

Initial Public Offerings: International Insights

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ABSTRACT OF ARTICLE

This paper discusses evidence on the short-run and long-run performance of companies going public in many countries. Differences in average initial returns are analyzed in terms of binding regulations, contractual mechanisms, and the characteristics of the firms going public. The evidence suggests that the move in recent years by most East Asian countries to reduce regulatory interference in the setting of offering prices should result in less short-run underpricing in the 1990s than in the 1980s. Evidence is presented that companies successfully time their offerings for periods when valuations are high, with investors receiving low returns in the long-run. Implications for investors, issuers, and regulators are discussed.

The following table updates Table 1 of the *Pacific-Basin Finance Journal* article, with the inclusion of data from Argentina, Austria, Bulgaria, China, Cyprus, Denmark, Egypt, Greece, India, Indonesia, Iran, Ireland, Israel, Jordan, Mauritius, Morocco, Nigeria, Norway, Pakistan, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Sri Lanka, Tunisia, Turkey, the United Arab Emirates, and Vietnam, and updated information from all of the original 25 countries. For recent years, Dealogic is the source of some of the data. The numbers are updated through the end of 2018 for some of the 54 countries.

A version of this table with 38 countries was published as “Differences between European and American IPO Markets” by Jay R. Ritter in *European Financial Management* Vol. 9, No. 4 (December 2003), pp. 421-434.

Year-by-year PowerPoint figures for some of these countries can be found elsewhere on Jay Ritter’s website.

Table 1
Equally weighted average initial returns for 54 countries

Country	Source	Sample Size	Time Period	Avg. Initial Return
Argentina	Eijgenhuijsen & van der Valk; Dealogic	30	1991-2018	5.7%
Australia	Lee, Taylor & Walter; Woo; Pham; Dealic	2,069	1976-2018	19.8%
Austria	Aussenegg; Dealogic	106	1971-2018	6.2%
Belgium	Rogiers, Manigart & Ooghe; Manigart DuMortier; Dealogic	154	1984-2017	11.0%
Brazil	Aggarwal, Leal & Hernandez; Saito; Ushisima; Dealogic	303	1979-2018	30.3%
Bulgaria	Nikolov	9	2004-2007	36.5%
Canada	Jog & Riding; Jog & Srivastava; Kryzanowski, Lazrak & Rakita; Ritter	758	1971-2017	6.4%
Chile	Aggarwal, Leal & Hernandez; Celis & Maturana; Dealogic	86	1982-2018	6.9%
China	Chen, Choi, & Jiang; Jia, Xie, Zhang, & Ritter	3,554	1990-2017	157.7%
Cyprus	Gounopoulos, Nounis, and Stylianides; Chandriotis	73	1997-2012	20.3%
Denmark	Jakobsen & Sorensen; Ritter	173	1984-2017	7.4%
Egypt	Omran; Hearn	74	1990-2017	9.4%
Finland	Keloharju; Dealogic	209	1971-2018	14.2%
France	Husson & Jacquillat; Leleux & Muzyka; Paliard & Belletante; Derrien & Womack; Chahine; Ritter; Vismara; Dealogic	834	1983-2017	9.7%
Germany	Ljungqvist; Rocholl; Vismara; Dealogic	779	1978-2014	23.0%
Greece	Nounis, Kazantzis & Thomas; Thomadakis, Gounopoulos & Nounis	373	1976-2013	50.8%
Hong Kong	McGuinness; Zhao & Wu; Ljungqvist & Yu; Fung, Gul, and Radhakrishnan; Dealogic	2,042	1980-2017	44.5%
India	Marisetty and Subrahmanyam; Dealogic	3,145	1990-2017	85.2%
Indonesia	Suherman	531	1990-2017	26.4%
Iran	Bagherzadeh	279	1991-2004	22.4%
Ireland	Dealogic	38	1991-2013	21.6%
Israel	Kandel, Sarig & Wohl; Amihud & Hauser; Ritter	348	1990-2006	13.8%
Italy	Arosio, Giudici & Paleari; Cassia, Paleari & Redondi; Vismara	312	1985-2013	15.2%
Japan	Fukuda; Dawson & Hiraki; Hebner & Hiraki; Pettway & Kaneko; Hamao, Packer, & Ritter; Kaneko & Pettway	3,488	1970-2016	44.7%
Jordan	Al-Ali and Braik	53	1999-2008	149.0%
Korea	Dhatt, Kim & Lim; Ihm; Choi & Heo; Mosharian & Ng; Cho; Joh; Dealogic; Lee	1,758	1980-2014	58.8%
Malaysia	Isa; Isa & Yong; Yong; Ma; Dealogic	562	1980-2018	51.0%

