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THE CREATION AND EVOLUTION OF ENTREPRENEURIAL PUBLIC MARKETS

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ABSTRACT

This paper explores the creation and evolution of new stock exchanges around the world geared towards entrepreneurial companies, known as second-tier exchanges. Using hand-collected novel data, we document the proliferation of these new stock exchanges that were created in a large number of countries, attracted a significant volume of global IPOs, were introduced fairly cyclically, and had lower listing requirements when compared to first-tier stock exchanges. We find that increases in demand for entrepreneurial capital—as proxied for by patenting, IPOs, and stock market valuations—led to a higher likelihood of the introduction of second-tier exchanges. We find no evidence that new second-tier exchanges diverted the existing flow of IPOs from established stock exchanges. Shareholder protection strongly predicted exchange success, even in countries with high levels of venture capital activity, patenting, and financial market development. Second-tier exchanges in countries with better shareholder protection allowed younger, less profitable, but faster-growing companies to raise more capital. These results highlight the importance of institutions in enabling the provision of entrepreneurial capital to young companies.

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An internet appendix is available at http://www.nber.org/data-appendix/w25414

1. Introduction

How does finance contribute to economic growth? Empirical evidence (see Levine, 2005 for a review) suggests that one important channel through which financial development enables growth is through the funding of innovative and entrepreneurial projects, activities that have been long recognized as particularly hard to finance with outside capital (Arrow, 1962). Well-developed public equity markets have shown to be instrumental in filling this financing gap, allowing young and fast-growing companies to fund R&D activities (Brown, Fazzari, and Petersen, 2009; Hall and Lerner, 2010).

Recognizing the importance of entrepreneurial finance, a major focus of financial policymakers around the world has been on the creation of new stock exchanges for young and small-capitalization companies, often characterized by less restrictive listing requirements. Such exchanges, termed second-tier exchanges, have been heralded in many places as a way to promote the creation, financing, and retention of job-creating new ventures.[2] Anecdotally, while there have been some highly visible successes (such as NASDAQ in New York, London's Alternative Investment Market, and the Shenzhen-based ChiNext market), there have been many more failures (such as EASDAQ). We describe two such cases in Section 3.

[2] Recent examples from Saudi Arabia, Trinidad and Tobago, India, and China include "New Saudi SME stock market surges on first day," http://gulfbusiness.com/new-saudi-sme-stock-market-surges-first-day/, February 20, 2017; Leah Soriasand, "CinemaONE first up on SME market," https://www.trinidadexpress.com/business/local/cinemaone-first-up-on-sme-market/article_dd89dca0-f29d-11e8-aa09-3f220ed53323.html, November 27, 2018; "BSE creates new division for listing of startups," November 28, 2018, https://www.livemint.com/Companies/BEFgjhFC1Zupl2hIB5CrYK/BSE-creates-new-division-for-listing-of-startups.html; and Zhang Yu, Liu Caiping, Qu Yunxu and Fran Wang, "Shanghai's New High-Tech Board to Lower Profitability Requirements, Draft Rules Say," https://www.caixinglobal.com/2018-12-10/the-proposed-high-tech-board-will-lower-the-requirements-on-candidate-companies-profitability-but-it-will-not-directly-accept-biotech-firms-that-have-not-had-any-income-a-market-participant-close-to-the-shanghai-stock-exchange-told-caixin-101357510.html, December 10, 2018.

Despite the energy devoted by securities regulators to these efforts, there has been very few systematic explorations in the finance literature of the determinants of the creation and success of new exchanges geared towards entrepreneurial firms. Among the few exceptions have been Vismara, Paleari, and Ritter's (2012) examination of the listing decision of firms in the four largest European economies in the period from 1995 to 2009 and Aggarwal and Angel's (1999) clinical study of the Amex Emerging Company Marketplace during the 1990s. This neglect is particularly striking in light of the interest in trends in global equity markets. Doidge, Karyoli, and Stultz document that the number of listed companies in the U.S. has dropped by more than half in the past two decades (2017), driven in large part by the declining share of American companies going public (2009, 2013). This reduced propensity to undertake an initial public offering (IPO) appears to be particularly concentrated among smaller firms in the U.S., as documented by Gao, Ritter, and Zhu (2013).

In this paper, we seek to understand the drivers of the creation and success of new second-tier markets, focusing specifically on the role of countries' legal provisions for shareholder protection. Second-tier markets typically allow small market-cap entrepreneurial firms to raise capital by lowering their listing requirements, as we show below. However, lower listing requirements increase adverse selection concerns and the risk that investors may be expropriated by the entrepreneur. Following La Porta et al. (2002, henceforth LLSV), we hypothesize that when minority shareholder rights are better protected by the law, investors should be more willing to provide capital to firms on exchanges with low listing requirements, as the risk of expropriation will be mitigated. Thus, stronger shareholder protection may increase the willingness of shareholders to invest in new listings and the valuations that they assign to these firms. This greater willingness will, in turn, attract more entrepreneurs to list their companies in the market. We

hypothesize that stronger shareholder protection may attract more entrepreneurs and investors to a newly formed second-tier exchange, and thus increase the likelihood of market introduction and ultimate success.

To explore this hypothesis, we construct a novel dataset that covers 281 stock exchanges across 113 countries. We find that since 1990, there were 78 new second-tier exchanges that were introduced with the aim of facilitating capital flows to entrepreneurial companies. Our analysis begins in 1990, reflecting the greater coverage of IPO activity in that year, and ends in 2013 to ensure that we have at least four years of data to evaluate the success of the exchanges.

To construct this data, we combine information from the Bloomberg, Capital IQ, and SDC databases with that from the *International Encyclopedia of the Stock Market*, annual editions of the *World Stock Exchange Factbook*, and direct contacts with the exchanges and knowledgeable local academics and practitioners. We gather information on the exchanges' creation and listing requirements, as well as the details of any incumbent exchanges in these countries. Finally, we supplement these data with information on the exchanges' listed firms.

Using this unique dataset, we first document the proliferation of second-tier stock exchanges around the world over the past three decades. Summary statistics suggest that these new stock exchanges were introduced in a large number of countries, attracted a significant volume of IPOs (although much less in terms of value, due to the smaller size of their listed firms), and appeared fairly cyclically. We confirm that second-tier exchanges indeed had lower listing requirements when compared to first-tier stock exchanges. Finally, consistent with our hypothesis above, we find that such exchanges were more likely to be introduced in in countries with stronger shareholder protection.

Given the importance of second-tier exchanges in global IPO markets, we examine more systematically several key questions about these markets. The first of these concerns the key triggers that lead countries to establish second-tier exchanges. We find that, within a country, increases in demand for entrepreneurial capital—as proxied for by patenting, IPOs, and stock market valuations—lead to an increased likelihood of introducing second-tier exchanges. While more shareholder protection is associated with a greater probability of creating exchanges in general, differing levels of protection do not generate significantly different sensitivity in most cases to these factors.

The previous question raises a related issue: does a new second-tier exchange divert the existing flow of IPOs from established stock exchange(s) in the country? In other words, does a new second-tier exchange serve a different segment of the market, or there is a substitution between the new market and the incumbent first-tier exchange? We find no evidence of a substitution effect following the introduction of a second-tier exchange, neither in terms of the flow nor the composition of IPOs listed on existing first-tier exchanges. The newly introduced exchanges seem to cater to a different segment of firms and investors in the economy.

Third, we explore the drivers of the success of second-tier exchanges. We find that shareholder protection strongly predicts a robust new market. Even in countries with high levels of venture capital activity, much patenting, broad availability of private credit, and high stock market valuations (all of which are also associated with more successful new exchanges), we find that shareholder protection remains a key predictor of success.

Finally, we analyze the mechanisms behind the seeming importance of shareholder protection to the success of these second-tier exchanges. We find that new second-tier exchanges in countries with better shareholder protection allow younger and less profitable companies to raise

more capital. This result is consistent with the notion that better shareholder protection mitigates risk of expropriation, allowing investors to invest in riskier firms. Indeed, these companies subsequently grow more quickly. Interestingly, we find that the listing requirements of the new second-tier exchanges in nations with high and low shareholder protection are similar, with an eye to attracting more entrepreneurial companies. But countries with better shareholder protections are able to attract offerings from younger firms, despite the fact that they do not have lower listing requirements.

Taking stock, these results suggest the importance of institutions in enabling the provision of entrepreneurial capital to young companies. Second-tier markets in countries with weaker investor protection seem less able to attract investors in the kind of high-risk, high-growth firms that the markets are intended to promote. Anticipating these difficulties, fewer exchanges are created under these circumstances.

Our findings are consistent with the broader literature on law and finance, particularly the subset of works that examine the impact of legal conditions on entrepreneurial finance. For instance, the law and finance literature has highlighted the greater success of markets in common law nations and those with greater investor protection (e.g., LLSV, 1998, 1999, 2002). Lerner and Schoar (2005) document that private investments in common law nations are structured similar to those in the U.S., but differ considerably in those with French and other legal origins, and that investors in common law nations enjoy substantially greater success. Lerner et al. (2018) show that in nations where the legal barriers to entrepreneurship are greater, entrepreneurs appear to hold back from approaching angel groups until later in their development and, even then, ask for a smaller amount of funds.

The remainder of the paper proceeds as follows. Section 2 presents a conceptual framework. The two case studies alluded to above are summarized in Section 3. Section 4 describes the collection of information on the newly established stock exchanges. In Section 5, we provide a first look at the data and describe several novel stylized facts about these stock exchanges around the world. Section 6 explores the key determinants that lead to the creation of new second-tier stock exchanges, and Section 7 the drivers of second-tier market success. In Section 8, we characterize the firms listed on the new second-tier stock exchanges. Section 9 concludes the paper.

2. Conceptual Framework

Stock exchanges play a variety of roles, including creating a forum for the execution of transactions, facilitating the clearing and settlement process, and providing a transparent record of transaction prices. Exchanges also provide a certification and monitoring function to ensure investors that the issuing company is of high quality and to mitigate concerns about the expropriation of shareholders through, for example, insider trading, price manipulation, or tunneling assets. A reduced risk of expropriation enhances the willingness of investors to provide capital to listed firms and to assign high valuations.

One of the central ways through which exchanges can screen the quality of listed firms and reduce the risk of investor expropriation is through the imposition of listing requirements. These requirements typically limit firms traded on an exchange to companies with a sufficient track record of operations and profitability, as well as a minimum scale (e.g., level of assets) and level of disclosure.

For example, a firm aspiring to list on the New York Stock Exchange in 2018 must have a minimum of 1.1 million shares outstanding, with a minimum aggregate market value of $40

million. In addition, the company must have aggregate pre-tax earnings of $10 million over the past three years, with at least $2 million in each of the preceding two years. This minimum profitability requirement precludes many fledgling high-tech companies, which often are not profitable at the time of going public, from listing on the NYSE.

Indeed, higher listing requirements can reduce the extent of information problems about firms and their management. Enterprises with a proven track record of success are likely to have reduced uncertainty, information asymmetries, and risk of investor expropriation. Johnson (2000) discusses the early history of the Neuer Markt, and argues that its stringent listing and disclosure requirements attracted investors and "allow[ed] relatively young technology-based firms to go public in Germany for the first time."

On the other hand, high listing requirements can be problematic for entrepreneurial firms. Venture-backed companies are frequently unprofitable, not just at the time that they go public, but for several years thereafter (see the data, for instance, in Table 2 of Cao, Jiang, and Ritter, 2015). Moreover, tests based on the book value of assets or shareholders' equity will not capture the intangible capital that is the key asset for many technology and biotech firms. To accommodate high-growth entrepreneurial companies, second-tier exchanges typically have lower listing requirements despite adverse selection concerns, as we illustrate empirically below.

Following the "law and finance" literature, and LLSV (2002) in particular, we explore the role of country-level legal institutions that are meant to provide shareholder protection. Such legal rules aim to protect shareholders against the misuse of corporate assets, provide governance safeguards, and enhance corporate transparency.

We hypothesize that when shareholder rights are better protected by the law, investors should be more willing to provide capital to firms on exchanges with low listing requirements, as

the risk of expropriation will be mitigated. Thus, stronger legal shareholder protection may increase the willingness of shareholders to invest in new listings, as well as the valuations that they assign to these firms. This greater willingness will, in turn, attract more entrepreneurs to list their companies in the market. This brings us to the first two hypotheses in the paper:

H1: Countries with stronger shareholder protection are more likely to introduce second-tier markets.

H2: Conditional on the introduction of a second-tier market, countries with stronger shareholder protection will attract more listed companies, and more capital will be raised.

