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ABSTRACT

Doidge, Karolyi, and Stulz (2017) show that from 1999 to 2012 the US develops a listing gap relative to other countries, meaning that it has abnormally few publicly listed firms. In this paper, we update their evidence to 2023 and find that the listing gap increases, but at a low rate. By 2023, the US has about half as many listed firms per capita as other developed countries. We discuss some of the important questions raised by the existence and increase of the listing gap to which we hope researchers will find answers.

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1. Introduction

Over the last fifty years, the peak year for US stock market listings was 1996. In that year, more than 8,000 firms were listed on the New York, American and Nasdaq stock exchanges. Doidge, Karolyi, and Stulz (2017, DKS) document the inverted U-shape of the number of listings in the US and investigate whether, in a global context, the evolution of the number of listings in the US is abnormal. Drawing on the literature that views and models the number of listings per capita as a measure of financial development across countries, DKS conclude that the US has fewer listings than expected for a country with the characteristics of the US. With this metric the US has too few public firms; that is, it has a listing gap. We define the gap as the difference between the predicted number of listings for the US given its economic development and the quality of its governance institutions and the actual number of listings. The sample used in DKS ends in 2012. For 2012, the listing gap was so large that the number of missing listed firms, 5,436, exceeded the number of listed firms, 4,102.

From 1996 to 2012, the number of publicly listed firms in the US decreased dramatically. The number of listed firms in 2012 was about half what it was in 1996. The decrease in the number of listed firms is the result of fewer new lists, due to a dearth of IPOs (Gao, Ritter, and Zhu, 2013), and an increase in delists. According to DKS, the largest contributor to delists is increased M&A activity. If two listed firms merge, there is one less listed firm. The second largest contributor is delists for cause. These delists arise when firms no longer meet listing requirements. Such firms might have made losses for several years, have a market capitalization that is too small, or have a stock price that is too low. The third contributor, which plays a much smaller role, consists of firms that decide to leave an exchange voluntarily. There are other countries that experience large declines in listings, but overall non-US firms did not experience such a decline in the number of listed firms.

Almost all firms in the US are private, i.e., not publicly listed on a major stock exchange. The results in DKS are not due to a decrease in the number of firms in the US, but instead they are explained by a decrease in the propensity of firms to list. Before the listing peak in 1996, the propensity to list was at least one percent almost every year, except for 1980, 1989, 1990, and 1991. This means that, in most years, at

least one percent of firms with at least 20 employees were listed. By 2012, only 0.59% of such firms were listed. DKS point to reasons for the fall in the propensity to list that are idiosyncratic to the US and reasons that are not. Other scholars since DKS offer evidence that fits into both categories (see for instance Ewens and Farre-Mensa, 2020 and 2022; Schlingemann and Stulz, 2022; Eckbo and Lithell, 2023; Lattanzio, Megginson, and Sanati, 2023; Davydova, Fahlenbrach, Sanz, and Stulz, 2024; Lowry, 2024; and Stanek, 2024). Hence, it could be that the US was simply ahead of other countries in having fewer listed firms, in which case the listing gap should have reversed course and fallen since 2012. It could also be the case that the factors unique to the US that led to the emergence of the listing gap have become even more important, such that the listing gap increased. In this paper, we investigate the current state of the listing gap and its evolution since the end of the sample period studied in DKS. We use the 2024 version of the same databases used in DKS.

We find that the listing gap is larger now than in 2012. If we estimate the model used by DKS to estimate the listing gap over the period 1990 to 2023, the listing gap is 5,420 firms in 2012 and it widens to 7,162 firms in 2023. This means that the listing gap has increased by 32.14% since 2012. The evolution of the listing gap since 2012 is not monotonic. The gap decreased by more than 400 listings in the years 2020 and 2021 alone. However, it recovered fully from that decline by 2023. Though the gap becomes larger, the speed at which it increases slows down. The most rapid increase in the listing gap took place in the early 2000s when it increased from 1,332 in 2000 to 3,874 in 2005. Further, and perhaps most strikingly, at the peak of listings in 1996, the number of listed firms per million inhabitants in the US, 29.8, was higher than the average number of listed firms per million inhabitants in other developed countries. However, the average number of listed firms per million inhabitants in other developed countries in 2023, at 24.5, is now almost twice the equivalent ratio in the US, at 12.9. Importantly, the number of listed firms per million inhabitants in other developed countries has increased since 1996, while it has fallen in the US by 56.7%.

We provide evidence to help understand why the increase in the listing gap slows down. In the early 2000s, the gap increased dramatically because the new list rate was much lower than the delist rate. The delist rate was then abnormally high (see Fama and French, 2004). In the 2010s, the delist rate became low

by historical standards. The low delist rate overall stems from the low percentage of firms delisting for cause and not from the delisting rate for mergers or for voluntary reasons. Such an evolution is not surprising. As a result of the decrease in listed firms resulting from mergers that often involve the acquisition of smaller listed firms, of the involuntary delistings of mostly small firms, and of a low new list rate that reduced the arrival of new small firms in the markets, the average size of US public firms increased substantially. Larger firms are less likely to fail and firms become larger as the new list rate is low and more mergers take place.

The listing gap keeps getting larger after 2012. Many economists and market watchers are likely to react to this new fact with the comment: So, what? Why should we care at all about the listing gap? Is it the right metric of whether the US has too few listed firms? Is it indicative of a serious problem for the US economy or just evidence of markets at work allocating resources even more efficiently? The scope of this paper is too limited to try to answer all these questions. Instead, we discuss considerations that should be taken into account by those wanting to understand the implications of the listing gap better, including researchers interested in tackling these questions.

We proceed as follows. In Section 2, we show how the listing gap has evolved. We then show in Section 3 some implications for firm characteristics of the evolution of the listing gap. In Section 4, we discuss some considerations that must be taken into account to assess the implications of the increase of the listing gap. We conclude in Section 5.

