TWO ESSAYS ON IPO UNDERPRICING

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Two Essays on IPO Underpricing

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                               (Signed)

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Two Essays on IPO Underpricing

Abstract

This thesis focuses on the *cross-sectional difference* in the extent of IPO underpricing in different places.

The first essay examines how the difference in institutional environment constitutes differential IPO underpricing across countries. Using the Heritage Foundation's Index of Economic Freedom (IEF) as a proxy for the cross-country heterogeneous institutional environment, and a large sample of 10,251 IPOs from 35 countries and regions over the period of 1993-2008, I find that countries with higher economic freedom have significantly less serious IPO underpricing problems. Moreover, among the ten economic freedom factors covered by the IEF, financial freedom related factors play a more important role in reducing the IPO underpricing problem. Finally, consistent with the market sentiment hypothesis, I find strong evidence that pre-IPO market sentiment influences the IPO first-day returns, and that the IPO underpricing problem is less severe when the market is bearish.

The second essay examines how the difference in institutional environment across various provinces in China can explain IPO underpricing in the Chinese equity market. As the largest developing country in the world, the level of economic development and the institutional environments across China are extremely heterogeneous. In addition, China's IPO firms have quite complicated ownership

structures and corporate governance mechanisms that are distinct from those in developed countries. Because most of the IPO firms in China are originally state-owned enterprises (SOEs), IPOs play the most important role in share issuing privatization (SIP) and are influenced by governments' political and economic considerations. Therefore, whether the cross-regional institutional heterogeneity and ownership structure play any role in IPO underpricing becomes an interesting and important issue. Using Chinese IPO data from 1999 to 2007, I find strong evidence that firms located in regions with better institutional environment (i.e., better credit market development, less governmental intervention and better legal environment) have significantly smaller IPO discounts than their counterparties. In addition private firms have less severe underpricing problems relative to SOEs. Finally, I find that local government controlled IPO firms have less severe underpricing problems than firms controlled by the central government.

Keywords: IPO underpricing, Institutional environment, Economic freedom, Ownership structure, Share issue privatization

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Essay 1

Economic Freedom and IPO Underpricing: The International Evidence

1   Introduction

The significant abnormal first-day returns of IPOs have been documented in the literature for many countries over the last several decades (e.g., Merrett, Howe and Newbould, 1967; Stoll and Curley, 1970; Ibbotson, 1975; Rock, 1986; Ritter, 1987; Welch, 1989; Loughran and Ritter, 1995, 2004). That is, IPO underpricing has become a persistently pervasive worldwide phenomenon (Loughran, Ritter and Rydqvist, 1994; Krigman, Shaw and Womack, 1999; Ritter and Welch, 2002; Kutsuna, Smith and Smith, 2009; Chambers and Dimson, 2009; Chemmanur, Hu and Huang, 2010).

In addition, the level of IPO underpricing varies dramatically across different countries, and is generally more pronounced in emerging markets (Loughran, Ritter and Rydqvist, 1994; Kooli and Suret, 2004). For example, while Loughran and Ritter (2004) find that the underpricing level in the developed U.S. market is 11.7%, Jelic and Briston (1999) report that the average IPO underpricing level is 52.6% in the emerging Hungarian market. Krishnamurti and Kumar (2002) and Hussin (2005) find that the average underpricing level is 77.94% in India and 83% in Malaysia, respectively. Ritter (2011) indicates that the average IPO initial returns in the emerging Malaysian and Indian markets are more than four times those in the

developed British market.[1] Why does the degree of IPO underpricing vary so dramatically across different countries, especially between developed and developing countries? This is an important and interesting question that deserves a thorough investigation. Surprisingly, most previous studies investigate IPO underpricing from a single market perspective, and few studies have been found that examine the issue from a cross-country perspective. This study investigates the relationship between IPO underpricing and institutional environment from a cross-country perspective. Specifically, it investigates how IPO underpricing is associated with an important aspect of institutional environment, the degree of *economic freedom,* across different countries. Following Henry (2007) and Miller and Holmes (2009, 2010), I define economic freedom as a combination of all liberties and rights of production, distribution and consumption of goods and services. I conjecture that IPO underpricing levels are negatively associated with economic freedom levels.

The motivation to conduct a cross-country IPO study on the relationship between IPO underpricing and economic freedom is not only inspired by the abovementioned cross-country IPO underpricing phenomenon, but also by the important findings and inconclusive results from previous studies.

Significant and persistent worldwide IPO underpricing obviously violates the efficient market hypothesis. However, a definitive explanation of the IPO underpricing anomaly remains a source of debate. A number of popular explanations for IPO underpricing proposed in the literature include the information role of IPOs, ownership control, different IPO contractual mechanisms and investor behavior. The asymmetric information explanation suggests that underpricing could be regarded as

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[1] Updated global IPO underpricing information can be found on Jay Ritter's website: http://bear.warrington.ufl.edu/ritter/IntMay2011.pdf.

a tool to avoid "winner's curse" (Rock, 1986), an incentive for revealing truthful information to the underwriter (Benveniste and Spindt, 1989) or a signal to differentiate the issuers from less qualified competitors (Allen and Faulhaber, 1989; Welch, 1989).

The ownership control hypothesis argues that IPO underpricing is a tool for dispersing ownership, either to achieve controlling power (Brennan and Franks, 1997; Boulton, Smart and Zutter, 2012) or to alleviate the agency cost by allocating large stakes to outside investors (Ljungqvist, 2007). Specifically, Jones, Megginson, Nash and Netter (1999) show that in the process of share issue privatization (SIP), governments' political and economic considerations affect the IPO offering prices, with governments consistently underpricing SIP offers. In a related cross-listing study, Doidge, Karolyi, Lins, Miller and Stulz (2009) find that controlling ownership plays an important role in choosing the listing market.

The explanation of different IPO contractual mechanisms (Benveniste and Spindt, 1989; Chowdhry and Sherman, 1996) argues that different underwriting methods, subscriptions and pricing procedures might result in different levels of oversubscription and underpricing across countries. For example, underwriters may exert an effort to promote underpricing in the firm-commitment IPO mechanism (Benveniste and Spindt, 1989; Loughran and Ritter, 2004), or to support the price in countries that allow price stabilization (Aggarwal, 2000; Aggarwal and Conroy, 2000).

The investor behavior explanation presents market sentiment evidence of "hot issue" markets (Ritter, 1984; Loughran and Ritter, 2004; Lowry, Officer and Schwert, 2010), and the "prospect theory" (Loughran and Ritter, 2002) that argues that the issuers pay more attention to a net increase in wealth than to the level of wealth in

the IPO activities, and thus would not bargain harder to avoid underpricing in hot markets. However, empirical evidence that tests these explanations is mixed for different countries and different sample periods.

Intuitively, IPOs in different countries are constrained by each particular country's economic and institutional environment; therefore, the cross-country IPO underpricing differences cannot be fully explained by traditional single-market underpricing explanations. Some of the related economics and corporate governance literature has proven that cross-country institutional factors, such as economic liberalization, corporate governance and legal system, can greatly influence a firm's performance and corporate finance strategy (e.g., LLSV, 1997, 1998, 2002; Shleifer and Wolfenzon, 2002; Beck, Kunt and Levine, 2004). The standard international asset pricing model (ICAPM) and literature on cross-listing specifically suggest that stock market liberation may reduce the liberalizing country's equity capital costs (Stapleton and Subrahmanyan, 1977; Errunza and Losq, 1989; Stulz, 1999; Henry, 2000b). In the corporate governance literature, Doidge, Karolyi and Stulz (2007) argue that a comprehensive institutional environment with financial development, legal system and openness plays a determinant role in influencing a firm's governance. Furthermore, recent home bias studies in finance find that the geographic difference might be a potential factor that influences investors' decisions (Hong, Kubik and Stein, 2008). All of these findings suggest that institutional environment affects corporate finance and investors' decisions across different countries.

Although the previously cited literature suggests that better institutional environment helps improve firms' performance and facilitates corporate finance, and Loughran, Ritter and Rydqvist (1994) specifically argue that financial liberalization

or lifting the IPOs' contractual bindings might help release more information to alleviate the underpricing, there are few studies that systematically investigate whether and how country-level economics and institutional environment explain the cross-country IPO underpricing differences. Some previous studies investigate how certain aspects of the institutional environment, e.g., the legal protection of corporate governance mechanisms or accounting disclosure systems, affect initial returns across countries, although the empirical findings are mixed. For example, while Hopp and Dreher (2007), Banerjee, Dai, and Shrestha (2011), and Boulton, Smart and Zutter (2012) find a negative relationship between legal protection and underpricing, Boulton, Smart and Zutter (2010, 2011) find the relationship to be positive.

This essay fills that gap by providing a systematic cross-country study on the relationship between IPO underpricing and economic freedom. Economic freedom is a comprehensive proxy for institutional environment that is strongly associated with economic liberalization and property ownership protection (e.g., Henry, 2007; Miller and Holmes, 2009, 2010; Qi, Roth and Wald, 2010). The literature suggests that investing in a free economy prompts benefits, such as information transparency, lowered uncertainty, higher confidence in investment and increased risk-sharing (Miller and Holmes, 2009, 2010). I hypothesize that the degree of economic freedom in a particular country has a significant impact on the underpricing level of the IPO firms in that country, after controlling for the impact of economic development, market sentiment and some conventional firm-specific control variables.

Following many previous studies from economics academia (Claessens and Laeven, 2003; Santos-Paulino and Thirlwall, 2004; Henry, 2007; Miller and Holmes, 2009; Qi, Roth and Wald, 2010), I use the Heritage Foundation's *Index of Economic*

Freedom (hereafter the IEF) as the measure of economic freedom for the sample countries. The IEF has ten sub-indexes that measure different aspects of a country's economic freedom level. The aggregation of the ten sub-indexes gives a comprehensive economic freedom index value. Specifically, I predict that the overall value of the index is negatively associated with the initial returns across countries. Moreover, the IEF is updated annually; therefore it can better reflect the dynamic changes in economic freedom in different countries. Due to limited data availability and update frequency, several previous studies using other institutional environment measures simply use a specific year's measure to represent the institutional environment over a long sample period. Thus, the empirical results of those studies are easily subject to the critique of dynamic measurement bias.

Using a sample of 10,251 IPO observations from 35 countries between July 1993 and June 2008, I find a significant negative relation between economic freedom and IPO underpricing. This relation holds after controlling for other commonly used country-level economic development, corporate governance and legal system variables, in addition to conventional IPO-related, firm-specific control variables. The finding supports my main hypothesis that higher levels of economic freedom are associated with lower levels of IPO underpricing across different countries.

In addition, I find that although different economic freedom sub-indexes show various associations with IPO underpricing, their combining effect is significantly and negatively associated with the initial return. Among the IEF's ten sub-indexes, financial freedom plays the most influential role in explaining cross-country underpricing. Previous studies find that financial liberalization improves the issuers' earnings abilities and productivity (Sun and Tong, 2003), and the firms' capital returns (Henry, 2007). I provide direct evidence that lifting redundant financial

regulatory restrictions lowers the underpricing.

Moreover, IPO performance can be quite different across different years, due to different market conditions and investor sentiments (Ritter, 1984; Ibbotson and Jaffe, 1975; Ibbotson, Sinderlar and Ritter, 1994; Lowry and Schwert, 2002; Lowry, Officer and Schwert, 2010). Cornelli, Goldreich and Ljungqvist (2006) find that the pre-IPO market sentiment is strongly and positively associated with first-day returns. Loughran and Ritter's (2002) prospect theory further predicts that such an association is asymmetrical, although they do not formally test this assumption. Therefore, I include a global market sentiment dummy variable in tests to control for the dynamic market sentiment changes. I find that the pre-IPO global market sentiment has a significant impact on the level of IPO underpricing. Specifically, I find that bearish market sentiment results in lower initial returns, while bullish market sentiment is generally followed by higher initial returns. Moreover, the magnitude of underpricing in a bearish market is much larger than that it is in a bullish market. The cross-country results are consistent with Loughran and Ritter's (2002) prospect theory, and the empirical findings of Cornelli, Goldreich and Ljungqvist (2006) for the U.S. market.

Because U.S. IPOs account for a great percentage of the total number of IPOs in the sample, I also conduct robustness tests on this potential data bias problem. I conducted a sub-sample period test and a test without U.S. IPO data, respectively. The results in both tests support the main conclusion.

In summary, this essay contributes to the literature by systematically examining the relationship between heterogeneous institutional environment and IPO underpricing from a cross-country perspective. I provide strong empirical evidence that heterogeneous institutional environment contributes to cross-country IPO

underpricing differences. Specifically, higher levels of economic freedom are associated with lower levels of IPO underpricing. Given the scarcity of empirical evidence in this area, the evidence not only complements earlier studies, but also provides both market regulators and firm leaders with useful insights into how to improve the institutional environment and lower the cost of equity capital for IPO issuers.

The remainder of this essay is organized as follows. Section 2 develops the research hypotheses. Section 3 presents the empirical results. Section 4 provides the robustness tests and Section 5 concludes the essay.

2   Hypothesis development

2.1 Economic freedom and IPO underpricing

Economic freedom reflects how market forces act in an economy. A free economy is one where the marketplace, rather than governmental coercion or constraint, acts as the primary force in allocating economic resources and achieving the price of the capital. Miller and Holmes (2009, page 11) state that the "highest form of economic freedom should provide an absolute right of property ownership, realized freedoms of movement for labor, capital and goods, and an absolute absence of coercion or constraint of economic liberty beyond the extent necessary for citizens to protect and maintain liberty itself."

Miller and Holmes (2009, 2010) illustrate at least four channels through which a free economy might affect the equity costs in financial markets. First, economic freedom lowers the external regulatory burden and enables investors to make long-term plans more easily, thus lowering the uncertainty (and the risk) of the investment. Second, it encourages openness, brings more foreign investors to the

domestic markets and facilitates risk-sharing activities. Third, by securing property protection and punishing corruption, a free economy gives investors the confidence to undertake higher risks. Fourth, it encourages banking and financial intermediaries to provide information services independently, which helps lower the information asymmetry and identify the pricing of capital. In short, an economy's economic freedom reflects how efficiently the market allocates economic resources and achieves the price of capital (Miller and Holmes, 2009).

Empirically, Henry (2000a, 2000b) demonstrates that lifting economic constraints reduces the liberalizing country's cost of equity capital by allowing for more risk-sharing. In the corporate governance literature, Doidge, Karolyi and Stulz (2007) argue that a comprehensive institutional environment that combines legal protection, economic development, financial development and the openness of a firm's home country is a determinant of a firm's governance. LLSV (1997, 1998, 2002) and Djankov, LaPorta, Silanes and Shleifer (2006) find that country-level investor protection and corporate governance are important for firms to enjoy higher valuations and a lower cost of equity capital. Qi, Roth and Wald (2010) argue that institutional settings impact the general information environment and make creditors better able to monitor potential violations in their debt agreements. All of these studies imply a negative relationship between economic freedom and equity costs, and IPO underpricing is a part of equity costs.

More explicitly, Loughran, Ritter and Rydqvist (1994) argue that lifting the binding economic contract and IPO mechanism helps to foster transparency, lower information asymmetry and thus alleviate the IPO underpricing, although they do not formally test this assertion. In examining the role of governments in privatizing state-owned enterprises through public share offering, Jones, Megginson, Nash and

Netter (1999) argue that governments that allow less economic freedom should find it necessary to offer greater underpricing to signal SIP commitment. On the basis of the previously mentioned studies, I hypothesize that overall economic freedom is negatively associated with IPO underpricing across countries.

2.2 Measurement of economic freedom

Following Henry (2007) and Miller and Holmes (2009, 2010), I use the Heritage Foundation's *Index of Economic Freedom* (IEF) to measure a country's level of economic freedom.

The IEF is a popular benchmark for tracking and comparing global economic progress and freedom. It has been extensively used in studies of the relationship between economic freedom and capital market development (Lau and Lam, 2002; Miller and Holmes, 2009, 2010), trade policies and economic growth (Santos-Paulino and Thirlwall, 2004), corruption levels and capital costs (Claessens and Laeven, 2003; Qi, Roth and Wald, 2010) and capital market liberalization and economic growth (Henry, 2007; Qi, Roth and Wald, 2010). Jones, Megginson, Nash and Netter (1999) also apply the overall IEF rankings to measure governmental intervention levels in their cross-country SIP study.

The IEF has ten sub-indexes, each of which measure a specific aspect of economic freedom: Financial freedom (*Fin*), Investment freedom (*Ivst*), Business freedom (*Busi*), Property rights (*PPR*), Freedom from corruption (*Crup*), Government expenditure size (*FreeGov*), Trade freedom (*FreeTrd*), Monetary freedom (*Mny*), Fiscal freedom (*Fiscal*) and Labor freedom (*Labor*). Each of the ten freedom sub-indexes is graded using a scale from zero to 100, where a value of 100 represents the maximum level of freedom and signifies an economic environment or set of policies that is most conducive to economic freedom. The equally weighted

average of the ten sub-index scores gives an overall economic freedom score (*TotV*) for each economy. Countries are also classified into five groups by ranks determined using the overall IEF scores. Countries with higher overall scores or higher ranks are considered to have a higher level of overall economic freedom. In this study, I use both the overall score (*TotV*) and rank (*Rank*) to measure the economic freedom of the sample economies. A higher total score (*TotV*) or rank (*Rank*) for *IEF* implies a higher level of overall economic freedom.

In addition to examining the relationship between the total IEF score and the IPO underpricing level, I investigate the relationship between IPO underpricing level and each of the ten sub-scores, because I am also interested in the impact of the ten sub-indexes on initial returns. Although the total IEF score is negatively associated with the underpricing level, each of the ten sub-indexes might have different impacts on the initial return. For example, Miller and Holmes (2009) argue that financial freedom (*Fin*) can alleviate information asymmetry and help allocate resources to satisfy demand. Less information asymmetry leads to less risk premium. This predicts that a higher *Fin* would be associated with a lower *IR*. For property rights (*PPR*), LLSV (2002) argue that investors accept higher valuations for firms in countries with better protection of minority shareholders, which also implies a negative relationship between *PPR* and *IR*.

On the other hand, what exactly the role of government played in IPO underpricing, there is no consensus in the literature. Jones, Megginson, Nash and Netter (1999) find that though governments generally tend to underprice their shares in the SIPs and are associated with higher IPO initial returns, governments with a larger expenditure size compared to their GDP level (i.e., a lower *FreeGov* score) and stronger short-term revenue motivation would underprice less and are associated

with a lower level of IPO initial returns. Therefore, there might be a positive association between *IR* and some of the economic freedom factors, especially when a lower freedom sub-index reflects specific situations where issuers would be reluctant to underprice their shares, or consider such underpricing to be unnecessary. In a nutshell, whether the specific sub-index is negatively or positively associated with *IR* is an empirical question that needs to be formally tested.

Another advantage of the IEF is that it is dynamic and compiled annually since 1995.[2] When the computing method changed, the compilers adjusted the historical scores accordingly to keep the index consistent. Appendix I gives the IEF statistics for all of the sample economies.[3] They indicate that although there is a trend of improvement in the overall level of economic freedom for all of the economies over the sample period, the magnitude of that freedom is quite stable within each country but significantly different across countries. As expected, developed countries tend to have a higher level of economic freedom than developing countries. For example, developing countries such as Brazil, India, China, Indonesia and Russia are all at or close to the bottom line of the average IEF value, with IEF values of less than 57; while developed countries such as the U.K. and the U.S., are at the top level with average IEF values of more than 77.

3 Data, the sample and the model

3.1 Data and the sample

Because the IEF data cover the period from July 1993 to June 2008, I collect all the IPO data, such as the offer size, the first trading date, ROE, underwriter's name and the overselling status etc., over this period from the Thomson Financial

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[2] The 1995 index reflects the world-wide situation in the July 1993 ~ June 1994 period.
[3] If an economy does not have IPO issues in certain years, then the value of the IEF is left blank for those years.

Securities Data Company SDC Platinum Global New Issue database. After excluding private placements, non-original IPOs and IPOs without ultimate country information I obtain 22,778 IPOs from 80 economies. I further exclude IPOs that do not have any first-day return data and those whose nations are not covered by the IEF in a particular year. I also delete countries that have less than ten IPOs during the sample period.[4] The final sample consists of 10,251 IPOs from 35 economies. Other data, such as the GDP per capita, global market returns and some firm-specific information are obtained from the *Bloomberg*, *DataStream*, and *WIND* databases. Table 1 provides the chronological distribution of IPO numbers for the sample countries.

[Insert Table 1 Here]

Because I am interested in the institutional environment of the IPO issuers' original economies rather than the locations where the shares are listed, unlike Boulton, Smart and Zutter (2010, 2011) I identify an IPO's nation based of the issuers' ultimate controlling shareholder's nation, rather than the nation of the stock exchange in which they are listed. The other classification method is to exclude foreign issues (Ghoul, Guedhami and Pittman, 2011). Because the majority of the sample IPOs is domestic IPOs, the number of foreign listings counts for a small portion of the sample (846 out of 10,251 IPOs, or 8.25%), so the inclusion or exclusion of foreign issues does not have a significant impact on the results. To control for the possible selection bias, I also construct a robustness test by deleting these 846 foreign IPOs. The results remain unchanged.