If the previous two hypotheses hold, we expect to find that in countries with legal regimes that provide stronger shareholder protection, companies listed in the new second-tier markets will be riskier. This risk will be captured by measures such as lower profitability, younger age, and higher growth. Moreover, we anticipate that such firms will be able to raise more capital. In other words, second-tier exchanges will allow more entrepreneurial companies to raise capital.

H3: Second-tier exchanges in countries with stronger shareholder protection will attract riskier companies that will raise more capital.

Finally, a natural question relates to the impact of a second-tier exchange on the flow of IPOs to main exchanges within the same country. Is there a substitution of IPOs from the main boards to the second-tier exchange? If the previous hypotheses hold, we expect that the second-tier exchanges would attract companies that could not previously list in existing stock markets due to the high listing requirements. This leads to the following hypothesis:

H4: The introduction of second-tier exchanges does not affect the flow and composition of IPOs in existing stock exchanges within the same country.

In the analysis below, we explore whether these hypotheses hold.

3. Case Studies

In this section, we discuss the cases of two second-tier markets, ChiNext and the European Association of Securities Dealers (EASDAQ).[3] EASDAQ was introduced in 1996 as a pan-European exchange, but struggled to gain traction and failed after the dot.com crash of 2000-01. ChiNext was created in 2010 as a subsidiary of the Shenzhen Stock Exchange, and despite volatility in valuations and stock prices, has proven a robust home for new listings of entrepreneurial firms. While the outcomes of the two market development efforts were quite different, as well as many of the macroeconomic and regulatory conditions, several insights emerge from the cases:

- *The desire to boost entrepreneurial and venture capital activity*. The key motivation in establishing these exchanges was that such a stock market might facilitate high-growth companies, as well as the intermediaries that support them. The establishment of these exchanges also was triggered by concerns that the absence of a dedicated market was leading such firms to list offshore.
- *The tradeoff between inclusiveness and investor protection*. Both exchanges sought to list entrepreneurial companies, which would otherwise be precluded from going public by the requirements of the incumbent exchanges. Of particular concern were rules regarding profitability, length of operations, and size. At the same time, they sought to reassure investors about the quality of the listed companies. ChiNext's approach was particularly interesting, as it sought to prohibit bad management behavior by, among other steps,

[3] We provide detailed discussion of these cases in Internet Appendices A and B.

limiting insiders' access to the IPO proceeds, extending the lock-up period, and facilitating delistings.

- *The interplay between exchange designers and regulatory officials*. While both exchanges were nominally independent entities, in each case the involvement of government officials was important in their design. The EASDAQ exchange architects actively cultivated the support of the European Union and national policymakers, whose support gave greater gravitas to the effort and helped overcome some of the barriers to a trans-national market. The ChiNext effort dependent critically on the ability to get authorization to proceed from the China Securities Regulatory Commission.
- *The role of critical mass in exchange success*. Both teams of market designers sought to establish these exchanges as the dominant market for high-growth companies. They were motivated by the perception that market depth would translate into greater liquidity and market efficiency, as well the certification that a listing in the dominant national or regional exchange would provide to portfolio firms. The success of the two exchanges in achieving this goal differed markedly: while ChiNext was the only such market authorized to operate in the People's Republic of China, and thus was able to attract a large number of Chinese companies that did not meet the requirements for the main boards of the Shenzhen or Shanghai exchanges, EASDAQ soon faced competition from a bevy of national exchanges across Europe.

4. The Construction of the Data Set

In this section, we turn to our large-sample systematic analysis of second-tier stock exchanges, describing the various sources we utilize to construct a novel data-set on exchanges, listed firms, and countries.

Exchange-level data

We obtained our list of exchanges from five sources: (1) Securities Data Company (SDC) Platinum Global New Issues database, (2) the IPO data in the Bloomberg database, (3) the IPO data in the S&P Capital IQ's database, (4) the *International Encyclopedia of the Stock Market*, and (5) annual editions of the *World Stock Exchange Factbook* between 1997 and 2015. Using these sources, we collected a list of 431 exchanges. We gathered the country of the exchange, the entry and exit year of the exchange, and any mergers and acquisition dates from the *Factbook*, *Encyclopedia*, and various internet sources, as well direct contacts with the exchanges and knowledgeable local academics and practitioners.

We dropped 18 exchanges for which we could not find any information on the country of the exchange. We further consolidated 83 exchanges which had multiple entries in our data because of variation in names (e.g., the Poona Regional Stock Exchange and Pune Stock Exchange Limited) and name changes (e.g., the Cincinnati Stock Exchange was renamed the National Stock Exchange in 2003). Of these remaining 330 exchanges, we consolidated 45 exchanges because of name changes due to mergers and acquisitions,[4] leaving us with 285 exchanges in 113 countries. Since the coverage of our data sources becomes significantly better after 1990, in our analysis we

[4] When an exchange was acquired by another exchange and continued to be operational under a different name, we consolidated the two entries in our data. For example, the American Stock Exchange (AMEX) was acquired by NYSE Euronext in 2008 to create NYSE Alternext US (which was subsequently renamed as NYSE Amex Equities and later as NYSE MKT LLC). In our database, all of the four entries were treated as one exchange. If after a merger, only one of the involved exchanges remained operational, we assumed that the exchange that was more active—determined by the IPO count—in the five years before the merger continued to operate while the less active exchange went out of business.

focus on stock exchanges that were introduced between 1990 and 2013. This leaves us with a final sample of 147 unique new exchanges in 78 countries. Table A1 in the Internet Appendix lists the exchanges.

There are a number of exchanges for which we could not find the exact entry year. In such cases, we considered the year before the first IPO on the exchange as the entry year. Similarly, in cases in which we did not have explicit exit year of the exchange, we defined it as the two years after the year of the last IPO. Table A1 also lists the entry and exit years of the exchanges. The results of our analysis are not sensitive to these assumptions.

We classified exchanges based on whether they were a first-tier or second-tier exchange. We defined an exchange as a second-tier exchange if the exchange explicitly noted it is targeting entrepreneurial high-growth companies.[5] Many exchanges in their mission statement clearly stated what kind of companies they were geared towards. If this information was not available on the exchange website, we looked for news articles in LexisNexis and on the web to see if the exchange was described as being geared towards smaller companies. We also examined the historical version of the stock exchanges' websites using archive.org. Table A1 also lists the tier of the exchanges. We erred on the side of conservatism, not including, for instance, regional exchanges (especially common in India and the U.S.) as second-tier exchanges unless they explicitly announced such a mission. In total, we ended up with 69 new first-tier and 78 new second-tier exchanges. In no cases did a nation without an active first-tier exchange introduce a second-tier one.

The final characteristics of the exchange that we collected were the listing requirements based on the first few years of operation. We collected listing requirements across 16 categories, such as the minimum asset size of listed companies, the minimum number of years for which the

[5] Some of the keywords associated with second-tier exchanges were those geared toward small, high-growth, young, and technological firms, as well as small- and medium-sized enterprises and small- and medium-sized business.

companies had to be profitable, the minimum amount of paid-up capital, and the minimum amount of companies' equity owned by the public, among others. We provide the complete description of listing requirements we gathered in Table A2 of the Internet Appendix.

Panel A of Table 1 compares the listing requirements of the new first-and second-tier exchanges in the sample. We are not able to obtain these requirements for all new exchanges. If an individual listing requirement is not specified, we assume that the exchange did not have that requirement and assign it a value of zero. For example, first-tier exchanges with a restriction on the minimum number of years of operation require on average 2.96 years before the IPO, while second-tier exchanges require 2.00. After we assign the number of required years to be to zero for exchanges without such requirements, the levels are 1.67 and 0.90. (The latter are the numbers reported in Panel A.) All requirements with amounts in local currencies were converted to 2010 U.S. dollars using historical exchange rates and the U.S. GDP deflator. As the panel reveals, the new first-tier markets consistently have more rigorous listing requirements.[6]

IPO Sample

We obtained our IPO data from the Bloomberg, Capital IQ, and SDC Platinum databases. We describe our procedure briefly here, which sought to replicate the IPO samples typically used in the finance literature; Table A3 in the Internet Appendix provides more details.

SDC was our largest source for IPO data. We started with 255,312 common stock offerings from January 1973 to August 2018. We dropped offerings before 1990 and after 2017, secondary offerings, and IPOs that were withdrawn, rejected, or postponed. We also dropped ADRs, unit offerings, offers with warrants, closed-end funds, and REITs. In addition, we excluded spin-offs,

[6] In unreported analyses, we show the same patterns hold when we compare the listing requirements of the new second-tier exchanges to those of older first-tier exchanges.

investment trusts, private placements, and financial firms. We finally dropped offerings if the firm had zero or missing global proceeds across all markets. Overall, we are left with 33,615 unique IPOs.

We also identified 54,928 transactions in the Bloomberg database. We then applied similar screens. After these filters, we had 19.615 IPOs remaining from Bloomberg. Finally, we started with 30,485 IPO transactions from Capital IQ database. We excluded a total of 17,129 transactions using similar criteria. We were left with 13,356 transactions from Capital IQ.

Many of these transactions were duplicated across the databases. Using Capital IQ identifiers, we matched the Bloomberg and Capital IQ database to get a total of 22,315 unique IPOs. We matched these with the transactions from the SDC database and ended up with a grand total of 40,123 IPOs across 210 exchanges issued from 1990 to 2017, including those on exchanges established both before and after 1990.[7]

Panels B and C of Table 1 compare the level of activity of the first- and second-tier exchanges, looking first at all exchanges active between 1990 and 2013, and then at markets introduced during this period. We see few differences in the number of IPOs on these exchanges. The first-tier exchanges had offerings which raised significantly greater proceeds (in millions of 2010 U.S. dollars). The first-tier exchanges also had considerably greater longevity. Strikingly, by the end of 2017, 64 of the 78 new second-tier exchanges were no longer active.

Company-level data

[7] Some young firms are cross-listed on multiple exchanges. Conversations with practitioners suggest that these cross-listing are typically done subsequent to an IPO. Even in cases where firms went public on multiple exchanges, the databases we employ identified a primary exchange, which we used in this analysis.

Our IPO sample had Capital IQ identifiers that we used to get the information from that database. We collected the equity market capitalization of the companies, which we define as the product of price per share and the total number of shares outstanding at the end of the calendar year. We also collected total assets, earnings before interest, taxes, depreciation and amortization (EBITDA), total revenues, and gross profit (total revenues – cost of revenues) at the end of the calendar year for the companies.

Country-level data

In our analysis, we explore how the creation of second-tier exchanges and their performance is associated with the level of investor protection. To do so, we used the 2017 edition of the World Bank's *Doing Business - Protecting Minority Investors* database. The data are based on a questionnaire administered to corporate and securities lawyers and explore the extent to which shareholders may be protected against misuse of corporate assets, based on their shareholder rights, governance safeguards, and corporate transparency requirements. The index is on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier. For example, a score of 75 means an economy was 25 percentage points away from the highest protecting minority score.

We also collected information about countries' financial development. To measure the domestic credit to the private sector, we used the World Bank's Financial Sector Database for the years 1990 to 2017. This measures non-equity securities provided to the private sector by financial institutions. The data are taken from the survey of financial corporations and are included in the International Monetary Fund's (IMF) *International Financial Statistics*. To measure the market

capitalization of listed domestic companies, we summed the share price times the number of shares outstanding for listed domestic companies in each country in a given year.

We gathered the total number of patent applications filed annually by the country of residence of the applicant from the World Intellectual Property Organization's (WIPO) Intellectual Property (IP) Statistics database. The number of patent applications includes both resident filings (patents filed in the home nation), as well as filings in other offices (patents filed internationally either directly or via regional IP offices and the WIPO-administered Patent Cooperation Treaty (PCT) system).[8]

We gathered country-level venture capital investment data from two sources. First, we obtained information from various national and regional associations. These organizations routinely gather data on venture capital investments and can be expected to be of high quality, due to their close ties to the members. Unfortunately, these data have two substantial limitations. First, in much of the world, these associations are quite new, and have only recently began tracking venture investments. Second, in some cases, the groups use differing methodologies.[9]

Consequentially, we also use SDC Platinum's VentureXpert data (other databases seemed to have limited global overage in the 1990s especially). The data includes 315,310 transactions with an average of 2.15 investors per deal. We remove transactions with missing total investment

[8] An application filed at a regional IP office is counted multiple times, according to the number of its members. This method applies to all regional offices where the filing has an immediate legal effect in all member states. For example, Eurasian Patent Organization has eight members: hence an application to this regional office counts as eight applications. Applications to two patent regional offices, the European Patent Office and African Regional Intellectual Property Organization, are not equivalent to filing in all their member states. Rather, the applicant has to list the member states where the patent will be enforced (and pay fees scaled accordingly). This information is not available to WIPO, so it counts one application originating from their member states as one resident filing plus one abroad filing, and counts one application originating from non-members as one abroad filing only. International applications can also be filed via WIPO's PCT system. Such applications are counted multiple times according to the number of member countries the applicant wants the patent to be enforced in.

