesis:

H2: The rule of law is negatively related to underpricing

Wang and Song (2021) investigate the impact of local corruption on underpricing in China and conclude a positive relationship, that is: firms located in regions with high corruption exhibit higher levels of underpricing. They do find that high-reputation underwriters weaken or attenuate this effect. Other research, such as Gounoupoulous, Huang and Liu (2019) confirm this effect and find that political corruption increases the level of underpricing, imposing burdens on issuing firms. Wang (2013) finds that firms from a highly corrupted country are associated with more underpricing as corruption increases "ex ante uncertainty" on the IPO valuation. Therefore, we hypothesize that corruption is positively associated with more underpricing. By using the areas from Rothstein (2011), we state the following:

H3: Absence of corruption is negatively associated with underpricing

Baker et al. (2021) investigated the relation between ESG risk management and firm-level IPO underpricing in 36 countries during the period 2008 until 2018. Their analysis provides support for a significant relationship between ESG (Environmental, Social & Governance) ratings and firm-level underpricing, and they report a negative relationship between these two variables. After all, it shows that by effectively managing its ESG resources, a country reduces information asymmetry and uncertainty associated with capital markets. Loughran, Ritter and Rydqvist (1994) present evidence indicating that reducing regulatory interference in determining offering prices leads to a decrease in short-run underpricing. Provided that government effectiveness is associated with less regulatory interference (Smith, 1776), this allows us to introduce our fourth hypothesis:

H4: Government efficiency reduces underpricing

2.5 Moderator

As well as Baker et al. (2021) and Duong et al. (2021), Ljungqvist (2007) too mentions information asymmetry as one of the reasons for underpricing, which is later confirmed by other literature, such as Hoque (2014) and Boulton et al. (2011). They conclude that information asymmetry is a significant driver of underpricing. Elbadry, Gounopoulos, and Skinner (2015) show the existence of an inverse relationship between governance quality and information asymmetry. This indicates that information asymmetry moderates the effect of governance quality on underpricing, as governance quality can reduce information asymmetry, which in turn affects the level of underpricing.

H5: Information asymmetry moderates the effect of governance quality on IPO underpricing such that lower information asymmetry strengthens the effect of governance quality in reducing IPO underpricing.

CHAPTER 3 Data

This chapter presents the databases used and provides a comprehensive definition of each variable. We use the IPO data from Prof. Ritter, specifically the average first day returns for a total of 22 countries, which provides a comprehensive overview of the average underpricing throughout the years per country. The timeframe of the data from these average first day returns ranges from the period 1980 to 2023. Some countries contain data from all years, while others contain data starting later or ending a maximum of two years earlier. Prof. Ritter uses different sources to create this database. Where more than one set of authors is listed as a source of information, combined sample sizes have been constructed. Procedure for how data used is constructed differ per study. In general, in countries where market prices are available immediately after offering, a one-day raw return is reported. In countries where there is a delay before unconstrained market prices are reported, market-adjusted returns over an interval of several weeks are reported. All the averages weight each IPO equally.

We also use the World Bank database, which offers data on global economics and social statistics on all members. We utilise the Worldwide Governance Indicators (WGI's). Specifically, the Corruption Control: Estimate, Voice and Accountability: Estimate, Rule of Law: Estimate and Government Effectiveness: Estimate. The DataBank contains this data in time series format. Members include 189 nations, who, most of the time, consistently provide data on their global development.

Our sample consists of the 22 previously mentioned countries. The timeframe of our sample spans from 1996 to 2022, aligning with the data from Prof. Ritter and the World Bank. Ultimately we obtain a total of 594 observations which we'll use to perform our study.

3.2 Dependent variable

The *average first-day return* (i.e. underpricing) is the difference between the issue price of a new share and the listing price on the first day of trading on the secondary market (Berk & DeMarzo, 2020) and is measured as a percentage. Data is collected from Prof. Ritter for $N = 22$ countries and $t = 27$ years by taking the average first-day returns. Some countries do not contain data on our full time period, hence creating an unbalanced panel dataset. We drop all observations with a negative value, as these span only four percent of our observations. This allows us to transform this variable by taking the natural logarithm.

