Merger-driven listing dynamics*

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Abstract

To accurately gauge the flow of firms into and retained by stock exchanges, we add targets of public acquirers to the listing count. For the U.S., this merger-adjustment rivals IPOs in its impact on listing dynamics, and it eliminates the dramatic post-1996 listing decline and subsequent international listing gap. We also show that listing peaks are surprisingly common internationally, but with a different impact of our merger-adjustment. While the U.S. post-peak decline reflects mergers *between* public firms, declines elsewhere tend to move assets *out of* public markets—pointing to a relative U.S. listing advantage.

JEl classification: G15, G34

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1 Introduction

After reaching a peak in 1996, the number of firms listed on the three major U.S. stock exchanges (NYSE, NASDAQ, AMEX) has declined by 50%. Figure 1 shows this peak along with four decades of stock-exchange listing dynamics of other advanced and developing/emerging economies, respectively. An extensive debate triggered by the sharp and apparently unique U.S. listing decline points to a similar reduction in initial public offerings (IPOs), as young companies have increasingly turned to private equity and other financial institutions to fund themselves.[1] Moreover, as Doidge, Karolyi, and Stulz (2017) were the first to demonstrate, and which Figure 1 also suggests, the erosion of IPOs in combination with an increase in the delisting rate has created a U.S. 'listing gap' relative to an international trend line starting in 1990. They argue that the listing gap points to a decrease in the absolute and relative net benefit of being listed in the U.S. In this paper, we expand the earlier focus on stock-market entries and exits of *stand-alone* firms to explicitly include entries and exits of firms via the merger channel. As it turns out, this expanded focus leads to new conclusions not only about the economic interpretation of the U.S. listing gap but also more broadly about merger-driven listing dynamics around the world.

We begin by demonstrating in unprecedented detail how firm-level merger transactions involving public acquirers explain the striking U.S. listing dynamics in Figure 1. While previous research recognizes that merger activity affects the listing count (Doidge, Karolyi, and Stulz, 2017; Lattanzio, Megginson, and Sanati, 2021), we are the first to precisely quantify this impact by tracking the merger activity of individual listed firms. Also interesting, we discover that, over the past four decades, more than three quarters of the countries underlying Figure 1 exhibit listing peaks (inclines followed by sharp declines). Moreover, as explained below, panel estimation reveals that mergers involving public acquirers impact the listing dynamics in these countries differently than in the U.S. Finally, also relevant for the listing debate, we show that the contribution of public companies to aggregate innovation, employment, and gross national product (GDP) has not declined after the listing peak in 1996.

Our focus on merger-driven listing dynamics is motivated by the well-documented contribution of merger waves to industrial reorganization and growth.[2] A further motivation is that firms contemplating

[1] For the decline of IPOs and the increasing role played by private equity and institutional capital, see e.g. Doidge, Karolyi, and Stulz (2013), Gao, Ritter, and Zhu (2013), Dambra, Casares Field, and Gustafson (2015), Ewens and Farre-Mensa (2020), Kwon, Lowry, and Qian (2020), and Dathan and Xiong (2021).

[2] For evidence on the time-series of merger waves, see e.g. Mitchell and Mulherin (1996), Andrade, Mitchell, and Stafford (2001), Harford (2005), Rhodes-Kropf, Robinson, and Viswanathan (2005), and Betton, Eckbo, and Thorburn (2008). Eckbo (2014) reviews various efficiency aspects of U.S. merger activity.

going public via an IPO regularly consider a sell-out to another company as a viable alternative funding strategy—albeit not as a stand-alone company.[3] In this paper, an important difference is that we restrict sell-outs to *public* acquirers (henceforth private-to-public acquisitions). Moreover, corporate executives consistently rank gaining access to 'acquisition currency' (liquid stock) as a major motive for going public—a goal that is achieved whether entering the stock market via an IPO or as the target of a public firm. These executive motives are also supported by acquisition sprees appearing soon after the IPO (Celikyurt, Sevilir, and Shivdasani, 2010), and by the extensive use of stock-payment for the targets in the merger wave thaht occurred in the 1990s (Eckbo, Makaew, and Thorburn, 2018). In sum, many of the benefits of going public via an IPO can also be achieved in a sell-out to a public acquirer, including gaining access to public capital, acquisition currency, and the information signal provided by public market pricing. Moreover, for some private firms, obtaining these benefits may be less expensive through a sell-out than through the IPO process.

While the stock market listing count is certainly a useful metric for analysing the size and organizational boundaries of public stand-alone companies,[4] it omits the effects of M&A transactions on the *de facto* entry and retention of firms and their resources. We show that stock-market entries and retentions of targets of public acquirers are so numerous that our direct adjustment of the listing count for these transactions rivals the effect of IPOs and bankruptcies on listing dynamics. As a consequence, our merger-adjusted listing count gauges the stock market's true ability to attract and retain firms much more accurately than does the actual count. In addition to adding private-to-public acquisitions to the actual listing count, this merger adjustment backfills the actual listing count with public targets of public acquirers (public-to-public acquisitions). Over the past four decades, private-to-public acquisitions total as much as 90% of the number of IPOs, with the ratio increasing to 170% after 1996. Moreover, public-to-public acquisitions total 86% of the number of delistings "for cause" (bankruptcies and other involuntary delistings), which rises to 124% after 1996. In sum, our merger adjustment substantially impacts actual listing dynamics—enough to eliminate the 1996 U.S. listing peak and explain the subsequent listing gap.

We use the Refinitiv SDC Platinum M&A database (SDC) for our merger adjustments and compare the resulting merger-driven listing dynamics across our sample of seventy-four countries. The empirical

[3]For the choice between an IPO and a sell-out, see e.g. Poulsen and Stegemoller (2008), Bayar and Chemmanur (2012), Chemmanur, He, Ren, and Shu (2020), Ewens and Farre-Mensa (2020), Bowen, Fresard, and Hoberg (2021).

[4]For recent studies of organizational boundaries and firm scope, see e.g. Maksimovic, Phillips, and Prabhala (2011), Gao, Ritter, and Zhu (2013), Bowen, Fresard, and Hoberg (2021), and Hoberg and Philips (2021).

results produces several important findings. First, we show that the actual U.S. listing dynamics—a peak followed by a sharp decline—is the *rule* rather than the exception internationally, with international peaks spread over the past four decades in both advanced and non-advanced economies equally. This observation prompts us to analyze pre-peak runups and post-peak declines in event time, centered on the peak year. The event-time analysis reveals that merger transactions involving public acquirers are sufficient to eliminate the listing peak in the U.S. but *not* internationally on average. Interestingly, according to our regression results, a reason for this difference is that U.S. merger activity in the post-peak event period tends to reallocate target assets *between* public firms (driven by public-to-public mergers), while the post-peak event periods in other countries tends to reflect the flow of assets *out of* public markets—pointing to a relative U.S. listing advantage.

The lack of a merger-adjusted listing peak in the U.S. is also apparent when we measure the transaction value of merger-driven firm inflows and outflows in addition to regular inflows and outflows like IPOs and bankruptcies. The value of net inflows over the 1997–2020 period actually exceeds the value of net inflows from 1981–1996: $1.7 versus $1.2 trillion, respectively. These aggregate transaction values sum to 8% of the total increase in the market value of the U.S. stock exchanges over the four decades. In other words, as much as 92% of the total market-value increase of listed firms comes from *organic* firm growth. To our knowledge, this evidence is also new to the literature—made possible by our measurement of the complete anatomy of transactions causing listing changes.

We use our merger-adjusted listing series to re-examine the negative U.S. listing-gap estimates reported by Doidge, Karolyi, and Stulz (2017). As in their study, we use 1990 as base year and the same basic regressors, while extending the end of the sample period from their 2012 to our 2020. Most important, for all countries, we replace the actual listing count (properly scaled) with our own merger-adjusted listing series as the *dependent* variable in the listing-gap regression. Using the actual listing count replicates Doidge, Karolyi, and Stulz (2017)'s main finding of significantly negative annual U.S. listing gaps. However, for our main regression specification, our replacement of the dependent variable results in *none* of our merger-adjusted annual gap estimates being significantly negative (1991–2020). In other words, after adjusting for mergers involving public acquirers around the world, there is no evidence that U.S. firms are leaving the stock market at a higher rate than listed firms in other countries.

It is worth pointing out that our merger-adjustment of the dependent variable in the listing-gap regression identifies the *causal* firm-level impact of merger transactions on the listing dynamics. This

treatment effect, which is new to the literature, also reveals that the listing gap estimates are statistically insignificant even if we *only* correct for public-to-public mergers. Since public-to-public merger transactions are particularly well covered in SDC on an international basis, our results are robust to concerns with international SDC data coverage. In fact, our merger-adjusted listing-gap estimates remain statistically insignificant in nearly all of our regression specifications even if we artificially *quintuple* foreign public-to-public mergers (leaving the domestic U.S. merger count unchanged). Our econometric approach also clarifies the evidence in Lattanzio, Megginson, and Sanati (2021), who show that adding country-level M&A volume as a regressor lowers U.S. listing-gap estimates.[5]

Furthermore, as explained in Section 2.3 below, when a public firm exits the stock exchange for reasons other than being acquired by another public firm, the merger-adjusted count must—for internal consistency—be lowered by that firm's cumulative acquisition history. Importantly, we apply this acquisition-history adjustment *only* to U.S. listed firms, which effectively penalizes the relative U.S. merger-adjusted listing count. This built-in penalty is substantial as it removes around one-third of all targets from the U.S. merger-adjusted listing count (and one-fourth of all public targets), while no such adjustment is made for other countries. Notwithstanding this penalty, our merger adjustment eliminates the U.S. listing gap. The reason is that, by 2020, as much as three-quarters of the cumulative number of targets of public acquirers are retained on the stock exchange under public ownership.

Finally, we provide new information on the wealth effect of the mergers involving public firms as well as certain macroeconomic time series involving listed companies, 1980–2020. First, among the industry-specific merger waves of the 1990s, more experience what John, Kadyrzhanova, and Lee (2021) label a 'synergistic merger wave' (mergers generating a positive combined bidder-target wealth effect) than in any other period. Moreover, U.S. public firms largely maintain their aggregate contribution to U.S. employment and GDP, while innovation activity increases. The latter is measured as research and development (R&D) spending and the number of patents originating from U.S. public companies. This evidence is consistent with the notion that classical economic drivers such as industry-specific deregulations (Harford, 2005) and changes in the technology, size and scope of listed firms (Gao, Ritter, and Zhu, 2013; Bowen, Fresard, and Hoberg, 2021) are important drivers behind the public merger wave of the 1990s—with its dramatic impact on the listing dynamics.

The rest of the paper is organized as follows. Section 2 lays out the merger-adjustment procedure,

[5]See Section 6.1 and Appendix A for a detailed discussion of different econometric approaches to listing-gap estimation.

while we apply this procedure to the U.S. listing dynamics in Section 3. In Section 4, we present the frequency and shapes of listing peaks around the world in both calendar time and event time (centered on the peak). Section 5 shows the results of our merger-adjustment of the international listing counts. Using this adjusted listing-count series, Section 6 first explains our listing-gap regression specification and then shows our merger-adjusted U.S. listing gap estimation. In Section 7, we show that the public-to-public merger wave of the late 1990s generated value for the transacting parties, and that listed firms continue to contribute to the U.S. economy on a similar level as prior to the merger wave. Section 8 concludes the paper.

2 Procedure for measuring merger-driven listing dynamics

The merger-adjustment procedure described in this section uses the listing anatomy provided by the Center for Research in Security Prices (CRSP) and the merger transactions in SDC. This adjustment procedure is subsequently applied to the U.S. listing count in Section 3 below.

2.1 Anatomy of actual listing changes

Let ΔL denote the annual net change in the actual listing count, i.e., new lists minus delists of stand-alone companies. The following components, which fully describe ΔL, are defined in Table 1 and further detailed in Appendix B:

$$\Delta L = \begin{cases} Newlists\ (+): & IPO + Spin + Misc_{New} \\ Delists\ (\text{-}): & Merge_{Public-to-Public} + Merge_{Public-to-Private} + Misc_{Del} \end{cases} \tag{1}$$

New lists arise from initial public offerings (IPO), from public company divisional spinoffs into new public companies ($Spin$), and from miscellaneous new listings ($Misc_{New}$, details below). The latter includes new lists without raising capital—in particular uplists from smaller exchanges and over-the-counter markets—relistings following leveraged buyouts and emergence from bankruptcy, the creation of a new public firm from the merger of two other companies, and firms that change status from foreign-domiciled to US-domiciled.

Delists arise from public-to-public and public-to-private mergers, where the subscript indicates the

direction of the target firm, and miscellaneous other reasons. In $Merge_{Public-to-Public}$ a public target is acquired by another public company, while in $Merge_{Public-to-Private}$ the public target is acquired by a private firm.[6] The miscellaneous other delistings $Misc_{Del}$ (given by CRSP) include delistings that are voluntary, for 'cause', or for unknown reasons.[7]

2.2 The merger-adjusted listing count

Let ΔL_A denote the net change in the merger-adjusted listing count. It is the sum of the following six components:

$$\Delta L_A = \begin{cases} Newlists_A\ (+): & IPO + Merge_{Private-to-Public} + Misc^N_{New} \\ Delists_A\ (-): & Merge^N_{Public-to-Private} + Divest_{Subsidiary-to-Private} + Misc^N_{Del} \end{cases} \tag{2}$$

In $Merge_{Private-to-Public}$ a private target is acquired by a public firm. $Divest_{Subsidiary-to-Private}$ represents the sale of a subsidiary of a public parent to a buyer that is not listed.

While $Newlists_A$ is affected by IPO in the same way as $Newlists$, it adds $Merge_{Private-to-Public}$ and excludes $Spin$. As stated in the introduction, we include $Merge_{Private-to-Public}$ in the listing count because the acquisition of a private target by a public bidder *de facto* results in the target firm entering the public market, albeit not as a stand-alone company. Similarly, $Spin$ is excluded since a divisional spinoff into a separate public firm does not change corporate resources under public management. Comparing the actual and adjusted delists, $Delists_A$ is not lowered by $Merge_{Public-to-Public}$ since the target firm *de facto* remains in the public market. However, $Divest_{Subsidiary-to-Private}$ now subtracts from the listing count because the subsidiary of a public parent is sold to a private firm.

2.3 The historical acquisition tracking index

For internal consistency, as we add targets of public acquirers to the listing count, we must also lower this count by the same targets whenever a public firm leaves the stock exchange for reasons other than being acquired by another public company. For this purpose, we create the index N_{it}, which tracks the cumulative number of acquisitions by public company i from 1980 to year t. With subscript j indicating

[6] The private acquirer may be U.S. domiciled or a foreign company. We designate the acquirer as 'private' even if it trades over-the-counter or on a minor exchange in the U.S., or on a public exchange in a foreign country.

[7] A delisting for cause occurs when a firm fails to uphold certain exchange-listing requirements, such as when the firm files for bankruptcy or its stock falls below a minimum price.

the target firm, this cumulative index is constructed recursively as follows:

$$N_{it} = \begin{cases} N_{i,t-1} + 1 & \text{if target } j \text{ acquired in period } t \text{ is a private firm} \\ N_{i,t-1} + 1 + N_{j,t-1} & \text{if target } j \text{ in period } t \text{ is a public firm} \end{cases} \tag{3}$$

$N_{i,t-1}$ is public firm i's index value up to the date of i's acquisition. It increases by one if firm i acquires a private target j in year t, and by $1 + N_{j,t-1}$ if target j is another public company, where $N_{j,t-1}$ is the value of that target's acquisition index. Thus, N_{it} tracks all private targets of public acquirers as well as the cumulative acquisition history of public targets, going back to 1980.

In Eq. (2), we use superscript N for transactions that may change the adjusted listing count ΔL_A by more than just one. For example, for a private firm that relists on the stock exchange (covered by $Misc^N_{New}$), $N_{it} > 1$ if the firm undertook at least one acquisition during its prior years as a public company. Or, for $Misc^N_{Del}$, a public company with a prior acquisition history may delist due to bankruptcy. In $Merge^N_{Public-to-Private}$, a public company with a possible prior acquisition history delists because it is acquired by a private firm.

While we track N_{it} for all public companies in all years, note that N_{it} is used to adjust the listing count ΔL_A *only* when a firm *leaves* the exchange, and then for reasons other than being acquired by another public company. When firm i leaves in this sense, ΔL_A is lowered by $N_{i,t-1} + 1$, as opposed to ΔL, which is lowered by one. However, there is one important caveat to this use of N_{it}: we apply it to U.S. listed companies only. The reason is that, for foreign stock markets, our available data sources track the actual listing count and the number of mergers but not the identity of each listed company, which is required to accurately measure N_{it}. Since $N_{it} = 0$ is likely counterfactual for many firms delisting from foreign stock exchanges, this treatment leads to overstatement of the foreign merger-adjusted listing counts (by understatement of the exits): when a foreign listed firm leaves the exchange, that country's merger-adjusted listing count is lowered by one only, while it is lowered by $1 + N_{it} \geq 1$ for a U.S. company. In Section 5.2 below, we return to the magnitude of this 'penalty' of the U.S. merger-adjusted listing count, which turns out to be substantial.

3 Merger-driven listing dynamics in the U.S.

In this section, we apply the above merger-adjustment procedure to the three major U.S. stock markets (NYSE, NASDAQ, AMEX), 1980–2020. We begin by explaining our choice of a minimum firm size for the target of a public acquirer to be 'listable'. Applying this minimum target-size screen, we then examine how the merger adjustment affects the overall listing-count dynamics, as summarized in the following proposition:

> **Proposition 1 (U.S. listing peak)**: *Adjusting the U.S. listing count for private-to-public and public-to-public mergers eliminates the 1996 U.S. listing peak.*

3.1 The minimum target-size threshold

It is necessary to impose a minimum firm-size threshold for a private target (and a subsidiary) to be reasonably classified as a *bona fide* listable firm and included in our merger-adjusted count. Our threshold is the year-end 1^{st} percentile of the market capitalization of all publicly listed firms in the target's Fama-French-12 industry. To avoid a downward bias due to financial distress, we also require the firms used to identify this size threshold to be listed also in year $t + 1$. Panel A of Figure 2 plots this size threshold (solid black line) as well as the same threshold without a one-year survivorship requirement (dotted black line). As shown, eliminating the one-year survivorship requirement has a negligible impact on the size threshold.

For comparison purposes, the grey bars in Figure 2 also show annual distribution of the 1^{st} percentile of the market value of IPO firms, using the firm's closing price at the end of the first trading day and averaged across industries. Note that the industry-specific minimum size of a private target of a public acquirer may well be smaller than the minimum size of a firm that goes public via an IPO. The reason is that the two channels for entering the stock market are very different. For example, a firm may select a sell-out to a public acquirer when the IPO channel is particularly costly, e.g. in terms of investment banking fees and disclosure requirements. Or, a private negotiation resulting in a sell-out may be preferable when the target assets are particularly difficult to value based on public information. Therefore, for our purposes, we do not impose an IPO-based size threshold on the acquisition channel. Note also that our chosen benchmark has the desirable property of being stable relative to the 1^{st} percentile of IPOs, while also capturing the general trend toward a larger minimum firm size to survive as an independently listed firm.

Panel B of Figure 2 shows the large number of post-1996 merger transactions that qualify as drivers of the wedge between the actual and merger-adjusted U.S. listing counts ΔL and ΔL_A. Notice first the substantial number of private-to-public mergers. As detailed in Appendix Table 2, over the past four decades, private-to-public acquisitions number as much as 90% of the total number of IPOs, which increases to 170% after 1996. At the same time, while Panel B of Figure 2 shows a decline in private-to-public mergers after 1996, the 170% implies an even greater post-1996 decline in IPOs. Overall, the large number of private-to-public acquisitions shows the degree to which the actual listing count—by recording IPO and $Misc_{New}$ only—misses a substantial chunk of the actual flow of target firms into the public markets. In fact, this flow is larger in number than $Merge_{Public-to-Public}$ in most (36 of 40) years.

Second, $Merge_{Public-to-Public}$ is itself a major factor in lowering the listing count. Again referring to Appendix Table 2, over the total sample period, public-to-public mergers constitute 86% of delistings for cause, which increases to 124% after 1996. Third, the figure plots the total outflow (net of relistings) driven by the acquisition index N_{it} when public firms leave the exchange. The dark shaded area restricts N_{it} to public targets only, while the lighter shaded area also includes private targets. As shown, N_{it} is substantial and, naturally, lags both $Merge_{Private-to-Public}$ and $Merge_{Public-to-Public}$.

3.2 Transaction values of inflows and outflows

Implementing the above minimum size thresholds, Figure 3 shows the contribution of each of the listing channels in terms of the annual transaction value ΔV_A (inflation-adjusted to 2020). Since the market value of a public firm that delists directly accounts for any value-implications of the firm's acquisition history, ΔV_A is constructed using $Merge_{Public-to-Private}$ and not $Merge^N_{Public-to-Private}$. Over the period 1980–2020, total inflow amounts to $Newlists_A$ = \$11.1 trillion, while total outflow is $Delists_A$ = \$8.2 trillion. The difference of \$2.9 trillion is also shown in the left-side vertical axis for the solid curve in Figure 3. \$1.2 trillion of the net inflow is added between 1981–1996 and the remaining \$1.7 trillion is added *after* the listing peak.

While we noted in the previous section that the number of private-to-public acquisitions number as much as 90% of the number of IPOs, switching to dollar values changes this picture because the average private-to-public target is smaller than the average IPO firm. In terms of dollar values, $Merge_{Private-to-Public}$ constitutes 28% of $IPO + Misc_{New}$ (\$2.5/8.7 trillion)). Also interesting, on the delist side, $Merge_{Public-to-Private}$ accounts for as much as 80% (\$6.6/8.2 trillion) of the total transaction

value of delisting outflows. Moreover, while not tabulated, the value of $Merge_{Public-to-Public}$—which reflects the reshuffling of assets already on the exchange—is 1.6 times that of $Merge_{Public-to-Private}$ ($10.7 trillion versus $6.6 trillion).

Finally, the information in Figure 3 shows that the net transaction-value inflow of $2.9 trillion represents 8% of the total market-value increase of $34.9 trillion on NYSE, NASDAQ and AMEX from 1980–2020. In other words, as much as 92% of the total market-value increase is organic growth: a combination of internal investments a revaluation of assets in place. To our knowledge, this evidence is also new to the literature. It is made possible by our measurement of the complete anatomy of transactions causing listing changes.

3.3 The merger-adjusted listing series

To examine Proposition 1, we use the annual components of *Newlists* and *Delists* for the actual and merger-adjusted U.S. listing series illustrated in Figure 4 for the period 1981–2020. The actual listing count is the lower series (for convenience repeated from Figure 1 above), while the middle and upper series are the public-to-public merger-adjusted and the full merger-adjusted listing series, respectively. In Table 2, we highlight the merger-driven impact on these listing series by contrasting ΔL with ΔL_A and the associated components over the total sample period as well as over the post-peak period (1996–2020). The annual values of the listing changes and their components are found in Appendix B, with ΔL in Appendix Table A.1 and ΔL_A in Appendix Table A.2.

Focusing first on the actual listing series in Table 2, over the 1981–2020 period, the values of *Newlists* and *Delists* sum to 17,837 and 18,919, respectively, for a net decline of $\Delta L(1980-2020) = -1,083$ listed firms. This net decline is the result of the 10,567 IPOs (59% of *Newlists*) and the 6,799 miscellaneous additional listings being offset by 10,063 delistings due to acquisitions of public targets plus an additional 8,856 delistings (of which 7,063 are in the 'cause' category).[8] Over the post-peak period, $Newlists = 7,004$ and $Delists = 10,696$, which result in a much larger net decline of $\Delta L(1996-2020) = -3,692$ listed firms by 2020. This decline is primarily caused by a reduction in the rate of IPOs (totalling 4,173 over the post-peak period) and the continued high merger activity involving public targets: 3,721 public-to-public

[8]Interestingly, uplists from minor exchanges and over-the-counter (OTC) markets make up as much as 28% of *Newlists*. Unlike IPOs, these are transactions that do not involve an equity issuance (Brüggeman, Kaul, Leuz, and Werner, 2018; Cole, Floros, and Ivanov, 2018).

and 2,524 public-to-private transactions.[9]

Turning to the merger-adjusted series in Table 2, $\Delta L_A(1980{-}2020) = 7,436$ listed firms. This increase, which contrasts with the deline of $\Delta L(1980 - 2020) = -1,083$, is the difference between $Newlists = 28,448$ and $Delists = 20,712$. For $Newlists$, the main addition by far comes from 9,481 private-to-public mergers, now counted as entries of the target firms into the three stock exchanges. Note also that the merger-adjusted $Delists$ is close to the actual number of delistings: 20,712 versus 18,919, respectively. This is surprising because the merger-adjustment does *not* lower the listing count by the 6,108 public-to-public mergers that lowers the actual count. The main reason why the merger-adjustment still produces this large number of delistings is the imposition of the historical acquisition tracking index N_{it} (Eq. 3).[10]

For the post-peak period, the merger-adjustment almost entirely eliminates the 1996 listing peak: $\Delta L_A(1996 - 2020) = -98$. In other words, while the actual listing in 2020 is down by 50% from the 1996-level (-3,692/7,325), the adjusted count is down by less than one percent. The main reasons for this modest adjusted listing change are the backfilling of 3,721 targets in public-to-public mergers, and the addition of 9,481 targets in private-to-public mergers. As shown in Appendix Table 1.2, the adjusted series keeps rising from 12,250 firms in 1996 to 13,816 in year 2000, for then to level out at about 5% of the 1996-level annually through to 2020, when the number of firms is 12,152 (99% of the 1996-level). Noting that one standard deviation of the annual merger-adjusted listing count is 2,511 firms, these results show that the merger-adjustment is by itself sufficient to eliminate the 1996 listing peak in the U.S., as stated in Proposition 1.

In the remainder of the paper, we apply our merger-adjustment procedure to stock markets around the world. We first document the properties of international listing dynamics in order to see whether the U.S. pattern with a dramatic listing peak is unique or common internationally (Section 4). This is followed by our merger adjustment of the international listing series (Section 5), which tests whether merger activity involving publicly listed companies affects international listing dynamics differently than in the U.S., and which is ultimately explored in our merger-adjusted listing-gap estimation (Section 6). We end by showing several statistics indicating that the merger wave of the 1990s, which drives the 1996 listing peak in the U.S., has not lowered the contribution of listed firms to the overall economy.

[9] Of the public to private transactions where the acquirer is a U.S. private firm, leveraged buyouts account for roughly one-third of the transactions, 1980–2020.

[10] Specifically, this index nearly doubles the delistings caused by $Merge_{Public-to-Private}$, from 3,955 to 7,943. Moreover, it increases $Misc_{Del}$ from 8,856 in the actual count to 12,156 in the adjusted count.

4 Listing peaks: an international phenomenon

We begin in this section by providing novel evidence on the frequency and shapes of listing peaks around the world. Note first that the cost/benefit of public listing likely varies across countries as well as through time, as it responds to things like country-specific regulatory changes and, more importantly for this paper, to changes in business cycles creating industry-specific merger waves.[11] Moreover, the benefit for public acquirers of having access to their stock as acquisition currency depends on the ability of the local legal and financial system to resolve issues of adverse selection, which is also likely to vary across countries. We therefore summarize the empirical proposition of this section as follows:

> **Proposition 2 (international listing peaks)**: *Responding to country-specific variations over time in the cost/benefit of being publicly listed as a stand-alone firm, the U.S. listing pattern—a peak followed by a rapid decline—is the norm rather than the exception internationally.*

Below, we first provide evidence on the frequency of international listing peaks in calendar time. Conditional on observing a listing peak, we then show the speed of decline during the five years following the peak, which is the time period over which the bulk of the post-peak decline tends to take place across countries.

4.1 Country selection and data sources

As detailed in Appendix B, we select a sample of 74 of the 100 countries and territories with the highest GDP as of 2020 per the IMF. Using the IMF classification, 33 countries in our sample are advanced economies, representing 59% of global GDP. The remaining 41 countries are classified as developing and emerging economies, and represent 37% of world GDP. See Appendix Table B.4 for the full country selection procedure.[12]

[11] See, e.g., Harford (2005), Rhodes-Kropf, Robinson, and Viswanathan (2005), Rhodes-Kropf and Robinson (2008) and Phillips and Zhdanov (2013) for evidence on how U.S. merger waves correlate with the relative market-to-book ratios (M/B) of bidder and target firms.

