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THE US EQUITY VALUATION PREMIUM, GLOBALIZATION, AND CLIMATE CHANGE RISKS

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ABSTRACT

In the 2000s, US firms have higher valuations than comparable non-US firms listed only outside the US but not non-US firms cross-listed in the US. Though one would expect this US valuation premium to fall over time because of globalization, it widens for firms in developed markets by 36% and falls for firms in emerging markets by 20% after the global financial crisis of 2007-2008. This evolution is explained in part by the decreased valuation of brown firms in other developed countries relative to the US. Other potential explanations are explored and rejected.

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1. Introduction.

US firms are valued more highly than comparable non-US firms (see, for example, Aggarwal, Erel, Stulz, and Williamson, 2010). We call this valuation difference the US premium. In this paper, we examine whether the US premium falls over time, as we would expect from a continuation of increased financial globalization, or whether it increases, as would happen with a retrenchment from globalization.

The integration of global financial markets should foster a convergence of valuations. With increased globalization, we would expect the US premium to fall over time because firms across different countries increasingly face the same funding and investment opportunities. If firms across countries pursue the same objective of maximizing shareholder wealth, their valuations should converge. Whatever advantage US firms possess in creating wealth for their capital providers relative to firms in other countries, that advantage should dissipate. Hence, we would expect that with increased globalization, the US premium should be increasingly lower. However, many observers argue that there has been a retreat from globalization after the global financial crisis (GFC) of 2007-2008 (among others, see Bailey and Lund, 2013). A report by the McKinsey Global Institute (2018) states that "one of the biggest changes in the financial landscape [after the GFC] is sharply curtailed international activity." If non-US firms benefit more than US firms from financial globalization via access to US markets and opportunities that US firms already have, we would expect a retreat from globalization to increase the US premium.

There is much evidence concerning trade and capital flows to support the view that there is a retreat in globalization after the GFC. Flows of goods and services drop and trade flows remain below their pre-GFC levels. Cross-border capital flows and cross-border financial asset holdings play a critical role in financial globalization as they enable investors to take advantage of valuation discrepancies across the globe and to invest where new funding is valued the most. Yet, after the GFC, global cross-border capital flows decrease sharply. After reaching a peak of $12.7 trillion in 2007, these flows recede to $5.9 trillion by 2017 (McKinsey Global Institute, 2018). Following the GFC, regulatory tightening in the financial sector reduces cross-border lending. External assets of all banks reporting to the Bank for International Settlements fall from 56% of world GDP in 2007 to 36% by 2015 (Lane and Milesi-Ferretti, LMF, 2017). Perhaps most strikingly, there is evidence that this regulatory tightening has direct implications for capital market integration. For example, covered interest parity (CIP) stops holding after the GFC (Chinn and Ito, 2023).

Du, Tepper, and Verdelhan (2018) attribute the collapse of CIP to changes in the regulatory environment that increased the cost of using bank balance sheets for arbitrage.

Non-US developed countries (DMs) evolve differently from emerging countries (EMs) after the GFC. While growth in many DMs is weak, some EMs have very strong growth (Foda and Prasad, 2018), so that the share of EMs in global output and trade increases. From 2007 to 2015, EM's share of world GDP rises from 25% to nearly 40% (LMF, 2017, Figure 2). Cross-border flows increase dramatically among DMs before the crisis and collapse with the crisis. From 2007 to 2015, external assets/liabilities as a fraction of world GDP related to portfolio and FDI holdings, reserves and other investment claims decline among DMs, but grow among EMs (LMF, 2017, Figure 4). The regulatory changes brought about by the GFC have a particularly sharp impact on DMs. Chinn and Ito (2023) argue that "capital mobility has clearly declined for industrial country currencies." Foreign claims by BIS-reporting banks on advanced economies fall from $16 trillion to $12 trillion, while those on EMs rise in nominal terms and as a share of world GDP (IMF, 2017, Figure 11). With these differing changes in trade, financial flows, and financial claims, it is more plausible that DMs experienced a retrenchment from globalization than EMs.