We see remarkable differences in the dataset, as show in Figure 1. Countries in Asia, on average, experience higher levels of underpricing compared to Europe. We also observe that China exhibits extreme values of underpricing looking at the rest of the countries in our sample Additionally, 1999 recorded the highest level of underpricing on average, significantly surpassing other years in our sample.
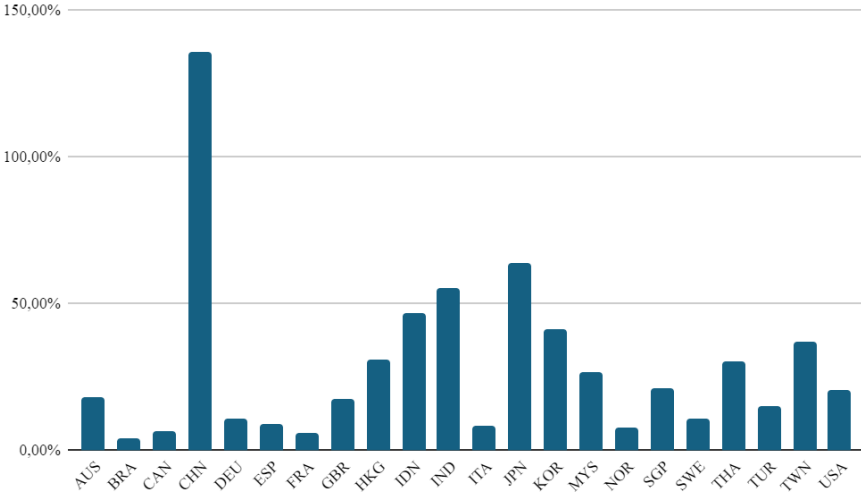

Figure 1: Average first-day returns

3.3 Independent variables

Government quality is defined as the impartiality of the government (Rothstein, 2011). This definition includes four factors: absence of corruption, rule of law, democracy and government efficiency. Rothstein (2011) emphasises that the system of "voice and accountability" could be included in the definition in place of democracy for the (sake of the) definition of good governance.

To measure these factors, we look at the Control of Corruption: Estimate, Voice and Accountability: Estimate, Rule of Law: Estimate and Government Effectiveness: Estimate respectively. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5. Data is collected from The World Bank for N = 22 countries and for the period 1996 to 2022, where the years 1997, 1999 and 2001 are missing (t = 24), creating an unbalanced panel dataset.

Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Variation between countries is significant, with massive differences even amongst neighbouring nations. For example, we see countries like Japan and France excel, whereas China and Italy underperform.

Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. This variable has a large variation across our sample, supported by the highest standard deviation out of these four

variables measuring government quality. As expected, we see higher levels in very developed countries, such as Singapore and Norway, and lower levels in developing countries, like Brazil.

Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. We see remarkable differences across our sample, despite having the lowest standard deviation out of these four variables. We see higher levels in developed countries and lower levels in developing countries.

Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. We see higher levels in countries in the Western Hemisphere and lower levels in all of Asia. It is also the variable which sees the most improvement over our time period.

The *legal origin* of a country is our first control variable and claims that two legal origins shape lawmaking, namely civil/codified law or common law. Following La Porta et al. (1997), Bigus and Dreyer (2023) state that we should expect lower levels of underpricing in countries using common law-based legal systems. The legal origin per country can be found in the Appendix ... Data on whether a country uses civil or common law is collected from Wikipedia for N = 22 countries. The number of years is irrelevant, since countries do not transition from common to civil law systems, as it would entail a complete overhaul of the entire legal framework. This is a dummy variable, where we assign value 1 to common law countries, and value 0 to civil law countries. We ignore countries that use sharia law next to common or civil law. We notice that former colonies follow the same legal system as their colonisers, like Hong Kong and the United Kingdom. We also observe that, in accordance with literature, common law countries have a lower level of underpricing on average.

GDP per capita, defined as the 'gross domestic product divided by midyear population' (World Bank Indicators), is our second control variable. Loughran, Ritter, and Rydqvist (1994) conclude that developing countries tend to exhibit higher levels of underpricing compared to developed countries. Thus, we use *GDP per capita* to distinguish between developing and developed markets, serving as our second control variable. Data is collected for N = 22 countries and t = 27 years from The World Bank and the International Monetary Fund (IMF) for Taiwan. This variable is measured in US dollars, using current prices, and was transformed by taking the natural logarithm, which has also been done in other relevant literature (Zang & Neupane, 2024). We see large differences in the data, with high levels in the Western Hemisphere and lower levels in developing countries in Asia.

