

## Chapter 5

### Reenergizing the IPO Market

*Jay R. Ritter, University of Florida*

To be published in *Restructuring to Speed Economic Recovery*, edited by Martin Bailey, Richard Herring, and Yuta Seki, forthcoming Brookings Press, 2013

From 1980–2000, an annual average of 310 operating companies went public in the United States. During 2001–12, on average, only 99 operating companies went public.<sup>1</sup> This decline occurred in spite of the doubling of real gross domestic product (GDP) during this 33-year period. The decline was even more

---

**[blind note]** Some of the content of this article overlaps with my testimony before the U.S. Senate Banking Committee on March 6, 2012 (Ritter 2012). The analysis of this paper draws heavily on my joint work with Xiaohui Gao and Zhongyan Zhu (Gao, Ritter, and Zhu 2013), Martin Kenney and Don Patton (Kenney, Patton, and Ritter 2012), and Stefano Paleari, Andrea Signori, and Silvio Vismara (Vismara, Paleari, and Ritter 2012, and Ritter, Signori, and Vismara 2013). I wish to thank Leming Lin for research assistance. For comments on an earlier draft, I wish to thank Barry Silbert, Harry DeAngelo, François DeGeorge, David Weild, and participants at the Kauffman Foundation Summer Legal Institute on July 23–25, 2012; the Brookings, Nomura, Wharton conference on Reconstructing and Revitalizing Japan’s Financial Sector on October 26, 2012; the Kellogg School conference on Security Market Auctions and IPOs on November 2–3, 2012; and the Brookings Institution conference on Promoting Innovative Growth on December 3, 2012.

1. “Operating-company” initial public offerings (IPOs) exclude closed-end funds, real estate investment trusts (REITs), special-purpose acquisition companies (SPACs) and other blind-pool offers, oil and gas limited partnerships, American Depositary Receipts (ADRs), unit offerings, penny stocks (IPOs with an offer price below \$5 per share), small best efforts offers, bank and savings and loan IPOs (most of which are conversions of mutual into stock companies), and stocks not listed on Nasdaq or the American or New York Stock Exchanges. Table 15 of “Initial Public Offerings: Updated Statistics” on my website at <http://bear.warrington.ufl.edu/ritter> gives the year-by-year number of IPOs excluded for each of these reasons.

severe for small-company initial public offerings (IPOs), for which the average volume dropped 83 percent, from 165 IPOs a year during 1980–2000 to only 28 a year during 2001–12. Figure 5-1 illustrates the pattern on a year-by-year basis for both small and big companies. Small and big companies are defined on the basis of inflation-adjusted (2009 dollars) annual sales in the twelve months prior to going public, using a cutoff of \$50 million to define small and big.

**[Figure 5-1 here]**

Many commentators have been alarmed at this prolonged drop in small-company IPOs, since it is the conventional wisdom that companies going public create many jobs. The *Wall Street Journal* editorial page has bought into this argument, as has Congress, culminating in the April 2012 passage of the Jumpstart Our Business Startups (JOBS) Act.

The JOBS Act is intended to encourage the funding of small businesses, primarily by easing various securities regulations. The JOBS Act, among other things, encourages crowdfunding; eliminates restrictions on general solicitation (that is, permits advertising securities offerings to the general public); creates a category of firms, emerging growth companies, defined as firms with less than \$1 billion in annual sales, and for their first five years as public companies exempts them from certain regulations, including some of the Sarbanes-Oxley regulations; increases the number of shareholders of record from 500 to 2,000 before public disclosure requirements are triggered; eliminates “quiet period” restrictions that had prohibited the analysts working for underwriters from publicly making buy and sell recommendations at the time of an IPO; raises the Regulation A limit on securities offerings for which there are fewer regulatory requirements from \$5 million to \$50 million; and requires the SEC to conduct a study on “the impact that decimalization has had on the number of initial public offerings.”

In this paper, I address why IPO volume, and especially small-company IPO volume, has been so depressed for more than a decade. The conventional wisdom is that the main culprits are a combination of heavy-handed regulation, especially the Sarbanes-Oxley (SOX) Act of 2002, a decline in analyst coverage of small firms, and lower stock prices since the 2000 technology bubble burst. I present an alternative explanation—the economies of scope hypothesis—that has very different policy implications. I also

discuss the effect of tick sizes on the IPO market, as this is the current focus of policy recommendations from the SEC's Advisory Committee on Small and Emerging Companies. I then discuss the number of jobs created by companies going public and the effect of alternative venues for cashing out and raising capital, SecondMarket and SharesPost. Lastly, I offer some thoughts on what can and should be done to reenergize the IPO market.

### **Heavy-Handed Regulation**

The most common explanation for the decline in IPO activity is a series of regulatory changes, with the Sarbanes-Oxley Act of 2002 shouldering the greatest blame. Motivated by the securities frauds perpetrated by WorldCom and Enron, Section 404 of SOX requires external audits of the internal control systems of publicly traded companies to ensure that their financial reports are accurate.<sup>2</sup> Following complaints that the Section 404 compliance costs were excessively high for small firms, at the end of 2007 small firms were exempted from many of the requirements.

If SOX costs were a major impediment to being public for small companies, small-company IPOs should have rebounded after 2007. Of course, the Panic of 2008 would have delayed this rebound, but 2010, 2011, and 2012 saw fewer, not more, small-company IPOs than in each year from 2004 to 2007. Furthermore, evidence from Europe suggests that heavy-handed regulation has not been the prime deterrent of small-company IPOs.

Following the success of London's exchange-regulated Alternative Investment Market (AIM), all of the major continental European stock exchanges have created second markets for small companies that are exchange regulated (that is, unregulated). Companies going public on these second markets have been exempt from many investor protection regulations.<sup>3</sup> In these papers, we document that public market

---

2. At their peak, Enron's market capitalization was over \$60 billion and WorldCom's was over \$180 billion. Enron declared bankruptcy in December 2001, and WorldCom declared bankruptcy in July 2002, wiping out equity investors.

3. See Vismara, Paleari, and Ritter (2012) and Ritter, Signori, and Vismara (2013).

investors have earned very low long-run returns on second-market IPOs in Europe, new listing volume on these markets was very low during 2008–11, and few of these companies have been reporting positive earnings per share, in spite of being exempt from many regulations applying to companies traded on the main markets.<sup>4</sup>

This evidence suggests that SOX has not been the primary reason that the volume of small-company IPOs has been low for more than a decade in the United States, although this does not mean that heavy-handed regulation has had no effect on IPO volume. It is difficult for regulators to strike the right balance between investor protection and efficient capital raising.

### **Analyst Coverage and IPO Activity**

Many people have argued that the SEC's Regulation FD in 2000 and the Global Settlement in 2003, along with other regulatory and technological changes, have contributed to the decline in analyst coverage for small stocks.<sup>5</sup> The implicit assumption, which I find to be very plausible, is that analyst coverage results in greater awareness of a stock's existence. The resulting increase in the number of potential investors leads to greater demand and a higher price relative to the price of other stocks that receive less attention.<sup>6</sup>

If there were more analyst coverage, what would be the effect on the IPO market? To quantify the answer, there are two steps. First, how much does analyst coverage boost a stock's price? Second, what is the sensitivity of IPO volume to increases in public market valuation?

---

4. IPO activity in Europe during 2011–12 was depressed partly by the Euro Zone crisis, which was associated with low stock returns on many European markets.

5. Regulation FD refers to fair disclosure and mandates that companies disclose material information to all recipients simultaneously, rather than leaking the information to favored analysts.

6. For analyst coverage to boost the market value of all stocks, at least some investors would have to decide to move a higher proportion of their assets into stocks from other asset classes as a result of analyst coverage.