For historical reasons, the SDC database has more IPO data on developed countries, such as the U.S., especially in the early sample period. To alleviate the

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[4] I also conduct robustness tests by excluding the countries with less than five IPOs, and the main results do not change.

impact of this possible data-selection bias resulting from the use of the SDC database, I conduct two robustness tests by omitting the IPO samples before June 2001, and by deleting all the U.S. IPOs, respectively. The results of these two robustness tests show that the main results still hold after controlling for the possible data selection bias.

The dependent variable in this study is the IPO initial return (*IR*), which is calculated as the ratio of the difference between the first-day closing price and the offering price to the offering price:

$$IR = \frac{\text{IPO first day closing price - Offering price}}{\text{Offering price}}. \qquad (1)$$

To alleviate the potential effects of outliers, I winsorize the initial returns at the 1st and the 99th percentiles.

[Insert Table 2 Here]

Table 2 reports the basic statistics for the IPO initial returns (Panel A) and the IEF index scores (Panel B) for the sample countries over the sample period. The 35 sample countries are ranked by their average IPO first-day returns over the whole sample period.

Panel A of Table 2 shows that, first, IPO underpricing exists in almost all the sample economies, and that the underpricing level varies significantly across countries. Second, consistent with previous studies (e.g., Loughran, Ritter and Rydqvist, 1994, Boulton, Smart and Zutter, 2011), the sample IPO firms from less developed countries or emerging markets tend to have much higher first-day returns than those from developed markets, although there are some exceptions, such as Japan and Canada. For example, the average initial returns in Malaysia, Poland and South Korea are 33.12%, 50.07% and 53.5%, respectively, while the average initial returns in the U.S. and the U.K. are 21.11% and 21.83%, respectively. Finally, Table

2 indicates that high return is associated with higher risk (stand deviation), and high return countries are most emerging countries, which is consistent with the consensus that emerging markets are riskier and thus have higher initial returns.[5]

[Insert Table 3 Here]

More importantly, Panel B of Table 2 shows that countries with higher levels of IPO underpricing tend to have lower IFE scores. Table 3 summarizes the correlation between the economic freedom variables and *IR*. The main testing variable *TotV* is significantly and negatively related to the *IR* at the 1% level. This supports my hypothesis that the overall IPO initial return is negatively associated with the degree of economic freedom.

Interestingly, the ten IFE sub-indexes show a different correlation with *IR*: *Fin*, *PPR*, *Busi*, *Crup* and *Ivst* are negatively associated with IR while *FreeGov, FreeTrd*, *Mny*, *Fiscal* and *Labor* are positively associated. Among the ten IFE sub-scores, the variables that reflect financial market freedom (*Fin, Ivst*) have the largest correlation coefficients in terms of absolute value. The variable *FreeGov* is an important factor, too, but it is less influential than *Fin*. Overall, Tables 2 and 3 suggest that IPO firms from economies with less freedom tend to have a higher level of IPO underpricing, but not all the sub-indexes are negatively related to the underpricing, and thus I need to conduct further tests to examine the relevant influence of these sub-indexes on initial returns.

Notably, however, countries with higher IFE scores tend to be developed countries. This implies that economic development status may have a significant impact on underpricing levels, and thus I need to control for its potential impact.

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[5] My further analysis on the variance finds that although there are very large within country underpricing variations, the cross-country underpricing variance is very significant, at the 1% level. The significant cross-country variance implies that the cross-country IPO underpricing variations cannot be fully explained by with-in country IPO underpricing variations.

Vassalou (2003) argues that GDP growth plays an important role in explaining the cross-sectional equity returns. Ibbotson and Chen (2003) report that the long-term equity returns are in line with the growth of per capita GDP. Hopp and Dreher (2007) find that GDP is a significant variable in cross-country underpricing research, though such significance is sensitive to other included institutional variables. To control for the potential influence of the economic development status on initial returns, I add the GDP per capita (*GDP*) of the issuer's ultimate nation as a control variable.[6]

Furthermore, Table 2 shows that there are prominent variations of IPO returns and IEF values across countries. However, the variations of IPO returns are much larger than those of IEF values. The average standard deviations of IR and IEF are 52.03% and 1.62%, respectively, for the whole sample. Huge differences, such as the one between the standard deviation of IR and that of IEF also exist for each individual sample country. In other words, either cross-sectionally for all the sample countries or over the time-series for each individual sample country, variations in the IPO initial returns are much larger than those in the economic freedom index. One possible reason is that while the degree of economic freedom usually does not change dramatically from year to year within a particular country, IPO initial returns are more sensitive to the changes in market conditions and investors' sentiments. Ibbotson and Jaffe (1975) and Ritter (1984) find that the average initial IPO return is higher in "hot market" periods compared to "cold market" periods. This finding is confirmed by later studies (Ibbotson, Sinderlar and Ritter, 1994; Lowry and Schwert, 2002; Dorn, 2009; Lowry, Officer and Schwert, 2010). Recent studies further suggest that the underpricing magnitude is asymmetrically associated with market sentiments. From the issuer's perspective, Loughran and Ritter's (2002) prospect

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[6] I also used one-year lag GDP growth of the issuer's ultimate nation as a control variable and the main conclusions are still robust.

theory explains that issuers bargain hard in a bad state of the world to improve the offer price, whereas they are pushovers in a good state, resulting in an asymmetric relationship between pre-IPO market sentiment and initial returns. Cornelli, Goldreich and Ljungqvist (2006) provide evidence of this by using Europe's pre-IPO (grey markets) data. In light of these arguments, I also include market sentiment dummy variables in this study. I expect that IPO first-day abnormal returns are positively (negatively) associated with market sentiment in bull (bear) markets, and that the impact of market sentiment is stronger in magnitude when the market is bearish.

3.2 The models

The basic statistical analyses in Tables 2 and 3 suggest that the level of IPO initial returns is associated with the level of economic freedom, economic development status and market conditions for the IPO sample country. To further investigate how economic freedom contributes to the observable difference in underpricing across economies, I estimate the following panel data regression after controlling for the economic development and market condition factors:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \qquad (2)$$

where IR is the IPO initial return as defined in equation (1) and IEF is the economic freedom variable, proxied by either the total score ($TotV$) or the rank ($Rank$) of the index of economic freedom. GDP is the GDP per capita of the IPO firm's country or region, and it is included to control for the impact of economic development on underpricing. $Bear$ and $Bull$ are the pre-IPO market sentiment dummy variables, calculated based on the three-month holding period returns (R_{ACWI}) on the Morgan Stanley Country Index-All Country World Index (MSCI-ACWI index) prior to the

IPO trading day.[7] Specifically, *Bull* =1 if $R_{ACWI} \geq 10\%$; and 0, otherwise; and *Bear*

=1 if $R_{ACWI} \leq -10\%$; and 0 otherwise. Other than the bull and bear market periods, the

market is defined as normal.[8] MSCI-ACWI is used since this study focuses on the

impact of the economic freedom on IPO underpricing in a cross-country level rather

than on the domestic market itself. Besides, this study identifies an issuer's nation by

its ultimate controlling shareholder's nation, rather than the stock exchange it is

listed. However, in unreported robustness tests, I also construct the sentiment

measures using local market indexes, and the main results still hold.

Following previous studies (e.g., Fernandes and Ferreira, 2008; Qi, Roth and

Wald, 2010; Aggarwal, Erel, Ferreira and Matos, 2011), I use fixed effect panel data

regressions to control for time-series and industrial and country fixed effects.

Fixeffects are the industry (*Ind*) and year (*Year*) fixed effect control variables. I use

White's (1980) consistent variance estimator to adjust standard errors for

heteroskedasticity. I also conduct a robustness test by using Petersen's (2009)

clusters test, and the results are generally the same.

Traditional single-country IPO studies suggest that underpricing can be

attributed to several firm-specific financial factors (Baron, 1982; Beatty and Ritter,

1986; How and Howe, 2001; Michaely and Shaw, 1994; Ljungqvist, 2007). In

addition, recent home bias studies find that geographic difference might be a

potential factor that influences investor decisions (Hong, Kubik and Stein, 2008),

although the empirical evidence regarding how home-country bias impacts IPO

initial returns is mixed. Stulz (1999) argues that home bias jeopardizes the effort of

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[7] The MSCI-ACWI index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of both developed and emerging markets. As of May 27, 2010 the MSCI-ACWI consisted of 45 country indexes comprising 24 developed and 21 emerging market country indexes.
[8] In unreported robustness tests, I also construct the sentiment measures with cutting points of -20% and 20% for a 3-month MSCI-ACWI return, and my main results still hold.

globalization, and that higher home bias could result in higher cost of equity, whereas Banerjee, Dai and Shrestha (2011) find that home bias is negatively related to initial returns across countries because more demand from local institutional investors endows the issuers with more bargaining power when setting the price. To control for the impacts of firm-specific IPO factors and home bias, my second testing model is an extension of Model (2) that includes two additional sets of control variables: (a) Firm-specific IPO control variables (*FC*s), and (b) Home bias variable (*HB*):

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon.$$

(3)

Following previous studies (Loughran, Ritter and Rydqvist, 1994; Boulton, Smart and Zutter, 2010, 2011, 2012), I include four firm-specific IPO control variables (*FC*s): the IPO's offering size (*Proceeds*), the demand for IPO (*Oversold*), an underwriter reputation dummy variable (*Uwrt*) and the financial performance of the firm before going public, which is proxied by the return of equity (*ROE*) one year before the IPO date. In previous within-country IPO studies, these variables are considered to be related with ex ante uncertainty in the information asymmetry literature (Ritter, 1984; Michaely and Shaw, 1994; Arugaslan, Cook and Kieschnick, 2004; Loughran and Ritter, 2004; Ljungqvist, 2007) and thus should be considered. Following the previously mentioned literature, I use the home bias index of Lau, Ng and Zhang (2010) as a proxy for home bias.[9] Appendix II provides the definitions for all the variables in the models.

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[9] The home bias index is the aggregate measure of home bias, defined as the share of domestic mutual fund holdings in a country's stock market capitalization divided by that country's world-market capitalization weight, and it is expressed in natural log.

4   Empirical results

4.1 IPO first-day returns and economic freedom

The basic statistics reported in Tables 2 and 3 suggest that the IPO first-day returns are negatively associated with economic freedom variables. To further examine the relationship between the overall institutional environment and initial returns, I estimate the regression model (2) and report the results in Table 4.

[Insert Table 4 Here]

The primary variable of interest in Table (4) is the economic freedom variable *IEF*. A higher total score (*TotV*) or rank (*Rank*) for *IEF* implies a higher level of overall economic freedom. If a higher degree of economic freedom helps to lower the IPO underpricing level, I expect the estimated coefficient α_1 is significantly negative. The Table (4) results support my hypothesis. The estimated coefficient of *TotV* and *Rank* are significantly negative at the 5% and 1% levels, respectively. Specifically, the significantly negative coefficient of *TotV* (-0.225) implies that one score improvement in a country's *IEF* value is associated with a 0.225% reduction in the underpricing level of that country's IPOs. Similarly, the significantly negative coefficient of *Rank* (-2.971) indicates that for every one rank improvement in a sample country, the IPO underpricing of the firms in that country will be reduced by 2.971%. These results provide strong support for my main hypothesis that overall economic freedom is negatively associated with IPO underpricing across countries.

Some of the related literature finds that economic freedom fosters economic growth (Haan and Sturm, 2000), and that greater freedom of the press provides an important channel for reducing bond risks cross the countries (Qi, Roth and Wald, 2010). However, this study is the first to provide direct evidence of the relationship between IPO underpricing and economic freedom. The results prove that while free

markets are not perfect (Berggren, 2003), generally speaking, economic freedom advances wealth and welfare.

The coefficients of the control variable *Gdp* reported in Table 4 are generally negatively but not significantly associated with the IPO initial returns. The negative coefficient of *GDP* suggests that average initial returns tend to be higher in the less wealthy economies, although this negative relation is rather weak. The coefficients of the pre-IPO market sentiment dummy variables are consistent with "hot issue" explanations (Ritter, 1984; Lowry, Officer and Schwert, 2010) and those for "prospect theory" (Loughran and Ritter, 2002). I find that initial returns are negatively associated with bear markets and positively associated with bull markets. Moreover, the absolute value of the coefficient for *Bear* (-13.778) is more than double of that for *Bull* (6.608), showing an asymmetrical relationship between market sentiment and IPO initial returns. Cornelli, Goldreich and Ljungqvist (2006) and Dorn (2009) find a similar relationship between pre-IPO market sentiment (of the IPO shares) and first-day returns.

In summary, my cross-country regressions provide evidence that overall economic freedom helps to reduce underpricing across countries. Miller and Holmes (2009) explain that a free economy is associated with a low external regulatory burden and enables investors to make long-term plans more easily, lowering the uncertainty (and the risk) of investments. In addition, by securing property protection and encouraging openness, a free economy provides the confidence to undertake risks and facilitate risk-sharing activities. All of these help to lower underpricing for the IPO issuers. Because economically free countries are more open to and engaged in the world economy than their more repressive counterparts (Miller and Holmes, 2010), my results also provide evidence that Henry (2007) considers valuable for the

traditional argument that liberalization has significant effects on real variables, such as cost of capital, investments and economic growth.

4.2 Tests with firm-specific and home-bias control variables

Model (3) is an extension of the basic Model (2) that has two additional sets of control variables: four firm-specific IPO control variables (*FCs*), and a home bias variable (*HB*). I try to investigate whether the economic freedom factor is sensitive to the inclusion of these two groups of control variables.

Table 5 reports the estimates of the extended models. To test the robustness of the results, I estimate five different extended models. In addition to the original independent variables, the first four sub-models include one to four firm-specific variables, respectively, while the last sub-model also includes the home bias variable. Note that when more and more control variables are added in the regressions, the adjusted R^2 increases, but the sample size for each regression decreases significantly due to the availability of additional data.

Consistent with the estimates from Model (2), the estimates from the extended models show that α_1 is significantly negative. What's more, compared to Table 4, the significance of α_1 is improved to the 1% level for all sub-models. That is, my main result – that a higher level of economic freedom helps to lower the level of IPO underpricing – is not sensitive to the inclusion of traditional firm-specific IPO variables and/or the home bias effect.

The control variables in Table 5 are broadly consistent with the expectations of the literature. For the firm-specific IPO control variables, consistent with previous studies (Ritter, 1984; Arugaslan, Cook and Kieschnick, 2004), Table 5 shows that the coefficient of *Proceeds* ranges from -3.398 to -4.840, and is consistently significant at the 1% level in all the regressions. IPO size (*Proceeds*) is often used in previous

within-country IPO studies as a proxy for large firms that are generally believed to have less severe information asymmetry problems (Boulton, Smart and Zutter, 2011). My result indicates that large firms tend to have less information asymmetry problem and less underpricing problem.

Column 4 of Table 5 shows that the *ROE* coefficient is negative, indicating that an issuer with a better operating situation would leave less money on the table (Loughran and Ritter, 2002). However, as with *Uwrt*, *ROE* is sensitive to other included firm-specific variables.

Consistent with Banerjee, Dai and Shrestha's (2011) home-bias argument, Table 5 shows that the estimated coefficient of *HB* is significantly negative. Banerjee, Dai and Shrestha (2011) argue that in markets with serious home bias, domestic IPO issuers do not have to worry about outside competitors and do not lower their price too much to attract more investors because domestic investors constitute a strong support.

In short, the results show that economic freedom is not sensitive to the inclusion of previous firm-specific variables from the within-country IPO research, and neither is it sensitive to the cross-country home bias effect. This further strengthens my hypothesis that cross-country IPO underpricing is a function of not only firm-specific variables, but also of country-level institutional heterogeneity variables.

[**Insert Table 5 Here**]

4.3 Relationship between IPO initial returns and the sub-indexes of economic freedom

In addition to testing the overall relation between *IR* and institutional environment, I also test the relation between *IR* and each of the ten IEF sub-indexes. Columns 1-10 of Table 6 report the estimates for each of the ten univariate

regressions, respectively, and Column 11 reports the estimates for a general regression that includes all ten sub-indexes.

[Insert Table 6 Here]

The results in Table 6 show that different aspects of economic freedom have different impacts on initial returns. In the ten univariate regressions, four sub-indexes (*Fin*, *Ivst*, *Busi* and *PPR*) show significantly negative coefficients; and the other four sub-indexes (*FreeGov*, *Fiscal*, *FreeTrd* and *Mny*) show significantly positive coefficients. However, when all ten IEF sub-indexes are included in the general regression, only the estimated coefficients of *Fin* (-0.627), *FreeTrd* (0.378) and *FreeGov* (0.263) remain significant.

The significantly negative coefficient for *Fin* indicates that an economy with more financial market freedom would suffer less from IPO underpricing. Miller and Holmes (2009) argue that financial freedom is essential in allocating capital resources to their highest values uses and encouraging banking and financial intermediaries to provide information services independently with the goal of achieving the suitable pricing of capital and alleviating information asymmetry at the country level. Here, I provide new evidence that financial freedom also helps to alleviate the IPO underpricing problem. The role of financial freedom is generally accepted by previous empirical studies on financial deregulation (Loughran, Ritter and Rydqvist, 1994; Errunza and Miller, 2000; Henry, 2007).

Note that the other four sub-indexes (*FreeGov*, *Fiscal*, *FreeTrd* and *Mny*) are all government related variables. There are no generally accepted theories on the exact impact of the different government policies on economies in general, and IPO underpricing in particular, and the empirical evidence is mixed across different countries. Miller and Holmes (2009, 2010) argue that government spending is

inefficient, which implies that a low level of government spending represents a high level of economic freedom. Jones, Megginson, Nash and Netter (1999) argue that different types of governments might have different economic and political ends, and that each would employ different IPO strategies, which would obscure the relation between initial returns and government variables. For example, they find that populist governments underprice less in SIP when they need more revenue for expenditure. As for *FreeTrd*, lower *FreeTrd* is associated with higher tariffs and trade protection, which increases the price of domestic products and lowers the interest that domestic firms have in producing comparative goods. The results indicate that, ceteris paribus, internal issuers with higher trade protection have less incentive to underprice new shares. This is consistent with prior evidence that countries with lower trade liberalization also have segmented capital markets where capital costs tend to be higher (Henry, 2000b; Errunza and Miller, 2000).

In summary, the results of Table 6 suggest that although IPO initial returns are negatively associated with overall economic freedom, the relation between IPO initial returns and each of the ten individual sub-indexes is complicated. The overall economic freedom index score or rank is more appropriate in this cross-country IPO study.

5   Robustness tests

5.1 Sub-sample period tests

As with other international financial studies, my samples show some asymmetrical distribution of IPO numbers. Specifically, American IPOs weighted heavily in the whole period (38%), especially for the period before June 2001 (83%). To alleviate the possible impact of this sample distribution bias on the main results, I

conduct two robustness tests. The first is a sub-sample period test that does not include the IPOs before June 2001. By doing so, the American IPO weight is reduced significantly to a reasonable level (14.8%) for the sub-sample period from June 2001 to June 2008. The sub-sample period has 6,849 observations, accounting for 67% of the total sample, and thus it still provides reliable test results for the hypothesis.

I estimate the extended model (3) for the sub-sample period, and report the estimates in Table 7. Compared to the results in Tables 4 and 5, Table 7 provides even stronger evidence of my main hypothesis. The estimated coefficient of α_1 is significantly negative for *TotV* (or *Rank*) in all regressions, and its magnitude increases significantly when more and more control variables are added in the regressions. For example, without the firm-specific control variables and the home bias variable, α_1 is -0.363 (Column 1); when all control variables are included (Column 5), α_1 is more than doubled (-0.789). In other words, the asymmetric sample distribution does not affect the main results.

[**Insert Table 7 Here**]

5.2 Robustness test without U.S. IPOs

My second robustness test is conducted by estimating the extended model without all the U.S. IPOs. Table 8 shows that the main results still hold even after completely omitting the U.S. IPOs. The estimated coefficient of α_1 is significantly negative for *TotV* (or *Rank*) in all regressions, and the magnitude of the estimated coefficients of α_1 in Columns 4 and 5 are large compared to the results in Tables 4 and 5. In short, in all the regressions for the sub-sample, the main testing variables (*TotV, Rank, Bear* and *Bull*) are all significant at the 1% level.

[**Insert Table 8 Here**]

The results in Tables 7 and 8 demonstrate that the main results still hold and are even strengthened after adopting sub-sample period tests or adjusting the asymmetric sample distribution by omitting the U.S. IPOs. There could be at least two reasons for the reinforcement of the estimated coefficients. First, reducing the weight of U.S. samples to a reasonable level, as shown in the sub-sample period tests, could result in a more balanced sample distribution and thus help to manifest the effect of cross-country institutional heterogeneity on the dependent variable. Second, the U.S. is a developed economy that typically has less institutional environment variation than less developed economies, so deleting U.S. samples could enlarge the economic freedom variations across countries, which could produce more prominent testing results.

5.3 Other robustness tests

Estimates from panel data regressions are subject to the bias caused by both cross-sectional and time-series correlations. To control for these possible biases, following most of the previous cross-country IPO studies (Loughran, Ritter and Rydqvist, 1994; Boulton, Smart and Zutter, 2010, 2011; Banerjee, Dai, and Shrestha, 2011), in all the previous tests I control for the industry and year fixed effects. An alternative way of controlling the cross-sectional fixed effect is to control the fixed country effect (Boulton, Smart and Zutter, 2012).[10] As a robustness test, I estimate model (3) by controlling for the fixed country and year effects. Columns 1-3 of Table 9 show that the estimates from this robustness test are very consistent with the results of previous regressions.

