

The Effects of Institutional Factors on the Underpricing of Initial Public Offerings

Bachelor Thesis in Finance
Stockholm School of Economics

Abstract

This paper investigates the effects of several institutional factors on IPO underpricing. We study how indices reflecting the degree of investor protection, the quality of the legal system and the extent of economic freedom explain variations in first day returns between countries. More specifically, we hypothesise that increased investor protection on the country level increases underpricing and we find some evidence for this when examining 9 025 IPOs across 18 countries from 1995 to 2018. We also hypothesise that better developed legal institutions will lead to less underpricing, where our evidence is mixed. There is no evident consensus in previous literature and we therefore provide additional empirical findings and suggest possible explanations for prevailing contradictions.

Keywords: initial public offering (IPO); underpricing; investor protection; economic freedom; rule of law

Acknowledgement: *We would like to devote special gratitude to Jungsuk Han for providing valuable insight in the writing process. We would also like to extend our appreciation to Alexander Albedj for improving our knowledge regarding initial public offerings.*

Tutor: Han, Jungsuk

Authors: Bergman, Andreas[†] and Yuran, Edward[‡]

Date: 2018-05-14

[†]23518@student.hhs.se

[‡]23739@student.hhs.se

Table of Contents

1. Introduction	1
2. Theory and Literature Review.....	4
2.1 The IPO Process.....	4
2.2 Underpricing Theories	5
2.2.1 Asymmetric Information.....	5
2.2.2 Ownership and Control.....	8
3. Method.....	10
3.1 Variables	10
3.1.1 ASDI and ADRI.....	10
3.1.2 Rule of Law	12
3.1.3 Index of Economic Freedom	12
3.1.4 Control Variables	16
3.2 Hypotheses.....	19
3.3 Sample Construction.....	21
4. Results	22
4.1 Descriptives.....	22
4.2 Main Results	29
5. Conclusion.....	35
6. References	39

1. Introduction

It has consistently been documented that investment banks tend to underprice the shares of a company going public meaning that the first day closing price exceeds the offer price. This provides investors with a positive first day return while money is left on the table by the issuing firm. Global IPOs are on average underpriced as observed by e.g. Loughran et al (1994) which provides evidence that companies are listed at a price that is lower than the market value. Although the majority of models and theories that seek to explain the underpricing phenomenon focus on firm-specific factors the degree of underpricing often varies between countries and we therefore believe there is a lacking emphasis on the institutional setting.

There is a common notion in the literature pertaining to the ‘ownership and control’ theories of underpricing that an IPO can serve as a tool for dispersing the ownership to outside investors and protecting insiders from the scrutiny of significant blockholders. This idea was largely popularised by Zingales (1995), Brennan and Franks (1997) as well as Stoughton and Zechner (1998) and implies that an increased number of investors holding a smaller share of the company will have relatively less control than larger blockholders. Underpricing can then be used as a tool to ensure that an issue will be oversubscribed and subsequently, insiders will be able to discriminate between investors and decide how to allocate shares such that the ownership becomes fragmented. Inferring this logic to the country level underpricing should be even more important as a means of maintaining managerial control in countries with legislation that grants outside investors more power. Conversely, underpricing should be less pronounced in countries with weaker governance since the degree of managerial control is assumed to be larger from the start.

Owing to the contribution of La Porta et al (1998) as well as Djankov et al (2008), there now exist generally accepted scores that reflect the extent of investor protection and thus the governance quality across countries. They find that common-law countries have the strongest investor protection and that French-origin have the weakest, with German and Scandinavian countries placing themselves in the middle. The authors do not however make the connection between IPO underpricing and investor protection, but the country-specific variables that they define could be used to explain variations in underpricing between countries. These variables (hereby denoted collectively as ‘LPSS’ variables) have been used extensively in finance literature, where their ‘anti-director rights’ score and ‘anti-self dealing’ index are of particular interest to us.

We consequently posit that countries with stronger investor protection rights experience more underpricing and it is in this regard interesting to examine whether the LPSS variables hold some predictable power or if there is a need to update their indices or even formulate new ones that are easier to reproduce. For instance, Spamann (2010) as well as Pagano and Volpin (2005) found some data inconsistencies in the original variables from 1997. There is thus a need for thorough and precise variables that at the same time are standardised and easy to reproduce which is a challenge since there is a trade-off between precision and generalisability. For this reason we include other more readily available metrics to see whether the interpretation could be any different. More specifically, we use The Heritage Foundation's country-specific Index of Economic Freedom (IEF) and other related sub-indices. These have been updated annually since 1995 and have been used in studies that examine capital market development across countries (Jones et al 1999; Lau and Lam, 2002; Henry, 2007), levels of corruption (Claessen and Laeven, 2003) and trade policies (Thirlwall, 2004) to name a few. Boulton et al (2010) also examine whether property rights – an IEF sub-index – correlates with underpricing.

While it is true that the degree of investor protection could differ greatly on the firm-level and that performing the analysis on the country level is not as precise, we narrow our analysis to only focus on that dimension for the governance related factors since we believe that the issuer's country conveys more than the particular issuer's governance practices. Doidge et al (2007) perform this very analysis, as they study whether the governance proxies related to firm characteristics (e.g. ownership structure, growth) or country characteristics (rule of law, anti-director rights) are superior in explaining variations in governance ratings. They find that the country characteristics explain significantly more than the firm characteristics which is why we limit our governance variables to the country level dimension. Previous literature that explores the connection between governance related factors and underpricing – specifically the variables from La Porta et al (1998) – includes Boulton et al (2010), Engelen and van Essen (2010), Hopp and Dreher (2011) and Banerjee et al (2011). In addition, Bell et al (2008), Boulton et al (2011) and Chen et al (2017) study the connection between IPO underpricing and the IEF score of the issuer's country.

We aim to contribute to the existing literature in several ways. We test whether the LPSS variables, as proxies for investor protection, significantly affect the underpricing of an IPO. Since e.g. Boulton et al (2010) and Engelen and van Essen (2010) find significant yet opposite results we would like to contribute with additional empirical evidence that could support or reject either of these arguments. We are also interested in whether any inference can be made at all from these scores or whether they have lost their timeliness since most of the

related research is nearly a decade old or more. Lastly, we supplement our analysis by testing whether the IEF variables could affect underpricing, and assess the relative statistical quality of models based on IEF variables compared to the LPSS variables.

Using a sample of 9 025 IPOs we find statistically significant evidence that issues in countries with stronger investor protection legislation – using the LPSS variables ‘anti-director rights’ and ‘anti-self dealing’ – tend to experience more underpricing. A higher rule of law expressed through low corruption and high property rights appears to have a significant negative association with underpricing, although not all tested variables indicate this. We find less conclusive evidence for the other IEF variables, as some are statistically significant while others are not. Government spending, labour freedom and trade freedom are significantly associated with underpricing at 5% or lower. We complement the findings of Boulton et al (2010) but contend that further research is warranted to better rule out the possibility of omitted variable effects on the observed phenomena.

This paper is organised in the following manner. Section 2 reviews the broader theoretical literature of IPO underpricing and also presents the field of literature that we align ourselves with more closely. Section 3 concerns our method and explains the variable specification as well as the sample construction. Section 4 presents our descriptive statistics as well as our main results. Section 5 concludes and summarises our findings.

2. Theory and Literature Review

2.1 Initial Public Offerings

There are several methods for a firm to raise capital of which an initial public offering (IPO) is one of the more commonly used. It allows a private company to go public by selling its shares on capital markets. Such a process can include selling both newly issued or existing shares. An IPO allows firms access to public capital and can also act as a showcasing platform for the company (Ljungqvist, 2004). Most firms that go public are young (Chemmanur et al, 2009). There are two main reasons for why firms choose to go public, the first originating from a need to refinance. Current shareholders will be looking to liquidate their positions and an IPO is a feasible option for this. The second reason is to obtain new funds in the case of banks or venture capitalists not allowing additional debt. Tapping into the capital markets is therefore many firms' last resort in financing current operations or new investments when they are experiencing poor liquidity (Ljungqvist, 2004).

The IPO process involves several steps, the first one being employing an underwriter i.e. an investment bank. The bank will be chosen based on certain criteria which can include reputation, track record, and industry expertise. The underwriter acts as a stock broker for the shares of the issuing company and thereby bridges the gap between the firm and the investors. The investment bank is responsible for writing a prospectus in which all information about the issuing company has to be available. The initial prospectus is referred to as a red herring which lacks an exact offer price. This document is used on the road show which the underwriter goes on to present the IPO to investors. The offer price may be revised after the road show as well as the number of shares to be sold. These decisions will influence the amount that is raised for the company. IPOs are often underpriced which may be explained by a number of factors which will be explored in more detail below. A stock is underpriced if investors receive a positive first day return. The first day return is defined as follows:

$$IR = \frac{P_{close} - P_{offer}}{P_{offer}} \times 100\%$$

2.2 Underpricing Theories

There are many theories that seek to explain why IPOs tend to be underpriced and some have gained more traction than others in the literature. Behavioural theories stem from the assumption that investors are irrational (Welch, 1992). This assumption can manifest itself in several different ways, such as investors irrationally disregarding negative information in favour of a positive preconception of the issuing firm (Ljungqvist, 2004). Another behavioural explanation of underpricing is prospect theory which regards irrational decision-makers rather than irrational investors. Loughran and Ritter (2004) argue that issuers do not mind leaving money on the table if the initial return creates wealth for them due to retained shares.

Institutional theories, as defined by Ljungqvist (2004), include legal liability, price stabilisation, and tax arguments. In countries such as the US where the risk of litigation is high, issuers might deliberately underprice as a means of lawsuit avoidance (Hensler, 1995). Ruud (1993) on the other hand argues that IPOs are not in fact intentionally underpriced and that any unintended mispricing is stabilised post-IPO. She also argues that the price stabilisation may be due to underwriter manipulation.

Another potential benefit from underpricing could be taxation (Ljungqvist, 2004). Firms in countries where income is taxed higher than capital gains will have an incentive to offer underpriced shares to their employees as a means of compensation. Sweden used to be an example of such a country and Rydqvist (1997) finds that underpricing decreased significantly after new legislation was put into place to remove the incentive to pay employees with underpriced stock.

Although the above theories are interesting to study we decide to align ourselves with the two theories which are most commonly referred to in studies examining country level governance and its impact on underpricing. These are the asymmetric information and ownership and control theories and they will be explored in detail below.