Demiroglu and Ryngaert analyze 549 initiations of coverage on Nasdaq, Amex, and New York Stock Exchange (NYSE)-listed stocks that had no reported sell-side analyst coverage prior to the initiation.<sup>7</sup> These initiations occurred during 1997–2005, and 88 percent of the stocks had a market capitalization below \$250 million. They report an average announcement effect of 5 percent. Assuming that this is a permanent increase (conditional on continued coverage by an analyst after the original initiation of coverage), we can take this as the valuation effect of analyst coverage.<sup>8</sup>

Gao, Ritter, and Zhu report the results of a regression that has the quarterly number of IPOs scaled by real GDP (in trillions of dollars a year using 2009 purchasing power) as the dependent variable and, among other variables, the lagged log of the market-to-book (MB) ratio for small firms as an explanatory variable.<sup>9</sup> The coefficient on the natural logarithm of the MB ratio is 3.33. This coefficient implies that an increase in the MB ratio by 5 percent—for example, from 2.00 to 2.10—would result in  $3.33 \times [\ln(2.10) - \ln(2.00)] = 0.162$  more IPOs per quarter per \$1 trillion of GDP. With 2012 real GDP of approximately \$15 trillion, this calculation predicts that 2.43 more IPOs per quarter, or ten per year, would occur if small-company stock prices were 5 percent higher due to more analyst coverage. Thus a lack of analyst coverage is unlikely to account for a large proportion of the drop from 310 IPOs a year in 1980–2000 to 99 in 2001–12.

## Market Conditions

---

7. Demiroglu and Ryngaert (2010).

8. Several considerations must be kept in mind when interpreting this number. First, initiations are typically “buy” recommendations, in that an analyst who evaluates an uncovered firm and is not enthusiastic is more likely not to initiate coverage than to initiate coverage with a negative recommendation. Thus the announcement effect may overstate the effect of coverage itself. Second, additional coverage is likely to have a decreasing impact. For example, for a firm that is already covered by twenty-two analysts, the twenty-third analyst is likely to have little impact. Third, the 5 percent announcement effect for a sample of primarily very small firms is likely to be higher than for a larger company.

9. Gao, Ritter, and Zhu (2013).

As discussed above, IPO volume is higher when stock prices are higher. During the 11 years from 1990–2000, the quarterly average MB ratio for small firms, lagged by two quarters, was 3.89. During the 12 years from 2001–2012, the quarterly average MB ratio was 3.16. Using the coefficient of 3.33 on the logged MB ratio, as discussed above, the drop in the average MB ratio implies  $3.33 \times [\ln(3.89) - \ln(3.16)] = 0.692$  fewer IPOs per quarter per \$1 trillion of real GDP, or 42 fewer IPOs per year in an economy with real GDP of \$15 trillion per year. A full unit drop in the MB ratio from 3.0 to 2.0 is associated with a drop of 81 IPOs per year. Thus the market conditions hypothesis can partly explain why IPO volume in 2001–11 was lower than in 1996–2000, but has trouble explaining why IPO volume was lower than in 1980–95, when both price-to-earnings (PE) and MB ratios were relatively low in comparison with 2001–12.

The Nasdaq index peaked in March 2000 and has not come close to this level since then. However, 2000 was not the peak of IPO activity. As shown in figure 5-1, 1996 had more small-company IPOs than any other year during 1980–2012, and only 1993 had more large-company IPOs than 1996. Yet 1996 was not the peak year for valuations. Indeed, one measure of market valuations, the Shiller PE ratio, computed as the ratio of the level of the Standard and Poor's (S&P) 500 index divided by a 10-year moving average of the inflation-adjusted earnings of the S&P 500, shows a surprisingly low correlation with scaled IPO activity, as shown in figure 5-2.

**[Figure 5-2 here]**

Market upturns (as proxied by increases in the Shiller PE ratio) are typically accompanied by increases in IPO volume, and market downturns are immediately followed by a drop in IPO activity. Yet the level of the market, as measured by the Shiller PE ratio, has very little correlation with IPO activity. Indeed, starting in 1997, IPO activity has been much lower than might be suggested by market valuations. In unreported results, a very similar pattern to that of the Shiller PE ratio is displayed if the MB ratio on small stocks is graphed. So whether MB or PE ratios are used, there has been a 16-year drought in IPO activity relative to what might be expected.

## **The Economies of Scope Hypothesis**

In “Where have All the IPOs Gone?”, Xiaohui Gao, Zhongyan Zhu, and I posit that a gradual structural change has been occurring for the last few decades that favors big firms at the expense of small firms.<sup>10</sup> We argue that getting big fast is more important than it used to be, at least in some industries such as the technology industry, and globalization and improvements in communication technology are behind the change. The implication is that being a small independent company and growing organically (that is, internally) is increasingly an inferior business strategy compared to an alternative strategy of growing big fast, which frequently can be accomplished most efficiently through mergers and acquisitions. This hypothesis implies that young firms are now more likely to make acquisitions or sell out in a trade sale than to go public.

In our paper, we present a body of facts consistent with our economies of scope hypothesis.<sup>11</sup> We show that small companies, whether recent IPOs or more seasoned firms, are increasingly unprofitable and that the frequency of being acquired within three years of going public has increased over time, with the uptrend starting in the early 1990s. Other authors have shown an uptrend in the frequency of acquisitions by companies that have recently gone public. We also show that small-company IPOs have produced low stock returns for public market investors in the last three decades, including within each of four subperiods that we examine. In a companion paper Andrea Signori, Silvio Vismara, and I show that these patterns were also present in Europe in the 1995–2011 period.<sup>12</sup>

If the U.S. IPO market is broken for small companies, but being a small independent firm is still attractive, we might expect to see many small U.S. firms going public abroad. In fact, as documented by several studies, only a few U.S. firms each year have gone public abroad.<sup>13</sup> Vismara, Paleari, and Ritter

---

10. Gao, Ritter, and Zhu (2013).

11. Gao, Ritter, and Zhu (2013).

12. Ritter, Signori, and Vismara (2013).

13. See Ritter, Signori, and Vismara (2013, table 4).

document that investors earned low returns on European IPOs from 1995–2006 that listed on Europe’s markets catering to emerging growth companies.<sup>14</sup> Furthermore, 95 percent of the listings on London’s AIM were “placings,” restricted to qualified institutional buyers. Most of these IPOs were for very small amounts, and no liquid market ever developed. The reality is that very few of the IPOs listed on AIM would have qualified for Nasdaq listing.

The economies of scope hypothesis predicts a gradual drop in small-company IPO activity over time, rather than the abrupt fall that occurred between 2000 and 2001. The abrupt fall can be explained largely by the collapse of the Internet bubble.<sup>15</sup> Market valuations during 2001–12 were not sufficiently depressed, however, to be able to explain the long-term downward trend in the volume of small-company IPOs. Figure 5-2, which graphs the Shiller PE ratio, illustrates the inability of market valuations to explain the low IPO volume in the last decade. As the figure shows, a shortfall in IPO volume began to emerge in 1997.

### **Excessive Direct and Indirect Costs of Going Public**

One issue that has gotten very little attention in the United States is the high direct and indirect costs of going public associated with high investment banking fees and the underpricing of IPOs. As noted in a recent *Journal of Finance* article, almost all moderate-size IPOs in the United States pay investment banking fees of 7 percent, whereas in Europe they typically pay fees in the vicinity of 4 percent.<sup>16</sup> Additional legal, auditing, and prospectus printing costs, as well as the opportunity cost of management time, add several percentage points to the costs, although these other costs have a large fixed

---

14. See Vismara, Paleari, and Ritter (2012, table 5). We report that the average three-year buy-and-hold abnormal return relative to the FTSE Euromid index is –19 percent for 1,725 second-market IPOs from 1995–2006.