2. The evolution of the listing gap

Our first step in this section is to show how the number of listed firms in the US has evolved since 2012, the end of the original sample period in DKS.[1] Our definition of a US listed firm is a domestically incorporated firm that trades on a major US exchange. Collective investment vehicles that trade on US

[1] The first public reference to the Doidge, Karolyi, and Stulz (DKS, 2017), the May 2015 NBER Working Paper #21181 version, was featured in the *Financial Times* Alphaville column by Cardiff Garcia, "The mysterious decline in the number of US public companies" (May 26, 2015). A book by Davis (2016) pointing to the decline in the number of US public companies was published around the same time as DKS.

exchanges are excluded. For instance, a SPAC is not a domestically listed firm with our definition. However, once a SPAC acquires a firm, the resulting combination is a listed firm if it trades on a US exchange (Gahng, Ritter, and Zhang, 2023). For all counts of listed firms on non-US exchanges, we follow DKS.[2] Figure 1 shows the evolution of the number of listings for the US, the non-US countries, and the non-US developed countries using a constant sample.

We start by discussing just the evolution of the number of listed firms in the US. Using the CRSP database, the US had 4,775 listed firms in 1975. The number of listed firms peaked in 1996 at 8,025. By 2012, the end of the sample period considered in DKS, the number of listed firms was 4,102. Since 2012, the number of listed firms has fallen every year except in 2014, 2018, and 2020-2021. The increase in 2014 is likely due to the adoption of the Jumpstart Our Business Startups (JOBS) Act in 2012 as argued by Chaplinsky, Hanley, and Moon (2017). The increase in 2018 is trivially small as it corresponds to 32 listings, but the increase of 864 firms from 2019 to 2021 is exceptionally large. The increase in 2020-2021 is at least in part explained by the SPAC phenomenon. In 2021, the number of listed firms is the highest since 2008. However, that number falls by 458 listings from 2021 to 2023. Hence, at the end of the sample period, the number of listings is 4,315. Note that this number of listed firms is higher than at the end of the DKS sample period by 213 listings.

The number of listings for the rest of the world is 39,427 in 2012. After 2012, the number of listings in the rest of the world keeps increasing, though not monotonically, until 2021, when it peaks at 44,749.[3] The rest of the world did not experience the rise in listings that the US experienced in 2020-2021. At the end of the sample period, the number of non-US listings is 43,856, which is much greater than in 2012. The same evolution takes place for the developed countries.

[2] DKS use the data from the World Bank's World Development Indicators (WDI) and from the World Federation of Exchanges (WFE). For the US, they use CRSP until 1988 and then use WDI and WFE counts for subsequent years.
[3] A change in the methodology for computing the number of listings in the Indian market affects the number of listings starting in 2019. This change is due to the removal of the Bombay exchange from the data. If we add the data from the Bombay exchange in the data, the estimate of the gap reported in the text increases. To keep the data comparable, we add back the data from the Bombay exchange to the number of listings starting in 2019.

Listings evolve differently outside of the US than in the US. This difference is stronger when we consider listings per million inhabitants. For the US, the number of listings per million inhabitants is 22.1 in 1975, 29.8 at the peak in 1996, 13.1 in 2012, and 12.9 in 2023. The number of listings per million inhabitants is 56.7% lower than at the peak. The evolution for developed countries is the opposite in that the number of listings per million inhabitants is lower in 1975, at 23.9, than in 2023, at 24.5. The number of listings per million inhabitants in developed countries declines slowly from 2012 to 2020. In 2012, it is 31.2, but at the end of 2020, it is 29.3. However, the number of listings per million inhabitants in developed countries falls sharply after 2020, so that it is 24.5 in 2023. The extent to which this decrease is due in part to lags in updating of databases and changes in methodologies is not clear.

We now turn to estimates of the listing gap. DKS estimate a regression model that builds on La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), which relates the listings per capita to country characteristics concerning capital markets, governance, and economic capacity. We expect wealthier countries to have more listings as well as countries with better legal protection for investors. The DKS model regresses the logarithm of the number of listings per million inhabitants on year fixed effects, the anti-self-dealing index of Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), and the logarithm of GDP per capita. The model also includes a non-US indicator variable that is a measure of the US listing gap (multiplied by minus one). If the logarithm of the number of listings per million inhabitants in the US is explained by the variables of the regression model and the non-US indicator variable is statistically insignificant, there is no listing gap; that is, expected listings are not statistically different from actual listings. A statistically significant positive (negative) coefficient on the non-US indicator variable implies that there are fewer (more) listings in the US than expected, as defined by the covariates in the regression model, so that there is a listing gap (surplus). We re-estimate the regressions of DKS but for the longer sample period. The estimates of the regression coefficients are very similar to those obtained in DKS for the shorter period of 1990 to 2012. Specifically, the coefficient estimates on the anti-self-dealing index and logarithm of GDP per capita in DKS are 1.259 and 0.641. With the longer sample period, the estimate is 1.358 for the coefficient on the anti-self-dealing index and 0.656 for the logarithm of GDP per capita. The

explanatory power of the regression is similar, with an adjusted R-squared of 48% in both DKS and the longer sample period.

To obtain a yearly estimate of the listing gap, we interact the non-US indicator variable with the year fixed effects in order to compute the US listing gap each year and to trace its evolution from 1990 to 2023. The coefficients on the year fixed effects capture the U.S.-specific residuals. They allow us to assess how actual U.S. listings differ each year from predicted listings, measured relative to the rest of the world.[4] To compute the gap, we subtract the actual listing counts from the predicted number of listings. We show the listing gap through time in Figure 2. The listing gap is statistically significant starting in 1999. It increases every year except in 2020 and 2021. The drop from the end of 2019 to the end of 2021 is 6.42%. However, the gap in 2023 is the largest ever. Indeed, that gap is 32.14% higher than in 2012, the end of the sample period of DKS. Instead of focusing on yearly estimates of the gap, we could look at averages. The averages tell the same story of a steadily increasing gap. The average from 1991 to 1999 is 2; from 2000 to 2009, the average is 3,403; the average for 2010 to 2019 is 5,913. Finally, for 2020 to 2023, the average is 6,684. These results demonstrate the facts behind our contention that the listing gap is increasing.