The World Press Freedom Index is our first proxy for our moderator, information asymmetry. *Press freedom* is defined as the ability of journalists as individuals and collectives to select, produce, and disseminate news in the public interest independent of political, economic, legal, and social interference and in the absence of threats to their physical and mental safety. This data is collected from The World Bank for 22 countries, starting between 1998 and 2002 and ending in 2022. We use the World Press Freedom Index – Score which is divided into 5 categories: good (85-100), satisfactory (70-85),

problematic (55-70), difficult (40-55) and very serious (<40). We see remarkable differences in the dataset, with countries following a democratic regime exhibiting higher scores than countries following a non-democratic regime.

Fixed broadband subscription, per 100 people, refers to fixed subscriptions to high-speed access to the public Internet (a TCP/IP connection) at downstream speeds equal to, or greater than, 256 kbit/s. This is our second proxy for information asymmetry. Higher fixed broadband subscription indicates that more people have access to the internet, facilitating the acquisition of information. Data for this variable starts between 1998 and 2003 and is collected from the World Bank for 21 countries, except for Taiwan. Unfortunately, no data is available for this country. In the dataset, we see large differences between developed and developing countries, as expected.

Settler mortality is defined as the mortality rate faced by Europeans at the time of colonization. Acemoglu, Johnson and Robinson (2001) argue that European mortality rates can be used to estimate the effect of institutions on economic performance and that differences in colonial experience could be a source of exogenous differences in institutions. We will use this variable as an instrumental variable to perform a two-staged least squares regression. Data is collected from the QoG database. The variable is transformed by taking the natural logarithm and is cross-sectional. The only downside of this variable is that it only contains data for 13 countries.

3.4 Summary statistics

Table 1: Descriptive Table of Variables

Variable	Average	Median	Min	Max	Standard deviation
Log Average First-day Returns	-1.813	-1.897	-4.605	1.668	1.151
Control of Corruption	0.916	1.179	-1.160	2.301	0.971
Government Effectiveness	1.061	1.295	-0.705	2.470	0.763
Rule of Law	0.940	1.222	-0.910	2.024	0.820
Voice and Accountability	0.643	0.941	-1.750	1.775	0.834
Legal origin	0.318	0	0	1	0.466
Log GDP per Capita	4.235	4.435	2.602	5.036	0.534
Press Freedom	45.716	50.710	-10	136	31.710
Fixed Broadband Subscription	19.091	19.040	0.001	49.404	14.691
Settler Mortality	3.318	2.874	0.936	5.136	1.377

Table 1 offers a descriptive overview of our variables. We can see large differences in the average first-day returns, even after the log transformation, with levels ranging from –4.605 to 1.668, and a high standard deviation of 1.151. Control of corruption exhibits the highest standard deviation of the four government quality variables, 0.971 respectively, indicating a larger spread in levels in its data. We also observe that, on average, governments operate relatively effectively, as indicated by an average score of 1.061. However, levels of voice and accountability are relatively low, both in terms of the average and the median. We also notice that more countries seem to use a civil law system than a common law system as the average is 0.32. GDP per capita does not seem to exhibit much variation by looking at the standard deviation of 0.534. Press freedom displays high variability, which can be seen by looking at the standard deviation, whereas fixed broadband subscription displays a relatively normal distribution. Settler mortality does show larger variability, with a minimum and maximum of 0.9361 and 5.1358 respectively.

We observe large correlation between our 4 independent variables by looking at Table 2. However, since we separately test each of them, this should not lead to multicollinearity problems. We also observe that our instrumental variable is highly correlated with both our independent and control variables.

Table 2: Correlation Matrix

Variable	1	2	3	4	5	6	7	8	9	10
1. Log average first day returns	1.0000									
2. Control of Corruption	-0.3026	1.0000								
3. Government Effectiveness	-0.2237	0.9492	1.0000							
4. Rule of Law	-0.3607	0.9677	0.9439	1.0000						
5. Voice and Accountability	-0.5969	0.6467	0.5027	0.7132	1.0000					
6. Legal origin	-0.1620	0.5233	0.5122	0.5528	0.4860	1.0000				
7. Square root GDP per Capita	-0.0133	0.5544	0.5676	0.5595	0.1589	0.2374	1.0000			
8. Press Freedom	0.1588	-0.0733	-0.0654	-0.0408	-0.1336	-0.0093	0.2222	1.0000		
9. Fixed Broadband Subscription	-0.2413	0.6201	0.6092	0.6790	0.4394	0.2366	0.6651	0.2854	1.0000	
10. Settler Mortality	0.3332	-0.7819	-0.7236	-0.7850	-0.6522	-0.5752	-0.5134	0.0634	-0.4687	1.0000

This correlation matrix presents the pairwise correlations between variables related to government quality and the average first-day returns.