2.2.1 Asymmetric Information

Winner's Curse

Asymmetric information models assume that one of the parties involved in an IPO has an information advantage over the other. The three main parties are the issuing firm, the underwriter and the investors. One of the most prominent asymmetric information models is the winner's curse (Rock, 1986). Rock assumes that some investors hold more knowledge

about the issuing firm than others. This reasoning implies that there is a ‘market of lemons’ as referenced by Akerlof (1970) since markets do not function as well when asymmetrically informed buyers and sellers are interacting. Consequently, buyers’ scepticism towards the quality of a product or service provided by the seller lead them to believe that the product or service is worth less than the price at which it is offered. In the IPO context investors will therefore only subscribe for shares in what they know to be attractively priced IPOs. This will cause uninformed investors to receive all the shares they have bid for in unattractive IPOs while they will only receive a fraction of their demanded shares in attractive offerings. In the extreme case this will lead to negative average returns for the uninformed investor. These investors will therefore be reluctant to participate in IPOs which implies that all participating investors will be informed. If it is assumed that the market depends on the participation of all types of investors all IPOs must be underpriced by assumption in order to attract both informed and uninformed investors. The issuing firm however has a clear incentive to not underprice as they will raise more capital that way.

Originating from Ritter (1984) and later delineated by Beatty and Ritter (1986) is the notion that ex ante uncertainty regarding the issuing firm’s valuation increases IPO underpricing. The provided rationale for this is that an investor that participates in information production essentially invests in a call option on the IPO. This option will only be exercised if the true or correct value exceeds the offer price. Increased valuation uncertainty will increase the value of this call option, and more investors will therefore become informed. Such an occurrence will increase the required underpricing as the winner’s curse problem intensifies with an increasing amount of informed investors.

An example of a study that applies the logic proposed by Beatty and Ritter (1986) but in a context similar to the one of this paper is Engelen and van Essen (2010). They examine how differences in legal framework between countries affect underpricing. In contrast to Boulton et al (2010), they argue that weaker investor protection leads to higher ex ante uncertainty with respect to firm valuations. Applying the same logic as Beatty and Ritter (1986), increased ex ante uncertainty will aggravate IPO underpricing, which Engelen and van Essen (2010), as well as Banerjee et al (2011) validate.

Bookbuilding Theory

The bookbuilding theory, as proposed by Benveniste and Spindt (1989), revolves around the underwriters extracting information from the institutional investors in order to set a more accurate price. The information revelation theory involves aligning the investors' and underwriters' incentives. An informed investor who reveals positive information to the investment bank will increase the offer price and thus receive a lower return. It is therefore in the investor's best interest to either not reveal any information at all or to only disclose negative information. The underwriter therefore has to provide an incentive for the investors to be truthful about the information they hold on the company going public. They do so by allocating a disproportionate share of the issue to the highest bidder. By doing so, the underwriter provides a clear incentive for the investors to reveal their true demand.

However, first day returns and price revisions are positively correlated and the increase in the offer price does not exceed the increase in returns. This is in accordance with Hanley's (1993) 'partial adjustment' phenomenon. It explains bookbuilding in the context that investors are rewarded for revealing their demand for an issue, since the upward price revision is initiated by a display of demand.

Principal-Agent Theory

The disadvantage of the disproportionate allocation of shares to truthful investors is that agency problems may arise (Loughran and Ritter, 2004). Underwriting fees are usually a percentage of the IPO proceeds. The investment banks therefore earn less the more they underprice. However, there are other incentives for them to sell the shares at a discount, one of them being building relationships with the institutional investors. In a principal-agent framework the underwriter will be the agent selling the issuing firm's, or principal's, shares in the IPO. If the agent benefits from underpricing, and these actions are not observable by the principal, the underwriter may choose a price that is too low.

Signalling

An issuing firm can use different aspects of the IPO to signal that they are of high quality to the investors. One such signal is the offer price (Ibbotson, 1975). A high quality firm can leave money on the table as they know that this can be compensated for the next time they tap into the capital markets when the investors know that they are dealing with a good firm. A low

quality firm will naturally want to mimic this signal but they are uncertain as to if they can recover the cost borne from underpricing if their true firm quality is revealed at the later stage. The IPO underpricing will therefore be a signal to the investors that they are dealing with a high quality firm as the risk of detection is too high for a low quality firm to imitate that particular signal. If by assumption it is only possible to signal higher quality by leaving money on the table, only high quality firms will have a clear incentive to do so.

However, there are many additional ways for a firm to signal that it is of high quality, like employing a renowned underwriter (Booth and Smith, 1986) or being backed by famous venture capitalists (Megginson and Weiss, 1991). These will all provide a certification effect that does not require firms to underprice their shares.

2.2.2 Ownership and Control

Reducing Agency Costs

Agency costs in the context of an IPO originate from managers making overall sub-optimal choices in order to maximise their personal utility by retaining control. This can however put the success of the IPO at risk with a too low offer price and a lower market value of the firm. Depending on how large stakes managers hold their gained utility from maintaining control may be less than the agency costs, in which case it would be mutually beneficial for both the firm and the managers to give outside investors a larger share allocation. The role of these investors would be to monitor the activities and operations of the firm from an outside perspective which (as agency costs are reduced) is favourable for both investors and managers. However, investors may be reluctant to hold a large stake in a firm for several reasons (difficulty to diversify, liquidity etc.). An incentive that the managers can provide for these investors is to deliberately underprice the IPO (Stoughton and Zechner, 1998).

Managerial Control

Grossman and Hart (1980) argue that managers aim to maintain control when they take their company public by dispersing the shares among as many investors as possible to avoid potential hostile takeovers. One method of attracting more investors is to offer them a higher initial return and thereby generate a higher demand. Another risk that managers take when taking their company public is the scrutiny of outside investors holding large amounts of shares. Having many outside investors holding small stakes reduces this outside scrutiny (Zingales, 1995; Brennan and Franks, 1997).

We find the managerial control argument appealing since inferring it to the country level could provide an answer to previous findings that otherwise would seem counterintuitive. It would thus explain the legal environment and specifically the presence of strong investor protection rights as a facilitator for outside investors gaining control over incumbents.

3. Method

While it is correct in principle to adjust for the market return and to instead report an adjusted initial return in excess of the daily market return we believe the difference is negligible and will therefore not have a significant effect. E.g. Beatty and Ritter (1986) report average initial returns of 14.1% and daily market returns below 0.1% implying that there is no real need to adjust the variable for a one-day observation. We therefore calculate the first day return as:

$$IR = \frac{P_{close} - P_{offer}}{P_{offer}} \times 100\%$$

Our regressions consist of four sets of variables: the governance variables from La Porta et al (1998) and Djankov et al (2008) (LPSS) together with the rule of law index formulated by Kaufmann et al (2005), the economic freedom variables from The Heritage Foundation (IEF) and our control variables. These four sets of variables are specified below.

We test our hypotheses by running regressions with the specific individual variables against a set of control variables that are selected from previous studies such as Ritter (1984), Habib and Ljungqvist (2001), and Bradley et al (2004). The sign of the beta coefficients of the governance proxy variables will then suggest if that variable is positively or negatively associated with our dependent initial return variable ('IR') and consequently either validate or reject our different hypotheses. We also observe the different AIC (Akaike Information Criterion) scores of the LPSS and IEF models. AIC is an estimator of the relative quality of a statistical model, where the lower the score the better the model.

3.1 Variables

3.1.1 ASDI and ADRI

We have chosen to test the variables for creditor and shareholder rights as defined by La Porta et al (1998). The creditor rights variable takes a value between 0 and 4 based on the sum of four dummy variables. These dummy variables are: 'no automatic stay on assets', 'secured creditors first paid', 'restrictions for going into reorganisation', and 'management does not stay in reorganisation'. If the type of investor protection is in the law of that particular country the dummy variable will take on the value of 1, and 0 if not.

The shareholder rights variable, or anti-director rights variable (here-on 'ADRI') is expressed twice, as 'ADRI_97' and 'ADRI_05'. 'ADRI_97' takes a value between 0 and 5 based on the sum of five dummy variables. These dummy variables are: 'proxy by mail allowed', 'shares not blocked before meeting', 'cumulative voting/proportional representation', 'oppressed minority', and 'pre-emptive rights to new issues'. If the type of investor protection is in the law of that particular country, it will take on the value of 1, and 0 if not. La Porta et al (1998) define these variables based on the jurisdiction of 1997, meaning that the timeliness of the later issues in our sample can be questioned. Due to some measurement inconsistencies, these indices were updated in Djankov et al (2008) for the jurisdiction of 2005 and a new 'anti-self dealing index' (denoted 'ASDI') was also provided. This is why we include 'ADRI_05' from Djankov et al (2008) to contrast any potential changes over time. All else equal, we assume that any potential changes occurring after 2005 will only be incremental in nature and will not significantly distort the relative differences among countries.

The proposed ASDI metric in Djankov et al (2008) is slightly more complicated than the previous ADRI metric brought forward by La Porta et al (1998). This metric is composed of different scores that are ascribed to a country based on a hypothetical case that involves self dealing which is defined as 'a situation where one takes an action in an official capacity which involves dealing with oneself in a private capacity and which confers a benefit on oneself' (Kernaghan and Langford, 1990). The premise is that a fictitious person, Mr. James, holds a majority stake in two companies, the Buyer and the Seller (of which the Buyer is publicly traded), and proposes that the Buyer purchases an asset from the Seller. (This arrangement is likely unfair to the Buyer.) The anti-self dealing index is then the weighted average of 'the ex ante and ex post private control' of a self dealing event like this where the value ranges from zero to one. The ex ante private control of self dealing is composed of scores on the following metrics: 'approval by disinterested shareholders', 'disclosures by buyer', 'disclosures by Mr. James', 'independent review', and 'ex ante disclosure'. The ex post private control of self dealing is composed of the following metrics: 'disclosure in periodic filings', 'standing to sue', 'rescission', 'ease of holding Mr. James liable', 'ease of holding the approving body liable', 'access to evidence' and 'ease in proving wrongdoing'.

We also use the 'public enforcement index' (PEI) laid out by Djankov et al (2008). This index ranges from 0 to 1 and gives a quarter point to the following conditions: 'fines for approving body', 'prison term for approving body', 'fines for Mr. James' and 'prison term for Mr. James'.

3.1.2 Rule of Law

Law and finance studies that examine the impact of institutions on corporate financial decisions usually include indices that aim to reflect the extent and effectiveness of the legal system in a particular country. Kaufmann et al (2005) provide six indices reflecting governance in over 200 countries, and these provide the significant benefit of being updated annually as well as being used as benchmark indices in law and finance studies. The information is based on 30 internal and external sources which makes for unbiased metrics. These sources include surveys of households and firms, commercial business information providers, non-governmental organisations and public sector organisations. The six governance indicators are: ‘voice and accountability’, ‘political stability and absence of violence’, ‘government effectiveness’, ‘regulatory quality’, ‘rule of law’ and ‘control of corruption’. Every governance indicator is constructed by rescaling and aggregating the data of the underlying sources, yielding a value between 0 and 100 for each variable and for each country and year. This value is then matched with the country of the exchange where the issuing firm is listed and the year of the IPO. We choose to use the ‘rule of law’ variable in accordance with e.g. Boulton et al (2010) and Hopp and Dreher (2011).