To begin, we measure the US premium as the difference in valuations between US and non-US firms, and investigate how it changes over time. Specifically, we investigate whether the US premium changes from before to after the GFC in a way that is consistent with a continuation of the process of globalization, or in a way that is consistent with a retrenchment from globalization. To measure the valuations of US and non-US firms, we use the Tobin's q ratio. It is defined as the market value of the firm divided by its book value. Tobin's q is widely used in studies that compare valuations across countries (e.g., La Porta, Lopez-de-Silanes, Shleifer, and Vishny, 2002). We control for variables that are known to be related to Tobin's q, so that we are comparing the valuation of similar firms located in different countries.

With Tobin's q, the US premium can change because the numerator and/or the denominator change. The numerator is the present value of cash flows to capital providers and the denominator, in many implementations including ours, is the book value of assets. The present value of cash flows can change because of changes in discount rates and/or changes in expected cash flows. The advantage of using Tobin's q as opposed to an earnings-based valuation metric is that the inputs to Tobin's q are likely to be less affected by differences in accounting practices. There is a considerable literature that examines how

expected returns on financial assets differ across countries, the role of the home bias for these differences, and whether the expected returns of assets with same risk characteristics are converging over time as one would expect with globalization (for reviews, see e.g., Karolyi and Stulz, 2003; Lewis, 2011; Cooper, Sercu, and Vanpée, 2013). Focusing on changes in value as opposed to changes in expected returns of financial assets has the advantage that our results do not depend on measuring expected returns. This advantage is important because the pre-GFC and post-GFC periods we consider are short, so that estimating changes in expected returns reliably is challenging given the noisiness of realized returns (Elton, 1999).

An important issue in computing Tobin's q across countries is that accounting rules differ. This is especially important for R&D. The US tends to expense rather than capitalize research and development (R&D) investment much more than other countries (Bhagat and Welch, 1995). Such a difference in accounting could lead to a US premium because the denominator of Tobin's q (the book value of a firm's assets in our implementation) for firms in non-US countries likely includes R&D more so than for firms in the US. Moreover, R&D expenditures have become more important for US firms (Kahle and Stulz, 2017), so that it could be that the growing importance of R&D expenditures could bring about an increase in the US premium from before to after the GFC. As far as we know, this study is the first to address the R&D issue head-on by capitalizing R&D for US firms. By itself, this innovation is important for the literature comparing Tobin's q across countries. We capitalize R&D following the methods of Peters and Taylor (2017).

We first compute Tobin's q valuation ratios annually for an average of 12,000 non-US firms per year from 51 countries around the world from 2001 to 2018. We estimate the US premium from regressions of Tobin's q on firm characteristics, country-level factors, like GDP growth, industry fixed effects, and an indicator variable for non-US firms. The coefficient on the indicator variable for non-US firms is our measure of the difference in valuations between US and non-US firms, i.e., the US premium. This estimate of the US premium would be biased if omitted determinants of value are correlated with being a US firm. We address possible sources of bias in our analysis and conclude that our results about the evolution of the US premium are robust to them. Consistent with earlier studies (e.g., Aggarwal, Erel, Stulz, and Williamson, 2010), we find that before the GFC non-US firms are valued less than comparable US firms. To test whether the US premium changes from before to after the GFC, we use a pre-GFC period from 2001

to 2007 and a post-GFC period from 2010 to 2018. China is excluded from our sample because it maintains strong barriers to international investment during our sample period. Its financial markets are largely segmented from those of other countries and the government at times targeted equity valuations (see Carpenter and Whitelaw, 2017, for a review). As a result, we have no predictions about how the valuations of Chinese firms should evolve compared to those of US firms if globalization reverses after the GFC.