[12] We start with the top 100 countries and territories ranked by GDP and remove 26 countries for which the 2020 listing count is unavailable or less than 10 years of data is available. Of our 74 countries, 53 overlap with the sample of 54 countries in Doidge, Karolyi, and Stulz (2017), who instead construct a sample based on the 71 countries with an anti-self-dealing index in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). The subset of advanced economies is the same in both papers. We have verified that the results of this paper are unaffected by switching to the sample in the earlier listing gap paper.

While the U.S. listing count is from CRSP, we identify the listing counts for each non-U.S. country by supplementing data from the World Bank's World Development Indicators (WDI) with information from the World Federation of Exchanges (WFE), the ISI Emerging Market Group's CEIC database (CEIC), and individual stock exchange home pages.[13] We count the number of listings on a country's major stock exchanges only. Second-tier exchanges generally have lower listing standards and therefore do not compete with major stock exchanges in terms of attracting the listing of major companies. Bernstein, Dev, and Lerner (2020) find that internationally, IPOs on second-tier exchanges do not appear as substitutes for IPOs on main exchanges.[14] We only count dual-listed firms once, in the country where they are incorporated. Finally, we identify public-to-public and private-to-public mergers for each country using SDC. In order to maximize data coverage in non-U.S. countries, we base our international sample in 1990 instead of 1980.

4.2 International listing peaks in calendar time

Figure 1 extends the global listing information provided by Doidge, Karolyi, and Stulz (2017) from 2012 to year 2020. It shows a U.S. listing peak in 1996 followed by a decline of 50% by year 2020. Moreover, as shown by Doidge, Karolyi, and Stulz (2017) as well, the U.S. listing pattern contrasts with the aggregated listing count of the rest of the world, which largely continues to rise over our sample period, 1990–2020. In this section, we extend the analysis beyond the extant literature by disaggregating all of the international listing counts in Figure 1. For illustrative purposes, we provide this information all the way back to 1975.

In our definition, a listing peak occurs if the country's unadjusted listing count in 2020 is lower than in any previous year, where the listing-peak year is the year of the highest unadjusted listing count over the sample period.[15] As shown in Figure 5, disaggregating the non-U.S. listing count reveals a surprisingly high number of country-specific listing peaks around the world—both across time and economic development. In the figure, the bars plot the number of countries that experience a listing peak in each year from 1980–2019. The distinct impression left by Figure 5 is that these peaks are numerous and roughly evenly distributed over time. Furthermore, this pattern seems to apply to both advanced

[13] Investment companies, mutual funds, real estate investment trusts, and other collective investment vehicles are excluded.

[14] While our procedure excludes regional exchanges (e.g., in Canada and Japan), we follow WDI and include firms listed on Spanish regional exchanges because these are consistently tracked over our sample period.

[15] When a country has two identical peak years, we use the year of the most recent peak. Two identical peak yearsare observed in five non-advanced countries (Brazil, Bulgaria, Kenya, Nigeria, and Poland). When a country has a second peak at least ten years after the first, which is within 95% of the first peak count, we use the year of the second peak. This occurs in Belgium, Mexico and Norway.

and non-advanced economies. Figure 6 and Table 3 further detail these peaks by showing how the listing count has decreased from peak until 2020 for each of these countries. Table 3 orders countries according to listing-peak year and divides the sample into four non-overlapping categories: advanced/non-advanced countries with/without a peak. Columns (2) and (3) show the number of listed firms at peak and the listing count in 2020, while Column (4) shows the total percent change in the listing count between the peak-year and 2020, with the average annual percent change in Column (5).

This new international listing-peak information yields several interesting facts. First, consistent with Proposition 2, experiencing a listing peak is indeed the norm rather than the exception: Among the 33 advanced economies alone, as much as 82% (27 economies) exhibit a listing peak—five before the U.S. and another 21 in 1996 or later.[16] A similar proportion of non-advanced countries also experience a listing peak: 31 of 41 (76%). In sum, more than three-quarters (58 of 74) of all sampled countries have fewer listed firms in 2020 than in the past. Second, the total number of listing peaks is widely distributed across the period 1985–2019, with the greatest number of peaks in 1998.[17] The average peak year for the advanced countries is 2000 with a standard deviation of 8 years. For the non-advanced economies, the average peak year is 2001 with a standard deviation of 10 years.

Third, while the U.S. experienced a 50% decline in the listing count from the peak year until 2020, the average decline across all advanced economies with a listing peak is 49%, with fifteen advanced countries experiencing a greater overall decline than the U.S. Fourth, while the annual percent decline in the number of lists since the peak year is 2.1% for the U.S., the average rate of decline for advanced economies is 2.5%, with more than half (16 of 27) of advanced countries experiencing a higher rate of decline than the U.S. Finally, the earlier in the sample period that a country peaks, the lower is the 2020 listing count relative to the peak count. The correlation between number of years passed since the peak and the percent decline is 65%. This suggests that the post-peak listing decline tends to persist over time.

[16]The six advanced economies that have not peaked by 2020 are Hong Kong, Italy, Japan, South Korea, Sweden, and Taiwan.

[17]The earliest advanced economies to peak in our sample are Denmark and New Zealand in 1986 and the most recent is Australia in 2017. Among developing economies, the first country to peak is Argentina in 1975, while Sri Lanka peaks last in 2018.

4.3 Listing peaks in event time

Conditional on experiencing a listing peak, Panel A of Figure 7 shows the average listing pattern over the eleven-year event period (-5,5) centered on the peak year (year 0). The shapes of the three U.S., non-U.S. advanced, and non-advanced listing patterns are surprisingly similar both in terms of the pre-peak incline and post-peak decline. Table 4 lists each country's listing-count change that underlies the average in Figure 7, and it also expands this list to a 21-year event window surrounding the peak year, which Panel B of Figure 7 also illustrates. Focusing first on the pre-peak runup period for advanced countries (Panel A of Table 4), for the U.S. the percent runup is 24% over the (-10,0) period (Column 3) and 29% over the shorter (-5,0) event period (Column 5). For other advanced (developing/emerging) economies, the runup averages 65% (87%) over the (-10,0) period and 51% (40%) for the (-5,0) period.[18] This shows that the bulk of the pre-peak runup in advanced economies, as in the U.S., is typically concentrated over the (-5,0) event period.

Turning to the post-peak event period, the actual U.S. listing count declines -37% over the (0,10) period and by -24% over the shorter (0,5) period. For advanced (non-advanced) economies, the decline over these two event periods average -32% (-30%) and -24% (-22%) for the 21-year and 11-year event periods, respectively. This shows that the average annual rate of listing decline is also similar across the U.S. and other countries, and that the bulk of the decline occurs quickly—within the event period (0,5).[19] In sum, the (-5,5) event period catches the bulk of the listing runups and declines around the peaks. Next, we present a cross-country analysis of the impact of mergers on the rate of post-peak listing decline that focuses on the (0,5) event window.

5 International merger-driven listing dynamics

The central thesis of this paper is that merger activity constitutes an empirically important driver of listing changes. In light of the extraordinary U.S. merger activity relative to other countries (documented below), we expect the impact of our merger-adjustment procedure to be greatest for the U.S. listing count:

> **Proposition 3 (international merger-adjusted listing counts):** *Treating private targets of public acquirers as de facto entries into the stock market, and backfilling public targets into*

[18] In this average, we exclude four outliers shown in the table: Croatia, Czech Republic, Luxembourg, and Portugal.
[19] The listing decline is higher in the (0,5) period than in the (5,10) period for four-fifths of the countries.

the listing count because these targets de facto remain in the public domain, will significantly affect average listing dynamics, and more so in the U.S. than in other countries.

Below, using SDC as our source of international merger activity, we implement our merger-adjustment procedure across our sample of 74 economies from 1990–2020 and examine the merger-adjusted listing dynamics, including the impact on the rates of post-peak listing decline.

5.1 International merger propensities

Panel A of Figure 8 shows the international average annual number of mergers where at least one of the two parties to the transaction is a public company, while Panel B further restricts the mergers to deals between two public firms. In both panels, the U.S. likelihood of a merger is noticeably higher than the likelihood in any other country in our sample. Moreover, this difference is even more pronounced for the public-to-public mergers in Panel B. This further suggests that the effect of mergers on listing dynamics stated in Proposition 3 will be stronger in the U.S. than in other countries, which is confirmed below.

5.2 International merger-adjusted listing series

Panel A of Figure 9 shows the three merger-adjusted listing series of the U.S., advanced economies, and developing/emerging economies, over the period 1990–2020. Recall from Section 2 that the merger-adjustment procedure uses the complete anatomy of ΔL_A for all countries. However, while it also lowers the U.S. listing count with the acquisition history of a public company that exits the stock exchange ($N \geq 1$, looking back to 1990 when we compare the U.S. to other economies), it ignores this exodus of private-to-public merger-induced listed firms for all other countries ($N = 0$ even if counterfactual). Thus, the merger-adjusted listing counts of non-U.S. economies in Panel A of Figure 9 is biased upwards relative to the U.S. adjusted count. In fact, for the U.S., tracking N from 1990-2020 removes as much as 29% of the public and private targets when public acquirers leave the U.S. stock exchange.

Notwithstanding the above U.S.-specific penalty, comparing Panel A of Figure 9 to the actual listing series (ΔL) in Figure 1 reveals that, while the net effect of the merger-adjustment is positive for the two equal-weighted portfolios of non-U.S. economies, the effect is smaller in magnitude than for the U.S. Moreover, going from Panel A of Figure 7 to Panel B of Figure 9 shows that the merger-adjustment increases both the pre-peak runup and the post-peak listing count for the U.S., with a much milder effect

for other countries.

These two findings are therefore consistent with our Proposition 3.

Finally, in Figure 10, we show the results of narrowing the above merger-adjustment to public-to-public mergers only—still with $N \geq 1$ for the U.S. and $N = 0$ elsewhere, and in this context tracking public-to-public mergers only. The main motivation for this exercise is to examine whether the extraordinary U.S. public-to-public acquisition activity by itself is sufficient to eliminate the U.S. listing peak. The answer appears to be affirmative as the U.S. adjusted listing curve in Panel A also flattens out after 1996, as does the post-peak rate of change in the U.S. adjusted listing count in Panel B. Specifically, over the (0,5) period, the public-to-public merger-adjusted listing count declines by -5% in the U.S., compared to -22% for non-U.S.-advanced and -21% for developing/emerging economies. This is evidence that public-to-public mergers alone have a much greater attenuating effect on the merger-adjusted listing decline in the U.S. than in other countries. Combined with Panel A, this evidence means that the actual post-peak listing decline in the U.S. to a great extent represents a *reallocation* of target firms between listed companies, while the actual listing declines elsewhere largely represent an *outflow* of listed firms from public markets.

5.3 Determinants of the post-peak rate of listing decline

To examine the U.S.-specific effect on the post-peak decline speed introduced in Proposition 3, let $Decline_{Ti}$ denote the average annual rate of decline (in percent) in the number listed firms for country i in the $T = 5$ years (alternatively, $T = 3$) after that country's listing peak. $Decline_{Ti}$ is either the unadjusted listing count, the public-to-public merger-adjusted listing count, or the full merger-adjusted count. We run the following cross-sectional regression:

$$Decline_{Ti} = \alpha + \beta D_{US} + \lambda Z_{Ti} + \epsilon_{Ti}, \quad i = 1, ..., N, \tag{4}$$

where D_{US} is a dummy taking a value of one if the country is the U.S. and zero otherwise. The vector Z_{Ti} is a set of pre-peak country-specific control variables using data from the World Bank and IMF. Each variable is computed as the annual T-period average prior to the listing-peak year of country i. The pre-peak growth variables are *Listing count runup* (the average percent growth in the unadjusted listing count), and *GDP growth*. The GDP-scaled variables are *Trade* (the sum of exports and imports) and

FDI net inflows (foreign direct investment). Finally, population-scaled variables are *Patent applications* and *GDP*. The patent applications are restricted to those filed by domestic firms and residents. We use patents to measure innovation activity because they are more consistently recorded across countries than are data on R&D expenditures.

The regression results are reported in Table 5. Odd-numbered columns use all available countries, while the even-numbered columns are based on advanced economies only. In columns (1)–(4), the dependent variable is the rate of decline of the unadjusted listing count. Note first that D_{US} is insignificant in Column (1) (all countries) and in Column (2) (advanced economies). This implies that the U.S.-specific five-year average annual rate of post-peak decline is statistically indistinguishable from other countries. A similar conclusion holds for columns (3) and (4), in the three-year post-peak period.

Columns (5)–(8) of Table 5 show the regression results when $Decline_{Ti}$ is for the post-peak annual average rate of decline of the public-to-public merger-adjusted listing series. Most important, D_{US} now receives a negative and statistically significant coefficient estimate—implying a significantly slower rate of post-peak decline in the merger-adjusted listing series. The coefficient on D_{US} is estimated at -2.2 to -2.6 percentage points for the five-year event window and from -4.2 to -5.0 for the three-year window. Importantly, the fact that the merger adjustment *lowers* the coefficient estimate of D_{US} when going from columns (1)–(4), means that there is a U.S.-specific effect of public-to-public mergers that reduces the speed at which listed firms leave the stock exchange. Between columns (1)–(4) and columns (5)–(8), the U.S.-specific effect of public-to-public merger activity decelerates the speed of decline by -3.5 to -3.6 pps, relative to other countries.

It is worth reemphasizing the above interpretation of the coefficient estimates on D_{US}. They show that U.S. public-to-public merger activity reallocates target firms *within* the stock exchange to a greater extent than in other countries. This interpretation follows because, when going from, say, columns (1) to (5), we are *only* changing the dependent variable $Decline_{Ti}$. As a result, the significant decline in the coefficient estimate on D_{US} means that public-to-public merger activity slows down the post-peak rate of decline relative to other countries. Hence, this evidence strongly supports our Proposition 3.

In columns (9)–(12), $Decline_{Ti}$ is measured using the full merger-adjusted listing count series. Again focusing on D_{US} and the total sample of countries, recall that the full merger adjustment adds private-to-public acquisitions to the listing count. The marginal decline in the coefficient estimate for D_{US} from -1.4 pps to -2.2 pps when going from columns (5)–(8) to (9)–(12) is evidence that the U.S.-specific effect

of private-to-public acquisitions is smaller than the case is for public-to-public mergers. Furthermore, it confirms that what distinguishes the post-peak U.S. merger activity is *not* an inflow of private targets so much as the effective retention of listed targets through public-to-public mergers, which further supports Proposition 3. This result is also noticeable by comparing Panel B of figures 9 and 10, which shows a somewhat similar private-to-public effect on US and non-US advanced, but a noticeably different public-to-public effect.

Finally, we test whether role of post-peak merger activity documented above for the U.S. is unique—i.e, whether Proposition 3 might hold also for other countries. In Table 5 we estimate country-by-country regressions where we replace the U.S. dummy D_{US} in Eq. (4) with a dummy for each respective non-U.S. country. In the sample of advanced economies, this replacement fails to produce a significantly negative country dummy when using the merger-adjusted listing series (columns 5–12) for all non-U.S. countries with insignificant or positive unadjusted dummy estimates (columns 1–4). This reinforces the notion that the significant effect of merger activity on the rate of post-peak listing decline is uniquely strong in the U.S.—primarily due to public-to-public mergers.

6 Is there a merger-adjusted U.S. listing gap?

Since the above evidence demonstrates that mergers involving public acquirers eliminate the 1996 listing peak, our next step is to examine whether the merger-adjusted listing series also eliminates the U.S. listing gap:

> **Proposition 4 (U.S. listing gap)**: *Treating private targets of public acquirers as de facto entries into the stock market, and backfilling public targets into the listing count because these targets de facto remain in the public domain, is sufficient to eliminate the U.S. listing gap.*

In the following, we first describe in detail the econometric specification of our listing-gap regression, and then present the empirical results.[20]

[20] Because the econometric specification described below differs somewhat from that of Doidge, Karolyi, and Stulz (2017), we provide a detailed explanation of the econometric differences in Appendix A.

6.1 Econometric specification

The U.S. listing gap in year t is defined as the difference between two conditional expected listing counts. The first difference is the expected number of U.S. listings in year t relative to the base-year 1990 (which maximizes international data availability). Let D_{US} denote a dummy variable with a value of one if the country is the U.S. and zero otherwise. The first difference is then

$$E(Y_{it} \mid D_{US} = 1, year = t) - E(Y_{it} \mid D_{US} = 1, year = 1990). \tag{5}$$

The second difference is between the expected number of listings in a non-U.S. country in year t and that in 1990:

$$E(Y_{it} \mid D_{US} = 0, year = t) - E(Y_{it} \mid D_{US} = 0, year = 1990). \tag{6}$$

We estimate the listing gap parameter (the two differences in conditional means) across a total of 30 years and N countries using the following panel regression:

$$ln(Y_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N. \tag{7}$$

The dependent variable Y_{it} is country i's listing count (L) per capita (Pop) or per GDP in year t, and δ_i and τ_t are country and year fixed effects, respectively. X_{it} is a vector of three country-specific control variables: country i's anti-self-dealing index (Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2008), log(GDP/Pop) and annual GDP growth.

Hence, ignoring the country-specific parameters λ_i and δ_i (since these cancel out in the difference below), the gap-parameter in year t is:

$$\begin{aligned} [E(Y_{it} \mid D_{US} = 1, year = t) &- E(Y_{it} \mid D_{US} = 1, year = 1990)] \\ -[E(Y_{it} \mid D_{US} = 0, year = t) &- E(Y_{it} \mid D_{US} = 0, year = 1990)] \\ &= [(\alpha + \tau_t + \beta + \gamma_t) - (\alpha + \beta)] - [(\alpha + \tau_t) - \alpha] \\ &= \gamma_t, \end{aligned} \tag{8}$$

where γ_t—the annual parameter in the vector Γ—captures the U.S.-specific residual in year t. For a given

γ_t, we then compute the U.S. listing gap in year t (expressed as the number of firms) as follows:

$$\text{US gap computation, year } t\text{:} \quad \begin{cases} Y_{US,1990} \times Pop_{US,t} \times (e^{\gamma_t} - 1) \text{ for } L \text{ scaled by population} \\ Y_{US,1990} \times GDP_{US,t} \times (e^{\gamma_t} - 1) \text{ for } L \text{ scaled by GDP} \end{cases} \tag{9}$$

In other words, computing the U.S. listing gap for year t in terms of the total number of firms involves multiplying three items: the U.S. listing count per capita or GDP in 1990, the corresponding population or GDP scaling variable in year t, and the antilogarithm of γ_t minus one.

To show clearly the marginal impact of our novel listing count adjustment, we fix the right-hand-side of Eq. (7) and gradually develop the following three listing gaps:

$$\text{Gap} \quad \begin{cases} \text{G1:} & Y_{it} \textit{ is} \text{ unadjusted (the actual listing gap).} \\ \text{G2:} & Y_{it} \textit{ is} \text{ public-to-public merger-adjusted only, with } N_{it} = 0 \text{ for non-U.S. countries.} \\ \text{G3:} & Y_{it} \textit{ is} \text{ merger-adjusted, with } N_{it} = 0 \text{ for non-U.S. countries.} \end{cases} \tag{10}$$

In G1, the numerator of the dependent variable Y_{it} is the actual (unadjusted) listing count for all countries. For the U.S., G2 adjusts the actual listing count for public-to-public mergers and spinoffs and, therefore, the acquisition index N_{it} tracks public targets only. Moreover, for the U.S., G3 fully tracks inflows and outflows of *all* firms—both public and private—to and from U.S. public markets using the full Eq. (2) and an acquisition index N_{it} in Eq. (3) that tracks both public and private targets.

6.2 Listing gap estimation

Figures 11 (scaled by population) and 12 (scaled by GDP) plot the annual U.S. listing gap estimates for all three gap definitions G1–G3 in Eq. (10) using the full set of 74 countries. A complete set of annual coefficient estimates for the gaps, each with four different regression specifications, is listed in Table 7. In the discussion below, we primarily focus on the regression specification with the listing count scaled by population and including country fixed effects (columns 2, 6, and 10). Table 7 also reports three alternative regression specifications: (i) the dependent variable scaled by population and without country fixed effects, (ii) the dependent variable scaled by GDP and with country fixed effects, and (iii) the dependent variable scaled by GDP but without country fixed effects. In Table 8, we also report the

results of the same twelve regressions for the subsample of 28 advanced economies, which lead to largely identical inferences.

6.2.1 The unadjusted listing gap (G1)

We begin with the U.S. unadjusted listing gap (G1), which is shown as the solid black line in Panel A of Figure 11. The gray shaded area is the 90% confidence interval around the annual gap estimates (with standard errors clustered by country). The coefficient estimates corresponding to the black line are shown in Column (2) of Table 7, where $ln(Y_{it})$ is natural logarithm of the actual listing count scaled by population and including country fixed effects. Using Eq. (9), the estimate of γ_t in Column (2) of Table 7, and population data from the IMF, the estimated G1-gap in year 2020 is $Y_{US,1990} \times Pop_{US,2020} \times (e^{\gamma_t} - 1) = 22.78 \times 330.01 \times (e^{-0.636} - 1) = -3,538$ listed companies. In 2012, which is the final sample year in Doidge, Karolyi, and Stulz (2017), $G1 = Y_{US,1990} \times Pop_{US,2012} \times (e^{\gamma_t} - 1) = 22.57 \times 314.12 \times (e^{-0.631} - 1) = -3,348$ listed companies.

Doidge, Karolyi, and Stulz (2017) instead report a listing-gap estimate of -5,436 listed firms for 2012. In terms of the regression parameters in our Eq. (7), their regression specification is equivalent to using $\gamma_t + \tau_t$ to estimate the listing gap G1 (see Appendix A for proof). In other words, the difference between our G1-gap for 2012 of 2,088 listed firms and the larger number reported by Doidge, Karolyi, and Stulz (2017) emerges primarily because we subtract out the common component (the time trend τ_t) in the listing dynamic before computing G1. By netting out the time trend in the panel estimation, our gap estimate is restricted to the portion of the international time trend that is unique to the U.S. As shown in Appendix Table 2, the time trend parameter estimates of τ_t become negative and statistically significant after 2009, hence causing the gap-estimates in Doidge, Karolyi, and Stulz (2017) to have larger negative values.

6.2.2 The merger-adjusted listing gaps (G2, G3)

Panel A of Figure 11 also shows the full merger-adjusted listing gap, which is again computed using our main regression specification, this time with the γ_t coefficient estimates shown in Column 10 of Table 7). Adjusting for both public-to-public and private-to-public merger activity causes G3 to be positive and statistically significant in years 1993–1999, and insignificant in all sample years thereafter. In year 2020, the estimated G3-gap is $Y_{US,1990} \times Pop_{US,2020} \times (e^{\gamma_t} - 1) = 22.78 \times 330.01 \times (e^{0.007} - 1) = +52$ listed

companies (a statistically insignificant listing surplus). The absence of a listing gap 1991–2020 holds across the three alternative regression specifications for G3.

The broken line in Panel B of Figure 11 shows G2, the public-to-public merger-adjusted listing gap, from 1991–2020. This broken line is based on the γ_t coefficient estimates shown in Column (6) of Table 7. Recall that, while all countries are adjusted for public-to-public mergers, the acquisition index N_{it} (which, in G2, accumulates public targets only) is applied exclusively to U.S.-listed firms when these firms leave the exchange, which lowers the merger-adjusted U.S. listing count relative to other countries. Nevertheless, the estimates of G2 are statistically insignificant at conventional levels in *all* sample years 1991–2020. In year 2020, the estimated G2-gap is $Y_{US,1990} \times Pop_{US,2020} \times (e^{\gamma_t} - 1) = 22.78 \times 330.01 \times (e^{-0.137} - 1) = -962$ listed companies. Also important, G2 is statistically insignificant at conventional levels in all years, and across almost all years of the three alternative regression specifications in columns (5), (7), and (8) of Table 7.

In sum, we have shown that Proposition 4 holds for both listing gap definitions G2 and G3. Importantly, since a public-to-public merger does not rely on the supply of private equity capital, it is not necessary to appeal to the contemporaneous growth in private equity funding or decline in IPOs to explain the actual U.S. listing gap G1. Rather, our evidence is consistent with the notion that the extraordinary propensity of U.S. stock exchanges to effectuate large merger transactions between public companies is sufficient to explain G1. Since these transactions require a high level of capital market functionality in terms of contracting technology and legal protection of minority shareholders, they provide U.S. listed firms with a comparative advantage in terms of realizing scale economies through external growth strategies.

6.3 Robustness

We end this section by first showing that the support of Proposition 4 holds when focusing on the subsample of advanced economies only, and that the results are robust to concerns with SDC's international coverage of merger transactions. Table 8 shows the parameter estimates when using the subsample of 28 advanced economies. In all columns, the values of all three listing-gap estimates gaps (G1–G3) are somewhat lower (more negative) than for the full sample of 74 countries. More important, however, G2 and G3 remain insignificantly differently from zero in nearly all years across the sample period. Thus, we conclude that Proposition 4 holds also when focusing on advanced economies only.

Turning to SDC's international merger coverage, re-estimating Eq. (7) after artificially *quintuple* the annual number of public-to-public mergers outside of the U.S. produces statistically insignificant values of in three of four specifications of G2 and all specifications of G3. Moreover, G3 remains statistically insignificant in three of four specifications if we in addition nearly triple the foreign private-to-public acquisitions. Furthermore, recall that our conservative application of the acquisition index N_{it}, where we artificially set $N_{it} = 0$ for all countries other than the U.S., further alleviates concerns about SDC coverage. As it turns out, this treatment of N_{it} severely penalizes the U.S. Specifically, for U.S. listed firms that left the stock exchange over the period 1991–2020 for reasons other than being acquired by another U.S. public company, $\sum_{i=1}^{N}\sum_{t=1991}^{2020} N_{it} = 4,459$.[21] Yet another way to see this U.S. listing count penalty is that it lowers the 2020 merger-adjusted U.S. listing count by 42% with a base year of 1990: from 10,700 (when $N_{it} = 0$) to 6,241 listed firms. Since the merger-adjusted U.S. listing count is lowered by this number, it increases the prospect of finding a significantly negative G3.

In sum, the empirical evidence of this section confirms Proposition 4: U.S. merger transactions involving public acquirers is indeed sufficient to eliminate the U.S. listing gap.

7 The merger wave of the 1990s and the macroeconomy

As illustrated in Panel B of Figure 2 above, the merger wave of the 1990s—which along with the decline in IPOs drove the listing decline—contains an extraordinary number of both private-to-public and public-to-public mergers. Furthermore, as illustrated by the dollar values in Figure 3 above, the second half of the 1990s brought in $1.5 trillion from merger transactions and IPOs alone (net of delistings)—by far the highest net inflow to the stock market over the four decades. In this section, we take a step back and ask whether there is evidence of a positive association between the 1990s merger wave and key macroeconomic factors.

Note first that Harford (2005) shows that six of eleven deregulatory events between 1981 and 1996 took place after 1990, which are likely to have triggered several of industry-specific merger waves underlying our data. He also shows that these deregulatory events, combined with increased supply of liquidity (measured by the real interest rate) eliminates the high market valuation of the late 1990s (measured by market-to-book ratios) as a driver of the merger wave. This evidence suggest that the 1990s merger wave

[21] Breaking the total of 4,459 firms into public and private targets, respectively, this treatment effectively cancels out as much as 33% (3,173 of 9,481) of private-to-public mergers and 21% (1,286 of 6,108) of public-to-public mergers.

was triggered by classical economic factors rather than being 'market driven' as in the behavioral theory of Shleifer and Vishny (2003).[22]

Did the public-to-public merger wave create positive total synergies for the merging firms? Panel A of Figure 13 provides evidence on this question. It shows a substantial increase in the share of industry-years (using the 49 Fama and French (1997) industries) undergoing 'synergistic merger waves' in the second half of the 1990s. Here, we follow John, Kadyrzhanova, and Lee (2021) and classify an industry-year as experiencing a synergy wave if the number of deals with positive combined bidder and target wealth effect (CWE) is one standard deviation above the time-series industry median. We calculate CWE as the value-weighted average of their seven-day cumulative abnormal return, CAR(-3,3), where day zero is the first public announcement of the merger given by SDC.[23] As shown, synergistic merger waves occur to a much higher degree during the second half of the 1990s than during any other period, 1980–2020. This further supports the notion that the merger activity driving the post-1996 U.S. listing decline represents predominantly valuable transactions between publicly listed firms.