3.1.3 The Index of Economic Freedom

The Index of Economic Freedom is published annually by The Heritage Foundation. It covers 12 different economic freedoms in 186 countries and has been updated for 24 years. The Heritage Foundation defines economic freedom as ‘the fundamental right of every human to control his or her own labour and property’ (Miller and Holmes, 2009). The overall economic freedom index score is based on four categories with 12 sub-indices. These are: ‘rule of law’ (property rights, government integrity, judicial effectiveness), ‘government size’ (government spending, tax burden, fiscal health), ‘regulatory efficiency’ (business freedom, labour freedom, monetary freedom) and ‘open markets’ (trade freedom, investment freedom, financial freedom). Each of the mentioned indices takes on a value between 0 and 100, and the overall score is an equal-weighted average of them. Each index is therefore given the same importance in terms of their effects on economic freedom. Detailed descriptions of each IEF variable follow below.

Property Rights

The extent to which individuals are allowed to accumulate property freely, and the regulatory protection provided by the government for these individuals. The property rights component is an equal-weighted average of physical property rights, intellectual property rights, strength of investor protection, risk of expropriation, and quality of land administration. Each sub-factor is normalised for comparativeness.

Judicial Effectiveness

How well-functioning the specific country's legal structure is. Judicial effectiveness relies on uncorrupted and impartial judicial systems to enforce the laws and sanctions against violators. This component is derived as an equal-weighted average of ratings on judicial independence, quality of the judicial process and likelihood of obtaining favourable judicial decisions. Each sub-factor is normalised for comparativeness.

Government Integrity

How uncorrupted a country's government is. Focus is put on systematic institutional corruption in the shape of 'bribery, nepotism, extortion, patronage, cronyism, and graft' (Miller and Holmes, 2009). The score is derived from the equal-weighted average of ratings on public trust in politicians, irregular payments and bribes, transparency of government policymaking, absence of corruption, perceptions of corruption, and governmental and civil service transparency. Each sub-factor is normalised for comparativeness.

Tax Burden

A measure of the marginal tax rates on both personal and corporate income as well as the overall degree of taxation expressed as a percentage of GDP. The sub-factors from which the score is derived are the top marginal tax rate on individual income, the top marginal tax rate on corporate income and the total tax burden as a percentage of GDP. Each sub-factor is normalised for comparativeness.

Government Spending

Represents the burden due to government spending. The Heritage Foundation does not claim to advocate a specific level of expenditure, but this variable illustrates deviations from the optimum point. The index treats zero government spending as the benchmark which will give

developing countries an unjustifiably high score in this index. The index scale is exponential which means that a doubled expenditure will result in four times less freedom.

Fiscal Health

A measure of the debt levels and budget deficit of a country. These factors are caused by poor budget management which is associated with economic uncertainty and volatility. The score for fiscal health is derived as a weighted average of the average deficits as a percentage of GDP for the most recent three years (80% weight) and debt as a percentage of GDP (20% weight).

Business Freedom

Business freedom measures how efficiently the regulatory and infrastructure environments allow a business to operate. The score is an equal-weighted average of 13 sub-factors rating (between 0 and 100) how easy it is to start a business, obtain a license, close a business, and get access to electricity.

Labour Freedom

A measure of how the labour market is affected by the regulatory environment, including minimum wage, lay-off laws and restraints on hours worked. The score is made up of the equal-weighted average of scores for the ratio of minimum wage to the average value added per worker, hindrance to hiring additional workers, rigidity of hours, difficulty of firing redundant employees, legally mandated notice period, mandatory severance pay, and labour force participation rate. Each sub-factor is converted to a scale ranging from 0 to 100.

Monetary Freedom

A measure of price stability and price control. The benchmark is natural price stability without any government intervention. The score is based on the weighted average inflation rate for the most recent three years, and price controls, where the inflation serves as the primary input.

Trade Freedom

How freely a country can import and export goods and services. The score is derived from the trade-weighted average tariff rate and nontariff barriers.

Investment Freedom

A score on how freely the investment capital is allowed to flow inside and outside of a country regarding both individuals and firms. Restrictions on capital flow can include payment restrictions, limitations on foreign investment, and restricted access to foreign exchange. Each country is provided an initial score of 100 from which points are deducted for restrictions on investments and land ownership.

Financial Freedom

A measure of the efficiency of a country's banking system and the lack of government control and intervention. The score is derived from the extent of government regulation of financial services, the degree of state intervention in banks and other financial firms through direct and indirect ownership, government influence on the allocation of credit, the extent of financial and capital market development and the openness to foreign competition.

Selected IEF Variables

Unlike previous similar studies (e.g. Boulton et al, 2010), we choose to test a wider span of IEF variables to see if any additional conclusions can be drawn. We thus decide to test 'overall score', 'property rights', 'government integrity', 'government spending', 'business freedom', 'labour freedom', 'monetary freedom', 'trade freedom', 'investment freedom' and 'financial freedom'. We omit 'fiscal health' as well as 'judicial effectiveness' since these variables are recent additions to the index and have limited data points. We also omit the 'tax burden' variable since we cannot deduce any rationale behind its implication on underpricing. We find more appealing interpretations for the 'overall score', 'property rights' and 'government integrity' and will therefore call these our primary IEF variables. The others are referred to as secondary IEF variables.

3.1.4 Control Variables

The control variables are specified in this section, as well as the economic rationale behind their hypothesised effect on underpricing as proposed by previous researchers. To start we control for some of the ex ante uncertainty at the firm level by including the firm age as a variable, defined as $\ln(\text{Firm age at IPO}+1)$. This variable is used as a proxy for the amount of information asymmetry between the issuing firm and the public. The analogy is that there is less information available to investors about a young firm than there is for an old firm. Firm age is therefore expected to alleviate information asymmetry and therefore also be negatively associated with IPO underpricing (yielding a negative regression coefficient). Previous notable studies that have used firm age as a control variable include Carter and Manaster (1990), Carter et al (1998) and Habib and Ljungqvist (2001).

Similarly, some of the ex ante uncertainty is controlled for when including a dummy variable that takes on the value of 1 if the firm is classified as 'high tech' in the Thomson Reuters' SDC database. This variable is tested by e.g. Aggarwal et al (2002). Loughran and Ritter (2004) argue that tech firms are associated with more uncertainty and information asymmetry which will have a positive effect on underpricing in an initial public offering. We therefore expect our tech dummy to have a positive beta coefficient. We also construct a dummy variable called 'OA' that takes on the value of 1 if an over-allotment option has been exercised, and 0 if not.

To test for the effect of information asymmetry we include a variable that we define as the natural logarithm of the total IPO proceeds of the issuer. A bigger IPO in the sense that it involves higher proceeds will indicate less information asymmetry and therefore also less underpricing. Consistent with Beatty and Ritter (1986) and Loughran and Ritter (2004) we expect the beta coefficient of 'lnProc' to be negative. We then proceed to formulate a dummy variable, 'Hot', that takes on the value of 1 if the issue is above the top 25th percentile in the number of IPOs for that country during the sample period, and 0 otherwise. In accordance with the 'hot issues market' phenomenon (Ritter, 1984), IPOs tend to follow cyclical patterns where underpricing correlates with the amount of IPOs. Therefore, the underpricing should be more pronounced in hot issue markets.

Habib and Ljungqvist (2001) argue that there is a trade-off between underpricing and losing out on underwriting fees, which then should lower underwriting fees as a percentage of the offer size. We therefore formulate the variable 'Uwr' that is defined as the underwriter fees expressed as a percentage of the offer size. We expect the regression coefficient of this variable to be positive. To test for the effect of market sentiment, we proceed to formulate the variable

‘30day’ which is defined as the 30 day prior return of the main stock exchange index in the particular country one day prior to the IPO date. Lowry and Murphy (2007) find that overall stock-market returns are positively associated with IPO underpricing, that is, we expect the beta coefficient of ‘30day’ to be positive.

Our final control variable is ‘Integer’, a dummy variable that takes on the value of 1 if the offer price is an integer and 0 if it is not. Bradley et al (2004) hypothesise that parties in an IPO with high information asymmetries will be unlikely to discuss small increments in offer price and are therefore more likely to choose an integer offer price. They empirically validate this hypothesis as they find that IPOs with an integer price are significantly more underpriced than other firms.

Table 1. Our selected variables and examples of previous researchers using said variables.

Variable	Researcher(s)	Expected sign
LPSS		
ADRI	Boulton et al. (2010), Engelen and van Essen (2010), Hopp and Dreher (2011)	+
ASDI	Boulton et al. (2010), Engelen and van Essen (2010), Banerjee et al. (2011), Boulton et al. (2017)	+
PEI	Boulton et al. (2010), Engelen and van Essen (2010)	-
CredRi	Boulton et al. (2010)	+
RuleOfLaw	Boulton et al. (2010), Hopp and Dreher (2011)	-
IEF		
OS	Bell et al. (2008), Boulton et al. (2011), Boulton et al. (2017), Chen et al. (2017)	-
PR	Boulton et al. (2010), Chen et al. (2017)	-
GI	Chen et al. (2017)	-
GS	Chen et al. (2017)	+
BF	Chen et al. (2017)	-
LF	Chen et al. (2017)	-
MF	Chen et al. (2017)	-
TF	Chen et al. (2017)	-
IF	Chen et al. (2017)	-
FF	Chen et al. (2017)	-
Control		
Tech	Aggarwal et al. (2002)	+
lnAge	Carter and Manaster (1990), Carter et al. (1998), Habib and Ljungqvist (2001)	-
lnProc	Beatty and Ritter (1986), Loughran and Ritter (2004)	-
OA	Chen et al (2017)	+
Hot	Ritter (1984)	+
30day	Lowry and Murphy (2007)	+
Uwr	Habib and Ljungqvist (2001)	+
Integer	Bradley et al. (2004)	+

The above table presents the variables that we use in our regressions, as well as some previous researchers that study their impact on underpricing. In the case of most variables, there are several other researchers that have tested the impact of these on IPO underpricing. Table 1 also provides the expected signs of the beta coefficients of each respective variable in the regressions that are presented in the ‘Results’ section below.