[**Insert Table 9 Here**]

Although Petersen (2009) shows that panel data models with explicit fixed

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[10] Another concern is that a couple of the sample countries had IPO price control in the sample period which might cause some impact on *IR*, thus controlling for the fixed country effects could also help to alleviate such impact on the testing results.

firm effect dummy variables can be estimated with standard OLS without correcting the significance, some recent studies also apply clustered standard errors tests to control for the cross-sectional and time-series correlations. As a robustness test, I also estimate models (2) and (3) by using Petersen's (2009) method and controlling for the fixed country (rather than industry) and year effects. Table 10 shows that the estimates of the robustness tests are very consistent with the results of Tables 4 and 5. The estimated coefficient of *TotV* is significantly negative at the 1% level, and estimated coefficient of *Rank* is weaker, but still significantly negative at the 10% level. Note also that as compared with the results of Tables 4 and 5, the adjusted R^2 and the magnitude of the estimated coefficient of the economic freedom variable in Table 10 actually increase.[11] In short, the main findings that IPO initial return is significantly and negatively associated with economic freedom level is neither sensitive to the choice of estimation methods, not to the choice of the fixed effect control variables (industry versus country effects.)

[**Insert Table 10 Here**]

A number of previous studies suggest that legal environment is an important institutional factor in influencing investments, and that relative to common law countries, civil law countries seem to suffer from higher cost of equity (LLSV, 1998, 2006; Eleswarapu and Venkataraman, 2006).

In contrast with these traditional findings, Coffee (2001) finds that civil law countries also show dispersed ownership, and Sarkar (2011) observes that some civil law countries provide better minority shareholder protection than common law countries. Some recent studies even challenge the traditional methodology of using

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[11]The magnitude differences in the estimated coefficients between Table 10 and Tables 4 and 5 might partly due to the choice of the different fixed effects controlling variables, i.e., industry or country dummy variables. Obviously, the correlation between *IR* and country control variables is generally stronger than that between *IR* and industry variables.

law origins as a basis for analysis, suggesting that most legal systems are hybrids in reality (Siems, 2007). Empirically, whether common law or civic law countries have lower levels of IPO underpricing, the empirical evidence is mixed (Boulton, Smart and Zutter, 2010, 2012). To test whether the legal system has any impact on my main results, I conduct a robustness test that includes the ten economic freedom factors and a common law dummy variable (*LawSys*).

Table 11 reports that the main results are not sensitive to the inclusion of the legal system variable. *LawSys* is also significantly and negatively associated with *IR*, indicating that issuers in common law countries enjoy less underpricing. However, as mentioned above, questions have been asked about whether *LawSys* is a proper measure of analysis. Note that economic freedom may also be highly correlated with the legal condition of an economy, and whether civic law or common law provides better investor protection, the empirical findings are still mixed (Sarkar, 2011). Therefore, I only use *LawSys* in robustness testing. Another reason for choosing IEF indexes as the main variable source is that IEF is annually updated, while *LawSys* has only one year of data from LLSV (1998), and is easily subject to the critique of dynamic measurement bias.

[Insert Table 11 Here]

6   Conclusion

In this essay I investigate whether economic freedom plays a role in explaining the IPO underpricing phenomenon across different countries. I examine the relationship between economic freedom and IPO initial returns across 35 countries over a 15-year period from July 1993 to June 2008.

The results indicate that economic freedom is an irrefutable factor affecting IPO underpricing: firms in economies with higher levels of economic freedom have less

severe underpricing problems. I also find that the most influential factor in reducing underpricing among the economic freedom indexes is financial market liberalization (*Fin*). This result is consistent with the ICAPM's prediction that stock market liberation may reduce the liberalizing country's costs of equity capital (Stapleton and Subrahmanyan, 1977; Errunza and Losq, 1989; Stulz, 1999; Henry, 2000b) and it also provides direct evidence of the prediction of Loughran, Ritter and Rydqvist (1994).

Consistent with Lowry and Schwert (2002), I find evidence that international market movements predict international underpricing, and that there is an asymmetry association between market sentiments and underpricing (Cornelli, Goldreich and Ljungqvist, 2006) My results also lend support to Loughran and Ritter's (2002) "prospect theory": issuers bargain harder over the offer price in a bad state of the world. The findings also provide supplement evidence for the IPO "hot issue" markets literature.

Another notable finding is that home-country bias behavior has a significant negative effect on cross-country underpricing, even after controlling for firm-specific and cross-country underpricing variables. The results support the argument that although home-country bias can increase the long-term cost of equity, it allows the IPO issuers to achieve lower underpricing in their first financing activities.

Finally, the robustness test results indicate that the results are robust after controlling for the firm-specific variables of the issuers, economic development status and market conditions and the original legal systems of the economies.

This essay contributes to the IPO literature by providing country-level evidence that heterogeneous institutional environment helps to explain the cross-country IPO underpricing anomaly. This essay illustrates the general correlation between

economic freedom and IPO underpricing. One possible future research could investigate in more details the specific channels through which economic freedom can influence the IPO underpricing, especially, how and why the IEF sub-indexes can result in different underpricing across countries through those channels. Also, to the extent that investors apply similar risk premiums or required returns to all financing activities, one possible extension would be to investigate whether heterogeneous institutional environment also affects the debt issuing activities or seasonal offering activities, either within countries or across countries.

Essay 2

Institutional Environment, Firm Ownership and IPO First-Day Returns: Evidence from China

1   Introduction

Previous studies investigate the association between institutional environment and IPO underpricing from a cross-country perspective. In this essay, I further examine whether institutional environment and the different ownership types of IPO firms affect an IPO's initial returns in China's equity market, after controlling for some of the most popular firm-specific IPO control variables.

As noted in Essay 1, previous studies have documented significant abnormal first-day returns for the IPOs of many countries,[12] and while the degree of the IPO underpricing problem varies dramatically across different countries, it is generally more pronounced in emerging markets. [13] Although a number of popular explanations have been proposed, [14] the huge underpricing difference among different firms and across different countries cannot be fully explained by the firm-specific variables examined in previous single-country IPO studies; such as

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[12] Studies can be found for the U.S. (Rock, 1986; Welch, 1989; Loughran and Ritter, 2004), Canada (Kooli and Suret, 2004), the U.K. (Chambers and Dimson, 2009) and Japan (Kutsuna, Smith and Smith, 2009), etc.

[13] Relevant evidence can be found in the studies of Loughran, Ritter and Rydqvist (1994) and Kooli and Suret (2004). In addition, Jelic and Briston (1999) report the average IPO underpricing as 52.6% in Hungary. Chen, Fok and Wang (2006) list the average IPO underpricing as 31.6% in Taiwan. The underpricing is 77.94% for the Indian market (Krishnamurti and Kumar, 2002) and 83% for the Malaysian market (Hussin, 2005), more than four times that of the developed British market on average (Ritter, 2011).

[14] The explanations include the information role of IPOs (e.g., Allen and Faulhaber, 1989; Welch, 1989), different IPO contractual mechanisms, the ownership controlling hypothesis (Benveniste and Spindt, 1989; Loughran, Ritter and Rydqvist, 1994; Brennan and Franks, 1997; Jones, Megginson, Nash and Netter, 1999; Boulton, Smart and Zutter, 2012) and institutional factors (Ibbotson, 1975; Jones, Megginson, Nash and Netter, 1999; Lowry and Shu, 2002).

firm size, age, performance and financial leverage, or by IPO mechanism and accounting variables (Aggarwal, 2000; Aggarwal and Conroy, 2000; Loughran and Ritter, 2004). In the Chinese market, researchers also find that the underpricing level is significantly high, and this is attributed to China's unique economic and institutional framework, such as firms' ownership structures, IPO mechanisms and financial characteristics (Mok and Hui, 1998; Su and Fleisher, 1999; Chen, Firth and Kim, 2004).

Indeed, some related studies attribute the variations in firms' valuation to the differences in ownership structure (Demsetz, 1983; Morck, Shleifer and Vishny, 1988) and corporate governance mechanisms (La Porta, Lopez-De-Silanes, Shleifer and Vishny, 2002, hereafter LLSV; Durnev and Kim, 2005). Other studies suggest that variations in firms' valuation can also be attributed to institutional environment factors, such as credit market development, law environment and government decentralization (Jensen and Meckling, 1976; LLSV, 1997, 1999, 2002; Henry, 2000b; Miller and Holmes 2009, 2010). Theoretically, Jensen and Meckling (1976) show that better credit market development helps financing activities, while both the law and the sophistication of contracts help to minimize agency costs and improve firm value. LLSV (1997, 1998, 2000 and 2002) show that better legal protections have a positive impact on firm value and capital markets, while government interference can result in a great disparity of firm value. LLSV (1999) find that state control is associated with poorer shareholder protection. Miller and Holmes (2009, 2010) argue that less government intervention would help to reduce the firms' cost of equity. Considering the institutional factors comprehensively, Doidge, Karolyi and Stulz (2007) find that credit market development can help firms in poor regions obtain capital more easily, and that the openness of the firm's home country enables

firms to improve shareholder protection levels. They argue that a comprehensive institutional environment that combines financial development, legal protection and the openness of an economy is a determinant in influencing a firm's governance and cost of equity capital. In short, these studies suggest that the institutional environment does affect firms' external financing activities and firm valuation.

Although there is an extensive body of cross-country literature that investigates the impact of heterogeneous institutional environment on firms' valuation, performance and payout policies, few studies systematically examine the relation between institutional environment and IPO underpricing across different countries, and no single country study has been found to date. Only a couple of single country studies investigate a particular aspect of institutional environment, such as the relation between IPO underpricing and litigation risk in the U.S. (Ibbotson, 1975; Lowry and Shu, 2002). Ibbotson (1975) and Lowry and Shu (2002) argue that IPO underpricing could reduce the likelihood of future lawsuits in the U.S. market. One reason this area is lacking single country studies is that some researchers believe that the legal and regulatory environment within a particular country is homogeneous, and thus that there is limited institutional variability across firms (Boulton, Smart and Zutter, 2011).

By investigating the association between IPO initial returns and overall institutional environment development and ownership type in a single Chinese economy this essay contributes to the IPO literature by providing within-country empirical evidence. Following the previously cited literature, I define the overall institutional environment as a combination of the development of credit market, legal environment and government decentralization.

China is an interesting research setting because not much is known about its

IPO practices. As the largest developing country and the largest emerging market in the world, the economic and institutional environment is extremely heterogeneous across mainland China's 31 provinces, municipalities and autonomous regions (e.g., Wang, Wong and Xia, 2008; Fan, Wang and Zhu, 2007).[15] The institutional heterogeneity is especially significant in the credit market (Brandt and Zhu, 2000; Tang, 2006), legal environment and governmental decentralization (Fan, Wong and Zhang, 2007). Thus, the cross-regional study of China is analogous to cross-country studies due to the heterogeneous institutional environment. Moreover, the home bias literature indicates that the geographic difference might be a potential factor that influences investor decisions (Hong, Kubik and Stein, 2008), creating a costly information barrier that increases both capital costs and agency costs (Clark, Francis and Hasan, 2009). Although it is common to conduct cross-country studies in institutional heterogeneity research, to the best of my knowledge this essay is the first within country research to address the impact of institutional heterogeneity on IPO underpricing.

I postulate that the heterogeneous institutional environment across different regions affects the initial return of IPO firms, and that better institutional environments are associated with a lower level of IPO underpricing. To measure the overall institutional environment of different regions, I use the National Economic Research Institute Index of Marketization (hereafter NERIIM), which has been widely used in studies of China's socio-economic development and institutional environments (e.g., Xia and Fang, 2005; Li, Meng and Zhang, 2006; Wang, Wong and Xia, 2008). I also use the sub-indexes of the NERIIM to measure the level of development experienced by credit markets, legal environments and the government

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[15] Taiwan, Hong Kong and Macau are not included.

decentralization of different regions.

Many studies document that an IPO's underpricing level is associated with the firm's ownership structure (Dewenter and Malatesta, 1997; Brennan and Franks, 1997; Mok and Hui, 1998; Hill, 2006). Because most of the IPO firms in China are originally state-owned enterprises (SOEs), the IPO serves the most important role in share issuing privatization (SIP). Therefore, IPO underpricing might also be influenced by governments' political and economic considerations (Jones, Megginson, Nash and Netter, 1999; Jelic and Briston, 1999). A number of studies on the Chinese financial market also relate firms' performance to officials' political incentive and SIP procedure (Aharony, Lee and Wong, 2000; Sun and Tong, 2003; Fan, Wong and Zhang, 2007). I hypothesize that IPO underpricing is associated with a firm's ownership type and influenced by governments' political and economic considerations, with SOEs displaying higher IPO underpricing than that of private firms.

In addition, I further investigate the underpricing variation among SOEs. Jones, Megginson, Nash and Netter (1999) put forward a framework that governments have different commitments to SIP: a committed government cares more about the economic benefit of the SIP and would accept more underpricing to signal its commitment, while a populist government would be reluctant to do so, as they care more about the initial revenue. They find that the underpricing of SOEs varies across countries. In China, SOEs are supervised either by the central government, or by local governments at different levels. Aharony, Lee and Wong (2000) find that SOEs under the direct supervision of the central government (CSOEs) are less efficient than those under the supervision of local governments (LSOEs). Chen, Firth and Xu (2009) argue that political intervention is more likely if a listed firm is controlled by

a CSOE. I argue that because SIPs are initiated by the central government, the IPO of a CSOE should be more influenced by the political and economic considerations of the central government. Thus, incentive and commitment differences in SIPs between the central and local governments affect the level of IPO underpricing between CSOEs and LSOEs, and the IPO underpricing problem could be more severe for CSOEs than for LSOEs.

Consistent with my first hypothesis, I find that the underpricing level of IPO firms from regions with better institutional environments, regardless of whether they are SOEs or private firms, is significantly lower than their counterparts. Consistent with my second hypothesis, I find that relative to private firms, SOEs have a more serious underpricing problem. Finally, consistent with my third hypothesis, I find that CSOEs leave more money on the table than LSOEs. These results indicate that institutional environment and a firm's ownership structure affects IPO first-day returns, and that the difference in the level of IPO underpricing between CSOEs and LSOEs reflects the different political and economic considerations of the central and local governments. The results also suggest that the cross-country framework of Jones, Megginson, Nash and Netter (1999) could be applied to a single country with institutional heterogeneity and various governmental commitments at different levels.

In addition, I separately examine the relation between IPO underpricing and institutional environment for SOEs and private firms. I find that while government intervention is the most important factor among the three institutional factors for SOE firms, credit market development is more important for private firms. I also find that regional legal environment has a more significant impact on the IPO underpricing of private firms than on that of SOEs. Finally, I provide evidence that

market sentiment is strongly associated with IPO underpricing in China. Consistent with the hot market argument of Loughran and Ritter (2002), I find that firms generally have a higher level of IPO underpricing during hot market periods, especially SOEs. In contrast, private firms have a significantly higher IPO underpricing level in bad market periods.

The rest of this essay is organized as follows. Section 2 introduces the institutional background and the data. Section 3 develops the hypotheses. Section 4 provides the empirical results and Section 5 concludes the essay.

2   Institutional background and hypothesis development

2.1 Institutional environment and IPO underpricing

In a cross-country IPO study, Doidge, Karolyi and Stulz (2007) argue that a comprehensive institutional environment with financial development, legal system and openness plays a determinant role in influencing a firm's governance. The main focus of this essay is to test whether IPO underpricing is associated with heterogeneous institutional environments across different regions. Following the previously cited literature, institutional environment is defined as a combination of the development of credit markets, legal environments and government decentralization. Thus, I hypothesize that:

H$_1$: A better institutional environment is associated with a lower level of IPO underpricing.

Previous studies on corporate governance and corporate finance illustrate that credit market development can influence the cost of equity, while the firm-creditor relation also affects a firm's financial costs (Myers, 1984; Myers and Majluf, 1984; Petersen and Rajan, 1994; Shleifer and Vishny, 1997). Specifically, Schenone (2004)

shows that firms with pre-IPO banking relationships have lower underpricing than firms without such relationships, because the banks have fewer information asymmetry problems with those related firms. The impact of this type of firm-bank relationship is more significant on firms with broad credit relationships than on those with only underwriting relationships. From a financial liberalization perspective, Miller and Holmes (2009, 2010) argue that financial liberalization helps to allocate economic resources more efficiently and lowers financing costs. I predict that the higher the degree of credit market development, the lower the level of IPO underpricing.

It has been well documented that legal system is an important factor in explaining both firm performance (Jensen and Meckling, 1976; Shleifer and Vishny, 1997; LLSV, 1997, 1999, 2000, and 2002) and IPO differences in cross-country studies (Hopp and Dreher, 2007; Boulton, Smart and Zutter, 2011, 2012; Banerjee, Dai and Shrestha, 2011). In China, however, the legal system is the same across different regions, and the degree of law enforcement and the quality of law services is also heterogeneous across regions. Therefore, I expect firms in provinces with better legal environments to have a lower level of IPO underpricing.

Finally, a number of previous studies (LLSV, 1997, 1999, 2000 and 2002) argue that different types of government interference result in a great disparity of firm values across countries, and that government involvement is negatively related to firm performance (Sun and Tong, 2003). Jones, Megginson, Nash and Netter (1999) find that less government intervention is generally associated with less underpricing. Accordingly, I predict that the higher the degree of government decentralization (i.e., the less the government intervenes), the lower the level of IPO underpricing.

2.2 Measuring institutional environment

Excluding Hong Kong, Macau and Taiwan, China has 31 provinces, municipalities and autonomous regions. To measure the institutional environment for each province, municipality and autonomous region, I use the National Economic Research Institute Index of Marketization (NERIIM). To the best of my knowledge, NERIIM is the only index that provides systematic annual measurements of the institutional environment for each province of mainland China. The NERIIM index captures the institutional characteristics of China's provinces in five dimensions: government intervention, the development of non-state sectors, product markets, resource markets and intermediaries and legal environment. Each of these dimensions has a sub-index score ranging from 0 to 10. The arithmetic mean of the sub-index scores provides an overall measure of institutional environment.[16]

Following previously cited literature, I define institutional environment as a combination of the development of credit markets, legal environments and government decentralization. Therefore, I investigate the following three sub-indexes of the NERIIM: credit market development (*Credit*), legal environment (*Legal*) and government decentralization (*Gov*). Higher scores for the *Credit*, *Legal* and *Gov* indexes indicate a better institutional environment with a more developed financial market, stronger legal protection and enforcement and less government intervention, respectively.

My institutional environment variable (*INST_V*) is calculated based on the NERIIM scores. First, I define the summation of *Credit*, *Legal* and *Gov* raw values as an overall measure of institutional environment (*INST_V*). A province is defined as "good" if its *INST_V* is always above the median in each sample year. To clearly

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[16] The compliers also use principal components analysis to calculate the NERIIM, and find that the results using either the principal component analysis or the arithmetic mean procedure are almost the same (Fan, Wang and Zhu, 2007).

separate "good" and "poor" provinces, four provinces (Sichuan, Jilin, Henan and Hainan) are classified as "middle" provinces and excluded from the sample. Two of these four provinces exhibit significant variations in total institutional scores during the sample period, and thus cannot be constantly identified as provinces in either "good" or "poor" regions.[17] The top twelve provinces in terms of the total score constitute the institutionally "good" regions, and the bottom fifteen provinces constitute the "poor" regions. Second, because the main issue is whether and how a "good" or "poor" institutional environment might affect the first-day return of IPO firms, I also use a dummy variable *INST_D* to capture the environmental heterogeneity in the regressions. *INST_D* takes a value of 1 if a firm is registered in a "good" region, and 0 otherwise.

NERIIM is updated frequently, but not regularly. The earliest available NERIIM data are from 1997, however, the calculating method used by the NERIIM index has changed significantly since 1999. To avoid any potential impact of this change in calculation method, my sample begins in 1999. In addition, because there is currently no NERIIM data available for 2006 and 2007, I substitute the data from those two years with the NERIIM index's data from 2005. Fan, Wang and Zhu (2007) find that the disparity of China's marketization has enlarged rather than narrowed in recent years. Although using data from 2005 as a substitution for data from 2006 and 2007 is not a perfect solution to the availability problem, it will at least ensure that I do not over-estimate the impact of institutional environment on IPO underpricing.

2.3 Heterogeneous institutional environments across China's provinces

For historical and geographic reasons, both the level of economic development and the level of institutional environment vary significantly across different regions,

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[17] To ascertain whether the four omitting provinces affect the hypothesis, I enlarge the samples by including the IPO firms in these four regions. The former conclusions are not sensitive to this test.

especially between the eastern coastal region and the western inland region. In general, provinces in the eastern coastal region have better institutional environments and a higher level of economic development.[18] Table 12 provides the total score and the average score for each of the three sub-indexes for the sample provinces.