What do we find? The US premium is large before the GFC and is larger after the GFC. Specifically, the premium is 15.7% (0.22 relative to the mean US Tobin's *q* of 1.40) before the GFC and 16.3% after the GFC (0.24 relative to the mean of 1.47). This increase is economically small, and not statistically significant. However, this small increase in the US premium globally masks sharply divergent evolutions of the premium between DMs and EMs. Before the GFC, the US premium was lower for DMs than EMs, 14.3% (or 0.20 on the base *q* of 1.40) versus 18.6% (0.26). After the GFC, the US premium is higher for DMs than EMs, 18.4% (or 0.27 on a base *q* of 1.47) versus 14.3% (0.21). In percentage terms, the US premium for DMs increases by 29.4% while the US premium for EMs falls by 23%. These are economically large and statistically significant differences.

Non-US firms listed on stock exchanges in the US face lower barriers to international investment than non-US firms not listed in the US as their shares are freely traded in the US and are subject to US governance institutions that better protect shareholders compared to the home countries of these firms. As a result, we would expect the US premium for the non-US firms cross-listed in the US to be lower than for non-US firms that are not cross-listed. We find that non-US firms listed in the US are valued almost like US firms before the GFC and very close to US firms after the GFC. Since non-US firms traded in the US are valued almost like US firms, non-US firms listed in the US have a valuation premium relative to other non-US firms, which we call the cross-listing premium, following Doidge, Karolyi, and Stulz (2004).

Having shown that US firms are valued at a premium compared to non-US firms not listed in the US, and that this US premium increases from before the GFC to after the GFC, we next investigate whether the premium evolves differently for different sectors. Different industries seem to have experienced different changes across countries from before the GFC to after the GFC. If our firm and country characteristics do not account for these changes, they would show up in our estimate of the premium. First, as we already mentioned, international trade was adversely affected by the GFC, but differentially between DMs and

EMs. This differential effect could manifest itself in a worsening of the US premium for traded goods industries in DMs versus an improvement in the US premium for traded goods industries in EMs if it is not captured by our control variables. A second industry of interest is technology. The post-GFC period is one where US tech firms thrived and the most successful ones experienced enormous valuation gains. To the extent our regression model fails to capture factors that explain the valuation of US tech firms compared to the valuation of non-US tech firms, the US premium might have increased for tech firms because of omitted variables.

We estimate the US premium separately for traded goods industries and other industries. We do not find a significant difference in the evolution of the US premium between traded goods industries and other industries. Interestingly, the literature argues that some industries, such as tradable goods industries, might be better integrated globally in that the prices at which they sell are more similar (among others, see Bergin and Glick, 2007). With this hypothesis, we would expect firms producing traded goods to be valued more similarly globally, but we find that the US premium is not significantly different between traded and non-traded goods industries in both DMs and EMs before and after the GFC. Neither the slowdown in global trade flows nor changes in the sectoral allocation between traded and non-traded goods industries can explain our results. We investigate next whether the US premium for the high-tech sector evolves differently from that for the other sectors. For DMs, the US premium does not change from before the GFC to after for firms in the high-tech sector whereas for EMs, the US premium significantly widens for firms in the high-tech sector. Outside the high-tech sector, the US premium widens for firms in DMs and narrows for firms in EMs. It follows that developments in the high-tech sector across countries do not explain the increased US premium for DMs or the decreased US premium for EMs.

A broader explanation for the evolution of the US premium could be centered around the growing importance of intangible assets. It is well-known that countries with better institutions are better at developing intangible assets (Claessens and Laeven, 2003). It is also well-known that organization capital has become more important (Falato, Kadyrzhanova, Sim, and Steri, 2022). Hence, one conjecture is that the US premium increases because US firms are better positioned to develop intangible capital and obtain higher valuations because of that capital as it becomes more important. If this were the case, we would expect to see a larger increase in the US premium for firms that experienced the greatest increase in

intangible assets. We would expect these firms to be younger firms, firms with less tangible assets, and multinationals since intangible capital is important for multinationals (Morck and Yeung, 1991). We find that the differing evolution of the US premium between DMs and EMs holds strongest for older firms, firms with high tangible assets, and firms that are not multinationals. Hence, it is not the failure of non-US firms to accumulate intangible capital like US firms that explains the dynamics of the US premium.