Country	Source	Sample Size	Time Period	Avg. Initial Return
Mauritius	Bundoo	40	1989-2005	15.2%
Mexico	Aggarwal, Leal & Hernandez; Eijgenhuijsen & van der Valk; Villarreal	149	1987-2017	9.9%
Morocco	Alami Talbi; Hearn	33	2000-2011	33.3%
Netherlands	Wessels; Eijgenhuijsen & Buijs; Jenkinson, Ljungqvist, & Wilhelm; Ritter	212	1983-2017	13.3%
New Zealand	Vos & Cheung; Camp & Munro; Alqahtani; Dealogic	269	1979-2018	15.9%
Nigeria	Ikoku; Achua; Dealogic	125	1989-2017	12.8%
Norway	Emilsen, Pedersen & Sættem; Liden; Dealogic; Fjesme	266	1984-2018	6.7%
Pakistan	Mumtaz	80	2000-2013	22.1%
Philippines	Sullivan & Unite; Dealogic	173	1987-2018	17.3%
Poland	Jelic & Briston; Woloszyn	309	1991-2014	12.7%
Portugal	Almeida & Duque; Dealogic	33	1992-2017	11.5%
Russia	Dealogic	64	1999-2013	3.3%
Saudi Arabia	Al-Anazi, Forster, & Liu; Alqahtani	80	2003-2011	239.8%
Singapore	Lee, Taylor & Walter; Dawson; Dealogic	687	1973-2017	25.8%
South Africa	Page & Reyneke; Ali, Subrahmanyam & Gleason; Dealogic	316	1980-2013	17.4%
Spain	Ansotegui & Fabregat; Alvarez Otera; Dealogic	199	1986-2018	9.2%
Sri Lanka	Samarakoon	105	1987-2008	33.5%
Sweden	Rydqvist; Schuster; de Ridder	405	1980-2015	25.9%
Switzerland	Kunz, Drobotz, Kammermann & Walchli; Dealogic	164	1983-2013	27.3%
Taiwan	Chen; Chiang	1,620	1980-2013	38.1%
Thailand	Wethyavivorn & Koo-smith; Lonkani & Tirapat; Ekkayokkaya and Pengniti; Vithessonthi; Dealogic	697	1987-2018	40.0%
Tunisia	Hearn, Dealogic	38	2001-2014	21.7%
Turkey	Kiyamaz; Durukan; Ince; Kucukkocaoglu; Elma; Dealogic	404	1990-2014	9.6%
United Arab Emirates	Alanzi & Al-Zoubi	24	2003-2010	270.1%
United Kingdom	Dimson; Vismara; Levis; Doukas & Hoque	5,185	1959-2016	15.8%
United States	Ibbotson, Sindelar & Ritter; Ritter	13,134	1960-2018	16.8%
Vietnam	Tran, Le & Hoang	69	2005-2012	49.1%

Sources: See references listed in the published 1994 article and updates listed below. Where more than one set of authors is listed as a source of information, combined sample sizes have been constructed. Average initial returns are constructed in different manners from study to study. In general, in countries where market prices are available immediately after offerings, the one-day raw return is reported. In countries where there is a delay before unconstrained market prices are reported, market-adjusted returns over an interval of several weeks are reported. All of the averages weight each IPO equally.

The Argentine numbers are from Hans Eijgenhuijsen and Rob van der Valk for 20 IPOs from 1991-1994. Dealogic is the source for 10 IPOs from 2007-2018. The Australian numbers for 1990-95 are from Li-Anne Woo's University of New South Wales (UNSW) dissertation. The 1996-2005 Australian numbers are from Peter Pham at the UNSW. The 2006-18 numbers are from Dealogic. Note that most Australian IPOs are very small with an offer price of 20 cents per share, raising A\$3-8 million, and are frequently in the mining industry. The Austrian numbers are from Wolfgang Aussenegg's Vienna University of Technology working paper for 1984-2006, and from him for 2007-2013. Only main market IPOs are included. For 2014-2018, Dealogic is the source. The updated Belgian numbers come from Sophie Manigart of the University of Ghent, with assistance from Alexander Ljungqvist of NYU. For 2000-2004, the Belgian numbers are from Christophe DuMortier. For 2005-2017, the Belgian numbers are from Dealogic, and include Belgian companies that went public in continental Europe.