15. Gao, Ritter, and Zhu (2013).

16. See Abrahamson, Jenkinson, and Jones (2011). The authors calculate that differences in legal costs can account for approximately 0.5 percent of the 3.0 percent gap in underwriting fees between the United States and Europe.



component and are smaller in percentage terms for larger offerings. Furthermore, there is the indirect cost of selling stock for less than its subsequent market price. In the last decade, the average U.S. IPO had a first-day return of 11 percent, measured from the offer price to the first-day closing price. For a moderate-size IPO with an offer price of \$10 per share, the firm thus nets at most \$9.30 for a share that trades, on average, at \$11.10 in the market. This \$1.80 gap is 16 percent of the expected market price of \$11.10. Since a typical IPO sells 30 percent of the shares outstanding, at least  $0.16 \times 30$  percent = 4.8 percent of the post-issue market value of the firm is lost in the process of going public.

Now, I am not arguing that the costs of going public should be zero or that issuing firms receive nothing in return for the fees that investment bankers receive. But the costs of going public do seem to be higher than they need to be. I continue to be puzzled by why more companies do not hire WR Hambrecht + Co to conduct an IPO auction. WR Hambrecht + Co is willing to charge lower fees, and auctions can result in less expected underpricing.<sup>17</sup>

Perhaps one of the reasons that issuing firms are fairly complacent about the opportunity cost of underpricing is that they are unaware that with bookbuilding, the procedure used to sell most IPOs in the United States, Europe, and Japan, the economic incentives of underwriters are misaligned with those of issuers. Specifically, although the gross spread and other direct costs are required to be disclosed as underwriter compensation, the SEC has never insisted that the soft-dollar revenue (that is, commissions in excess of direct execution costs on other trades) received by underwriters in return for allocating underpriced IPOs to hedge funds and other clients be disclosed. The ability to collect soft-dollar revenue on underpriced IPOs creates an incentive for underwriters to recommend a lower offer price than they otherwise would when bookbuilding is being used. As Supreme Court Judge Louis Brandeis stated, “Sunlight is said to be the best of disinfectants.”

Once a company is public, it is subject to not only SOX requirements, but also the threat of shareholder class-action lawsuits, which result in higher directors and officers (D&O) insurance

---

17. See DeGeorge, Derrien, and Womack (2010).

premiums than if the company were private. As many commentators have noted, the current legal system, in which a company pays for the misdeeds of company executives, hits shareholders twice—both from the effect of correcting an accounting misstatement, for example, and from either higher D&O payments or money that the company pays in a settlement. In general, the executive or executives who are responsible for the misdeed bear only part of these costs, reducing the deterrence effect of lawsuits. Furthermore, a cost is associated with discovery and lawsuit defenses whether or not a company has engaged in a misdeed.

Although the direct and indirect costs of going public are high and public firms have higher ongoing legal costs, it is not clear that those costs were higher in the last decade than in the 1990s. Thus these costs do not explain the drop in IPO volume in the last decade.

### **Minimum Tick Sizes**

Section 106(b) of Title 1 of the JOBS Act mandated that the SEC conduct a study of the impact of low tick sizes on the IPO market, resulting in the July 2012 *Report to Congress on Decimalization*.<sup>18</sup> The study concluded that there was insufficient evidence to recommend mandating a minimum tick size. In their September 2012 Grant Thornton white paper, Weild, Kim, and Newport state that a minimum tick size “in sub-\$2 billion market value stocks will bring life back to capital formation and, with it, innovation, job growth, and U.S. competitiveness.”<sup>19</sup> They propose that a minimum tick size, perhaps \$0.10 per share, should be mandated for small-cap stocks.

Tick size is the minimum increment in which a security can trade. Until 1997, when stocks started trading in sixteenths, the tick size for U.S. stocks was one-eighth of a dollar, with prices such as \$12.00, \$12.125, and \$12.25. Consequently, the minimum bid-ask spread was one-eighth. Until May 1994, however, many Nasdaq stocks had bid-ask spreads of \$0.25 because market makers colluded and avoided

---

18. SEC (2012).

19. Weild, Kim, and Newport (2012).

“odd eighth” prices such as \$12.125, 12.375, and \$12.625. Following the move to decimalization in 2001, the tick size fell to \$0.01.

A higher minimum tick size than the size that market participants would otherwise voluntarily arrive at is equivalent to a transaction tax, with one important caveat. Instead of the government receiving the revenue from an explicit tax, market makers receive the revenue from a higher tick size, which can create economic incentives to market a stock, boosting the price. However, a higher tick size would generate more revenue only if the increase in revenue per transaction more than offset the smaller number of transactions associated with a higher cost of transacting.

Weild and Kim, in both their 2012 white paper with Newport and their previous white papers, make a distinction between tick sizes, bid-ask spreads, and what they term the “bankable spread.”<sup>20</sup> They define the bankable spread as “the portion of a spread that market makers can reasonably rely on to compensate themselves for their investment in capital, research, and sales support. In today’s electronic order-driven market, as a rule of thumb, the bankable spread is generally equivalent to the tick size.”<sup>21</sup>

They argue that a major reason for the decline in the volume of small-company IPOs has been a change in market structure that has resulted in a decline in bankable spreads, which in turn has reduced the economic incentive for equity salespeople to market a stock and has caused the collapse of the IPO “ecosystem” composed of, among other parts, boutique underwriters and regional investment banks.<sup>22</sup> The decline in bid-ask spreads started with the end of collusion by Nasdaq market makers in 1994. The decline in bankable spreads has been facilitated by technological changes, the SEC’s Order Handling

---

20. Weild and Kim (2008, 2009) and Weild, Kim, and Newport (2012).

21. Weild, Kim, and Newport (2012, p. 6). The quoted spreads on small-cap stocks, however, are typically larger than the tick size of a penny per share. Bessembinder (2003, table 1, panel b) reports that the volume-weighted average quoted spread for large-cap Nasdaq stocks declined from \$0.0701 per share to \$0.0162 per share between the predecimalization period of January 8–26, 2001, and the postdecimalization period of April 9–August 31, 2001, with the average quoted spread declining for small-cap Nasdaq stocks from \$0.127 to \$0.0798 per share.

22. Weild and Kim (2008, 2009) and Weild, Kim, and Newport (2012).

Rules in 1997, Regulation ATS in 1998, the move to decimalization in 2001, and Regulation NMS in 2005.<sup>23</sup>

Weild and Kim, however, make no effort to quantify how much a higher tick size would boost the market price of small-cap stocks and the number of IPOs. They merely provide selected facts, such as the reduction in the number of investment banks since 2000 and the decrease in tick sizes in the last 15 years, that loosely coincide with the decrease in the number of small-company IPOs since 1996. They do not discuss other facts that could also have a causal effect on the volume of small-company IPOs, such as the decline in the profitability of small companies and the low returns earned by public market investors on small-company IPOs.

What evidence would support the claim that the decrease in small-company IPO activity is due to the decrease in tick sizes and the decline in the IPO ecosystem? I can think of two testable predictions. First, if low public market valuations are behind the drought in small-company IPO activity, I would expect a decrease in venture capital funding of start-ups due to the lack of this attractive exit path. Second, I would expect to see a decrease in public market small-company valuation multiples relative to large-company valuation multiples.

The evidence from the venture capital industry is unambiguous: during 1980–94, according to the National Venture Capital Association (NVCA) yearbooks, venture capital investment never exceeded \$4.5 billion per year in nominal terms, or \$10 billion a year in 2012 purchasing power. During 1995–2012, inflation-adjusted venture capital investment was greater than \$10 billion every year, peaking at more than \$100 billion in 2000 and exceeding \$20 billion a year in almost every year since then.<sup>24</sup> In the last decade, most venture capital exits were via trade sales. It appears that venture capitalists are willing to

---

23. Regulation ATS refers to alternative trading systems, which are nonexchange venues for matching buyers and sellers, and NMS refers to the national market system.