We thus construct the following model for our control variables:

$$IR_{i,j} = \beta_0 + \beta_1 Tech + \beta_2 lnAge + \beta_3 lnProc + \beta_4 OA + \beta_5 Hot + \beta_6 30day + \beta_7 Uwr + \beta_8 Integer + \varepsilon_{i,j}$$

3.2 Hypotheses

There are many costs to consider for a firm going public. One such cost is the one arising from the information monitoring by external investors that could scrutinise managerial shareholders' ability to extract private benefits. Such benefits could include using a disproportionate amount of funds for perquisites. It could also extend beyond this and instead consider insiders' attempts to conceal any managerial weaknesses. Brennan and Franks (1997) outline this connection between insiders wanting to retain control and the subsequent effect on IPO underpricing. They theorise that managers of a firm will encourage underpricing in order to make the issue more attractive to investors which in turn will disperse the power among a large number of outside investors holding relatively small stakes. Insiders will therefore avoid the risk of hostile takeovers. Outside investors with small holdings are, as conjectured, also unlikely to monitor the firm management which gives managers more control. Brau and Fawcett (2006) find evidence that 40% of the chief financial officers at firms that had attempted an IPO between 2000 and 2002 believed that a wide owner-base could explain the extent of underpricing of their respective firm. Smart and Zutter (2003) find lower IPO underpricing for US firms with a dual-class offering as opposed to a single-class offering. This further supports the notion that less outside monitoring increases management control and subsequently underpricing.

Boulton et al (2010) develop this argument in a global context and argue that in countries with weak corporate governance, issuing firms need to take little action in terms of IPO underpricing in order to retain control due to insignificant investor rights. Conversely, in countries with extensive corporate governance and investor protection insiders are less prone to counteract underpricing – or even to actively promote it – as it disperses the power among outside investors as a means of retaining control. This would mean that 'anti-director rights' as defined by La Porta et al (1998), as well as 'anti-self dealing' as defined by Djankov et al (2008) are positively correlated with IPO underpricing.

Hypothesis 1: Issues in countries with more developed investor protection rights will experience more IPO underpricing.

Typical law and finance studies, of the type that was established by La Porta et al (1997, 1998), use proxies that examine investor protection – or more specifically minority protection – as well as the quality and efficiency of the legal system. We find this distinction relevant because in contrast to our first hypothesis we believe that the quality of the legal system will

benefit both insiders and outside investors. We therefore imply that there is a difference between ‘law in the books’ and ‘law in practice’, a distinction made in e.g. Hopp and Dreher (2011) meaning that countries with lower judicial efficiency simultaneously could have more extensive investor protection in their legislation and that there is no necessary mutual dependency. The rule of law-components found in La Porta et al (1998) are also tangential to some of the IEF indices where e.g. ‘corruption’ is captured by ‘government integrity’ and ‘risk of expropriation’ is reflected in ‘property rights’. In extension, we thus believe that a higher quality judiciary implies more reliability and less uncertainty.

This matters on the firm level and on the country level. For example, Ritter (1984) finds that firms with more uncertainty regarding its growth opportunities experience higher underpricing. On the country level, less developed institutions could pose a higher risk for investors and increase their required rate of return. An example of this can be found in Bhattacharya and Daouk (2002), in which the authors find that the cost of equity in a country falls with the first conviction against insider trading. A different example is the use of the bookbuilding mechanism to reveal investors’ demand for a particular issue, gauging the real market value of said issue. In countries where there are restrictions on the use of the book building mechanism, there tends to be higher levels of underpricing (Ljungqvist et al, 2003).

In extension, countries with institutions that e.g. limit the free exchange of products and services between parties and present a risk of arbitrary expropriation of private property could be hypothesised to have a higher degree of underpricing. Limited government integrity, i.e. higher levels of corruption, may lead to increased costs for investors and issuing firms as suggested by Weitzel and Berns (2006) as they find that more corruption tends to decrease take-over premiums in cross-border acquisitions. It is not particularly surprising then that the IEF variable ‘overall score’ that intends to gauge the overall economic freedom in a country occurs in some studies attempting to use it as one factor explaining underpricing (Bell et al, 2008; Boulton et al, 2011, 2017; Chen et al, 2017). We thus posit that IPOs in countries with weaker rule of law and less economic freedom on average experience a higher degree of underpricing.

Hypothesis 2: Rule of law and economic freedom are negatively associated with IPO underpricing.

3.3 Sample Construction

Our sample of IPOs is collected from the Thomson Reuters' SDC Platinum database. The data extends from April 1995 to April 2018 and includes data on global new issues from which we have extracted first day returns that have been filtered to only include the original IPO. We then filter out entries where the country of the IPO is not specified and remove countries with less than ten IPOs, as well as all IPOs from China except for Hong Kong. The reason for this is that there was a disproportionate thousand-fold skew at 40-45% initial return for China. We then trim the sample at the top and bottom 2.5% of IPOs based on initial return, similar to Boulton et al. (2010), to eliminate the effect of outliers which results in a sample consisting of 9 025 IPOs. While one ideally would want to study such outliers more closely to potentially find underlying mechanisms explaining their presence the large sample size would make such a procedure challenging and beyond the intended scope of this thesis. While the SDC Platinum database coverage might not reflect a truly random sampling of the population we believe that this approach will yield a sufficiently representative sample.

The control variables 'lnAge', 'Tech', 'OA', 'lnProc', 'Uwr' and 'Integer' are obtained from the SDC Platinum database, whereas '30day' is the 30-day daily CRSP country return. The 'Hot' variable is based on our sample statistics. We match scores on the IEF variables by country of the stock exchange and the year of the IPO, and match the LPSS variables by country.

4. Results

4.1 Descriptive Statistics

Table 2 provides an overview of the IPOs per year and country of our sample. The total sample size of 9 025 IPOs is distributed over 18 countries and 24 years. The largest fraction of our sample consists of IPOs performed in the US comprising about half of the total sample size. The next two countries by number of IPOs in our sample are Japan (1 246) and Hong Kong (835).

As can be seen in Table 2, the IPOs follow a seemingly cyclical pattern with the number of IPOs peaking in years like 1996, 2000, 2006, 2007 and 2014. A possible explanation for this phenomenon is that the number of IPOs per year tends to follow the general state of the market. We e.g. observe that the number of IPOs in our sample peaks in 2007 and drops dramatically in 2008, due to the financial crisis. This trend can be observed in, among others, the US, Australia, Japan, and Hong Kong. Interestingly, Canada appears to experience some type of lag compared to the other countries. IPOs there e.g. peak in 2008 instead of 2007. The first three years in our sample, 1995-1998, are completely dominated by IPOs in the US. We are also cautious to draw any significant conclusions based on the number of IPOs per year and country as our sample is not exhaustive on a country-basis.

Table 3 reports the basic statistics for the initial returns as well as the IEF-variable ‘overall score’ per country. The country-specific values for ADRI (for both 1997 and 2005) and ASDI are also presented. IPOs in each country are underpriced on average except for in Brazil where the initial returns are slightly negative. When observing Table 3 it is apparent that although underpricing is prevalent in almost every country, its extent varies. Taiwan experiences the highest average underpricing of 23.73%, closely followed by Thailand at 20.72%. The highest standard deviations of underpricing are also found in Asia, more specifically in Thailand (26.57%) and South Korea (23.64%). The country with the highest overall economic freedom in the sample period is Hong Kong with an average score of 89.62, followed by Singapore with a score of 87.65. The lowest scores are found in India (54.10) and Indonesia (55.50). The biggest variations in economic freedom over time are observed in Malaysia where the standard deviation is 3.77, and in Japan (2.56).

Table 2. IPO:s per country and year (1995-2018)

Country	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	Total
Australia	0	0	0	0	0	1	0	2	4	17	33	27	52	8	4	6	32	22	24	36	31	19	39	5	362
Brazil	0	0	0	0	0	0	0	0	0	0	0	0	14	3	2	7	6	1	5	0	0	0	0	0	38
Canada	0	0	0	0	0	0	0	0	11	34	50	65	27	51	23	62	81	97	27	23	30	3	5	0	589
Germany	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	2	1	1	0	1	3	2	0	0	14
Hong Kong	0	0	0	0	0	0	11	67	40	28	20	24	44	19	36	65	53	31	70	72	66	65	109	15	835
India	0	0	0	0	0	0	0	0	0	0	0	0	2	13	8	10	5	0	0	0	0	0	2	4	44
Indonesia	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	3	9	0	0	3	0	0	0	0	21
Italy	1	0	0	0	0	0	0	0	0	0	2	2	4	0	1	0	0	0	0	0	0	0	0	0	10
Japan	0	0	27	74	47	135	101	76	75	89	68	98	70	35	11	14	26	30	34	54	62	64	46	10	1 246
Malaysia	0	0	0	0	0	0	0	0	1	4	10	1	8	9	6	8	12	5	9	9	5	6	6	3	102
New Zealand	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	2	5	0	0	0	0	11
Philippines	0	0	0	0	0	0	0	0	0	0	1	3	6	0	0	0	3	3	5	3	2	0	1	0	27
Singapore	0	0	0	1	0	0	0	2	0	2	3	8	8	8	8	13	16	18	11	10	4	3	8	0	123
South Korea	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	56	46	19	26	49	90	58	54	11	412
Taiwan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32	56	47	52	36	44	40	29	10	346
Thailand	0	0	0	0	0	0	0	2	0	1	0	1	1	0	0	0	1	4	0	1	0	0	0	0	11
UK	1	3	2	1	2	2	0	1	7	20	5	9	20	7	2	5	9	4	7	16	10	9	0	0	142
US	387	711	508	269	351	268	92	110	96	212	189	183	218	31	33	86	65	112	215	205	131	75	127	18	4 692
Total	389	714	537	345	400	406	204	260	235	409	383	422	478	187	136	369	422	395	487	523	478	344	426	76	9 025

The above table presents the number of IPOs per country of the exchange on which the firm is listed and year of the IPO, as found in our sample extracted from the SDC Platinum database. The table reports on the time period April 1995 to March 2018, and on a total of 9 025 IPOs distributed over 18 countries.

Table 3. Average initial return, economic freedom, anti-director rights and anti-self dealing by country.