We pursue one more conjecture for our findings. We find our results to be strongest for older firms with a high ratio of tangible assets to assets. These firms are more likely to be brown firms than other firms. There are good reasons for the Tobin's q of brown firms in non-US DMs to have fallen after the GFC compared to the Tobin's q of brown firms in the US and in EMs. We know a broad-based shock to the demand for stocks in a sector could affect the investors' required rate of return on these stocks (Koijen and Yogo, 2017). There is much evidence focused on the impact on stock prices of the large increase since the GFC in the extent to which investors pay attention to climate risks and to environment, social, and governance (ESG) considerations in forming their portfolios. Investors focused on sustainability and ESG objectives prefer so-called green firms and shun brown firms. The existing literature shows that the equity returns of green firms have exceeded those of brown firms both in the US (Pastor, Stambaugh, and Taylor, 2021, 2022) and in the world (Karolyi, Wu, and Xiong, 2023). However, to the extent that these high returns reflect a shift in demand for green and brown stocks, they would not predict future returns (Pastor, Stambaugh, Taylor, 2022; van der Beck, 2022). Instead, brown stocks would be expected to outperform green stocks. There is an open debate in the literature as to whether there is an expected return premium for brown stocks and, if there is one, its magnitude (see, among others, Bolton and Kacperczyk, 2022a, 2022b; Pastor, Stambaugh, and Taylor, 2022; Aswani, Raghunandan, and Rajgopal, 2023; Zhang, 2023).

Not all countries are equally focused on climate concerns and ESG objectives. Globally, however, there is evidence that countries differ in the extent to which their investors are focused on sustainable investments (Gantchev, Giannetti, and Li, 2022), possibly explaining why the performance of green stocks relative to brown stocks differs across countries (Zhang, 2023). If the demand for brown and green stocks differs across countries, this difference in demand could cause equity markets to be less integrated across countries than they would otherwise be if investors in different countries had the same relative preferences for brown and green stocks. To the extent that investors in non-US DMs are more focused on climate concerns and

ESG objectives than investors in the US or EMs , we would expect the demand for brown stocks to be lower relative to the demand for green stocks in non-US DMs compared to the US and to EMs. Provided that investors have some home bias (Cooper, Sercu and Vanpée, 2013, show persistence of the home bias), the required expected rate of return on brown stocks should be higher in countries in which investors penalize these stocks more. As a result, the greater focus on climate risks and ESG objectives has the potential to contribute to the increase in the US premium for DMs. Though some studies have related equity valuations to measures of exposure to climate change risks for stocks, these studies do not reach a consensus and do not address the issue we focus on (Bolton, Halem, and Kacperczyk, 2022b; Aswani, Raghunandan, and Rajgopal, 2022; Choi, Gao, Jiang, and Zhang, 2023).

We use Morgan Stanley Capital International's (MSCI) IVA ratings scores, one of the most popular stock-level ESG ratings providers, to separate brown industries from other industries. We attribute the same score to all firms in an industry. For brown industries, the US premium increases from 0.16 pre-GFC to 0.29 post-GFC in DMs. This represents a 79% increase. In contrast, the premium increases by only 23% for other industries. Looking at EMs, there is no significant difference in the change in the premium for brown and other industries. In both cases, the US premium falls significantly and by a similar percentage. This evidence suggests that whether an industry is brown or not does not have valuation implications for EMs. For DMs, the valuation of brown industries falls sharply from before the GFC to after the GFC. This fall in the valuation of brown industries contributes importantly to the increase of the US premium for DMs.