24. Dow Jones VentureOne reports slightly different numbers from year to year, but the patterns are the same. For example, VentureOne reports \$32.6 billion of new commitments in 2011. In general, when a fund is raised, limited partners make commitments to invest capital when it is requested, and most of the money is then invested over the following five years.

continue funding new technology and biomedical start-ups even without an active IPO market for small-company IPOs.

The evidence from public market valuation multiples is illustrated in figure 5-3, which shows the PE ratios for publicly traded small firms (less than \$1 billion in inflation-adjusted annual sales) and big firms (greater than \$1 billion). The ratios are computed using only firms with positive earnings before extraordinary items and are calculated for each year as the sum of market values divided by the sum of earnings.<sup>25</sup> For 29 out of 32 years, the small-firm PE ratio was higher than the big-firm PE ratio. There has been no deterioration of the small-firm PE ratio relative to the big-firm PE ratio since 1996, in spite of the decrease in tick sizes and in the number of analysts covering small-cap stocks.<sup>26</sup> Thus the evidence in figure 5-3 offers no support for the hypothesis that the volume of small-company IPOs dropped due to declining tick sizes, since the implied drop in small-company valuations did not occur.

**[Figure 5-3 here]**

That said, the contraction of the IPO ecosystem has undoubtedly had some effect on the volume of small-company IPOs. Quantifying the effect is difficult because causality goes in both directions:

---

25. Appendix table 5A reports the number of companies with positive earnings per share (EPS) each year and reports the time series of PE ratios using two different calculations: the ratio of aggregate market value divided by aggregate earnings, as reported in figure 5-3, and the median PE ratios. Similar patterns are present when the definition of small and large firms is changed from using a \$1 billion cutoff (2011 purchasing power) to a \$250 million cutoff (2009 purchasing power), as is done in Gao, Ritter, and Zhu (2013). The patterns are also similar when earnings after extraordinary items are used. The patterns are different, however, when the sample includes all firms, rather than just firms with positive EPS. In some years, the median small firm has negative earnings and the aggregate earnings numbers are either negative or near zero. As a result, the ratios jump from positive to negative or to extremely high ratios in some years when the denominator is positive but near zero.

26. One might expect an increase in small-firm PE ratios after 2005 due to the change in the expensing of employee stock options. This increase in reported expenses would, everything else the same, lower reported earnings, even though this accounting change did not affect cash flows. The conventional wisdom is that small companies, and especially tech companies, were more intensive in the granting of employee stock options.

having fewer small-company IPOs has resulted in a smaller infrastructure, and a smaller infrastructure has resulted in fewer IPOs. If smaller investment banks were earning economic profits on trading IPOs in the aftermarket due to higher bankable spreads, they would have an economic incentive to take more companies public; that is, there would be a lower threshold for taking a company public and providing analyst coverage. Given the low long-run returns on small-company IPOs, however, public market investors might not be willing to pay a sufficiently high price to make it attractive for a firm to go public rather than sell out in a trade sale.

### **The Effect of SecondMarket, SharesPost, and Crowdfunding on IPO Activity**

In the last few years, two markets for private companies have sprung up, SecondMarket and SharesPost. Both of these markets attempt to bring together buyers and sellers of stock in private companies, including companies, venture capitalists, and employees on the sell side and investors (individual and institutional) on the buy side of the market.<sup>27</sup> As with most illiquid markets where there is private information, buyers have had to worry about adverse selection.<sup>28</sup> For some stocks, however, notably Facebook before its May 2012 IPO, there have been many transactions, and pre-IPO investors and employees have been able to cash out some or all of their stakes before the company is listed.

The JOBS Act increased from 500 to 2,000 the number of shareholders of record that triggers public reporting requirements. Furthermore, the JOBS Act exempted employees from the count. By

---

27. In 2007, Goldman Sachs set up a private marketplace for unregistered shares (Rule 144a securities), Goldman Sachs Tradable Unregistered Equity trading platform, or GStrUE. After quickly attracting two large private companies that each issued close to \$1 billion in shares, the venue failed to attract additional issuers and liquidity dried up. GStrUE appears to have been supplanted by the Portal Alliance, a marketplace formed in 2009 by Nasdaq OMX, Goldman Sachs, and other Wall Street firms that has failed to attract issuers.

28. SecondMarket requires the company to give approval to allow its shares to trade, allows it to determine who is permitted to buy or sell its shares, and requires it to provide financial statements and other disclosure to approved buyers and sellers at the time of a transaction.

making these changes, many private companies that did not want to allow existing shareholders to sell shares to other investors for fear of triggering public reporting requirements are now far below the threshold for triggering reporting requirements. These regulatory changes and the development of these secondary markets have reduced the benefits of going public and thus, everything else the same, may result in a reduction in the number of IPOs.

The JOBS Act also encouraged crowdfunding, the concept that a large number of investors each should be able to invest a small amount of money in a company that is, they hope, early in its lifecycle. I say hope because some companies that are early in their lifecycle end up having very short lifecycles before they go out of business. Crowdfunding has obvious collective-action problems, since each investor has little incentive to devote substantial resources to doing due diligence. It appears likely, however, that intermediaries will be created to do some screening. I am of the opinion that it is unlikely that investors will earn high average returns on crowdfunding investments, although the returns may be higher than the –30 percent earned on purchases of state lottery tickets.

### **IPOs and Job Creation**

In a recent Kauffman Foundation report, Martin Kenney, Donald Patton, and I document employment and revenue growth for U.S. companies that went public from June 1996–December 2010.<sup>29</sup> For the 2,766 domestic operating-company IPOs in this period, we find that the average company added 822 employees after its IPO. In the ten years after going public, the average company increased employment 60 percent, amounting to a 4.8 percent compound annual growth rate (CAGR).<sup>30</sup>

---

29. See Kenney, Patton, and Ritter (2012).

30. The 60 percent cumulative average growth in employment and 4.8 percent CAGR numbers are based on the 1,857 IPOs from June 1996 to December 2000. The numbers are computed as the increase in the aggregate employment of the 1,857 firms relative to their aggregate employment at the time of the IPO. The average company had 1,303 employees at the time of the IPO. Because of the lack of small-company IPOs during 2001–10, the average pre-IPO employment for the full population of 2,766 IPOs from June 1996–December 2010 was 1,830 employees.

These numbers can be used to calculate the number of jobs that would have been created if the average annual volume of domestic operating-company IPOs between 1980 and 2000 had continued during 2001–12, rather than collapsing. In 1980–2000, an average of 296 domestic operating companies per year went public, whereas an average of only 90 domestic operating companies per year have gone public since then, a difference of 206 IPOs per year.<sup>31</sup> Over the 12-year period 2001–2012, this amounts to a shortfall of 2,472 IPOs. Multiplying 2,472 missing IPOs by 822 jobs per IPO results in a figure of 2.03 million jobs that were not “created” due to the IPO shortfall. This calculation assumes that these employees would have been sitting at home watching television if they had not been hired by the recent IPO firm and that the roughly \$100 million raised per IPO would not have been invested in anything else. But, in a mechanical sense, 2.03 million jobs were “lost.”

In the lead-up to passage of the JOBS Act, a widely reported statistic was that companies going public create huge numbers of jobs after the IPO, with only 8–10 percent of a company’s subsequent number of employees on the payroll before the company went public. For example, slide 11 of the IPO Task Force presentation to the Senate Banking Committee on October 11, 2011, reported, “92 percent of job growth in a company occurs post-IPO.” This number, sometimes rounded off to 90 percent, was repeated in several *Wall Street Journal* articles and op-ed pieces.<sup>32</sup>

---

31. During 2001–12, an average of nine foreign non-ADR IPOs occurred in the United States each year, which is why there was an average of 99 operating-company IPOs and ninety domestic operating-company IPOs. During 1980–2000, an average of fourteen foreign-company non-ADR IPOs occurred each year, which is why there was an average of 310 operating-company IPOs and 296 domestic operating-company IPOs a year. In Kenney, Patton, and Ritter (2012), we calculate 1.88 million jobs lost because we use a number of 298 domestic IPOs during 1980–2000 rather than 296, and we did our calculation for the eleven years ending in 2011 rather than the twelve years ending in 2012.