Country	Initial Return (IR)				Overall Score (IEF)				Investor Protection (LPSS)		
	Mean	Std. dev	Min	Max	Mean	Std. dev	Min	Max	ADRI*	ADRI**	ASDI
Australia	11.36%	24.56%	-50.00%	102.00%	81.07	1.43	77.10	83.10	4.00	4.00	0.82
Brazil	-0.02%	8.33%	-15.56%	27.41%	56.37	0.65	55.60	57.90	5.00	5.00	0.25
Canada	15.27%	28.39%	-56.52%	100.00%	78.98	1.84	74.80	80.80	4.00	4.00	0.49
Germany	4.76%	7.63%	-7.17%	24.07%	71.79	2.13	68.10	74.40	4.00	4.00	0.21
Hong Kong	11.22%	22.93%	-50.00%	100.00%	89.62	0.42	88.60	90.20	4.00	4.00	0.98
India	11.60%	28.84%	-19.36%	101.29%	54.10	0.43	52.60	54.60	4.00	4.00	0.46
Indonesia	17.00%	21.20%	-17.33%	57.27%	55.50	1.69	53.20	58.50	---	---	0.73
Italy	9.69%	11.31%	-5.00%	38.57%	62.76	1.21	61.20	64.90	2.00	4.00	0.29
Japan	21.37%	29.05%	-37.86%	103.00%	70.36	2.66	64.30	73.30	5.00	5.00	0.36
Malaysia	11.04%	19.91%	-35.00%	89.19%	66.38	3.76	59.90	74.50	4.00	4.00	0.97
New Zealand	3.47%	13.00%	-28.00%	24.55%	81.43	0.38	81.10	82.30	5.00	5.00	0.98
Philippines	13.25%	19.31%	-12.00%	50.00%	57.81	2.44	54.70	65.60	4.00	5.00	0.14
Singapore	13.61%	22.65%	-28.75%	85.71%	87.66	0.90	86.10	89.40	4.00	4.00	1.00
South Korea	19.18%	29.18%	-33.20%	103.25%	71.34	1.46	67.80	74.30	4.00	6.00	0.36
Taiwan	27.55%	23.00%	-18.49%	102.89%	73.16	1.98	70.40	76.60	5.00	5.00	0.49
Thailand	27.02%	32.22%	-16.88%	90.00%	65.12	1.98	63.30	69.10	4.00	4.00	0.91
UK	8.77%	11.85%	-11.54%	55.00%	77.12	3.75	74.10	80.40	4.00	5.00	0.97
US	15.02%	22.23%	-59.46%	102.50%	77.04	1.80	75.10	81.20	2.00	2.00	0.49
Whole sample	15.81%	24.41%	-59.46%	103.25%	76.85	6.09	52.60	90.20	3.13	3.24	0.55

*Reports the variable values based on 1997 data.

**Reports the variable values based on 2005 data.

Table 3 reports the mean, standard deviation, minimum and maximum of the average initial return and IEF variable 'overall score' over the sample period in each of the 18 countries that are included in our sample, as well as for the whole sample. The table also presents the country-specific values of ADRI (for both 1997 and 2005) and ASDI 'Overall score' ranges from 0 to 100, 'ADRI_97' from 0 to 5, 'ADRI_05' from 0 to 6 and ASDI from 0 to 1.

The average ADRI-value increases slightly from 1997 to 2005 which is due to the scores for Italy, South Korea, and the UK having been upgraded. The lowest ADRI-values are somewhat surprisingly assigned the US (2.00). The highest ASDI-scores are awarded to Hong Kong (1.00), Singapore (0.98) and New Zealand (0.98) while the lowest scores are given to the Philippines (0.14) and Germany (0.26). ADRI-values for Indonesia are missing.

Some conclusions can be drawn from Table 3. Firstly, less developed countries tend to have a lower economic freedom and conversely, developed countries generally have higher economic freedom scores. Evidence of this can be found in for instance Thailand (65.14) and Indonesia (55.50) which have low scores whereas New Zealand (81.43) and Singapore (87.65) have significantly higher scores. There also appears to be a correlation between how developed a country is, the economic freedom of said country and its extent of underpricing. IPOs in Germany are for example underpriced on average with 4.76% while the corresponding value in Thailand is 20.72%. Economic development therefore seems to have an effect on the economic freedom, and subsequently also on IPO underpricing.

Table 4. Descriptive statistics for each explanatory variable.

Variable	Obs	Mean	Std. Dev	Min	Max
IR	9 025	15.82%	24.41%	−59.46%	103.25%
Control					
Tech	9 025	0.19	0.39		
lnAge	6 413	2.12	1.12	0.00	4.62
lnProc	9 025	0.16	0.24	−0.59	1.03
OA	8 126	0.56	0.50		
Hot	8 524	0.55	0.50		
30day	7 748	1.40%	5.20%	−32.63%	29.06%
Uwr	8 924	5.81%	2.24%	0.00%	32.21%
Integer	8 209	0.68	0.47		
IEF					
OS	9 004	76.85	6.09	52.60	90.20
PR	9 004	84.99	9.44	30.00	97.10
GI	9 004	75.86	11.18	22.00	96.00
GS	9 004	63.15	13.34	3.60	95.30
BF	9 004	87.33	7.50	36.30	100.00
LF	5 114	82.51	15.77	39.90	98.90
TF	9 004	82.25	5.12	51.00	95.00
IF	9 004	70.26	10.86	30.00	90.00
FF	9 004	71.50	14.41	30.00	90.00
ROL	5 639	90.32	8.11	29.67	98.59
LPSS					
ADRI_97	9 025	3.13	1.24	0.00	5.00
ADRI_05	9 025	3.24	1.39	0.00	6.00
ASDI	9 025	0.55	0.20	0.14	1.00
CredRi	7 730	1.46	0.83	0.00	4.00
PEI	9 025	0.14	0.31	0.00	1.00

Table 4 reports the mean, standard deviation, minimum and maximum of initial return, the control variables as well as the IEF, ROL and LPSS variables. ‘IR’ is the initial return. ‘Tech’ is our tech dummy variable. ‘lnAge’ is the natural logarithm of the firm age +1. ‘lnProc’ is the natural logarithm of the total IPO proceeds. ‘OA’ is the over-allotment dummy variable. ‘Hot’ is our hot market dummy variable. ‘30day’ is the previous 30 day return on the country index where the IPO is listed. ‘Uwr’ is the underwriter fee as a percentage of the total offer size. ‘Integer’ is the integer offer price dummy variable. ‘ROL’ is the value of the ‘rule of law’ variable. ‘OS’ is the equal-weighted average of the sub-indices that make up the Index of Economic Freedom. ‘PR’ is the ‘property rights’ sub-index of the IEF. ‘GI’ is the ‘government integrity’ sub-index of the IEF. ‘GS’ is the ‘government spending’ sub-index of the IEF. ‘BF’ is the ‘business freedom’ sub-index of the IEF. ‘LF’ is the ‘labour freedom’ sub-index of the IEF. ‘TF’ is the ‘trade freedom’ sub-index of the IEF. ‘IF’ is the ‘investment freedom’ sub-index of the IEF. ‘FF’ is the ‘financial freedom’ sub-index of the IEF. ‘ADRI_97’ is the value of the 1997 anti-director rights index. ‘ADRI_05’ is the value of the 2005 anti-director rights index. ‘ASDI’ is the value of the anti self dealing index. ‘CredRi’ is the value of the ‘Creditor Rights’ variable. ‘PEI’ is the value of the public enforcement

index. The minimum and maximum for ‘Tech’, ‘OA’, ‘Hot’, and ‘Integer’ is not reported as they are dummy variables. The limiting factors in terms of observations are the ‘labour freedom’ and ‘rule of law’ variables. The amount of observations reported in the regression tables below are lower than in the above table since the regressions are run such that there is data on each variable.

We note that the average initial return on the IPOs in our sample is 15.81% and that the lowest and highest returns are -59.46% and 103.25% respectively after the trimming at the top and bottom 2.5%. Tech firms make up 19% of the sample, whereas 55% of the firms went public in what we define as ‘hot markets’. 56% of IPOs also exercised an over-allotment option, and 68% of the firms had an integer offer price. These factors have all been confirmed to increase underpricing which explains a part of the positive average first day returns that we observe in our sample.

The average of the overall economic freedom score is 76.85 and the averages of the individual sub-indices vary with the highest being ‘business freedom’ (87.33) and the lowest being ‘government spending’ (63.15). ‘Government spending’ also has the lowest minimum value of 3.60 which is found in Italy.

Table 5. Pearson correlation matrix of control variables.

	IR	Tech	lnAge	lnProc	OA	Hot	30day	Uwr	Integer
IR	1.000								
Tech	0.118	1.000							
lnAge	0.091	0.057	1.000						
lnProc	-0.082	-0.010	0.004	1.000					
OA	0.279	0.061	0.112	0.231	1.000				
Hot	0.096	0.047	-0.013	-0.293	-0.017	1.000			
30day	0.104	-0.012	-0.019	0.061	0.132	0.038	1.000		
Uwr	0.061	0.181	0.034	0.005	0.277	-0.049	0.123	1.000	
Integer	0.061	0.066	0.012	0.166	0.165	-0.027	0.012	0.250	1.000

Table 5 illustrates the Pearson bivariate correlations between the dependent variable, ‘IR’, and the control variables. ‘IR’ is the initial return. ‘Tech’ is our tech dummy variable. ‘lnAge’ is the natural logarithm of the firm age +1. ‘lnProc’ is the natural logarithm of the total IPO proceeds. ‘OA’ is the over-allotment dummy variable. ‘Hot’ is our hot market dummy variable. ‘30day’ is the previous 30 day return on the country index where the IPO is listed. ‘Uwr’ is the underwriter fee as a percentage of the total offer size. ‘Integer’ is the integer offer price dummy variable. If the correlation coefficient is positive, there is a positive relationship between the particular control variable and the initial return, meaning that an increase in one causes an increase in the other, and vice versa. Conversely, if there is a negative correlation between two variables, the increase in one will decrease the other and vice versa.

Firstly, there are no correlations above 0.3 between any of the control variables which suggests that there are no significant problems with multicollinearity in our control model. The correlation matrix provides insight into what effect a standalone variable will have on initial return. The 'Tech' variable is positively correlated with first day return which means that tech firms are more underpriced than non-tech firms in our sample. 'lnAge' is also positively correlated with initial returns which suggests that older firms are more likely to be underpriced which contradicts the consistent findings of the information asymmetry literature and we are consequently careful to infer any particular meaning to this result. Also, firms that exercise over-allotment options are more underpriced, which holds true for 'hot market' issues as well. Table 5 also shows that increased previous 30 day country index returns, higher underwriter spreads, and integer offer prices all increase initial returns. The only control variable that we examine that has a negative correlation with underpricing is the IPO proceeds which means that the individual effect of higher proceeds is negative in terms of initial return.

4.2 Main Results

Table 6. Regression results for LPSS and ROL variables with robust standard errors in parentheses.