3. Sources and implications of the recent increase in the listing gap.

The stability over time of the regression model and the coefficient estimates that yield predictions of the number of listings per million inhabitants is striking. It means that the listing gap is not increasing after the end of the sample period of DKS because the relation between listings per million inhabitants and country characteristics changes. Instead, the listing gap in the US is increasing because the number of listings per million inhabitants in the US is falling. The number of listings falls because delists exceed new lists. Another way to put this is that the number of listings falls for two main reasons: too many delists and/or too few new lists. Figure 3 shows the new list rate and the delist rate just for the US from 1975 to 2023. The new list (delist) rate is the sum of new lists (delists) in a year divided by the number of all listings

[4] Technically, the year fixed effects are measured relative to 1990 but we follow DKS in interpreting them in absolute terms as there is no listing gap at the beginning of the sample period.

at the beginning of the year. Following the listing peak, the number of delists increases sharply before falling to low levels in the 2010s. The new list rate in 1996 is higher than in any year from 1997 to 2023, except for 2021. The new list rate in 2021 is the largest yearly new list rate across the period from 1975 to 2023. The large number of new lists in 2021 does not persist as the new list rate in 2022 and 2023 is extremely low.

The rate of increase of the gap slows in the 2010s. An important contributor to the slowdown is the decrease in the delist rate. The lowest values of the delist rate after 2010 are less than half the peak delist rate after the peak – less than 6% versus more than 12%. However, the delist rate is higher at the end of the sample period. A firm can delist for three reasons. First, it can be acquired. Second, it can be delisted for cause because it does not meet the exchange's listing requirements. Third, it can choose to delist voluntarily. Figure 4 shows the components of the delisting rate over the 1975-2023 period. In almost all years, the most important delisting cause is mergers. There are almost no exceptions to this pattern after the peak. Not surprisingly, delists for cause are more important than mergers in 2009, following the Global Financial Crisis (GFC). Surprisingly, the delist for cause rate in 2020 and 2021 is extremely low. However, the delist for cause rate is higher than the merger rate at the end of the sample period. Looking at the period after the peak, the delist rate for cause is high initially, but from 2014 to 2021 it is extremely low. It shoots up in 2022 and 2023 as many new lists from 2020 and 2021 perform poorly. The voluntary delist rate is extremely low and does not appear to be important for our understanding of the evolution of the number of listings.

Though the voluntary delist rate is low, it does not tell the whole story of firms choosing to go private. A publicly listed firm becomes a private firm if a private firm acquires it. There are two types of private firms. One type of private firm is a private operating company. The other type of private firm consists of acquisition vehicles that are private non-operating companies. From 1975 through 2023, acquisitions by private non-operating companies represent a substantial fraction of all acquisitions. Interestingly, the percentage of acquisitions by private non-operating companies is the lowest in the mid-1990s. This rate peaks in the 1980s and exceeds 30% of all acquisitions. It exceeds 20% almost every year after 2003. In contrast, the percentage of acquisitions by public companies is low in the 2010s and early 2020s compared

to the second half of the 1990s and early 2000s. Separately, we collected data for leverage buyouts (LBOs) from LSEG Securities Data Corporation (SDC Platinum). LBOs represent a fairly stable fraction of acquisitions of public companies after the GFC, but that rate is much higher after the GFC than before it.

Larger and older listed firms are less likely to be delisted for cause (Fama and French, 2004). This means that when there are fewer IPOs and when firms become larger through acquisitions, we expect fewer delists for cause. The low rate of delists for cause of the 2010s is therefore in part the result of the low new list rate and the fact that public firms have become much larger. The average market capitalization of US public firms measured in 2023 constant dollars experiences a spectacular increase. The disappearance of many small firms from the exchanges contributes importantly to this increase. At the listing peak, the average market capitalization of listed firms was $2.05 billion in 2023 dollars. At the end of the sample period of DKS it was $6.04 billion. By 2023, the average market capitalization is $11.35 billion. Similarly, the age of firms has increased sharply. At the listing peak, the average age of listed firms was 11 years. The average age was 19.6 years at the end of the sample period of DKS. However, since 2012, the average age increased little until its peak of 20.2 years in 2019 before falling to 17.8 years in 2023.

The last issue we consider is whether the evolution of the number of listed firms since 2012 reflects the evolution in the total number of firms in the US or is a phenomenon specific to public firms. The evolution of the number of listed firms since 2012 could be consistent with an increase in the propensity of firms to list if the total number of firms in the US decreased. Almost all firms in the US are private firms. Almost no listed firm has less than 20 employees, so that 20 employees can be used as a threshold for firms to consider listing. Most private firms have less than 20 employees, but even if one considers only firms with at least 20 employees, it is still the case that the vast majority of firms are private firms. We use the US 2022 Census Business Dynamics Statistics (BDS) for the period after the end of the DKS sample period. Note that these data end in 2022, one year shy of our sample period end. In 2022, there were 632,513 firms with 20 employees or more in the US. In contrast, there were only 4,099 public firms with 20 employees or more. At the listing peak, the propensity of a firm with 20 employees or more to be listed was 1.23%, meaning that 1.23% of the firms with 20 employees or more were listed. By the end of the sample period

of DKS, that propensity was 0.59%. This propensity fell to 0.55% by the end of 2020, but increased to 0.65% by 2022.[5] It follows that the propensity to list increased slightly from 2012 to 2022. It is noteworthy that while the population of firms in the US increased from the end of 2019 to the end of 2022 by slightly more than 200,000 firms, the population of firms with 20 employees or more fell by about 16,000 from 2019 to 2022.

DKS report a decrease in the propensity to list across firm size classes and across one digit SIC codes. With respect to size classes, DKS find a decrease in the propensity to list across all size classes (defined by the number of employees) they consider. These results largely hold when the sample is extended. The exception is for the propensity to list involving firms with more than 10,000 employees. That propensity is higher after the end of the DKS sample period than it was before the peak. Across industries, the one important exception is that the propensity to list by firms in the financial industry has increased. This may not be surprising since the number of smaller private firms in the regulated banking sector has fallen significantly over that period.