32. See, for example, the interview with Kate Mitchell, IPO Task Force chair and former NVCA chair, in “How Silicon Valley Won in Washington,” *Wall Street Journal*, April 7, 2012. The article states, without questioning, “To sell politicians on the benefits of allowing start-ups to grow into public companies, the task force pointed to research showing that when such firms go public, more than 90 percent of job creation happens *after* the IPO.” Also, Delaware Governor Jack Markell, in his opinion



The 92 percent job growth number comes from reports paid for by the NVCA, an industry trade group. The annual reports, entitled *Venture Impact: The Economic Importance of Venture Capital-Backed Companies in the U.S. Economy*, are produced by consulting firm IHS Global Insight.<sup>33</sup> The 92 percent (or 90 percent) number has been used with statements that if the volume of IPOs in 1996 had continued in the years since then, rather than the lower number of IPOs that actually occurred, as many as 22.7 million more jobs would have been created. For example, the IPO Task Force report presented to the U.S. Treasury and the U.S. Senate Banking Committee in late 2011 by task force chair Kate Mitchell used the 22.7 million jobs figure.<sup>34</sup> Where did this number come from?

It comes from a 2009 Grant Thornton White Paper in which Weild and Kim make five assumptions that are different from those used in my 2.03 million jobs lost number.<sup>35</sup> They also report other, lower, numbers based on alternative assumptions about employee growth rates and benchmark numbers of IPOs, but their high-end estimate is the number that has typically been repeated, without qualifications.<sup>36</sup>

First, they make the reasonable assumption that IPO volume should be proportional to real GDP, and since the U.S. economy has grown over the last thirty years, one would expect IPO activity to rise rather than be flat. My number, which assumes that IPO activity would be constant over time, is conservative in comparison.

---

piece, “Restarting the U.S. Capital Machine,” *Wall Street Journal*, March 1, 2012, states, “In fact, 92 percent of a typical company’s employment growth occurs after the IPO.”

33. See, for example, IHS Global Insight (2011).

34. IPO Task Force (2011).

35. Weild and Kim (2009, pp. 26–27).

36. Exhibit 27 of Weild and Kim’s report computes thirty-six separate numbers for job creation based on alternative assumptions regarding the pre-IPO number of employees, the CAGR of employment, and the benchmark number of IPOs (1998 actual, 1991–95 average, and 1996 actual), resulting in estimates varying from 1.1 million jobs to 22.7 million jobs. They then state, “Though 22 million may seem to be a staggering number on its own, we believe it is a reasonable estimate in the context of long-term historical employment growth in this country” (Weild and Kim 2009, p. 27).

Second, they assume that each IPO that did not occur would have had 1,372 employees before going public and that post-IPO employment would grow at a CAGR of 17.8 percent, a number that implies employment growing by 415 percent in the 10 years after an IPO (and approximately 900 percent in 14 years). They base the 17.8 percent a year number on a “select” group of 25 venture capital-backed IPOs from 1996 and later. In other words, they assume that thousands of companies that did not go public would have grown as fast as a select group of highly successful venture capital-backed companies such as Google if they had! This assumption has a huge impact on their calculations.

Third, they assume that the normal level of IPO activity is that of 1996, the peak of the IPO market, and that the volume should grow from this level.<sup>37</sup> The assumption that the peak year of 1996 is normal biases their number upward. Furthermore, their count of 803 IPOs in 1996 apparently includes 110 penny stock and unit IPOs as well as 64 foreign-company IPOs.<sup>38</sup> Thus they implicitly assume that the average penny stock IPO had 1,372 pre-IPO employees and increased its employment 415 percent in the following decade. In other words, they assume that it would be just as big and successful as the average “select” venture capital-backed IPO.

Fourth, they assume that the IPO shortfall started in 1997, rather than 2001, and that more than 1,500 additional firms would have gone public in 1997–2000 and then increased their employment by 17.8 percent a year for more than a decade. This 1997–2000 shortfall assumption, combined with the 17.8 percent CAGR assumption, adds at least 9 million lost jobs to their 22.7 million total.

Fifth, their calculation ends in an earlier year than mine, so the difference in per year numbers is even larger than the 22.7 million versus 2.03 million numbers suggest.

---

37. Weild and Kim (2009, p. 26).

38. See tables 14 and 15 of “Initial Public Offerings: Updated Tables” on my website at <http://bear.warrington.ufl.edu/ritter> for a decomposition of how many IPOs take place in the United States every year. For 1996, my count is 675 operating-company IPOs, including 32 non-ADR foreign listings, for a total of 643 domestic operating-company IPOs that are not penny stock or unit IPOs.

In sum, the number of 22.7 million jobs lost is based on one reasonable assumption and three indefensible assumptions.<sup>39</sup> The exact number of jobs lost through a shortfall in IPO activity, however, is not something that can be calculated through mechanical computations. If one company goes public and raises capital that is used to hire new employees, capital is taken from some other activity in the economy, and, unless the company only hires people who would otherwise be unemployed, the net number of jobs created in the economy is less than the number added by this firm. Incidentally, to the best of my knowledge, none of the sources quoting the 22.7 million jobs lost number has pointed out that with a civilian labor force of 154.5 million and 12.8 million unemployed in August 2012, any number of jobs lost above 12.8 million would create a negative unemployment rate unless the labor force expanded.<sup>40</sup>

### **What Should Be Done?**

Well-functioning labor markets and capital markets can help to allocate resources to their most valued uses and thus boost standards of living. A strong case can be made that the private returns for investments that lead to technological advances underestimate the social returns. A well-functioning IPO market can facilitate the financing of young growth companies, partly by being a conduit for raising capital, but also by providing an exit for pre-IPO investors who invested with the anticipation of eventually having a liquid market in which to sell some or all of their stock. Not all IPOs are the same, however. I would argue that a restaurant chain adding employees is largely just taking business away

---

39. Weild, Kim, and Newport (2012, p. 26) back away from the extreme number of 22.7 million jobs, stating, “We estimate that this dearth of IPOs has cost the United States as many as 9.4 million additional jobs that might have been created after companies go public. If we add the private market effect (our best estimate of the multiplier effect in the private market when more companies go public), the number of additional jobs increases to 18.8 million (see Exhibit 6).” The 9.4 million jobs number is based on an assumption of annual 2.57 percent U.S. real GDP growth and 822 post-IPO jobs created per IPO, with the 822 jobs number coming from Kenney, Patton, and Ritter (2012). They retain the assumptions that there were 803 IPOs in 1996 and that this is the benchmark year for normal IPO activity.

40. The civilian labor force and unemployment numbers are found in table 1 on the Bureau of Labor Statistics website ([www.bls.gov/news.release/laus.htm](http://www.bls.gov/news.release/laus.htm)).

from competing restaurants, with little effect on the economy. However, a biotechnology company that develops a drug that cheaply prevents diabetes, resulting in fewer workers taking early retirement or incurring large medical costs, would have large social benefits.

IPOs are merely one way in which pre-IPO shareholders achieve either immediate or future liquidity and by which private companies raise money. Thus public policy toward IPOs should be determined as one element of policies to create and maintain well-functioning capital markets that, in the absence of externalities, fund positive net present value (NPV) investments and do not fund negative NPV investments. Tax policy and investor protection policy cannot be separated from policies aimed at the efficient raising of capital. If venture capitalists and their limited partners were earning very high rates of return during the last decade, if very little money was being invested by venture capitalists, or if public market investors were earning very high returns on investments in small-company IPOs, I would be more concerned about a shortage of capital being a problem for emerging growth companies. Instead, my biggest concern is the lack of profitability of these companies.