Importantly, since we use Tobin's q as our valuation measure, Tobin's q could be lower for brown firms in one country compared to another because the former country is expected to eventually impose stronger restrictions on brown firms than the latter. When we compare measures of the US premium relative to different sets of countries, it is possible that the premium is larger for firms in a given country because expected cash flows in that country are lower due to other factors. Such an outcome is plausible for factors having to do with climate risks, including transition risks, as they may play out in the future in such a way that they are not reflected in the ways we control for expected cash flows. We leave for future research an examination of the relative importance of cash flow and discount rate effects in the impact of climate risk on the valuation of firms.

2. The sample of firms across countries and years.

To construct our dataset of non-US publicly-listed firms around the world, we download the list of firms in a country from Thomson Reuter's Worldscope country lists. Worldscope has data on over 81,000 active and inactive companies in 119 countries. It covers 99% of global market capitalization in any given year. We also download Worldscope data for a variety of firm characteristics from 2001 to 2018. We refer to 2001-2007 as the pre-GFC period and 2010-2018 as the post-GFC period. The pre-GFC period is chosen because Worldscope is reasonably comprehensive in those years and because the financial globalization wave of the 1990s led to a dramatic decrease in barriers to international investment. The comprehensiveness of Worldscope is especially important since, without it, any inference about changes in financial globalization could just be the outcome of changes in selection criteria by Worldscope. Our post-crisis period stops before the COVID-19 crisis since including that crisis would detract from our post-GFC focus. For US publicly-listed firms, we download the list of firms in the CRSP/S&P Compustat Merged Database and drop firms not incorporated in the US.

We also drop 67 countries that do not have at least five years of sequential data with complete data on firm characteristics for at least 20 firms. To make our dataset comparable to earlier studies, we also drop Saudi Arabia, and as noted in the introduction, we drop China. Firms must have at least $100 million in total assets, as measured in 2018 constant US dollars. Once a firm crosses the $100 million threshold, it stays in the sample. Finally, we drop country-years that do not have at least 20 firms with complete data on firm characteristics in a year. The final sample includes 51 non-US countries and the US.

Table 1, Panel a shows counts of the number of firms by year from 2001 through 2018 for an unrestricted sample. This sample includes country-years that meet our criteria above and includes firms that have market cap data available in a year. We divide countries into DMs and EMs following Morgan Stanley Capital International (MSCI) definitions as of 2018. We report the counts separately for all non-US countries, developed markets (DMs) only, emerging markets (EMs) only, and the US. The count of non-US firms increases steadily from 18,772 firms in 2001 to 28,496 firms in 2018. It increases each year except for 2009, 2012 and 2014. In DMs, the number of firms increases from 12,946 in 2001 to a peak of 16,272 in 2008, but then declines to 15,408 by 2018. EMs account for the increase in the number of non-US firms. The number of listed firms increases each year, from 5,826 in 2001 to 13,088 by 2018. The pattern of listing

counts is sharply different in the US. The number of firms declines from a peak of 5,752 in 2001 to 3,761 in 2018, a continuation of a longer-term trend from its peak in 1997 (Doidge, Karolyi and Stulz, 2017). At the bottom of each column, we report the total number of firm-year counts across the years and for the years we associate with the pre- and post-GFC periods.

We use Tobin's *q* ratio as our valuation measure. For the numerator, we take the book value of short-term debt plus long-term debt and add the market value of equity. For the denominator, it is traditional to use the book value of total assets. However, using the book value of total assets introduces a bias in a comparison of the Tobin's *q* ratio of US firms with the *q* ratio of non-US firms because non-US firms tend to capitalize R&D while the US does so only to an extremely limited extent. Such differences in standards could lead to a US premium with our valuation metric, as the denominator of Tobin's *q* for firms in non-US countries likely capitalizes R&D in a way that firms in the US do not. A simple way to address this issue is to capitalize R&D for US firms.