Regression	(1) Coeff	(2) Coeff	(3) Coeff	(4) Coeff	(5) Coeff	(6) Coeff	(7) Coeff
Constant	0.103*** (0.013)	0.061*** (0.023)	0.037 (0.024)	0.072*** (0.021)	0.054*** (0.020)	0.070*** (0.014)	0.127*** (0.040)
ADRI_97		0.007** (0.004)					
ADRI_05			0.010*** (0.003)				
ASDI				0.035* (0.019)			
CredRi					0.017*** (0.004)		
PEI						0.068*** (0.015)	
ROL							0.000 (0.000)
Tech	0.047*** (0.007)	0.047*** (0.007)	0.047*** (0.007)	0.047*** (0.007)	0.049*** (0.007)	0.047*** (0.007)	0.055*** (0.009)
lnAge	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.010*** (0.002)	0.009*** (0.002)	0.010*** (0.002)	0.005** (0.003)
lnProc	-0.018*** (0.002)	-0.016*** (0.002)	-0.014*** (0.002)	-0.018*** (0.002)	-0.016*** (0.002)	-0.017*** (0.002)	-0.014*** (0.003)
OA	0.112*** (0.005)	0.110*** (0.005)	0.111*** (0.005)	0.112*** (0.006)	0.117*** (0.006)	0.120*** (0.006)	0.116*** (0.006)
Hot	0.018*** (0.006)	0.019*** (0.005)	0.019*** (0.005)	0.018*** (0.006)	0.017*** (0.006)	0.015*** (0.006)	0.023*** (0.007)
30day	0.298*** (0.055)	0.300*** (0.055)	0.301*** (0.055)	0.299*** (0.055)	0.358*** (0.060)	0.307*** (0.055)	0.345*** (0.073)
Uwr	-0.484*** (0.130)	-0.264 (0.172)	-0.104 (0.179)	-0.409*** (0.138)	-0.243 (0.165)	-0.251* (0.140)	-0.312 (0.198)
Integer	0.018*** (0.006)	0.018*** (0.006)	0.015*** (0.006)	0.025*** (0.007)	0.014** (0.006)	0.020*** (0.006)	-0.002 (0.008)
N obs	4377	4377	4.377	4377	4027	4377	2827
R-squared	12.49%	0.1260	0.1276	0.1257	0.1371	0.1301	0.1358
F(8. 4358)	88.94	0.000	0.000	0.000	0.000	0.000	0.000
Prob > F	0.000	79.27	79.99	80.17	82.74	84.54	56.24
AIC	-3057.69	-3060.94	-3069.08	-3059.52	-2841.28	-3081.64	-2196.75
BIC	-3000.23	-2997.10	-3005.24	-2995.68	-2778.27	-3017.80	-2137.28

*p<0.1. **p<0.05. ***p<0.01

Table 6 illustrates the robust OLS regression results with robust standard errors in parentheses. We have chosen to perform robust regressions due to having heteroscedastic error terms. The beta coefficients for the LPSS variables are tested against the control variables where first day return is the dependent variable. ‘ADRI_97’ is the value of the 1997 anti-director rights index. ‘ADRI_05’ is the value of the 2005 anti-director rights index. ‘ASDI’ is the value of the anti-self dealing index. ‘CredRi’ is the value of the ‘Creditor Rights’ variable. ‘PEI’ is

the value of the public enforcement index. 'ROL' is the value of the 'rule of law' variable 'Tech' is our tech dummy variable. 'lnAge' is the natural logarithm of the firm age +1. 'lnProc' is the natural logarithm of the total IPO proceeds. 'OA' is the over-allotment dummy variable. 'Hot' is our hot market dummy variable. '30day' is the previous 30 day return on the country index where the IPO is listed. 'Uwr' is the underwriter fee as a percentage of the total offer size. 'Integer' is the integer offer price dummy variable.

Model 1 reports on the control variables alone. We find that tech stocks are on average more underpriced than non-tech stocks, likely due to more uncertainty which aggravates the underpricing according to the information asymmetry argument. The previous 30 day country stock index return affects initial returns positively, which reflects Ritter's (1984) 'hot issues market' phenomenon in part. Higher IPO proceeds will tend to decrease the extent of underpricing (i.e. larger issues are generally underpriced less), which also reflects the information asymmetry argument since larger issues are more likely to reveal proportionately more information ex ante. Underwriting spreads decrease the degree of underpricing, possibly due to the trade-off effect of lower proceeds and lower fees stemming from underpricing, and the higher fees collected from higher underwriting spreads. We also observe that initial public offerings where an over-allotment option has been exercised are on average more underpriced. An IPO that is performed in a 'hot market' will increase underpricing significantly and the same holds true for IPOs with an integer offer price. One control variable that is inconsistent with the literature is the firm age variable that has a significantly positive effect on IPO underpricing in our data, contradicting our expectations.

Models 2, 3, 4, 5 and 6 have LPSS variables that are statistically significant at 10% or below. 'ADRI_97', 'ADRI_05', 'ASDI', 'CredRi', and 'PEI' are all positively associated with IPO underpricing. (However, 'PEI' has the opposite sign to what we expect.) These results seem to confirm our first hypothesis, showing that an IPO is more likely to be underpriced if it is issued in a country where anti-self dealing regulation is strong, or if there are strong anti-director rights. This strengthens the notion that insiders' ability to exercise private managerial control is related to IPO underpricing, as suggested by e.g. Brennan and Franks (1997) where they imply that the benefit gained from reduced monitoring and scrutiny by outside investors offsets the cost of underpricing.

The 'PEI' variable is negatively associated with underpricing and our interpretation is that the variable is more likely a reflection of the overall judicial effectiveness of a country, despite being defined as a country's legal effectiveness against self dealing by insiders. This index appears to be less extensively studied as compared to the other indices and we are

therefore careful to infer any significant meaning to it. As for the investor protection variables, it could be the case that there instead is some omitted third variable that suggests some other mechanism for the impact on underpricing. One could control for this to some extent by including a variable indicating the post-IPO ownership concentration, since the underlying assumption of underpricing as a means of dispersing ownership – being a core assumption for the investor protection relationship to underpricing – should reflect a more dispersed ownership post-IPO. Such a control is made in e.g. Boulton et al (2010), yielding similar results to ours.

Table 7. Regression results for the primary IEF variables with robust standard errors in parentheses.

Regression	(8) Coeff	(9) Coeff	(10) Coeff
Constant	0.144*** (0.044)	0.168*** (0.027)	0.154*** (0.022)
OS	−0.001 (0.001)		
PR		−0.001*** (0.000)	
GI			−0.001*** (0.000)
Tech	0.047*** (0.007)	0.048*** (0.007)	0.047*** (0.007)
lnAge	0.009*** (0.002)	0.008*** (0.002)	0.009*** (0.002)
lnProc	−0.019*** (0.002)	−0.017*** (0.002)	−0.018*** (0.002)
OA	0.112*** (0.005)	0.113*** (0.005)	0.113*** (0.005)
Hot	0.016*** (0.006)	0.018*** (0.006)	0.019*** (0.006)
30day	0.297*** (0.055)	0.301*** (0.054)	0.304*** (0.055)
Uwr	−0.464*** (0.129)	−0.295** (0.141)	−0.307** (0.138)
Integer	0.014** (0.006)	0.012** (0.006)	0.011* (0.006)
N obs	4367	4367	4367
R-squared	12.57%	12.74%	12.75%
F(8. 4358)	79.75	81.41	81.24
Prob > F	0.000	0.000	0.000
AIC	−3050.03	−3058.43	−3058.75
BIC	−2986.21	−2994.61	−2994.93

*p<0.1, **p<0.05, ***p<0.01

The table illustrates the robust OLS regression results with robust standard errors in parentheses. The beta coefficients for the primary economic freedom variables are tested against the control variables where initial return is the dependent variable. The economic freedom variables are regressed individually against the control variables in order to isolate their standalone effects on the degree of underpricing and to avoid any issues stemming from multicollinearity. ‘OS’ is the equal-weighted average of the sub-indices that make up the Index of Economic Freedom. ‘PR’ is the ‘property rights’ sub-index of the IEF. ‘GI’ is the ‘government integrity’ sub-index of the IEF. ‘Tech’ is our tech dummy variable. ‘lnAge’ is the natural logarithm of the firm age +1. ‘lnProc’ is the natural logarithm of the total IPO proceeds. ‘OA’ is the over-allotment dummy variable. ‘Hot’ is our hot market dummy variable. ‘30day’ is the previous 30 day return on the country index where the IPO is listed. ‘Uwr’ is the underwriter fee as a percentage of the total offer size. ‘Integer’ is the integer offer price dummy variable.

Tables 7 and 8 show the results of the ordinary least squares regression of the independent variables, including the economic freedom variables, with first day return as the dependent variable. Model 8 provides no statistically significant evidence that the overall score has an effect on IPO underpricing. Models 9, 10, 11, 13, 15 and 16 are significant at 10% or below for the regressed IEF variables. We find that ‘overall score’ is not significantly correlated to IPO underpricing, whereas ‘property rights’, ‘government integrity’, ‘labour freedom’, ‘trade freedom’ and ‘investment freedom’ are significant at 10% or lower. All of these variables have negative coefficients, implying that the better a country scores on these indices, the lower the underpricing will be according to the respective models. Government spending, on the other hand, has a statistically significant positive coefficient indicating a positive effect on underpricing. The Heritage Foundation defines the ‘government spending’ variable with zero expenditure as the benchmark. Thus, countries with low levels of spending will be highly scored even though the reason for their low spending might differ significantly. Countries such as Chad and Ethiopia have low government spending because they are under-developed and therefore cannot afford to spend more while countries such as Hong Kong and Singapore are so highly developed that they do not have the need for high government spending.

As such, the results in Table 7 provide no conclusive evidence for the overall economic freedom score being associated with IPO underpricing. However, the ‘rule of law’ IEF variables, i.e. ‘property rights’ and ‘government integrity’, are significantly negatively associated with IPO underpricing. By their according definitions, this would then imply that issues in countries with less corruption and better property rights tend to be less underpriced.

Table 8. Regression results for secondary IEF variables.