[Insert Table 12 Here]

It comes as no surprise that most of the provinces in the "good region" group are located in the eastern coastal region. Provinces located in other regions constitute the "poor region" group. The average total institutional environment (*INST_V*) score differs significantly between the "good" (23.71) and "poor" (13.92) regions, and across the sample provinces. For example, Shanghai's total score (27.95) is more than three times that of Qinghai province (9.12).

The average score for the credit market index also differs significantly between "good" (8.14) and "poor" (4.32) regions. This indicates that there is a great gap in firms' external financing resources across regions. Note that mainland China's two stock exchanges, the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE), are both located in the eastern coastal region. The headquarters of China's largest state banks and all large commercial banks, including foreign banks, are also located in the eastern region. Tang Shuangning, vice president of the China Banking Regulatory Commission (CBRC), reported in 2006 that by the end of 2005, bank loans issued in the most developed eastern region of China amounted to RMB Yuan 11.1 trillion, about 60% of China's total loans with loans issued in the central, western and northeastern regions accounting for 15%, 17% and 8%, respectively.[19] Brandt and Zhu (2000) suggest that the concentration of banks in the eastern

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[18] Because the initial return could be influenced by both institutional environment and regional wealth variations, I also control for the GDP and GDP per capita (unreported) of each province in robustness tests.

[19] Tang, S.N., 2006. Speech on the coordinate development of China's banking industry. http://www.gov.cn/gzdt/2006-10/17/content_415142.htm.

provinces enhances the liquidity provision to firms in these provinces, although this further aggravates the uneven development of the credit markets between eastern and other regions.

Since the beginning of the economic reform in the 1970s, China has achieved great progress in improving its legal system. The legal system reform accelerated during the years before China joining the World Trade Organization (WTO).[20] However, the improvement in legal environment, especially in law enforcement, does not evolve evenly across provinces. Outstanding lawyers and reputable law firms are mainly located in the politically and economically developed centers and coastal cities; whereas in the western and internal regions, well-served law consultation and qualified auditing services are difficult to obtain (Fan and Wang, 2003; Fan, Wang and Zhu, 2007). Consistent with these observations, Table 12 shows that the average score from the legal environment index is much higher in the "good" regions (7.00) than it is in the "poor" regions (3.61).

Local governments wield a large discretionary power when managing local SOEs and overseeing other local business. The intervention level and impact of local government varies across regions. Table 12 shows that the mean government decentralization value is much higher in "good" regions (8.56) than it is in "poor" regions (5.98). Fan, Wong and Zhang (2007) claim that local governments in "good" regions tend to be more market-oriented, operate more efficiently and require significantly less intervention into business operations. However, whether government intervention plays a positive or negative role in IPO underpricing is still an empirical issue.

In summary, Table 12 provides strong evidence that, unlike the findings of

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[20] To enter the WTO, the Chinese government has reviewed 2,300 laws and regulations relating to goods and services trading, intellectual property rights and investment protection.

previous studies that focused on a particular developed country or small country where the institutional environment across different regions tends to be homogeneous (e.g., Boulton, Smart and Zutter, 2011), cross-regional institutional environments are extremely heterogeneous in China.[21]

2.4 Ownership structure of IPO firms and its impact on share issue privatization

My second goal is to investigate the relationship between IPO first-day abnormal returns and the ownership structures of IPO firms.

There are two types of shares traded in the SSE and the SZSE: domestic A-shares, and foreign B-shares. Domestic investors were not allowed to trade B-shares until June 1, 2001. In addition, some firms also cross-list their shares in Hong Kong (known as H-shares), New York (ADRs) and other overseas markets. In this essay, I concentrate on the IPOs of domestic A-shares.

The public offering of A-shares is a great step toward the privatization of SOEs. Before the economic reform in the 1970s, all firms in China were owned by the state. However, the separation of state-ownership and management resulted in serious practical agency problems. To construct a socialist market economy and establish a modern corporate system, China's central government tries hard to push the SIP process (Sun and Tong, 2003). After 1994, the State Council decided to take a firm grip on only the largest SOEs while releasing the medium and small ones. After several rounds of reform, the State Council only directly supervises about a hundred SOEs through the State-owned Assets Supervision and Administration Commission (SASAC) with the help of a selection of other state ministries. All other former

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[21] In unreported tests, I further analyzed the variance if the IPO underpricing of "good" and "poor" regions and find that although there are large within-region underpricing variations, the cross-regional underpricing variance is very significant, at the 1% level. This further validates the importance of cross-regional IPO underpricing study for China.

SOEs are under the supervision of local governments or their agents. Accordingly, I classify IPO firms in China in three groups: CSOEs, LSOEs and private firms.

The last three columns of Table 12 report the number of total IPOs, SOE IPOs and private firm IPOs for different regions or provinces, respectively. First, the whole sample contains 400 SEO IPOs and only 217 private firm IPOS. This significant difference in the number of IPOs between SOEs and private firms indicates that government controlled SOEs predominate IPOs in China. Second, the ownership structure is quite different between "good" and "poor" regions. In "good" regions, the number of SOE firms (240) is only slightly larger than that of private firms (188); whereas in "poor" regions, the number of SOE firms (160) is more than five times that of private firms (29). This implies that governmental influence on IPO decisions varies across different regions, and private firms in "good" regions gain more exposure to external financing opportunities compared to their counterparts in "poor" regions.

When comparing SOEs, private firms are generally believed to be more efficient and have fewer agency problems (Jones, Megginson, Nash and Netter, 1999). In China, Aharony, Lee and Wong (2000) find that SOEs with less efficient managers have more serious agency problems. On the other hand, compared to private firms, SOEs have a great advantage in getting loans from national banks, attracting foreign investments, gaining business and government projects and enjoying better treatment in the IPO process. In a cross-country study, Dewenter and Malatesta (1997) find that there is no explicit trend in whether SIP firms are more seriously underpriced than private firms on a global scale. They argue that although SOEs are generally large, well-known and have less information asymmetry that positions them to enjoy less underpricing, they are more vulnerable to the influence

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of a government's political considerations and SIP incentives, and thus would underprice new shares to a greater degree. Therefore, how investors can best assign risk premiums to SOEs and private firms is still an empirical problem.

In the Chinese market, Chen, Firth and Kim (2004) study the A-share and B-share IPOs during 1992-1997 and document that state-ownership is positively related to IPO initial returns, with underpricing required to compensate for increased risk exposure. In another related study, Chen, Firth and Xu (2009) compare the long-term operating performance of private firms and SOEs, and argue that the distinct owner types of Chinese firms have different objectives and motivations that affect their investment decisions. Because IPO plays the most important role in privatizing SOEs, IPO underpricing might also be influenced by governments' political and economic considerations (Dewenter and Malatesta, 1997; Jones, Megginson, Nash and Netter, 1999). Fan, Wong and Zhang (2007) find that firms with politically connected CEOs underperform those without politically connected CEOs and display poorer post-IPO performance. Sun and Tong (2003) find that SIP is effective in improving the earnings abilities and productivity of SOEs, and a variety of ownership behavior types differently after SIP. Therefore, I hypothesize that IPO underpricing is associated with a firm's ownership type, and SOEs have higher IPO underpricing than that of private firms. The second hypothesis is:

H_2: The first-day IPO abnormal return is positively associated with the state-ownership of IPO firms, and SOEs have higher IPO underpricing than that of private firms.

Besides comparing the underpricing between SOEs and private firms, I investigate the underpricing between SOEs. Although both CSOEs and LSOEs are state-owned enterprises, they differ in many important aspects. First, CSOEs and

LSOEs differ in their SIP commitment. Relative to local government controlled LSOEs, the SIPs of CSOEs are influenced more by the central government's economic and political considerations. According to Jones, Megginson, Nash and Netter (1999), governments with different commitments to SIP underprice shares differently. A committed (i.e., market-oriented) government places a higher value on the economic benefits of SIP and would consistently underprice SIP orders to favor domestic investors, while a populist government, motivated by short-term revenue rather than the benefits of privatization, tend to underprice less. I argue that incentive and commitment differences in SIP between the central and local governments contribute to the IPO underpricing differences between CSOEs and LSOEs, with CSOEs displaying a higher level of underpricing.

Second, because the ownership relation between central government and the CSOEs is less clear than that between LSOEs and the local governments, the agency problem is more serious for CSOEs than it is for LSOEs. Local governments are usually the big stakeholders of LOSEs, with direct interest in and control over them. All SOE leaders have administrative ranks equal to relevant governmental officials, and CSOE leaders are more politically connected with a significantly higher rank than LSOE leaders. CSOE managements are more politically connected and more likely to be appointed based on political considerations rather than their previous business background. Firms led by politically connected CEOs tend to have more serious agency problems and poor performance (Fan, Wong and Zhang, 2007; Chen, Firth and Xu, 2009). In contrast, LSOE managers act more like businessmen and have a greater incentive to employ earnings management in the IPO selection process, making their IPO more attractive (Aharony, Lee and Wong, 2000).

I conjecture that because CSOEs have more serious agency problems and their

SIPs are influenced more by other economic and political considerations, it follows that:

H₃: IPO underpricing problems are more serious for CSOEs than for LSOEs.

3   Sample, data and the model

3.1 IPO sample and data

The IPO data are obtained from the *WIND* Information Database for the period 1999-2007[22] The *WIND* database provides most of the information on business location, stock trading and financial data and the controlling ownership of the IPO firms. I also use *CSMAR* database, the prospectus of IPO firms and information from the three official securities newspapers (*China Securities News, Shanghai Securities News* and *Securities Times*) as supplements to the *WIND* database.

Panel A of Table 13 provides the chronological distributions of the sample IPO firms. The initial sample has 759 A-share IPOs, and I delete 58 IPOs from the four "middle" provinces. Because I concentrate on the IPOs of the domestic A-shares, I delete 44 firms that issue either B-shares, H-shares or other foreign shares.[23] The final sample has 617 A-share IPOs.

[Insert Table 13 Here]

Consistent with the market sentiment hypothesis, which argues that initial return is positively associated with higher market sentiment (Lucas and McDonald, 1990; Choe, Masulis and Nanda, 1993; Loughran and Ritter, 2002; Dorn, 2009; Lowry, Officer and Schwert, 2010), there are more IPOs in bullish periods such as

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[22] To see whether the results are sensitive to the selected sample period, I enlarge the samples by including IPOs in 1997 and 1998, and find no significant changes in the results.

[23] The information asymmetry explanation of the IPO literature suggests that dual-listed firms have less severe underpricing problems, because they have been listed in other stock markets before and their information is more applicable for potential investors. By adding an overseas-shares dummy in the regressions, I find that the dual-listing status is not significantly connected to the first-day return for the sample, and it does not affect my former results.

2007, and less IPOs in bearish periods such as 2003 and 2005. The initial return is also much higher in bullish times. Thus, in the following analysis, I also control the time-varying market sentiment.

All of the IPO firms are classified into two regional groups according to their registered address of incorporation.[24] Panel B of Table 13 provides the industrial distribution for all IPOs based on the industrial code of the *WIND* database, IPOs in different regions and different ownerships. Consistent with the industrial distribution of all A-shares, there are more IPOs in the manufacturing, material and general consuming industries and less IPOs in the telecommunication and energy industries. The "good" regions have significantly more IPOs (428) than the "poor" regions (189), indicating that a better institutional environment helps promote more external finance (LLSV, 1997; Boulton, Smart and Zutter, 2011).

To examine the effect of ownership, I classify the firms into SOEs and private firms by the ownership type of the controlling shareholders. For each SOE, if the controlling shareholder is the central government, I further classify it as a CSOE; otherwise, I classify it is as a LSOE. Since 2001, IPO firms in China are required to clearly disclose their final controller. For firms that went public before 2001, I manually collected the controlling ownership information from the firm websites or the State-owned Assets Supervision and Administration Commission (SASAC). Table 13 shows that LSOE firms are major IPO issuers with 302 IPOs, accounting for 48.95% of the IPO markets; followed by private firms with 217 IPOs (31.5%) and CSOE firms with 98 IPOs (15.88%). Unlike developed countries where private firms take the leading market positions, SIP firms lead the equity market in China. Chen, Firth and Xu (2009) find similar distributions and explain that the lower

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[24] Firms may have different registration and operating locations. In my data, only six firms have different addresses for registration and headquarters, and a robustness test (not reported in this essay) shows that excluding these six firms does not alter the main results.

percentage of private firms is also due to the fact that a natural person was not allowed to hold more than 0.5% of the listing firm's shares before 1998.

I use the market-adjusted IPO first-day abnormal return (*Y1d*) to measure IPO underpricing:

$$Y1d = \frac{P_1}{P_0} - \frac{I_1}{I_0},$$ (1)

where P_1 is the closing price of the first trading day and P_0 is the issue price of IPO, respectively; I_1 and I_0 are the closing price of the A-share market index in the first trading day and the issue day of IPO, respectively. Note that I use "the market-adjusted IPO first-day abnormal return" and "IPO abnormal return" interchangeably in this essay.

Table 14 provides the market-adjusted IPO first-day abnormal returns for the sample firms in the 1999-2007 period. Consistent with the findings in some previous studies (Mok and Hui, 1998; Chan, Wang and Wei, 2004), I find that the average abnormal IPO return in China is extremely high compared to other countries. Over the sample period, the average IPO abnormal return is 129.56%. More than half of the IPOs achieve a first-day abnormal return above 75%, and only 6.32% of the IPOs have a first-day return below 25%.

The average IPO abnormal return varies significantly over time. 2007 has the highest annual average (210.53%), due to the over-heated global financial market before the financial crisis. 2005 has the lowest annual average (40.71%), although it is still high compared to most markets in the world.[25] Except in 2007, there is a trend of declining IPO discounts in recent years. One possible reason might be that since 2004 the CSRC has required no official approval of the IPO issuing price, in

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[25] Ritter (2011) reports that China's average IPO initial return is among the top three in the world, following the Saudi Arabia and Jordan markets, and only 8 out of 48 sample countries has average underpricing greater than 40%.

addition to adopting a so-called "window guidance" policy that allows issuers to adopt higher issuing prices within the CSRC's oral guidance.[26]

[Insert Table 14 Here]

3.2 Regression model

To test Hypotheses 1 and 2, I estimate the following panel data regression:

$$Y1d_{it} = \alpha_0 + \alpha_1 INST_{it} + \alpha_2 SOE_{it} + \sum_{j=1}^{J} \beta_j ControlVariable_{jit} + \varepsilon_{it},\qquad(3)$$

where *INST* is the institutional environment variables (*INST_V* and *INST_D*) defined before. *SOE* is the SOE ownership dummy variable that takes a value of 1 if the IPO firm is a SOE, and 0 otherwise. I expect that *Y1d* is negatively associated with *INST_V* or *INST_D* and positively associated with *SOE*. The control variables include five firm-specific variables, seven IPO mechanism control variables and two market sentiment dummy variables.

The five firm-specific variables have been used extensively in previous IPO studies related to ex ante uncertainty and information asymmetry (Ritter, 1984; Rock, 1986; Allen and Faulhaber, 1989; Welch, 1989; Arugaslan, Cook and Kieschnick, 2004). They have also been used in previous Chinese IPO underpricing studies (Mok and Hui, 1998; Chen, Firth and Kim 2004; Ma, 2007; Tian, 2011). The five firm-specific control variables are:

i) firm size (*Asset*), which is defined as the logarithm of the total asset;

ii) financial performance (*ROA*), which is the average return on assets over the previous two years before IPO;

iii) debt ratio (*Lev*), which is the average leverage (total debts/total assets) over the previous two years before IPO;

iv) growth potential (*Growth*), which is the average scaled sales (sales/total

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[26] CSRC, 2004, "Some regulations on the pricing mechanism from CSRC"(File No.162).

assets) in the two years before IPO and

v) firm's history (*Age*) before IPO.

Previous studies suggest that IPO mechanism plays an important role in IPO underpricing (Benveniste and Spindt, 1989; Chowdhry and Sherman, 1996). Some Chinese IPO research also argues that China's characteristic IPO mechanism greatly affects initial returns (Mok and Hui, 1998; Su and Fleisher, 1999; Liu, 2003; Chen, Firth and Kim, 2004; Chan, Wang and Wei, 2004; Kim and Pukthuanthong-Le, 2008). Thus, I include seven common control variables and China's unique IPO mechanism control variable:

i) the lag between the issue date and the IPO date (*Length*);

ii) the supply of the tradable shares issued (*Issue*), defined as the number of IPO shares issued in 100 millions;

iii) the percentage of tradable shares (*Liquid*), defined as the percentage of tradable shares after the IPO;

iv) the percentage of winning the IPO lottery (*Lott*)[27];

v) the issuing P/E ratio, defined as the IPO offering price to the earnings per share after the IPO (*IssPE*);[28]

vi) auditor quality (*AU*9), a dummy variable that takes a value of 1 if the auditor firm is one of the top nine auditing firms in China[29] and

vii) underwriter reputation (*UNWR6*), a dummy variable that takes a value of 1

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[27] Both cash and market value application lottery are considered. When there are two lottery rates, the larger one is chosen and I argue that if lower rates are chosen, the estimated coefficients should have larger magnitude and more significance.

[28] Since 2003, three new regulatory policies have been adopted in China: the sponsor system in 2004, the book building in 2005 and the green shoes system in 2006. For details on these three policy changes, please refer to the CSRC website http://www.csrc.gov.cn. To ascertain whether the results are sensitive to the policy changes, I conduct three independent robust tests that include three relevant dummy variables, respectively, and find that the main results are not affected.

[29] The audit ranking is based on the ranking report by the Chinese Institute of Certified Public Accountants (CICPA). I also rank the auditing firms by client assets, and the results remain unchanged.

if the underwriter is one of the top six underwriters in China.[30]

Note that *Length* indicates the IPO waiting period length; *Issue*, *Liquid* and *Lott* are IPO demand and supply control variables and *IssPE*, *AU*9 and *UNWR*6 are information asymmetry related control variables.

Finally, following previous explanations of "hot issue" markets (Ritter, 1984; Loughran and Ritter, 2004; Lowry, Officer and Schwert, 2010), I also include two market sentiment dummy variables, *UP20* and *DOWN20*, based on the following annual market sentiment index (*MSI*):

$$MSI_t = (MIP_t / MIP_{t-1}) - 1, \tag{2}$$

where MIP_t and MIP_{t-1} are the market index prices on the IPO date and the date one year before the IPO, respectively. Depending on which exchange the new issue is listed in, the market index is proxied by either the Shanghai A-share Stock Index or the Shenzhen A-Share Stock Index; *UP20* takes a value 1 if $MSI \geq 20\%$, and 0 otherwise; *DOWN20* takes a value 1 if $MSI \leq -20\%$, and 0 otherwise. Periods with market returns of between -20% and 20% are classified as normal.[31]

4   Empirical results

4.1 Descriptive statistics

Table 15 reports the descriptive statistics of the sample IPO firms. During the sample period, the average first-day abnormal return is around 130% for all samples

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[30] The underwriter ranking is based on the ranking report by the Securities Association of China (SAC) for the period between 1999 and 2007. SAC ranks the underwriters yearly according to their IPO numbers, IPO size, the total assets of the securities firms and their profitability. During the sample period, the top six underwriters were: China International Capital Corporation limited (CICC), Guosen Securities, CITICS Securities, Guotai Junan Securities, Nanfang Securities, and GF Securities. In unreported tests, I also use a dummy variable for the top ten underwriters in China (UNWR10). During the sample period, the top ten underwriters include the six underwriters mentioned above, plus: Everbright Securities Company Limited, China Galaxy Securities Company Limited, China Merchants Securities Co., Ltd. (CMS) and Shenyin & Wanguo Securities Co., Ltd. (SYWG). The selection of the top six or top ten underwriters does not alter the main results.

[31] In unreported robust tests, I also construct the sentiment measures with the cut-off points -10% and 10%, and the results are consistent with those reported in this essay.

and 123% and 140% for "good" and "poor" regions, respectively. Consistent with Hypothesis 1, the difference in the IPO abnormal returns between "poor" and "good" regions is significantly positive (17%) at the 5% level.

[Insert Table 15 Here]

Firms in "good" regions also have higher growing potential and less tradable shares. The average lag between issue date and listing date for all IPOs has been significantly reduced to about 25 days, compared to 260 days before 1995 (Su and Fleisher, 1999). However, firms in "good" regions enjoy significantly less waiting time before going public (22.78 days) than firms in "poor" regions (29.61 days). The odds of winning an IPO lottery are extremely low (0.298%), with no significant difference between "good" and "poor" regions. The low value of *Lott* reflects the fact that the demand for IPO is still very high in China, even in "poor" regions, due to the limited investment opportunities in China and the low level of tradable shares on the market (about 30%) during the sample period.

Table 16 reports the correlation matrices for all IPOs. Consistent with the prediction of Hypothesis 1, the first-day IPO return is significantly and negatively associated with the institutional environment variables (*INST_V* and *INST_D*). *Y1d* is also significantly and negatively associated with firm size (*Asset*), suggesting that firms with fewer information asymmetry problems tend to have lower underpricing levels. Consistent with the IPO demand and supply arguments in the IPO literature, *Y1d* is significantly and negatively associated with IPO size (*Issue*) and lottery ratio (*Lott*). Consistent with the signaling hypothesis (Allen and Faulhaber, 1989), *Y1d* is positively correlated with the issue P/E ratio (*IssPE*).