To capitalize R&D for US firms, we follow the procedure outlined in Peters and Taylor (2017). The main idea is to remove R&D from operating expenses and treat it as a capital expenditure, which results in the creation of an "R&D asset" that is amortized over time. We use annual data on R&D expense from Compustat for US firms and set it to zero when it is missing. To operationalize the procedure, we need to make assumptions about the depreciation rate of the R&D asset and the value of the R&D asset for firms in their IPO year (R&D expense data for years prior to the IPO are not available in Compustat). Based on the results in Peters and Taylor, we make two simple assumptions: (1) the value of the R&D asset is zero in the first year a firm enters the Compustat database; and, (2) the depreciation rate is 20%, which implies a five-year straight-line amortization period.[1] That is, the unamortized value of the current year R&D expense is 100%, 80% for the prior year, and so on.

With these assumptions, we capitalize R&D expenses and adjust the book value of assets by the value of the R&D asset. To compute the value of the R&D asset for each firm each year, we sum the unamortized

[1] Peters and Taylor (2017) interpret R&D spending as an investment in knowledge capital and they apply a perpetual-inventory method to a firm's past R&D to measure the replacement cost of its knowledge capital. They use industry specific depreciation rates, as well as rates of 10%, 15%, and 20%. They find that the choice of depreciation rate does not impact their results. A firm's first non-missing record in Compustat usually coincides with its IPO and we do not have R&D data for five years prior to a firm's IPO. We assume that the value of the R&D asset is zero in the first year in which a firm enters the database. Peters and Taylor use a more complicated approach to estimate the initial value of the R&D asset. They conclude that assuming an initial value of zero is a reasonable proxy.

R&D expenses in the current year and over the previous four years (i.e., $\sum_{t=0}^{t=-4} R\&D\ expense_t \times \frac{t+5}{5}$). In year *t*, "Total assets-adjusted" equals total assets plus the value of the R&D asset. We also adjust operating income by the current year's R&D expense and the amortization of the R&D asset, which equals the sum of the amortized value of R&D expense over the previous five years (i.e., $\sum_{t=-1}^{t=-5} R\&D\ expense_t \times 20\%$). "Operating income-adjusted" in year *t* equals operating income plus R&D expense minus the amortization of the R&D asset. Finally, we use total assets-adjusted to compute versions of *q*, leverage, asset tangibility, and Log(Assets) in which R&D expense is capitalized. With the exception of Log(Assets), we winsorize these variables at the 1st and 99th percentiles each year.

Since our analysis relies on the use of Tobin's *q*, we focus on a restricted subset of firms that have complete data on Tobin's *q* as well as data for variables we use to explain Tobin's *q*, namely sales growth, operating income, asset tangibility, financial leverage, and the log of assets. All variables are defined in the Appendix Table A.I. We further exclude financial firms (SIC Codes 6011 through 6799) and firms in public administration (SIC Codes 9111 through 9999). Table 1, Panel b shows the number of listed firms for this restricted sample. The firm counts are smaller, typically by half, for the restricted sample relative to the unrestricted sample in each year for all non-US, DM only, EM only, and US groups. For the entire 2001 to 2018 period, we have 458,999 firm-year observations in the unrestricted sample and 222,626 in the restricted sample, which is about 50% of the total. Over the sample period, the percentage of firms in the restricted sample falls by a small amount in developed markets (50% to 48%) and increases for emerging markets (41% to 49%) and in the US (51% to 57%). There appears to be no special constraint imposed on data availability for EM relative to DM firms in this period of analysis.

Table 2 describes our restricted sample of firm-year counts by country. Panel a lists 22 countries classified as DMs and Panel c, 28 EMs. The counts are reported for the 2001 to 2018 period as well as for the separate pre- and post-GFC sub-periods. We also report the years in which the country is represented in the overall sample. This is important for a few EMs which do not qualify with sufficient numbers of firms or with sufficient fundamental data until years past the 2001 start date. The average number of firms per country is similar among DMs at 318 pre-GFC and 344 post-GFC. Among EMs, the counts are half as large before the GFC, but they increase from 133 pre-GFC to 221 post-GFC. This pattern in firm counts by country is similar for DMs and EMs in the unrestricted sample.