4. Some important questions concerning the listing gap

We show that the listing gap increased over time. The JOBS Act of 2012, which was designed to give new life to the IPO market, had no lasting impact on the listing gap. Neither did the burst of listings in 2021, as it did not prevent the listing gap from probing new heights within a couple of years. The question then is whether we should be concerned about that evolution or whether we should be concerned about the existence of the listing gap at all. Indeed, some argue we should not (for instance, Govindarajan, Rajgopal, Srivastava, and Enache, 2018, and Roe and Wang, 2024).

In 1996, the peak year for the number of listed firms in the US, the aggregate market capitalization of listed firms was $16.47 trillion (in 2023 constant dollars). In 2023, the aggregate market capitalization was $48.98 trillion. While the number of listed firms fell by 46.23% from 1996 to 2023, the market capitalization

[5] The Longitudinal Business Database (LBD) data DKS and we use is not available to the end of the sample period.

increased by 197.39% in 2023 dollars. It seems challenging to conclude that we should be concerned about a decrease in the number of listed firms when the market capitalization of listed firms has increased so spectacularly. Eckbo and Lithell (2023) point out correctly that a firm's assets do not disappear when it is acquired even though its listings disappear. Is there really a difference between a situation in which there are two separate listed firms or one listed firm that is the merger of the two separate listed firms? In general, mergers create value for shareholders in that the combined firm is worth more than the sum of the merging firms. Hence, aggregate shareholder wealth would be expected to increase as more mergers take place.

Financial economics should have a clear and convincing answer to the question of whether the existence of a listing gap makes the US worse off or not. Currently, there is no consensus answer to that question. Doidge, Kahle, Karolyi, and Stulz (2018) discuss the role of the change in the composition of firms' capital as an important factor in the emergence of the listing gap. That is, intangible capital has become increasingly important relative to tangible capital in the US. Here, we highlight and briefly discuss five other important areas where research could help us reach a conclusion about whether the listing gap makes the US worse off. There are other areas of research that are relevant for our understanding of the costs of the listing gap that we cannot address given space constraints. The following discussion raises the issues but is not in any way a review of what is an ever-expanding research area. We therefore apologize to the authors whose work we cannot discuss given the objective of this discussion. Our focus is on identifying important issues that researchers should address to help us understand better the costs of the listing gap.

4.1. The role of the legal framework that divides firms into publicly listed and private firms.

The US went through a dramatic change in the legal framework for securities in the early 1930s. First, in 1933, the Securities Act was adopted and it regulates the issuance of securities to the public. Second, in 1934, the Securities Exchange Act was adopted and it regulates the secondary trading of securities in the US. The two Securities Acts put in place a framework that still governs the distinction between private and publicly listed firms in the US. With this framework, private firms are those that in principle do not sell securities to the public and public firms are those that do. To be given the right to sell securities to the

public, firms that list must meet requirements that include the issuance of a prospectus when they issue securities and commit to regular reporting to the Securities Exchange Commission (SEC). The framework created by the securities laws was designed, to use the language of the SEC itself, to protect investors from misconduct, to promote fairness and efficiency in the securities markets, and to facilitate capital formation. However, it led to a situation where public firms are subject to costly disclosure rules. They are also more regulated than private firms. For instance, the Sarbanes-Oxley Act of 2002 applies to public firms, but not private ones. More recently, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 has provisions concerning compensation that apply to all public firms but not private firms. To the extent that these regulations are restrictive and costly to firms, they make it more advantageous for firms to be unlisted and private.

At its origin, this framework was designed to make sure that firms that sell securities to the public are public firms. It had a sharp dividing line between firms that are public and those that are not. Lowry (2024) points out that this dividing line has slowly lost its sharpness, so that the distinction between public and private firms is weakening. When the Securities Acts were enacted, the belief was that the protection of the public required that firms selling securities to the public should be subject to laws and regulations that forced them to disclose material facts about their performance and to report on their performance and situation periodically. Over time, the restrictions on private firms that limited their ability to raise funds, and hence grow without being public, have softened considerably. Ewens and Farre-Mensa (2020) find that the passage of the National Securities Markets Improvement Act (NSMIA) in 1996 is a particularly important step in this evolution and show how private market funding increased afterwards. Private firms can now have many shareholders and sell securities to many investors. It is not even clear that private firms are typically at a disadvantage in raising funds compared to public firms (de Fontenay, 2017).

If laws and regulations have evolved so that private firms are not forced to become public to grow, and if the availability of funding to private firms has evolved so that funding limitations do not constrain their growth, the incentives for private firms to go public are much weaker. As such, it is not surprising that the propensity to list has fallen. However, is it possible that this evolution has gone too far? Is it possible that

it is now too easy for firms to go private and to stay private? Or is it possible that by enabling firms to stay private economic efficiency improves because firms can operate with more flexibility and with fewer risky disclosure obligations than if they were public? Is it possible that a framework developed in the 1930s to protect investors is not as useful as they now invest much more through asset managers and advisors than on their own? Could there be other benefits derived from forcing firms to be public besides better investor protections? Or is it that the distinction between public and private firms has become so obsolete that a case can be made that most of the regulations that constrain public firms should be eliminated altogether? These are open questions to which we need better answers.

4.2. Competition.

There seems to be almost a mechanical relation between the listing gap and the degree of concentration in the economy. If listed firms in an industry merge to increase their market power, the number of listed firms falls and the listing gap increases. It is likely no accident that the listing gap has grown at a time of weak antitrust enforcement (Grullon, Larkin, and Michaely, 2019). Competition authorities have been more aggressive in other countries, which could have contributed to their having more listed firms per million inhabitants. However, it has to be noted that it is not necessarily the case that greater concentration decreases welfare. Concentration does not necessarily arise through mergers. It can result from firms being more successful than others in innovation and production. Further, concentration can also increase because technological change may make it optimal for firms to be larger. In that case, forcing firms to be smaller could just lead to more inefficient production. Nevertheless, it can also be the case that imperfect competition leads to economic inefficiencies. Indeed, larger firms may have so much power as to squash potential competition.