CHAPTER 4 Method

To analyse the impact of government quality and other control variables on underpricing at the country level, we depart from the approach used in previous literature, which typically employs an Ordinary Least Squares (OLS) regression. Instead, we opt for a Generalized Least Squares (GLS) regression approach. GLS regression models are used when the OLS estimates are not the best linear unbiased estimator (BLUE). In this study, it is because of heteroskedasticity and autocorrelation, whereas OLS does not specifically account for the latter. This approach allows us to determine which aspects of government quality have the most significant impact on underpricing and to what extent. We use four different regression models, one for each hypothesis stated in section 2.4, to determine the individual effect of every variable, as correlation between them is high. The regression models are as follows:

$$Underpricing_{i,t} = \beta_0 + \beta_1 Control\ of\ Corruption_{i,t} + \beta_2 \textbf{Control Variables} + \varepsilon_{i,t}$$

$$Underpricing_{i,t} = \beta_0 + \beta_1 Government\ Effectiveness + \beta_2 \textbf{Control Variables} + \varepsilon_{i,t}$$

$$Underpricing_{i,t} = \beta_0 + \beta_1 Rule\ of\ Law + \beta_2 \textbf{Control Variables} + \varepsilon_{i,t}$$

$$Underpricing_{i,t} = \beta_0 + \beta_1 Voice\ and\ Accountability + \beta_2 \textbf{Control Variables} + \varepsilon_{i,t}$$

In the above-mentioned regression, underpricing represents the average first-day return per country per year. Absence of Corruption, Voice and Accountability, Rule of Law and Government Effectiveness are all measures of government quality, assessed annually at the country level.

We use a hierarchical approach to estimate our model. Instead of estimating the model in one go, we first estimate the effect of β_1 on underpricing and then start adding control variables to see if and how this changes our estimates and their significance.

We perform a White test to test for heteroskedasticity. Since we reject our null hypothesis of homoscedasticity, we must account for the issue of heteroskedasticity. We use clustered errors to counter this.

We perform a Durbin-Watson to test for the presence of serial correlation. We obtain a value significantly different from two and reject the null hypothesis of no serial correlation. Our results are confirmed after performing the Breusch-Godfrey test, where we notice severe autocorrelation.

We do not include fixed or random effects as this is not possible with GLS.

We do not expect our panels (i.e. countries) to be correlated with each other, as literature has proven that the degree of underpricing varies enormously across countries. Hence, we do not expect correlation between countries.

We find autocorrelation in the errors, which we can see after plotting the residuals over time. We expect that observations in the same country may be correlated due to common country-level factors. To counter this, we use panel specific auto correlation structure in our GLS regression. This panel specific auto correlation addresses the unique correlation pattern within each group or panel and helps to correct

for any serial correlation in the residuals. The structure specifies that that, within panels, there is AR(1) autocorrelation and that the coefficient is specific to each panel. By modelling these correlations effectively, GLS can provide more reliable and unbiased estimates.

We use proxies to measure and isolate the effect of asymmetric information, as this has proven to be the moderator in our relationship. We identify two proxies, *press freedom* and *fixed broadband subscription* respectively. We use these proxies to measure the direct impact of the moderator on our dependent variable. We also use interaction terms to explore how information asymmetry moderates our relationship. These proxies allow for more reliable estimates and address endogeneity concerns.

We check for the robustness of our results by re-estimating the model for different samples. This addresses the concern that our results might be driven by a few countries with extreme values of the average level of underpricing.

To correct for the issue of endogeneity, we employ an instrumental variable (IV) and a two stage least squares (2SLS) regression, following the approach used by Li, Wang and Wang (2019). We use *settler mortality* as our instrumental variable, as this variable meets both the relevance condition and exclusion restriction. The relevance condition requires the instrumental variable to be correlated with the endogenous explanatory variable, whilst the exclusion restriction requires that the instrumental variable is not correlated with the error term in the regression model. We present the first stage to show the relevance condition by regressing our instrument on our explanatory variable (i.e. independent variable). In the second stage, we show the impact of our independent variable on our dependent variable, whilst correcting for endogeneity through the use of the instrumental variable. Additionally, by isolating the exogenous variation in the independent variable, an instrumental variable and the two-stage least squares regression provide robust estimates less vulnerable to biases arising from reverse causality and omitted variable effects. This enhances the credibility of our regression results.