[9] For instance, Invest Europe compiles investment activity by the headquarters of the fund (rather than the funded firm, as is standard elsewhere). This leads to misleadingly large activity in Great Britain, which many funds use as a base for doing investments across Europe.

value, or transactions classified as Buyout, Fund of Funds, Generalist Private Equity, Mezzanine, Other Investor (Non-Private Equity), Other Private Equity, and Real Estate. Overall, we were left with a final deal count of 156,165 transactions. We summed the venture capital investment by the country of the company and year of investment. Table A4 in the Internet Appendix summarizes the methodology used.

We used these two sources to construct a measure of venture capital investment as a share of GDP. Of 3,164 country-year observations, 1,658 country-year observations had no data from either source. We assumed that they had zero venture capital investments (or a nominal sum, when we take logarithms). Of 1,506 observations where we have non-zero investments, 119 were sourced exclusively from the associations. In the 813 observations where we had data from both sources, we used the investments from SDC. All investments amounts were then converted to millions of constant 2010 U.S. dollars using the U.S. GDP deflator.

We used the data from LLSV, 1999 (last updated in 2013) to classify countries as having common and civil legal origins. We obtained annual data on population (in millions) and GDP (Purchasing Power Parity-adjusted in millions of 2010 U.S. dollars) from the Economist Intelligence Unit database.

We use the country of incorporation data from Capital IQ to classify whether a company was domestic or foreign from the perspective of the exchange where it had its IPO. 5.8% of the companies do not have the country of incorporation data. For these cases, we use country of headquarters to determine whether they are foreign or domestic.

For all our country-level analyses, we made the following country consolidations, due to limitations in the way that certain data were reported: entries that list British Virgin Islands and Channel Islands were included under the United Kingdom, the Netherlands Antilles was included

under the Netherlands, Serbia and Montenegro[10] were included under Serbia (bigger of the two countries), and Taiwan and Hong Kong were included under China.

5. A First Look at the Data

In this section, we describe the distribution of exchanges and their success in attracting IPOs. We highlight several stylized facts:

1. *The introduction of new second-tier markets is intensely cyclical*. Figure 1 looks at the introduction of new exchanges over time. Panel A highlights how the creation of new markets had peaks in 1996, 2000, and 2008. The relatively slower pace of exchange creation after 2000 is also clear.

2. Second-tier markets are the majority of new exchanges. The figure also presents the breakdown of the 147 new markets between first- and second-tier exchanges. Second-tier exchanges made up over half (78) of the new markets over the entire period.

3. *European and emerging market exchanges dominate the new exchanges*. Panel B of Figure 1 looks at the geographic distribution of these new markets. The extent to which the number of new exchanges was dominated by those in Europe, Asia outside of China, and elsewhere in the world is apparent. The small number of new markets in the U.S. has been dominated by second-tier exchanges, including the American Stock Exchange's Emerging Company Market Place, NASDAQ's Portal, and the New York Stock Exchange's Arca (formerly the Archipelago Exchange).

[10] All the companies in VentureXpert from either Serbia or Montenegro were founded before 2006 (when Montenegro gained independence from Serbia and Montenegro). VentureXpert lists Serbia and Montenegro as the domestic country for these companies.

4. IPOs are highly cyclical as well. Figure 2 looks at the distribution of IPOs across these markets from 1990 to 2017. (Here we look at all offerings, regardless of whether they occurred on new exchanges or not.) Panel A looks at the aggregate count of offerings, which was highly cyclical, though less dramatically so than, for instance, the time series of U.S. offerings documented by Ritter and Welch (2002).

5. *Second-tier markets account for many offerings, but a smaller share of the IPO proceeds*. The share of offerings on second-tier markets, having been above one-half for much of the 1990s, declined somewhat in the 21st century, but still remained substantial. In total, there were 25,406 and 14,367 IPOs in the first and second-tier exchanges respectively. Panel B looks at IPO activity measures using proceeds from these offerings, rather than the count of IPOs (in billions of constant 2010 U.S. dollars). While second-tier markets hosted 36% of all the IPOs by number, the picture is very different when using dollars raised, reflecting the fact that first-tier markets hosted the bulk of the large IPOs. A total of $3,494 billion (in 2010 U.S. dollars) was raised in first-tier exchanges between 1990 and 2017, while a fifth of that, $658 billion, was raised in second-tier exchanges over the same period. The mean proceeds raised of IPOs annually across the globe was $120 billion and $22 billion (again in 2010 U.S. dollars) in active first- and second-tier exchanges respectively.

6. *The geographic patterns of IPOs on first- and second-tier markets are quite different*. In Figure A1 in the Internet Appendix, we look at the geographic location of the IPOs. The share of offerings that are in the U.S. in first-tier markets has fallen sharply, reflecting both the rise of Chinese IPOs in the post-crisis years and the more general rise of offerings in the rest of the world. Of the IPOs on first-tier exchanges, 9% were in the U.S., 23% in China, 34% in Asia outside of China, 20% in Europe and 14% in the rest of the world. Among second-tier markets, the U.S. (and

NASDAQ in particular) remains pre-eminent. The decline of second-tier offerings since the 1990s is consequentially due to the reduction of IPOs in the United States and from Asia outside of China (especially India). Of the IPOs on second-tier exchanges, 43% were in the U.S., 5% in China, 27% in other Asian nations, 10% in Europe, and 15% in the rest of the world. Table A5 in the Internet Appendix lists the countries in each region in our data.

7. *The typical exchange had few offerings.* In Figures A2 and A3 in the Internet Appendix, we show that the median annual number of offerings on each new (and still active) exchange was quite modest, only one or two in most years (if there is any activity at all). The mean number of offerings was substantially larger, reflecting the skewed distribution of IPOs. This is particularly true for second-tier exchanges. In unreported analyses, we show that the relative size of the median second-tier offering was anomalously high in the second half of the 1990s. But both before and after that date, the median offering was much smaller than that of the IPOs on first-tier markets.

8. *New exchanges are where a large fraction of IPOs are listed.* Figure 3 also looks at all exchanges established between 1990 and 2013. We look at the fraction of all IPOs and total proceeds from new first- and second-tier markets. Panel A suggests a rising share (with a few intermediate dips) of offerings in these new exchanges until 2008, reaching to close to 60% of the global IPO volume. This increase was largely fueled by the increasing activity at exchanges in emerging economies. When we look at proceeds in Panel B, the peak level of IPOs was 2008-09, when over half of total capital was raised in new exchanges formed between 1990 and 2013.

9. *New second-tier exchanges represent a significant share of IPOs on new exchanges, though the share has fallen in recent years.* Figure 4 looks specifically at new second-tier exchanges. The share of offerings (Panel A) relative to those on all new exchanges was quite high,

with peaks in 1995 and 2005, reaching to close to 70%. The share of proceeds in Panel B from these exchanges was more modest, and fell notably since 2008.[11]

10. *There are substantial differences between nations that introduced second-tier markets and those that did not*. Finally, Panel D of Table 1 compares whether countries that did and did not establish new second-tier exchanges between 1990 and 2013. This analysis presents the summary statistics for the 48 countries that did and 65 countries that did not establish a new second-tier market during this period (but had at least one active first- or second-tier market). The countries that did so were larger and wealthier. They were also more innovative, as measured through patenting and venture capital activity, and had more developed financial markets (as measured by the ratios of equity market capitalization and domestic private credit to GDP). Finally, they had stronger shareholder protections and were less likely to have civil law origins.

The picture so far is one where new markets have had mixed success in promoting entrepreneurial offerings. On the one hand, the number of markets introduced—especially second-tier ones—was large, with a pattern that has mirrored market cycles. Numerous IPOs have been listed on the exchanges. On the other hand, the median second-tier market has only had a handful of new listings annually, and these are overwhelmingly smaller offerings in terms of proceeds. The share of offerings on new exchanges peaked in the first decade of the 2000s, and declined thereafter.

6. The Determinants of Second-Tier Market Creation

[11] In Figure A4 in the Internet Appendix, we show the corresponding activity on new exchanges measured as a function of all IPOs; in Figure A5, we do similar calculations, defining new exchanges as those that have been formed in the past five years.

In this section, we start by exploring which countries were more likely to introduce second-tier exchanges, as well as the particular timing when these exchanges were introduced.

In Table 2, we look at the correlation of investor protection with the tendency to introduce a second-tier stock exchange. We anticipate that stronger investor protection would be associated with a greater willingness to introduce second-tier exchanges. The regression analyses use a simple cross-section of the 113 countries that had at least one active stock exchange between 1990 and 2013. The dependent variable in this section is always one or zero, depending on whether or not the country established a second-tier stock exchange between 1990 and 2013. We gradually add controls for the GDP of the nation, population, and regional fixed effects. These control variables are defined in 1990, or the first year available for our data.

In column (1), we find that the coefficient of high shareholder protection equals to 0.299 and the effect is highly statistically significant. This implies that high investor protection increased the probability of introducing a second-tier exchange during the sample period by 29.9%. In column (2), we add population and GDP controls. The investor protection variable remains largely unchanged. At the same time, we find that wealthier nations were more likely to introduce second-tier markets. The results are robust to the use of a continuous investor protection variable as well. The latter relationship is captured graphically in Figure 5, which displays the relationship between the minority shareholder protection index and the probability of establishing a second-tier stock exchange. The figure illustrates a clear monotonic relationship, in which an increase in minority shareholder protection was associated with a higher probability of introducing a second-tier exchange. These results are consistent with our first hypothesis that countries with stronger legal protection of shareholders may be more likely to introduce second-tier exchanges.

It is also interesting to note that when we explore the impact of the legal regime, using for common law and civil law dummies, we find that civil law countries were less likely to introduce a second-tier stock exchange. However, these effects are only weakly statistically significant. Hence, the effect seems to be arising specifically from the legal regime that relates to investor protection. We report these results in Table A6 in the Internet Appendix.

We see similarly strong results when we look at how economic activity in the nation affected the introduction of new second-tier markets. We first look at the extent of innovation, as measured through patenting and venture capital activity (the latter of which tends to finance high-potential new firms). We anticipate that the nations with high levels of venture capital activity and patenting would be more conducive to the creation of second-tier markets, likely due to the proliferation of high-growth firms.

In Table 3, we focus on two independent variables: the extent of venture capital investment as a share of GDP and patent applications filed by nationals, again measured in 1990. Specifically, we construct a dummy variable that equals to one if a country is in the top quartile of the patenting and venture capital investments. In both cases, we find a strong association. Nations with top-quartile levels of venture and patenting activity were strongly associated with a greater probability of creating second-tier exchanges. These results continue to hold after controlling for the population, the level of GDP, and regional fixed effects. Similarly, they hold in unreported regressions when we use these ratios as continuous variables.

We then turn to examine the impact of financial development. It might be anticipated that the creation of second-tier markets would be a function of the extent of financial market development more generally. In nations without robust debt and equity markets, investors may anticipate that new firms would be unable to get the resources necessary to grow quickly.

To examine this hypothesis, we compute the ratio of national market capitalization and domestic private sector credit to GDP, in 1990 or the earliest available year. Table 4 examines the impact of being in the top quartile on these measures. In column (1), we find that nations in the top quartile of the distribution of domestic private sector credit share were 38.5% more likely to introduce a second-tier market, a strongly statistically significant effect. As illustrated in column (3), the effect remains statistically significant, albeit slightly smaller, when controlling for GDP, population, and region and country income group fixed effects. We similarly find that nations with higher levels of equity market capitalization (as a share of GDP) were more likely to introduce new exchanges, with the exception of the specification in column (6) that includes region and country income fixed effects. The results are again robust in unreported regressions to the use of continuous measures of financial development.

We turn in the next two tables from a cross-sectional to a panel approach to explore the timing, within a country, of when second-tier exchanges were introduced. The unit of observation is at the country-year level for the years 1990 and 2013, with the binary dependent variable now being coded as one if a second-tier stock exchange (a) was introduced in that nation after 1989 and prior to the year of the observation and (b) was still active in the year of the observation.