An important issue is whether the distinction between public and private firms plays a role in market concentration, in the ability of firms to mark up prices for goods and services, and in the increase in firm size on public markets. If we think of a size threshold below which firms are unlikely to be public, that threshold has increased substantially over time. Hence, it could be that the benefits and costs of being public

are such that it is advantageous for public firms to be larger. For instance, financial economists have documented the existence of a size effect in stock returns (see van Dijk, 2011, for a review). This size effect has not always been strong. However, to the extent that there is such an effect, firms could obtain a lower cost of capital by being larger. It could be that the benefits of scale for public firms are large. These benefits could include higher stock market liquidity for their traded shares and an ability to issue securities more cheaply. They could also include the ability to use their traded equity as currency for acquisitions in a way that would not be available to smaller firms. With the growth of the role of institutional investors, these benefits of scale may have increased. By necessity, institutional investors must focus on larger investment opportunities.

This discussion shows that it is important to understand how much of the US listing gap is caused by increased market concentration and to determine the economic consequences of the increase in the US listing gap caused by increased market concentration. To what extent is concentration detrimental to welfare? Is the fact that US competition authorities are less aggressive than in other countries an important determinant of the listing gap? Could it be that market concentration results in part from changes in the stock market that make it more attractive for larger firms than smaller firms? If the firms that are most likely to prosper on the stock market are those that exceed some size threshold, does it mean that small young firms may find it preferable to be acquired than go public? More questions for which we need more answers.

4.3. Dynamism.

An important trend in the US is the decrease in the dynamism of the economy (Decker, Haltiwanger, Jarmin, and Miranda, 2016). In the Schumpeterian growth model, new firms innovate and displace incumbents through the mechanism of creative destruction (see Aghion and Howitt, 1992). We would therefore expect the number of new firms to keep increasing with economic growth. In an economy where the stock market opens the door to funding and growth, developments that make it harder for firms to enter the stock market have an adverse impact on innovation. Entrepreneurs may forego innovations that have low value unless the startup eventually becomes a public company.

The decline of dynamism has many potential explanations. There are also signs of more firm creation after the COVID crisis suggesting that it could be possible for dynamism to increase. However, it is important to understand whether the evolution of US stock market listings plays a role in the decline of US dynamism. Many commentators have argued that the Sarbanes-Oxley Act of 2002 (SOX), which imposed additional governance and disclosure requirements on public firms, increased the cost of being public and hence had an adverse impact on the propensity of firms to be public. There is a substantial literature that examines the costs imposed by SOX. In perhaps the most recent effort to address the impact of SOX, Stanek (2024) develops a dynamic model of entry and exit in public markets and finds that SOX reduced the value of the option to be public by half. The problem with the argument that SOX explains much of the increase in the listing gap is that the timing is wrong. The listing gap starts in 1999. By 2002, the listing gap is at 2,677 firms, according to Figure 2. Moreover, the smallest firms were exempted from SOX's most expensive measures for several years after the adoption of SOX.

The cost of being listed on the stock market has fixed components as well as variable components. The direct costs can be substantial, but there are indirect costs that are probably even higher. Once a firm is listed, it receives more attention and its management must deal with outside shareholders. The firm must be focused on its corporate disclosures as this information could help its competitors and could also expose it to legal liabilities. We would expect an increase in the cost of being listed to reduce the number of public firms. Startups may wait longer to go public or may not go public at all. It seems reasonable to view the increase in the listing gap as the result of both an increase in the cost of being public and a decrease in the benefit of being public. These costs are hard to quantify. However, in evaluating the costs of the listing gap, it is necessary to assess the implications of these costs for the dynamism of the US economy. Counterfactuals are key. Are we missing out on the creation of startups that will only succeed if they have potential access to the stock market? This question is made more complicated by the availability of funding in private markets that makes it easier for startups to prosper without accessing public markets. More research is needed on these questions.

4.4. Capital allocation

A key role of public markets is to help the economy allocate capital efficiently. They do so by making prices publicly available, so that investors, entrepreneurs, and corporations can assess investment opportunities. Public markets also facilitate capital raising. By observing stock prices, managers learn about the prospects of their firms and their competitors. They can change policies to respond to the market's assessment. Entrepreneurs can observe how firms in the sectors they are interested in are valued and how their valuation responds to competition and entry in the industry. Investors can constantly measure the value of their portfolios. They can assess whether they believe that the market values the firms correctly and they can try to take advantage of what they believe are valuation mistakes, thereby helping make the markets more efficient.

Private markets do not have the same mechanisms that public markets have to help make pricing more efficient and to diffuse information about the value of securities. Importantly, investors in private markets become shareholders by invitation and investors cannot generally sell short. A startup can decide not to allow a potential investor to buy shares. A public firm cannot easily prevent an investor from buying its shares. With the absence of short-selling, prices may be excessively influenced by the most optimistic investors. Private capital is widely available. However, much of venture capital goes to high tech firms. And historically it went to firms with limited capital needs and for investments with a rapid payoff. This has changed over time. While it used to be that venture capital funds had to find an exit for their investments rapidly, the nature of exit has changed. A venture capital fund that was an early investor can sell its stake to another fund in the private-sale market that will, in turn, invest in startups that are more mature. While the allocation of capital may be less efficient in private markets as argued by Sanati and Spyridopoulos (2024), there are reasons to believe that some types of agency costs are more important in public markets than in private markets. Private firms have more concentrated ownership, which makes it more valuable for shareholders to monitor firms and they can do so more efficiently than in public firms.

The differences between public and private markets concerning capital allocation raise important questions. Capital allocation directly affects economic growth. Hence, inefficient capital allocation can

have large welfare costs. Yet, we still know little about how a decrease in the propensity of firms to be listed on major stock markets affects capital allocation in the economy. Such a decrease undoubtedly has externalities for capital allocation. It means that public markets create less information about firms. Private markets rely on that information to identify investment opportunities and to benchmark performance. It follows that having fewer public firms could make private firms less efficient and less successful. This makes it important to understand better how the efficiency of capital allocation in the economy depends on how the population of firms is divided between public and private markets.