In addition, the overall measure of institutional environment *INST_V* is positively associated with *Growth* and *Age*, indicating that better institutional

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environment is associated with higher growth rates and longer operation histories for firms. *INST_V* is negatively associated with *Length* and *Lott*, suggesting that better institutional environment is associated with shorter IPO waiting periods and a higher demand for IPO. Because high growth potential and higher IPO demand all predict lower underpricing, these results help to explain why better institutional environment could be negatively associated with the IPO underpricing level.

[Insert Table 16 Here]

4.2 Regression results

The basic statistics reported in Tables 13-15 provide supporting evidence to the main hypothesis that better institutional environment is associated with a lower level of IPO underpricing. To further test Hypotheses 1 and 2, I estimate the following panel data regression (3) and report the estimates in Table 17.

One concern about the panel data is the potential for residuals to be cross-correlated and auto-correlated. To address that concern I control for fixed effects by using the clusters tests suggested by Petersen (2009). In unreported robustness tests, I also estimate the fix-effect panel regression model and test the significance of the coefficients based on the heteroskedasticity-consistent standard errors of White (1980). The results using both methods are very consistent.

[Insert Table 17 Here]

Columns 1 to 5 of Table 17 report the estimates of regression model (3) for the overall institutional environment variables (*INST_V* and *INST_D*) and the three sub-indexes (*Credit*, *Legal* and *Gov*), respectively. The most important result in Table 17 is that, consistent with Hypothesis 1, the coefficient of *INST_V* (-0.024) or *INST_D* (-0.184) is significantly negative at the 1% or 5% level. Consistent with the basic statistics analysis in Table 15, this result indicates that IPO firms in provinces

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with better overall institutional environment, as measured by either *INST_V* or *INST_D*, have significantly smaller IPO discounts. The estimated coefficients of the three institutional environment sub-indexes are all significantly negative in columns (3), (4) and (5), suggesting that firms in regions with good institutional environment suffer less from underpricing. For example, the estimated coefficient of *Gov* is significantly negative (-0.06), suggesting that IPO firms in regions with less government intervention have smaller IPO discounts. Among the three sub-indexes, credit market development (*Credit*) is the most important institutional factor in terms of both the magnitude (-0.063), and the significance level (1%) of the coefficient, followed by *Gov* (-0.060 and 5%) and *Legal* (-0.036 and 5%). In short, these findings provide strong evidence supporting the main hypothesis that better institutional environment is associated with a lower level of IPO underpricing, even within a country like China.

Consistent with Hypothesis 2, the estimated coefficient of *SOE* (α_2) is significantly positive at the 1% level in all regressions, indicating that relative to private firms, SOEs have significantly larger IPO underpricing. Note that many studies document that a different controlling level of ownership might influence the firms' performance (Demsetz, 1983; Morck, Shleifer and Vishny, 1988). However, in China, the ownership concentration level for SOEs is extremely high, and therefore SOE ownership plays the most influential role in the firms' investment decisions compared to other types of ownership (e.g., Chen, Firth and Xu, 2009).[32]

Consistent with previous information asymmetry explanations (Ritter, 1984; Rock, 1986; Arugaslan, Cook and Kieschnick, 2004), I find that *Yld* is negatively correlated with firm size (*Asset*) and firm performance (*ROA*). The prospect theory

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[32] I also construct robust tests by adding several ownership concentration variables and applying a piecewise linear regression, and the main conclusions do not change.

of Loughran and Ritter (2002) and Kim and Pukthuanthong-Le (2008) argues that higher leverage is associated with increased risk and uncertainty, so a greater IPO discount is required to attract investors. Consistent with these arguments, I find that *Y1d* is positively correlated with the average leverage (*Lev*).

For the seven IPO mechanism-related control variables, I find strong and consistent evidence that *Y1d* is positively related to *Issue* (the supply of the tradable shares issued to the market). This is consistent with Jones, Megginson, Nash and Netter (1999), who argue that a privatizing government must incur greater underpricing to sell a larger percent of an SOE. In recent years, the CSRC has lifted the quota system and gives more freedom to underwriters and issuers in deciding the number of shares issued. The more shares to be issued, the more effort the underwriters and issuers must make to sell them. I also find consistent but weaker evidence that *Y1d* is negatively correlated with the IPO lottery ratio (*Lott*) and percentage of tradable shares (*Liquid*), suggesting that demand for IPOs does play a role in boosting the IPO first-day prices. However, unlike some early Chinese IPO studies (e.g., Mok and Hui, 1998; Su and Fleisher, 1999), the estimate of *Length* in Table 17 is not significant in all the regression tests. This difference might reflect the rapid evolution of IPO mechanisms in China. The waiting period for IPOs has been greatly reduced in recent years. Note that Table 15 shows that the average *Length* is about 25 days for the sample period, while it was 260 days in Su and Fleisher's (1999) study on the period before 1995. Finally, unlike U.S. findings (Benveniste and Spindt, 1989; Michaely and Shaw, 1995; Willenborg, 1999), the estimate of the underwriter quality (*UNWR*6) is not significant and the estimate of the auditor quality (*AU*9) is mixed. One possible explanation is that most underwriters and auditors in China were ultimately controlled by the state until very recently, and

there are few differences across the reputational standings of underwriters and auditors (Chen, Firth and Kim, 2004).

The market sentiment dummy (*UP20*) is significantly positive, suggesting that the IPO underpricing level will be significantly higher when the market is hot. This result is consistent with "hot issue" literary predictions (Ibbotson and Jaffe, 1975; Ritter, 1984). Loughran and Ritter (2002) find similar results for the U.S. market and recently Boulton, Smart and Zutter (2011) provide further evidence in their cross-country IPO study.

4.3 IPO underpricing and firm ownership

Hypothesis 3 conjectures that because CSOEs have more serious agency problems and their SIPs are more strongly influenced by the central government's other economic and political considerations, the IPO underpricing problem would be more severe for CSOEs than for LSOEs. To test Hypothesis 3, I estimate the following regression:

$$Y1d_{it} = \theta_0 + \theta_1 INST_{it} + \theta_2 CSOE_{it} + \theta_3 LSOE_{it} + \sum_{j=1}^{J} \lambda_j ControlVariable_{jit} + e_{it} , (4)$$

where *CSOE* (*LSOE*) is a dummy variable that equals 1 if the firm is a central (local) government supervised SOE. A positive estimate of θ_2 (θ_3) indicates that the *CSOE* (*LSOE*) has larger first-day abnormal returns compared to private firms.

In addition, I consider whether foreign investment has any impact on IPO underpricing. Although foreigners were not allowed to directly trade Chinese A-shares before the Chinese security authority introduced the Qualified Foreign Institutional Investors (QFII) scheme in late 2005, QFII still plays a limited role in the Chinese equity market due to its limited quotation and it is possible that foreign investors might influence the IPO issuers indirectly through foreign direct

investment (FDI).[33] FDI also reflects a province's openness to foreign investment. Thus, I add a control variable *FDI*, defined as the logarithmic FDI value of a province, in regression model (4). All FDI data are collected from the *China Data Online* System. Table 18 reports the estimates of model (4).

[Insert Table 18 Here]

Consistent with Hypothesis 1 and the results in Table 17, the coefficient of *INST_V* (or *INST_D*) is significantly negative. Consistent with Hypothesis 2, θ_2 and θ_3 in Table 18's two regressions are significantly positive at the 5% level, indicating that SOEs, whether they are CSOEs or LSOEs, have higher abnormal IPO returns than private firms. Furthermore, consistent with Hypothesis 3, the magnitude of θ_2 is much larger than θ_3, suggesting that CSOEs tend to have a higher underpricing level than LSOEs. Finally, the estimates of the control variables are also very consistent with those reported in Table 17.

4.4 Differences between SOE and private firm IPOs

I have demonstrated that institutional environment and ownership do affect IPO initial returns. In this section, I further investigate whether institutional environment has a different impact on the IPO underpricing of SOEs and private firms. To this end, I estimate the following regression:

$$Y1d_{it} = \phi_0 + \phi_1 INST_{it} + \sum_{j=1}^{J} \eta_j ControlVariable_{jit} + u_{it}. \tag{5}$$

The only difference between Models (3) and (5) is that instead of adding the SOE ownership dummy variable to control the impact of ownership in the regression, we estimate Model (5) separately for SOEs and private firms to compare the differences

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[33] The CSRC allowed qualified foreign institutional investors (QFII) to access the A-share market in 2002 as a temporary provision with very limited QFII numbers and investment amounts, and QFIIs are not allowed to withdraw from the A-share market freely. The formal QFII regulation was not implemented until September 11, 2006 (CSRC file No. 36). To date, individual foreign investors are still not allowed to invest in A-share markets.

between them.

[Insert Table 19 Here]

Panels A and B of Table 19 report the estimates of model (5) for SOEs and private firms, respectively. Consistent with the results in Table 17 for all IPO firms, the coefficients of the overall institutional environment variable (*INST_V*) are significantly negative in both Panels A and B. The three sub-indexes (*Credit*, *Legal* and *Gov*) are all significantly negative for private firms, and two of them are also significantly negative for the SOEs (*Credit* and *Gov*). These results strengthen the argument that the IPO returns for all types of firms are significantly affected by the heterogeneous institutional environment across China, for SOEs and private firms.

Table 19 also shows that the magnitude of the estimated coefficient of *Credit* is the largest among the three sub-indexes, indicating that the credit market development level is the most important institutional factor for private firm IPOs. The higher the level of local credit market development, the lower the IPO discounts. The magnitude of the estimated coefficient of *Gov* is the largest in absolute value for SOEs, indicating that government decentralization is the most important institutional factor for SOE IPOs. The less the government intervenes, the lower the IPO discounts. The above results reflect the fact that while China's private firms are more constrained in their IPO pricing decision process by a lack of external financing recourses, China's SOEs are more vulnerable to the influences of governmental political considerations and SIP incentives. Moreover, IPO initial returns are significantly and negatively associated with the legal environment variable for private firms, but not for SOEs. This suggests that relative to SOEs, IPOs of private firms are constrained more strongly by the local legal environment.

The estimates of the firm specific control variables and other control variables

are generally consistent with those in Table 17. One exception is the estimated coefficient of *IssPE*. Although it is negative but not significant in Table 17, it is significantly negative for the SOE sample in Panel A of Table 19 and significantly positive for the private firm sample in Panel B of Table 19. The significantly negative relation between *Y1d* and *IssPE* for SOEs is consistent with the SIP hypothesis (Jones, Megginson, Nash and Netter, 1999), which argues that investors predict that SOE firms should be underpriced to ensure a smooth SIP, and thus a higher *IssPE* would cause lower incentives to apply for the new shares. In contrast, though private firms have no incentive to lower the price by themselves, they do have to follow the CSRC's oral guidance (as we mentioned above), which restricts them from setting the issuing P/E ratio at a high level. Note that China's private firms have limited financing resources compared to SOEs, so they have to unwillingly "underprice" to ensure a successful listing, even though they know the price should be higher. Investors foresee this and consider the high *IssPE* of private IPOs as a signal of an even higher price without the CSRS's restriction. This signaling hypothesis (Allen and Faulhaber, 1989) explains the positive association between *Y1d* and *IssPE* for private firms. The different signs of *IssPE* for SOEs and private firms also strengthen the argument that China's investors consider SOEs to be underpriced due to more serious agency problems, and SOEs with a higher P/E should be less attractive.

When comparing Panels A and B of Table 19, *UP20* is only significantly positive for SOEs, while *DOWN20* is only significantly positive for private firms. Generally speaking, firms tend to leave more money in the hot market (Loughran and Ritter, 2002). A positive coefficient of *UP20* for SOEs is consistent with the hot market argument. However, a significantly positive *DOWN20* for private firms may

suggest that the IPOs of private issuers are underpriced more when the market is bearish. The sentiment difference between SOEs and private firms further reflects the fact that China's SOEs and private firms have different external financing constraints. SOEs generally enjoy more external financial resources, including governmental resources. Thus, when market sentiment is low SOEs may choose to postpone the IPOs and obtain other external financing support instead. Private firms are more constrained by limited external financing opportunities, and this situation is getting even worse during bad market periods because bad market periods are usually accompanied by a lack of liquidity. Therefore, private firms would like to reduce their IPO offering prices to attract more potential equity investors, especially when the market conditions are bad.

4.5 Further robustness test

I have shown that institutional environment has a significant impact on IPO returns, and that firms in institutionally better regions have a significantly lower level of underpricing. Note that regions with better institutional environment also tend to have a higher level of economic development. To control for the impact of economic development in different regions on the IPO underpricing, I conduct a robustness test by adding an economic development variable (*GDP*) into Model (3):

$$Y1d_{it} = \alpha_0 + \alpha_1 INST_{it} + \alpha_2 SOE_{it} + \alpha_3 GDP_{it} + \sum_{j=1}^{J} \beta_j ControlVariable_{jit} + \varepsilon_{it} \quad (6)$$

GDP is defined as the annual gross domestic product value (in billion RMB yuan) for each sample province in year *t*. I collect the gross domestic product value for each IPO firm in the IPO year for the province where the IPO firm is registered in the *WIND* database.[34]

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[34] In unreported tests, I also used GDP per capita to substitute for the *GDP* variable and found the main results unchanged.

[Insert Table 20 Here]

Table 20 provides the estimated coefficients for the robustness test (6). Consistent with the results for Model (3) reported in Table 17, the estimates of the overall institutional variables (*INST_V*, and *INST_D*) and the three sub-indexes of the institutional environment remain significantly negative at the 5% or 1% level. The state-ownership estimate (SOE) remains significantly positive and the estimates of the control variables are very consistent with those in Table 17 in terms of the sign, significance level and magnitude of the estimates. The estimate of *GDP* is negative, but not significantly at the 5% level in all regressions. In summary, Table 20 shows that when the economic development level has been taken into consideration, the main results hold, and although the IPO underpricing level tends to decrease with the regional economic development level, this relation is economically and statistically not significant.

5   Conclusion

This essay has examined whether the institutional environments and different ownership types of IPO firms affect their initial returns in the emerging Chinese equity market, after controlling for some of the most popular firm-specific IPO variables.

I hypothesize that better institutional environment is associated with a lower level of IPO underpricing. Consistent with this hypothesis, I find that the market-adjusted IPO first-day abnormal returns are significantly and negatively associated with the institutional environment variables after controlling for firm-specific risk factors, common and China-specific IPO mechanism control variables and market sentiment before the IPO. In other words, there is significant evidence that institutional environment plays an important role in determining the

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IPO underpricing level of firms in different regions across China. Specifically, firms in regions with better credit market development, better legal environments and less government intervention enjoy a lower level of IPO underpricing. Among the three previously cited sub-indexes of the institutional environment, credit market development plays a more important role in affecting the underpricing level. These results hold for all IPO firms, whether they are SOEs or private firms, and are robust when a regional economic development level variable is added.

The second goal of this essay is to investigate the relationship between IPO first-day abnormal returns and the ownership type of IPO firms. Because SOEs tend to be less efficient than private firms and IPO plays the most important role in privatizing SOEs, an SOE's IPO pricing decisions are more significantly influenced by governments' political and economic considerations. Consistent with my second hypothesis, IPO first-day abnormal return is significantly and positively associated with the SOE dummy variable at the 1% level in all regressions and the robustness tests.

Third, I argue that among the SOEs, because the ownership relation between central government and the CSOEs is less clear than that between the local governments and the LSOEs, the agency problem is more serious for CSOEs than it is for LSOEs. In addition, incentive and commitment differences in SIP between the central and local governments also contribute to the IPO underpricing differences between CSOEs and LSOEs. Thus, I conjecture that the IPO underpricing problem is more serious for CSOEs than it is for LSOEs. Consistent with my third hypothesis, although both the estimates of the CSOE and LSOE dummy variables are significantly and positively associated with the IPO initial abnormal returns, the magnitude of the estimated LSOE coefficient is three times that of the estimated

LSOE coefficient, suggesting that CSOEs have more serious IPO underpricing problems than LSOEs.

In addition, I also separately examine the relation between IPO underpricing and institutional environment for SOEs and private firms. While the overall results of the separated regressions are very consistent with the regression results for the whole sample, I find some interesting differences between the SOEs and private firms. Among the three institutional environment sub-indexes, although government intervention is the most important factor for SOE firms, credit market development is more important for private firms. This strengthens the argument that while China's SOEs are more vulnerable to the influences of governmental political considerations and SIP motivations, Chinese private firms are more constrained by a lack of external financial recourses. My results also show that the regional legal environment has more significant impact on the IPO underpricing of private firms than it does for SOEs.

Finally, I provide evidence that market sentiment is strongly associated with IPO underpricing in China. Consistent with the hot market argument of Loughran and Ritter (2002), I find that firms generally have a higher level of IPO underpricing during hot market periods, especially for SOEs. In contrast, private firms have a significantly higher level of IPO underpricing in bad market periods. This sentiment difference between SOEs and private firms further reflects the fact that China's private firms are more constrained by limited external financing opportunities, and this situation is getting even worse during bad market periods because bad market periods are usually accompanied by a lack of liquidity. Therefore, private firms would like to reduce their IPO offering prices to attract more potential equity investors, especially when the market conditions are bad.

Institutional environment is quite heterogeneous across different countries, even across different regions within a specific country, and ownership structure is also significantly different from country to country. Therefore, my study of the relations between IPO underpricing, institutional environment and ownership structure not only contribute to the literature on IPOs in the Chinese financial market, but also to those of other international financial markets, especially other emerging financial markets.

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This table provides the chronological distribution of the number of IPOs for the 35 sample countries over the period July 1993-June 2008.

Country	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Count
Australia				2	3			1	3	29	67	144	147	174	217	31	818
Austria											2	1	2	6	3		14
Belgium					1							2	6	15	12	4	40
Brazil				1	3			1		2		3	2	10	28	3	53
Canada	4	4	4	10	9	7	4	4	3	5	22	77	88	97	38	40	416
China	36	22	4	77	97	49	36	41	22	45	87	129	47	125	194	72	1,083
Finland		1		1								2	1	3	6		14
France	2	2	1	4	2	2				3	3	21	22	62	55	5	184
Germany				2		1		1	1	1	1	4	6	30	32	2	81
Greece							1		4	11	12	7	4	4	8		51
Hong Kong	1	1	2	2	4	2	1	3	9	75	45	32	49	39	47	5	317
India									2	1		2	1	2	20	18	46
Indonesia										2	2	4	1	3	9	5	26
Ireland-Rep		2	1		3	1						6	7	6	8		34
Israel	2	4	3	6	11	3	6	6	1			6	11	7	7		73
Italy		2		1			1				1	6	15	13	15	1	55
Japan								1		79	105	138	103	159	93	20	698
Malaysia										3	47	61	57	31	25	11	235
Mexico	5	4			1							1	1	2	3	3	20
Netherlands	1		1	2	2			1				2	3	11	5	1	29
New Zealand					2				1	2	6	13	3	3	7		37
Norway								1				7	14	12	15	2	51
Philippines								1		2	5		1	3	5	2	19
Poland												6	5	12	11		34
Russian Fed				1						1		1	2	4	4		13
Singapore		1				1				12	33	39	32	28	27	7	180
South Africa											1	1	1	5	4	2	14
South Korea		2								66	72	65	48	50	59	22	384
Spain										1		2	1	6	5		15
Sweden				2								2	3	10	11	1	29
Switzerland				1	3	1				1	1	4	5	7	9	2	34
Taiwan				1					1	16	47	94	74	42	41	48	20	384
Thailand										10	24	46	49	15	9	9	162
U.K.	1	2	5	7	4	1	1	1	14	30	64	205	144	147	94	14	734
U.S.	306	385	427	612	414	224	294	174	60	98	85	208	188	167	203	29	3,874
Total	358	432	448	732	559	292	344	237	136	526	779	1,321	1,111	1,309	1,336	331	10,251

Table 2 Descriptive Statistics of the IPO Initial Returns and the Economic Freedom Index Scores

Table 2 provides the basic statistics of the IPO initial returns (*IR*) and the IEF index score for the 35 sample countries in the period of July 1993 to June 2008. The sample countries are ranked by their average IPO initial returns over the sample period. Tier1 to Tier4 represents the intervals of (-∞, -25], (-25, 25], (25, 75] and (75, +∞) respectively. IEF score is the total score from the Heritage Foundation's *Index of Economic Freedom.*