The Brazilian numbers (62 IPOs with 78.5% underpricing) from 1979-1990 are from Aggarwal, Leal, & Hernandez, and (44 IPOs with 6.7% underpricing) from 2004-2006 are from Dealogic. There are also 74 IPOs from 1995-2003 with unknown underpricing. Richard Saito has also provided numbers from 2004-2006. The 1997-2006 volume numbers are from Emerson Faria, based on information at www.boverspa.com.br. The 2007-2011 numbers (95 IPOs with average underpricing of 3.3%) are from Roberto Ushisima. For 2012-November 2018, the 28 IPOs with 3.2% average underpricing are from Dealogic. The Bulgarian numbers for 2004-January 2007 are from von Georgi Nikolov's University of Innsbruck dissertation.

The updated Canadian numbers are from Lawrence Kryzanowski, Skander Lazrak, and Ian Rakita's 2006 *Multinational Finance Journal* article "The Behavior of Prices, Trades and Spreads for Canadian IPOs." For 2003-2016, I have used numbers calculated from Dealogic, using Toronto Stock Exchange-listed IPOs only, and excluding unit offers as well as closed-end funds and REITs. For 2005-2016, I have used numbers from Dealogic and the Toronto Stock Exchange.

The updated Chilean numbers are from Cristian Celis and Gustavo Maturana's 1998 *Revista ABANTE* article and from Franco Parisi, Joseph Ganitsky, and Antonio Parisi's "The Intra-day Returns Approach in Chilean IPOs." For 2004-2018 (downloaded Dec. 13, 2018), I have used numbers from Dealogic.

The Chinese numbers for 1990-2005 are from Zhaohui Chen, Jongmoo Jay Choi, and Cao Jiang's 2007 Temple University working paper "Corruption in State Owned Firms: Evidence from China's IPOs." Their numbers are consistent with Lihui Tian and William Megginson's 2006 Peking University and University of Oklahoma working paper "Extreme Underpricing: Determinants of Chinese IPO Initial Returns" for 1992-2000 and Shiguang Ma and Robert Faff's April 2007 *Pacific-Basin Finance Journal* article "Market Conditions and the Optimal IPO Allocation Mechanism in China" for 1994-2003. For 2006-2016, data are provided by Chunxin Jia of Peking University, Jay R. Ritter of the University of Florida, Zhen Xie of Shanghai University of Finance and Economics, and Donghang Zhang of the University of South Carolina "Pre-IPO Analyst Coverage: Hype or Information Production?" For 2017, data is provided by Shunlin Song of Central University of Finance and Economics. Chinese IPOs are A shares traded domestically. In 2014, a new regulation limiting stock price changes on the first day of trading was implemented, resulting in a cap of 44% on the first day return, and 10% price changes on subsequent days. The CSRC also started to implement an offer price ceiling of a price-earnings ratio of 23. Consequently, for 2014-2017, average initial returns are computed over a window that is long enough so that an unconstrained market price is established. In 2015-2017, average underpricing of 200% has reappeared.

Data from Cyprus are provided by Dimitrios Gounopoulos, Christos Nounis, and Paris Stylianides for 1999-2002, whose 2008 *Journal of Financial Decision Making* article "The Short and Long Term Performance of Initial Public Offerings in the Cyprus Stock Exchange" reports numbers for 75 IPOs. The numbers for 51 IPOs reported here exclude 24 IPOs that raised less than U.S.\$1 million (2007 purchasing power). Dimitrios Gounopoulos of the U of Surrey has supplied data for 15 Cypriot IPOs from 2003-2011, and Athos Chandriotis has supplied numbers for 1997-1998. The Danish numbers are from Jan Jacobsen and Ole Sorensen at Copenhagen Business School for 1984-1998, with Dealogic being the source for 1999-2006 (with confirmation from Christian Nielsen) and 2007-2016. The Egyptian numbers for 1990-2000 are for share issue privatizations only, and are in Table 2 of Mohammed Omran's Summer 2005 *Journal of Financial Research* article "Underpricing and Long-run Performance of Share Issue Privatizations in the Egyptian Stock market." The 2001-2009 numbers are from Bruce Hearn of the University of Sussex. The 2010-2017 numbers are from Dealogic. The Finnish numbers are from Matti Keloharju, and from 2014-2018 from Dealogic.