In theory, the cost of capital should be higher in private markets than in public markets. This should be true for at least three reasons. First, not all investors can participate in private markets but all investors can participate in public markets. Second, search and monitoring costs are higher in private markets. Third, investments in private markets are less liquid. If the cost of capital is higher in private markets, this pushes firms to go public. However, when private market funding is abundant, it is not clear that the cost of capital in private markets is always higher than in public markets. More optimistic investors may put sufficiently high prices on private market investments so that funding is cheaper in private markets for the firms that these investors consider to be particularly attractive and do not have close substitutes in public markets. This may lead to inefficient allocation of capital since more optimistic valuations are more likely to be kept in check by short sellers in public markets. Research needs to help us understand better the variation in the cost of capital across startups in private markets and the implications of this variation.

4.5. Why care about the number of publicly listed firms versus the market cap of public equity markets?

One recent study, entitled "Half the firms, double the profits: Public firms' transformation, 1996-2022" (Roe and Wang, 2024) poses to readers a question that asks who cares about the number of listed firms. If profits double, we expect the market capitalization to double, everything else equal. We showed that the aggregate market capitalization of public firms has increased considerably since 1996, the peak year for the number of listed firms. The interpretation of this growth is complicated. If one could conclude that an increase in stock market capitalization necessarily increases aggregate welfare commensurately, the case

for focusing on market capitalization and ignoring the number of listed firms would be stronger. But even then, one would still have to show that aggregate welfare is not affected adversely by a decrease in the number of listed firms.

It is not the case that greater market capitalization necessarily means greater welfare for a country. Suppose that profits increase because of a decrease in wages brought about by greater market power of employers. Such an increase makes shareholders better off, but it also makes workers worse off. The labor share of GDP has fallen over the last fifty years and the share of shareholder rents has increased (Barkai, 2020). Greenwald, Lettau, and Ludvigson (2025) attempt to understand the return to investing in the stock market from 1989 to 2017. They conclude that 40% of the return can be attributed to a reallocation of rewards towards shareholders. Only 25% of the return can be attributed to economic growth. It is also not clear that the stock market does better when the economy grows more. Ritter (2012) finds that the correlation between economic growth and stock returns is negative for the 19 countries with continuously operating markets from 1900 to 2011.

When examining the welfare implications of a decrease in the number of listed firms, it is important to assess carefully why the number of listed firms falls and the long-run implications of that decrease. It could be that economies of scale and scope have increased, as suggested by Gao, Ritter, and Zhu (2013). In this case, it would be expected that there would be larger and hence fewer public firms. However, fewer firms may also mean that the economy becomes less dynamic as creative destruction is impeded by the largest listed firms that defend their product market space. Lastly, if much wealth creation takes place in private markets, investors who cannot access private markets are cut off from this wealth creation. Understanding the relative importance of these issues is crucial to reaching a complete assessment of the implications of the decrease in the number of publicly listed firms. We challenge researchers to take on this vital question.

5. Conclusion

In this paper, we show that the listing gap measured by DKS (2017) keeps increasing after 2012, the end of the sample period used in that original paper. We provide estimates of the US listing gap from 1990

to 2023. We find that the listing gap is highest in 2023. While the listing gap increases after 2012, other statistics about the number of listings have changed only in a very limited way. This is in part due to the very high IPO rate in 2021 – the largest IPO rate (but not the largest number of IPOs) from 1975 to 2023. After 2021, listings fell again, but the drop, although substantial, did not offset the increase in listings of 2020 and 2021. The number of listings increases with IPOs and falls with delists. As public firms have become larger and older, the rate of delists for cause has fallen since larger and older firms are less likely to delist for cause.

The increase in the listing gap raises many questions for which there is no consensus answer. The evolution of the number of listed firms in the US has led to a vigorous debate to date. However, this debate needs to be informed by more research. This research must help us reach a consensus as to whether this gap is *costly* because it results from regulatory frictions that cause the US to have too few listed firms or whether it is *beneficial* because the growth of private markets has led to more efficient ways to fund some types of firms.