Panel A: Descriptive Statistics of the IPO Initial Returns

					Initial Return (IR)					
Country	Mean	Max	Min	Median	Std.	Tier1	Tier2	Tier	Tier4	Sum
Spain	3.02	18.91	-7.03	0.22	8.59	0	0	15	0	15
Norway	4.18	40.72	-17.23	2.05	10.91	0	3	48	0	51
France	4.24	86.88	-22.01	0.03	13.67	2	7	175	0	184
Sweden	5.44	37.23	-27.57	4.65	15.32	0	4	23	2	29
Austria	6.09	27.80	-8.57	1.18	12.86	0	3	11	0	14
Brazil	6.35	156.09	-19.97	3.77	23.54	1	0	52	0	53
Mexico	7.09	37.86	-5.44	5.32	11.30	0	2	18	0	20
Belgium	7.56	33.00	-2.92	4.00	9.16	0	3	37	0	40
Finland	8.04	80.72	-27.52	4.27	22.86	1	0	12	1	14
Germany	8.41	128.07	-14.53	1.20	20.62	1	10	70	0	81
Italy	8.54	55.44	-5.14	4.54	13.96	0	4	51	0	55
Russian	11.79	66.67	-12.89	1.56	22.68	0	3	10	0	13
Netherlands	12.34	137.20	-9.45	4.55	29.19	1	3	25	0	29
Switzerland	12.81	67.74	-9.34	7.38	19.05	0	7	27	0	34
Israel	14.12	99.06	-26.37	6.25	24.03	3	10	58	2	73
South	14.50	70.25	-25.00	12.11	21.40	0	2	12	0	14
Ireland-Rep	14.95	73.12	-7.41	11.09	18.90	0	7	27	0	34
Greece	15.14	183.39	-35.38	1.76	43.80	4	5	39	3	51
Thailand	15.93	151.81	-35.83	3.14	35.24	13	30	115	4	162
Hong Kong	16.70	235.55	-37.25	5.71	43.63	20	51	233	13	317
Philippines	17.73	140.07	-17.44	7.78	34.17	1	3	15	0	19
Australia	20.91	321.79	-37.47	10.16	44.38	71	161	559	27	818
U.S.	21.11	337.33	-37.50	9.58	41.12	249	729	285	39	3874
New	21.18	234.11	-28.96	9.82	50.84	2	8	25	2	37
U.K.	21.83	342.59	-37.93	9.48	48.47	40	120	551	23	734
Taiwan	25.37	329.21	-34.85	6.91	63.82	36	37	310	1	384
Singapore	28.70	334.15	-26.27	10.15	50.10	26	42	107	5	180
China	28.74	353.85	-38.40	1.61	66.46	137	126	815	5	1083
India	31.38	287.50	-23.97	13.48	60.91	7	8	31	0	46
Indonesia	32.17	181.82	-20.83	16.43	44.46	4	6	16	0	26
Canada	32.71	354.00	-35.71	6.52	69.15	61	70	262	23	416
Malaysia	33.12	323.96	-32.80	16.67	59.88	31	58	131	15	235
Japan	48.69	306.25	-37.04	27.92	66.93	166	198	322	12	698
Poland	50.07	334.26	-3.22	14.84	83.09	7	6	21	0	34
South	53.50	350.00	-23.50	27.30	77.66	104	99	181	0	384
Whole	25.04	354.00	-38.40	7.95	52.03	988	1825	726	177	10251

Panel B: Descriptive Statistics of the Economic Freedom Index Scores

	IEF Score			
Country	Mean	Max	Min	Std.
Spain	69.17	70.07	67.03	0.80
Norway	68.04	70.18	64.51	1.47
France	62.95	64.70	58.94	1.73
Sweden	69.79	70.88	63.34	1.80
Austria	70.83	71.64	68.78	1.12
Brazil	56.85	63.39	52.27	2.28
Mexico	64.07	66.15	58.49	2.14
Belgium	71.63	72.51	62.92	1.52
Finland	72.68	74.55	63.72	3.55
Germany	70.26	70.84	64.30	1.24
Italy	62.26	64.94	58.05	0.94
Russian Fed	51.21	52.81	49.76	1.20
Netherlands	74.49	77.35	61.24	3.84
Switzerland	79.02	79.53	76.76	0.64
Israel	65.58	68.30	61.49	2.08
South Africa	63.78	66.29	62.87	0.77
Ireland-Rep	80.15	82.62	68.5	4.24
Greece	59.40	60.98	58.66	0.77
Thailand	63.16	65.82	62.31	0.65
Hong Kong	89.61	90.51	88.04	0.49
Philippines	56.97	61.34	54.71	2.15
Australia	80.97	82.64	75.5	1.54
U.S.	77.44	81.24	75.43	2.11
New Zealand	81.80	82.33	79.22	0.65
U.K.	79.48	80.35	76.22	0.89
Taiwan	70.20	71.65	69.45	0.82
Singapore	87.90	88.87	86.53	0.70
China	53.21	56.37	51.32	0.90
India	54.01	54.36	51.17	0.90
Indonesia	53.15	55.76	51.9	0.74
Canada	77.29	80.47	67.94	3.21
Malaysia	62.58	64.59	59.93	1.31
Japan	70.62	73.25	64.28	3.38
Poland	59.75	60.32	58.11	0.75
South Korea	67.71	73.04	66.38	0.80
Whole Sample	69.66	90.51	49.76	1.02

Table 3 Correlations between IPO Initial Return and Economic Freedom Variables (July 1993-June 2008)

Table 3 reports the correlation matrix for the IPO initial returns and the Economic Freedom Index (IEF) scores. *IR* is the initial return. *TotV* is the total IEF value. *Fin* is the financial freedom sub-index score of IEF; *Ivst* is the investment freedom sub-index score of IEF; *Busi* is the business freedom sub-index score of IEF; *PPR* is the property right freedom sub-index score of IEF; *Crup* is the corruption freedom sub-index score of IEF; *Fiscal* is the fiscal freedom sub-index score of IEF; *FreeTrd* is the trade freedom sub-index score of IEF; *FreeGov* is the government size sub-index score; *Mny* is the monetary freedom sub-index score of IEF; *Labor* is the labor freedom sub-index score of IEF. *** and ** indicate that the correlation coefficient is significant at the 1% and 5% levels, respectively.

	IR	TotV	Fin	FreeTrd	PPR	Busi	Mny	Crup	Ivst	Fiscal	FreeGov	Labor
IR	1.000											
TotV	-0.050***	1.000										
Fin	-0.107***	0.840***	1.000									
FreeTrd	0.014	0.734***	0.511***	1.000								
PPR	-0.062***	0.919***	0.805***	0.693***	1.000							
Busi	-0.059***	0.904***	0.754***	0.703***	0.896***	1.000						
Mny	0.045***	0.521***	0.229***	0.488***	0.496***	0.464***	1.000					
Crup	-0.056***	0.871***	0.727***	0.707***	0.913***	0.859***	0.515***	1.000				
Ivst	-0.069***	0.844***	0.788***	0.575***	0.817***	0.787***	0.343***	0.731***	1.000			
Fiscal	0.052***	0.073***	-0.213***	-0.008	-0.184***	-0.076***	0.051***	-0.233***	-0.107***	1.000		
FreeGov	0.068***	-0.287***	-0.386***	-0.453***	-0.515***	-0.498***	-0.194***	-0.575***	-0.403***	0.692***	1.000	
Labor	0.000	0.165***	0.104***	0.318***	-0.029***	0.191***	0.060***	0.048***	0.091***	0.154***	-0.079***	1.000

Table 4 Regression: IPO Initial Returns and Economic Freedom (July 1993-June 2008)

This table provides the regression results for the following model:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \qquad (2)$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country and *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; and *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Regression	(2a)		(2b)	
	Coeff.	t-Value	Coeff.	t-Value
Constant	42.871	(3.17)***	36.865	(2.93)***
TotV	-0.225	(-2.36)**		
Rank			-2.971	(-3.20)***
GDP	-0.010	(-1.47)	-0.007	(-1.09)
Bear	-13.778	(-3.29)***	-13.776	(-3.30)***
Bull	6.608	(4.54)***	6.583	(4.52)***
Ind	Yes		Yes	
Year	Yes		Yes	
Adj. R^2	0.037		0.037	
Prob(F-stat)		0.000		0.000
No. of Obs.	10,251		10,251	

Table 5 Regression: IPO Initial Returns and Economic Freedom with Additional Firm-specific and Home Bias Control Variables
(July1, 1993-June 30, 2008)

This table provides the regression results for the following model:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon , \quad (3)$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country; *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; *FC* are firm-specific IPO control variables, including the IPO size (*Proceeds*), IPO demand (*Oversold)*, underwriter reputation (*Uwrt*) and return on equity (*ROE*) and *HB* is the Home bias index of Lau, Ng and Zhang (2010); and *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. [*], [**] and [***] represent significance at the 10%, 5% and 1% levels, respectively.

Regression	(1)		(2)		(3)		(4)		(5)	
	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value
Constant	134.010	(8.79)***	130.739	(8.35)***	121.956	(7.84)***	153.983	(6.21)***	192.159	(7.24)***
TotV	-0.424	(-4.29)***	-0.414	(-4.15)***	-0.384	(-3.88)***	-0.569	(-3.74)***	-0.686	(-4.41)***
GDP	0.001	(0.18)	0.003	(0.42)	0.001	(0.13)	0.004	(0.30)	-0.020	(-1.36)
Bear	-15.221	(-3.66)***	-15.280	(-3.67)***	-15.029	(-3.62)***	-33.432	(-4.30)***	-35.468	(-4.53)***
Bull	7.211	(4.99)***	7.213	(5.00)***	7.344	(5.11)***	7.596	(3.22)***	7.862	(3.29)***
Proceeds	-4.840	(-12.12)***	-4.688	(-10.95)***	-4.298	(-9.93)***	-3.398	(-4.55)***	-3.597	(-4.84)***
Oversold			-1.686	(-1.21)	-1.729	(-1.23)	-0.875	(-0.37)	-2.887	(-1.06)
Uwrt					5.717	(4.46)***	1.904	(0.91)	2.665	(1.25)
ROE							-0.055	(-1.67)*	-0.047	(-1.48)
HB									-4.929	(-4.17)***
Ind	Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes	
Adj. R²	0.056		0.056		0.074		0.073		0.078	
Prob(F-stat)		0.000		0.000		0.000		0.000		0.000
No. of Obs.	10,227		10,227		3,720		3,720		3,607	

Table 6 Regression: IPO Initial Returns and the Sub-indexes of Economic Freedom (July1, 1993-June 30, 2008. n=10,238)

This table provides the regression results for the relation between IPO initial returns and the ten economic freedom sub indexes. *IR* is the IPO initial return. The ten sub-indexes are the financial freedom (*Fin*), investment freedom (*Ivst*), business freedom (*Busi*), property right freedom (*PPR*), corruption freedom (*Crup*), fiscal freedom (*Fiscal*), trade freedom (*FreeTrd*), government size (*FreeGov*), monetary freedom (*Mny*) and labor freedom (*Labor*). *GDP* is the GDP per capita of the IPO country. *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; and *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Regression	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variable	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
Constant	45.771 ***	38.466 ***	41.250 ***	33.997 ***	31.047 **	14.969	13.594	17.057	-8.671	30.838 **	16.710
Fin	-0.442 ***										-0.627 ***
Ivst		-0.205 ***									0.093
Busi			-0.190 **								-0.058
PPR				-0.130 **							0.097
Crup					-0.039						0.087
FreeTrd						0.220***					0.378 ***
Fiscal							0.208 ***				-0.150
FreeGov								0.129 ***			0.263 ***
Mny									0.504 ***		-0.168
Labor										-0.020	0.040
GDP	0.020	-0.004	-0.007	-0.005	-0.017	-0.032	-0.017	-0.011	-0.030	-0.021	0.014 ***
Bear	-15.124 ***	-13.834 ***	-13.782 ***	-13.718 ***	-13.572 ***	-13.255***	-13.501 ***	-13.588 ***	-13.868 ***	-13.587 ***	-15.026 ***
Bull	6.525 ***	6.676 ***	6.650 ***	6.581 ***	6.581 ***	6.587***	6.518 ***	6.595 ***	6.587 ***	6.698 ***	6.352 ***
Ind	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.048	0.038	0.037	0.037	0.036	0.037	0.037	0.037	0.038	0.036	0.054

Table 7 Sub-sample Test for the Period from June 30, 2001 to June 30, 2008

Table 7 provides the estimates of the following two regression models for the sub-sample period of June 30, 2001 to June 30, 2008:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \qquad (2)$$

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon, \qquad (3)$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country; *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; *FC* are firm-specific IPO control variables, including the IPO size (*Proceeds*), IPO demand (*Oversold*), underwriter reputation (*Uwrt*) and return on equity (*ROE*) and *HB* is the Home bias index of Lau, Ng and Zhang (2010), and *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Regression	(2a)		(2b)		(3a)		(3b)		(3c)	
	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value
Constant	65.873	(4.56)***	54.997	(4.09)***	145.475	(8.72)***	151.161	(5.34)***	177.845	(5.95)***
TotV	-0.363	(-3.55)***			-0.509	(-4.84)***	-0.711	(-4.46)***	-0.789	(-4.87)***
Rank			-4.607	(-4.70)***						
GDP	-0.013	(-1.80)*	-0.009	(-1.30)	-0.001	(-0.16)	0.003	(0.25)	-0.011	(-0.74)
Bear	-20.477	(-4.96)***	-20.187	(-4.92)***	-22.826	(-5.53)***	-33.702	(-4.41)***	-34.888	(-4.53)***
Bull	8.714	(5.03)***	8.616	(4.96)***	9.859	(5.76)***	9.790	(3.31)***	9.900	(3.29)***
Proceeds					-4.147	(-8.36)***	-3.460	(-3.81)***	-3.806	(-4.19)***
Oversold					-2.320	(-1.50)	-5.663	(-1.99)**	-5.875	(-1.90)*
Uwrt					4.863	(3.04)***	2.024	(0.69)	2.461	(0.82)
ROE							-0.065	(-0.90)	-0.056	(-0.79)
HB									-3.300	(-2.60)***
Ind	Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes	
Adj. R^2	0.029		0.033		0.051		0.059		0.061	
Prob(F-stat)		0.000		0.000		0.000		0.000		0.000
Obs.	7,279		7,279		7,053		2,406		2,303	

Table 8 Robustness Tests by Omitting U.S. IPOs (June 30, 1993 to June 30 2008)

Table 8 provides the estimates of the following two regression models for the IPO sample without the U.S. IPOs over the whole sample period:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \qquad (2)$$

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon, \qquad (3)$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country; *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; *FC* are firm-specific IPO control variables, including the IPO size (*Proceeds*), IPO demand (*Oversold)*, underwriter reputation (*Uwrt*) and return on equity (*ROE*) and *HB* is the Home bias index of Lau, Ng and Zhang (2010). and *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Regression	(1)		(2)		(3)		(4)		(5)	
	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value
Constant	50.932	(3.55)***	36.869	(2.79)***	138.771	(7.92)***	171.920	(5.95)***	193.057	(6.37)***
TotV	-0.374	(-3.66)***			-0.573	(-5.43)***	-0.759	(-4.75)***	-0.822	(-5.08)***
Rank			-3.363	(-3.21)***						
GDP	-0.002	(-0.22)	-0.004	(-0.63)	0.004	(0.49)	0.002	(0.17)	-0.009	(-0.61)
Bear	-17.829	(-3.49)***	-17.664	(-3.46)***	-18.814	(-3.71)***	-38.695	(-4.34)***	-40.548	(-4.49)***
Bull	6.094	(3.36)***	6.053	(3.33)***	7.271	(4.06)***	8.822	(3.17)***	8.909	(3.13)***
Proceeds					-4.514	(-8.46)***	-3.379	(-3.65)***	-3.453	(-3.75)***
Oversold					-2.143	(-1.22)	-6.090	(-2.04)**	-5.496	(-1.76)*
Uwrt					3.117	(1.75)*	1.120	(0.38)	1.232	(0.41)
ROE							-0.105	(-1.04)	-0.094	(-0.93)
HB									-2.959	(-1.99)**
Ind	Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes	
Adj. R^2	0.035		0.034		0.053		0.096		0.100	
Prob(F-stat)		0.000		0.000		0.000		0.000		0.000
Obs.	6,377		6,377		6,155		2,458		2,345	

Table 9 Robust Tests for Controlling Country Fixed Effect

This table reports the estimates of the regression models (2) and (3) for controlling the country fixed effect rather than the industrial fixed effect:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \qquad (2)$$

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon \quad (3)$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country; *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; *FC* are firm-specific IPO control variables, including the IPO size (*Proceeds*), IPO demand (*Oversold)*, underwriter reputation (*Uwrt*) and return on equity (*ROE*) and *HB* is the Home bias index of Lau, Ng and Zhang (2010); and *FixEffects* are the county (*Country*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

	(2a)		(2b)		(3)	
	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value
Constant	183.569	(4.78)***	69.694	(6.70)***	356.361	(5.93)***
TotV	-1.729	(-3.29)***			-2.402	(-3.01)***
Rank			-3.910	(-1.91)*		
GDP	-0.069	(-2.78)***	-0.090	(-3.82)***	-0.200	(-3.49)***
Bear	-17.033	(-4.04)***	-16.711	(-3.99)***	-40.209	(-4.93)***
Bull	6.171	(4.28)***	6.137	(4.25)***	8.668	(3.77)***
Proceeds					-2.535	(-3.23)***
Oversold					-7.039	(-1.98)**
Uwrt					-0.447	(-0.21)
ROE					-0.036	(-1.22)
HB					-5.024	(-3.24)***
Country	Yes		Yes		Yes	
Year	Yes		Yes		Yes	
Adj. R^2	0.063		0.061		0.110	
Prob(F-stat)		0.000		0.000		0.000
No. of Obs.	10,251		10,251		3,607	

Table 10 Robust Tests Using the Clustered Standard Errors Method

This table provides the estimates of the regression models (2) and (3) using the clustered standard errors method of Petersen (2009), and controlling the country fixed effect rather than the industrial fixed effect:

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_4 Bull + FixEffects + \varepsilon, \tag{2}$$

$$IR = \alpha_0 + \alpha_1 IEF + \alpha_2 GDP + \alpha_3 Bear + \alpha_3 Bull + \sum_{k=1}^{K} \beta_k FC_k + \gamma HB + FixEffects + \varepsilon \tag{3}$$

where *IR* is the IPO initial return; *IEF* is the economic freedom variable, proxied by either the total value of the IEF (*TotV*) or the rank of the IEF (*Rank*); *GDP* is the GDP per capita of the IPO country; *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively; *FC* are firm-specific IPO control variables, including the IPO size (*Proceeds*), IPO demand (*Oversold*), underwriter reputation (*Uwrt*) and return on equity (*ROE*) and *HB* is the Home bias index of Lau, Ng and Zhang (2010), and *FixEffects* are the county (*Country*) and time (*Year*) fixed effect dummy variables. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

	(2a)		(2b)		(3)	
	Coeff.	t-Value	Coeff.	t-Value	Coeff.	t-Value
Constant	177.183	(4.72)***	65.465	(6.94)***	332.465	(5.53)***
TotV	-1.729	(-3.29)***			-2.402	(-3.01)***
Rank			-3.910	(-1.91)*		
GDP	-0.001	(-2.78)***	-0.001	(-3.82)***	-0.002	(-3.49)***
Bear	-17.033	(-4.03)***	-16.711	(-3.99)***	-40.209	(-4.93)***
Bull	6.171	(4.28)***	6.137	(4.25)***	8.668	(3.77)***
Proceeds					-2.535	(-3.23)***
Oversold					-7.039	(-1.98)**
Uwrt					-0.447	(-0.21)
ROE					-0.036	(-1.22)
HB					-0.427	(-0.08)
Country	Yes		Yes		Yes	
Year	Yes		Yes		Yes	
Adj. R^2	0.067		0.073		0.123	
Prob(F-stat)		0.000		0.000		0.000
No. of Obs.	10,251		10,251		3,607	

Table 11 Regression: IPO Initial Returns, Economic Freedom and Law Origin
(July1, 1993-June 30, 2008. n=10,238)

This table provides the regression results for the relation between IPO initial returns, the ten economic freedom sub indexes and the law system variable. *IR* is the IPO initial return and *IEF* is the economic freedom variable, proxied by the scores of the ten sub-indexes of the IEF. The ten sub-indexes are the financial freedom (*Fin*), investment freedom (*Ivst*), business freedom (*Busi*), property right freedom (*PPR*), corruption freedom (*Crup*), fiscal freedom (*Fiscal*), trade freedom (*FreeTrd*), government size (*FreeGov*), monetary freedom (*Mny*) and labor freedom (*Labor*). *LawSys* is the common law system dummy variable. *GDP* is the GDP per capita of the IPO country. *Bear* and *Bull* are the pre-IPO bearish and bullish market sentiment variables, respectively. *FixEffects* are the industrial (*Ind*) and time (*Year*) fixed effect dummy variables. *t*-test statistics are calculated by using White's (1980) heteroskedasticity-consistent standard errors method. *, ** and *** represent significance at the 10%, 5% and 1% levels, respectively.