We focus on the impact of various time-varying measures. Table 5 looks at the market capitalization of the nation's equity markets in the prior year normalized by GDP and the volume of patent applications filed by nationals in the prior year. Note that all regressions include country fixed effects.

We find that following periods with high market capitalization, the probability of the introduction of a new second-tier market increased. Specifically, in column (1), a one standard deviation increase in lagged stock market value boosted the probability of introducing a new stock

exchange by 7.1%. Some of the effects may be driven by aggregate trends: therefore, we introduce year fixed effects in column (2), on top of the country fixed effects. We find that the coefficient decreases from 0.19 to 0.11: one standard increase in stock market capitalization led to a 4% climb in the probability of introducing a new second-tier market. The effect remains statistically significant at the 5% confidence level.

In columns (3) and (4), we interact stock market capitalization variable with a dummy variable that equals to one for countries that are in the top quartile of the minority investor protection.[12] We find that the probability of second-tier market introduction in countries with better minority shareholder protection was significantly less sensitive to fluctuations of the value of the stock market.

In column (5) onward, we focus on the impact of patent application volume on market creation. Similarly to fluctuations in stock market value, increases in lagged patent applications positively contributed to the probability of introducing a new second-tier market. A one standard deviation increase in lagged patent filings boosted the probability of introducing a second-tier market by 22.1%, an effect that is highly statistically significant. The effect is robust to the introduction of year fixed effects in column (6): a one standard deviation increase in patenting led to a 19.1% boost in the likelihood of establishing a second-tier exchange.

Interestingly, when interacting lagged patent applications with high shareholder protection variable in columns (7) and (8), we find that the interaction effect is statistically insignificant and small. The sensitivity to lagged local patenting activity did not vary with investor protection. One interpretation of this pattern is that in the absence of strong legal protections for minority investors, the barriers to new exchange creation can be overcome by a robust market. Meanwhile, a surge of

[12] Since these variables do not change over time, this is subsumed in the fixed effect.

innovation seems to be a powerful spur to second-tier market development, regardless of the extent of legal protections.

Table 6 examines the impact of IPO activity in the country, following a structure similar to that in Table 5. Here the key independent variables are the lagged numbers of IPOs and total proceeds in such offerings, looking across all exchanges in the country in the previous two years. These variables are used alongside and interacted with the measure of high shareholder protection. We again examine if such activity explains the creation of new second-tier markets.

We find that there was a strong positive relationship between the volume of IPO activity, however measured, and the likelihood of the establishment of a second-tier exchange. These results are robust, and the coefficients stable, when we add interactions with the measure of shareholder protection and year fixed effects. When we include year fixed effects, a one standard deviation increase in the lagged number of IPOs translated into a roughly 12% increase in the probability of introducing a second-tier market; a similar increase in IPO proceeds led to a 2.5% increase.

7. The Drivers of Second-Tier Market Success

In this section, we seek to understand how the contemporaneous level of investor protection in a country affects the success of its new second-tier exchanges. Before we do so, however, we turn to a related question: what was the effect of these new second-tier markets on the incumbent (typically first-tier) exchanges in the nation? In particular, did these new markets serve as substitutes, luring IPOs that would otherwise list on the existing exchanges? Or was activity on the second-tier markets in addition to that on the incumbent exchanges?

To explore this question, we examine in Table 7 pairs of (a) new second-tier exchanges and (b) each of the existing first-tier markets operating in a given country in the year the new

entrepreneurial market was introduced. In each case, the dependent variables are the total number and the volume (in millions of 2010 U.S. dollars) of IPOs on the incumbent first-tier market during the first five years after the introduction of the second-tier exchange. The key independent variables are these measures of activity over this same period in the second-tier exchange, as well as the activity on the incumbent market in the five years preceding the introduction of the new second-tier exchange.

The patterns are striking. In each case, there was strong stationarity: the coefficient on previous activity on the first-tier exchange was about one, suggesting the persistence of IPO activity in the existing stock market exchanges. The impact of the variables measuring activity in second-tier markets were modest in size, always positive, and typically insignificant. There is no evidence that IPO activity on the second-tier market crowds out that on the incumbent first-tier one. While we cannot fully address the possibility that unobserved shocks that may have boosted the volume of IPOs on both exchanges, we control for the extent of shareholder protection and a variety of fixed effects, and find that little change in the relationship.

It is also interesting to note that we do not find that the introduction of a second-tier exchange leads to a change in the composition of firms listed on first-tier exchange. In Table A7 in the Internet Appendix, we repeat the specification of Table 7, but explore various characteristics of firms listing on first-tier exchanges such as the logarithm of age (Panel A), the logarithm of assets (Panel B), and the EBITDA/Assets ratio (Panel C). In all three panels, we do not find a statistically significant relationship between the activity in the second-tier exchange and the change in characteristics of firms listing on the first-tier exchange. Overall, these results are consistent with the view that second-tier exchanges cater to a different segment in the market, which is otherwise unable to tap into the existing stock exchanges.

We now examine the drivers of second-tier exchange success. In each of the tables, the unit of observation is at the exchange-year level. The sample includes only second-tier exchanges that were introduced between 1990 and 2013 and includes only exchange-years that are in or after the first year of operation of the exchange. We do not drop exchanges after they are no longer active, as we do not want to introduce survivorship bias. Instead, we assume they no longer experience additional listings. We employ three dependent variables in the analysis: (a) a binary variable if the exchange is still active in the year of the observation, with active exchanges coded as one and inactive ones as zero, (b) the log of one plus the number of annual IPOs in that market, and (c) the log of one plus the total annual proceeds of IPOs in that market, expressed in millions of constant 2010 U.S. dollars.

In Table 8, we look at the impact of shareholder protection, defined as in the tables above. We also control for log GDP and log population of the nation and add fixed effects for the year of the observation and the year of the exchange's foundation, effectively comparing the performance of markets introduced in the same year. We find that nations with stronger investor protection were 14.1% more likely to remain active in a given year. The effect remains similar when controlling for region fixed effects in column (2). Similarly, we find that countries with stronger investor protection attracted a higher volume of IPOs and greater IPO proceeds. These effects are illustrated in columns (3) to (6) and are highly statistically significant.[13] These results suggest that second-tier markets introduced in countries with stronger investor protection are more successful in attracting firms and raising capital.

These relationships are captured graphically in Figures 6 and 7, which depict the evolution of the mean number of IPOs and IPO proceeds over time at these exchanges. These plots illustrate

[13] In Table A8 in the Internet Appendix, we find that common law nations are more likely to have robust IPO markets (as measured by the number and dollar volume of offerings), while French legal origin nations have weaker ones.

separately the evolution of activity at exchanges in countries above and below the median level of investor protection. The disparities in both the levels and trends in IPO activity at these new second-tier exchanges are readily apparent. The IPO activity in second-tier markets with high shareholder protection gradually increased over time. In contrast, markets in countries with low shareholder protection experienced a gradual decline in both IPO volume and total proceeds raised. Again, these results are consistent with the hypothesis that better legal shareholder protection mitigates the risk of expropriation and enables investors to allocate capital to young firms.

We then turn to look at the robustness of the effects of shareholder protection on the success of stock market exchanges, by exploring whether the effects can, in fact, be explained by the economic activity in the respective countries. We first look at the extent of innovation, as measured again through patenting and venture capital activity. We anticipate that the nations with high levels of venture activity and patenting will be more conducive to the success of second-tier markets, due to higher demand for capital by high-growth entrepreneurial companies.

In all specifications of Table 9, we include log GDP and log population, as well as fixed effects for the year of the observation and the origination year of the second-tier market. We explore whether the investor protection level remains statistically significant, even when controlling for the effects of the local economic activity.

We find in Table 9 a strong association between high levels of patenting activity and venture capital investments on the one hand and second-tier market performance on the other. Specifically, when the level of activity of both venture capital investment and patenting activity were in the top quartile, second-tier stock exchanges were more successful. The new exchanges both had more IPOs and a larger amount of proceeds raised in these offerings, as illustrated in columns (1) and (5) for venture capital investment, and columns (3) and (7) for patenting activity.

These results continue to hold even when we compare exchanges located within the same region, as seen in the remaining columns in Table 9 that include regional fixed effects. We find that even when controlling for the level of venture capital investment and innovation, shareholder protection remains highly statistically significant and economically important.

We then turn to examine the more general level of financial development. We again compute the ratios of total national market capitalization and domestic private sector credit to GDP. Table 10 examines the impact of being above the median on these measures. Even after controlling for GDP and investor protection levels and region fixed effects, we find that new exchanges in nations with higher levels of credit and (less consistently) equity market development were more likely to be successful. And yet again, high shareholder protection remains a key driver that explains the success of second-tier exchanges, even when controlling for the level of financial development in the country.

We repeat the analyses in Tables 8, 9, and 10 in the Appendix, but separately estimating the performance of second-tier exchanges for domestic and foreign firms. This analyses are reported in Tables A9, A10, and A11 in the Appendix. It is interesting to note that the sensitivity of domestic firms to shareholder protection when listing on a second-tier exchange is significantly larger relative to foreign listed companies.

8. Firm Listing Choice and Listing Requirements

In this section, we explore the characteristics of firms listed on second-tier exchanges, as well as the rules that the exchanges employ in determining who can list. Again, we focus only on new second-tier exchanges that were introduced between 1990 and 2013.

In Table 11, we use each firm listing on one of these new second-tier exchanges as an observation. In each case, one characteristic of the listing firm is used as the dependent variable. We examine the impact of investor protection in the nation, defined as above. The sample size varies with data availability, with over 3500 observations in the case of the most available variable (firm age). We control, as before, for population and GDP, as well as for the year of the exchange's creation and the year of the IPO.

The patterns in this analysis are striking. The IPOs in the new second-tier markets differed markedly in nations with strong investor protection. In countries with stronger investor protection, listed firms tended to be significantly younger, as illustrated by the highly statistically significant coefficient in column (1) of -1.021. The coefficient suggests that firms listed in markets with high investor protection were about 60% less than the average age of listed firms in the sample. In column (2), we find that firms listed in second-tier markets with high investor protection had fewer assets at the time of the IPO: the coefficient implies roughly one-tenth the sample mean. We find in column (3) that listed firms in second-tier markets based in nations with high investor protection were less profitable; column (4) illustrates that these firms were significantly less likely to be profitable at the time of the IPO. Again, the magnitudes of the differences were substantial: firms are about 40% less likely to be profitable when listing in countries with high investor protection.

At the same time, firms listed in second-tier markets with high investor protection tended to raise more (expressed as a share of asset pre-offering) in the IPOs, as illustrated in column (5). This seeming paradox can be partially addressed by the final two columns, which show that these firms also enjoyed faster growth in assets and revenues in the years around the IPO (from three years before to three years after). Specifically, these firms experienced a 4.5% higher annualized asset growth rate, and 5.2% higher annualized growth rate of revenues. The stronger shareholder

protection may provide investors with greater assurances that the IPO will be successful (or more precisely, that if the business succeeds, that the investors will be able to harvest the gains), leading to a willingness to provide more financing to riskier firms.

A natural follow-on question is whether this pattern is due to the imposition of differing listing requirements in second-tier markets in nations with stronger investor protection. Table 12 examines this question. We explore various measures of listing requirements, including an index of the 16 distinct listing requirements that we identified, as well as key areas where markets set thresholds, such as the minimum number of profitable years or shareholders. If a requirement was not mentioned, we assumed that the requirement had a value of zero. We find that in all cases, with the exception of paid-up capital in column (4), there were no statistically significant relationships between shareholder protection and listing requirements. Despite the fact that second-tier exchanges have similar listing requirements across nations, countries with institutions that provide better shareholder protection allow more entrepreneurial firms to raise more capital.

9. **Conclusions**

In this paper, we explore the creation of evolution of new stock exchanges around the world geared towards entrepreneurial, fast-growing companies, known as second-tier exchanges. Using a hand-collected novel data, we find that since 1990 most of the newly created exchanges were second-tier exchanges, and that these exchanges attracted a significant proportion of the global IPO market activity.

We show that increases in demand for entrepreneurial capital, as measured for instance by patenting, IPOs, and stock market valuations, led to the introduction of second-tier exchanges. These markets did not divert offerings from existing first-tier exchanges. Exchange success was

driven by the presence of strong shareholder protection, even in countries with high levels of venture capital activity, patenting, private credit availability, and stock market valuations. Second-tier exchanges in countries with better shareholder protection allowed younger and less profitable companies to raise more capital. These results suggest the importance of institutions in enabling the provision of entrepreneurial capital to young companies: these markets alone cannot boost entrepreneurial activity but need enabling institutions.