If the reason that many small companies are not going public is because they will be more profitable as part of a larger organization, then policies designed to encourage companies to remain small and independent have the potential to harm the economy rather than boost it. Not all emerging growth companies should stay private or merge, however, and to the degree that excessive burdens associated with going public, and being public, result in less capital being raised and invested wisely, standards of living are lowered.

In thinking about the JOBS Act, one should keep in mind that the law of unintended consequences will never be repealed. It is possible that, by making it easier to raise money privately, creating some liquidity without being public, restricting the information that stockholders have access to, restricting the ability of public market shareholders to constrain managers after investors contribute capital, and driving out independent research, the net effect of the JOBS Act might be to reduce the flow of capital into young high-technology companies or the number of IPOs of small emerging growth companies.

I do not think that the JOBS Act will result in a flood of companies going public. The main reason why fewer small companies have been going public is that they are finding it difficult to earn a profit. The JOBS Act does little to solve this problem. Nor do I think that noticeably higher economic growth and job creation will result from the JOBS Act.

I also do not see any reason to set minimum tick sizes for firms with sales or market caps below some threshold. Indeed, the evidence from other countries that have created second markets, with less stringent criteria than Nasdaq and the NYSE impose, is not promising. As documented elsewhere, investors in these markets have earned very low returns.<sup>41</sup>

What should be done? I suggest three policy changes that, I believe, would have a modest effect on encouraging more IPOs. More important, I think that these proposed changes would improve standards of living by encouraging innovation and allocating capital and labor more efficiently.

First, I would lower the costs of going public by encouraging the use of auctions rather than the use of book building. If the costs of going public eat up 5 percent of firm value, on average, quantitatively these costs are of the same order of magnitude as the lower level of share prices from a lack of analyst coverage. The specific suggestion that I am making is for the SEC to interpret its existing regulations on the disclosure of underwriter compensation less narrowly and require the disclosure of soft-dollar commission revenue that is generated when underwriters use book building. The average level of IPO underpricing would fall. Investment bankers are opposed to reforms that might lead to lower gross spreads or less underpricing. Investment bankers have a lot of political influence, especially with Republicans.

Second, I would reform the legal system to discourage class-action lawsuits that do not have solid grounds, and I would shift the defendants from the companies (and their shareholders) to the individuals

---

41. See Vismara, Paleari, and Ritter (2012) and Ritter, Signori, and Vismara (2013). In the United States, the American Stock Exchange's Emerging Company Marketplace (ECM) was created in 1992 but failed to attract many new listings before it closed in 1995. See Aggarwal and Angel (1999) for a discussion of the ECM.

who are responsible for the actions. Plaintiff attorneys, and many defense attorneys and consultants, are opposed to this change, for not only do they benefit from the existing system, but they also do not want to reduce the amount of malfeasance to zero, for then they would make no money. These attorneys have a lot of political influence, especially with Democrats.

Third, I would reform the copyright and patent system. A book by Adam Jaffe and Josh Lerner, *Innovation and Its Discontents*, provides a cogent analysis of the problems with our current system of patenting.<sup>42</sup> Patents and copyrights are designed to create temporary monopoly power so that a creator can capture part of the benefits of an innovation. But current copyright law in the United States gives exclusive rights to receive royalties for 70 years after the death of the creator. The great-grandchildren of dead authors and musicians, and the owners of many existing patents, are opposed to this change. At the other extreme, intellectual property rights are not effectively enforced in China, India, and many other countries, with the result that firms based in the United States and other countries are unable to capture economic returns on their investments.

In summary, I do not know what the optimal level of IPO activity is in the United States or any other country, nor do I think that it should necessarily be the same now as it once was. I believe that a long-term change has been occurring in which getting big fast is now more important than was once the case, at least in certain industries. Because merging is sometimes the most efficient way of getting a successful new technology to market quickly, I do not view the increase in trade sales and the decrease in IPO activity as necessarily alarming.

---

42. Jaffe and Lerner (2004).

## References

- Abrahamson, Mark, Tim Jenkinson, and Howard Jones. 2011. "Why Don't U.S. Issuers Demand European Fees for IPOs?" *Journal of Finance* 66, no. 6 (December): 2055–82.
- Aggarwal, Reena, and James J. Angel. 1999. "The Rise and Fall of the Amex Emerging Company Marketplace." *Journal of Financial Economics* 52 (May): 257–89.
- Bessembinder, Hendrik. 2003. "Trade Execution Costs and Market Quality after Decimalization." *Journal of Financial and Quantitative Analysis* 38 (December): 747–77.
- Degeorge, François, François Derrien, and Kent L. Womack. 2010. "Auctioned IPOs: The U.S. Evidence." *Journal of Financial Economics* 98, no. 2 (November): 177–94.
- Demiroglu, Cem, and Michael Ryngaert. 2010. "The First Analyst Coverage of Neglected Stocks." *Financial Management* 39, no. 2 (Summer): 555–84.
- Gao, Xiaohui, Jay R. Ritter, and Zhongyan Zhu. 2013. "Where Have All the IPOs Gone?" Unpublished working paper. University of Florida.
- IHS Global Insight. 2011. *Venture Impact: The Economic Importance of Venture Capital-Backed Companies in the U.S. Economy*. Arlington, Va.
- IPO Task Force. 2011. "Rebuilding the IPO On-Ramp." Report presented to U.S. Department of Treasury, Washington.
- Jaffe, Adam B., and Josh Lerner. 2004. *Innovation and Its Discontents: How Our Broken Patent System Is Endangering Innovation and Progress, and What to Do about It*. Princeton University Press.
- Kenney, Martin, Donald Patton, and Jay R. Ritter. 2012. *Post-IPO Employment and Revenue Growth for U.S. IPOs, June 1996–2010*. Kansas City, Mo.: Kauffman Foundation.
- Ritter, Jay R.. 2012. Testimony before the Senate Committee on Banking, Housing, and Urban Affairs, March 6, 2012

- Ritter, Jay R., Andrea Signori, and Silvio Vismara. 2013. "Economies of Scope and IPO Activity in Europe." Forthcoming in *Handbook of Research on IPOs*, edited by Mario Levis and Silvio Vismara. Cheltenham U.K.: Edward Elgar.
- SEC (Securities and Exchange Commission). 2012. *Report to Congress on Decimalization*. Washington.
- Vismara, Silvio, Stefano Paleari, and Jay R. Ritter. 2012. "Europe's Second Markets for Small Companies." *European Financial Management* 18, no. 3 (June): 352–88.
- Weild, David, and Edward Kim. 2008. "Why Are IPOs in the ICU?" White Paper. Chicago: Grant Thornton LLP.
- . 2009. "A Wake-up Call for America." White Paper. Chicago: Grant Thornton LLP.
- Weild, David, Edward Kim, and Lisa Newport. 2012. "The Trouble with Small Tick Sizes." White Paper. Chicago: Grant Thornton LLP.