CHAPTER 5 Results

Table 3 presents the results from the GLS regressions described in the previous chapter. We use a hierarchical approach to show the impact of the independent variables on the dependent variable, that is starting by performing a one-on-one regression (A), then adding control variables (B) and finally adding proxies (C). We refer to the regressions per independent variable as frameworks (e.g. framework 1, framework 2 etc.)

Our independent variable, the *average first-day returns* (i.e. underpricing), as discussed in Chapter 4, is transformed by taking the natural logarithm. Therefore, since our dependent variable is measured by taking the natural logarithm, we interpret the effect of the coefficient β_1 as $(1 - e^{\beta_1})$ on the *average first-day returns*, in percentages.

Table 3: Regression Results

	Dependent variable:											
	(1A)	(1B)	(1C)	(2A)	(2B)	(2C)	(3A)	(3B)	(3C)	(4A)	(4B)	(4C)
Control of Corruption	-0.262*** (0.058)	-0.357*** (0.085)	-0.780*** (0.150)									
Government Effectiveness				-0.313*** (0.096)	-0.298** (0.141)	-1.002*** (0.215)						
Rule of Law							-0.341*** (0.073)	-0.547*** (0.110)	-0.994*** (0.193)			
Voice and Accountability										-0.498*** (0.069)	-0.631*** (0.083)	-1.049*** (0.179)
Legal Origin		0.226* (0.134)	0.466*** (0.133)		0.308** (0.146)	0.467*** (0.143)		0.295** (0.131)	0.503*** (0.193)		0.197* (0.114)	0.430*** (0.124)
Log GDP per Capita (in US$)		0.161 (0.152)	0.494*** (0.156)		-0.181 (0.155)	0.409** (0.167)		0.295* (0.155)	0.553*** (0.156)		0.276** (0.131)	0.497*** (0.147)
Press Freedom			-0.004 (0.003)			-0.006 (0.004)			-0.004 (0.004)			-0.001 (0.002)
Press Freedom * Independent Variable			0.006*** (0.002)			0.009*** (0.003)			0.006*** (0.002)			0.006*** (0.002)
Fixed Broadband Subscription			-0.022** (0.011)			-0.036** (0.015)			-0.008 (0.013)			-0.005 (0.008)
Fixed Broadband Subscription * Independent Variable			0.005 (0.007)			0.012 (0.012)			0.000 (0.009)			-0.005 (0.006)
Constant	-1.578*** (0.085)	-2.355*** (0.596)	-2.716*** (0.612)	-1.473*** (0.139)	-0.956* (0.572)	-2.72*** (0.612)	-1.492*** (0.101)	-2.772*** (0.591)	-3.648*** (0.591)	-1.506*** (0.077)	-2.706*** (0.551)	-3.449*** (0.591)
N	473	473	345	473	473	345	473	473	345	473	473	345
Wald Chi-Squared	20.29	26.08	70.71	10.62	17.25	63.58	21.87	32.70	82.88	51.37	62.41	154.61

This table reports the regression results of the relation between aspects of government quality and the natural logarithm of the average first-day returns. The standard errors reported in parentheses are adjusted to account for heteroscedasticity and panel-specific autocorrelation using robust standard errors clustered at the country level. All variables are defined in Chapter 3. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

We notice that the Wald-Chi squared keeps increasing from model A to C. Model A, which excludes relevant controls and proxies, has an average Wald-Chi squared of 26.04, whereas model C has an average of 92.95, which is almost 4 times as high. We notice that the effect of adding proxies and interaction terms is bigger than adding control variables, as this seems to increase the Wald-Chi squared more. Overall, this highlights the fact that adding relevant controls and proxies increases the model's overall significance.

We see that *control of corruption*, that is framework 1, is negatively related to our dependent variable, which is in accordance with our hypothesis (see Section 2.4). We notice that adding controls and proxies triples the magnitude of the coefficient of *control of corruption*. This independent variable remains highly significant under the one percent level throughout the process of adding controls and proxies. The same applies to the constant. The results from this first framework can be interpreted as follows: a 1-point increase in the aggregate indicator of control of corruption reduces the average level of underpricing in a country by 54.16%. Consequently, we do not reject our first hypothesis: absence of corruption is negatively correlated with underpricing.