Panel B of Figure 13 shows the annual percent contribution of U.S. domestic listed firms to four measures of aggregate economic activity: labor employment, GDP, R&D spending, and patents.[24] Public firms' economic contribution to employment and GDP changes little in the post-1996 period. Specifically, the ratio of U.S. workers employed by public firms is 25.5% in 1996 and 23.8% in 2018 (the last year of information on foreign affiliates in BEA), while the value added by public firms to U.S. GDP is 26.7% in 1996 and 28.5% in 2018.[25] Even more interesting, there is an increase in innovation activity of U.S. public firms as a fraction of all U.S. entities (public and private firms, governmental agencies, universities, and individuals): R&D spending increases from 54.5% to 68.7% (1996–2018), while granted patents relative

[22]Consistent with this classical interpretation of the 1990s merger wave, Eckbo, Makaew, and Thorburn (2018) and Li, Taylor, and Wang (2018) provide further evidence against the 'bidder opportunism' hypothesis raised by Shleifer and Vishny (2003), which holds that bidders succeed in exploiting target shareholders by paying for the target firm with over-priced shares. See also Eckbo, Malenko, and Thorburn (2020) for a theoretical and empirical review of these two competing hypotheses.

[23]CAR is the difference between the realized and the value-weighted market returns from CRSP. The pre-announcement market value of the bidder and the target is measured one month before the deal announcements.

[24]We follow Schlingemann and Stulz (2021) and measure GDP as the sum of value added generated domestically as well as by majority-owned foreign affiliates. Similarly, aggregate employment is measured as the sum of domestic employment and employment abroad by those affiliates. We adjust R&D for foreign affiliates in the same way, while patents are granted to U.S. entities only. For listed firms, the data sources are Compustat (for employment, GDP and R&D) and the University of Virginia Darden Global Corporate Patent Dataset (Bena, Ferreira, Matos, and Pires, 2017). Aggregate U.S. labor employment is from the Bureau of Labor Statistics (BLS), GDP is from the IMF, R&D expenditure is from the OECD, and patents are from the U.S. Patent and Trademark Office (USPTO). Information from foreign affiliates is from the Bureau of Economic Analysis (BEA). See Appendix B for further data details.

[25]With a sample period that starts in 1973, Schlingemann and Stulz (2021) show that the proportion of U.S. employment and GDP attributable to listed firms declines prior to the early 1990s for then to increase.

to all entities increases from 40.8% to 49.7% (1996–2016).[26] In sum, notwithstanding the substantial merger-driven listing decline, there is little evidence in Panel B of a post-1996 reduction in public firms' contribution to the U.S. economy.

8 Conclusion

While the stock market listing count is a useful metric for analysing the size and organizational boundaries of public stand-alone companies, it omits the effects of M&A transactions on the *de facto* stock market entry and retention of firms and their resources. We show that, over the past four decades, stock market entries and retentions of U.S. targets of public acquirers are so numerous as to rival the effect of IPOs and bankruptcies on listing dynamics. With this in mind, we develop a simple merger-adjusted listing count in order to more accurately gauge the stock-market contribution to economic growth, and to explain both the dramatic post-1996 U.S. listing decline and subsequent development of a listing gap relative to an international trend line.

Our analysis of the U.S. listing dynamics accounts for the full anatomy of new lists and delists from the three major U.S. stock exchanges. The primary adjustment involves adding target firms in private-to-public and public-to-public acquisitions to the actual listing count. While private targets enter the stock market via a public acquirer, they are added to our merger-adjusted listing count because this type of entry represents an viable alternative to going public via an IPO. Also, corporate executives consistently rank gaining access to 'acquisition currency' (liquid stock) as a major motive for going public—a goal that is achieved whether entering the stock market via an IPO or as the target of a public firm. Moreover, we backfill the actual listing count with targets in public-to-public mergers because, notwithstanding that these transactions *lower* the listing count, these target firms continue under the control of a public acquirer and thus do not exit the public market place.

Over the past four decades, private-to-public acquisitions total as much as 90% of the number of IPOs, while public-to-public acquisition total 86% of the number of bankruptcies. As a result, our merger adjustment substantially impacts actual listing dynamics—enough to explain both the 1996 U.S. listing peak and subsequent listing gap. Also surprising, we discover that, over the past four decades, more than three quarters of the seventy-four country-specific listing dynamics investigated in this paper

[26] Appendix Table 3 shows that aggregate U.S. R&D and patenting roughly doubles from 1996–2018, which means that the increases in the fractions R&D and patents is not driven by declines in the two measures of aggregate innovation activity.

exhibit a listing peak. Panel estimation shows that mergers involving public acquirers impact the listing dynamics in these countries differently than in the U.S. Specifically, while U.S. merger activity in the post-peak event period tends to reallocate target assets between public firms (driven by public-to-public mergers), the post-peak event periods in other countries tends to reflect the outflow of assets out of public markets. Based on this difference, we infer that the access of public firms to a well-developed market for corporate control is not only beneficial for listed firms, but also represents a unique U.S. benefit hitherto missing from the international listing debate.

We use our merger-adjusted listing series to re-examine the negative U.S. listing-gap estimates reported by extant research. Specifically, we replace the actual listing count with our the merger-adjusted listing series as dependent variable in listing-gap regressions. This replacement, which allows us to identify the direct causal impact of merger transactions on the listing dynamics, reveals that none of the annual U.S. listing gap estimates are significantly negative. This result, which contrasts with the negative listing gap estimates that are based on the actual listing count, holds even if we restrict the merger-adjustment to public-to-public mergers only (for which SDC has the most comprehensive international coverage). In sum, after adjusting for mergers involving public acquirers around the world, there is no evidence that the three major U.S. stock market at any point in time of the past four decades have developed a merger-adjusted listing gap relative an international trend line.

Finally, the evidence of this paper also suggests that the ability of U.S. public companies to grow through merger activity—through a relatively sophisticated market for corporate control—constitutes a comparative advantage. In particular, we show that the public-to-public merger wave of the 1990s, which along with the decline in IPOs caused the 1996 listing peak, generated higher total synergies for the merging firms than in other periods over the past four decades. The productivity of this merger activity also manifests itself through a contribution of listed firms to economic activity (GDP, labor employment, R&D spending and patent generation) that we show has not declined after 1996.

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Figure 1: **Stock exchange listing counts around the world, 1980–2020**

This figure shows the total number of domestic listed firms in 74 of the 100 countries with highest GDP in 2020 according to the International Monetary Fund (IMF). The 74 countries represent 96% of the world GDP in 2020. The IMF classifies 33 of the countries as advanced economies and 41 as developing or emerging economies. The U.S. listing count is from the Center for Research in Security Prices (CRSP) and consists of firms with common stock listed on NYSE, NASDAQ, or AMEX. Non-U.S. listing counts are found using data from the World Bank's World Development Indicators (WDI), the World Federation of Exchanges (WFE), ISI Emerging Market Group's CEIC database, and individual stock exchange homepages. Investment companies, mutual funds, real estate investment trusts, and other collective investment vehicles are excluded. See Appendix B further details on the data selection. The vertical dotted line in 1996 marks the year of the U.S. listing peak.

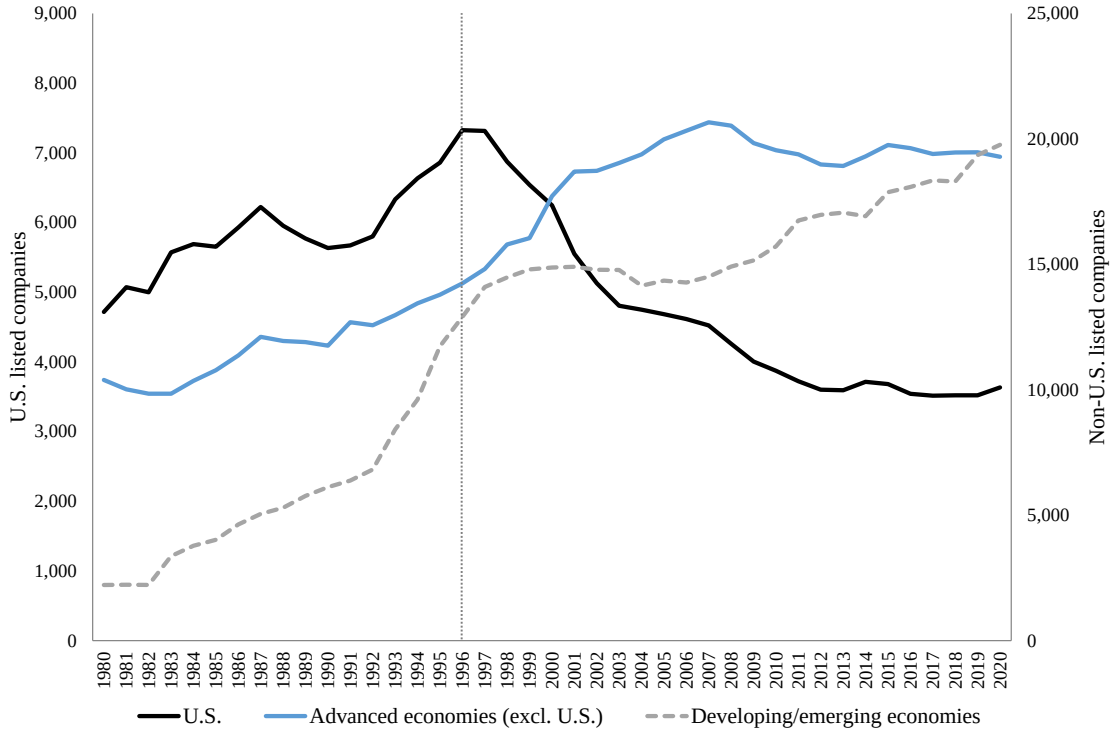
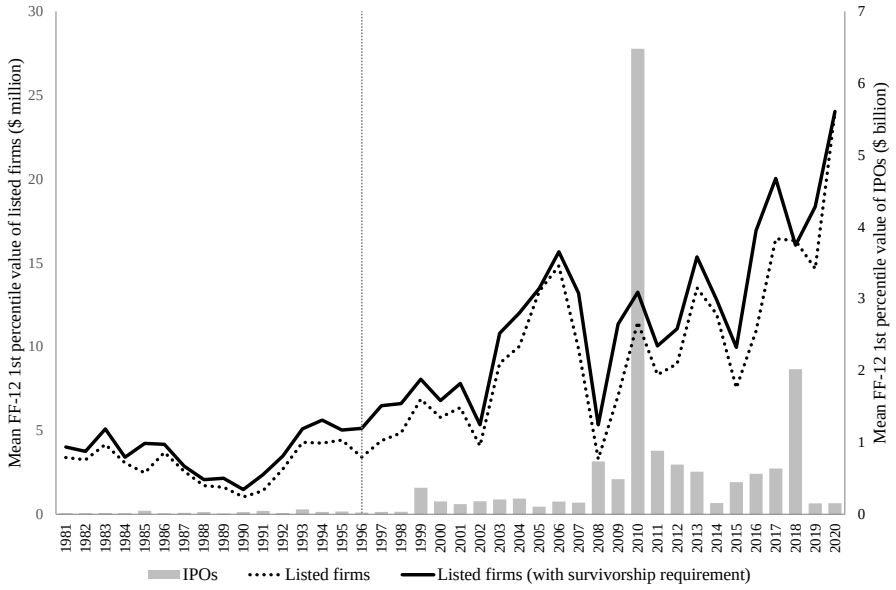


Figure 2: Firm size thresholds and transactions used for the all-merger-adjusted series

The transformation from unadjusted to all-merger-adjusted listing count requires a firm size threshold for $Merge_{Private-to-Public}$ and $Divest_{Subsidiary-to-Private}$. While ignoring industry matching, Panel A shows the time series of three such alternative firm size thresholds (measured in 2020 USD million). These are the 1^{st} percentile market values of IPOs, all listed firms, and all listed firms that also survive and stay listed over the following year. In the empirical analysis, the size threshold is the 1^{st} percentile of listed firms with survivorship requirement, matched with the Fama-French 12 industry classification of the firm. Panel B shows the annual count of the transactions that differentiate the unadjusted, public-to-public merger-adjusted, and merger-adjusted listing counts after applying this size threshold. N_it net delists are delists of accumulated targets minus relists. All transactions are defined in Eqs. (1), (2), and (3) in the text. The vertical dotted line indicates the date of the U.S. listing peak. Sample period 1981–2020. Data are from CRSP and SDC.

A: Firm size thresholds for private-to-public mergers and subsidiary divestitures



B: Transactions differentiating the unadjusted and merger-adjusted listing counts

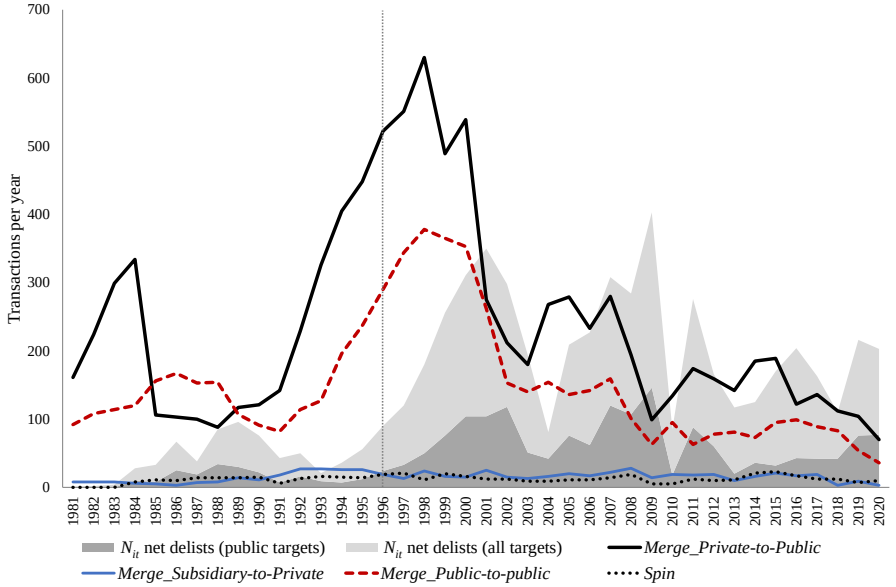


Figure 3: Inflows and outflows of firm value classified by (de)listing channel

The figure shows the annual values (V_A) of firm inflows (merger-adjusted new lists) and outflows (merger-adjusted delists) in U.S. public markets. The annual change in V_A (ΔV_A) is measured using individual transaction values as follows:

$$\Delta V_A = \begin{cases} Newlists_A: & IPO + Merge_{Private-to-Public} + Misc_{New} \\ Delists_A: & Merge_{Public-to-Private} + Divest_{Subsidiary-to-Private} + Misc_{Del} \end{cases}$$

The right axis shows annual values for each channel in 2020 USD billion (bars), while the left axis shows the cumulative net new listing value in 2020 USD trillion (line). The new lists and delists in Appendix Table 1 that have an effect on the actual but not on the merger-adjusted listing count are not included. The vertical dotted line indicates the date of the U.S. listing peak. Variable definitions are as in Figure 4 except that, in this figure, each transaction is measured by its market value. Data are from CRSP and SDC.

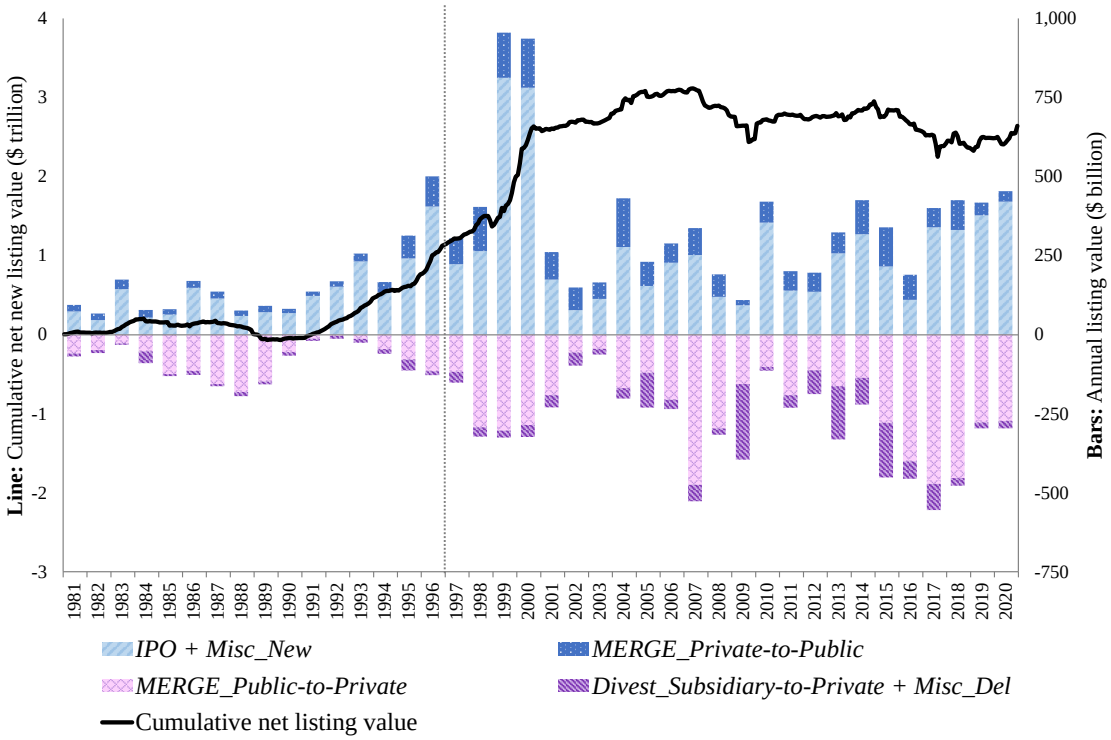


Figure 4: Actual and merger-adjusted U.S. listing counts, 1980–2020

This figure plots the (monthly) U.S. actual and merger-adjusted counts of listed firms on NYSE, NASDAQ, and AMEX. The change in the actual listing count, ΔL is the sum of the following six variables, all of which are defined in Table 1:

$$\Delta L = \begin{cases} Newlists: & IPO + Spin + Misc_{New} \\ Delists: & Merge_{Public-to-Public} + Merge_{Public-to-Private} + Misc_{Del}. \end{cases}$$

IPO are initial public offerings, $Spin$ are spinoffs, $Misc_{New}$ are miscellaneous new listings, and $Merge$ are mergers where the subscript indicates the direction of the change in the public/private status of the target. The change in the all-merger-adjusted listing count, ΔL_A, is:

$$\Delta L_A = \begin{cases} Newlists_A: & IPO + Merge_{Private-to-Public} + Misc^N_{New} \\ Delists_A: & Merge^N_{Public-to-Private} + Divest_{Subsidiary-to-Private} + Misc^N_{Del}. \end{cases}$$

When public company i buys public company j ($Merge_{Public-to-Public}$) the delisting of j reduces the actual listing count by one, while it leaves ΔL_A unchanged. Instead, in each period t, the merger-adjusted count keeps track of public company i's past number of acquisitions $N_{i,t-1}$ (since 1981), periodically updated as follows:

$$N_{it} = \begin{cases} N_{i,t-1} + 1 & \text{when target } j \text{ in period } t \text{ is a private firm} \\ N_{i,t-1} + 1 + N_{j,t-1} & \text{when target } j \text{ in period } t \text{ is a public firm} \end{cases}$$

where $N_{j,t-1}$ is the acquisition index of public target j. Thus, N_{it} tracks firm i's cumulative acquisitions of other listed firms (and the cumulative acquisitions accrued by these targets, and by the targets of the targets, and so on) as well as minimum-sized private targets. For the public-to-public merger-adjusted listing count, only public targets are considered. If firm i is itself delisted at time t for reasons other than being acquired by a public company, then the merger-adjusted count is reduced by $1 + N_{it}$, in recognition that i's assets accumulated over N_{it} past acquisitions also leave the public market at that time. $Divest_{Subsiduary-to-Private}$ are divestitures in which the parent company is public and neither the acquirer not the subsidiary are public firms. The vertical dotted line indicates the date of the U.S. listing peak. Data are from CRSP and SDC.

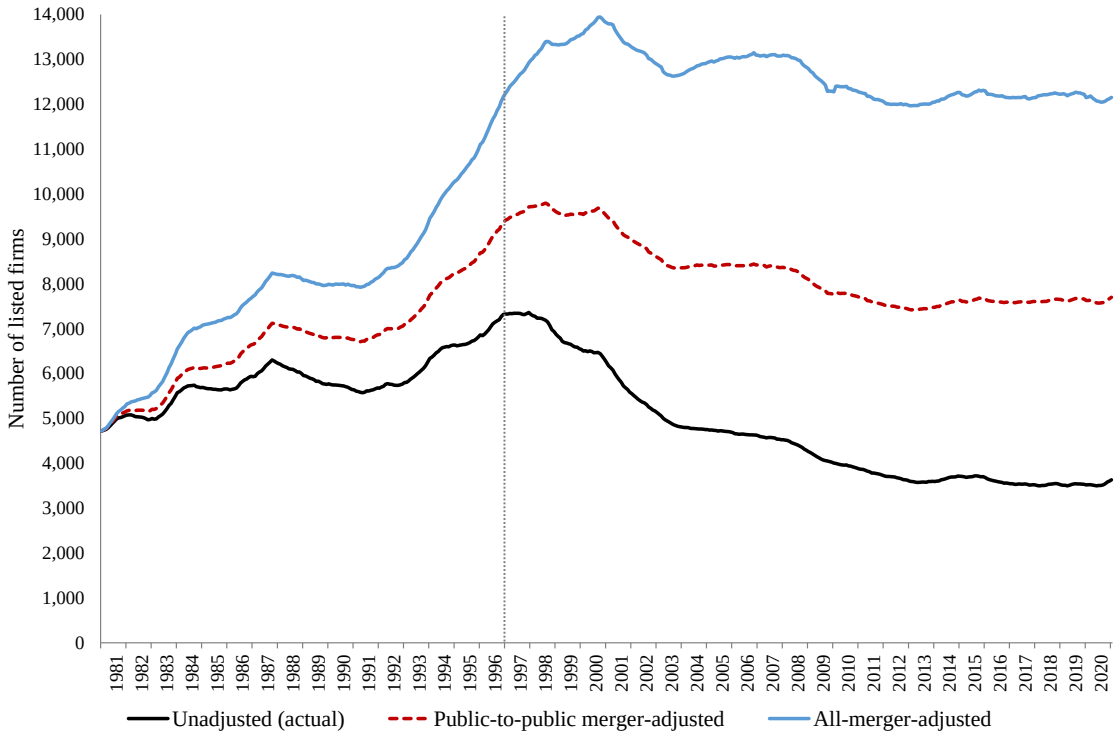


Figure 5: **Annual number of global listing peaks, 1980–2019**

This figure shows the annual number of listing peaks (economies with fewer listed firms in 2020 than earlier, at peak) around the world. With one exception (Argentina in 1975), there were no peaks before 1986. Blue bars designate advanced economies and grey bars designate developing and emerging economies. 57 of 74 sampled countries and territories are represented in the figure. The U.S. listing count is from CRSP and consists of firms with common stock listed on NYSE, NASDAQ, or AMEX. Non-U.S. listing counts are found using data from WDI, the WFE, CEIC, and individual stock exchange home-pages. Investment companies, mutual funds, real estate investment trusts, and other collective investment vehicles are excluded. See Appendix B further details on the data selection. The vertical dotted line in 1996 marks the year of the U.S. listing peak.

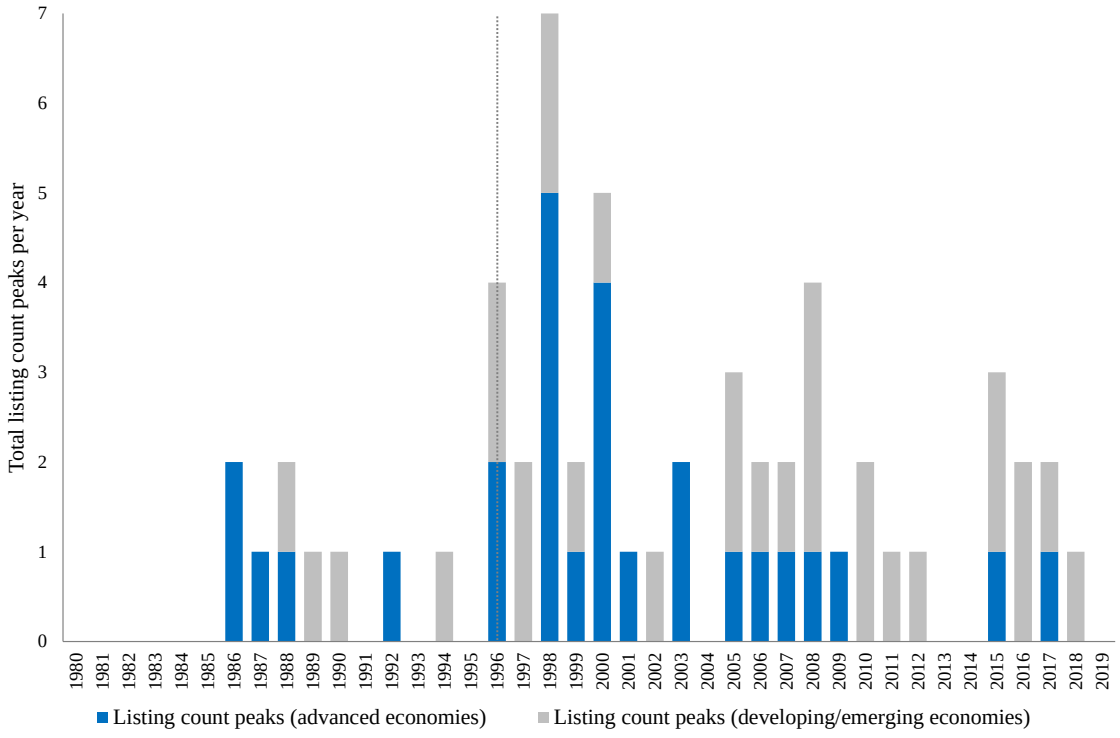


Figure 6: **Country-specific listing peak years and subsequent listing decline, 1975–2020**

This figure shows the decline in the number of listed firms from the listing peak year to 2020. Light bars are countries that have not experienced a peak, and dark bars indicate countries that have peaked (have fewer listed firms in 2020 than at peak). The listing peak year is shown in parentheses. 74 countries are sampled: 33 advanced (Panel A) and 41 developing/emerging (Panel B). Data are from CRSP, WDI, WFE, CEIC, and stock exchange homepages. Advanced and developing/emerging economies are classified by the IMF. The vertical dotted line shows the U.S. decline of 50% from 1996 to 2020.

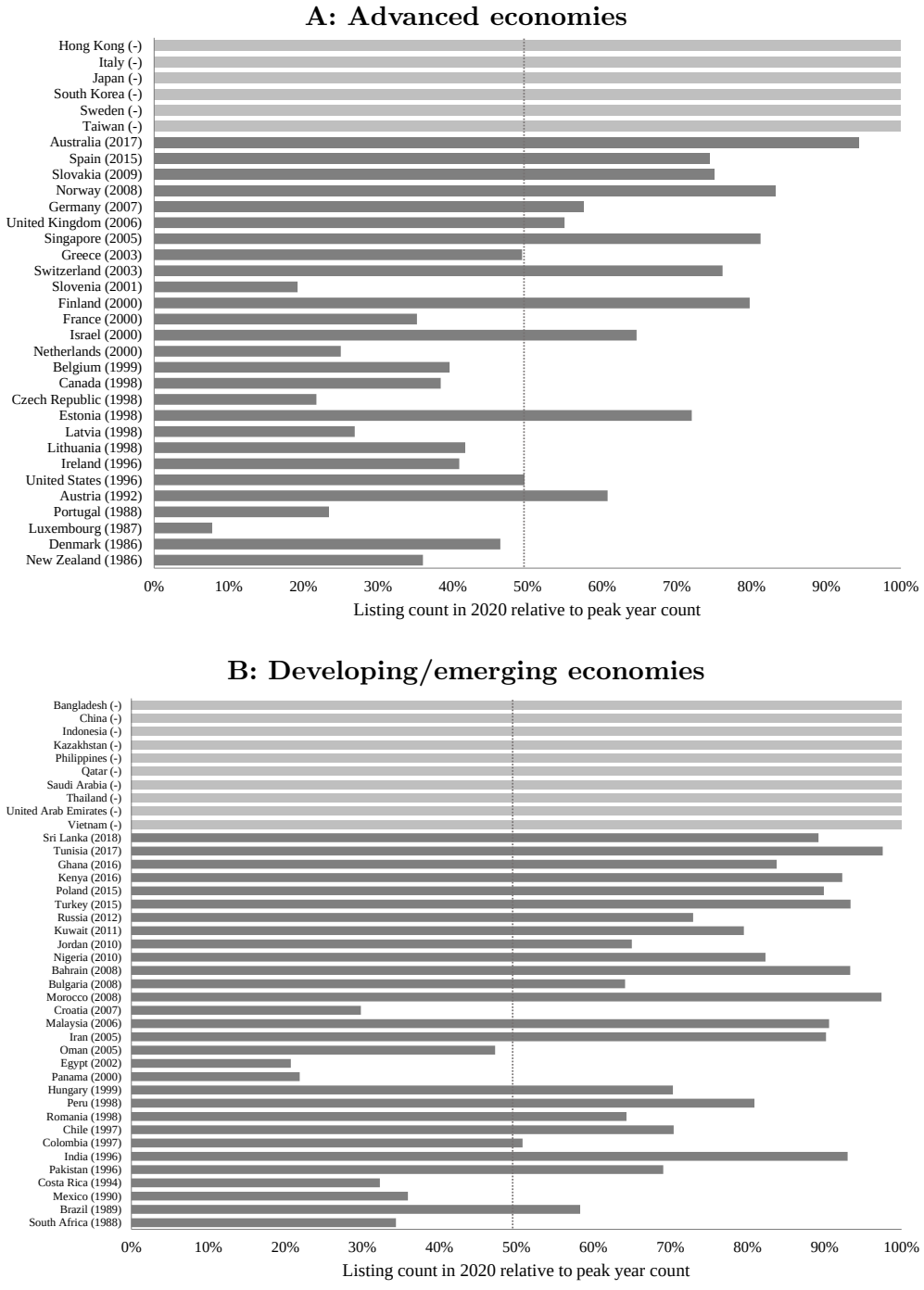


Figure 7: Average rates of listing change around listing peaks

Conditional on experiencing a listing peak, this figure plots the percent change listing counts over the eleven-year event window (-5,5) centered on the peak year (year 0) in Panel A. In Panel B, a 21-year event window is used instead (-10,10). Countries with listing peaks are drawn from the period 1975–2019. The percent change is relative to the country's listing count in year 0. The portfolios of 23 non-U.S. advanced and 30 developing/emerging economies are equal-weighted. Economic development is classified by the IMF. Data are from CRSP, WDI, WFE, CEIC, and stock exchange home pages.