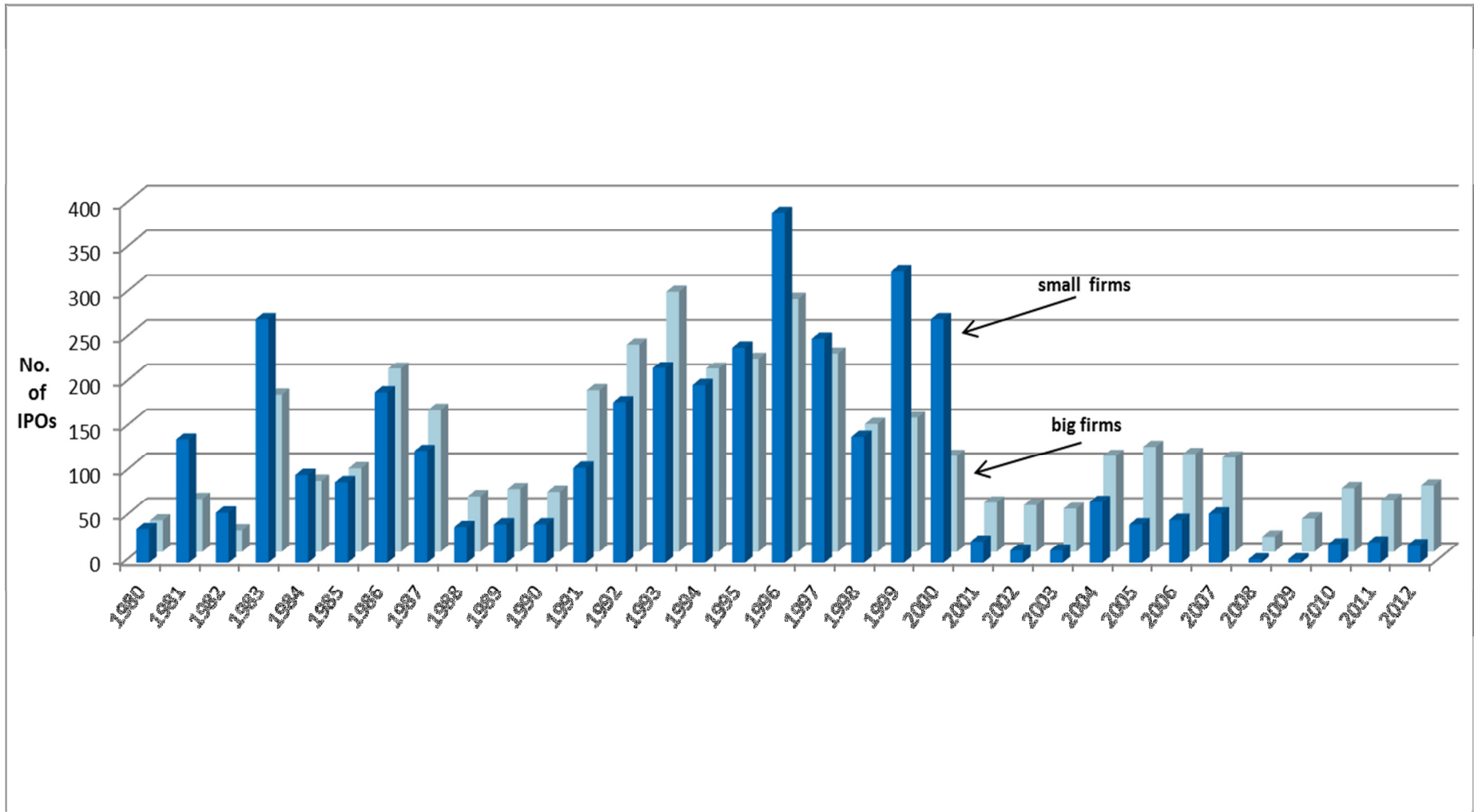
**Appendix Table 5A. Number of Publicly Listed Firms in the United States with Positive EPS and the Median and Aggregate PE Ratios, 1980–2011<sup>a</sup>**

<i>Year</i>	<i>Small firms</i>			<i>Big firms</i>		
	<i>Number</i>	<i>Median PE1</i>	<i>Aggregate PE2</i>	<i>Number</i>	<i>Median PE1</i>	<i>Aggregate PE2</i>
1980	2,365	9.62	11.38	953	7.89	7.98
1981	2,493	9.70	10.12	899	7.38	7.28
1982	2,306	12.74	12.55	809	9.76	9.61
1983	2,565	15.31	15.13	820	11.38	11.07
1984	2,587	12.74	11.92	848	9.97	9.17
1985	2,410	15.73	15.04	785	13.04	11.94
1986	2,491	16.43	16.22	783	14.52	13.64
1987	2,625	14.05	14.27	875	12.17	12.46
1988	2,508	13.35	13.57	906	11.57	11.25
1989	2,367	14.42	15.26	884	13.01	13.40
1990	2,342	12.87	13.30	855	12.66	13.44
1991	2,405	17.77	19.16	819	17.23	18.14
1992	2,668	18.09	18.31	798	17.68	18.15
1993	2,995	18.65	19.31	903	18.54	18.27
1994	3,199	16.07	17.34	1,071	15.11	16.35
1995	3,192	18.23	20.31	1,115	16.28	17.31
1996	3,354	18.71	20.31	1,256	17.19	18.20
1997	3,256	19.48	22.28	1,325	19.26	20.83
1998	2,868	16.35	22.04	1,291	18.61	23.52
1999	2,590	16.21	32.31	1,338	16.39	27.60
2000	2,200	13.97	23.54	1,317	16.32	22.00
2001	1,783	19.10	19.23	1,113	20.65	23.00
2002	1,734	16.79	19.12	1,101	16.94	18.54
2003	1,813	22.40	23.49	1,300	19.12	18.63
2004	1,936	22.12	21.34	1,459	18.49	16.74
2005	1,877	21.89	21.08	1,463	17.51	15.29
2006	1,837	21.75	20.70	1,523	17.76	14.78
2007	1,673	21.06	21.84	1,406	16.68	15.42
2008	1,308	14.14	14.41	1,178	12.34	11.38
2009	1,329	19.28	20.03	1,193	16.70	15.93
2010	1,564	19.20	18.40	1,348	16.61	14.00
2011	1,437	17.22	17.08	1,342	15.14	12.73

Source: Sample firms are Amex, Nasdaq, and NYSE firms listed on Compustat by the Center for Research on Security Prices with positive earnings per share (EPS before extraordinary items). Firms with Standard Industrial Classification codes between 6000 and 6199 (banks and savings & loans) and between 6700 and 6799 (closed-end funds, REITs, and SPACs) are excluded.

a. Small firms are defined as those with fiscal-year sales of less than \$1 billion in 2011 dollars, using the U.S. Consumer Price Index, and big firms are defined as those with more than \$1 billion in sales. PE1 is the median price-earnings ratio, and PE2 is the ratio of the aggregates, calculated as the sum of undiluted earnings divided by the sum of market values for, respectively, small or big firms. For companies with multiple classes of shares outstanding, all share classes are used. Market values are calculated as of the end of the fiscal year, so, for example, the 1999 numbers reflect the prices for December 31 for companies with a December 31 fiscal year, but June 30 for companies with June 30 fiscal years.