Looking at *government effectiveness*, that is framework 2, we too notice that this variable is negatively related to our dependent variable. This is again in accordance with our earlier stated hypothesis (see Section 2.4). However, we see that adding controls, model B, reduces its significance, dropping this to the 5 percent level instead of the 1 percent level in model A. This could be due to multicollinearity, as *government efficiency* and *GDP per capita* exhibit relatively high correlation (see Table 2). Adding proxies, however, undoes this reduction and increases the significance level of both control variables. *Fixed broadband subscription* and the interaction term between *press freedom* and *government efficiency* are also significant, under the 1 and 5 percent level respectively. The results from this second framework can be interpreted as follows: a 1-point increase in the aggregate indicator of government efficiency reduces the average level of underpricing in a country by 63.29%. Hence, we do not reject our second hypothesis: government efficiency reduces underpricing.

The *Rule of law* (i.e. framework 3) is also negatively related to our dependent variable. We see that this effect almost triples throughout the process of adding controls and proxies. This negative relationship is once again in accordance with our stated hypothesis (see Section 2.4). Adding proxies pushes the significance level to the 1 percent level for all independent and control variables and the interaction term between *press freedom* and *rule of law*. Other proxies remain insignificant. This is most likely due to the severe correlation between the *rule of law* and *fixed broadband subscription* as observed in Table 2. The results from the third framework can be interpreted as follows: a 1-point increase in the aggregate indicator of the rule of law reduces the average level of underpricing in a country by 62.99%. Therefore, we again do not reject our third hypothesis: on the cross-country level, the rule of law is negatively related to underpricing.

Voice and accountability (i.e. framework 4) is once again negatively related to our dependent variable. Moreover, the magnitude of the coefficient of the independent variable in model C is the highest across

all models and frameworks. Standard errors are low looking at the other regressions. Apart from our proxies and the interaction term between *press freedom* and *voice and accountability*, all variables exhibit high significance. Adding proxies, however, again proves to raise significance across our control variables. Overall, this final framework exhibits the highest overall significance relative to the other frameworks, looking at the Wald-Chi squared, with a value of 154.61 respectively. The results from this final framework can be interpreted as follows: a 1-point increase in the aggregate indicator of voice and accountability reduces underpricing by 64.97 percent. As stated in Section 3.3, that we use voice and accountability instead of democracy, we do not reject our final hypothesis: on the cross-country level, democracy is negatively related to underpricing.

Legal origin is positively related to the average level of underpricing and is highly significant in all frameworks and models. This is in contrast with previous literature, which states that common law countries exhibit lower levels of underpricing. This might be attributed to access to capital, which might be more difficult in common law countries, or volatility and risk, which might be lower in civil law countries. *Log GDP per capita* is also positively related to the average level of underpricing, which also contradicts previous literature. This can be due to investors' expectations, where institutional investors might expect some level of underpricing in developed markets as standard practice.

Furthermore, the analysis indicates that lower levels of information asymmetry (i.e. higher levels of *press freedom* and *fixed broadband subscription*) enhance the effectiveness of governance quality in mitigating IPO underpricing. This suggests that efforts to improve information transparency and reduce information asymmetry in financial markets can potentially lead to more accurate pricing of IPOs. Because this evidence is not significant across all frameworks, we do not reject our hypothesis: information asymmetry moderates the effect of governance quality on IPO underpricing such that lower information asymmetry strengthens the effect of governance quality in reducing IPO underpricing.

5.2 Robustness Check

As shown in Figure 1, that the average level of underpricing varies largely across countries and is particularly higher in Asia. Asian countries in our sample have an average level of underpricing of 14.90%, whereas countries in Europe and North America only exhibit an average level of 10.86%. We also observe that China is an extreme outlier with its average level of 135%. Therefore, we perform a sample re-estimation. This entails estimating the baseline model, as we have done so previously, either with countries in Asia removed or China individually removed. The results are shown in Table 4.

Our results remain robust using different samples, excluding countries located in Asia and China specifically. This rules out the possibility that the negative relationship we previously found is driven by countries in Asia or China. However, we do notice that the magnitude of our independent variables is much lower, indicating that China and other countries in Asia are serious drivers of our observed negative relationship.