The study suggests a number of issues for further exploration. One fascinating—though difficult to measure (see the discussion in Lerner and Schoar, 2010) —question is how the presence of these markets affects the rate and nature of entrepreneurship in these nations, especially high-potential ventures. Another little-explored area is how the choice of listing venue impacts the future evolution of entrepreneurial firms.

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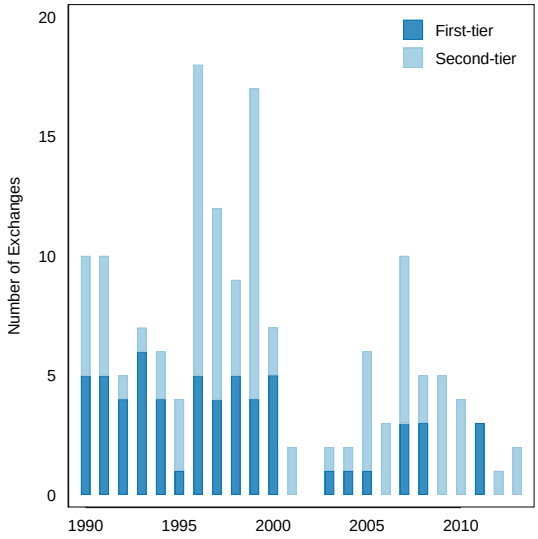
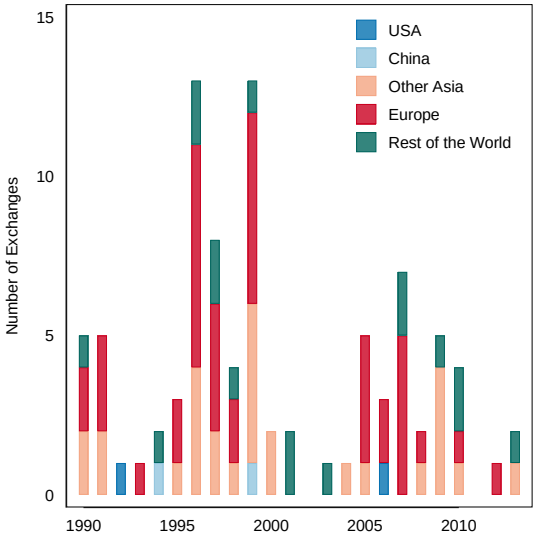
Figure 1. New Exchanges over Time.

This figure shows the number of new exchanges that were created between 1990 and 2013. Panel A shows the counts for first-tier and second-tier exchanges. Panel B breaks the creation of new second-tier exchanges by region. Table A1 in Internet Appendix lists the names of the exchanges, their entry and exit years, and their tiers. Table A4 in the Internet Appendix lists the countries in each region.



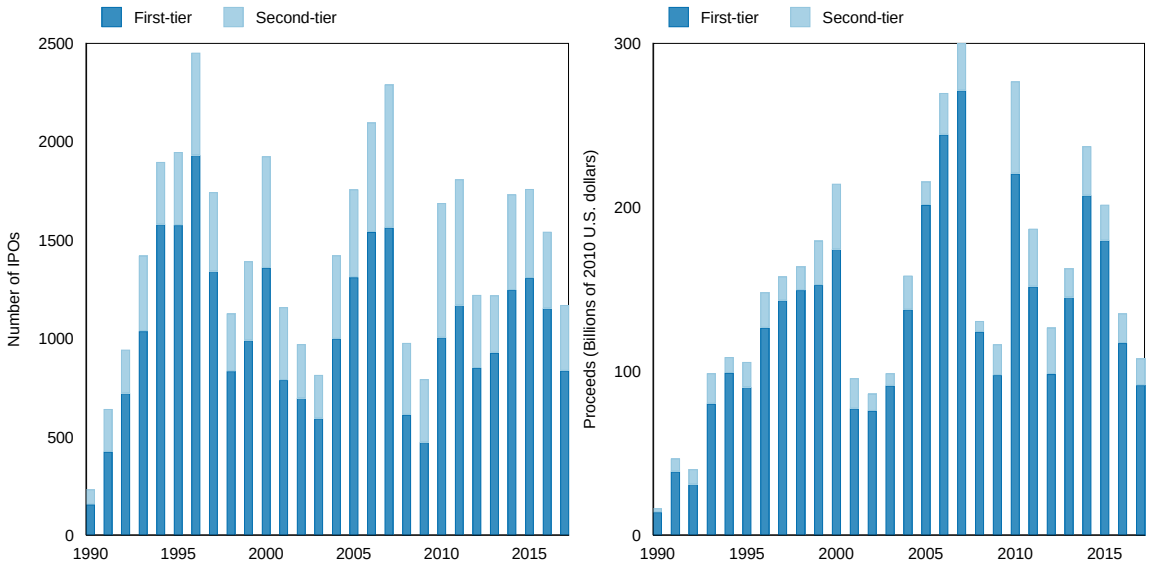
A. Number of new exchanges



B. New second-tier exchanges by region

Figure 2. Number of IPOs and Total IPO Proceeds Raised, by Market Tier.

This figure shows the number of IPOs and total proceeds raised in IPOs (in billions of 2010 U.S. dollars) across all exchanges from 1990 to 2017. Panel A shows the number of IPOs on first and second-tier exchanges. Panel B shows the proceeds raised in IPOs on first and second-tier exchanges.

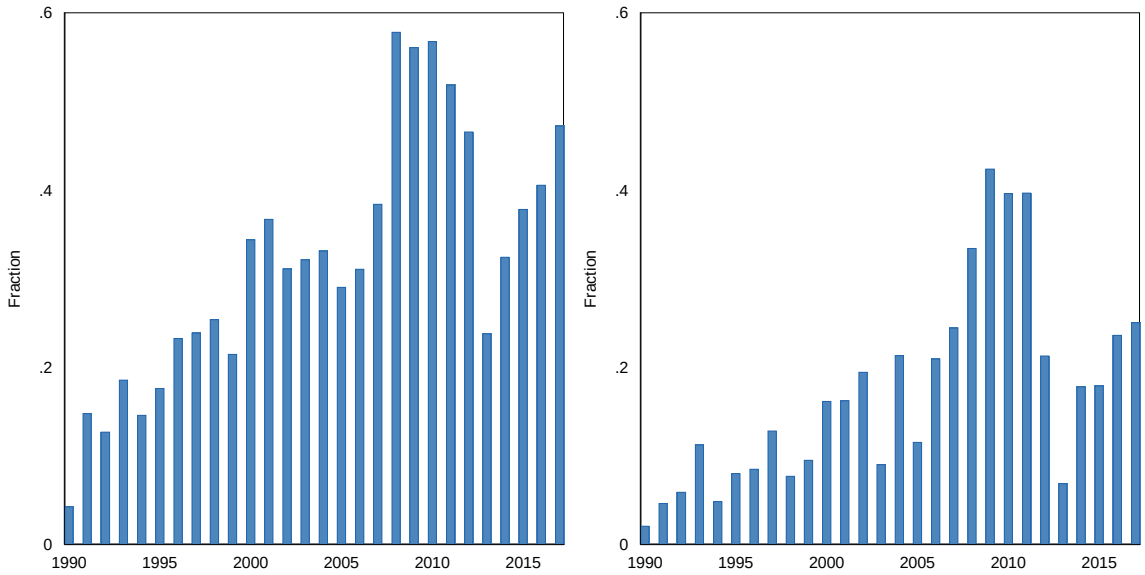


A. Number of IPOs

B. Total Proceeds

Figure 3. Fraction of IPO Activity and Proceeds Raised in New Exchanges.

This figure shows the fraction of total IPOs and proceeds raised in each year in new exchanges begun between 1990 and 2013. Panel A shows the fraction of IPO activity in new exchanges. Panel B shows the fraction of total proceeds raised in new exchanges.

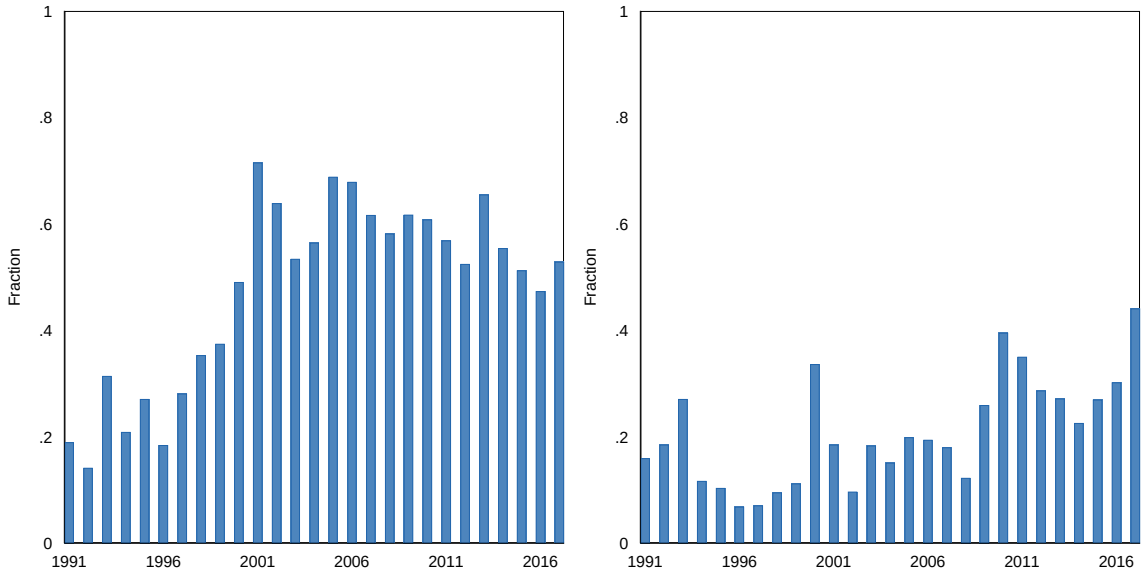


A. Number of IPOs

B. Total Proceeds

Figure 4. Fraction of New Exchange IPO Activity and Proceeds Raised in New Second-Tier Exchanges.

This figure shows the fraction of IPOs and proceeds raised in exchanges opened between 1990 and 2013 that were in second-tier exchanges. Panel A shows the fraction of IPO activity on new exchanges in new second-tier exchanges. Panel B shows the fraction of total proceeds raised on new exchanges in new second-tier exchanges.



A. Number of IPOs

B. Total Proceeds

Figure 5. Introduction of New Second-Tier Exchanges and Minority Shareholder Protection.

The bin-scatter plot depicts the mean probability of a nation establishing a second-tier exchange between 1990 and 2013. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The index was taken from World Bank's *Doing Business Report* for the year 2017.

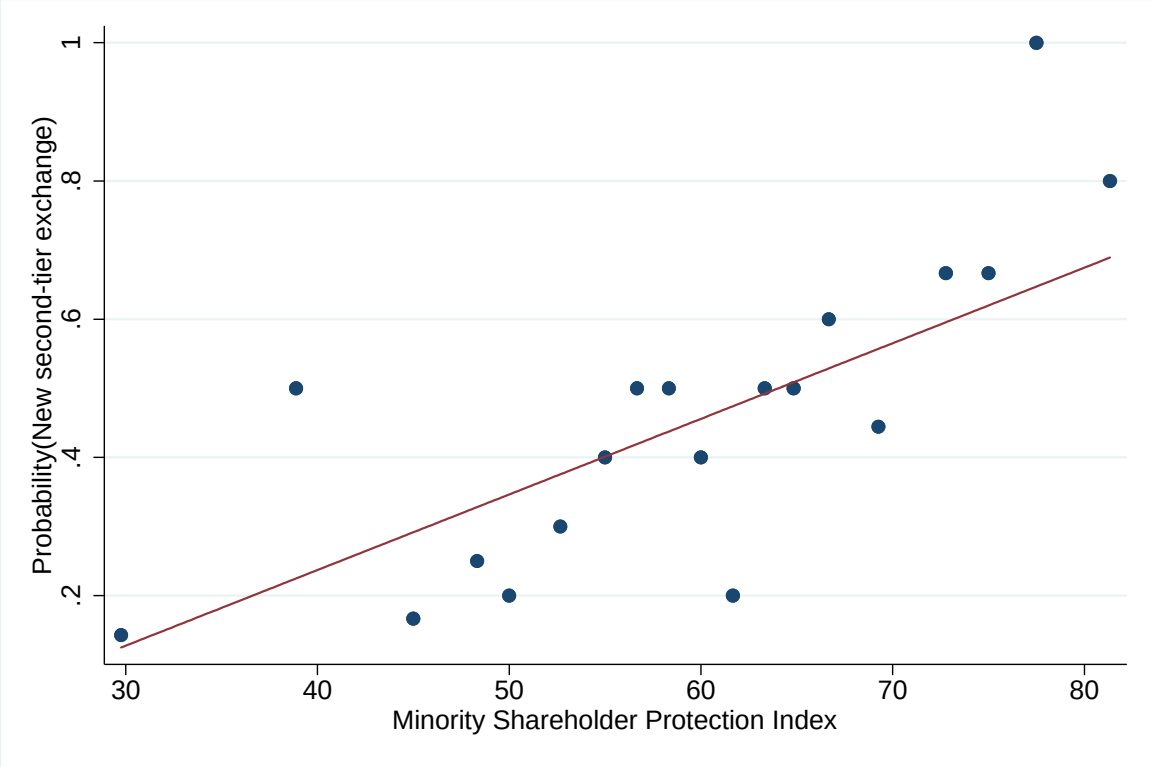


Figure 6. Number of IPOs in New Second-Tier Exchanges and Minority Shareholder Protection.