The French numbers from 1993-98 are from Francois Derrien and Kent Womack. The French numbers from 1999-2000 are from Salim Chahine. The French numbers from 2001-2006 and 2009-2017 are from Dealogic, and exclude Marché Libre IPOs. The 2007-2008 French numbers are from Silvio Vismara. For 2009-2017, closed-end funds, RIETs, trusts, and investment funds are excluded, and for 2011 three IPOs with proceeds of less than \$100,000 are also excluded. The German numbers are a weighted average of 27.7% for 407 IPOs from 1978-1999 from Alexander Ljungqvist and 41.0% for 138 Neuer Market IPOs from 2000-2001, with the latter numbers from Jorg Rocholl's 2005 University of North Carolina working paper. For 2002-2006, data on the 107 IPOs comes from Dealogic. For 2007-2009, Silvio Vismara has supplied numbers from the *EurIPO Factbook*. For 2010, the Deutsche Borse website is the source.

The Greek numbers for 1987-1994 can be found in a chapter in Mario Levis' 1996 book *Empirical Issues in Raising Equity Capital*, but the reported numbers for 1976-1989 are from a working paper by Christos Nounis of the National and Kapodistrian University of Athens, and the 1990-2006 numbers are from "Price Cap Effect in the Performance of Greek IPOs" by S. Thomadakis, D. Gounopoulos, and C. Nounis, which uses the first unconstrained market price. Dimitrios Gounopoulos reports that 2010-2013 saw zero IPOs in Greece. Zhao and Wu's Hong Kong numbers are from a City University of Hong Kong working paper. For 1997-2001, the Hong Kong numbers are from Alexander Ljungqvist and Xiaoyun Yu's 2003 working paper "Stock market development, liquidity, and corporate governance." For 2002-2003, the Hong Kong numbers are from Simon Yu Kit Fung, Ferdinand A. Gul, and Suresh Radhakrishnan's "Investment Banks' Repeated IPO Business Opportunities and IPO Underpricing." For 2004-2017, the Hong Kong numbers are from Dealogic, and include GEM IPOs. The average first-day return on GEM IPOs is much higher than on Main Board IPOs. For 241 GEM IPOs from 2009-2017, the average proceeds were US\$11.9 million with an average first day return of 282.3%, with approximately 10% of GEM IPOs having a first-day return of over 1,000%. The average first-day return on 665 Main Board IPOs was 7.7%. Steve Dawson of the University of Hawaii has confirmed the Hong Kong numbers for the early years.

The average initial return for India from 1990-2003 is from the NYU working paper "Group Affiliation and the Performance of Initial Public Offerings in the Indian Stock Market," by Vijaya B Marisetty and Marti G. Subrahmanyam. The average initial return for 1992-93 would be only 35.3% based upon IPOs with an offer price of above 10 Rupees, with the data coming from the 2002 *Managerial Finance* article by Chandra Krishnamurti and Pradeep Kumar. This is only about one-third of the unconditional average for these two years. Indian data for 2005-2007 has been supplied by Vijayi Marisetty. IPOs from 2004-2017 are from Dealogic, excluding SME offerings. Most SME offers have proceeds of less than US\$1 million. The Indonesian numbers for 1990-2017 are from Suherman of the State University of Jakarta, confirmed for 2002-2003 by Freddy Danny.

The Iranian numbers from 1991-2004 are from Saeed Bagherzadeh's 2006 University of Tehran working paper "The Initial Public Offerings Underpricing and Long-Run Underperformance in the Iranian Emerging Stock Market: Some Empirical Evidence." The Irish numbers are from Dealogic. The Israeli numbers are from Yakov Amihud and Shmuel Hauser's 2001 NYU working paper. Kandel, Sarig, and Wohl's *Review of Financial Studies* article covers the period after Israeli auctions with no price limits became mandatory. For 1999-2006, the numbers for 63 Israeli IPOs are from Dealogic. Many Israeli IPOs are unit offerings, and first-day returns must be carefully constructed to avoid using a unit offer price and market price per share. The updated Italian numbers are from a working paper by Arosio, Giudici and Paleari of Politecnico di Milano and Università degli Studi di Bergamo through 2000, and from Cassia, Paleari & Redondi for 2001. For 2002-2013, the numbers have been supplied by Silvio Vismara using the EurIPO database.