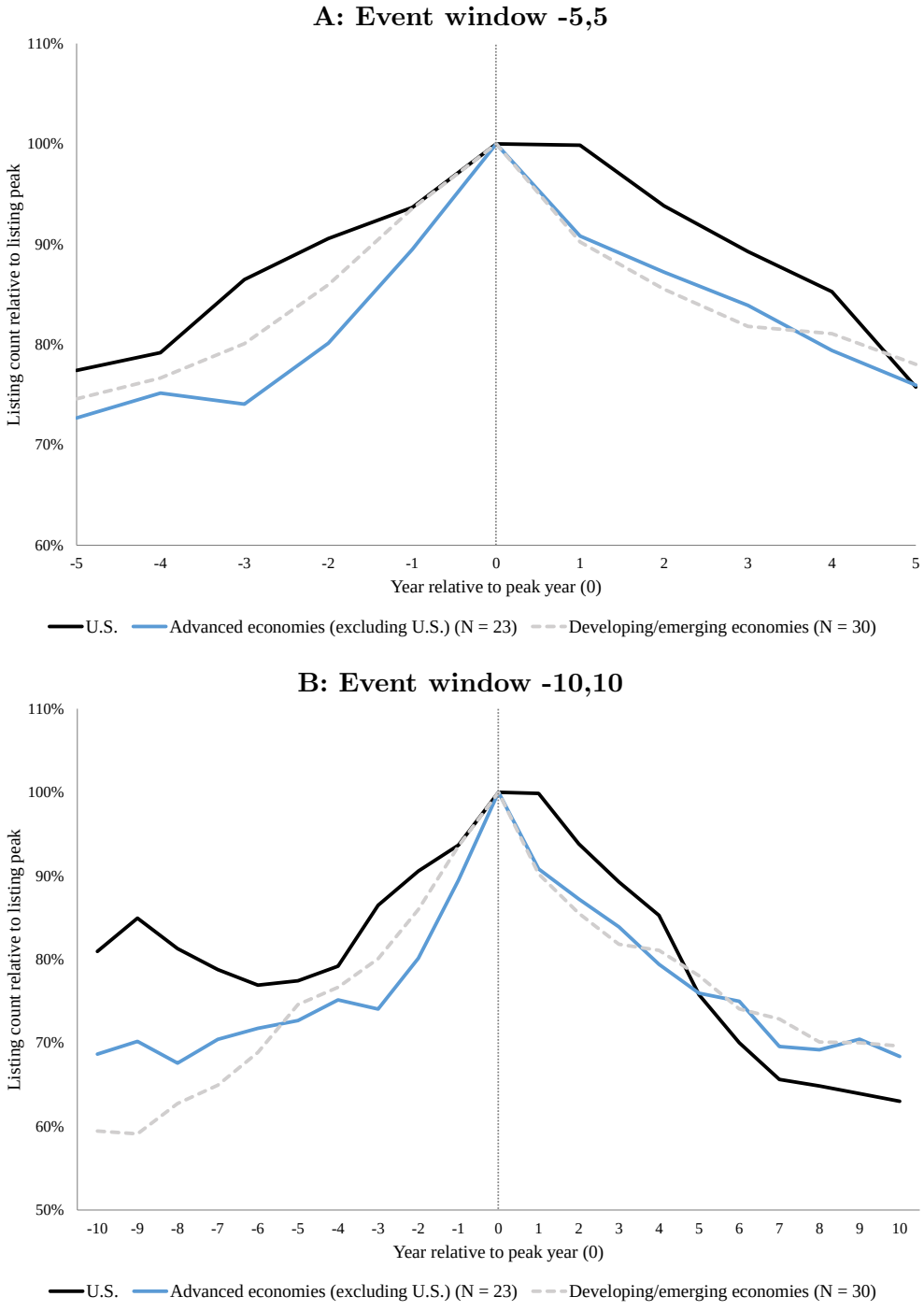
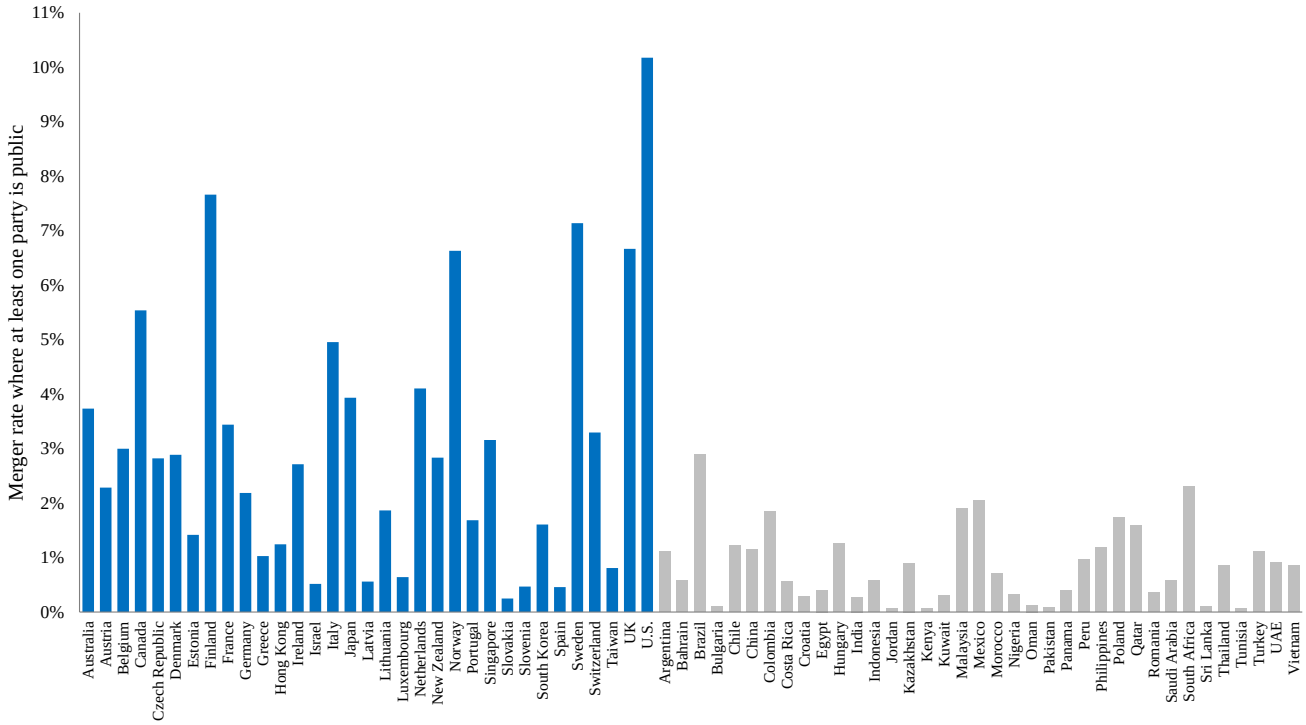


Figure 8: **International merger rates, 1990–2020**

This figure shows the average annual merger likelihood for listed companies by country or territory. Panel A shows the likelihood for a listed company to be the target or acquirer in a completed merger. Panel B shows the likelihood for a listed company to be acquired by another domestic listed firm. Blue bars indicate advanced economies and grey bars indicate developing/emerging economies. Merger data are from SDC, listing counts are from CRSP, WDI, WFE, CEIC, and stock exchanges, and economic development status is classified by the IMF.

A: All mergers where at least one party is a public firm



B: Public-to-public mergers only

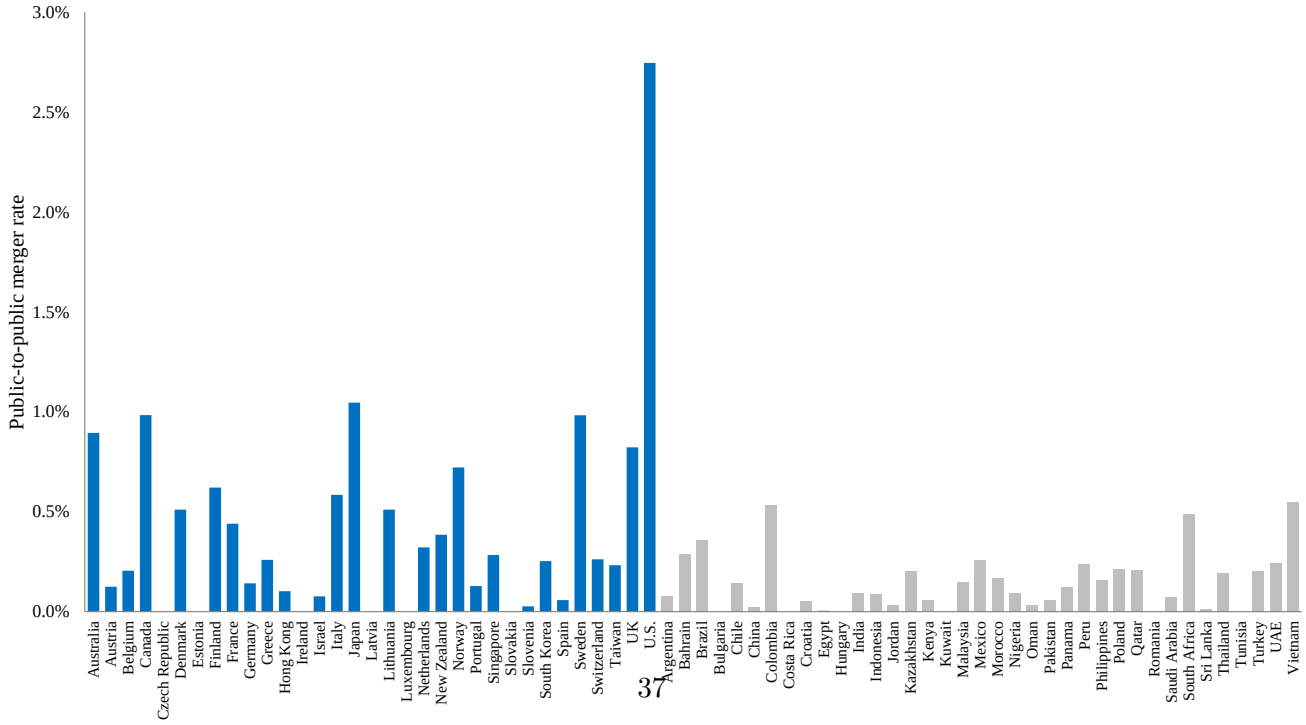


Figure 9: Merger-adjusted listing counts and peaks, 1990–2020

Panel A of this figure aggregates merger-adjusted listing counts for 74 economies: the U.S., 33 non-U.S. advanced economies, and 41 developing/emerging economies. Merger-adjusted listing counts are calculated with a base year of 1990 to maximize SDC merger data coverage. For countries with a listing peak, Panel B plots the percent change in merger-adjusted listing count over the eleven-year event window (-5,5) centered on the peak year (year 0). The countries in this event-period sample are required to have a peak in 1995 or later to allow for full event-period data coverage. The percent change is relative to the country's listing count in year 0. See Appendix B further details on the data selection. The vertical dotted line in 1996 marks the year of the U.S. listing peak.

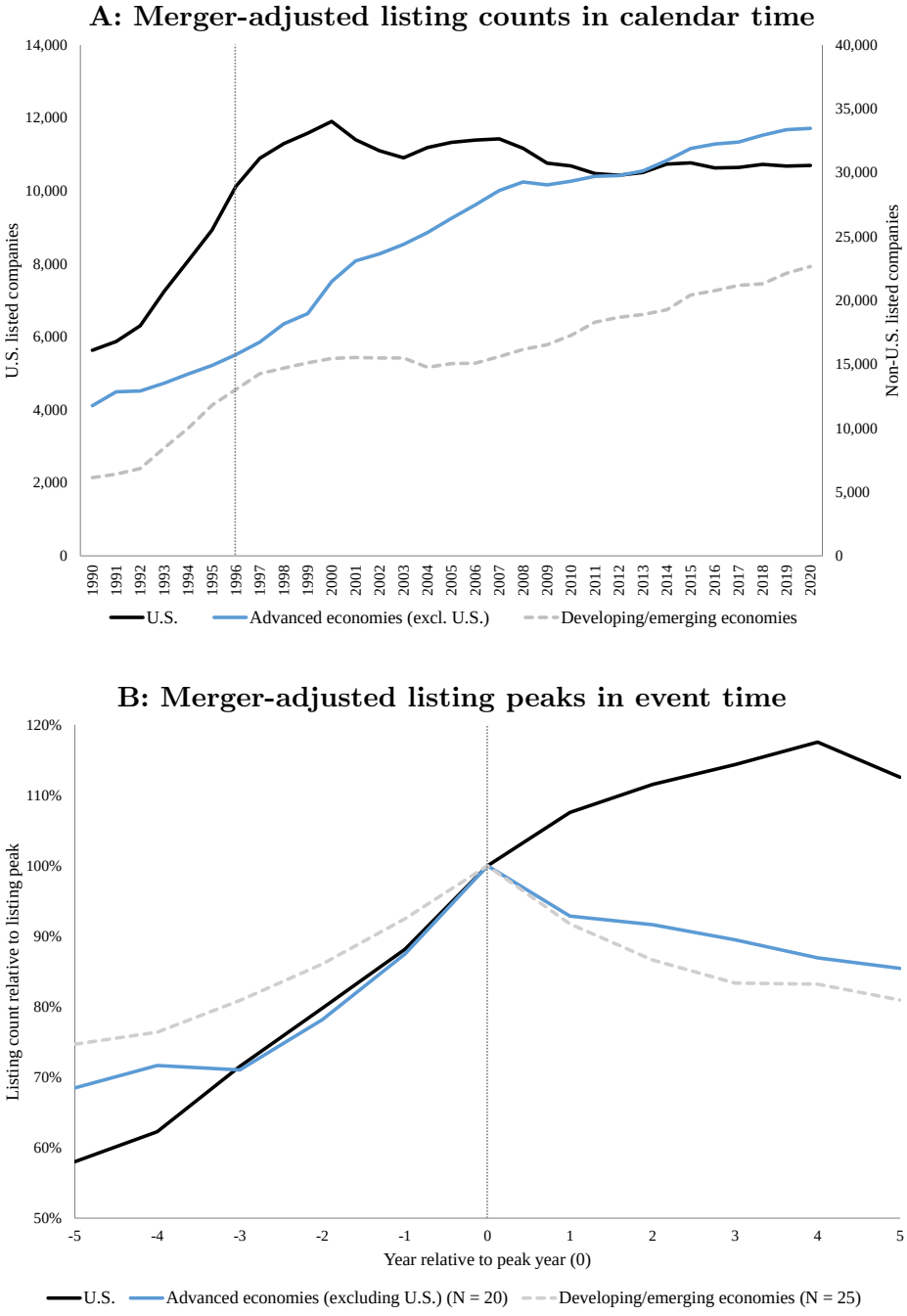


Figure 10: **Public-to-public merger-adjusted listing counts and peaks, 1990–2020**

Panel A of this figure aggregates public-to-public merger-adjusted listing counts for 74 economies: the U.S., 33 non-U.S. advanced economies, and 41 developing/emerging economies. Public-to-public merger-adjusted listing counts are calculated with a base year of 1990 to maximize SDC merger data coverage. For countries with a listing peak, Panel B plots the percent change in public-to-public merger-adjusted listing count over the eleven-year event window (-5,5) centered on the peak year (year 0). The countries in this event-period sample are required to have a peak in 1995 or later to allow for full event-period data coverage. The percent change is relative to the country's listing count in year 0. See Appendix B further details on the data selection. The vertical dotted line in 1996 marks the year of the U.S. listing peak.

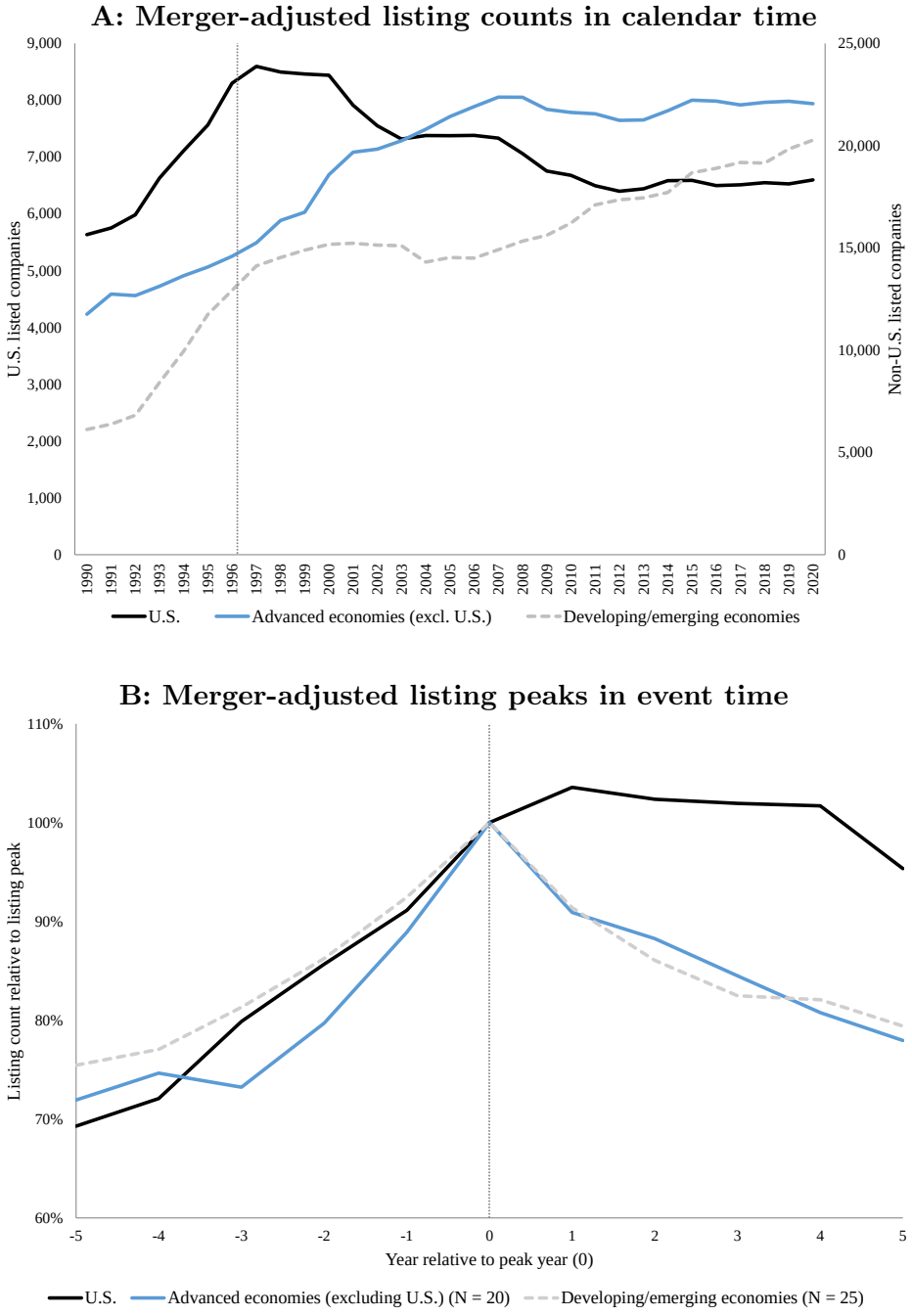


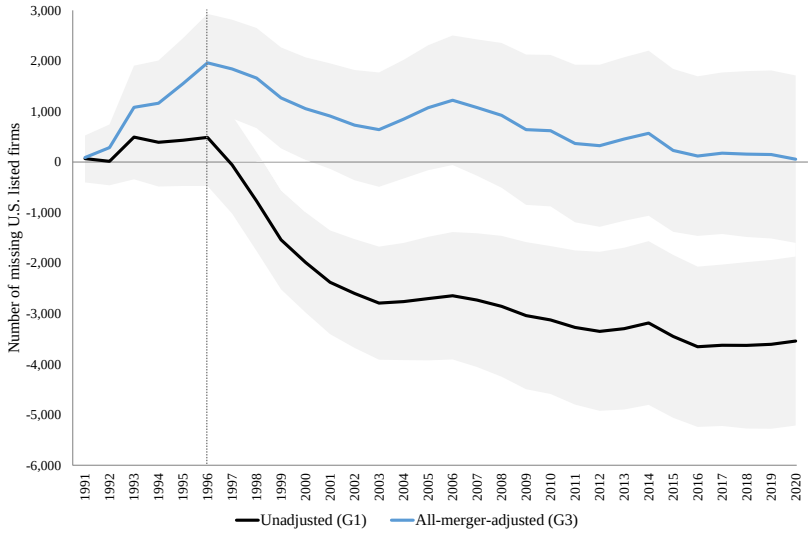
Figure 11: **Population-scaled unadjusted and merger-adjusted U.S. listing gaps**

This figure shows the unadjusted (G1, black line) and two merger-adjusted U.S. listing gaps, estimated as follows:

$$ln(L/Pop_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N.$$

$ln(L/Pop_{it})$ is the natural logarithm of the unadjusted or merger-adjusted listing count of country i in year t, scaled per capita and specified as follows. In Panel A, the listing count is adjusted by adding one to the listing count for each public- and minimum-sized private-to-public merger (G3, blue line). In Panel B, the listing count is adjusted by adding back one for each domestic public-to-public merger (G2, broken red line). Additionally, the U.S. merger-adjusted listing series tracks net firm outflows via the acquisition index N_{it}, as well as spinoffs and subsidiary divestitures. Listing gaps G1, G2, and G3 are defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. D_{US} is a dummy variable that takes a value of one if country i is the U.S. and zero otherwise, and X_{it} is a vector of three country-specific control variables: country i's anti-self-dealing index, log(GDP/capita) and GDP growth. Standard errors are clustered at the country-level. The U.S. listing gap in year t is computed as $L/Pop_{US,1990} \times GDP_{US,t} \times \ (e^{\gamma_t} - 1)$, where γ_t is the annual parameter in the vector Γ. The sample consists of 74 countries and covers 1990–2020. U.S. listing data are from CRSP, non-U.S. listing data are from WDI, WFE, CEIC, and exchange homepages, and merger data are from SDC. The vertical dotted line indicates the year of the U.S. listing peak. The shaded grey area displays 90% confidence intervals.

A: Unadjusted and merger-adjusted listing gaps (G1, G3)



B: Public-to-public merger-adjusted listing gap (G2)

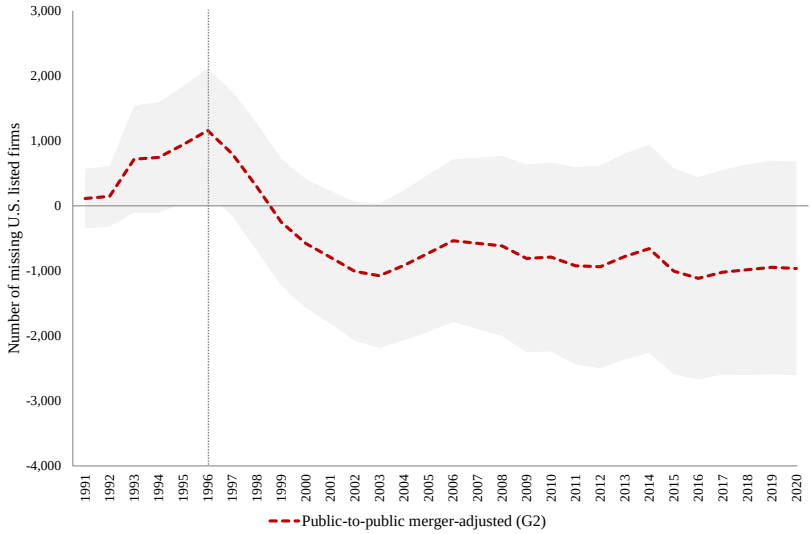


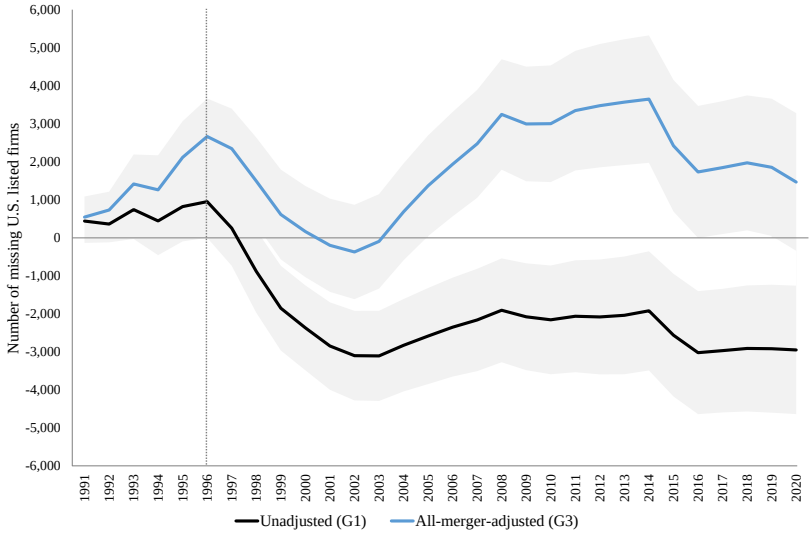
Figure 12: **GDP-scaled unadjusted and merger-adjusted U.S. listing gaps**

This figure shows the unadjusted (G1, black line) and two merger-adjusted U.S. listing gaps, estimated as follows:

$$ln(L/GDP_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N.$$

$ln(L/GDP_{it})$ is the natural logarithm of the unadjusted or merger-adjusted listing count of country i in year t, scaled with GDP and specified as follows. In Panel A, the listing count is adjusted by adding one to the listing count for each public- and minimum-sized private-to-public merger (G3, blue line). In Panel B, the listing count is adjusted by adding back one for each domestic public-to-public merger (G2, broken red line). Additionally, the U.S. merger-adjusted listing series tracks net firm outflows via the acquisition index N_{it}, as well as spinoffs and subsidiary divestitures. Listing gaps G1, G2, and G3 are defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. D_{US} is a dummy variable that takes a value of one if country i is the U.S. and zero otherwise, and X_{it} is a vector of three country-specific control variables: country i's anti-self-dealing index, log(GDP/capita) and GDP growth. Standard errors are clustered at the country-level. The U.S. listing gap in year t is computed as $L/GDP_{US,1990} \times GDP_{US,t} \times (e^{\gamma_t} - 1)$, where γ_t is the annual parameter in the vector Γ. The sample consists of 74 countries and covers 1990–2020. U.S. listing data are from CRSP, non-U.S. listing data are from WDI, WFE, CEIC, and exchange homepages, and merger data are from SDC. The vertical dotted line indicates the year of the U.S. listing peak. The shaded grey area displays 90% confidence intervals.