Table 4: Sample Re-estimation Results

	(1) Asia excluded	(1) China excluded	(2) Asia excluded	(2) China excluded	(3) Asia excluded	(3) China excluded	(4) Asia excluded	(4) China excluded
			Dependent variable					
Control of Corruption	-0.232** (0.101)	-0.228** (0.101)						
Government Effectiveness			-0.303** (0.125)	-0.242* (0.146)				
Rule of Law					-0.363*** (0.128)	-0.459*** (0.136)		
Voice and Accountability							-0.521*** (0.186)	-0.543*** (0.121)
Legal Origin	0.877*** (0.124)	0.461*** (0.134)	0.891*** (0.124)	0.448*** (0.142)	0.930*** (0.126)	0.524*** (0.136)	0.821*** (0.112)	0.430*** (0.123)
Log GDP per Capita (in US$)	0.702*** (0.170)	0.152 (0.192)	0.699*** (0.175)	0.026 (0.196)	0.742*** (0.174)	0.276 (0.192)	0.723*** (0.179)	0.342** (0.161)
Press Freedom	0.003* (0.002)	0.009*** (0.002)	0.003* (0.002)	0.010*** (0.002)	0.003 (0.002)	0.008*** (0.002)	0.003* (0.002)	0.008*** (0.002)
Fixed Broadband Subscription	-0.003 (0.006)	-0.014** (0.007)	-0.002 (0.006)	-0.016** (0.007)	-0.000 (0.006)	-0.010 (0.007)	-0.003 (0.006)	-0.011* (0.006)
Constant	-5.867*** (0.741)	-2.913*** (0.741)	-5.800*** (0.769)	-2.317*** (0.730)	-5.968*** (0.752)	-3.281*** (0.727)	-5.619*** (0.762)	-3.468*** (0.633)
N	195	326	195	326	195	326	195	326
Wald-Chi squared	73.33	56.99	72.91	51.37	77.07	63.59	76.43	62.49

This table reports the estimation results using alternative sample selection, excluding all countries in Asia and China individually, given that these countries exhibit relatively high average levels of first-day returns. The standard errors reported in parentheses are adjusted to account for heteroscedasticity and panel-specific autocorrelation using robust standard errors clustered at the country level. All variables are defined in Chapter 3. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

5.3 Endogeneity

Our study suggests that aspects of the quality of government are negatively related to the average first-day returns in a country. However, this negative relationship between government quality and a country's level of underpricing could also be driven by reverse causality. For example, all four aspects of government quality we have studied may be affected by the same unobservable variables. To potentially correct for this endogeneity concern, we employ an instrumental variable. For an instrumental variable to be valid, it must satisfy both the relevance and the exclusion condition. That is, the instrument must be correlated with the explanatory variable, and the instrument must not be correlated with the error term respectively. We instrument *settler mortality*, following Acemoglu, Johnson and Robinson (2001) who argue that differences in European mortality rates are a source of differences in a country's institutions.

Table 5 reports the results of the two-stage least squares (2SLS) regression. We decide to include our proxies as this improves the model's overall fit and to correct for potential omitted variable bias. Column 1 shows the results from the first stage, which indicates high correlation between the instrument and the explanatory variable, satisfying the relevance condition. Column 2 shows the results from the second stage, where we instrument *settlor mortality*, showing the impact of our independent variable on our dependent variable, whilst correcting for endogeneity. The coefficients estimated in IV regression represent the causal effect of the independent variable on the dependent variable after adjusting for endogeneity.

We first notice that our instrument is negatively related to all our independent variables and is also significant under the 1 percent level in all frameworks. This satisfies the relevance condition. We notice that the R^2 in the first stage is much higher compared to the second stage, indicating a better fit for the models in the first stage. However, this outcome is expected given the nature of the 2SLS, but it does support the relevance condition.

The coefficient estimate of *control of corruption* is negative and not significant in our first framework. We notice that the coefficient estimate is slightly higher than our results in Table 3. Since this coefficient is also insignificant, this could indicate potential downward bias due to endogeneity.

The coefficient estimate of *government effectiveness* is also negative and insignificant. However, we notice that the difference in magnitude, compared to our previous results (Table 3), is relatively large. This could again indicate potential downward bias due to endogeneity, but much more severe than seen in the other frameworks.

The coefficient estimate of the *rule of law* is again more negative than the results shown in Table 3. This result from the second stage is insignificant, indicating potential downward bias due to endogeneity.

The coefficient estimate of voice and accountability is more negative than our previous results (Table 3), however significant under the 5 percent level. This indicates that the effect is likely not biased due to endogeneity.

Overall, the negative coefficient estimates of the independent variables on the average level of underpricing support our hypotheses and contribute to our study that government quality is negatively related to the average level of underpricing at the cross-country level.