The bin-scatter plot depicts the mean of the log of the number of IPOs in second-tier exchanges created between 1990 and 2013, by year since the exchanges' formation. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The index was taken from World Bank's *Doing Business Report* for the year 2017. *High Shareholder Protection* includes countries with index values above the median. Remaining countries are classified as *Low Shareholder Protection.*

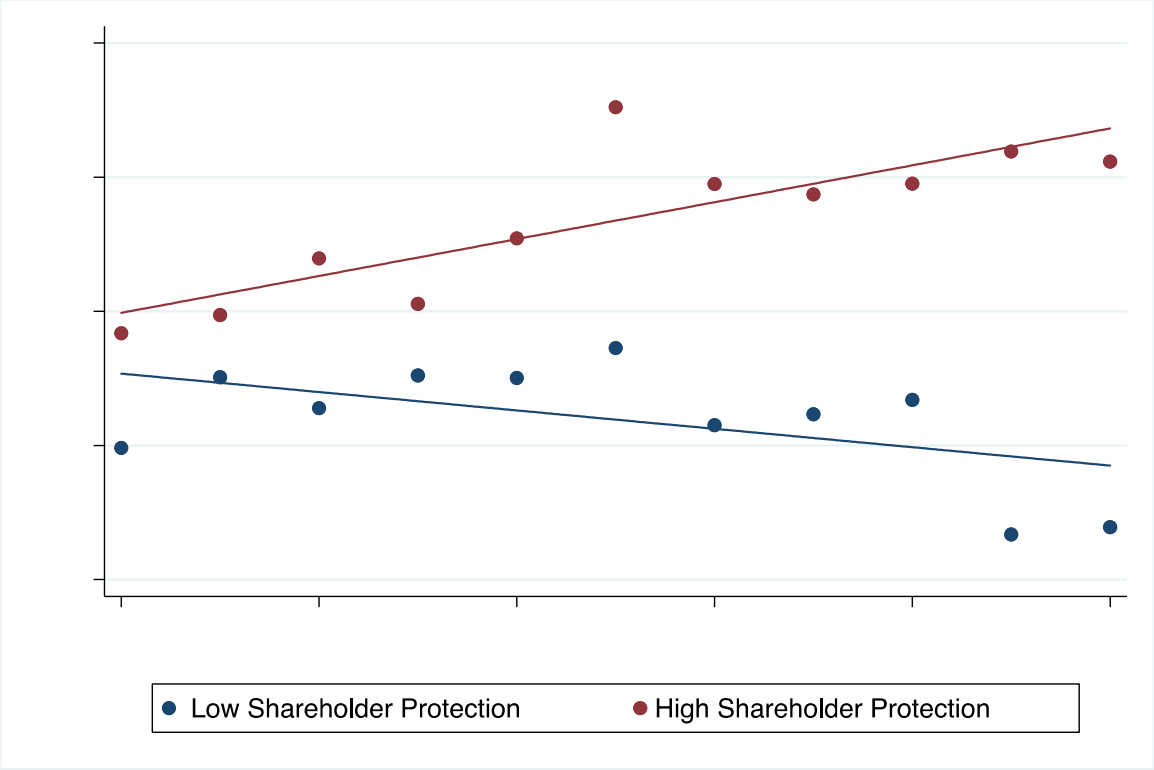


Figure 7. Total IPO Proceeds in New Second-Tier Markets and Minority Shareholder Protection.

The bin-scatter plot depicts the mean of the log of total IPO proceeds (in millions of 2010 U.S. dollars) in second-tier exchanges created between 1990 and 2013, by year since the exchanges' formation. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score possible respectively. The index was taken from World Bank's *Doing Business Report* for the year 2017. *High Shareholder Protection* includes countries with index values above the median. Remaining countries are classified as *Low Shareholder Protection.*

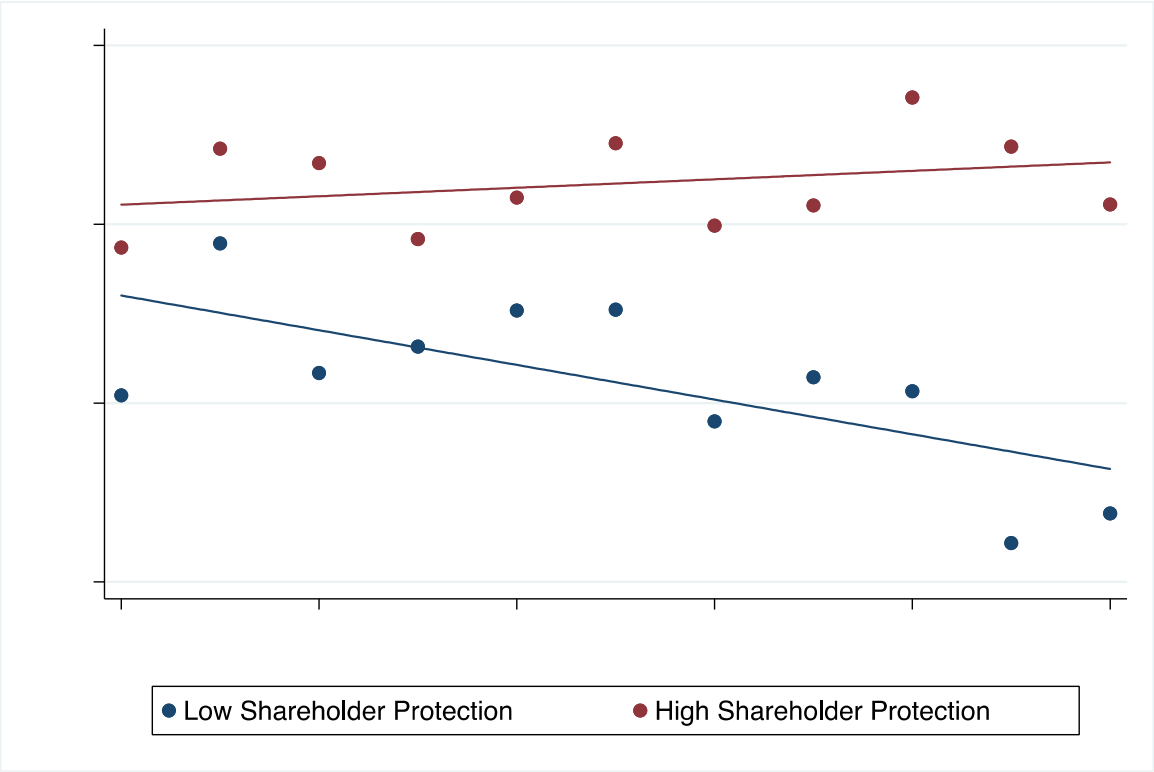


Table 1: Summary Statistics.

This table explores the difference in characteristics between first and second-tier exchanges (Panels A through C) and countries that introduced new second-tier exchanges (Panel D). Panel B compares all first- and second-tier exchanges active between 1990 and 2013; panels A and C only look at exchanges introduced during this period. Panel A analyzes the total number of requirements for the companies to list in the exchange across 16 categories. When analyzing the listing requirements, if a requirement was not in place or not mentioned, we assumed that the requirement had a value of zero. In Panels B and C, all annual activity measures are computed between 1990 and 2017, or the subset of years during that period where the exchange was active. The *Survival time of exchanges that exited (years)* is the number of years from the introduction of the exchange until its exit (this includes only exchanges that had exited as of 2018). *Years in operation of exchange* is the number of years since entry that the exchange has been operational (as of the end of 2017 or the time of exit). In Panel D, *GDP* is purchasing power parity (PPP)-adjusted (in billions of 2010 U.S. dollars). *Patent applications* are the total applications filed by nationals. The *Minority shareholder protection* index ranges from a score of 0 to 100, representing the lowest performing economy and highest score possible respectively. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

Panel A – Comparison of listing requirements in new exchanges.

	First-tier (1) Mean	Second-tier (2) Mean	Diff (3)
Number of listing requirements	9.87	8.34	1.52*
Market capitalization (USD 2010 millions)	3.09	0.29	2.80**
Number of profitable years	0.77	0.19	0.58***
Years of operation	1.67	0.90	0.77***
Paid-up capital (USD 2010 millions)	2.13	0.04	2.09***
Free float (percent)	0.12	0.06	0.06***
Shareholder equity (USD 2010 millions)	0.80	0.24	0.56*
Minimum number of shareholders	112.92	76.56	36.36
Minimum value of shares traded (USD 2010 millions)	0.71	0.03	0.67
Listing fee (USD 2010 per year)	0.15	0.04	0.11**
Number of exchanges	69	78	

Panel B – Comparison of first- and second-tier exchanges.

	First-tier		Second-tier		Diff
	(1) Mean	(2) N	(3) Mean	(4) N	(5)
Total number of IPOs per exchange	171.9	184	103.2	101	68.7
Total IPO proceeds per exchange (USD 2010 millions)	21,613.2	184	5,134.2	101	16,479.0***
Mean number of IPOs per year per exchange	6.6	184	4.9	101	1.7
Mean IPO proceeds per year per exchange (USD 2010 millions)	791.4	184	255.3	101	536.1**
Survival time of exchanges that exited (years)	60.6	110	8.7	81	51.9***
Years in operation of exchange as of end of 2017 or exit	76.4	184	11.4	101	65.0***

Panel C – Comparison of new first- and second-tier exchanges.

	First-tier		Second-tier		Diff
	(1)	(2)	(3)	(4)	(5)
	Mean	N	Mean	N	
Total number of IPOs per exchange	102	69	72	78	30
Total IPO proceeds per exchange (USD 2010 millions)	9,946.7	69	2,094.5	78	7,852.1*
Mean number of IPOs per year per exchange	4.3	69	3.9	78	0.4
Mean IPO proceeds per year per exchange (USD 2010 millions)	404.3	69	158.1	78	246.2
Survival time of exchanges that exited (years)	8.9	41	5.0	64	3.9***
Years in operation of exchange as of end of 2017 or exit	13.8	69	7.2	78	6.5***

Panel D – Introduced a new second-tier stock exchange?

	Yes		No		
Average of Characteristics, 1990-2017	Mean	Std	Mean	Std	Diff
Log GDP (PPP-adjusted; USD 2010 billions)	5.657	1.725	4.481	1.395	1.176***
GDP per capita (PPP-adjusted; USD 2010)	23,436	17,617	15,305	18,798	8,130***
Log population (millions)	2.908	1.603	2.463	1.159	0.445***
Annual log (# patent applications)	5.483	4.066	3.488	3.094	2.109***
Annual log(VC funding) (USD 2010 millions)	4.57	2.385	2.46	1.828	41.489***
Domestic credit to private sector (% of GDP)	77.246	54.988	35.757	25.877	43.058***
Stock market capitalization to GDP (%)	82.376	122.475	39.318	38.079	5.623***
Minority shareholder protection	61.273	12.762	55.65	12.648	5.623***
Legal origin – Common Law (%)	0.438	0.496	0.207	0.405	0.231***
Legal origin – Civil Law (%)	0.286	0.452	0.466	0.499	-0.180***
Number of countries	48		65		

Table 2: Shareholder Protection and Introduction of Second-Tier Exchanges.