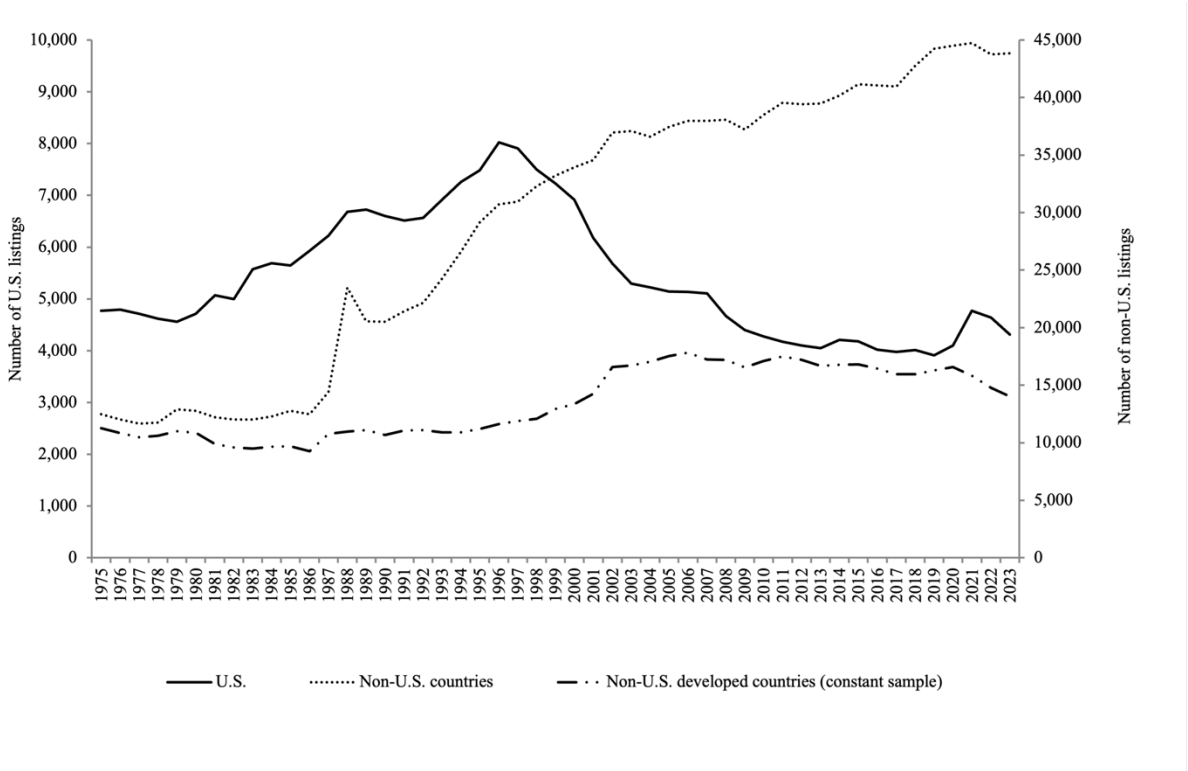

Figure 1. Listing counts for the U.S. and for non-U.S. countries. This figure shows the number of domestic, publicly listed firms in the U.S. and in non-U.S. countries from 1975 to 2023. Listing counts are from the WDI and WFE databases. Investment companies, mutual funds, REITs, and other collective investment vehicles are excluded. The set of non-U.S. countries comprises the 71 countries included in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). Countries are classified as developed based on the MSCI classification scheme as of 2014. There are 13 non-U.S. developed countries in the constant sample.

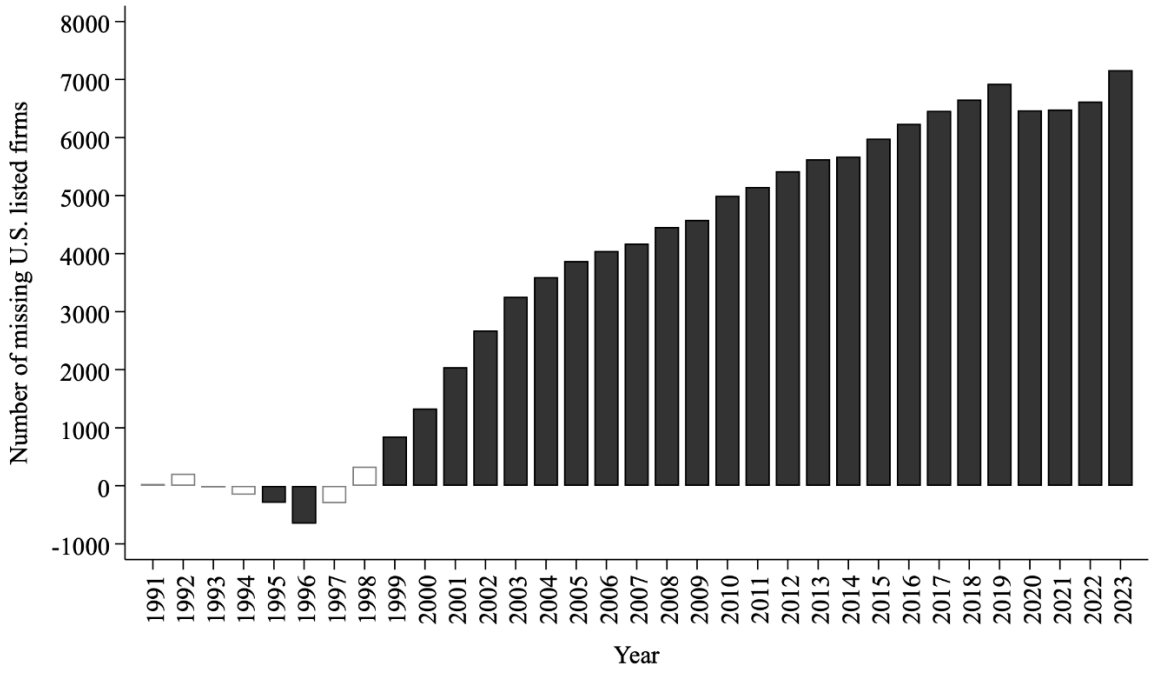

Figure 2. The U.S. Listing Gap. This figure shows the U.S. listing gap, measured as the number of missing listed firms each year from 1991 to 2023. The listing gap is computed using year fixed effects estimated the same as Model 7 of Table 2 in Doidge, Karolyi, and Stulz (2017), but with an extended sample period. The dependent variable in this regression is the log of a country's annual listing count per capita (in millions of inhabitants). The explanatory variables include the anti-self-dealing index, Log(GDP per capita), GDP growth, a non-U.S. dummy, year fixed effects, and interactions of the non-U.S. indicator with the year fixed effects. Listing counts are the number of domestic, publicly listed firms from the WDI and WFE databases. Investment companies, mutual funds, REITs, and other collective investment vehicles are excluded. The sample comprises 72 countries included in Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008). The panel regression t-statistics are adjusted for clustering by country. A black bar indicates that the coefficient on a given year fixed effect is statistically significant at the 5% level or better. A white bar indicates the coefficient is not statistically significant.