A: Unadjusted and merger-adjusted listing gaps (G1, G3)



B: Public-to-public merger-adjusted listing gap (G2)

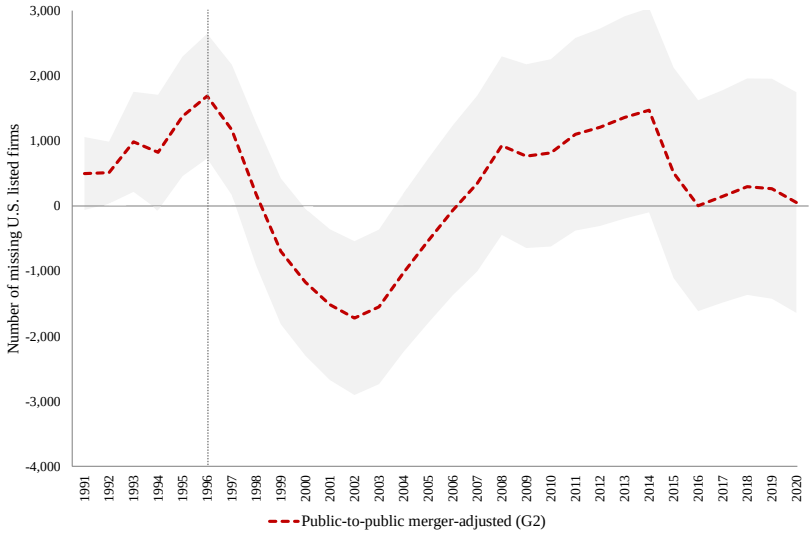
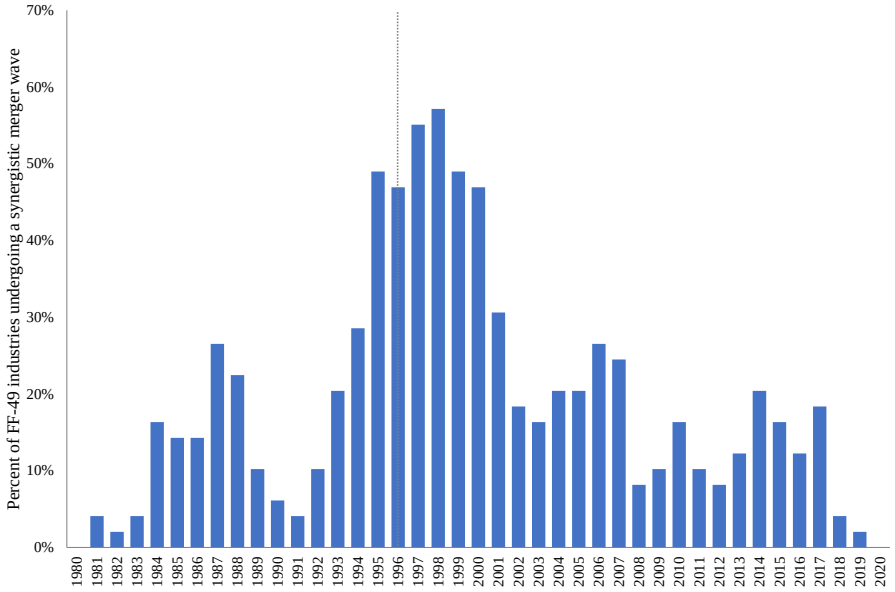


Figure 13: **Synergy merger waves and contribution of public firms to economic activity**

Panel A shows the share of industry-years undergoing a synergistic merger wave for our sample of public-to-public mergers, 1982–2020, using the 49 industries in Fama and French (1997). Following John, Kadyrzhanova, and Lee (2021), industry-years are considered to undergo a synergy wave if the number of deals with positive bidder and target combined wealth effect (CWE) in that year is one standard deviation above the industry time-series median. CWE is the value-weighted average CAR for the event period (-3,3), where (0) is the announcement date. CARs are calculated as the difference between the realized and value-weighted market return. Pre-announcement market value of the bidder and the target is measured one month before the deal announcement. Both acquirer and target must be U.S. public firms, with the bidder holding less than 50% of target shares before announcement and seeking to hold at least 50% after the transaction. Panel B shows the time series of public firms' percent contribution to aggregate U.S. employment, GDP, R&D spending, and patents, with data from the BEA, BLS, Compustat, GCPD, IMF, OECD, and USPTO. Construction and data series are detailed in Appendix B.

A: Share of industry-years with synergistic public-to-public merger waves



B: Contribution of listed firms to economic activities

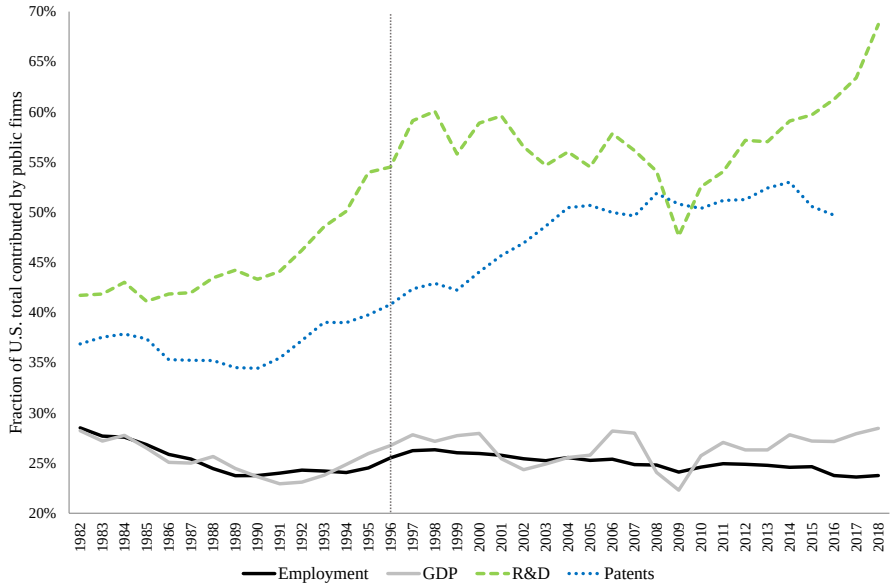


Table 1: Definition of variables representing actual and merger-adjusted new lists and delists

Definition	Data sources (further details in Appendix B)
A: New lists	
IPO Initial public offering on NYSE, NASDAQ, or AMEX.	Matched to IPO data from SDC and Jay Ritter's webpage, counting U.S. operating companies only.
Spin Divisional spin-off from a U.S. public company.	Identified in CRSP (distribution code 3763) and SDC (acquirer name 'shareholders'). Spin-off parent is confirmed as U.S. public using CRSP. Includes equity carve-outs (for cash).
$Misc_{New}$ Relist, uplist, CRSP reorganization (when a merger of equals results in the creation of a new firm), CRSP form change (to U.S. common stock and/or U.S. incorporation), or unidentified new list.	Relists, reorganizations, and form changes are identified in CRSP. Remaining new lists are classified as uplists, and verified when possible using OTC data from WRDS, SDC (by identifying 'follow-on' listings that occur simultaneously with a new listing), and manual web searches.
$Merge_{Private-to-Public}$ Private-to-public merger: acquisition in which a U.S. public company acquires a non-public corporation (foreign, private, or OTC firm).	Mergers are completed transactions that are identified in SDC using the deal forms "merger", "acquisition", and "acquisition of remaining-, partial- and majority interest", and result in 100% ownership. Targets must have a greater market value than the first percentile of same-industry (using Fama-French 12 industry definitions) public firms that remain listed one year later. Percentiles are determined using data from CRSP.
B: Delists	
$Merge_{Public-to-Public}$ Public-to-public merger: a merger between two publicly listed U.S. companies.	Merger delistings are identified in CRSP using acquiring PERMCO and PERMNO (delisting codes 200-399). Acquirer identity is found in CRSP, SDC, and manually with web searches.
$Merge_{Public-to-Private}$ Public-to-private merger: merger in which a U.S. public firm is acquired by a foreign, private, or OTC firm.	Same as above.
$Misc_{Del}$ Delist due to cause, voluntary, or for unknown reasons.	Cause delists are identified in CRSP using delisting codes 400-569 and 574-999, and voluntary delists with codes 570-573. Unknown delistings are not marked in CRSP by a delisting code, but occur when the firm leaves the CRSP sample of U.S. public firms for more than two weeks for reasons other than trading suspensions.
$Divest_{Subsidiary-to-Private}$ Subsidiary-to-private divestiture: acquisition of a U.S. public-owned subsidiary by a private, foreign, or OTC firm.	Takeovers are identified in SDC (excludes deals with acquirer name 'shareholders'). Minimum target size threshold is calculated using CRSP and is the same as that of $Merge_{Private-to-Public}$. Subsidiary parent is confirmed as U.S. public using CRSP. The subsidiary itself must not be publicly listed.

Table 2: Summary of actual and merger-adjusted U.S. listing counts, 1990–2020

Listing counts are given by equations (1) and (2) in the text and are replicated in the expressions shown below. The merger-adjusted listing count also uses the cumulative acquisition index in Eq. (3). ΔL is the change in the actual listing count, ΔL_A is the change in the merger-adjusted listing count, IPO counts initial public offerings, $Spin$ counts spinoffs, $Misc_{New}$ counts miscellaneous new listings, and $Misc_{Del}$ counts miscellaneous delists. The subscript in $Merge$ indicates the direction of the change in the target's public/private status. Thus, in $Merge_{Public-to-Public}$ and $Merge_{Public-to-Private}$ a public target merges with a public or a private acquirer, respectively, while a private target merges with a public acquirer in $Merge_{Private-to-Public}$. In Panel B, the acquisition index N tracks all public and private targets. See also Table 1 for variable definitions. The annual distribution of all variables in this table is found in Appendix Table A.1 for Panel A and Appendix Table A.2 for Panel B.

A: Actual listing count

A.1 Total sample period (1980–2020)

$$\Delta L = -1,083 \begin{cases} 17,837\ Newlists = 10,567\ IPO + 471\ Spin + 6,799\ Misc_{New} \\ 18,919\ Delists = 6,108\ Merge_{Public-to-Public} + 3,955\ Merge_{Public-to-Private} + 8,856\ Misc_{Del} \end{cases}$$

A.2 Post-peak sample period (1996–2020)

$$\Delta L = -3,692 \begin{cases} 7,004\ Newlists = 4,173\ IPO + 302\ Spin + 2,529\ Misc_{New} \\ 10,696\ Delists = 3,721\ Merge_{Public-to-Public} + 2,524\ Merge_{Public-to-Private} + 4,451\ Misc_{Del} \end{cases}$$

B: Merger-adjusted listing count

B.1 Total sample period (1980–2020)

$$\Delta L_A = +7,436 \begin{cases} 28,148\ Newlists_A = 10,567\ IPO + 9,481\ Merge_{Private-to-Public} + 8,100\ Misc^N_{New} \\ 20,712\ Delists_A = 7,943\ Merge^N_{Public-to-Private} + 613\ Divest_{Subsidiary-to-Private} + 12,156\ Misc^N_{Del} \end{cases}$$

B.2 Post-peak sample period (1996–2020)

$$\Delta L_A = -98 \begin{cases} 13,498\ Newlists_A = 4,173\ IPO + 5,756\ Merge_{Private-to-Public} + 3,569\ Misc^N_{New} \\ 13,596\ Delists_A = 5,970\ Merge^N_{Public-to-Private} + 392\ Divest_{Subsidiary-to-Private} + 7,234\ Misc^N_{Del} \end{cases}$$

Table 3: International listing counts and peak years

This table provides an overview of country-specific listing peaks, sorted by year of peak. A country's listing-peak year is defined as the year with the highest listing count between 1975–2020. Columns (4) and (5) show each country's change in listing count from the peak year to 2020. Advanced and developing/emerging economies are defined by the IMF. Data are from CRSP, WDI, WFE, CEIC, and stock exchange homepages.

Country	Peak listing year (1)	Listing count at peak (2)	2020 listing count (3)	Change since peak (4)	Annual change (5)
A: Advanced countries that have peaked					
Denmark	1986	274	127	-54%	-1.6%
New Zealand	1986	339	122	-64%	-1.9%
Luxembourg	1987	347	27	-92%	-2.8%
Portugal	1988	158	37	-77%	-2.4%
Austria	1992	112	68	-39%	-1.4%
Ireland	1996	93	38	-59%	-2.5%
United States	1996	7,325	3,633	-50%	-2.1%
Canada	1998	1,991	764	-62%	-2.8%
Czech Republic	1998	92	20	-78%	-3.6%
Estonia	1998	25	18	-28%	-1.3%
Latvia	1998	67	18	-73%	-3.3%
Lithuania	1998	60	25	-58%	-2.7%
Belgium	1999	278	110	-60%	-2.9%
Finland	2000	158	126	-20%	-1.0%
France	2000	1,185	417	-65%	-3.2%
Israel	2000	664	429	-35%	-1.8%
Netherlands	2000	392	98	-75%	-3.8%
Slovenia	2001	151	29	-81%	-4.3%
Greece	2003	339	167	-51%	-3.0%
Switzerland	2003	289	220	-24%	-1.4%
Singapore	2005	564	458	-19%	-1.3%
United Kingdom	2006	2,913	1,601	-45%	-3.2%
Germany	2007	761	438	-42%	-3.3%
Norway	2008	209	174	-17%	-1.4%
Slovakia	2009	16	12	-25%	-2.3%
Spain	2015	3,623	2,695	-26%	-5.1%
Australia	2017	2,013	1,901	-6%	-1.9%
Average (N = 27)	2000	905	510	-49%	-2.5%
B: Advanced countries that have not peaked by 2020					
Hong Kong	–	–	2,360	–	–
Italy	–	–	374	–	–
Japan	–	–	2,808	–	–
South Korea	–	–	2,323	–	–
Sweden	–	–	335	–	–
Taiwan	–	–	948	–	–
Average (N = 6)	–	–	1,525	–	–

Continued on next page

Table 3: Continued (page 2 of 2)

Country	Peak listing year (1)	Listing count at peak (2)	2020 listing count (3)	Change since peak (4)	Annual change (5)
C: Developing/emerging countries that have peaked					
Argentina	1975	321	91	-72%	-1.6%
South Africa	1988	754	259	-66%	-2.1%
Brazil	1989	592	345	-42%	-1.3%
Mexico	1990	390	140	-64%	-2.1%
Costa Rica	1994	31	10	-68%	-2.6%
India	1996	5,999	5,579	-7%	-0.3%
Pakistan	1996	782	540	-31%	-1.3%
Chile	1997	294	207	-30%	-1.3%
Colombia	1997	128	65	-49%	-2.1%
Peru	1998	246	199	-19%	-0.9%
Romania	1998	126	81	-36%	-1.6%
Hungary	1999	64	45	-30%	-1.4%
Panama	2000	151	33	-78%	-3.9%
Egypt	2002	1,150	238	-79%	-4.4%
Iran	2005	408	368	-10%	-0.7%
Oman	2005	235	111	-53%	-3.5%
Malaysia	2006	1,021	925	-9%	-0.7%
Croatia	2007	359	107	-70%	-5.4%
Bahrain	2008	45	42	-7%	-0.6%
Bulgaria	2008	404	259	-36%	-3.0%
Morocco	2008	77	75	-3%	-0.2%
Jordan	2010	277	180	-35%	-3.5%
Nigeria	2010	215	177	-18%	-1.8%
Kuwait	2011	215	171	-20%	-2.3%
Russia	2012	292	213	-27%	-3.4%
Poland	2015	872	784	-10%	-2.0%
Turkey	2015	392	366	-7%	-1.3%
Ghana	2016	37	31	-16%	-4.1%
Kenya	2016	65	60	-8%	-1.9%
Tunisia	2017	82	80	-2%	-0.8%
Sri Lanka	2018	297	265	-11%	-5.4%
Average (N = 31)	2003	526	389	-33%	-2.2%
D: Developing/emerging countries that have not peaked by 2020					
Bangladesh	–	–	628	–	–
China	–	–	4,186	–	–
Indonesia	–	–	716	–	–
Kazakhstan	–	–	97	–	–
Philippines	–	–	268	–	–
Qatar	–	–	48	–	–
Saudi Arabia	–	–	207	–	–
Thailand	–	–	744	–	–
United Arab Emirates	–	–	74	–	–
Vietnam	–	–	751	–	–
Average (N = 10)	–	–	772	–	–

Table 4: **Listing-count changes in event time around peak year (0) in Table 3**

This table shows the change in actual listing count L for countries with a listing peak, 10 and 5 years before and after the peak. The countries, sorting, and data sources in this table are as in Table 3.

	Peak year -10		Peak year -5		Peak year	Peak year +5		Peak year +10	
Country	L	% change	L	% change	L	L	% change	L	% change
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A: Advanced countries that have peaked									
Denmark	247	11%	210	30%	274	260	-5%	237	-14%
New Zealand	–	–	–	–	339	139	-59%	132	-61%
Luxembourg	73	375%	88	294%	347	59	-83%	56	-84%
Portugal	38	316%	25	532%	158	89	-44%	76	-52%
Austria	62	81%	75	49%	112	101	-10%	109	-3%
Ireland	–	–	–	–	93	68	-27%	57	-39%
United States	5,930	24%	5,672	29%	7,325	5,550	-24%	4,616	-37%
Canada	1,856	7%	1,673	19%	1,991	1,239	-38%	1,409	-29%
Czech Republic	–	–	3	2,967%	92	37	-60%	19	-79%
Estonia	–	–	–	–	25	14	-44%	18	-28%
Latvia	–	–	–	–	67	56	-16%	36	-46%
Lithuania	–	–	–	–	60	45	-25%	41	-32%
Belgium	190	46%	162	72%	278	235	-15%	165	-41%
Finland	73	116%	73	116%	158	133	-16%	123	-22%
France	443	167%	710	67%	1,185	749	-37%	617	-48%
Israel	216	207%	652	2%	664	579	-13%	596	-10%
Netherlands	260	51%	184	113%	392	237	-40%	150	-62%
Slovenia	–	–	45	236%	151	100	-34%	66	-56%
Greece	135	151%	246	38%	339	289	-15%	248	-27%
Switzerland	215	34%	232	25%	289	253	-12%	236	-18%
Singapore	250	126%	328	72%	564	461	-18%	483	-14%
United Kingdom	2,041	43%	2,438	19%	2,913	2,001	-31%	1,794	-38%
Germany	700	9%	715	6%	761	665	-13%	450	-41%
Norway	214	-2%	160	31%	209	173	-17%	175	-16%
Slovakia	11	45%	14	14%	16	13	-19%	13	-19%
Spain	3,290	10%	3,310	9%	3,623	2,695	-26%	–	–
Australia	1,913	5%	1,959	3%	2,013	–	–	–	–
Average	1,003	63%	993	50%	993	698	-24%	535	-32%
(excluding Czech Republic, Luxembourg, and Portugal due to outliers)									
B: Developing/emerging countries that have peaked									
Argentina	–	–	–	–	321	277	-14%	226	-30%
South Africa	507	49%	464	63%	754	615	-18%	650	-14%
Brazil	404	47%	522	13%	592	548	-7%	478	-19%
Mexico	271	44%	188	107%	390	185	-53%	175	-55%
Costa Rica	16	94%	–	–	31	21	-32%	22	-29%
India	1,911	214%	2,556	135%	5,999	5,795	-3%	4,796	-20%
Pakistan	360	117%	542	44%	782	747	-4%	651	-17%
Chile	211	39%	244	20%	294	245	-17%	238	-19%
Colombia	–	–	83	54%	128	110	-14%	90	-30%
Peru	–	–	235	5%	246	195	-21%	201	-18%
Romania	–	–	–	–	126	57	-55%	62	-51%
Hungary	–	–	40	60%	64	47	-27%	42	-34%
Panama	–	–	97	56%	151	27	-82%	34	-77%
Egypt	–	–	654	76%	1,150	435	-62%	234	-80%
Iran	142	187%	285	43%	408	369	-10%	318	-22%
Oman	114	106%	208	13%	235	114	-51%	116	-51%
Malaysia	615	66%	804	27%	1,021	932	-9%	893	-13%
Croatia	77	366%	67	436%	359	211	-41%	155	-57%
Bahrain	38	18%	38	18%	45	43	-4%	43	-4%
Bulgaria	–	–	326	24%	404	381	-6%	–	–
Morocco	53	45%	52	48%	77	75	-3%	75	-3%
Jordan	163	70%	201	38%	277	228	-18%	180	-35%
Nigeria	–	–	215	0%	215	183	-15%	177	-18%
Kuwait	78	176%	164	31%	215	196	-9%	–	–
Russia	–	–	–	–	292	230	-21%	–	–
Poland	234	273%	570	53%	872	784	-10%	–	–
Turkey	257	53%	263	49%	392	366	-7%	–	–
Ghana	29	28%	29	28%	37	–	–	–	–
Kenya	52	25%	58	12%	65	–	–	–	–
Tunisia	50	64%	71	15%	82	–	–	–	–
Sri Lanka	235	26%	289	3%	297	–	–	–	–
Average	287	87%	354	40%	532	508	-22%	462	-30%
(excluding Croatia due to outliers)									

Table 5: Determinants of post-peak listing count rates of decline

This table shows coefficient estimates from the following regression specification:

$$Decline_i = \alpha + \beta D_{US} + \lambda Z_i + \epsilon_i, \quad i = 1, ..., N,$$

where $Decline_i$ is the average annual rate (percent) of decline in listed firms for country i in the five years (columns 1–2, 5–6, 9–10) or three years (columns 3–4, 7–8, 11–12) after that country's listing peak. $Decline_i$ is calculated from the unadjusted listing count in columns (1)–(4), the public-to-public merger-adjusted listing count in columns (5)–(8), and the merger-adjusted listing count in columns (9)–(12). D_{US} is a dummy taking a value of one if the country is the U.S. and zero otherwise. Z_i is a set of pre-peak country-specific control variables. Each is an annual average value from the five or three years (depending on the sample) before the listing peak in country i. *Growth variables* measure the average percent growth in listing count (unadjusted or merger-adjusted, corresponding to $Decline_i$) and GDP from the start of the event period to the peak year. Trade and FDI net inflows are scaled by GDP, where the former is the sum of exports and imports. Patent applications and GDP are scaled by population. Patent applications only includes those made by residents. The sample starts with the full list of countries that experience a peak between 1975 and 29 (45 countries). Several countries are dropped due to missing data. Additionally, Croatia, Czech Republic, Luxembourg, and Portugal are excluded due to outliers. Odd-numbered columns use all available countries and even-numbered columns only sample advanced economies. U.S. listing count data are from CRSP, foreign listing count data are from WDI, WFE, CEIC, and exchange homepages, and merger data are from SDC. Control variables are from the World Bank and IMF. Advanced economies are classified by the IMF. Parentheses display robust standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	$Decline_i$: **Unadjusted listing count**				$Decline_i$: **Public-to-public merger-adj. listing count**				$Decline_i$: **All-merger-adj. listing count**			
Event time:	±5 years		±3 years		±5 years		±3 years		±5 years		±3 years	
Sampled countries:	All	Adv.	All	Adv.	All	Adv.	All	Adv.	All	Adv.	All	Adv.
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.037**	0.066***	0.048***	0.084***	0.035**	0.061***	0.046***	0.076***	0.039**	0.058**	0.048***	0.073***
	(0.014)	(0.016)	(0.015)	(0.025)	(0.014)	(0.014)	(0.015)	(0.021)	(0.015)	(0.019)	(0.014)	(0.018)
D_{US}	0.013	0.009	-0.014	-0.007	-0.022**	-0.026**	-0.050***	-0.042***	-0.036***	-0.041**	-0.070***	-0.064***
	(0.009)	(0.009)	(0.011)	(0.012)	(0.009)	(0.009)	(0.010)	(0.012)	(0.012)	(0.013)	(0.010)	(0.011)
Pre-peak growth variables												
Listing count runup	0.054	0.081	-0.003	-0.055	0.052	0.075	-0.000	-0.043	0.031	0.034	-0.001	-0.028
	(0.046)	(0.051)	(0.033)	(0.048)	(0.045)	(0.049)	(0.033)	(0.046)	(0.056)	(0.068)	(0.029)	(0.038)
GDP growth	-0.001	-0.001	0.000	-0.000	-0.001	-0.001	0.000	-0.000	-0.001	-0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP-scaled variables												
Trade	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FDI net inflows	0.001	0.007	-0.001	0.005	0.001	0.005	-0.001	0.003	0.001	-0.000	-0.001	-0.000
	(0.001)	(0.005)	(0.002)	(0.007)	(0.001)	(0.004)	(0.002)	(0.006)	(0.002)	(0.005)	(0.002)	(0.005)
Population-scaled variables												
Patent applications	-42.484	-56.537	-25.328	-41.370	-42.241	-56.212	-26.992	-42.922	-64.222	-78.406	-42.556	-63.089
	(26.046)	(38.165)	(45.646)	(55.951)	(27.253)	(41.474)	(42.646)	(53.336)	(41.504)	(50.980)	(41.775)	(48.308)
GDP	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R^2	0.079	0.468	0.025	0.134	0.103	0.570	0.076	0.275	0.175	0.607	0.215	0.521
N	30	15	35	17	30	15	35	17	30	15	35	17

Table 6: **Country-specific post-peak listing count rates of decline**

This table shows β coefficient estimates from the regression specification:

$$Decline_i = \alpha + \beta D_{country} + \lambda Z_i + \epsilon_i, \quad i = 1, ..., N,$$

where variable definitions are as in Table 5 except for $D_{country}$, which replaces D_{US}. Each row shows the β coefficient estimates that results from setting $D_{country}$ to equal one if country i is the country indicated in the first column. Columns (1)–(12) and data sources are as in Table 5. Regression standard errors are robust but not shown in the table. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	$Decline_i$: **Unadjusted listing count**				$Decline_i$: **Public-to-public merger-adj. count**				$Decline_i$: **All-merger-adj. listing count**			
Event time:	±5 years		±3 years		±5 years		±3 years		±5 years		±3 years	
Sampled countries:	All	Adv.	All	Adv.	All	Adv.	All	Adv.	All	Adv.	All	Adv.
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Advanced economies												
Australia			-0.052*	-0.075**			-0.052*	-0.074**			-0.047*	-0.064*
Canada	0.032***	0.040***	0.070***	0.073***	0.023**	0.029*	0.058***	0.059***	0.007	0.002	0.039***	0.034**
Finland	-0.017	-0.031*	-0.008	-0.033	-0.017	-0.029	-0.011	-0.032	-0.042*	-0.050*	-0.023	-0.030
France	0.026***	0.019*	0.062***	0.063***	0.029***	0.024**	0.064***	0.066***	0.035***	0.034**	0.066***	0.066***
Germany	0.003	0.027	-0.019	0.003	0.026	0.058**	0.003	0.027	0.055*	0.077*	0.025	0.045
Greece	-0.020	-0.033*	-0.002	-0.020	-0.021*	-0.034**	-0.004	-0.021	-0.024*	-0.048***	-0.004	-0.028
Israel	-0.009	-0.013	0.000	-0.015	-0.000	-0.003	0.010	-0.003	0.014	0.007	0.027**	0.017
Latvia			-0.096	-0.189*			-0.094	-0.172*			-0.067	-0.111
Netherlands	0.024**	0.018	0.067***	0.062***	0.024**	0.021	0.066***	0.061***	0.021	0.027	0.058***	0.057***
Norway	-0.034	-0.040	-0.094*	-0.074	-0.021	-0.023	-0.077*	-0.047	0.005	-0.000	-0.051	-0.007
Singapore	-0.067	0.011	0.050	-0.025	-0.081	-0.057	0.034	-0.083	-0.092	-0.114	0.017	-0.141
Slovakia	0.014	0.002	0.008	-0.018	0.017	-0.002	0.012	-0.004	0.028	0.011	0.028	0.027
Slovenia	0.004	0.004	-0.025*	-0.037	0.008	0.016	-0.021*	-0.032	0.041	0.054	-0.009	-0.029
Spain	0.000	-0.012	0.009	-0.013	0.007	-0.002	0.013	-0.006	0.014	0.012	0.020	0.003
Switzerland	-0.033***	-0.029**	-0.015	-0.019	-0.025*	-0.019*	-0.009	-0.013	-0.022*	-0.014	-0.003	-0.005
UK	0.028***	0.014	0.038***	0.040	0.026***	0.014	0.033**	0.037	0.009	0.012	0.007	0.009
U.S.	0.013	0.009	-0.014	-0.007	-0.022**	-0.026**	-0.050***	-0.042***	-0.036***	-0.041**	-0.070***	-0.064***
Developing/emerging economies												
Bulgaria	-0.048*		-0.091*		-0.046*		-0.088*		-0.042		-0.081*	
Chile	0.002		-0.014		0.003		-0.012		-0.001		-0.017	
Colombia	-0.007		0.103***		-0.014		0.099***		-0.013		0.098***	
Costa Rica			0.040*				0.042**				0.046**	
Egypt	0.091***		0.075***		0.093***		0.077***		0.095***		0.077***	
Hungary	0.008		0.046***		0.011		0.048***		0.016		0.052***	
India	-0.057***		-0.042**		-0.055***		-0.040**		-0.051**		-0.041***	
Iran	-0.033*		-0.000		-0.029*		0.001		-0.028*		0.001	
Jordan	-0.007		-0.000		-0.008		-0.001		-0.005		0.003	
Kenya			-0.021				-0.024				-0.024	
Malaysia	-0.035		-0.041**		-0.038		-0.043**		-0.052		-0.056***	
Morocco	-0.034**		-0.043***		-0.035**		-0.046***		-0.041***		-0.053***	
Pakistan	-0.032*		-0.046***		-0.030*		-0.043***		-0.030*		-0.044***	
Panama	0.131***				0.130***				0.134***			
Peru	0.011		0.011		0.008		0.006					
Poland	-0.025**		-0.031***		-0.022*		-0.028***		-0.022*		-0.029***	
Russia			-0.003				0.004				0.013	
Tunisia			-0.044***				-0.043***				-0.040***	
Turkey	-0.029**		-0.038***		-0.031***		-0.037***		-0.032**		-0.039***	
Average R^2	0.106	0.500	0.057	0.217	0.123	0.522	0.064	0.270	0.179	0.523	0.163	0.415
N	30	15	35	17	30	15	35	17	30	15	35	17