This table explores the association between minority investor protection and the probability of introducing a new second-tier stock exchange. The sample is a country-level cross-section. The dependent variable *Second-Tier* equals one if a country introduced a new second-tier stock exchange between 1990 and 2013. *High Shareholder Protection* equals one if the country's protecting minority investor index is in the top quartile among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score possible respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in 1990. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions with robust standard errors. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Second-tier	(2) Second-tier	(3) Second-tier	(4) Second-tier
High Shareholder Protection	0.299***	0.241**	0.223**	0.215**
	(0.100)	(0.092)	(0.098)	(0.096)
Log(Population)		-0.029	-0.041	0.030
		(0.045)	(0.049)	(0.069)
Log(GDP)		0.117***	0.128***	0.078
		(0.036)	(0.042)	(0.059)
Region FE	No	No	Yes	Yes
Country Income FE	No	No	No	Yes
Observations	113	113	113	113
R-squared	0.076	0.185	0.194	0.250

Table 3: Innovation and Introduction of New Second-Tier Exchanges.

This table explores the association between innovation measures and the probability of introducing a new second-tier stock exchange. The sample is a country-level cross-section. The dependent variable *Second-tier* equals one if a country introduced a new second-tier stock exchange between 1990 and 2013. *Log(Patents)-top quartile* equals one if the level of patent applications filed by nationals in 1990 was in the top quartile among all countries in the sample. *Log(VC)-top quartile* equals one if the country level of VC funding in 1990 was in the top quartile among all countries in the sample. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in 1990. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions with robust standard errors. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Second-tier	(2) Second-tier	(3) Second-tier	(4) Second-tier	(5) Second-tier	(6) Second-tier
Log (Patents) – top quartile	0.495***	0.383***	0.382***			
	(0.091)	(0.120)	(0.132)			
Log (VC) – top quartile				0.551***	0.521***	0.340***
				(0.016)	(0.013)	(0.211)
Log(Population)		-0.034	-0.019		-0.004	0.020
		(0.043)	(0.065)		(0.046)	(0.066)
Log(GDP)		0.074*	0.069		0.050	0.044
		(0.040)	(0.055)		(0.042)	(0.058)
Region FE	No	No	Yes	No	No	Yes
Country Income FE	No	No	Yes	No	No	Yes
Observations	113	113	113	113	113	113
R-squared	0.192	0.217	0.280	0.129	0.258	0.183

Table 4: Financial Development and Introduction of New Second-Tier Exchanges.

This table explores the association between financial development measures and the probability of introducing a new second-tier stock exchange. The sample is a country-level cross-section. The dependent variable *Second-tier* equals one if a country introduced a new second-tier stock exchange between 1990 and 2013. *Credit (% of GDP)-top quartile* equals one if the country ratio of private credit to GDP in 1990 was in the top quartile among all countries in the sample. *Market Cap (% of GDP) top quartile* equals one if the country ratio of Market Capitalization to GDP in 1990 was in the top quartile among all countries in the sample. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in 1990. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions with robust standard errors. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Second-tier	(2) Second-tier	(3) Second-tier	(4) Second-tier	(5) Second-tier	(6) Second-tier
Credit (% of GDP) top quartile	0.385***	0.278**	0.246**			
	(0.100)	(0.106)	(0.116)			
Market Cap (% of GDP) top quartile				0.360***	0.218*	0.119
				(0.107)	(0.122)	(0.139)
Log(Population)		-0.011	0.022		-0.020	0.030
		(0.045)	(0.067)		(0.047)	(0.069)
Log(GDP)		0.093**	0.077		0.101**	0.075
		(0.039)	(0.059)		(0.041)	(0.060)
Region FE	No	No	Yes	No	No	Yes
Country Income FE	No	No	Yes	No	No	Yes
Observations	113	113	113	113	113	113
R-squared	0.113	0.188	0.248	0.089	0.164	0.222

Table 5: The Timing of Introduction of New Second-Tier Exchanges.

This table explores the variation in stock market valuation and innovation in a country over time, and their association with the probability of introducing a new second-tier stock exchange. The sample has a panel structure, with observations for each country-year pair between 1990 and 2017. The dependent variable *Second-tier* equals one if (a) the country introduced a new second-tier stock exchange after 1989 and in or after the year of the observation, and (b) the exchange was active in the year of the observation. *Lagged Stock Value (% of GDP)* equals the ratio of stock market value to GDP in year t-1. *Lagged Log # Patents* is the lagged log number of patent applications filed by nationals. *High Shareholder Protection* equals one if the country's protecting minority investor index is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the country level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Second-tier	(2) Second-tier	(3) Second-tier	(4) Second-tier	(5) Second-tier	(6) Second-tier	(7) Second-tier	(8) Second-tier
Lagged Stock Value (%GDP)	0.199***	0.110**	0.144***	0.103				
	(0.053)	(0.055)	(0.050)	(0.063)				
Lagged Stock Value (%GDP) X High Shareholder Protection			-0.123**	-0.109*				
			(0.060)	(0.062)				
Lagged Log # Patents					0.082***	0.071**	0.087**	0.081**
					(0.028)	(0.031)	(0.036)	(0.040)
Lagged Log # Patents X High Shareholder Protection							-0.011	-0.025
							(0.051)	(0.051)
Log GDP	0.129**	0.094	0.153***	0.092	0.072**	0.013	0.073**	0.009
	(0.054)	(0.168)	(0.057)	(0.159)	(0.034)	(0.094)	(0.036)	(0.088)
Log Population	-0.189	-0.213	-0.209	-0.215	-0.268	-0.346*	-0.263	-0.341*
	(0.163)	(0.172)	(0.164)	(0.170)	(0.181)	(0.180)	(0.174)	(0.175)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1,777	1,777	1,777	1,777	2,036	2,036	2,036	2,036
R-Squared	0.088	0.140	0.071	0.138	0.099	0.134	0.099	0.136

Table 6: The Timing of Introduction of New Second-Tier Exchanges (2).

This table explores the variation in measures of IPO activity in a country over time, and their association with the probability of introducing a new second-tier stock exchange. The sample has a panel structure, with observations for each country-year pair. The dependent variable *Second-tier* equals one if (a) the country introduced a new second-tier stock exchange after 1989 and in or after the year of the observation, and (b) the exchange was active in the year of the observation. *Lagged Log Number of IPOs* is the logarithm of the total number of IPOs across all exchanges in the country in the years t-2 and t-1. *Lagged Log Total Proceeds* is the logarithm of the total amount of IPO proceeds (in millions of 2010 U.S. dollars) raised across all exchanges in the country in the years t-2 and t-1. *High Shareholder Protection* equals one if the country's protecting minority investor index is in the top quartile among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the country level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Second-tier	**(2)** Second-tier	**(3)** Second-tier	**(4)** Second-tier	**(5)** Second-tier	**(6)** Second-tier	**(7)** Second-tier	**(8)** Second-tier
Lagged Log Number of IPOs	0.0522***	0.0422*	0.0544***	0.0609**				
	(0.013)	(0.014)	(0.018)	(0.019)				
Lagged Log Number of IPOs X High Shareholder Protection			0.0235	0.0196				
			(0.033)	(0.032)				
Lagged Log Total Proceeds					0.0112***	0.0152*	0.096**	0.0142*
					(0.004)	(0.004)	(0.005)	(0.005)
Lagged Log Total Proceeds X High Shareholder Protection							0.0072	0.0064
							(0.011)	(0.011)
Log GDP	0.082*	-0.0291	0.0872*	-0.0269	0.1025**	-0.0169	0.1023**	-0.0165
	(0.049)	(0.089)	(0.049)	(0.089)	(0.050)	(0.092)	(0.050)	(0.092)
Log Population	-0.0288	-0.0854	-0.0220	-0.0731	-0.0527	-0.990	-0.0274	-0.0972
	(0.178)	(0.196)	(0.176)	(0.194)	(0.181)	(0.199)	(0.179)	(0.197)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,566	2,566	2,566	2,566	2,566	2,566	2,566	2,566
R-Squared	0.090	0.117	0.092	0.118	0.068	0.098	0.069	0.099

Table 7: Relationship between First and New Second-Tier Exchanges Performance.

This table explores the association between the performance of new second-tier and first-tier exchanges in the same country. The sample includes pairwise observations of all new second-tier exchanges with each first-tier exchange operating in the same country in the year of the introduction of the new second-tier exchange. In columns (1) - (2) and (5) - (6), the dependent variable is the log of the total number of IPOs in a first-tier exchange in the first five years after the introduction of a new second-tier exchange. In columns (3) – (4) and (7) – (8), the dependent variable is the log of total proceeds in a first-tier exchange (in millions of 2010 U.S. dollars) in the first five years after the introduction of a new second-tier exchange. *Log # IPOs - Second-tier* and *Log Proceeds - Second-tier* are the logs of the total number of IPOs and the total proceeds (again in millions of 2010 U.S. dollars) raised across all IPOs in a second-tier exchange in its first five years of operation. *Log # IPOs - First-tier - pre-period* and *Log Proceeds – First-tier - pre-period* are the logs of the total number of IPOs and the total proceeds raised across all IPOs in a first-tier exchange in the five years before the introduction of a new second-tier exchange. *High Shareholder Protection* equals one if the country's protecting minority investor index is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the exchange level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Log # IPOs First-tier	Log # IPOs First-tier	Log Total Proceeds First-tier	Log Total Proceeds First-tier	Log # IPOs First-tier	Log # IPOs First-tier	Log Total Proceeds First-tier	Log Total Proceeds First-tier
Log # IPOs –Second-tier	0.128	0.104			0.142	0.167*		
	(0.080)	(0.075)			(0.088)	(0.090)		
Log # IPOs - First-tier - pre-period	1.004***	1.027***			1.008***	1.018***		
	(0.048)	(0.043)			(0.048)	(0.048)		
Log Proceeds - Second-tier			0.106	0.096			0.160*	0.158
			(0.090)	(0.098)			(0.095)	(0.103)
Log Proceeds - First-tier - pre-period			0.883***	0.885***			0.875***	0.869***
			(0.084)	(0.087)			(0.090)	(0.101)
High Shareholder Protection					-0.037	0.381	0.434	0.987
					(0.309)	(0.407)	(0.696)	(0.933)
High Shareholder Protection X Log # IPOs - Second-tier					-0.023	-0.118		
					(0.124)	(0.151)		
High Shareholder Protection X Log Proceeds - Second-tier							-0.109	-0.148
							(0.110)	(0.130)
Log GDP	-0.382***	-0.331*	-0.353	-0.451	-0.396***	-0.327*	-0.347	-0.388
	(0.116)	(0.171)	(0.237)	(0.323)	(0.122)	(0.171)	(0.262)	(0.327)
Log Population	0.324**	0.230	-0.132	-0.015	0.337**	0.232	-0.131	-0.067
	(0.126)	(0.172)	(0.286)	(0.381)	(0.135)	(0.171)	(0.317)	(0.377)
Entry Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Income Group FE	N	Y	N	Y	N	Y	N	Y
Region FE	N	Y	N	Y	N	Y	N	Y
Observations	188	188	188	188	188	188	188	188
R-squared	0.726	0.739	0.626	0.630	0.726	0.741	0.628	0.633

Table 8: Shareholder Protection and the Performance of New Second-Tier Exchanges.

This table explores the association between shareholder protection and the performance of new second-tier stock exchanges. The sample has a panel structure, with observations for each country-year pair. Only years from the introduction of a second-tier stock exchange onward are included. In columns (1) and (2), the dependent variable is *Active* which equals one if a second-tier stock exchange is still active in a given year, and zero otherwise. In columns (3) and (4), the dependent variable is the log number of IPOs in new second-tier exchanges in a given year. In columns (5) and (6), the dependent variable is the log of total proceeds of all IPOs in new second-tier exchanges in a given year, in 2010 U.S. dollars. *High Shareholder Protection* equals one if the country's protecting minority investor index is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the country level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1)	(2)	(3)	(4)	(5)	(6)
	Active	Active	Log # IPOs	Log # IPOs	Log proceeds	Log proceeds
High Shareholder Protection	0.141*	0.162**	0.464***	0.464***	0.797***	0.802***
	(0.084)	(0.079)	(0.145)	(0.136)	(0.234)	(0.203)
Log GDP	-0.129***	-0.108***	0.175**	0.207*	0.440***	0.517***
	(0.032)	(0.038)	(0.083)	(0.123)	(0.099)	(0.134)
Log Population	0.110**	0.085*	-0.095	-0.150	-0.252*	-0.359**
	(0.042)	(0.044)	(0.093)	(0.143)	(0.127)	(0.170)
Observations	1,479	1,479	1,479	1,479	1,479	1,479
R-squared	0.307	0.334	0.199	0.215	0.233	0.243
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Entry Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	Yes	No	Yes

Table 9: Innovation and the Performance of New Second-Tier Exchanges.