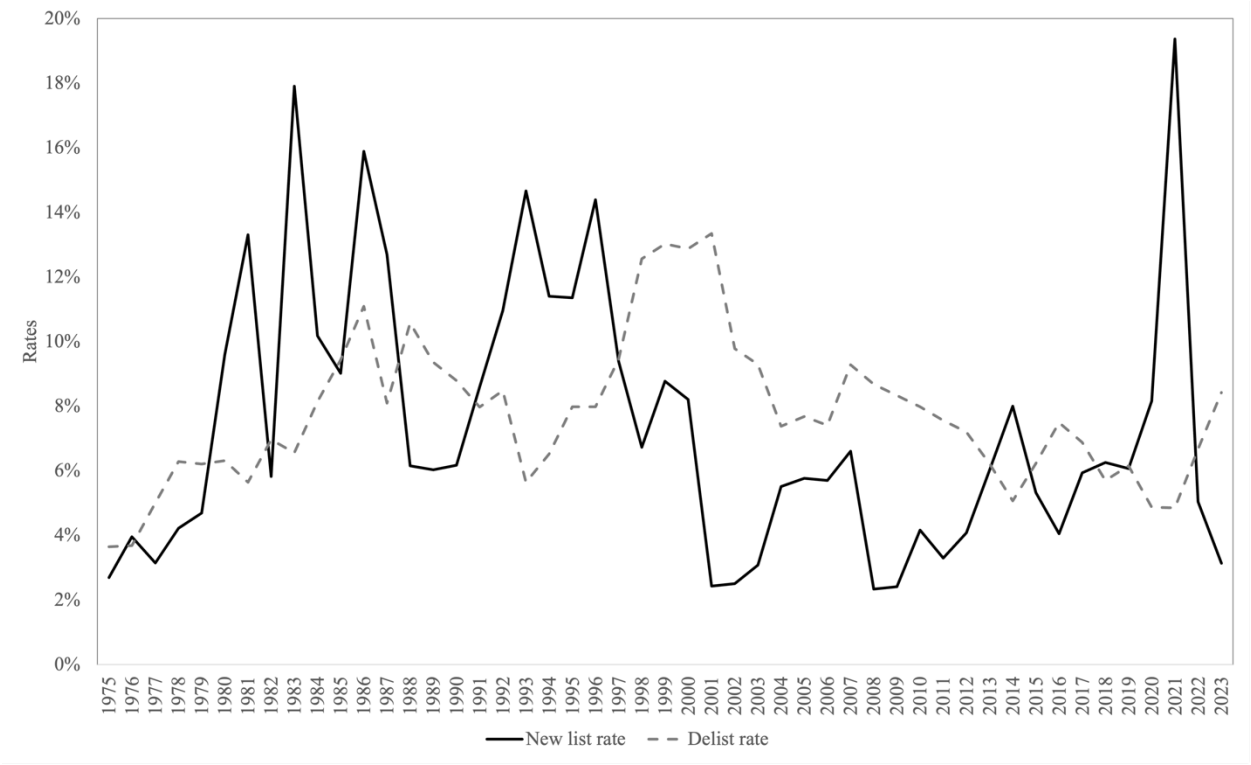

Figure 3. The U.S. New List Rate and Delist Rate. This figure shows the U.S. new list rate and delist rate each year from 1975 to 2023. Data for new lists and delists are from CRSP. The counts include U.S. common stocks and firms listed on Amex, Nasdaq, or NYSE. Investment funds and trusts are excluded. We count a new list as such in the year a record first enters the database and a delisting as such in the year in which a record drops out. The new list (delist) rate equals the number of new lists (delists) in year t divided by the listing count in year $t-1$.

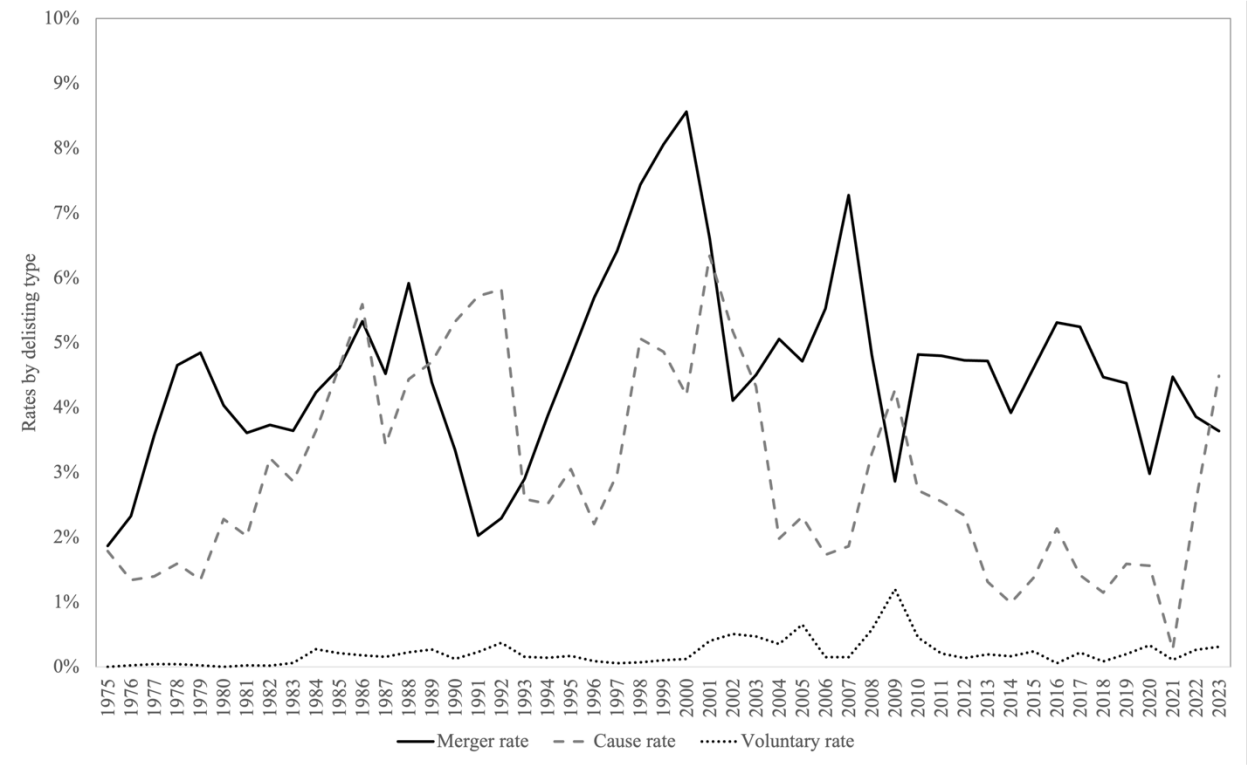

Figure 4. The U.S. Merger Rate, Delist for Cause Rate, and Voluntary Delist Rate. This figure shows the U.S. delist rate each year from 1975 to 2023 by three categories: merger, cause, and voluntary. Data for delists are from CRSP. The counts include U.S. common stocks and firms listed on Amex, Nasdaq, or NYSE. Investment funds and trusts are excluded. We count a delisting as such in the year in which a record drops out of CRSP. Following Fama and French (2004), we categorize CRSP delist codes 200–399 as mergers and codes 400 and above as delists for cause, except for codes 570 and 573, which are categorized as voluntary delists. To decompose the delist rate by categories, we define the merger (cause or voluntary) rate as the number of mergers (cause or voluntary) in year *t* divided by the listing count in year *t*-1.

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