The updated Japanese numbers are from Hamao, Packer and Ritter's 2000 *Pacific-Basin Finance Journal* article for 1989-1995 OTC firms, and from Takashi Kaneko and Richard Pettway's "Auctions versus Book-Building Underwriting of Japanese IPOs: OTC, Mothers, and Nasdaq-Japan Issues" for 1996-1997. Takashi Kaneko also supplied numbers on TSE-listed IPOs from 1992-1997. Numbers from 1998-2009 are from Kaneko and Pettway and can be found at <http://www.fbc.keio.ac.jp/~kaneko/KP-JIPO/top.htm>. (This web site also gives individual IPO data.) It should be noted that the Japanese average initial returns are sensitive to whether some very small issues are included, and whether the first trading day close is used or the close on the first day that price limits are not a binding constraint. For example, in December 2006, Piped Bits raised ¥420 million (about \$4 million) by selling 2,000 shares at an offer price of ¥210,000 per share, with a first-day close of ¥430,000 (probably constrained by price limits) and a one-week close of ¥1,200,000 (up 471%). Also in December 2006, eBase sold 1,000 shares at ¥185,000 per share, raising less than \$2 million. The

stock closed at ¥428,000 on the first day and ¥890,000 after one week (up 381%). The 1998-2009 numbers use the first closing market price that is unconstrained by price limits. For 2010, 2011, 2014, and 2016, TokyoIPO.com is the source. For 2012 and 2013, Takashi Kaneko of Keio University is the source. For 2015, Takato Hiraki of Tokyo University of Science is the source. For 2015 and 2016, the average first-day returns on IPOs raising more than ¥2 billion were 15.8% and 9.5%, respectively, whereas smaller IPOs had average first-day returns of 117.3% and 96.5%, respectively.

Jordanian numbers are from Asaad H. Al-Ali and Fayza A. Braik's "An Empirical Investigation of Initial Public Offerings (IPOs) Short Term Underpricing—Evidence in the Jordanian Stock Market" in the *Arab Journal of Administrative Sciences* Vol. 18, No. 2 (2011). 49 of the 53 IPOs are from 2006-2008, with the highest market-adjusted initial returns in 2005 and 2006.

The updated Korean numbers are from Byung Kyun Ihm's 1997 *Korean Journal of Financial Management* and Choi and Heo's 2000 *Korean Journal of Finance* articles, for years through 1996. For 1997-1999, David Ng has supplied the data. For 2000-2009, 963 IPOs from Sung Wook Joh are used, with 7-day returns used for 2000-2003 and first-day returns used for 2004-2009. Seven-day returns are used because of price limits of 124% or 130% for the first day. For 2004-2008, KSE first-day returns supplied by Sungil Cho of Chung-Ang University give very similar numbers. The 1980-1999 average is 74.3% for 558 IPOs, and the 2000-2009 average is 57.2% for 963 IPOs. For 2010, Dealogic is the source with seven-day returns used. For 2011-2012, Dealogic is the source with 1-day returns used unless the 130% price limit is hit, in which case 7-day returns are used. For 2013-2014, Seokhoon Lee of KCMI is the source.

The numbers for Malaysia come from several sources: Isa, Isa and Yong, and Othman Yong, and Dealogic. The numbers for most years have been confirmed by Steve Dawson of the University of Hawaii. In general, only Main Board IPOs are included for 1993 and later. Yong has provided numbers separating the main board, second board, and MESDAQ, with the majority of IPOs from 1991-2006 on the second board. There is a 2007 *Journal of Business Finance & Accounting* article by Ahmad, Cambell, and Goodacre that covers 1990-2000. Yusaf P. Ma has provided numbers for 1991-2009 in which all three markets are aggregated, and his numbers are very close to Othman Yong's numbers. For 2007-2008, I have used his numbers for all markets. Even on the main board, many IPOs raise less than US\$5 million. For 2010-2018, Dealogic data is used (downloaded on Dec. 13, 2018), with second board IPOs included but MESDAQ IPOs excluded. Numbers for Mauritius are from Sunil Kumar Bundoo's 2007 *African Journal of Accounting, Economics, Finance, and Banking Research* article "An Analysis of IPOs Underpricing in Mauritius."