Regression	(11) Coeff	(12) Coeff	(13) Coeff	(14) Coeff	(15) Coeff	(16) Coeff	(17) Coeff
Constant	−0.024 (0.024)	0.097** (0.041)	0.180*** (0.029)	0.050 (0.060)	0.221*** (0.057)	0.147*** (0.028)	0.092*** (0.022)
GS	0.001*** (0.000)						
BF		0.000 (0.000)					
LF			−0.001*** (0.000)				
MF				0.001 (0.001)			
TF					−0.001** (0.001)		
IF						−0.001* (0.000)	
FF							0.000 (0.000)
Tech	0.048*** (0.007)	0.047*** (0.007)	0.049*** (0.010)	0.046*** (0.007)	0.046*** (0.007)	0.047*** (0.007)	0.046*** (0.007)
lnAge	0.007*** (0.002)	0.009*** (0.002)	0.013*** (0.003)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
lnProc	−0.015*** (0.002)	−0.019*** (0.002)	−0.019*** (0.003)	−0.018*** (0.002)	−0.019*** (0.002)	−0.019*** (0.002)	−0.019*** (0.002)
OA	0.111*** (0.005)	0.112*** (0.005)	0.096*** (0.007)	0.111*** (0.005)	0.115*** (0.005)	0.112*** (0.005)	0.113*** (0.006)
Hot	0.013** (0.006)	0.018*** (0.006)	0.012 (0.011)	0.017*** (0.006)	0.010 (0.007)	0.016*** (0.006)	0.019*** (0.006)
30day	0.308*** (0.055)	0.295*** (0.055)	0.390*** (0.073)	0.294*** (0.055)	0.300*** (0.054)	0.297*** (0.054)	0.297*** (0.055)
Uwr	−0.079 (0.138)	−0.472*** (0.131)	−0.084 (0.201)	−0.497*** (0.132)	−0.504*** (0.132)	−0.482*** (0.130)	−0.483*** (0.130)
Integer	0.025*** (0.006)	0.017*** (0.006)	−0.001 (0.008)	0.018*** (0.006)	0.013** (0.006)	0.014** (0.006)	0.018*** (0.006)
Nobs	4367	4367	2712	4367	4367	4367	4.367
R-squared	13.23%	12.55%	12.61%	12.57%	12.66%	12.62%	12.56%
F(8. 4358)	86.01	79.41	49.27	79.73	81.37	80.3	79.69
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AIC	−3082.74	−3048.95	−1789.07	−3049.85	−3054.47	−3052.53	−3049.35
BIC	−3018.92	−2985.14	−1730.02	−2986.03	−2990.65	−2988.71	−2985.53

*p<0.1. **p<0.05. ***p<0.01

The above table shows the robust OLS regressions for the secondary IEF variables with the robust standard errors in parentheses. The beta coefficients for the LPSS variables are tested against the control variables where first day return is the dependent variable. ‘GS’ is the ‘government spending’ sub-index of the IEF. ‘BF’ is the ‘business freedom’ sub-index of the IEF. ‘LF’ is the ‘labour freedom’ sub-index of the IEF. ‘TF’ is the ‘trade freedom’ sub-index of the IEF. ‘IF’ is the ‘investment freedom’ sub-index of the IEF. ‘FF’ is the ‘financial freedom’ sub-index of the IEF. ‘Tech’ is our tech dummy variable. ‘lnAge’ is the natural logarithm of the firm

age +1. 'lnProc' is the natural logarithm of the total IPO proceeds. 'OA' is the over-allotment dummy variable. 'Hot' is our hot market dummy variable. '30day' is the previous 30 day return on the country index where the IPO is listed. 'Uwr' is the underwriter fee as a percentage of the total offer size. 'Integer' is the integer offer price dummy variable.

A recurring pattern in Table 6, 7 and 8 is the tendency of the significance of the 'Uwr' variable to differ greatly from one model to another. This is particularly evident in Table 6 with the LPSS variables. We believe that one potential explanation could be that the variable correlates with some of the IEF and LPSS variables. For instance, countries that have more rigid and prohibitive institutions may restrict underwriters from charging fees above a certain percentage or forbid private banks from underwriting issues altogether. An additional explanation for its variability is its potential correlation with the 'OA' variable, since exercising an over-allotment option generates additional underwriting fees.

When observing both Table 7 and Table 8, we thus find that the 'rule of law'-related variables 'property rights' and 'government integrity' are significantly negatively associated with underpricing. This is different from the results in Table 6 that include the 'rule of law' variable 'ROL'. While this latter variable is as frequently updated as the IEF variables, implying that there is no issue of timeliness, 'ROL' still lacks significance. This makes any useful interpretation of the legal system and its implication on underpricing difficult. Additionally, there are no notable differences in the observed AIC scores of the regression models. We therefore cannot conclude whether either of the metrics are of higher statistical quality. While we cannot fully confirm our second hypothesis, our findings are comparable to what previous researchers have found (e.g. Hopp and Dreher, 2011).

5. Conclusion

The IPO underpricing phenomenon has been extensively studied by researchers such as Rock, Ritter and Ljungqvist but little emphasis has been put on differences in institutional environments between countries and how that explains variations in IPO underpricing. We apply the investor protection related variables defined by La Porta et al (1998), i.e. ‘anti-self dealing index’ and ‘anti director rights index’ as well as the ‘public enforcement index’ and ‘creditor rights’ (‘LPSS’ variables) as well as ‘rule of law’ (Kaufmann et al 2005) on a sample of 9 025 IPOs in 18 countries from 1995 to 2018 to examine their effects on the first day return. We complement this analysis with the variables from the Index of Economic Freedom (‘IEF’ variables): ‘property rights’, ‘government integrity’, ‘monetary freedom’, ‘trade freedom’, ‘financial freedom’, ‘business freedom’, ‘investment freedom’, ‘labour freedom’, ‘government spending’, and the equal-weighted average of these variables, ‘overall score’. We run regressions of the IEF and LPSS variables against a selection of control variables from previous studies in order to isolate the effect of different levels of investor protection and economic freedom on underpricing.

We find that tech stocks are on average more underpriced than non-tech stocks, that the previous 30 day country stock index returns affect initial returns positively, and that increasing IPO proceeds and underwriting spreads decrease the degree of underpricing. We also observe that initial public offerings where an over-allotment option has been exercised are on average more underpriced. An initial public offering that is performed in a hot market will increase underpricing significantly which also holds true for IPOs with an integer offer price. The only control variable inconsistent with the literature is the firm age variable which has a significantly positive effect on IPO underpricing meaning that older firms are more underpriced which contradicts the information asymmetry theory.

We do not find statistically significant evidence for the IEF overall score having an effect on IPO underpricing which means that we cannot fully validate our second hypothesis. However, we do find that several of the sub-indices of the IEF are associated with first day returns. ‘Government integrity’, ‘property rights’, ‘labour freedom’, ‘trade freedom’, and ‘investment freedom’ all have a significant negative effect on first day returns meaning that they all contribute to alleviating underpricing. A higher government spending score, on the other hand, increases initial returns. Spending is therefore negatively associated with underpricing due to the variable being constructed with an inverse relationship to the actual

spending. This is however not particularly informative since two countries with completely different institutional environments could be assigned the same score.

The Heritage Foundation claims to not advocate a universal optimum level of spending, and yet they set zero spending as the benchmark for a perfect score. This suggests that the ‘government spending’ variable might be poorly defined as vastly different countries could be allocated the same score by using the approach of solely taking spending into account. We would advise against using this variable as it has a limited interpretation and this is also why we refer to some IEF variables as ‘secondary’ since their mechanisms with regards to underpricing are not entirely clear.

The results in Table 6 support the hypothesis that issues in countries with higher investor protection are more prone to IPO underpricing. The ‘ADRI_05’ score has a greater effect on underpricing than the older ‘ADRI_97’ variable but both indices are statistically significant on a 10% level. The ‘ASDI’ variable is also significantly positive providing evidence that anti-self dealing regulation increases underpricing. The public enforcement index (PEI) is significant but with a positive sign which contradicts a part of our second hypothesis. While the PEI variable is constructed as a complement to the ASDI variable, reflecting the judicial enforcement of anti-self dealing regulation, we expected it to be positive. The only LPSS variable that we cannot conclusively relate to variations in IPO underpricing is the ‘rule of law’ index. However, by supplementing our analysis with the ‘property rights’ and ‘government integrity’ variables, we find that they are statistically significant and negatively associated with underpricing. This partially supports our second hypothesis, where we posit that effective legal institutions reflected by a set of ‘rule of law’-related variables lower financial uncertainty and the required rate of return. This then lowers ex ante uncertainty that according to the information asymmetry theories is a primary driver of underpricing.

As the LPSS variables gained traction in the broader finance literature in 1997 and onwards, it has been interesting to find a statistically significant result for these variables regardless of the direction of their sign. Their consistent positive signs do however support our first hypothesis, reinforcing the managerial control argument. We still believe that the methodological complexity of La Porta et al (1998) and consequently Djankov et al (2008) makes the addition of more recent data both difficult and uncertain. One could have attempted to renew the LPSS variables with more recent data, but this alone would well exceed the scope of this paper since we recognise that Djankov et al (2008) used Lex Mundi law firms when deciding the presence of certain regulations in various legislations. This therefore implies that there is a need for more consistent metrics. It is for this reason that the results from the previous

‘rule of law’-regressions using IEF variables give some positive indication that they could be used as benchmark indices in other law and finance studies.

There are other aspects of this study that we feel could be addressed. We would like to have included more IPOs from more countries and the primary reason for not extending the sample even further was that it was computationally difficult to extract more information from the SDC Platinum database. Our suggestion for any researcher following a similar approach to ours is that one should extract the company identifying codes and then match subsequent data extracts with those codes. In this manner one could obtain a slightly larger sample. However, few studies use larger samples and it could be argued that a smaller but more carefully selected data set could lessen the risk of measurement error stemming from the SDC Platinum database.

We would also have liked to run the regressions with dummy variables for industry and year, but decided against this in favour of the ‘Tech’ and ‘Hot’ variables that cover some of the fixed effects that occur at the level of the industry and the year of the IPO. A different and perhaps more favourable statistical approach would be to perform hierarchical linear modelling in lieu of the OLS regression as the IPOs are nested by country. Such an approach would then involve performing the regressions at two dimensions, facilitating analyses of cross-country and inter-industry regressions. This could explain conflicting findings in the existing literature, since Boulton et al (2010) use traditional OLS regressions but Engelen and van Essen (2010) use hierarchical linear modelling with opposing results. We would also have liked to include additional control variables to test whether the regression outputs would change with a different configuration of control variables, as well as to have considered the possible endogeneity of the over-allotment variable.

Our intention with this paper has been to study the apparent contradictions in the existing literature and provide additional findings that could help explain the lack of consensus. Our results indicate that issues in countries with more developed investor protection tend to be more underpriced. While such a result could seem counterintuitive, it confirms the arguments laid out by previous researchers such as Boulton et al (2010) and Hopp and Dreher (2011) and contrasts the findings of Engelen and van Essen (2010) as well as Banerjee et al (2011). We thus contribute with additional evidence in this relatively niche field. We motivate these findings with the managerial control argument, implying that a primary reason for underpricing is the retention of control by incumbents and their subsequent influence over the share allocation process.

Lastly, since we find no significant connection between the overall economic freedom of a country and the likelihood of an issue being underpriced, we contribute to the existing

literature by opposing the notion that economic freedom could be related to underpricing. We believe that this could stem from the variable being too broadly defined, and thus being affected by some omitted variable. In summary, we find some evidence supporting our first hypothesis but fail to either reject or support our second hypothesis and thus conclude that more research is needed in this field of study.