Table 5: Endogeneity Correction Results

	First stage (1) Control of Corruption	2SLS (1) Log Average First-day Returns	First stage (2) Government Effectiveness	2SLS (2) Log Average First-day Returns	First stage (3) Rule of Law	2SLS (3) Log Average First-day Returns	First stage (4) Voice and Accountability	2SLS (4) Log Average First-day Returns
Settler Mortality	0.484*** (0.141)		-0.287*** (0.106)		-0.366*** (0.095)		-0.373*** (0.131)	
IV Control of Corruption		-0.897 (0.715)						
IV Government Effectiveness				-1.533 (1.261)				
IV Rule of Law						-1.165 (0.816)		
IV Voice and Accountability								-1.056** (0.430)
Legal Origin	0.294 (0.514)	0.467 (0.925)	0.297 (0.366)	0.675 (1.183)	0.343 (0.340)	0.604 (0.937)	0.333 (0.420)	0.548 (0.525)
Log GDP per Capita	0.166 (0.192)	0.512 (0.438)	0.364 (0.235)	0.892 (0.742)	0.184 (0.189)	0.517 (0.377)	-0.043 (0.213)	0.072 (0.284)
Press Freedom	-0.002** (0.001)	-0.003 (0.005)	-0.003*** (0.001)	-0.005 (0.008)	-0.002*** (0.001)	-0.002 (0.005)	-0.000 (0.000)	-0.001 (0.003)
Fixed Broadband Subscription	-0.000 (0.004)	0.014 (0.008)	-0.000*** (0.004)	0.015 (0.011)	0.004 (0.003)	0.020** (0.010)	-0.004* (0.002)	0.0132* (0.007)
Constant	1.609 (1.102)	-3.690*** (1.419)	0.426 (1.166)	-4.392** (2.025)	1.088 (0.891)	-3.602*** (1.141)	1.780 (1.101)	-2.159** (1.069)
N	248	228	248	228	248	228	248	228
R^2	0.6451	0.079	0.5948	0.028	0.6892	0.1358	0.4090	0.3589

This table reports the results of the regression analysis based on the instrumental variable approach, using *Settler Mortality* as the instrument for *Control of Corruption*, *Government Effectiveness*, *Rule of Law* and *Voice and Accountability*. The standard errors reported in parentheses are adjusted to account for heteroscedasticity by using robust standard errors clustered at the country level. All variables are defined in Chapter 3. *, **, *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

CHAPTER 6 Discussion

After observing that different aspects of government quality are negatively related to the average first-day returns, we conclude that government quality, as described by Rothstein (2011), is negatively related to the average level of underpricing. This finding is in contrast with Boulton, Smart and Zutter (2011) who find that country measures of voice and accountability, political stability and the absence of violence, government effectiveness, regulatory burden, rule of law and control of corruption help to explain firm-level IPO underpricing and determine positive correlation between country-level institutional quality and underpricing. They do find, however, that this relationship is strong in developed markets compared to developing markets. It is also possible that underpricing is related to other characteristics of a country which previous research, or this study, has not considered, such as market volatility and investor sentiment.

CHAPTER 7 Conclusion

In this thesis, we have investigated the relationship between government quality and the average level of underpricing across countries. Previous research has shown that underpricing is driven by asymmetric information, institutional reasons, control considerations, behavioural approaches and the existence of hot issue markets. Differences between countries are attributed to a country's accessibility to legal resources, political environment, enforcement restrictions or the amount of public expenditure. Therefore, the question that was studied in this thesis was: how does government quality influence the level of underpricing between countries?

To answer this question, we analysed the average first-day returns from 1996 to 2022 across 22 countries. Our analysis shows a significant negative relationship between underpricing and different aspects of government quality. We observe that this relationship is moderated by information asymmetry. In markets with high information asymmetry, the effect of government quality on underpricing is more pronounced. This could be due to the fact that information asymmetry amplifies the importance of government quality, because investors rely more heavily on the institutional framework to mitigate uncertainties and risks associated with IPOs.

This study therefore concludes, in contrast with previous literature, that a better government quality, measured by control of corruption, government effectiveness, rule of law and voice and accountability, reduces the level of underpricing in a country. It suggests that enhancing these aspects could potentially reduce the average level of underpricing within a country. The results remain robust after controlling for legal origin and GDP per capita, and after adding proxies for the moderator of our investigated relationship. Evidence remains strong after re-estimating our sample and correcting for endogeneity. However, we do notice downward bias in 3 of our 4 independent variables, which indicates that the effect is smaller, yet still negative.

An interesting area for future research is to find and then subsequently include more control variables. This study is limited by the availability of country-level control variables, which may lead to omitted variable bias and endogeneity. Previous research primarily focused on underpricing between firms and explaining differences between them. Future research should focus on identifying and incorporating more comprehensive country-level controls. This enhancement will enhance the robustness and validity of future research.

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