Table 7: Estimates of U.S. unadjusted and merger-adjusted listing gaps, all countries 1990–2020

The table reports coefficient estimates from the following regression specification:

$$ln(Y_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N,$$

where the dependent variable for country i in year t (Y_{it}) varies by column: actual listing count (G1) per capita (1–2) or per GDP (3–4), public-to-public merger-adjusted listing count (G2) per capita (5–6) or per GDP (7–8), or all-merger-adjusted listing count (G3) per capita (9–10) or per GDP (11–12). G1, G2, and G3 are defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. Country fixed effects are only included in even-numbered columns below. D_{US} is a dummy variable taking a value of one if the country is the U.S. and zero otherwise, and X_{it} is a set of country-specific control variables (anti-self-dealing index, log(GDP/capita) and GDP growth) in year t. For each year t after 1990, the size of the U.S. listing gap is computed as $Y_{US,1990} \times Pop_{US,t} \times (e^{\gamma_t} - 1)$ or $Y_{US,1990} \times GDP_{US,t} \times (e^{\gamma_t} - 1)$ (depending on the Y_{it} scaling variable), where γ_t is the annual parameter in the vector Γ. The regressions are run on the full sample of 74 countries. U.S. listing count data are from CRSP, foreign listing count data are from WDI and exchange homepages, and merger data are from SDC. Parentheses display country-clustered standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	Y_{it}: **Unadjusted listing count (G1)**				Y_{it}: **Public-to-public merger-adjusted listing count (G2)**				Y_{it}: **All-merger-adjusted listing count (G3)**			
	Per capita		Per GDP		Per capita		Per GDP		Per capita		Per GDP	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.176	1.571***	-0.812**	-0.031	0.109	1.591***	-0.836**	-0.045	-0.088	1.833***	-0.854***	-0.108
	(0.362)	(0.310)	(0.330)	(0.102)	(0.360)	(0.310)	(0.327)	(0.103)	(0.360)	(0.327)	(0.312)	(0.109)
Anti-self-dealing index	1.375***		1.180**		1.425***		1.242**		1.489***		1.341***	
	(0.479)		(0.510)		(0.472)		(0.501)		(0.454)		(0.472)	
Log(GDP/capita)	0.634***	0.299**			0.652***	0.282**			0.718***	0.148		
	(0.085)	(0.135)			(0.084)	(0.135)			(0.084)	(0.143)		
GDP growth	-0.003	-0.001	0.004	-0.004***	-0.004	-0.001	0.003	-0.004***	-0.005	0.000	0.000	-0.004***
	(0.003)	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)
U.S. dummy	-0.401**		-0.695***		-0.434**		-0.712***		-0.532***		-0.758***	
	(0.181)		(0.187)		(0.179)		(0.185)		(0.173)		(0.179)	
U.S. 1991 dummy	0.043	0.012	-0.027	0.074	0.058	0.019	-0.009	0.083	0.083	0.015	0.028	0.091
	(0.054)	(0.050)	(0.060)	(0.060)	(0.053)	(0.048)	(0.058)	(0.059)	(0.051)	(0.046)	(0.055)	(0.057)
U.S. 1992 dummy	0.068	0.002	0.009	0.060	0.098*	0.025	0.041	0.084*	0.151***	0.048	0.105*	0.118**
	(0.058)	(0.049)	(0.062)	(0.050)	(0.057)	(0.048)	(0.061)	(0.049)	(0.056)	(0.048)	(0.059)	(0.050)
U.S. 1993 dummy	0.162*	0.080	0.010	0.118	0.209**	0.114	0.061	0.154*	0.296***	0.168*	0.177*	0.215***
	(0.092)	(0.085)	(0.107)	(0.079)	(0.092)	(0.084)	(0.105)	(0.079)	(0.090)	(0.084)	(0.099)	(0.079)
U.S. 1994 dummy	0.034	0.063	-0.143	0.072	0.102	0.117	-0.075	0.129	0.195**	0.177**	0.052	0.191**
	(0.099)	(0.088)	(0.116)	(0.091)	(0.096)	(0.086)	(0.115)	(0.090)	(0.097)	(0.086)	(0.114)	(0.092)
U.S. 1995 dummy	0.069	0.069	-0.035	0.127	0.151	0.144	0.052	0.205**	0.273***	0.227**	0.193*	0.299***
	(0.097)	(0.091)	(0.111)	(0.092)	(0.098)	(0.090)	(0.111)	(0.092)	(0.100)	(0.090)	(0.112)	(0.095)
U.S. 1996 dummy	0.182	0.076	-0.008	0.144	0.295**	0.173*	0.112	0.243**	0.456***	0.277***	0.307**	0.360***
	(0.116)	(0.095)	(0.136)	(0.094)	(0.117)	(0.094)	(0.136)	(0.095)	(0.118)	(0.096)	(0.135)	(0.099)
U.S. 1997 dummy	0.086	-0.009	-0.183	0.040	0.236*	0.121	-0.023	0.172*	0.431***	0.259***	0.221	0.320***
	(0.131)	(0.094)	(0.162)	(0.097)	(0.132)	(0.094)	(0.162)	(0.098)	(0.134)	(0.095)	(0.159)	(0.103)
U.S. 1998 dummy	-0.047	-0.131	-0.364**	-0.151	0.149	0.045	-0.156	0.027	0.379***	0.234**	0.131	0.213*
	(0.135)	(0.095)	(0.163)	(0.105)	(0.136)	(0.094)	(0.163)	(0.106)	(0.139)	(0.096)	(0.162)	(0.111)
U.S. 1999 dummy	-0.232*	-0.277***	-0.562***	-0.343***	0.026	-0.041	-0.304*	-0.116	0.272*	0.182*	0.004	0.092
	(0.138)	(0.093)	(0.168)	(0.106)	(0.142)	(0.093)	(0.169)	(0.107)	(0.146)	(0.095)	(0.167)	(0.113)

Continued on next page

Table 7: Continued (page 2 of 2)

	Y_{it}: **Unadjusted listing count (G1)**				Y_{it}: **Public-to-public merger-adjusted listing count (G2)**				Y_{it}: **All-merger-adjusted listing count (G3)**			
	Per capita		Per GDP		Per capita		Per GDP		Per capita		Per GDP	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
U.S. 2000 dummy	-0.355**	-0.369***	-0.697***	-0.458***	-0.051	-0.094	-0.401**	-0.201*	0.206	0.152	-0.077	0.025
	(0.141)	(0.094)	(0.174)	(0.105)	(0.144)	(0.094)	(0.172)	(0.107)	(0.149)	(0.096)	(0.170)	(0.113)
U.S. 2001 dummy	-0.502***	-0.456***	-0.844***	-0.576***	-0.149	-0.129	-0.496***	-0.265**	0.113	0.131	-0.169	-0.030
	(0.139)	(0.096)	(0.170)	(0.108)	(0.142)	(0.096)	(0.170)	(0.108)	(0.148)	(0.098)	(0.169)	(0.115)
U.S. 2002 dummy	-0.556***	-0.504***	-0.851***	-0.639***	-0.199	-0.166*	-0.492***	-0.304***	0.066	0.105	-0.171	-0.058
	(0.131)	(0.100)	(0.152)	(0.109)	(0.132)	(0.099)	(0.152)	(0.109)	(0.138)	(0.101)	(0.152)	(0.115)
U.S. 2003 dummy	-0.580***	-0.547***	-0.769***	-0.632***	-0.195	-0.177*	-0.389***	-0.266**	0.072	0.092	-0.085	-0.014
	(0.123)	(0.103)	(0.138)	(0.109)	(0.123)	(0.102)	(0.138)	(0.109)	(0.128)	(0.104)	(0.139)	(0.114)
U.S. 2004 dummy	-0.485***	-0.532***	-0.676***	-0.549***	-0.117	-0.147	-0.301**	-0.166	0.169	0.119	0.020	0.097
	(0.127)	(0.105)	(0.146)	(0.110)	(0.128)	(0.105)	(0.146)	(0.111)	(0.134)	(0.107)	(0.147)	(0.116)
U.S. 2005 dummy	-0.452***	-0.511***	-0.657***	-0.482***	-0.042	-0.114	-0.239	-0.082	0.256*	0.148	0.097	0.185
	(0.135)	(0.110)	(0.158)	(0.114)	(0.136)	(0.109)	(0.158)	(0.114)	(0.142)	(0.111)	(0.159)	(0.119)
U.S. 2006 dummy	-0.421***	-0.491***	-0.595***	-0.423***	0.002	-0.082	-0.165	-0.010	0.294**	0.165	0.159	0.251**
	(0.137)	(0.112)	(0.159)	(0.116)	(0.139)	(0.112)	(0.159)	(0.116)	(0.146)	(0.114)	(0.162)	(0.123)
U.S. 2007 dummy	-0.433***	-0.506***	-0.513***	-0.376***	-0.000	-0.087	-0.076	0.049	0.288**	0.145	0.227	0.307**
	(0.136)	(0.117)	(0.151)	(0.119)	(0.137)	(0.116)	(0.152)	(0.119)	(0.143)	(0.119)	(0.155)	(0.125)
U.S. 2008 dummy	-0.421***	-0.529***	-0.479***	-0.321***	0.035	-0.093	-0.021	0.125	0.333**	0.125	0.287*	0.384***
	(0.138)	(0.122)	(0.152)	(0.119)	(0.139)	(0.121)	(0.153)	(0.120)	(0.145)	(0.125)	(0.158)	(0.127)
U.S. 2009 dummy	-0.429***	-0.569***	-0.620***	-0.351***	0.048	-0.123	-0.137	0.104	0.360**	0.088	0.210	0.356***
	(0.158)	(0.126)	(0.185)	(0.122)	(0.161)	(0.125)	(0.186)	(0.122)	(0.168)	(0.129)	(0.190)	(0.131)
U.S. 2010 dummy	-0.451***	-0.585***	-0.542***	-0.365***	0.039	-0.118	-0.048	0.109	0.332**	0.084	0.261	0.354***
	(0.144)	(0.126)	(0.164)	(0.123)	(0.145)	(0.125)	(0.165)	(0.124)	(0.153)	(0.129)	(0.169)	(0.132)
U.S. 2011 dummy	-0.447***	-0.617***	-0.499***	-0.342***	0.053	-0.139	0.004	0.144	0.345**	0.050	0.304*	0.386***
	(0.144)	(0.130)	(0.162)	(0.126)	(0.146)	(0.130)	(0.163)	(0.126)	(0.153)	(0.133)	(0.168)	(0.135)
U.S. 2012 dummy	-0.448***	-0.631***	-0.594***	-0.343***	0.072	-0.140	-0.070	0.156	0.373**	0.044	0.258	0.396***
	(0.158)	(0.134)	(0.187)	(0.128)	(0.160)	(0.132)	(0.188)	(0.129)	(0.168)	(0.136)	(0.192)	(0.138)
U.S. 2013 dummy	-0.436***	-0.611***	-0.547***	-0.332**	0.086	-0.114	-0.021	0.173	0.370**	0.061	0.283	0.402***
	(0.155)	(0.135)	(0.177)	(0.131)	(0.156)	(0.134)	(0.179)	(0.131)	(0.164)	(0.136)	(0.184)	(0.139)
U.S. 2014 dummy	-0.387**	-0.577***	-0.528***	-0.307**	0.093	-0.095	-0.047	0.184	0.373**	0.075	0.259	0.407***
	(0.156)	(0.136)	(0.180)	(0.131)	(0.162)	(0.134)	(0.187)	(0.131)	(0.170)	(0.137)	(0.191)	(0.140)
U.S. 2015 dummy	-0.464***	-0.638***	-0.718***	-0.431***	0.027	-0.148	-0.224	0.067	0.306	0.031	0.102	0.286*
	(0.171)	(0.134)	(0.205)	(0.134)	(0.178)	(0.132)	(0.213)	(0.134)	(0.186)	(0.134)	(0.215)	(0.144)
U.S. 2016 dummy	-0.567***	-0.686***	-0.760***	-0.527***	-0.029	-0.164	-0.216	0.001	0.226	0.016	0.074	0.212
	(0.152)	(0.131)	(0.174)	(0.133)	(0.160)	(0.128)	(0.184)	(0.134)	(0.169)	(0.130)	(0.189)	(0.143)
U.S. 2017 dummy	-0.531***	-0.672***	-0.681***	-0.511***	-0.018	-0.148	-0.166	0.020	0.223	0.023	0.103	0.223
	(0.149)	(0.131)	(0.171)	(0.133)	(0.154)	(0.129)	(0.177)	(0.134)	(0.163)	(0.131)	(0.182)	(0.143)
U.S. 2018 dummy	-0.511***	-0.667***	-0.674***	-0.495***	0.006	-0.141	-0.154	0.039	0.242	0.021	0.112	0.235
	(0.153)	(0.134)	(0.175)	(0.135)	(0.158)	(0.132)	(0.181)	(0.136)	(0.167)	(0.134)	(0.186)	(0.145)
U.S. 2019 dummy	-0.530***	-0.657***	-0.742***	-0.493***	0.014	-0.135	-0.190	0.035	0.242	0.020	0.077	0.221
	(0.162)	(0.136)	(0.189)	(0.137)	(0.165)	(0.133)	(0.190)	(0.137)	(0.174)	(0.135)	(0.195)	(0.146)
U.S. 2020 dummy	-0.506***	-0.636***	-0.706***	-0.497***	0.014	-0.137	-0.179	0.007	0.223	0.007	0.066	0.178
	(0.163)	(0.135)	(0.189)	(0.136)	(0.165)	(0.133)	(0.191)	(0.137)	(0.174)	(0.134)	(0.196)	(0.146)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.490	0.933	0.151	0.892	0.503	0.935	0.140	0.888	0.552	0.939	0.133	0.868
N	1,775	2,057	1,775	2,057	1,791	2,079	1,791	2,079	1,791	2,079	1,791	2,079

Table 8: **Estimates of U.S. unadjusted and merger-adjusted listing gaps, advanced economies 1990–2020**

The table reports coefficient estimates from the following regression specification:

$$ln(Y_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N,$$

where the dependent variable for country i in year t (Y_{it}) varies by column: actual listing count (G1) per capita (1–2) or per GDP (3–4), public-to-public merger-adjusted listing count (G2) per capita (5–6) or per GDP (7–8), or all-merger-adjusted listing count (G3) per capita (9–10) or per GDP (11–12). G1, G2, and G3 are defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. Country fixed effects are only included in even-numbered columns below. D_{US} is a dummy variable taking a value of one if the country is the U.S. and zero otherwise, and X_{it} is a set of country-specific control variables (anti-self-dealing index, log(GDP/capita) and GDP growth) in year t. For each year t after 1990, the size of the U.S. listing gap is computed as $Y_{US,1990} \times Pop_{US,t} \times (e^{\gamma_t} - 1)$ or $Y_{US,1990} \times GDP_{US,t} \times (e^{\gamma_t} - 1)$ (depending on the Y_{it} scaling variable), where γ_t is the annual parameter in the vector Γ. The regressions are run on the subsample of 33 advanced economies. U.S. listing count data are from CRSP, foreign listing count data are from WDI and exchange homepages, and merger data are from SDC. Parentheses display country-clustered standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	Y_{it}: **Unadjusted listing count (G1)**				Y_{it}: **Public-to-public merger-adjusted listing count (G2)**				Y_{it}: **All-merger-adjusted listing count (G3)**			
	Per capita		Per GDP		Per capita		Per GDP		Per capita		Per GDP	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.284	3.273***	-1.564***	-0.477***	-0.372	3.475***	-1.567***	-0.496***	-0.845	3.985***	-1.558***	-0.542***
	(1.000)	(0.587)	(0.378)	(0.109)	(1.000)	(0.608)	(0.374)	(0.108)	(0.975)	(0.615)	(0.352)	(0.115)
Anti-self-dealing index	2.063***		1.997***		2.089***		2.024***		2.128***		2.089***	
	(0.549)		(0.561)		(0.534)		(0.549)		(0.484)		(0.497)	
Log(GDP/capita)	0.644**	-0.107			0.668**	-0.173			0.802***	-0.338*		
	(0.262)	(0.174)			(0.259)	(0.180)			(0.249)	(0.180)		
GDP growth	0.003	0.001	0.006	-0.002	0.002	0.002	0.005	-0.002	0.000	0.003*	0.002	-0.001
	(0.007)	(0.002)	(0.008)	(0.002)	(0.007)	(0.002)	(0.008)	(0.002)	(0.007)	(0.002)	(0.007)	(0.002)
U.S. dummy	-0.431**		-0.478**		-0.452**		-0.493**		-0.518**		-0.543***	
	(0.209)		(0.206)		(0.209)		(0.206)		(0.206)		(0.197)	
U.S. 1991 dummy	-0.068	-0.073	-0.090	-0.010	-0.050	-0.072	-0.072	-0.005	-0.014	-0.079	-0.028	-0.003
	(0.086)	(0.046)	(0.091)	(0.039)	(0.085)	(0.046)	(0.092)	(0.039)	(0.080)	(0.048)	(0.086)	(0.041)
U.S. 1992 dummy	-0.030	-0.051	-0.047	0.040	0.003	-0.038	-0.014	0.058	0.066	-0.027	0.056	0.083*
	(0.092)	(0.056)	(0.097)	(0.045)	(0.092)	(0.055)	(0.099)	(0.045)	(0.087)	(0.055)	(0.093)	(0.047)
U.S. 1993 dummy	-0.072	-0.011	-0.153	0.017	-0.020	0.014	-0.099	0.043	0.081	0.053	0.034	0.087
	(0.167)	(0.068)	(0.180)	(0.068)	(0.166)	(0.068)	(0.183)	(0.069)	(0.154)	(0.068)	(0.170)	(0.076)
U.S. 1994 dummy	-0.027	0.013	-0.084	0.005	0.038	0.062	-0.018	0.054	0.143	0.135	0.110	0.126
	(0.104)	(0.086)	(0.104)	(0.088)	(0.103)	(0.085)	(0.105)	(0.088)	(0.096)	(0.082)	(0.100)	(0.093)
U.S. 1995 dummy	0.097	0.034	0.102	0.122	0.181**	0.105	0.185**	0.198**	0.313***	0.200**	0.316***	0.306***
	(0.081)	(0.087)	(0.081)	(0.092)	(0.081)	(0.086)	(0.081)	(0.094)	(0.081)	(0.084)	(0.083)	(0.098)
U.S. 1996 dummy	0.056	-0.028	-0.028	0.019	0.172	0.058	0.091	0.107	0.334**	0.159	0.285	0.215
	(0.149)	(0.101)	(0.182)	(0.120)	(0.150)	(0.101)	(0.185)	(0.123)	(0.150)	(0.101)	(0.179)	(0.135)
U.S. 1997 dummy	-0.060	-0.084	-0.199	-0.107	0.094	0.036	-0.040	0.011	0.285	0.166	0.205	0.138
	(0.214)	(0.104)	(0.247)	(0.126)	(0.215)	(0.104)	(0.252)	(0.130)	(0.209)	(0.107)	(0.243)	(0.144)
U.S. 1998 dummy	-0.214	-0.200*	-0.368	-0.296**	-0.017	-0.027	-0.164	-0.130	0.199	0.154	0.111	0.038
	(0.197)	(0.099)	(0.230)	(0.123)	(0.199)	(0.099)	(0.235)	(0.126)	(0.197)	(0.105)	(0.229)	(0.139)
U.S. 1999 dummy	-0.346*	-0.302***	-0.519**	-0.476***	-0.113	-0.084	-0.277	-0.269**	0.105	0.125	0.007	-0.086
	(0.188)	(0.100)	(0.231)	(0.124)	(0.189)	(0.100)	(0.235)	(0.127)	(0.187)	(0.106)	(0.226)	(0.141)

Continued on next page

Table 8: Continued (page 2 of 2)

	Y_{it}: Unadjusted listing count (G1)				Y_{it}: Public-to-public merger-adjusted listing count (G2)				Y_{it}: All-merger-adjusted listing count (G3)			
	Per capita		Per GDP		Per capita		Per GDP		Per capita		Per GDP	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
U.S. 2000 dummy	-0.521**	-0.411***	-0.733***	-0.654***	-0.248	-0.153	-0.449*	-0.411***	-0.023	0.071	-0.143	-0.223
	(0.222)	(0.104)	(0.257)	(0.117)	(0.223)	(0.103)	(0.263)	(0.119)	(0.218)	(0.110)	(0.255)	(0.136)
U.S. 2001 dummy	-0.643***	-0.517***	-0.850***	-0.800***	-0.326	-0.206*	-0.522**	-0.506***	-0.112	0.030	-0.229	-0.312**
	(0.194)	(0.110)	(0.228)	(0.117)	(0.195)	(0.109)	(0.232)	(0.117)	(0.194)	(0.114)	(0.228)	(0.129)
U.S. 2002 dummy	-0.645***	-0.572***	-0.801***	-0.812***	-0.308**	-0.233*	-0.455**	-0.487***	-0.097	0.011	-0.185	-0.278**
	(0.141)	(0.116)	(0.180)	(0.121)	(0.143)	(0.115)	(0.182)	(0.121)	(0.151)	(0.117)	(0.181)	(0.129)
U.S. 2003 dummy	-0.589***	-0.639***	-0.665***	-0.747***	-0.226*	-0.274**	-0.297*	-0.387***	-0.013	-0.037	-0.055	-0.165
	(0.117)	(0.120)	(0.148)	(0.126)	(0.117)	(0.118)	(0.146)	(0.125)	(0.127)	(0.118)	(0.148)	(0.129)
U.S. 2004 dummy	-0.492***	-0.667***	-0.524***	-0.632***	-0.171	-0.291**	-0.234	-0.281**	0.071	-0.073	0.033	-0.060
	(0.147)	(0.122)	(0.154)	(0.128)	(0.144)	(0.119)	(0.175)	(0.128)	(0.152)	(0.118)	(0.177)	(0.133)
U.S. 2005 dummy	-0.521***	-0.624***	-0.609***	-0.574***	-0.117	-0.247*	-0.201	-0.194	0.138	-0.045	0.088	0.016
	(0.177)	(0.132)	(0.201)	(0.134)	(0.180)	(0.128)	(0.204)	(0.133)	(0.187)	(0.127)	(0.207)	(0.139)
U.S. 2006 dummy	-0.488**	-0.615***	-0.562***	-0.537***	-0.075	-0.229*	-0.145	-0.146	0.166	-0.045	0.124	0.051
	(0.180)	(0.132)	(0.200)	(0.139)	(0.183)	(0.129)	(0.204)	(0.138)	(0.192)	(0.127)	(0.210)	(0.144)
U.S. 2007 dummy	-0.465***	-0.689***	-0.466**	-0.509***	-0.045	-0.293**	-0.047	-0.101	0.182	-0.124	0.181	0.095
	(0.169)	(0.129)	(0.172)	(0.140)	(0.171)	(0.125)	(0.175)	(0.140)	(0.179)	(0.121)	(0.182)	(0.144)
U.S. 2008 dummy	-0.482**	-0.756***	-0.471**	-0.476***	-0.040	-0.350**	-0.030	-0.052	0.199	-0.207	0.205	0.133
	(0.186)	(0.133)	(0.185)	(0.140)	(0.189)	(0.129)	(0.189)	(0.139)	(0.199)	(0.124)	(0.198)	(0.145)
U.S. 2009 dummy	-0.617**	-0.797***	-0.686**	-0.562***	-0.153	-0.385***	-0.221	-0.136	0.090	-0.265**	0.050	0.020
	(0.237)	(0.137)	(0.268)	(0.141)	(0.243)	(0.132)	(0.276)	(0.140)	(0.251)	(0.128)	(0.278)	(0.148)
U.S. 2010 dummy	-0.592***	-0.793***	-0.629***	-0.578***	-0.118	-0.358**	-0.155	-0.130	0.097	-0.239*	0.075	0.021
	(0.200)	(0.138)	(0.223)	(0.143)	(0.205)	(0.133)	(0.228)	(0.142)	(0.217)	(0.127)	(0.234)	(0.149)
U.S. 2011 dummy	-0.556***	-0.814***	-0.552***	-0.544***	-0.076	-0.371**	-0.073	-0.084	0.128	-0.262*	0.130	0.065
	(0.190)	(0.143)	(0.192)	(0.146)	(0.194)	(0.138)	(0.196)	(0.145)	(0.204)	(0.130)	(0.205)	(0.151)
U.S. 2012 dummy	-0.649**	-0.829***	-0.715**	-0.598***	-0.146	-0.377**	-0.212	-0.131	0.064	-0.286**	0.025	-0.006
	(0.236)	(0.147)	(0.265)	(0.147)	(0.242)	(0.142)	(0.272)	(0.145)	(0.250)	(0.136)	(0.275)	(0.154)
U.S. 2013 dummy	-0.594***	-0.789***	-0.635***	-0.575***	-0.095	-0.329**	-0.136	-0.103	0.085	-0.244*	0.060	0.014
	(0.207)	(0.152)	(0.228)	(0.154)	(0.212)	(0.146)	(0.233)	(0.152)	(0.221)	(0.138)	(0.239)	(0.158)
U.S. 2014 dummy	-0.581**	-0.755***	-0.635**	-0.553***	-0.092	-0.307**	-0.146	-0.093	0.079	-0.232	0.047	0.012
	(0.217)	(0.154)	(0.241)	(0.158)	(0.222)	(0.148)	(0.247)	(0.156)	(0.232)	(0.139)	(0.253)	(0.162)
U.S. 2015 dummy	-0.731**	-0.768***	-0.880***	-0.695***	-0.230	-0.312**	-0.373	-0.234	-0.064	-0.239	-0.149	-0.151
	(0.277)	(0.156)	(0.316)	(0.158)	(0.282)	(0.149)	(0.325)	(0.155)	(0.285)	(0.143)	(0.324)	(0.165)
U.S. 2016 dummy	-0.782***	-0.789***	-0.878***	-0.763***	-0.209	-0.290*	-0.308	-0.259	-0.083	-0.209	-0.143	-0.174
	(0.194)	(0.156)	(0.223)	(0.158)	(0.208)	(0.149)	(0.239)	(0.156)	(0.218)	(0.144)	(0.246)	(0.163)
U.S. 2017 dummy	-0.689***	-0.769***	-0.776***	-0.721***	-0.173	-0.275*	-0.256	-0.224	-0.063	-0.207	-0.112	-0.149
	(0.198)	(0.159)	(0.225)	(0.161)	(0.202)	(0.153)	(0.230)	(0.160)	(0.213)	(0.146)	(0.237)	(0.167)
U.S. 2018 dummy	-0.673***	-0.764***	-0.754***	-0.690***	-0.155	-0.270*	-0.232	-0.192	-0.054	-0.218	-0.100	-0.129
	(0.202)	(0.165)	(0.227)	(0.169)	(0.206)	(0.159)	(0.232)	(0.167)	(0.216)	(0.151)	(0.239)	(0.173)
U.S. 2019 dummy	-0.705***	-0.747***	-0.827***	-0.706***	-0.189	-0.261	-0.306	-0.217	-0.097	-0.226	-0.167	-0.176
	(0.238)	(0.168)	(0.267)	(0.172)	(0.243)	(0.161)	(0.274)	(0.170)	(0.250)	(0.153)	(0.279)	(0.177)
U.S. 2020 dummy	-0.657***	-0.698***	-0.771***	-0.681***	-0.169	-0.233	-0.277	-0.215	-0.105	-0.209	-0.169	-0.188
	(0.219)	(0.169)	(0.246)	(0.173)	(0.224)	(0.162)	(0.252)	(0.171)	(0.233)	(0.154)	(0.258)	(0.177)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.390	0.912	0.318	0.874	0.396	0.915	0.304	0.868	0.450	0.921	0.309	0.846
N	927	975	927	975	930	979	930	979	930	979	930	979

A Alternative listing-gap regression specifications

While we use the parameter γ_t to compute the listing gap, Doidge, Karolyi, and Stulz (2017) instead employ a non-U.S. dummy in their basic listing-gap regressions and use the year fixed effect to compute the gap. In our vernacular, this alternative approach is equivalent to using $\gamma_t + \tau_t$ to compute the gap. To see why, consider the regression model in Doidge, Karolyi, and Stulz (2017):

$$ln(Y_{it}) = \alpha' + \tau'_t + \beta' D_{non-US} + \Gamma'(D_{non-US} \times \tau'_t) + \lambda' X_{it} + \epsilon_{it}, \quad t = 1990, ..., 2012, \quad i = 1, .., N. \quad (11)$$

Their gap-parameter in year t is therefore

$$\begin{aligned} E(Y_{it} \mid D_{non-US} = 0, year = t) \quad &- \quad E(Y_{it} \mid D_{non-US} = 0, year = 1990) \\ &= \quad (\alpha' + \tau'_t) - \alpha' \\ &= \quad \tau'_t. \end{aligned} \quad (12)$$

If we switch the country dummy back to our D_{US}, and noting that $E(Y_{it} \mid D_{non-US} = 0) = E(Y_{it} \mid D_{US} = 1)$, it follows that

$$\begin{aligned} \tau'_t = E(Y_{it} \mid D_{US} = 1, year = t) \quad &- \quad E(Y_{it} \mid D_{US} = 1, year = 1990) \\ &= \quad (\alpha + \tau_t + \beta + \gamma_t) - (\alpha + \beta) \\ &= \quad \gamma_t + \tau_t. \end{aligned} \quad (13)$$

Hence, the year fixed effect (τ'_t) estimated in Doidge, Karolyi, and Stulz (2017) equals the sum of the year fixed effect τ_t and the gap-parameter in this paper γ_t, where τ_t is the portion of the U.S. listing trend that is common to the U.S. and all other countries.