6. References

- Aggarwal, R., and Prabhala, N.R., and Puri, M., 2002, Institutional Allocation in Initial Public Offerings: Empirical Evidence, *The Journal of Finance* 57, 1421-1442.
- Akerlof, G.A., 1970, The Market for 'Lemons': Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics* 84, Issue 3, 488-500.
- Arugaslan, O., and Cook, D.O., and Kieschnick, R., 2004, Monitoring as a Motivation for IPO Underpricing, *The Journal of Finance* 59, 2403-2420.
- Banerjee, S., and Dai, L., and Shrestha, K., 2011, Cross-country IPOs: What explains differences in underpricing?, *Journal of Corporate Finance* 17, Issue 5, 1289-1305.
- Baron, D.P. and Holmstrom, B., 1980, The Investment Banking Contract for New Issues under Asymmetric Information: Delegation and the Incentive Problem, *Journal of Finance* 35, Issue 5, 1115-1138.
- Baron, D.P., 1982, A Model of the Demand for Investment Banking Advising and Distribution Services for New Issues, *The Journal of Finance* 37, 955-976.
- Beatty, R.P., and Ritter, J.R., 1986, Investment Banking, Reputation, and the Underpricing of Initial Public Offerings, *Journal of Financial Economics* 15, Issue 1-2, 213-232.
- Bell, R. G., and Moore, C.B., and Al-Shammari, H.A., 2008, Country of Origin and Foreign IPO Legitimacy: Understanding the Role of Geographic Scope and Insider Ownership, *Entrepreneurship Theory and Practice* 32, 185-202.
- Benveniste, L.M., and Spindt, P.A., 1989, How investment bankers determine the offer price and allocation of new issues, *Journal of Financial Economics* 24, Issue 2, 343-361.
- Bhattacharya, U., and Daouk, H., 2002, The World Price of Insider Trading. *The Journal of Finance* 57, 75-108.
- Booth, J.R., and Smith, R.L., 1986, Capital raising, underwriting and the certification hypothesis, *Journal of Financial Economics* 15, Issues 1-2, 261-281,
- Boulton, T.J., and Smart, S., and Zutter, C.J., 2007, IPO Underpricing and International Corporate Governance, *Journal of International Business Studies* 41, 206-222.
- Boulton, T.J., and Smart, S., and Zutter, C.J., 2016, Conservatism and International IPO Underpricing, *Journal of International Business Studies*, Forthcoming; Kelley School of Business Research Paper No. 17-2.
- Boulton, T.J., and Smart, S., and Zutter, Chad J., 2011, Earnings Quality and International IPO Underpricing, *Accounting Review* 86, Issue 2, 483-505.
- Bradley, D.J., and Cooney Jr., J.W., and Jordan, B.D., and Singh, A.K., 2004, Negotiation and the IPO Offer Price: A Comparison of Integer vs. Non-Integer IPOs, *The Journal of Financial and Quantitative Analysis* 39, Issue 3, 517-540.
- Brau, J.C., and Fawcett, S.E., 2006, Initial Public Offerings: An Analysis of Theory and Practice, *The Journal of Finance* 61, 399-436.
- Brennan, M. J., and Franks, J., 1997, Underpricing, ownership and control in initial public offerings of equity securities in the UK, *Journal of Financial Economics* 45, Issue 3, 391-413.
- Carter, R. B., and Dark, F.H., and Singh, A.K., 1998, Underwriter Reputation, Initial Returns, and the Long-Run Performance of IPO Stocks, *The Journal of Finance* 53, 285-311.
- Carter, R.B., and Manaster, S., 1990, Initial Public Offerings and Underwriter Reputation, *The Journal of Finance* 45, 1045-1067.

- Chahine, S., 2004, Underpricing Versus Gross Spread: New Evidences on the Effect of Sold Shares at the Time of Ipos, EFMA 2004 Basel Meetings Paper.
- Chemmanur, T.J., and He, S., and Nandy, D.K., 2009, The Going Public Decision and the Product Market, RFS forthcoming 2010.
- Chen, H. and Ritter, J.R., 2000, The Seven Percent Solution, *The Journal of Finance* 55, 1105-1131.
- Chen, Y., and Wang, S.S., and Tong, W.H.S., and Chu, H., 2017, *Frontiers of Business Research in China* 11, 1-22.
- Claessens, S., and Laeven, L., 2003, Financial development, property rights, and growth, *The Journal of Finance* 58, 2401–2436.
- Cliff, M.T., and Denis, D.J., 2004, Do Initial Public Offering Firms Purchase Analyst Coverage with Underpricing?, *The Journal of Finance* 59, 2871-2901.
- Djankov, S., and La Porta, R., and Lopez-de-Silanes, F., and Shleifer, A., 2008, The law and economics of self-dealing, *Journal of Financial Economics* 88, Issue 3, 430-465.
- Djankov, S., and McLiesh, C., and Ramalho, R.M., 2006, *Regulation and Growth*, Washington, DC: World Bank.
- Dodge, C., and Karolyi, G.A., and Stulz, R.M., 2006, Why Do Countries Matter so Much for Corporate Governance? ECGI - Finance Working Paper No. 50/2004; Charles A. Dice Center Working Paper No. 2004-16 and Fisher College of Business Working Paper No. 2006-03-008.
- Engelen P.J., van Essen, M., 2010, Underpricing of IPOs: Firm-, issue- and country-specific characteristics, *Journal of Banking & Finance* 34, Issue 8, 1958-1969.
- Grossman, S.J. and Hart, O.D., 1980, Takeover Bids, the Free-Rider Problem, and the Theory of the Corporation, *Bell Journal of Economics* 11, Issue 1, 42-64.
- Habib, M.A., and Ljungqvist, A., 2001, Underpricing and Entrepreneurial Wealth Losses in IPOs: Theory and Evidence, *The Review of Financial Studies* 14, Issue 2, 433–458.
- Hanley, K.W., 1993, The Underpricing of Initial Public Offerings and the Partial Adjustment Phenomenon, *Journal of Financial Economics* 34, Issue 2, 231-250.
- Henisz, W. J., 2000, The Institutional Environment for Economic Growth, *Economics & Politics* 12, 1-31.
- Henry, P. B., 2007, Capital account liberalization: Theory evidence and speculation, *Journal of Economic Literature* 45, 887–935.
- Hensler, D.A., 1995, Litigation costs and the underpricing of initial public offerings. *Managerial and Decision Economics* 16, Issue 2, 111-128.
- Hopp, C., and Dreher, A., 2011, Do differences in institutional and legal environments explain cross-country variations in IPO underpricing?, *Applied Economics* 45, Issue 4, 435-454.
- Ibbotson, R.G., 1975, Price performance of common stock new issues, *Journal of Financial Economics* 2, Issue 3, 235-272.
- Jones, S.L., and Megginson, W.L., and Nash, R.C., and Netter, J.M., 1999, Share issue privatizations as financial means to political and economic ends, *Journal of Financial Economics* 53, 217–253.
- Kernaghan, K., and Langford, J.W., 1990, *The responsible public servant*, Institute of Public Administration of Canada and Institute for Research on Public Policy.

- La Porta, R., and Lopez-de-Silanes, F., and Shleifer, A., 2006, What Works in Securities Laws?, *The Journal of Finance* 61, 1-32.
- La Porta, R., and Lopez-de-Silanes, F., and Shleifer, A., and Vishny, R.W., 1998, Law and Finance, *Journal of Political Economy* 106, Issue 6, 1113-1155.
- Lau, K. N., and Lam, P. Y., 2002, Economic freedom ranking of 161 countries in year 2000: A minimum disagreement approach, *Journal of the Operational Research Society* 53, 664–671.
- Ljungqvist, A., and Wilhelm, W. J., 2003, IPO Pricing in the Dot-com Bubble, *The Journal of Finance* 58, 723-752.
- Ljungqvist, A., IPO Underpricing: A Survey. *Handbook in Corporate Finance: Empirical Corporate Finance*, B. Espen Eckbo, ed., Forthcoming.
- Loughran, T., and Ritter, J., 2004, Why Has IPO Underpricing Changed over Time?, *Financial Management* 33, Issue 3, 5–37.
- Loughran, T., and Ritter, J.R., 2004, Why Has IPO Underpricing Changed Over Time?, *Financial Management* 33, Issue 3, 5–37.
- Loughran, T., and Ritter, J.R., and Rydqvist, K., 1994, Initial public offerings: International insights, *Pacific-Basin Finance Journal* 2, Issues 2–3, 165-199.
- Lowry, M., and Murphy, K.J., 2007, Executive stock options and IPO underpricing, *Journal of Financial Economics* 85, Issue 1, 39-65.
- Meggison, W.L., and Weiss, K.A., 1991, Venture Capitalist Certification in Initial Public Offerings, *The Journal of Finance* 46, 879-903.
- Meggison, W.L., and Weiss, K.A., 1991, Venture Capitalist Certification in Initial Public Offerings. *The Journal of Finance* 46, 879-903.
- Miller, K., and Holmes, K.R., 2009, Index of economic freedom, *The Heritage Foundation & the Wall Street Journal*, New York: Dow Jones & Co.
- Pagano, M., and Volpin, P.F., 2005, The Political Economy of Corporate Governance, *American Economic Review* 95, Issue 4, 1005-1030.
- Ritter, J.R., 1984, The "Hot Issue" Market of 1980, *Journal of Business* 57, Issue 2, 215-240.
- Ritter, J.R., 1987, The costs of going public, *Journal of Financial Economics* 19, Issue 2, 269-281.
- Rock, K.F., 1986, Why New Issues are Underpriced, *Journal of Financial Economics* 15, Issue 1-2, 187-212.
- Ruud, J.S., 1993, Underwriter price support and the IPO underpricing puzzle, *Journal of Financial Economics* 34, Issue 2, 135-151.
- Rydqvist, K., 1997, IPO underpricing as tax-efficient compensation, *Journal of Banking & Finance* 21, Issue 3, 295-313.
- Santos-Paulino, A., and Thirlwall, A. P., 2004, The impact of trade liberalisation on exports, imports and the balance of payments of developing countries. *The Economic Journal* 114, 50–72.
- Smart, S., and Zutter, C.J., 2003, Control as a Motivation for Underpricing: A Comparison of Dual- and Single-Class Ipos, *Journal of Financial Economics* 69, Issue 1, 85-110.
- Spamann, H., The “Antidirector Rights Index” Revisited, 2010, *The Review of Financial Studies* 23, Issue 2, 467–486.

Stoughton, N.M., and Zechner, J., 1998, IPO-mechanisms, monitoring and ownership structure, *Journal of Financial Economics* 49, Issue 1, 45-77.

Weitzel, U., and Berns, S., 2006, Cross-border Mergers, Government Effectiveness, and Related Aspects of Corruption, *Journal of International Business Studies* 37, 786-806.

Yeoman, J.C., 2001, The optimal spread and offering price for underwritten securities, *Journal of Financial Economics* 62, Issue 1, 169-198.

Zingales, L., 1995, Insider Ownership and the Decision to Go Public, *The Review of Economic Studies* 62, Issue 3, 425–448.