This table explores the association between innovation measures and the performance of new second-tier stock exchanges. The sample has a panel structure, with observations for each country-year pair. Only years from the introduction of a second-tier stock exchange onward are included. In columns (1) through (4), the dependent variable is the log number of IPOs in new second-tier exchanges in a given year. In columns (5) through (8), the dependent variable is the log of total proceeds of all IPOs in new second-tier exchanges in a given year, in millions of 2010 U.S. dollars. *High Shareholder Protection* equals one if the country index of protecting minority investor is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. *Log(VC)-top quartile* equals one if the country level of VC funding is in the top quartile in the year. *Log(Patents)-top quartile* equals one if the number of patent applications filed by nationals is abo the top quartile in the year. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the country level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Log # IPOs	(2) Log # IPOs	(3) Log # IPOs	(4) Log # IPOs	(5) Log proceeds	(6) Log proceeds	(7) Log proceeds	(8) Log proceeds
High Shareholder Protection	0.321**	0.310**	0.478***	0.484***	0.468**	0.569**	0.744***	0.843***
	(0.154)	(0.140)	(0.055)	(0.055)	(0.203)	(0.222)	(0.096)	(0.105)
Log(VC) – top quartile	0.446*	0.458**			0.728*	0.694**		
	(0.257)	(0.206)			(0.363)	(0.300)		
Log(Patents) – top quartile			0.296***	0.442***			0.732***	0.886***
			(0.077)	(0.081)			(0.134)	(0.154)
Log GDP	0.145**	0.185	0.112***	0.115***	0.323***	0.483***	0.229***	0.331***
	(0.065)	(0.112)	(0.036)	(0.042)	(0.099)	(0.124)	(0.066)	(0.080)
Log Population	-0.104	-0.170	-0.071*	-0.119***	-0.243*	-0.389**	-0.176***	-0.297***
	(0.090)	(0.144)	(0.037)	(0.042)	(0.134)	(0.167)	(0.065)	(0.081)
Observations	1,479	1,479	1,479	1,479	1,479	1,479	1,479	1,479
R-squared	0.224	0.240	0.207	0.231	0.144	0.258	0.142	0.260
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entry Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes

Table 10: Financial Development and the Performance of New Second-Tier Exchanges.

This table explores the association between financial development measures and the performance of new second-tier stock exchanges. The sample has a panel structure, with observations for each stock exchange-year pair. Only years from the introduction of a second-tier stock exchange onward are included. In columns (1) through (4), the dependent variable is the log number of IPOs in new second-tier exchanges in a given year. In columns (5) through (8), the dependent variable is the log of total proceeds of all IPOs in new second-tier exchanges in a given year, in millions of 2010 U.S. dollars. *High Shareholder Protection* equals one if the country index of protecting minority investor is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. *Credit (% of GDP)-above median* equals one if the country ratio of private credit to GDP is above the median in the sample in the year. *Market Cap (% of GDP)-above median* equals one if the country ratio of Market Capitalization to GDP is above the median in the sample in the year. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the country level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Log # IPOs	(2) Log # IPOs	(3) Log # IPOs	(4) Log # IPOs	(5) Log proceeds	(6) Log proceeds	(7) Log proceeds	(8) Log proceeds
High Shareholder Protection	0.450***	0.456***	0.394***	0.383**	0.828***	0.835***	0.801***	0.764***
	(0.141)	(0.138)	(0.072)	(0.180)	(0.232)	(0.210)	(0.137)	(0.237)
Credit (% of GDP) above median	0.339**	0.360**			0.679***	0.674***		
	(0.134)	(0.146)			(0.230)	(0.223)		
Market Cap (% of GDP) above median			0.330***	0.282			0.382***	0.315
			(0.075)	(0.173)			(0.142)	(0.233)
Log GDP	0.049	0.052	0.189***	0.258	0.211	0.274*	0.534***	0.645***
	(0.104)	(0.100)	(0.055)	(0.187)	(0.154)	(0.153)	(0.105)	(0.221)
Log Population	0.021	0.005	-0.094*	-0.193	-0.035	-0.120	-0.272***	-0.428*
	(0.108)	(0.109)	(0.054)	(0.187)	(0.166)	(0.169)	(0.103)	(0.233)
Observations	1,273	1,273	1,094	1,094	1,273	1,273	1,094	1,094
R-squared	0.232	0.240	0.207	0.226	0.269	0.277	0.249	0.258
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Entry Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	No	Yes	No	Yes	No	Yes	No	Yes

Table 11: Listing Characteristics in New Second-Tier Exchanges.

This table explores the association between the characteristics of newly listed firms on new second-tier stock exchanges at the time of the IPO and investor protection. Each IPO in a new second-tier exchange between 1990 and 2017 is an observation. In column (1), the dependent variable is the log of firm age at the time of the IPO. In column (2), the dependent variable is the log of total assets (in millions of 2010 U.S. dollars) at the time of the IPO. In column (3), the dependent variable is the ratio of EBITDA to assets at the time of the IPO. In column (4), the dependent variable is a dummy that equals one if the firm has positive profitability at the time of the IPO. In column (5), the dependent variable is the ratio of total IPO proceeds divided by the firm assets at the time of the IPO. In column (6), the dependent variable is the annualized growth of firm assets in the 7 years around the IPO event (starting 3 years before and ending 3 years after the IPO). Finally, column (7) uses the annualized revenue growth of firms in the 7 years around the IPO. *High Shareholder Protection* equals one if the country index of protecting minority investor is above the median among all countries in the sample. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the exchange level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Log Age	(2) Log Total Assets	(3) EBITDA / Assets	(4) Profitable at IPO	(5) IPO Proceeds / Assets	(6) Annualized Assets Growth	(7) Annualized Revenue Growth
High Shareholder Protection	-1.021***	-2.442***	-0.379***	-0.561***	0.662***	0.045***	0.052***
	(0.228)	(0.364)	(0.063)	(0.084)	(0.102)	(0.017)	(0.012)
Log GDP	-0.092	1.906**	0.080	-0.032	0.365	0.069	0.016
	(0.129)	(0.846)	(0.099)	(0.178)	(0.305)	(0.043)	(0.033)
Log Population	0.321	-0.133	0.089	0.295*	-0.482*	-0.070*	-0.037
	(0.110)	(0.544)	(0.090)	(0.158)	(0.257)	(0.034)	(0.026)
Observations	3,692	3,410	2,127	2,106	3,401	3,451	2,141
R-squared	0.300	0.506	0.277	0.389	0.018	0.089	0.112
Issuance Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exchange Entry Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 12: Listing Requirements in New Second-Tier Exchanges.

This table explores the association between the listing requirements of new second-tier stock exchanges and investor protection. Each second-tier exchange introduced between 1990 and 2013 is an observation. The dependent variables in columns (1)-(7) are the log of one plus the count of the total number of requirements for the companies to list in the exchange (out of a total of 16), the minimum amount of market capitalization, the minimum number of profitable years, the minimum amount of paid-up capital, the minimum free-float percent, the minimum number of shareholders, and the minimum amount of equity owned by shareholders. As discussed in the Data Section, if a requirement was not mentioned, we assumed that the requirement had a value of zero. All currency-based units are in millions of 2010 U.S. dollars. *High Shareholder Protection* equals one if the country index of protecting minority investor is above the median among all 113 countries that have an exchange. The protecting minority investor index ranges from a score of 0 to 100, representing the lowest performing economy and highest score respectively. The variables *Log(GDP)* and *Log(Population)* are the log of the PPP-adjusted GDP (in millions of 2010 U.S. dollars) and population respectively in a given year. More information on the variables is available in the Appendix and Table A2 of the Internet Appendix. The coefficients are estimated using Ordinary Least Squares (OLS) regressions. Standard errors are clustered at the exchange level. *** denotes significance at the 1% level, ** at the 5%, and * at the 10%.

	(1) Number of Listing Requirements	(2) Market Cap	(3) Profitable Years	(4) Paid up Capital	(5) Free Float	(6) Minimum Number of Shareholders	(7) Min. amount of equity owned
High Shareholder Protection	0.172	-0.108	0.096	2.784**	0.327	0.765	0.866
	(0.291)	(2.814)	(0.128)	(1.131)	(0.482)	(1.086)	(1.540)
Log(Population)	-0.020	-0.996	-0.002	0.797	0.321	-0.737	0.733
	(0.180)	(1.822)	(0.086)	(0.828)	(0.324)	(0.823)	(1.061)
Log(GDP)	0.145	1.114	0.049	-0.486	-0.307	0.526	0.531
	(0.145)	(1.331)	(0.073)	(0.553)	(0.270)	(0.554)	(0.810)
Entry year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	75	75	75	75	75	75	75
R-squared	0.352	0.374	0.433	0.555	0.418	0.420	0.422

Appendix: Definition of Variables

Variable	Units	Level	Description	Source
Country data				
GDP	USD 2010 millions	Country-Year	The total of all economic activity in one country, regardless of who owns the productive assets, Purchasing Power Parity-adjusted.	Economist Intelligence Unit
Population	Millions	Country-Year	Total population of a country	Economist Intelligence Unit
Patent applications	Count	Country-Year	The total number of patent applications filed annually by the country of residence of the applicant.	World Intellectual Property Organization's Intellectual Property Statistics database
VC funding	USD 2010 Millions	Country-Year	Venture capital investment in a country by both domestic and foreign VC firms across all industries. Excludes Buyout, Fund of Funds, Generalist Private Equity, Mezzanine, Other Investor (Non-Private Equity), Other Private Equity, and Real Estate investments	National and regional associations & SDC Platinum's VentureXpert
Domestic credit to private sector	Percent	Country-Year	This measures non-equity securities provided to the private sector by financial institutions as a percent of GDP. The data are taken from the survey of financial corporations' included in the International Monetary Fund's International Financial Statistics.	World Bank Financial Sector database
Market capitalization	Percent	Country-Year	Total value of all listed shares in a stock market as a percentage of GDP.	World Bank Global Financial Development Database June 2017
Stock Value	Percent	Country-Year	Total value of stocks traded as percent of GDP	World Federation of Exchanges database
Minority shareholder protection	Index	Country	The index measures minority shareholder protections against directors' misuse of corporate assets for personal gain. The data are based on a questionnaire administered to corporate and securities lawyers and explore the extent to which shareholders may be protected against misuse of corporate assets, based on their shareholder rights, governance safeguards, and corporate transparency requirements. The index is on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier.	World Bank Doing Business - Protecting Minority Investors database
Legal origin	Dummy	Country	The "common law" dummy variable takes the value 1 if the country has a common law and 0 otherwise, and so forth.	LLSV 1999
Exchange data				

Entry Year	Year	Exchange	The year of creation of the exchange. We considered the one year before the first IPO on the exchange as the entry year when we could not find the exact entry year of the exchange.	International Encyclopedia of the Stock Market, World Stock Exchange Factbook, and others
Exit Year	Year	Exchange	The year in which the exchange closed. We considered two years after the year of the last IPO as the exit year if we did not have explicit exit year for an exchange.	International Encyclopedia of the Stock Market, World Stock Exchange Factbook, and others
Survival time of exchange	No. of years	Exchange	Difference between exit and entry year of an exchange that exited	Computed by authors
Years in operation	No. of years	Exchange	Difference between exit year and entry year or year 2017 if the exchange is still operational	Computed by authors
Number of listing requirements	Count	Exchange	An index of 16 listing requirement described below. Each requirement was weighted equally and the index ranges from 0 (not having any requirement across all the categories) to 16 (having an explicit requirement for all categories). If a requirement is not specified, we assumed that the exchange did not have that requirement and assign it a value of zero. Definitions of specific listing requirements are listed in Table A2 of the Internet Appendix.	International Encyclopedia of the Stock Market, World Stock Exchange Factbook and others
Company data				
Number of IPOs	Count	Company	Initial public offerings with non-zero global proceeds across all markets. Excludes IPOs that were withdrawn, rejected, or postponed. Also excludes ADRs, unit offerings, offers with warrants, closed end funds, and REITs, spin-offs, investment trusts, private placements, and financial firms.	SDC Platinum's Platinum Global New Issues database, Bloomberg, and S&P Capital IQ
Total proceeds	USD 2010 Millions	Company	Global proceeds raised in initial public offerings across all markets. Excludes IPOs that were withdrawn, rejected, or postponed. Also excludes ADRs, unit offerings, offers with warrants, closed end funds, and REITs, spin-offs, investment trusts, private placements, and financial firms. Also excludes offerings with zero or missing proceeds. Proceeds are in constant 2010 U.S. dollars	SDC Platinum's Platinum Global New Issues database, Bloomberg, and S&P Capital IQ