Numbers for several European countries for the 1992-99 period are supplied by Jenkinson, Ljungqvist, and Wilhelm, who compiled data for their 2003 *Review of Financial Studies* article. The Mexican numbers for 1991-1994 (51 IPOs with 3.45% underpricing) are from Hans Eijgenhuijsen and Rob van der Valk. For 1995-1999, Josef Schuster and Dealogic are the source of information. For 2000-2012, numbers supplied by the author for Cuauhtemoc Villarreal's December 2013 *Journal of Economics, Finance, and Administration* article is the source, with 21 IPOs having a -0.57% average first-day return. For 2013-2017, Dealogic is the source of Mexican numbers. Information from Morocco for 2004-2007 is from Fatima-Zohra Alami Talbi's 2011 *Banque et Stratégie* article "Les entreprises introduites en Bourse sont-elles correctement évaluées ?" For 2000-2003 and 2008-2011, Bruce Hearn of the University of Sussex is the source. For 2000-2003 and 2008-2010, I have used the end-of-the first week price in that it appears that daily price limits constraint large price rises.

For the Netherlands, the 2000-2006 numbers are from Dealogic and Silvio Vismara, and 1983-1999 numbers have been supplied by Tjalling van der Goot of the University of Amsterdam. The New Zealand numbers for 1992-99 are from a University of Auckland and University of Melbourne working paper by Graeme Camp and Robert Munro. The 2000-2004 numbers for New Zealand have been supplied by Graeme Camp. Data for 2005-2006 and 2011-2018 come from Dealogic. For 2007-2010, the numbers are from Faisal Alqahtani. The Nigerian numbers for 61 IPOs from 1989-1993 are from a University of Southern California working paper by Ikoku. For the 51 IPOs from 1995-2006, the source is Joseph Achua's 2007 University of Nigeria dissertation "Price Performance of Initial Public Offerings: Empirical Evidence from Deregulated Nigerian Capital Market." Data for 1994 is missing. For 2007-2017, Dealogic is the source of information for 13 IPOs, although only 10 have prices.

The Norwegian numbers for 1984-1996 are from N. Haug Emilsen, K. Pedersen, and Frode Sættem, 1997, *Børsintroduksjoner, BETA - Tidsskrift for bedriftsøkonomi* 11, 1-13 (in Norwegian). For 1997-2001, they are from Erik Liden, and from 2002-2016, they are from Dealogic, with corrections from Sturla Fjesme. The Pakistani

numbers are from Muhammad Zubair Mumta'z NUST Business School 2014 working paper "An Examination of Short-run Underpricing of IPOs Using Extreme Bounds Analysis."

The Philippine numbers are from Michael Sullivan and Angelo Unite's 2001 *Pacific-Basin Finance Journal* article for 1987-1997, and Dealogic for 1999-2018 (downloaded Dec. 13, 2018).

The Polish numbers are from Jelic and Briston's 2003 *European Financial Management* article for 1991-1998, from Dealogic for 1999-2004, and from Adrian Woloszyn for 2005-2014. Starting in 2007, the Polish New Connect market has had many IPOs, primarily of small companies, but only Warsaw Stock Exchange IPOs are included. The New Connect market offers are designed for less than 100 investors and according to Polish law are private placements. Only WSE offers raising capital are included, with other debuts excluded. For example, the 172 debuts on the New Connect market in 2011 are not included, and only 27 of the 38 debuts on the WSE are included. If both a price for shares and for rights to shares are posted, the rights to shares price is used. In Poland, court registration of shares is required, and this frequently takes several days, so the rights to shares price would correspond to the first closing market price. The Portuguese numbers are from Miguel Almeida and Joao Duque's chapter in *Initial Public Offerings: An International Perspective*, edited by Greg. N. Gregoriou (Elsevier, 2006) for 1992-1998, and from Dealogic for 1999-2017. Russian numbers are from Dealogic.