Regression		
Variable	Coeff.	t-Value
Constant	11.136	(0.68)
Fin	-0.579	(-8.33)***
Ivst	0.043	(0.66)
Busi	-0.052	(-0.39)
PPR	0.146	(1.12)
Crup	0.111	(1.23)
FreeTrd	0.413	(4.04)***
Fiscal	-0.109	(-0.90)
FreeGov	0.268	(4.06)***
Mny	-0.281	(-1.76)*
Labor	0.070	(1.53)
LawSys	-4.591	(-2.09)**
GDP	0.011	(1.04)
Bear	-14.939	(-3.52)***
Bull	6.161	(4.25)***
Ind	Yes	
Year	Yes	
Adj. R^2	0.054	
Prob(F-stat)		0.000
No. of Obs.		10238

Appendix I. IEF Statistics for the Sample Economies

Country	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ave	Std.	Max	Min
Australia	-	-	75.50	75.59	76.40	-	-	-	77.40	77.94	79.00	79.89	81.15	82.23	82.64	80.97	1.54	82.64	75.50
Austria	-	-	-	-	-	-	-	-	-	-	68.78	71.09	71.64	71.40	71.20	70.83	1.12	71.64	68.78
Belgium	-	-	-	-	62.92	-	-	-	-	-	69.01	71.77	72.51	71.66	72.13	71.63	1.52	72.51	62.92
Brazil	-	-	-	52.27	61.33	-	-	61.54	63.39	-	61.75	60.94	56.18	56.16	56.70	56.85	2.28	63.39	52.27
Canada	69.45	70.30	67.94	68.45	69.33	70.48	71.17	74.62	74.77	75.30	75.77	77.39	78.03	80.09	80.47	77.29	3.21	80.47	67.94
China	51.97	51.32	51.68	53.10	54.76	56.37	52.62	52.75	52.61	52.50	53.72	53.57	52.02	53.09	53.21	53.21	0.90	56.37	51.32
Finland	-	63.72	65.24	-	-	-	-	-	-	-	-	72.94	73.99	74.55	74.49	72.68	3.55	74.55	63.72
France	64.42	63.66	59.11	58.94	59.09	-	-	-	59.16	60.88	60.52	61.13	62.07	64.70	63.28	62.95	1.73	64.70	58.94
Germany	-	-	-	64.30	-	65.74	69.54	-	69.75	-	68.09	70.75	70.84	70.61	70.48	70.26	1.24	70.84	64.30
Greece	-	-	-	-	-	60.98	-	59.09	58.82	59.05	58.98	60.09	58.66	60.60	60.84	59.40	0.77	60.98	58.66
Hong Kong	88.59	90.51	88.56	88.04	88.52	89.53	89.91	89.42	89.80	89.97	89.49	88.61	89.91	89.66	89.97	89.61	0.49	90.51	88.04
India	-	-	-	-	-	-	-	51.17	51.23	51.55	-	52.22	53.87	54.08	54.36	54.01	0.90	54.36	51.17
Indonesia	-	-	-	-	-	-	-	-	55.76	52.12	52.95	51.90	-	53.17	53.42	53.15	0.74	55.76	51.90
Ireland-Rep	68.52	68.50	72.61	73.73	74.61	-	-	-	-	-	80.79	82.17	82.62	82.50	82.20	80.15	4.24	82.62	68.50
Israel	61.49	61.99	62.68	67.95	68.30	65.50	66.11	66.95	62.66	-	62.63	64.43	64.81	66.30	67.56	65.58	2.08	68.30	61.49
Italy	61.24	60.79	58.05	-	-	-	62.95	-	-	-	64.94	61.97	62.77	62.57	61.41	62.26	0.94	64.94	58.05
Japan	-	-	-	-	-	-	70.85	-	67.65	64.28	67.28	73.25	72.74	73.00	72.76	70.62	3.38	73.25	64.28
Malaysia	-	-	-	-	-	-	-	-	61.09	59.93	61.88	61.63	63.82	63.93	64.59	62.58	1.31	64.59	59.93
Mexico	63.12	61.19	-	-	58.49	-	-	-	-	-	65.24	-	66.04	66.15	65.81	64.07	2.14	66.15	58.49
Netherlands	61.24	69.74	70.37	69.18	-	-	73.01	-	-	-	72.92	75.36	75.45	77.35	76.98	74.49	3.84	77.35	61.24
New Zealand	-	-	-	79.22	81.72	-	-	-	81.12	81.49	82.33	82.01	81.43	80.74	81.98	81.80	0.65	82.33	79.22
Norway	-	-	-	-	-	-	-	67.35	-	-	64.51	67.95	67.90	68.56	70.18	68.04	1.47	70.18	64.51
Philippines	-	-	-	-	-	-	60.92	-	61.34	59.09	54.71	56.33	-	55.96	56.78	56.97	2.15	61.34	54.71
Poland	-	-	-	-	-	-	-	-	-	-	59.61	59.29	58.11	60.29	60.32	59.75	0.75	60.32	58.11
Russian Fed	-	-	-	52.81	-	-	-	-	50.84	-	-	52.44	52.19	49.76	50.79	51.21	1.20	52.81	49.76
Singapore	-	86.53	-	-	-	-	-	-	88.18	88.87	88.64	88.02	87.12	87.29	87.10	87.90	0.70	88.87	86.53
South Africa	-	-	-	-	-	-	-	-	-	66.29	62.87	-	63.55	63.42	63.81	63.78	0.77	66.29	62.87
South Korea	-	73.04	-	-	-	-	-	-	68.29	67.82	66.38	67.52	67.76	68.59	68.08	67.71	0.80	73.04	66.38
Spain	-	-	-	-	-	-	-	-	68.83	-	67.03	68.19	69.24	69.09	70.07	69.17	0.80	70.07	67.03
Sweden	-	-	63.34	63.97	-	-	-	-	-	-	69.81	70.88	69.31	70.81	70.45	69.79	1.80	70.88	63.34
Switzerland	-	-	-	79.04	79.14	76.76	-	-	79.00	79.53	79.27	78.92	78.03	79.51	79.42	79.02	0.64	79.53	76.76
Taiwan	-	-	-	70.37	-	-	-	-	71.65	69.62	71.25	69.66	69.45	70.26	69.51	70.20	0.82	71.65	69.45
Thailand	-	-	-	-	-	-	-	-	65.82	63.68	62.50	63.26	63.52	62.31	63.03	63.16	0.65	65.82	62.31
UK	77.94	76.38	76.42	76.51	76.22	77.28	-	78.53	77.48	77.73	79.21	80.35	79.87	79.43	78.98	79.48	0.89	80.35	76.22
United States	76.65	76.72	75.59	75.43	75.54	76.42	79.06	78.36	78.18	78.75	79.95	81.24	81.18	80.97	80.70	77.44	2.11	81.24	75.43
Average	**67.69**	**69.60**	**68.24**	**68.76**	**70.46**	**71.01**	**69.61**	**67.98**	**68.12**	**68.82**	**68.81**	**69.00**	**69.63**	**69.17**	**69.31**	**68.51**	**1.55**	**70.59**	**64.57**
Std. Dev.	**10.13**	**10.54**	**9.73**	**10.24**	**10.02**	**10.11**	**10.21**	**12.29**	**11.02**	**11.83**	**9.61**	**10.39**	**9.95**	**10.34**	**10.24**	**9.93**	**1.02**	**9.60**	**9.51**

Appendix II Variable Descriptions for Essay 1

IR	IPO initial return, defined as the ratio of the difference between the close price on the first trading day and the offering price to the offering price. Provided by SDC.
TotV	The total value of IEF, ranging from 0 to 100. All the index data is provided by the American Heritage Foundation.
Rank	Rank of economic freedom. Rank =1, if *TotV* is between 0 and 49.9; Rank =2, if *TotV* is between 50 and 59.9; Rank = 3, if *TotV* is between 60 and 69.9; Rank = 4, if *TotV* is between 70 and 79.9; and Rank =5, if *TotV* is between 80 and 100. The higher the rank, the more freedom of an economy.
Fin	The financial freedom sub-index score of the IEF. Higher score of Fin indicates higher level of financial freedom.
Ivst	The investment freedom sub-index score of the IEF. Higher score of *Ivst* indicates higher level of Investment freedom.
Busi	The business freedom sub-index score of the IEF. Higher score of *Bus* indicates higher level of business freedom.
PPR	The property right freedom sub-index score of the IEF. Higher score of *PPR* indicates higher level of property rights freedom.
Crup	The corruption freedom sub-index score of the IEF. Higher score of *Crup* indicates higher level of freedom from corruption.
Fiscal	The value of fiscal freedom sub-index score of the IEF. Higher tax rate results in lower fiscal freedom.
FreeTrd	The value of trade freedom sub-index score of the IEF. Higher tariff tax results in lower trade freedom.
FreeGov	The value of government size sub-index score of the IEF, reflecting how government size and expenditure weighted in the GDP. Higher government expenditure results in lower *FreeGov* freedom score.
Mny	The value of monetary freedom sub-index score of the IEF. Higher disturbances of prices and inflation results in lower monetary freedom.
Labor	The value of labor freedom sub-index score of the IEF. The more flexible labor regulation, the higher labor freedom of the economy.
GDP	GDP per capita of the IPO country.
Bear	Bearish market sentiment dummy variable, equals to one if the MSCI-ACWI index lost 10% during the three months just before the IPO date, and zero otherwise.
Bull	Bullish market sentiment dummy variable, equals to one if the MSCI-ACWI index improves 10% during the three months just before the IPO date, and zero otherwise..
HB	Home bias index of Lau, Ng and Zhang (2010). Higher score indicates more serious home bias.
LawSys	Common law system dummy variable, equals to one if a country belongs to the common law system, and zero otherwise, data are collected from LLSV (1998).
Uwrt	Underwriter reputation dummy variable, equaling to one if the underwriter of the IPO is among the top three underwriters in the country.
ROE	Return of equity of the issuer 12 month before the IPO, provided by SDC.
Proceeds	The natural logarithm of the total IPO proceeds of the issuer, provided by SDC.
Oversold	Dummy variable, equals to one if the IPO has overallotment, data provided by SDC.
Ind	Industry dummies; according to the industrial classification of SDC.
Country	County dummy variables.
Year	Year fixed effect dummy variable.

Table 12 Scores on Institutional Environment and IPO Firm Ownership Structure

Table 12 reports the total score of the overall institutional environment and the average scores of the credit market development, government decentralization and legal environment for each sample province between 1999 and 2005. The total score of the institutional environment is the summation of the three sub-index scores. Higher scores generally represent a better institutional environment. The last three columns provide the number of IPOs, number of SOE IPOS and number of private firm IPOs for each sample province, respectively. To separate provinces into institutionally "good" and "poor" regions, four middle provinces (Hainan, Henan, Jilin and Sichuan) are excluded from the sample.

	Rank	Total Score	Credit Market	Legal Environment	Government Decentralization	No. of IPOs	SOE IPOs	Private Firm IPOs
"Good" Regions						428	240	188
Shanghai	1	27.95	9.50	9.96	8.49	25	16	9
Zhejiang	2	25.31	9.41	7.32	8.59	75	18	57
Guangdong	3	24.93	8.30	8.01	8.62	71	27	44
Jiangsu	4	22.94	8.04	6.16	8.74	68	40	28
Beijing	5	21.25	5.74	7.82	7.68	47	37	10
Tianjin	6	20.47	6.85	6.94	6.69	12	10	2
Shandong	7	19.80	7.56	4.88	7.35	40	27	13
Fujian	8	19.20	5.56	5.46	8.19	22	11	11
Chongqing	9	18.74	7.57	3.43	7.75	9	7	2
Liaoning	10	18.57	6.70	5.16	6.71	13	10	3
Hebei	11	18.32	6.82	4.01	7.49	17	14	3
Anhui	12	17.01	5.61	3.60	7.80	29	23	6
Mean		23.71	8.14	7.00	8.56			
Std. Dev.		4.90	2.12	2.15	1.34			
"Poor" Regions						189	160	29
Guangxi	13	15.68	3.92	3.60	8.17	15	12	3
Hunan	14	15.12	5.79	2.89	6.44	30	28	2
Shaanxi	15	15.06	5.93	2.66	6.47	11	10	1
Hubei	16	14.74	4.30	3.94	6.50	26	21	5
Yunnan	27	14.57	5.00	2.89	6.68	14	13	1
Jiangxi	18	14.11	4.18	3.42	6.51	14	11	3
Shanxi	19	14.06	4.68	3.92	5.46	12	11	1
Ningxia	20	13.65	5.48	3.05	5.11	4	4	0
Guizhou	21	12.35	3.68	2.66	6.01	10	9	1
Heilongjiang	22	12.29	2.25	4.63	5.40	11	8	3
Neimenggu	23	12.23	3.32	3.97	4.95	8	8	0
Gansu	24	12.15	3.65	2.35	6.16	11	9	2
Xinjiang	25	11.99	3.29	3.99	4.71	17	13	4
Xizang	26	9.55	2.79	2.44	4.32	3	1	2
Qinghai	27	9.12	2.50	2.40	4.22	3	2	1
Mean		13.92	4.32	3.61	5.98	189		
Std. Dev.		2.88	1.86	1.04	1.51	189		
All Provinces						617	400	217
Mean		20.71	6.97	5.96	7.77			
Std. Dev.		6.29	2.70	2.44	1.83			

Table 13 Chronological and Industrial Distributions of the Sample IPO Firms

Table 13 provides chronological and industrial distributions of the sample IPO firms. Panel A reports the chronological distribution and the selection procedure of the sample IPOs, and Panel B reports the industrial distribution of the sample IPOs according to the industrial code of the *WIND* database.

Panel A: Chronological Distributions of IPOs

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Total IPO of A-share firms	98	137	79	71	67	100	15	66	126	759
Less: Firms with B-shares	-2	-4	-4	0	0	0	0	0	0	-10
Less: Firms with H-shares	-1	0	-5	-4	-2	0	-1	-6	-14	-33
Less: Firms with other overseas shares	0	0	-1	0	0	0	0	0	0	-1
Less: Four changing provinces	-14	-7	-11	-6	-7	-4	-1	-2	-6	-58
Less: Missing data	-4	-7	-7	-8	-4	0	0	-3	-7	-40
Number of IPOs in the sample	77	119	51	53	54	96	13	55	99	617

Panel B: Industrial distribution of IPOs (n = 617)

Industry	Industrial Code	No. of IPOs	IPO by Region		IPO by Ownership		
			Good Region	Poor Region	CSOE	LSOE	Private
Energy	10	15	7	8	4	10	1
		(2.43%)	(1.64%)	(4.23%)	(4.08%)	(3.31%)	(0.46%)
Material	15	141	83	58	18	85	38
		(22.85%)	(19.39%)	(30.69%)	(18.37%)	(28.15%)	(17.51%)
Manufacturing	20	157	116	41	35	63	59
		(25.45%)	(27.10%)	(21.69%)	(35.71%)	(20.86%)	(27.19%)
General Consuming	25	100	82	18	10	48	42
		(16.21%)	(19.16%)	(9.52%)	(10.20%)	(15.89%)	(19.35%)
Daily Consuming	30	45	22	23	4	29	12
		(7.29%)	(5.14%)	(12.17%)	(4.08%)	(9.60%)	(5.53%)
Health	35	44	29	15	7	20	17
		(7.13%)	(6.78%)	(7.94%)	(7.14%)	(6.62%)	(7.83%)
Properties	40	23	18	5	2	15	6
		(3.73%)	(4.21%)	(2.65%)	(2.04%)	(4.97%)	(2.76%)
Information and tech	45	71	58	13	13	17	41
		(11.51%)	(13.55%)	(6.88%)	(13.27%)	(5.63%)	(18.89%)
Telecommunication	50	2	2	0	1	0	1
		(0.32%)	(0.47%)	(0.00%)	(1.02%)	(0%)	(0.46%)
Utility	55	19	11	8	4	15	0
		(3.08)	(2.57%)	(4.23%)	(4.08%)	(4.97%)	(0.00%)
Total No.		617	428	189	98	302	217
Distribution (%)		(100%)	(69.37%)	(35.17%)	(15.88%)	(48.95%)	(35.17%)

Table 14 Descriptive Statistics of the IPO First–day Returns in China

Table 14 provides the descriptive statistics and distribution of the IPO first-day returns in China from 1999 to 2007. All the first-day IPO returns are market adjusted. The IPO distribution panel gives the number and percentage (in parentheses) of IPOs for each of the eight different first-day return ranges for each sample year.

	Market Adjusted IPO First-Day Returns					Distribution of IPOs							
Year	Min	Max	Mean	Median	St. Dev	Less than 25% (%)	Between 25% and 50% (%)	Between 50% and 75% (%)	Between 75% and 100% (%)	Between 100% and 125% (%)	Between 125% and 150% (%)	Between 150% and 175% (%)	Larger than 175% (%)
1999	7.14%	341.87%	111.17%	106.86%	73.61%	6 (7.79)	10 (12.99)	11 (14.29)	13 (16.88)	9 (11.69)	9 (11.69)	9 (11.69)	10 (12.99)
2000	21.82%	476.77%	154.44%	142.12%	83.01%	2 (1.68)	6 (5.04)	10 (8.40)	17 (14.29)	13 (10.92)	18 (15.13)	15 (12.61)	38 (31.93)
2001	13.25%	413.79%	156.37%	146.58%	85.55%	2 (3.92)	3 (5.88)	3 (5.88)	5 (9.80)	4 (7.84)	11 (21.57)	4 (7.84)	19 (37.25)
2002	24.78%	428.25%	141.19%	121.83%	89.36%	0 (0.00)	4 (7.55)	10 (18.87)	8 (15.09)	6 (11.32)	7 (13.21)	4 (7.55)	14 (26.42)
2003	10.73%	227.99%	77.46%	81.78%	45.23%	6 (11.11)	13 (24.07)	6 (11.11)	14 (25.93)	8 (14.81)	4 (7.41)	1 (1.85)	2 (3.70)
2004	-9.00%	324.89%	71.01%	58.77%	55.41%	19 (19.79)	18 (18.75)	18 (18.75)	15 (15.63)	13 (13.54)	8 (8.33)	3 (3.13)	2 (2.08)
2005	2.79%	133.86%	40.71%	43.17%	35.18%	4 (30.77)	3 (23.08)	4 (30.77)	1 (7.69)	0 (0.00)	1 (7.69)	0 (0.00)	0 (0.00)
2006	27.84%	345.71%	94.00%	86.25%	58.96%	0 (0.00)	10 (18.18)	15 (27.27)	15 (27.27)	5 (9.09)	6 (10.91)	2 (3.64)	2 (3.64)
2007	51.02%	538.12%	210.53%	193.74%	111.38%	0 (0.00)	2 (2.02)	7 (7.07)	7 (7.07)	10 (10.10)	9 (9.09)	12 (12.12)	52 (52.53)
1999-2007	-9.00%	538.12%	129.56%	109.81%	92.45%	39 (6.32)	69 (11.18)	84 (13.61)	95 (15.40)	68 (11.02)	73 (11.83)	50 (8.10)	139 (22.53)

Table 15 Descriptive Statistics on the Characteristics of IPO Firms

This table reports the descriptive statistics of IPO firms for all regions, including "good" regions and "poor" regions, and the difference between the "good" and "poor" regions of China. *Y1d* is the market adjusted IPO first-day return. *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores of the NERIIM. *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. ***,** and * indicate that the *t*-test statistics for the mean difference, the *z*-test statistics for the median difference and the *F*-test statistics for the standard deviation between the "good" and "poor" regions is significant at the 1%, 5% and 10% levels, respectively.

		All	Good	Poor	Good-Poor
		(n=617)	(n=428)	(n=189)	test
Y1d	Mean	1.30	1.23	1.40	(-0.17)**
	Median	1.08	1.02	1.16	(-0.14)
	St.Dev	0.91	0.88	0.98	(-0.10)*
INST_V	Mean	20.71	23.71	13.92	(9.79)***
	Median	19.83	22.41	14.05	(8.36)***
	St.Dev	6.29	4.90	2.88	(2.02)***
Asset	Mean	20.07	20.06	20.08	(-0.02)
	Median	19.96	19.97	19.94	(0.03)
	St.Dev	0.87	0.88	0.85	(0.03)
ROA	Mean	0.15	0.15	0.15	(0.00)
	Median	0.14	0.14	0.14	(0.00)
	St.Dev	0.06	0.06	0.06	(0.00)
Lev	Mean	0.55	0.56	0.54	(0.02)
	Median	0.57	0.57	0.57	(0.00)
	St.Dev	0.12	0.13	0.12	(0.01)
Growth	Mean	0.92	0.98	0.80	(0.18)***
	Median	0.80	0.86	0.72	(0.14)***
	St.Dev	0.59	0.64	0.42	(0.22)***
Age	Mean	4.24	4.33	4.04	(0.29)
	Median	3.50	3.62	3.32	(0.30)
	St.Dev	3.03	2.99	3.12	(-0.13)
Length	Mean	24.87	22.78	29.61	(-6.83)***
	Median	16.00	15.00	19.00	(-4.00)***
	St.Dev	22.34	18.88	28.14	(-9.26)***
Issue	Mean	0.69	0.70	0.67	(0.03)
	Median	0.45	0.40	0.50	(-0.10)***
	St.Dev	2.10	2.49	0.63	(1.86)***
Liquid	Mean	0.30	0.30	0.33	(-0.03)***
	Median	0.30	0.28	0.33	(-0.05)***
	St.Dev	0.07	0.30	0.33	(-0.03)*
Lott(%)	Mean	0.30	0.28	0.34	(0.06)
	Median	0.16	0.14	0.20	(-0.06)*
	St.Dev	0.46	0.38	0.61	(-0.23)***
IssPE	Mean	24.49	24.23	25.07	(-0.84)
	Median	20.00	20.52	20.00	(0.52)
	St.Dev	9.58	8.73	11.26	(-2.53)***

Table 16 Correlations of Firm-specific Variables (n=617)

This table reports the correlation matrix for the IPO initial returns, institutional environment variables and the control variables. *Yld* is the market adjusted IPO first-day return. *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores from the NERIIM. *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. ***,** and * indicate that the *t*-test statistics for the mean difference, the *z*-test statistics for the median difference and the *F*-test statistics for the standard deviation between the "good" and "poor" regions is significant at the 1%, 5% and 10% levels, respectively.