The estimates provided in Appendix Table 2 allow us to illustrate the impact of the two different econometric parameterizations of the U.S. listing gap—here and in Doidge, Karolyi, and Stulz (2017). This table shows estimates of the listing-gap parameters γ_t, τ_t, and τ'_t when we use a U.S. dummy (columns 1 and 3, as in our analysis) and a non-U.S. dummy (columns 2 and 4, as in the earlier paper), respectively. This information allows us to isolate the impact on the U.S. listing-gap computation of the inclusion of τ_t. Columns (1) and (2), which exclude the country fixed effect δ_i in the estimation, show that $(\tau_{2020} + \gamma_{2020})/\gamma_{2020} = \tau'_{2020}/\gamma_{2020} = (-0.915)/(-0.506) = 1.81$. In columns (3) and (4), where country fixed effects are included in the regression, the corresponding ratio is smaller: 1.27. In other words, in our analysis, including the global common trend in the listing gap computation (which we do not do) would have increased the size of the gap by 27% at minimum and 81% at maximum. Finally, note that using $-\gamma_t$ as the listing-gap parameter in a regression with a non-U.S. dummy produces exactly the same listing gap estimate as using γ_t with a U.S. dummy.

The above analysis provides a basis for directly comparing the actual (not merger-adjusted) U.S. listing gaps reported by Doidge, Karolyi, and Stulz (2017) and this paper. For year 2012—the last year in the sample period of the earlier paper—the two gaps are -5,436 and -3,289 (both significant at the

1% level), respectively. The above difference in the two listing gap estimates is primarily driven by the earlier paper's inclusion of the listing trend τ_t in their estimate. However, the two estimates also differ because we adjust for the growth in the dependent-variable scaling factor and take the antilog of γ_t (as per Eq. 9). Other differences arise because of our inclusion of country fixed effects, somewhat different data sources for the listing count, a slightly different set of sampled countries, and a longer sample period (1990–2020 instead of 1990–2012).

Lattanzio, Megginson, and Sanati (2021) also report listing-gap estimates that differ from those in Doidge, Karolyi, and Stulz (2017), however, for different reasons. Although both prior studies use the parameter τ_t' to compute the listing gap, the full regression model of Lattanzio, Megginson, and Sanati (2021) employs the unscaled listing count ($ln(L_{it})$) as the dependent variable—instead placing the scaling factor ($ln(Pop)$) as a regressor. Moreover, their model adds regressors capturing stock market valuation, private equity volume, and aggregate merger activity. Lattanzio, Megginson, and Sanati (2021) show that this alternative regression specification substantially lowers the listing gap, and in particular after controlling for aggregate merger activity. From 1991–2017, their regression renders the U.S. listing-gap estimate statistically insignificant for the years 1991–1992, 2011–2012, and 2014. In 2017, their gap-estimate is -2,253 firms, which is statistically significant at the 5% level. In Appendix Table 1, we replace our dependent variable with $ln(L_{it})$ and use the scaling factor as a regressor as in Lattanzio, Megginson, and Sanati (2021). Using either our full sample of 74 countries or the subsample of 33 advanced economies, our main conclusions are unaffected by this robustness test.

Appendix Table A. 1: Listing gap estimates with an unscaled dependent variable

The table reports coefficient estimates from the following regression specification:

$$ln(L_{it}) = \alpha + \delta_i + \tau_t + \beta D_{US} + \Gamma(D_{US} \times \tau_t) + \lambda K_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N,$$

where the dependent variable for country i in year t (L_{it}) varies by column: unadjusted listing count (G1) (1–2, 7–8), public-to-public merger-adjusted listing count (G2) (3–4, 9–10), and all-merger-adjusted listing count (G3) (5–6, 11–12). G1–G3 are defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. Country fixed effects are only included in the even-numbered columns below. D_{US} is a dummy variable taking a value of one if the country is the U.S. and zero otherwise, and K_{it} is a set of country-specific control variables (anti-self-dealing index, log(GDP), log(population) and GDP growth) in year t. Note two differences with the regressions in Table 7 and Appendix Table 8: the dependent variable L_{it} is not scaled like Y_{it}, and the control variables K_{it} are not the same as X_{it}. The regressions are run on the full sample of 74 countries in columns (1)–(6) and 33 advanced economies in columns (7)–(12). U.S. listing count data are from CRSP, foreign listing count data are from WDI, WFE, CEIC, and exchange homepages, and merger data are from SDC. Parentheses display country-clustered standard errors. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	Sample: All economies						**Sample: Advanced economies**					
	L_{it}: Unadjusted listing count (G1)		**L_{it}: Pub-to-pub merger-adj listing count (G2)**		**L_{it}: All-merger-adj listing count (G3)**		**L_{it}: Unadjusted listing count (G1)**		**L_{it}: Pub-to-pub merger-adj listing count (G2)**		**L_{it}: All-merger-adj listing count (G3)**	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	1.520***	3.297***	1.423***	3.433***	1.131**	4.238***	0.319	3.576**	0.175	3.929**	-0.387	4.682**
	(0.464)	(0.677)	(0.468)	(0.692)	(0.478)	(0.785)	(0.925)	(1.636)	(0.935)	(1.741)	(0.941)	(2.019)
Log(Population)	0.240***	0.114	0.225**	0.089	0.168*	0.031	0.198	0.982	0.184	0.988	0.074	1.052
	(0.090)	(0.295)	(0.090)	(0.294)	(0.091)	(0.318)	(0.255)	(0.586)	(0.253)	(0.617)	(0.240)	(0.729)
Log(GDP)	0.451***	0.285**	0.474***	0.268**	0.552***	0.129	0.623**	-0.108	0.651***	-0.176	0.787***	-0.342*
	(0.097)	(0.130)	(0.097)	(0.131)	(0.097)	(0.136)	(0.227)	(0.176)	(0.227)	(0.182)	(0.225)	(0.183)
GDP growth	-0.005**	-0.001	-0.006**	-0.001	-0.007***	-0.000	-0.004	0.001	-0.004	0.002	-0.005	0.003*
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.005)	(0.002)	(0.005)	(0.002)	(0.005)	(0.002)
Anti-self-dealing index	1.631***		1.672***		1.718***		2.083***		2.109***		2.144***	
	(0.395)		(0.393)		(0.388)		(0.504)		(0.498)		(0.468)	
U.S. dummy	0.493		0.440		0.278		0.029		-0.030		-0.165	
	(0.305)		(0.307)		(0.306)		(0.359)		(0.360)		(0.352)	
U.S. 1991 dummy	0.069	0.012	0.084	0.019	0.107**	0.015	-0.005	-0.073	0.009	-0.072	0.034	-0.079
	(0.054)	(0.048)	(0.053)	(0.047)	(0.051)	(0.044)	(0.060)	(0.046)	(0.060)	(0.046)	(0.057)	(0.048)
U.S. 1992 dummy	0.088	0.003	0.118**	0.025	0.169***	0.048	0.038	-0.050	0.067	-0.037	0.119*	-0.026
	(0.057)	(0.049)	(0.057)	(0.048)	(0.055)	(0.047)	(0.067)	(0.056)	(0.067)	(0.055)	(0.064)	(0.055)
U.S. 1993 dummy	0.216**	0.081	0.261***	0.115	0.345***	0.169**	0.064	-0.011	0.106	0.014	0.187*	0.054
	(0.085)	(0.084)	(0.085)	(0.083)	(0.083)	(0.082)	(0.114)	(0.068)	(0.115)	(0.068)	(0.109)	(0.068)
U.S. 1994 dummy	0.149*	0.078	0.214**	0.133	0.298***	0.198**	0.044	0.013	0.103	0.063	0.198**	0.137
	(0.089)	(0.088)	(0.085)	(0.086)	(0.086)	(0.084)	(0.081)	(0.086)	(0.081)	(0.085)	(0.076)	(0.082)
U.S. 1995 dummy	0.149*	0.080	0.230**	0.157*	0.346***	0.244***	0.118	0.035	0.200**	0.107	0.330***	0.203**
	(0.088)	(0.090)	(0.089)	(0.089)	(0.090)	(0.089)	(0.080)	(0.087)	(0.079)	(0.086)	(0.079)	(0.084)
U.S. 1996 dummy	0.297***	0.088	0.408***	0.186*	0.560***	0.294***	0.176	-0.027	0.283**	0.059	0.427***	0.160
	(0.096)	(0.096)	(0.097)	(0.095)	(0.099)	(0.095)	(0.116)	(0.101)	(0.118)	(0.101)	(0.118)	(0.101)
U.S. 1997 dummy	0.228**	0.006	0.374***	0.137	0.559***	0.280***	0.112	-0.083	0.253	0.038	0.419**	0.169
	(0.106)	(0.095)	(0.108)	(0.094)	(0.111)	(0.095)	(0.157)	(0.105)	(0.160)	(0.105)	(0.158)	(0.108)
U.S. 1998 dummy	0.120	-0.109	0.312***	0.068	0.530***	0.265***	-0.055	-0.198*	0.130	-0.024	0.322**	0.159
	(0.115)	(0.096)	(0.116)	(0.095)	(0.121)	(0.095)	(0.149)	(0.100)	(0.153)	(0.101)	(0.155)	(0.106)
U.S. 1999 dummy	-0.050	-0.258***	0.212*	-0.020	0.444***	0.209**	-0.198	-0.300***	0.024	-0.081	0.219	0.130
	(0.118)	(0.093)	(0.125)	(0.093)	(0.131)	(0.094)	(0.141)	(0.102)	(0.145)	(0.102)	(0.149)	(0.108)

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Appendix Table A. 1: **Continued (page 2 of 2)**

	Sample: All economies						Sample: Advanced economies					
	L_{it}: Unadjusted listing count (G1)		L_{it}: Pub-to-pub merger-adj listing count (G2)		L_{it}: All-merger-adj listing count (G3)		L_{it}: Unadjusted listing count (G1)		L_{it}: Pub-to-pub merger-adj listing count (G2)		L_{it}: All-merger-adj listing count (G3)	
Regressors	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
U.S. 2000 dummy	-0.158	-0.350***	0.145	-0.072	0.389***	0.181*	-0.343**	-0.409***	-0.084	-0.149	0.114	0.077
	(0.122)	(0.093)	(0.128)	(0.093)	(0.135)	(0.094)	(0.168)	(0.106)	(0.172)	(0.106)	(0.174)	(0.113)
U.S. 2001 dummy	-0.296**	-0.437***	0.055	-0.109	0.302**	0.158	-0.491***	-0.514***	-0.187	-0.201*	0.005	0.038
	(0.124)	(0.095)	(0.130)	(0.094)	(0.136)	(0.095)	(0.156)	(0.115)	(0.160)	(0.114)	(0.164)	(0.120)
U.S. 2002 dummy	-0.363***	-0.484***	-0.015	-0.141	0.237*	0.138	-0.550***	-0.567***	-0.221	-0.226*	-0.025	0.022
	(0.122)	(0.099)	(0.124)	(0.099)	(0.131)	(0.099)	(0.128)	(0.121)	(0.131)	(0.120)	(0.140)	(0.124)
U.S. 2003 dummy	-0.430***	-0.527***	-0.051	-0.155	0.206*	0.121	-0.556***	-0.634***	-0.197	-0.266**	0.012	-0.025
	(0.116)	(0.102)	(0.117)	(0.101)	(0.123)	(0.102)	(0.117)	(0.127)	(0.118)	(0.126)	(0.127)	(0.128)
U.S. 2004 dummy	-0.368***	-0.512***	0.018	-0.129	0.295**	0.143	-0.437***	-0.661***	-0.105	-0.283**	0.126	-0.060
	(0.119)	(0.105)	(0.118)	(0.104)	(0.124)	(0.104)	(0.150)	(0.129)	(0.141)	(0.127)	(0.146)	(0.127)
U.S. 2005 dummy	-0.312**	-0.497***	0.095	-0.099	0.384***	0.167	-0.399**	-0.619***	-0.005	-0.239*	0.232	-0.033
	(0.124)	(0.109)	(0.125)	(0.107)	(0.131)	(0.108)	(0.171)	(0.136)	(0.173)	(0.133)	(0.174)	(0.132)
U.S. 2006 dummy	-0.295**	-0.483***	0.125	-0.073	0.408***	0.177	-0.376**	-0.610***	0.029	-0.220	0.253	-0.031
	(0.127)	(0.111)	(0.128)	(0.109)	(0.135)	(0.110)	(0.176)	(0.136)	(0.179)	(0.133)	(0.182)	(0.131)
U.S. 2007 dummy	-0.346***	-0.503***	0.085	-0.085	0.367***	0.148	-0.415**	-0.682***	0.000	-0.284**	0.220	-0.109
	(0.126)	(0.116)	(0.127)	(0.114)	(0.133)	(0.115)	(0.168)	(0.135)	(0.169)	(0.132)	(0.174)	(0.129)
U.S. 2008 dummy	-0.347***	-0.534***	0.107	-0.099	0.399***	0.117	-0.407**	-0.750***	0.031	-0.341**	0.258	-0.192
	(0.126)	(0.120)	(0.127)	(0.119)	(0.133)	(0.120)	(0.184)	(0.138)	(0.186)	(0.135)	(0.191)	(0.131)
U.S. 2009 dummy	-0.318**	-0.572***	0.157	-0.127	0.462***	0.082	-0.441*	-0.791***	0.010	-0.376***	0.227	-0.251*
	(0.135)	(0.124)	(0.138)	(0.122)	(0.146)	(0.123)	(0.222)	(0.143)	(0.226)	(0.137)	(0.227)	(0.134)
U.S. 2010 dummy	-0.377***	-0.592***	0.112	-0.127	0.399***	0.072	-0.471**	-0.786***	-0.006	-0.348**	0.191	-0.224
	(0.128)	(0.124)	(0.130)	(0.123)	(0.138)	(0.123)	(0.197)	(0.145)	(0.201)	(0.140)	(0.205)	(0.136)
U.S. 2011 dummy	-0.391***	-0.628***	0.108	-0.151	0.395***	0.034	-0.472**	-0.807***	0.002	-0.360**	0.193	-0.246*
	(0.129)	(0.128)	(0.130)	(0.127)	(0.137)	(0.127)	(0.191)	(0.150)	(0.193)	(0.145)	(0.198)	(0.141)
U.S. 2012 dummy	-0.359**	-0.642***	0.159	-0.152	0.454***	0.028	-0.474**	-0.822***	0.016	-0.366**	0.200	-0.270*
	(0.136)	(0.131)	(0.138)	(0.129)	(0.146)	(0.129)	(0.224)	(0.155)	(0.227)	(0.149)	(0.227)	(0.145)
U.S. 2013 dummy	-0.360**	-0.626***	0.161	-0.131	0.439***	0.040	-0.466**	-0.781***	0.023	-0.318**	0.184	-0.227
	(0.135)	(0.133)	(0.137)	(0.130)	(0.144)	(0.129)	(0.204)	(0.160)	(0.206)	(0.155)	(0.208)	(0.150)
U.S. 2014 dummy	-0.308**	-0.595***	0.180	-0.113	0.453***	0.051	-0.439**	-0.747***	0.039	-0.296*	0.189	-0.215
	(0.138)	(0.133)	(0.140)	(0.131)	(0.149)	(0.129)	(0.212)	(0.163)	(0.215)	(0.157)	(0.217)	(0.152)
U.S. 2015 dummy	-0.338**	-0.655***	0.159	-0.165	0.428***	0.009	-0.507**	-0.761***	-0.023	-0.300*	0.110	-0.222
	(0.148)	(0.131)	(0.151)	(0.128)	(0.160)	(0.126)	(0.246)	(0.165)	(0.250)	(0.158)	(0.248)	(0.155)
U.S. 2016 dummy	-0.465***	-0.708***	0.082	-0.186	0.328**	-0.012	-0.647***	-0.780***	-0.083	-0.277*	0.021	-0.190
	(0.137)	(0.129)	(0.143)	(0.126)	(0.151)	(0.124)	(0.192)	(0.167)	(0.203)	(0.161)	(0.206)	(0.159)
U.S. 2017 dummy	-0.442***	-0.696***	0.078	-0.173	0.312**	-0.009	-0.571***	-0.760***	-0.064	-0.262	0.028	-0.187
	(0.138)	(0.130)	(0.139)	(0.127)	(0.147)	(0.125)	(0.196)	(0.169)	(0.199)	(0.164)	(0.203)	(0.161)
U.S. 2018 dummy	-0.419***	-0.694***	0.105	-0.169	0.333**	-0.015	-0.554***	-0.755***	-0.044	-0.257	0.038	-0.198
	(0.140)	(0.133)	(0.141)	(0.130)	(0.150)	(0.127)	(0.199)	(0.175)	(0.201)	(0.169)	(0.205)	(0.165)
U.S. 2019 dummy	-0.413***	-0.684***	0.129	-0.163	0.349**	-0.017	-0.540**	-0.739***	-0.036	-0.249	0.031	-0.207
	(0.146)	(0.134)	(0.147)	(0.131)	(0.156)	(0.128)	(0.224)	(0.177)	(0.228)	(0.171)	(0.229)	(0.166)
U.S. 2020 dummy	-0.383**	-0.663***	0.134	-0.166	0.334**	-0.030	-0.516**	-0.689***	-0.039	-0.220	0.004	-0.189
	(0.148)	(0.134)	(0.149)	(0.131)	(0.158)	(0.128)	(0.212)	(0.179)	(0.216)	(0.172)	(0.219)	(0.168)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
R^2	0.630	0.946	0.640	0.949	0.662	0.953	0.738	0.962	0.749	0.965	0.774	0.969
N	1,775	2,057	1,791	2,079	1,791	2,079	927	975	930	979	930	979

Appendix Table A. 2: Listing gap estimation using a U.S. or non-U.S. dummy

The table reports coefficient estimates from the following regression specification:

$$ln(Y_{it}) = \alpha + \delta_i + \tau_t + \beta D_{(N)US} + \Gamma(D_{(N)US} \times \tau_t) + \lambda X_{it} + \epsilon_{it}, \quad t = 1990, .., 2020, \quad i = 1, .., N,$$

where the dependent variable for country i in year t (Y_{it}) is the actual listing count (as in G1) per capita. G1 is defined in Eq. (10). δ_i and τ_t are country and year fixed effects, respectively. Country fixed effects are included in columns (3)–(4) below. $D_{(N)US}$ is a U.S. dummy variable in columns (1) and (3) with a value of one if the country is the U.S. and zero otherwise, and a non-U.S. dummy variable in columns (2) and (4) taking a value of zero if U.S. and one otherwise. X_{it} is a set of country-specific control variables (anti-self-dealing index, log(GDP/capita) and GDP growth) in year t. The regressions are run on the full sample of 74 countries. U.S. listing count data are from CRSP, foreign listing count data are from WDI, WFE, CEIC, and exchange homepages, and merger data are from SDC. Standard errors are country-clustered (not shown). *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels.

	U.S. dummy	Non-U.S. dummy	U.S. dummy	Non-U.S. dummy
Regressors	(1)	(2)	(3)	(4)
Constant	0.176	-0.226	1.571***	1.571***
Anti-self-dealing index	1.375***	1.375***		
Log(GDP/capita)	0.634***	0.634***	0.299**	0.299**
GDP growth	-0.003	-0.003	-0.001	-0.001
(Non-)U.S. dummy	-0.401**	0.401**		
(Non-)U.S. 1991 dummy	0.043	-0.043	0.012	-0.012
(Non-)U.S. 1992 dummy	0.068	-0.068	0.002	-0.002
(Non-)U.S. 1993 dummy	0.162*	-0.162*	0.080	-0.080
(Non-)U.S. 1994 dummy	0.034	-0.034	0.063	-0.063
(Non-)U.S. 1995 dummy	0.069	-0.069	0.069	-0.069
(Non-)U.S. 1996 dummy	0.182	-0.182	0.076	-0.076
(Non-)U.S. 1997 dummy	0.086	-0.086	-0.009	0.009
(Non-)U.S. 1998 dummy	-0.047	0.047	-0.131	0.131
(Non-)U.S. 1999 dummy	-0.232*	0.232*	-0.277***	0.277***
(Non-)U.S. 2000 dummy	-0.355**	0.355**	-0.369***	0.369***
(Non-)U.S. 2001 dummy	-0.502***	0.502***	-0.456***	0.456***
(Non-)U.S. 2002 dummy	-0.556***	0.556***	-0.504***	0.504***
(Non-)U.S. 2003 dummy	-0.580***	0.580***	-0.547***	0.547***
(Non-)U.S. 2004 dummy	-0.485***	0.485***	-0.532***	0.532***
(Non-)U.S. 2005 dummy	-0.452***	0.452***	-0.511***	0.511***
(Non-)U.S. 2006 dummy	-0.421***	0.421***	-0.491***	0.491***
(Non-)U.S. 2007 dummy	-0.433***	0.433***	-0.506***	0.506***
(Non-)U.S. 2008 dummy	-0.421***	0.421***	-0.529***	0.529***
(Non-)U.S. 2009 dummy	-0.429***	0.429***	-0.569***	0.569***
(Non-)U.S. 2010 dummy	-0.451***	0.451***	-0.585***	0.585***
(Non-)U.S. 2011 dummy	-0.447***	0.447***	-0.617***	0.617***
(Non-)U.S. 2012 dummy	-0.448***	0.448***	-0.631***	0.631***
(Non-)U.S. 2013 dummy	-0.436***	0.436***	-0.611***	0.611***
(Non-)U.S. 2014 dummy	-0.387**	0.387**	-0.577***	0.577***
(Non-)U.S. 2015 dummy	-0.464***	0.464***	-0.638***	0.638***
(Non-)U.S. 2016 dummy	-0.567***	0.567***	-0.686***	0.686***
(Non-)U.S. 2017 dummy	-0.531***	0.531***	-0.672***	0.672***
(Non-)U.S. 2018 dummy	-0.511***	0.511***	-0.667***	0.667***
(Non-)U.S. 2019 dummy	-0.530***	0.530***	-0.657***	0.657***
(Non-)U.S. 2020 dummy	-0.506***	0.506***	-0.636***	0.636***
Continued on right				

	U.S. dummy	Non-U.S. dummy	U.S. dummy	Non-U.S. dummy
Regressors	(1)	(2)	(3)	(4)
Continued from left				
1991 dummy	-0.039	0.004	-0.013	-0.001
1992 dummy	-0.052	0.016*	0.005	0.007*
1993 dummy	-0.079	0.083***	-0.001	0.079***
1994 dummy	0.074	0.108***	0.045	0.107***
1995 dummy	0.051	0.119***	0.057	0.126***
1996 dummy	-0.016	0.166***	0.099	0.176***
1997 dummy	0.054	0.140***	0.165*	0.156***
1998 dummy	0.096	0.049***	0.205**	0.073***
1999 dummy	0.203	-0.030**	0.281***	0.004
2000 dummy	0.253*	-0.101***	0.310***	-0.059***
2001 dummy	0.269*	-0.234***	0.268***	-0.188***
2002 dummy	0.233*	-0.323***	0.227**	-0.278***
2003 dummy	0.176	-0.404***	0.191*	-0.356***
2004 dummy	0.046	-0.439***	0.148	-0.384***
2005 dummy	-0.026	-0.478***	0.097	-0.415***
2006 dummy	-0.094	-0.515***	0.047	-0.444***
2007 dummy	-0.120	-0.552***	0.029	-0.477***
2008 dummy	-0.195	-0.615***	-0.012	-0.541***
2009 dummy	-0.240	-0.669***	-0.035	-0.604***
2010 dummy	-0.256*	-0.707***	-0.061	-0.646***
2011 dummy	-0.311**	-0.758***	-0.077	-0.694***
2012 dummy	-0.353**	-0.802***	-0.105	-0.736***
2013 dummy	-0.383**	-0.819***	-0.138	-0.749***
2014 dummy	-0.417**	-0.805***	-0.152	-0.729***
2015 dummy	-0.373**	-0.837***	-0.116	-0.754***
2016 dummy	-0.328**	-0.895***	-0.118	-0.804***
2017 dummy	-0.385**	-0.916***	-0.150	-0.821***
2018 dummy	-0.421***	-0.932***	-0.165	-0.832***
2019 dummy	-0.420**	-0.950***	-0.185	-0.842***
2020 dummy	-0.409**	-0.915***	-0.171	-0.807***
Year FE	Yes	Yes	Yes	Yes
Country FE	No	No	Yes	Yes
R^2	0.490	0.490	0.933	0.933
N	1,775	1,775	2,057	2,057

B International data selection

B.1 U.S. data

We restrict public firms in the U.S. sample to domestic companies with common stock (CRSP share codes 10 or 11) that are listed on NYSE, NASDAQ, or AMEX (CRSP exchange codes 1, 2, 3, 31, 32, and 33). We exclude investment funds and trusts (SIC codes 6722, 6726, and 6798–6799). We also exclude firms that are listed for only one day (there are less than a dozen in the 1981–2020 sample period). New lists are recorded when a firm (identified by PERMCO) first appears in the sample of CRSP public firms, or when it is relisted after at least two weeks off public markets (thus excluding SEC trading suspensions of a listed firm, which may last no more than ten days). IPOs are identified using SDC and Jay Ritter's website[27]. Spinoffs are identified using several sources. In CRSP, spinoffs are identified by the CRSP distribution code 3763 (Vijh, 1994). Using SDC, we also identify spinoffs (designated by the acquirer name "shareholders" or the SDC-provided spinoff dummy), which also include split-offs and carve-outs (found using SDC-provided dummies). For each spinoff new list, we match the parent company to a listed U.S. firm at the time of listing. Relistings occur when a publicly listed firm is delisted for at least two weeks (not including suspension periods) and then reappears on the public exchange. Reorganizations are cases in which a merger between two public companies results in a simultaneous delisting of both companies and listing of a new entity (as defined by PERMCO). Form changes are cases in which one or more of the criteria for a firm to count as U.S. public that were previously unfulfilled are met (for example, if a company relocates from another country to the U.S., changes the form of its listed equity to common stock, or a SPAC completes an acquisition and changes SIC code).