Saudi Arabian numbers through 2010 come from the 2011 Griffith University working paper "IPOs Underpricing in a Demand and Supply Simultaneous Model" by Ahmed Al-Anazi, John Forster, and Benjamin Liu. The authors note that Saudi Arabian IPOs are sold only to domestic investors, and that the largest 32 IPOs in their sample have average underpricing of 170.5% and the other 44 IPOs have average underpricing of 332.8%. Faisal Alqahtani of Taibah University in Saudi Arabia and the University of Auckland supplied 2011 numbers and year-by-year numbers for 2003-2011. The 2003-2010 numbers are also published in the 2015 *Journal of Multinational Financial Management* article "Extreme IPO Underpricing and the Legal Environment in Wealthy Emerging Economies," by Ahmed S. Alanazi and Haitham A. Al-Zoubi.

Numbers for Singapore from 1992-2001 are from Steve Dawson of the University of Hawaii. Singaporean numbers for 2002-2011, and 2013-17 are from Dealogic. For 2007 and 2012, the 14 Dealogic-listed offerings on Catalist are not included; they have a median proceeds of only US\$5 million. The South African numbers are from Page and Reyneke's Oct-Dec 1997 *Journal of Business, Finance, and Accounting* article "The Timing and Subsequent Performance of Initial Public Offerings on the Johannesburg Stock Exchange" for 1980-1991. For 1995-2004, the numbers are from Alli, Subrahmanyam, and Gleason's "Short and Long Run Performance of IPOs in Post-Apartheid South Africa." See also C. Correia and G. Holman's "An Analysis of Underpricing and Aftermarket Performance of Initial Public Offerings on the Alternative Exchange (AltX)" in the 2008 *South African Journal of Accounting Research* (Vol. 22, No. 1), pp. 97-117. For 2005-20013, the numbers are from Dealogic, and for 2007-2013 they exclude AltX offerings. (For 1995-2002, Josef Schuster reports much higher average first-day returns for South Africa.)

The updated Spanish numbers are from an ESADE working paper by Carmen Ansotegui and Jordi Fabregat and working papers by Susana Alvarez Otera. For 2005-2008, Spanish numbers for 24 IPOs are from Dealogic, with the offerings on the Mercado Alternativo Bursatil (Madrid Stock Exchange Alternative Market) excluded, since they are small offers, with a median proceeds of only US\$4.5 million. For 2009-2018, I include the Alternative Market IPOs. Sri Lanka numbers come from the 2010 *Journal of Multinational Financial Management* "The Short-run Underpricing of Initial Public Offerings in the Sri Lankan Stock Market" by Lalith P. Samarakoon. Swedish numbers from 1991-1994 are from Josef Schuster, and for 1995-2015 are provided by Adri de Ridder. For Sweden, offerings on the Aktie Torget and Nordic Growth Market (typically U.S.\$1-3 million in proceeds) from 2009-later are excluded. The Swiss numbers are from a University of Basel working paper by Wolfgang Drobetz, Matthias Kammermann, and Urs Walchli, and for 2001-2006 from Dealogic. For 2007-2008, *EurIPO Factbooks* is the source.

The updated Taiwanese numbers are from Hsuan-Chi Chen of the University of New Mexico. Published numbers for smaller samples are contained in a 1997 *Journal of Financial Studies* article by Lin and Sheu and a Hong Kong University of Science and Technology working paper by Gwohorng Liaw, Yu-Jane Liu, and John Wei for 52 auctions from 1995-1998. For the auctions, the average first-day return of 15.06% is computed as an average of the quantity-weighted average price paid in the discriminatory auction tranche and the fixed price paid for the other tranche. Each tranche has a 50% weight. Chiang, Qian, and Sherman (2010 *Review of Financial Studies*) also report numbers for

auctions. The 2007-2013 Taiwanese numbers are from Yao-Min Chiang of National Taiwan University, and include the numbers in Chang, Chiang, Qian, and Ritter's 2017 *Review of Financial Studies* article "Pre-Market Trading and IPO Pricing: Evidence" for 188 bookbuilt IPOs for 2006-2010.