	Yld	INST_V	INST_D	Asset	ROA	Lev	Growth	Age	Length	Issue	liquid	Lott	IssPE
Yld	1.000												
INST_V	-0.080**	1.000											
INST_D	-0.082**	0.718***	1.000										
Asset	-0.295***	-0.006	-0.007	1.000									
ROA	-0.047	0.055	0.058	-0.322***	1.000								
Lev	-0.029	0.027	0.056	0.342***	-0.387***	1.000							
Growth	-0.075	0.173***	0.142***	-0.007	0.134***	0.178***	1.000						
Age	0.022	0.227***	0.044	0.030	-0.123***	0.002	-0.051	1.000					
Length	-0.024	-0.293***	-0.141***	0.098**	-0.002	-0.056	-0.095**	-0.217***	1.000				
Issue	-0.110***	0.010	0.007	0.447***	-0.094**	-0.005	-0.066	-0.095**	0.020	1.000			
liquid	-0.033	-0.309***	-0.186***	-0.337***	-0.125***	0.027	-0.086**	-0.092**	0.115***	-0.121***	1.000		
Lott	-0.173***	-0.145***	-0.062	0.424***	0.021	0.008	-0.054	-0.209***	0.217***	0.343***	-0.237***	1.000	
IssPE	0.304***	-0.097**	-0.040	-0.159***	-0.112***	0.003	-0.127***	-0.045	-0.076	-0.051	-0.036	0.050	1.000

Table 17 Regression Results for Testing Heterogeneous Institutional Environment, Type of Ownership and IPO First-day Returns (n=617)

This table provides the estimates of the following regression model:

$$Y1d_{it} = \alpha_0 + \alpha_1 INST_{it} + \alpha_2 SOE_{it} + \sum_{j=1}^{J} \beta_j ControlVariable_{jit} + \varepsilon_{it},\qquad(3)$$

where *Y1d* is the market adjusted IPO first-day return; *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores from the NERIIM; *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise and *SOE* is the state-owned enterprise dummy variable. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. *UDWR6* is the underwrite quality dummy variable that equals 1 if the underwriter is among the top six underwriters, and 0 otherwise. *AU9* is the audit quality dummy variable that equals 1 if the auditor is among the top nine auditing firms, and 0 otherwise. *UP20* and *DOWN20* are the bull and bear market sentiment dummy variables before the IPO, respectively. The model is estimated using the clustered standard errors tests of Petersen (2009). ***, ** and * indicate that the t-test statistics are significant at the 1%, 5% and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	Coeff. t-value	Coeff. t-value	Coeff. t-value	Coeff. t-value	Coeff. t-value
Constant	11.699 (7.81)***	11.014 (8.45)***	11.595 (8.05)***	11.196 (8.26)***	11.600 (7.91)***
INST_V	-0.024 (-2.96)***				
INST_D		-0.184 (-2.18)**			
Credit			-0.063 (-2.85)***		
Legal				-0.036 (-2.38)**	
Gov					-0.060 (-2.50)**
SOE	0.100 (2.92)***	0.129 (3.11)***	0.099 (2.87)***	0.116 (3.32)***	0.135 (3.34)***
Asset	-0.441 (-6.74)***	-0.433 (-6.92)***	-0.440 (-6.79)***	-0.433 (-6.92)***	-0.440 (-6.81)***
ROA	-2.026 (-2.22)**	-1.915 (-2.05)**	-2.004 (-2.17)**	-1.971 (-2.20)**	-1.999 (-2.17)**
Lev	0.534 (2.60)***	0.550 (2.38)**	0.589 (2.77)***	0.491 (2.48)**	0.539 (2.39)**
Growth	-0.063 (-1.43)	-0.074 (-1.53)	-0.067 (-1.41)	-0.071 (-1.51)	-0.073 (-1.51)
Age	-0.006 (-1.24)	-0.007 (-1.66)*	-0.006 (-1.21)	-0.007 (-1.44)	-0.005 (-1.02)
Length	0.000 (-0.13)	0.000 (-0.27)	0.000 (-0.12)	0.000 (-0.20)	0.000 (-0.25)
Issue	0.044 (3.68)***	0.039 (3.07)***	0.045 (3.68)***	0.042 (3.44)***	0.041 (3.35)***
Liquid	-0.910 (-1.75)*	-0.800 (-1.65)*	-0.872 (-1.72)*	-0.830 (-1.68)*	-0.795 (-1.58)
Lott	-0.331 (-1.84)*	-0.336 (-1.84)*	-0.327 (-1.87)*	-0.335 (-1.79)*	-0.329 (-1.80)*
IssPE	-0.007 (-1.17)	-0.007 (-1.18)	-0.008 (-1.19)	-0.007 (-1.08)	-0.007 (-1.14)
UDWR6	0.080 (1.45)	0.060 (1.10)	0.072 (1.38)	0.082 (1.43)	0.065 (1.19)
AU9	0.109 (2.19)**	0.078 (1.45)	0.110 (1.89)*	0.089 (1.90)*	0.068 (1.47)
UP20	0.304 (2.84)***	0.315 (2.74)***	0.308 (3.06)***	0.299 (2.48)**	0.314 (2.83)***
DOWN20	0.028 (0.21)	0.049 (0.36)	0.019 (0.14)	0.044 (0.31)	0.075 (0.53)
Ind	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
Adj. R²	0.428	0.423	0.432	0.422	0.422
Prob(F-stat)	0.000	0.000	0.000	0.000	0.000

This table reports the estimates of the following model (4):

$$Y1d_{it} = \theta_0 + \theta_1 INST_{it} + \theta_2 CSOE_{it} + \theta_3 LSOE_{it} + \sum_{j=1}^{J} \lambda_j ControlVariable_{jit} + e_{it}, \qquad (4)$$

where *Y1d* is the market adjusted IPO first-day return; *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores from the NERIIM; *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise; *CSOE* is a dummy variable for central government supervised SOEs and *LSOE* is a dummy variable for local government supervised SOEs. *FDI* is the logarithm value of the foreign investment amount of the IPO issuing provinces for the IPO year. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. *UDWR6* is the underwrite quality dummy variable that equals 1 if the underwriter is among the top six underwriters, and 0 otherwise. *AU9* is the audit quality dummy variable that equals 1 if the auditor is among the top nine auditing firms, and 0 otherwise. *UP20* and *DOWN20* are the bull and bear market sentiment dummy variables before the IPO, respectively. The model is estimated using the clustered standard errors tests of Petersen (2009). ***, ** and * indicate that the t-test statistics are significant at the 1%, 5% and 10% levels, respectively.

	(1)		(2)	
	Coefficients	t-value	Coefficients	t-value
Constant	11.225	(4.75)***	10.510	(4.87)***
INST_V	-0.023	(-2.80)***		
INST_D			-0.172	(-2.00)**
CSOE	0.221	(2.07)**	0.249	(2.22)**
LSOE	0.076	(2.47)**	0.104	(2.50)**
FDI	0.023	(0.42)	0.024	(0.44)
Asset	-0.446	(-6.19)***	-0.437	(-6.34)***
ROA	-2.030	(-2.14)**	-1.913	(-1.98)**
Lev	0.542	(2.24)**	0.560	(2.10)**
Growth	-0.062	(-1.31)	-0.073	(-1.40)
Age	-0.004	(-0.71)	-0.005	(-0.97)
Length	0.000	(0.71)	0.000	(0.45)
Issue	0.043	(3.13)***	0.038	(2.63)***
Liquid	-0.960	(-2.00)**	-0.840	(-1.86)*
Lott	-0.333	(-1.90)*	-0.338	(-1.91)*
IssPE	-0.006	(-1.00)	-0.006	(-1.00)
UDWR6	0.064	(1.24)	0.045	(0.86)
AU9	0.115	(2.24)**	0.083	(1.51)
UP20	0.316	(3.48)***	0.327	(3.25)***
DOWN20	0.058	(0.51)	0.080	(0.70)
Ind	Yes		Yes	
Year	Yes		Yes	
Adj R^2	0.438		0.432	
Prob(F-stat)		0.000		0.000

Panels A and B of Table 19 report the estimates of the following regression model (5) for SOEs and private firms, respectively:

$$Y1d_{it} = \phi_0 + \phi_1 INST_{it} + \sum_{j=1}^{J} \eta_j ControlVariable_{jit} + u_{it} \tag{5}$$

where *Y1d* is the market adjusted IPO first-day return; *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores from the NERIIM and *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. *UDWR6* is the underwrite quality dummy variable that equals 1 if the underwriter is among the top six underwriters, and 0 otherwise. *AU9* is the audit quality dummy variable that equals 1 if the auditor is among the top nine auditing firms, and 0 otherwise. *UP20* and *DOWN20* are the bull and bear market sentiment dummy variables before the IPO, respectively. The model is estimated using the clustered standard errors tests of Petersen (2009). ***, ** and * indicates that the t-test statistics are significant at the 1%, 5% and 10% levels, respectively.

Panel A: SOE Firms in Different Areas (n=400)

	(1)		(2)		(3)		(4)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Constant	13.206	(6.79)***	13.017	(6.96)***	12.895	(6.61)***	13.331	(6.57)***
INST_V	-0.022	(-1.92)*						
Credit			-0.054	(-2.05)**				
Legal					-0.031	(-1.39)		
Gov							-0.061	(-2.09)**
Asset	-0.512	(-5.98)***	-0.508	(-6.02)***	-0.511	(-5.97)***	-0.517	(-5.82)***
ROA	-1.695	(-2.01)**	-1.670	(-1.94)*	-1.663	(-2.02)**	-1.679	(-2.01)**
Lev	0.860	(3.74)***	0.894	(4.04)***	0.826	(3.70)***	0.881	(3.81)***
Growth	-0.152	(-2.53)**	-0.156	(-2.51)**	-0.162	(-2.68)***	-0.166	(-2.73)***
Age	-0.001	(-0.10)	-0.001	(-0.12)	-0.002	(-0.21)	0.000	(0.00)
Length	0.000	(0.11)	0.000	(0.36)	0.000	(0.03)	0.000	(0.03)
Issue	0.153	(2.81)***	0.146	(2.56)**	0.157	(3.26)***	0.148	(2.69)***
Liquid	-1.312	(-2.12)**	-1.222	(-2.06)**	-1.264	(-2.05)**	-1.206	(-1.89)*
Lott	-0.311	(-1.88)*	-0.304	(-1.86)*	-0.312	(-1.82)*	-0.303	(-1.85)*
IssPE	-0.015	(-3.11)***	-0.015	(-3.04)***	-0.015	(-3.05)***	-0.016	(-3.25)***
UDWR6	0.100	(1.65)*	0.092	(1.58)	0.099	(1.67)*	0.089	(1.52)
AU9	0.171	(2.02)**	0.162	(1.79)*	0.149	(1.78)*	0.150	(1.86)*
UP20	0.286	(1.72)*	0.291	(1.81)*	0.278	(1.57)	0.295	(1.77)*
DOWN20	-0.126	(-0.93)	-0.130	(-0.94)	-0.105	(-0.75)	-0.089	(-0.65)
Ind	Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes	
Adj R^2	0.396		0.398		0.389		0.392	
Prob(F-stat)		0.000		0.000		0.000		0.000

Panel B: Private Firms in Different Areas (n=217)

	(1)		(2)		(3)		(4)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Constant	11.462	(2.97)***	11.280	(2.79)***	11.136	(2.89)***	11.283	(3.31)***
INST_V	-0.023	(-4.60)***						
Credit			-0.058	(-2.28)**				
Legal					-0.044	(-5.48)***		
Gov							-0.054	(-2.01)**
Asset	-0.425	(-1.92)*	-0.420	(-1.87)*	-0.419	(-1.88)*	-0.424	(-2.02)**
ROA	-2.407	(-1.93)*	-2.377	(-1.90)*	-2.350	(-1.93)*	-2.329	(-1.84)*
Lev	0.136	(0.17)	0.199	(0.24)	0.083	(0.10)	0.145	(0.18)
Growth	-0.006	(-0.10)	-0.011	(-0.17)	-0.008	(-0.12)	-0.010	(-0.14)
Age	-0.020	(-1.51)	-0.019	(-1.54)	-0.020	(-1.42)	-0.019	(-1.37)
Length	0.006	(1.79)*	0.006	(1.69)*	0.006	(1.83)*	0.006	(1.76)*
Issue	-0.008	(-0.03)	-0.011	(-0.04)	-0.017	(-0.06)	0.013	(0.06)
Liquid	0.097	(0.19)	0.065	(0.11)	0.189	(0.36)	0.130	(0.25)
Lott	-0.955	(-4.45)***	-0.923	(-4.61)***	-0.987	(-4.46)***	-0.971	(-4.46)***
IssPE	0.010	(2.66)***	0.009	(2.51)**	0.011	(2.95)***	0.011	(2.76)***
UDWR6	0.026	(0.46)	0.015	(0.29)	0.040	(0.65)	0.009	(0.16)
AU9	0.039	(0.63)	0.046	(0.62)	0.031	(0.53)	-0.016	(-0.27)
UP20	0.320	(1.21)	0.305	(1.19)	0.339	(1.25)	0.331	(1.32)
DOWN20	0.568	(11.59)***	0.570	(10.44)***	0.565	(10.75)***	0.624	(11.70)***
Ind	Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes	
Adj R^2	0.546		0.548		0.544		0.540	
Prob(F-stat)		0.000		0.000		0.000		0.000

Table 20 Robust Regression Results for Considering Regional Economic Development (n=617)

This table provides the regression results for the following model:

$$Y1d_{it} = \alpha_0 + \alpha_1 INST_{it} + \alpha_2 SOE_{it} + \alpha_3 GDP_{it} + \sum_{j=1}^{J} \beta_j ControlVariable_{jit} + \varepsilon_{it} \qquad (6)$$

where *Y1d* is the market adjusted IPO first-day return; *INST_V* is the overall value of the institutional environment that equals the sum of the *Legal*, *Credit* and *Gov* sub-index scores from the NERIIM; *INST_D* is an institutional environment dummy variable that takes a value of 1 if the IPO firm is in the "good" region, and 0 otherwise; *SOE* is the state-owned enterprise dummy variable and *GDP* is the gross domestic product value in the IPO year for the province where the IPO firm is registered. *Asset* is the firm size. *ROA* is the return on assets. *Lev* is the leverage ratio. *Growth* is the average sales growth. *Age* is the history of the firm. *Length* is the number of days between listing date and issue date. *Issue* is the number of shares issued (in 100 million shares). *Liquid* is the percentage of the tradable shares to the number of shares outstanding. *Lott* is the IPO lottery ratio. *IssPE* is the issuing P/E Ratio. *UDWR6* is the underwrite quality dummy variable that equals 1 if the underwriter is among the top six underwriters, and 0 otherwise. *AU9* is the audit quality dummy variable that equals 1 if the auditor is among the top nine auditing firms, and 0 otherwise. *UP20* and *DOWN20* are the bull and bear market sentiment dummy variables before the IPO, respectively. The model is estimated using the clustered standard errors tests of Petersen (2009). ***, ** and * indicate that the t-test statistics are significant at the 1%, 5% and 10% levels, respectively.

	(1)		(2)		(3)		(4)		(5)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Constant	11.743 (7.87)***		11.053 (8.30)***		11.622 (8.21)***		11.205 (8.11)***		11.528 (7.80)***	
INST_V	-0.026 (-3.12)***									
INST_D			-0.158 (-1.97)**							
Credit					-0.072 (-2.93)***					
Legal							-0.030 (-1.98)**			
Gov									-0.049 (-1.98)**	
SOE	0.105 (3.19)***		0.119 (3.03)***		0.108 (3.29)***		0.107 (3.16)***		0.125 (3.48)***	
GDP(%)	-0.003 (-1.38)		-0.004 (-1.72)*		0.005 (1.76)*		-0.005 (-1.35)		-0.004 (-1.41)	
Asset	-0.443 (-6.75)***		-0.432 (-6.86)***		-0.442 (-6.87)***		-0.432 (-6.86)***		-0.438 (-6.78)***	
ROA	-2.025 (-2.22)**		-1.932 (-2.07)**		-1.995 (-2.17)**		-1.980 (-2.20)**		-2.001 (-2.17)**	
Lev	0.539 (2.58)***		0.541 (2.39)**		0.605 (2.73)***		0.491 (2.50)**		0.531 (2.42)**	
Growth	-0.063 (-1.44)		-0.073 (-1.50)		-0.068 (-1.44)		-0.070 (-1.48)		-0.072 (-1.48)	
Age	-0.007 (-1.33)		-0.007 (-1.47)		-0.007 (-1.32)		-0.007 (-1.26)		-0.005 (-0.96)	
Length	0.000 (-0.16)		0.000 (-0.22)		0.000 (-0.13)		0.000 (-0.16)		0.000 (-0.20)	
Issue	0.044 (3.62)***		0.040 (3.23)***		0.045 (3.57)***		0.042 (3.55)***		0.041 (3.45)***	
Liquid	-0.920 (-1.79)*		-0.802 (-1.63)		-0.875 (-1.75)*		-0.825 (-1.65)*		-0.793 (-1.55)	
Lott	-0.333 (-1.84)*		-0.333 (-1.83)*		-0.329 (-1.86)*		-0.332 (-1.79)*		-0.327 (-1.80)*	
IssPE	-0.007 (-1.17)		-0.007 (-1.19)		-0.008 (-1.18)		-0.007 (-1.10)		-0.007 (-1.15)	
UDWR6	0.083 (1.47)		0.060 (1.12)		0.074 (1.41)		0.078 (1.38)		0.064 (1.19)	
AU9	0.118 (2.33)**		0.070 (1.29)		0.123 (1.93)*		0.078 (1.67)*		0.061 (1.36)	
UP20	0.303 (2.81)***		0.314 (2.77)***		0.308 (3.03)***		0.301 (2.55)**		0.313 (2.85)***	
DOWN20	0.026 (0.19)		0.049 (0.35)		0.017 (0.12)		0.045 (0.32)		0.072 (0.50)	
Ind	Yes		Yes		Yes		Yes		Yes	
Year	Yes		Yes		Yes		Yes		Yes	
Adj R^2	0.429		0.423		0.433		0.422		0.422	
Prob(F-stat)	0.000		0.000		0.000		0.000		0.000	

Appendix III Variable Descriptions for Essay 2

Y1d	IPO first-day market adjusted return. $Y1d = P_1/P_0 - I_1/I_0$; P_1 is the closing price of the first trading day, P_0 is the IPO issuing price; I_0 and I_1 are the closing A-share market index price on the IPO issuing day and first trading day, respectively.
Legal	The raw value of the NERIIM Legal Environment Index.
Credit	The raw value of the NERIIM Credit Market Index.
Gov	The raw value of the NERI Government Decentralization Index.
INST_V	The sum score of the Legal, Credit and Gov NERIIM index.
INST_D	Institutional environment dummy variable that takes a value of one if a firm is registered in the "good" region, and zero otherwise.
SOE	State-owned enterprise dummy variable. *SOE* equals to one if the firm is a SOE, and zero otherwise.
Private	Private firm dummy variable. *Private* equals to one if the firm is a private firm, and zero otherwise.
CSOE	Central government supervised SOE dummy variable. Data are collected by hand.
LSOE	Local government supervised SOE dummy variable. Data are collected by hand.
GDP	The gross domestic product value (in billion RMB) for the province where the IPO firm is registered in the IPO year; data are collected from *WIND* database.
FDI	The logarithm of the foreign investment amount of the province of the IPO firm in the IPO year. Data are collected from the *China Data Online* System.
Asset	Firm size, calculated as the logarithmic value of the total assets of the IPO firm.
ROA	The average return on assets over the two years before IPO.
Lev	Financial leverage, calculated as the average of the total debts/total assets ratio over the previous two years before the IPO.
Growth	Growth potential of the firm, Calculated as the average scaled sales (sales/total assets) over the previous two years before the IPO.
Age	The history of the firm, defined as the number of years between the listing date and the established date.
Length	The number of days between IPO issuing date and the listing date.
Issue	IPO issuing size, defined as the number of issuing shares (in 100 million shares).
Liquid	Liquidity ratio, defined as the percentage of the number of the tradable shares to the number of shares outstanding after the IPO.
Lott	The lottery ratio of IPO allocation. Data are collected from the *WIND* database.
IssPE	The IPO issuing P/E Ratio. Data are collected from the *WIND* database.
UDWR6	Underwriter quality dummy variable. *UDWR6* takes a value of one if the underwriter is one of the top 6 underwriters in China, and zero otherwise.
AU9	Auditing quality dummy variable. AU9 equals to one if the auditing firm is among the top 9 auditing firms in China, and zero otherwise.
UP20	Bull market sentiment dummy variable. *UP20* takes a value of one if the annual market sentiment index (*MSI*) return is at or above 20% on the listing date, and zero otherwise. *MSI* Return = Market index price on IPO date/ Market index price one year before IPO.
DOWN20	Bear market sentiment dummy variable. *DOWN20* takes a value of one if the annual market sentiment index (*MSI*) return is at or under -20% on the listing date, and zero otherwise. *MSI* Return = Market index price on IPO date/ Market index price one year before IPO.
Ind	Industry dummy variable according to the industry classification of the *WIND* database.
Year	Year dummy