Delists are recorded when a firm ceases to be publicly listed for at least two weeks. To classify delists, we follow Fama and French (2004) and use CRSP delisting codes: merger (delisting codes 200–399), cause (codes 400–569 and 574–999), and voluntary (codes 570–573). In CRSP, every PERMNO has one and only one delisting code observation (if a PERMNO has never been delisted, it will have a delisting code of 100 on the last day of available CRSP data). This means that if a firm is delisted and later relisted, no CRSP delisting code is provided for the first delisting. Furthermore, no delisting code is provided if a PERMNO fails to uphold the public-firm criteria listed above but still remains in CRSP. If no CRSP delisting code is available, we classify the delisting reason as unknown. In the 1981–2020 U.S. sample, 93% of unknown delists last more than one month, 81% more than three months, and 61% more than a year. 13% are never relisted. Finally, for CRSP merger delistings we identify the acquiring firm using SDC (56% of merger delists), the CRSP variables "acquiring PERMNO" and "acquiring PERMCO" (36%), and by hand using web searches (8%). We are unable to identify the acquirer in 103 transactions (1% of merger delists).

The value of a new listing is the CRSP market cap on the day of the listing. If this value is unavailable, we use the earliest available market value within two weeks. To estimate the value of a firm at delisting, we use the CRSP variable 'amount after delisting'. If this is missing or equal to zero, we use the CRSP delisting price instead. If the delist is not marked in CRSP (i.e. an unspecified delist), or if both amount

[27] https://site.warrington.ufl.edu/ritter/ipo-data/

after delisting and delisting price are missing, we use market cap on the day of delisting. If no market cap data are available on that day, we use the closest available data no more than two weeks before the delisting.[28] If a firm (as identified by PERMCO) has two or more U.S. public PERMNOs (usually different share classes) simultaneously, we sum the value of these when calculating market cap.

Appendix Table 3 shows the annual amount of employment, gross product, R&D spending, and patents generated by U.S. public firms, the U.S. economy as a whole, and majority-owned foreign affiliates (MOFAs), explained below. To calculate the contribution of public firms to U.S. employment, we follow the methodology of Schlingemann and Stulz (2021). For U.S. public firms, we collect the Employees (EMP) variable from CRSP/Compustat Merged Fundamentals Annual (CCM) database from WRDS. We only keep firms that can be matched to our CRSP sample of end-of-year public firms described above. If a firm is missing EMP in one year but not in adjacent years before and after, we replace the missing value with the average of the adjacent values. To find U.S. aggregate employment, we use non-farm employment in December of each year (not seasonally adjusted) as reported by the Bureau of Labor Statistics (BLS) (series ID: CEU0000000001). Since Compustat does not distinguish between the employment and gross product generated by U.S. multinational corporations (MNCs) in the U.S. versus abroad, it is necessary to adjust aggregate U.S. employment to also include output generated by MOFAs of U.S. MNCs.We therefore add MOFA employment from the Bureau of Economic Analysis (BEA) to U.S. employment reported by the BLS.

Schlingemann and Stulz (2021) also provide the methodology that we use to calculate the fraction of U.S. gross product (value added) attributable to public firms. Firm-level gross product is found by summing Operating Income Before Depreciation (OIBDP) and Staff Expense Total (XLR). To fill in missing values of XLR, we find the median ratio of XLR to EMP for industries with at least 20 non-missing observations (firms) in each year. For firms with missing XLR but non-missing EMP, EMP is multiplied with this median ratio to estimate labor expenses. Four industry classifications are used, in order of descending preference: Fama-French 17, Fama-French 12, 2-digit SIC, and finally BLS Supersectors. At the aggregate U.S. level, GDP is from the IMF and MOFA gross product is from the BEA.

To analyze the role of U.S. public firms in innovation, we look at both research and development (R&D) expenditure and patents. Firm-level R&D spending is found in CCM using the Research and Development Expense (XRD) variable. U.S. aggregate R&D spending is reported by the OECD (series name: GERD-SOF) and includes the source of funding. We include all sectors with funding from domestic sources. We also add MOFA R&D spending to the U.S. aggregate with data from the BEA. The BEA does not report MOFA R&D prior to 1989, so we estimate these values by assuming that the ratio of MOFA R&D to value added is the same in 1982–1988 as in 1989. Firm-level patents are from the University of Virginia Darden School of Business Global Corporate Patent Dataset (GCPD) (Bena, Ferreira, Matos, and Pires, 2017). The GCPD reports the annual number of utility patents granted by the U.S. Patent and Trademark Office (USPTO) to publicly listed firms around the world, with complete coverage from 1980–2016. After matching GCPD data to our CRSP sample of public firms and aggregating patent

[28] 99.9% of the new listings have market cap data on the day of listing. The 'amount after delisting' includes slightly more information than the delisting price (for instance, post-delisting distribution payments), which is why we prioritize it. 96.3% of unmarked delistings have market cap data on the day of delisting, and 98.6% within two days of delisting.

grants by year, we divide by the annual count of USPTO utility patent grants of U.S. origin. Note that due to the way that the GCPD matches patents to listed firms, patents granted to a subsidiary or target firm owned by a listed company at the time of the data collection will also be attributed to the parent company even before the acquisition took place. This means that, if anything, Figure 13 and Appendix Table 3 actually understate the increase in U.S. public firm patenting activity from 1996–2016.

Appendix Table B. 1: **New lists and delists in the U.S. by type, 1981–2020**

This table shows the total annual (year-end) number of new lists (Panel A) and delists (Panel B) on NYSE, NASDAQ and AMEX. The change in the actual listing count, ΔL is the sum of the following six variables, all of which are defined in Table 1:

$$\Delta L = \begin{cases} Newlists: & IPO + Spin + Misc_{New} \\ Delists: & Merge_{Public-to-Public} + Merge_{Public-to-Private} + Misc_{Del} \end{cases}$$

IPO are initial public offerings, $Spin$ are spinoffs, and $Misc_{New}$ are miscellaneous new listings. $Misc_{Del}$ are miscellaneous delists. The subscript in $Merge$ indicates the direction of the change in the target's public/private status.

A: $Newlists = IPO + Spin + Misc_{New}$

Year	Total lists (L)	$Newlists$	IPO	$Spin$	$Misc_{New}$			
					Uplists	Relist	Reorg.	Form
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1981	5,073	646	309	0	315	14	4	4
1982	4,999	326	105	0	181	35	4	1
1983	5,571	944	635	0	258	42	5	4
1984	5,691	621	317	8	243	47	4	2
1985	5,652	570	292	11	209	49	4	5
1986	5,930	984	603	10	291	66	1	13
1987	6,222	828	449	14	291	68	5	1
1988	5,955	437	191	14	175	47	8	2
1989	5,770	419	181	14	162	56	3	3
1990	5,634	414	156	15	177	52	7	7
1991	5,672	529	345	6	124	45	3	6
1992	5,801	650	464	13	141	25	2	5
1993	6,334	894	588	16	231	52	4	3
1994	6,634	747	497	15	207	24	3	1
1995	6,861	796	514	14	217	39	8	4
1996	7,325	1,028	748	19	210	31	14	6
1997	7,315	709	490	21	164	21	8	5
1998	6,873	523	299	11	172	22	11	8
1999	6,539	633	467	20	102	30	12	2
2000	6,246	585	347	16	152	47	18	5
2001	5,550	196	75	11	57	38	6	9
2002	5,129	170	69	10	49	32	8	2
2003	4,807	192	68	9	66	44	4	1
2004	4,750	320	172	9	67	55	7	10
2005	4,684	320	160	10	95	47	6	2
2006	4,616	304	163	10	86	36	4	5
2007	4,524	349	195	14	92	41	4	3
2008	4,259	144	36	19	44	33	4	8
2009	4,005	126	44	5	52	18	2	5
2010	3,874	194	100	5	55	27	3	4
2011	3,721	150	88	11	24	23	2	2
2012	3,601	161	116	10	24	5	2	4
2013	3,594	232	173	11	31	12	4	1
2014	3,713	317	225	21	40	24	5	2
2015	3,681	219	140	23	30	21	4	1
2016	3,542	155	85	17	36	14	1	2
2017	3,515	230	140	11	57	13	5	4
2018	3,520	232	147	12	50	12	2	9
2019	3,520	231	147	6	38	14	1	25
2020	3,633	312	227	10	40	21	2	12
Total		17,837	10,567	471	5,055	1,342	204	198
Average	5,108	446	264	12	126	34	5	5

Continued on next page

Appendix Table B. 1: **Continued (page 2 of 2)**

B: $Delists = Merge_{Public-to-Public} + Merge_{Public-to-Private} + Misc_{Del}$

Year	Actual listing count (L)	$Delists$	$Merge_{Pub-to-Pub}$	$Merge_{Public-to-Private}$				$Misc_{Del}$		
				Acq. by U.S. priv.	Acquired by non-U.S. public	Acquired by non-U.S. private	Acq. by unknown	Cause	Voluntary	Unknown
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1981	5,073	290	96	41	10	11	12	96	1	23
1982	4,999	397	112	53	8	8	10	162	1	43
1983	5,571	373	119	55	0	3	7	144	4	41
1984	5,691	501	125	95	9	6	4	201	15	46
1985	5,652	607	159	81	10	5	8	263	12	69
1986	5,930	708	168	96	22	3	15	317	10	77
1987	6,222	535	158	71	25	4	11	204	9	53
1988	5,955	704	162	147	36	10	13	275	15	46
1989	5,770	605	111	109	32	4	5	280	16	48
1990	5,634	550	97	58	26	6	6	307	7	43
1991	5,672	491	86	20	6	1	1	325	13	39
1992	5,801	520	115	16	2	0	1	328	21	37
1993	6,334	361	131	32	5	1	4	151	9	28
1994	6,634	449	199	29	19	0	1	157	9	35
1995	6,861	567	246	48	20	1	1	204	11	36
1996	7,325	565	303	59	25	4	0	152	6	16
1997	7,315	719	352	77	38	2	2	217	4	27
1998	6,873	967	391	99	47	7	0	368	5	50
1999	6,539	965	375	94	81	5	0	333	7	70
2000	6,246	879	371	111	74	5	0	273	8	37
2001	5,550	891	268	86	49	10	0	394	25	59
2002	5,129	590	161	50	15	4	0	286	28	46
2003	4,807	515	144	69	16	2	0	217	24	43
2004	4,750	376	161	68	14	2	0	94	17	20
2005	4,684	389	142	53	23	6	0	110	30	25
2006	4,616	369	146	82	23	7	1	76	7	27
2007	4,524	441	163	120	40	12	0	85	7	14
2008	4,259	410	105	71	40	3	0	143	25	23
2009	4,005	380	66	38	17	0	0	181	49	29
2010	3,874	326	97	71	22	3	0	105	18	10
2011	3,721	303	65	90	26	5	0	90	8	19
2012	3,601	282	80	77	16	4	0	84	5	16
2013	3,594	239	85	65	13	8	0	48	7	13
2014	3,713	197	78	42	18	3	0	36	6	14
2015	3,681	251	99	35	33	4	0	54	9	17
2016	3,542	293	100	56	27	14	0	84	2	10
2017	3,515	273	94	52	31	11	0	54	8	23
2018	3,520	211	85	42	21	6	0	42	3	12
2019	3,520	232	55	62	24	13	0	59	8	11
2020	3,633	198	38	37	21	8	1	64	13	16
Total		18,919	6,108	2,657	984	211	103	7,063	482	1,311
Average	5,108	473	153	66	25	5	3	177	12	33

Appendix Table B. 2: **Merger-adjusted new lists and delists in the U.S. by type, 1990–2020**

This table shows the total annual (year-end) number of new lists and delists on NYSE, NASDAQ and AMEX that impact the merger-adjusted listing count. The change in the all-merger-adjusted listing count, ΔL_A is the sum of the following six variables, all of which are defined in Table 1:

$$\Delta L_A = \begin{cases} Newlists_A: & IPO + Merge_{Private-to-Public} + Misc^N_{New} \\ Delists_A: & Merge^N_{Public-to-Private} + Divest_{Subsidiary-to-Private} + Misc^N_{Del} \end{cases}$$

The superscript N indicates that the count adjusts for the acquisition index (Eq. 3). IPO are initial public offerings and $Misc^N_{New}$ are miscellaneous new listings. $Misc^N_{Del}$ are misc. delists. The subscript in $Merge^{(N)}$ and $Divest$ indicates the direction of the change in the target's public/private status.

Year	All-merger-adjusted count (L_A)	$Newlists_A$	IPO	$Merge_{Priv-to-Pub}$ U.S. priv. target	$Merge_{Priv-to-Pub}$ Non-U.S. target	$Misc^N_{New}$	$Delists_A$	$Merge^N_{Pub-to-Priv}$	$Divest_{Sub-to-Priv}$	$Misc^N_{Del}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1981	5,319	812	309	160	1	342	209	81	8	120
1982	5,571	553	105	224	0	224	301	84	8	209
1983	6,546	1,248	635	298	1	314	273	71	8	194
1984	7,078	951	317	330	4	300	419	142	6	271
1985	7,254	691	292	103	3	293	515	148	5	362
1986	7,720	1,082	603	99	4	376	616	175	3	438
1987	8,207	935	449	96	4	386	448	160	7	281
1988	8,075	523	191	79	9	244	655	282	8	365
1989	7,989	531	181	99	18	233	617	196	14	407
1990	7,963	563	156	108	13	286	589	162	11	416
1991	8,158	692	345	124	18	205	497	39	18	440
1992	8,541	876	464	199	30	183	493	29	27	437
1993	9,463	1,228	588	297	29	314	306	62	27	217
1994	10,285	1,150	497	360	45	248	328	68	26	234
1995	11,103	1,250	514	389	59	288	432	108	26	298
1996	12,250	1,565	748	454	68	295	418	166	19	233
1997	12,981	1,262	490	469	82	221	531	209	13	309
1998	13,330	1,177	299	501	129	248	828	259	24	545
1999	13,560	1,140	467	384	105	184	910	327	16	567
2000	13,816	1,156	347	439	100	270	900	376	15	509
2001	13,271	473	75	216	59	123	1,018	274	25	719
2002	12,891	409	69	158	54	128	789	112	15	662
2003	12,672	416	68	134	46	168	635	156	13	466
2004	12,932	647	172	198	70	207	387	175	16	196
2005	13,038	623	160	208	71	184	517	234	20	263
2006	13,093	577	163	174	59	181	522	319	17	186
2007	13,096	653	195	214	66	178	650	461	22	167
2008	12,794	347	36	134	60	117	649	307	28	314
2009	12,280	239	44	70	29	96	753	151	14	588
2010	12,268	489	100	74	60	255	501	270	19	212
2011	12,046	350	88	117	57	88	572	374	18	180
2012	11,967	327	116	110	49	52	406	199	19	188
2013	12,045	425	173	81	61	110	347	217	10	120
2014	12,261	529	225	137	48	119	313	171	16	126
2015	12,299	437	140	136	53	108	399	195	21	183
2016	12,144	314	85	88	34	107	469	290	17	162
2017	12,132	397	140	93	43	121	409	258	19	132
2018	12,223	356	147	92	20	97	265	172	3	90
2019	12,148	361	147	78	26	110	436	261	9	166
2020	12,152	394	227	58	12	97	390	203	3	184
Total		28,148	10,567	7,782	1,699	8,100	20,712	7,943	613	12,156
Average	10,874	704	264	195	42	203	518	199	15	304

Appendix Table B. 3: Economic output of public firms, all U.S. entities, and MOFAs, 1982–2018

This table shows the total annual amount of employment (in millions of people), value added (in USD trillion), research and development spending (in USD billion), and patents granted (in thousands) for U.S. public firms, all U.S. entities (public and private firms, the government, universities, and individuals), and majority-owned foreign affiliates (MOFAs). To calculate the series shown in Figure 13, U.S. public firm output is divided by the sum of output from all U.S. firms and all MOFAs (except for patents). All monetary values are expressed in 2020 USD. MOFA R&D spending prior to 1989 is estimated and marked with * below. Data are from the BEA, BLS, Compustat, GCPD, IMF, OECD, and USPTO. Further details are provided in Appendix B.

	Employees (m)			Gross product (USD tn)			R&D spending (USD bn)			Patents granted (k)	
Year	U.S. pub. firms	All U.S. org.	All MOFA	U.S. pub. firms	All U.S. org.	All MOFA	U.S. pub. firms	All U.S. org.	All MOFA	U.S. pub. firms	All U.S. ent.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1982	26.9	89.4	5.0	2.7	8.9	0.6	95.8	216.4	13.1*	12.5	33.9
1983	27.0	92.9	4.9	2.7	9.4	0.6	102.9	233.5	12.3*	12.3	32.9
1984	28.0	96.8	4.8	2.9	10.0	0.5	114.7	254.7	12.0*	14.5	38.4
1985	28.0	99.4	4.8	2.9	10.4	0.5	118.1	275.5	11.6*	14.8	39.6
1986	27.4	101.3	4.7	2.8	10.7	0.5	123.4	282.9	12.0*	13.5	38.1
1987	27.7	104.5	4.7	2.9	11.0	0.6	126.0	286.8	13.5*	15.3	43.5
1988	27.5	107.7	4.8	3.1	11.4	0.6	133.1	291.9	14.3*	14.3	40.5
1989	27.3	109.7	5.1	3.0	11.7	0.7	137.0	295.1	14.6	17.3	50.2
1990	27.4	110.0	5.4	2.9	11.7	0.7	138.6	300.0	20.1	16.3	47.4
1991	27.5	109.1	5.4	2.8	11.6	0.7	142.3	304.8	17.7	18.2	51.2
1992	28.1	110.3	5.3	2.9	12.0	0.7	149.9	304.0	20.3	19.5	52.3
1993	28.6	113.1	5.2	3.1	12.2	0.6	153.2	295.9	19.5	20.8	53.2
1994	29.5	117.0	5.7	3.3	12.6	0.7	157.8	294.4	20.6	21.9	56.1
1995	30.7	119.1	5.9	3.6	12.9	0.8	179.2	310.7	21.2	22.2	55.7
1996	32.7	122.0	6.1	3.8	13.2	0.8	189.4	324.4	23.0	24.9	61.1
1997	34.6	125.4	6.5	4.1	13.7	0.8	215.4	340.9	23.4	26.1	61.7
1998	35.6	128.4	6.8	4.1	14.3	0.8	229.0	358.1	23.1	34.4	80.3
1999	36.3	131.6	7.8	4.4	14.9	0.9	227.2	379.2	28.0	35.4	83.9
2000	36.8	133.5	8.2	4.5	15.3	0.9	255.1	402.6	30.6	37.5	85.1
2001	36.1	131.8	8.2	4.1	15.4	0.9	259.7	407.1	28.6	40.0	87.6
2002	35.5	131.2	8.3	4.0	15.6	0.9	243.3	400.3	30.1	40.8	87.0
2003	35.2	131.4	8.2	4.2	16.0	1.0	242.1	410.9	31.9	42.7	87.9
2004	36.3	133.4	8.7	4.5	16.6	1.1	252.9	416.3	35.2	42.5	84.3
2005	36.6	136.0	9.1	4.7	17.2	1.2	255.5	432.2	36.4	37.8	74.6
2006	37.5	138.1	9.6	5.3	17.6	1.3	282.6	450.9	37.7	44.9	89.8
2007	37.1	139.3	10.0	5.4	17.9	1.4	288.9	471.8	42.7	39.5	79.5
2008	36.1	135.7	10.0	4.6	17.6	1.4	290.1	486.6	49.8	40.2	77.5
2009	34.1	130.7	10.8	4.2	17.3	1.4	247.9	473.4	47.0	41.9	82.4
2010	35.1	131.6	11.3	4.9	17.7	1.5	269.4	465.7	47.1	54.3	107.8
2011	36.3	133.7	11.9	5.2	17.8	1.6	283.1	472.9	51.1	55.6	108.6
2012	36.8	135.9	12.1	5.2	18.1	1.6	295.6	466.8	50.4	62.0	121.0
2013	37.3	138.3	12.4	5.3	18.5	1.5	304.6	479.8	54.4	70.0	133.6
2014	38.2	141.3	14.1	5.8	19.0	1.6	326.0	491.6	60.1	76.6	144.6
2015	39.0	144.0	14.1	5.8	19.8	1.5	341.0	510.4	60.9	71.3	141.0
2016	38.1	146.3	14.3	5.8	20.1	1.4	355.0	521.4	58.2	71.4	143.7
2017	38.5	148.5	14.4	6.1	20.5	1.5	377.7	535.1	60.7	–	151.0
2018	39.2	150.8	14.4	6.4	21.1	1.5	420.5	552.3	59.7	–	144.4
Avg.	33.3	124.3	8.3	4.2	14.9	1.0	225.0	383.7	32.2	35.0	79.8

B.2 Non-U.S. data

To select which countries are included in our international sample, we start with the top 100 countries and territories by GDP per the IMF and as of 2020. For each country, we require listing count data to be available from WDI, WFE, CEIC, or stock exchange homepages. We also require the 2020 listing count to be reported and the country to have at least 10 years of listing count observations. Appendix Table B.4 shows the countries and territories in each step of the sample selection procedure.

U.S. listing data are from CRSP as per above.[29] For non-U.S. countries, the number of listed firms is sourced from WDI and supplemented when necessary with data from the WFE, CEIC, and foreign stock exchange homepages themselves. Data from the following stock exchange's homepages are used: Borsa Italiana, Boursa Kuwait, Bratislava Stock Exchange, Cambodia Securities Exchange, Central Africa Securities Stock Exchange (BVMAC), Euronext, Ghana Stock Exchange, Japan Exchange Group, Nairobi Securities Exchange, NASDAQ Baltic, NASDAQ Nordic, Pakistan Stock Exchange, Prague Stock Exchange, and TMX Group.

The WDI data source raises some issues due to the merging of smaller local stock exchanges within a country. For example, the WDI Canadian listings includes only the Toronto Stock Exchange (TSX) prior to 2003, and the sum of the TSX and TSX Venture Exchange (TSXV) afterward (resulting in a one-year jump in the number recorded listed firms from 1,252 to 3,578). The TSXV was formed in 1999 by combining regional Canadian stock exchanges (primarily Alberta and Vancouver). The firm population in these smaller regional stock exchanges is different from that of the country's major stock exchange(s): new ventures are typically smaller and more risky than the more established firms. Based on this population difference, and in order to preserve a consistent time series within any given country, we exclude changes in the WDI listing counts resulting from regional exchange consolidations. In the case of Canada, we therefore use the TSX listing count net of the TSXV. Similarly, for Japan, we exclude listings on the Osaka Exchange from the Japan Exchange Group (JPX) after the exchange consolidation in 2013. While the WDI listing count data for Spain include regional exchanges, these exchanges are consistent over time and we thus keep these data as recorded. Were we to instead use data from Spain's primary exchange (the Mercado Continuo) only, we would have observed a listing peak in 2007 instead of 2015. As in the U.S., we exclude investment companies, mutual funds, real estate investment trusts (REITs), and other collective investment vehicles.

We identify international merger transactions using SDC. Deals are required to be completed, result in 100% ownership by the acquirer, and take the deal form merger, acquisition, or acquisition of majority/partial/remaining interest (since the latter also results in delisting). To be counted as public, a target or acquirer must be listed on a major exchange. Targets listed on minor exchanges are counted as private.

[29] For robustness, we also run listing gap regressions using WDI data instead for the U.S.

Appendix Table B. 4: International sample selection process

This table shows the countries included in each step of the sample selection process, starting with the 100 countries and territories with the largest GDP as of 2020 per the IMF.

100 highest GDP countries and territories in 2020 according to IMF (1)	Listing count data are available (2)	Listing count data are are available for 2020 (3)	At least 10 years of listing count data are available (4)
Algeria	–	–	–
Angola	–	–	–
Argentina	Argentina	Argentina	Argentina
Australia	Australia	Australia	Australia
Austria	Austria	Austria	Austria
Azerbaijan	Azerbaijan	–	–
Bahrain	Bahrain	Bahrain	Bahrain
Bangladesh	Bangladesh	Bangladesh	Bangladesh
Belarus	Belarus	–	–
Belgium	Belgium	Belgium	Belgium
Bolivia	–	–	–
Brazil	Brazil	Brazil	Brazil
Bulgaria	Bulgaria	Bulgaria	Bulgaria
Cameroon	Cameroon	–	–
Canada	Canada	Canada	Canada
Chile	Chile	Chile	Chile
China	China	China	China
Colombia	Colombia	Colombia	Colombia
Costa Rica	Costa Rica	Costa Rica	Costa Rica
Croatia	Croatia	Croatia	Croatia
Czech Republic	Czech Republic	Czech Republic	Czech Republic
DR Congo	–	–	–
Denmark	Denmark	Denmark	Denmark
Dominican Republic	–	–	–
Ecuador	Ecuador	–	–
Egypt	Egypt	Egypt	Egypt
Estonia	Estonia	Estonia	Estonia
Ethiopia	–	–	–
Finland	Finland	Finland	Finland
France	France	France	France
Germany	Germany	Germany	Germany
Ghana	Ghana	Ghana	Ghana
Greece	Greece	Greece	Greece
Guatemala	–	–	–
Hong Kong	Hong Kong	Hong Kong	Hong Kong
Hungary	Hungary	Hungary	Hungary
India	India	India	India
Indonesia	Indonesia	Indonesia	Indonesia
Iran	Iran	Iran	Iran
Iraq	–	–	–
Ireland	Ireland	Ireland	Ireland
Israel	Israel	Israel	Israel
Italy	Italy	Italy	Italy
Ivory Coast	–	–	–
Japan	Japan	Japan	Japan
Jordan	Jordan	Jordan	Jordan
Kazakhstan	Kazakhstan	Kazakhstan	Kazakhstan
Kenya	Kenya	Kenya	Kenya
Kuwait	Kuwait	Kuwait	Kuwait
Latvia	Latvia	Latvia	Latvia

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Appendix Table B. 4: **Continued (page 2 of 2)**

100 highest GDP countries and territories in 2020 according to IMF (1)	Listing count data are available (2)	Listing count data are are available for 2020 (3)	At least 10 years of listing count data are available (4)
Lithuania	Lithuania	Lithuania	Lithuania
Luxembourg	Luxembourg	Luxembourg	Luxembourg
Malaysia	Malaysia	Malaysia	Malaysia
Mexico	Mexico	Mexico	Mexico
Morocco	Morocco	Morocco	Morocco
Myanmar	Myanmar	Myanmar	–
Nepal	–	–	–
Netherlands	Netherlands	Netherlands	Netherlands
New Zealand	New Zealand	New Zealand	New Zealand
Nigeria	Nigeria	Nigeria	Nigeria
Norway	Norway	Norway	Norway
Oman	Oman	Oman	Oman
Pakistan	Pakistan	Pakistan	Pakistan
Panama	Panama	Panama	Panama
Paraguay	Paraguay	–	–
Peru	Peru	Peru	Peru
Philippines	Philippines	Philippines	Philippines
Poland	Poland	Poland	Poland
Portugal	Portugal	Portugal	Portugal
Puerto Rico	–	–	–
Qatar	Qatar	Qatar	Qatar
Romania	Romania	Romania	Romania
Russia	Russia	Russia	Russia
Saudi Arabia	Saudi Arabia	Saudi Arabia	Saudi Arabia
Serbia	–	–	–
Singapore	Singapore	Singapore	Singapore
Slovakia	Slovakia	Slovakia	Slovakia
Slovenia	Slovenia	Slovenia	Slovenia
South Africa	South Africa	South Africa	South Africa
South Korea	South Korea	South Korea	South Korea
Spain	Spain	Spain	Spain
Sri Lanka	Sri Lanka	Sri Lanka	Sri Lanka
Sudan	–	–	–
Sweden	Sweden	Sweden	Sweden
Switzerland	Switzerland	Switzerland	Switzerland
Taiwan	Taiwan	Taiwan	Taiwan
Tanzania	Tanzania	–	–
Thailand	Thailand	Thailand	Thailand
Tunisia	Tunisia	Tunisia	Tunisia
Turkey	Turkey	Turkey	Turkey
Turkmenistan	–	–	–
Uganda	–	–	–
Ukraine	Ukraine	–	–
UAE	UAE	UAE	UAE
UK	UK	UK	UK
U.S.	U.S.	U.S.	U.S.
Uruguay	Uruguay	–	–
Uzbekistan	–	–	–
Venezuela	Venezuela	–	–
Vietnam	Vietnam	Vietnam	Vietnam
Number of countries and territories in sample			
100	84	75	74