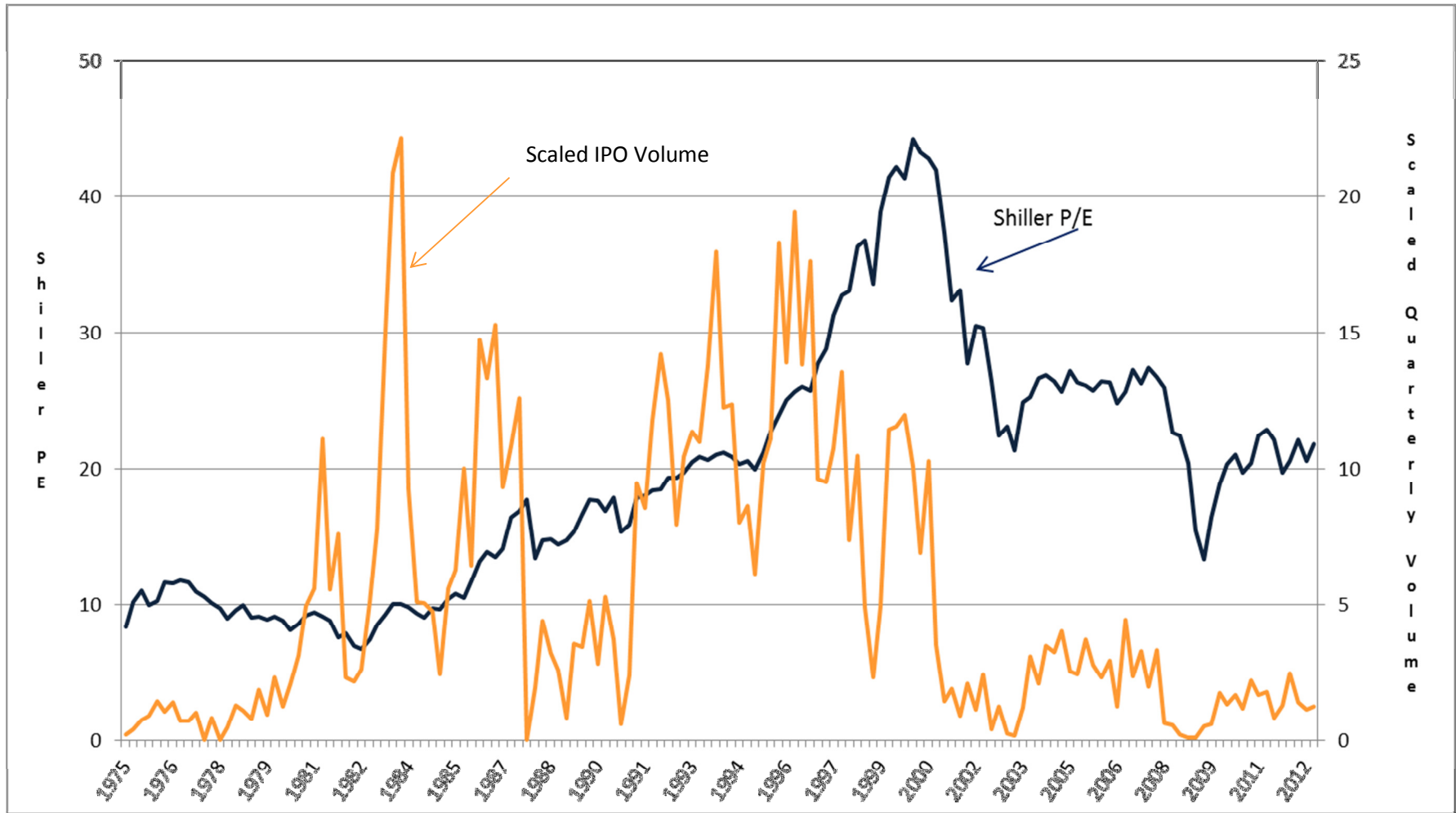
Figure 5-1. Number of IPOs in the United States, by Size of Firm, 1980–2012<sup>a</sup>



Source: Reproduced from Gao, Ritter, and Zhu (2013).

a. Small firms are defined as having pre-IPO annual sales of less than \$50 million (2009 purchasing power) and large firms as having pre-IPO sales of more than \$50 million (2009 purchasing power).

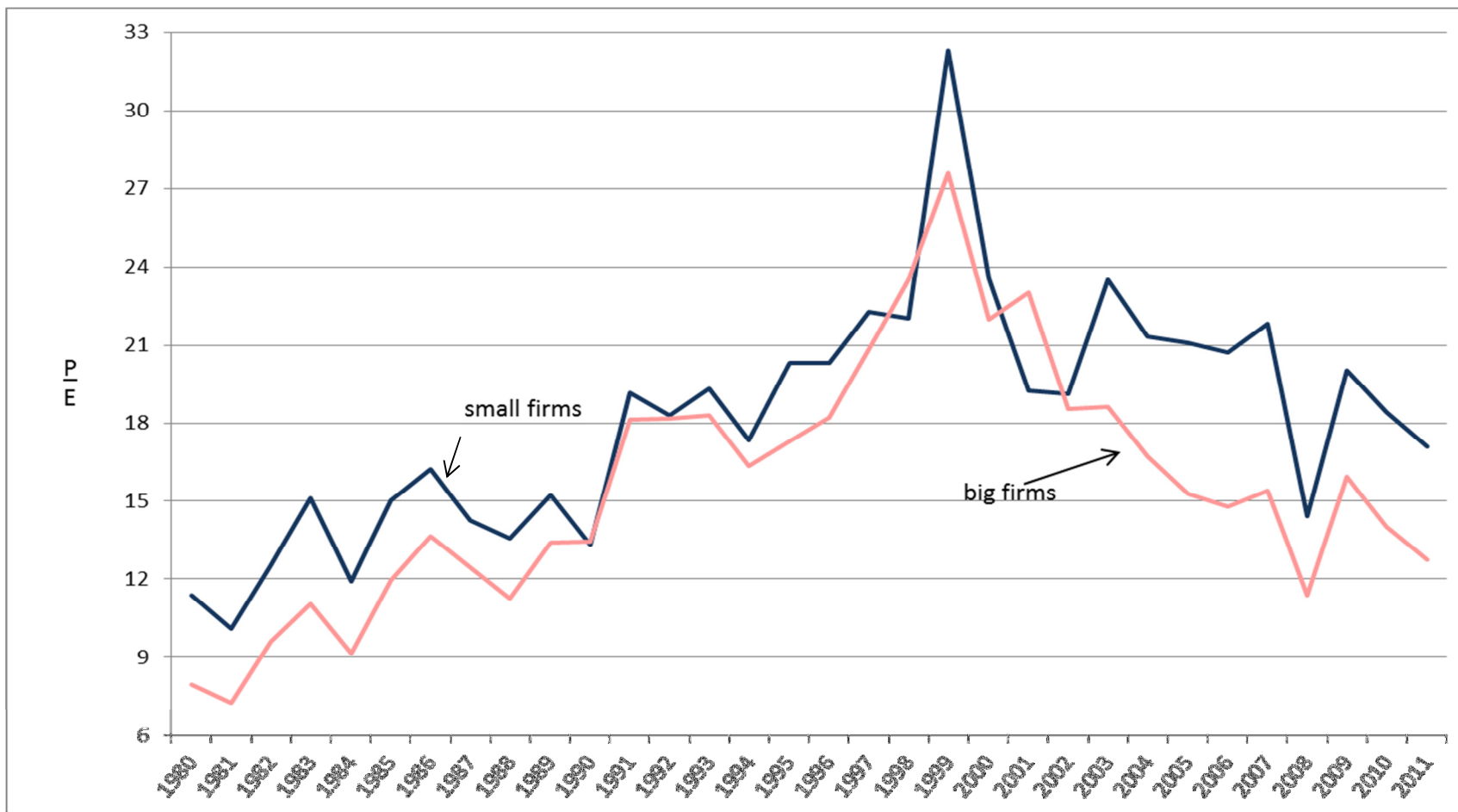
Figure 5-2. Scaled Quarterly Volume of IPOs and Shiller PE Ratio in the United States, 1975–2012<sup>a</sup>



Source: Shiller PE ratio is the CAPE (cyclically adjusted price-earnings) ratio taken from Robert Shiller’s website at <http://www.econ.yale.edu/~shiller/data.htm>. Scaled IPO volume is from Gao, Ritter, and Zhu (2013).

a. The Shiller PE ratio is computed as the ratio of the S&P 500 index divided by the inflation-adjusted ten-year moving average of S&P 500 earnings. Scaled IPO volume is the quarterly number of initial public offerings divided by annual real GDP, in trillions of 2009 dollars. The period plotted is the first quarter of 1975 through the fourth quarter of 2012.

Figure 5-3. PE Ratio in the United States, by Size of Firm, 1980–2011<sup>a</sup>



Source: See Appendix Table 5A.

a. Price-earnings ratio of small company (annual sales less than \$1 billion, 2011 purchasing power) and big company stocks (annual sales greater than \$1 billion, 2011 purchasing power) with positive EPS (before extraordinary items) traded on the Amex, Nasdaq, or NYSE with Compustat EPS data available. The price-earnings ratios are computed as the sum of the market values divided by the sum of the earnings for, respectively, small and big companies with positive earnings per share.