Thai numbers are from a working paper by Ravi Lonkani (Payap University) and Sunti Tirapat (Chulalongkorn University), for 2000-2006 from Dealogic, and for 2007 from Manapol Ekkayokkaya and Pengniti's Chulalongkorn University paper "Governance Reforms and IPO Underpricing," which covers 1990-2007. The source of 2008 numbers for Thailand is Chaiporn Vithessonthi's "What Explains the Initial Return of Initial Public Offerings after the 1997 Asian Financial Crisis? Evidence from Thailand", a 2013 University of Otago working paper available on SSRN. For 2009-2018 (through November), I use Dealogic data, after excluding 7 fund IPOs, for 226 IPOs on the Stock Exchange of Thailand (110) and the Market for Alternative Investment (116). For IPOs with a first-day return of 200%, the price limit, the initial return is calculated using the one-week price. The average initial return is 32.0% for the 110 SET IPOs and 64.8% for the 116 MAI IPOs. The average deal value (no inflation adjustment, in U.S. dollars), is \$12.0 million for MAI IPOs and \$88.2 million (with two missing proceeds) for SET IPOs. The Tunisian numbers are from Bruce Hearn of the University of Sussex.

The Turkish numbers are from Halil Kitmaz's June 2000 *Journal of Multinational Financial Management* article "The Initial and Aftermarket Performance of IPOs in an Emerging Market: Evidence from Istanbul Stock Exchange" for 1990-1996, and for 1997-2004 from Prof. Banu Durukan of Dokuz Eylul University. The Turkish numbers have been calculated with assistance from Prof. Ozgur Ince of Virginia Tech. For 2005-2008, the Turkish numbers are from Guray Kucukkocaoglu, based on the Baskent University working paper with Ozge Sezgin "IPO Mechanism Selection by Using Classification and Regression Trees (CART)." See also Recep Bildik and Mustafa K. Yilmaz "The Market Performance of Initial Public Offerings on the Istanbul Stock Exchange" on pp. 49-75 of the 2008 *Bankacilik ve Finansal Piyasalar*, where slightly lower average first-day returns are given for 1990-2000. The 2009-2011 numbers are from Dealogic. The 2012-2013 numbers are from Orhan Emre Elma of Adana Science and Technology University.

Numbers for the U.A.E. for 2003-2010 come from Table 2 in the 2015 *Journal of Multinational Financial Management* article "Extreme IPO Underpricing and the Legal Environment in Wealthy Emerging Economies," by Ahmed S. Alanazi and Haitham A. Al-Zoubi.

The U.K. numbers for 2000-2006 and 2012 are from Mario Levis of the Cass Business School of City University. UK numbers from 2007-2009 have been supplied by Silvio Vismara using *EurIPO Factbook* information, and Dealogic is the source for the 2010-11 numbers. For 2013-2016, "Why IPO Issuers Prefer the AIM When They Can List for Less on the Main Market?" by John Doukas and Hafiz Hoque is the source for 253 IPOs.

The U.S. numbers are from Ibbotson, Sindelar, and Ritter's 1994 *Journal of Applied Corporate Finance* article for 1960-1979, and from Jay Ritter's website for 1980-2018. The 1980-2018 numbers define IPOs to be CRSP-listed operating companies, with the following exclusions: closed-end funds, REITs, SPACs, natural resource limited partnerships, bank and S&L offerings, small best effort offerings, units, ADRs, and IPOs with an offer price below \$5 per share. Data comes from multiple sources, including SDC and Dealogic.

For Vietnam, the source is the market-adjusted abnormal returns in Table 2 of Thi Hai Ly Tran, Dat Chi Le, and Thi Phuong Thao Hoang's 2015 *International Journal of Business and Emerging markets* article "The Underpricing and Long-run Underperformance of Initial Public Offerings: Evidence from Vietnam".

The numbers for some countries represent the average first-day return on IPOs for which the company is headquartered in that country. For Belgium, for example, during 1991-1999, 61 companies went public, for which first-day return information is available on 41 IPOs. Of the 61 IPOs, 39 went public on the Brussels Stock Exchange, 3 on Nasdaq, 9 on Easdaq, and 10 on Euro.NM. Of the 3 Nasdaq IPOs by Belgian companies (Lernout et Hauspie, Xiekon, and ICOS Vision Systems), only Xiekon was an American Depositary Share (ADS) issue. The other 2 Nasdaq IPOs have been included in the U.S. totals, resulting in double-counting. The U.S. numbers exclude ADS issues, but in general include other foreign firms going public in the U.S. Many larger Canadian companies and Israeli tech companies went public in the U.S. in the 1990s. The Israeli numbers in the table are based on Israeli companies going public in Israel.

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