Table 3 presents summary statistics for firm attributes from Worldscope. We report means and medians across the count of firm-years for each of Tobin's *q*, sales growth, operating income, asset tangibility, financial leverage, and the log of assets for the full non-US sample of countries, DMs only, EMs only, and US only. Each year, we winsorize Tobin's *q*, sales growth, leverage, operating income, and asset tangibility at the 1st and 99th percentiles to reduce the impact of outliers. This is done for the full sample each year and not by non-US only, DMs only, EMs only, or US only groups.

Table 3 reports that the mean (median) Tobin's *q* for all non-US firms in Panel a increases from 1.057 (0.826) before the GFC to 1.075 (0.789) after the GFC. For the US, mean and medians are higher, both before and after the GFC. The mean (median) for US firms is 1.398 (1.117) before the GFC and 1.470 (1.137) after the GFC in Panel d. For non-US countries, the mean *q* increases from before to after the GFC, but the median falls. Our first glimpse of the divergent evolution of DMs and EMs arises when we study the changes in mean (median) Tobin's *q* between DMs and EMs. The mean *q* among EM firms rises from 1.066 to 1.108 from before to after the GFC while that of DMs decreases from 1.052 to 1.047. The table shows that DM firms experience a notable decline in annualized sales growth from 10.5% to 6.3% from pre- to post-GFC, but so do EM firms from 12.1% to 4.6%. Operating income also declines among DM firms from 4.4% to 4.1%, but the decline among EMs is even more dramatic, from 5.9% to 4.5%. These changes contrast with an increase in operating income among US firms from 4.5% to 5.1% from before to after the GFC. Leverage and the Log(Assets) are relatively stable from before to after the GFC among all firms. Asset tangibility is stable among DM and US firms, but declines among EM firms. Asset tangibility and leverage ratios among US firms are notably lower than those among non-US firms.

3. The US premium from before the GFC to after the GFC.

As discussed in the introduction, the integration of global financial markets should foster a convergence over time of valuation ratios across markets. Since US firms are valued more highly than non-US firms before the GFC, we would expect this US premium to fall post-GFC if markets keep becoming more integrated. A reversal of financial globalization would be expected to have the opposite effect. US firms would still get the benefit of the US markets and institutions if financial globalization reverses, but the non-

US firms would see their access to US markets and institutions fall, which would decrease their valuation relative to the valuation of US firms.

To assess the systematic differences in valuations between US and non-US firms, we estimate a panel regression model of Tobin's q across firm-years on a set of non-US year fixed effects, $\beta_t^{non\text{-}US}$, where t equals 2001 to 2018, and year fixed effects, η_t, where t equals 2002 to 2018 so that 2001 is the omitted year. We relate Tobin's q to fundamental variables, X_{it}, that are predictive of future firm cash flows. These variables include Sales growth, Operating income, Leverage, Asset tangibility, Log(Assets), country-level GDP growth, both contemporaneous and one-year ahead, the US dollar exchange rate return (all denoted by Z_{it}^c), and industry fixed effects, δ_i. We use the Fama-French 49 industry classification but we exclude industries 45 to 48, which are Financials. Industry 1 is the omitted industry fixed effect. We include the one-year-ahead GDP growth rate to capture the forward-looking nature of Tobin's q, but our main inferences about the dynamics of the US premium described below remain in place without it. The regressions are estimated using OLS and the standard errors are clustered at the firm level, so that observations are assumed to be independent across firms but not within them. Specifically, we estimate:

$$q_{it} = \alpha + \beta_t^{non-US} + \gamma_1' X_{it} + \gamma_2' Z_{it}^c + \delta_i + \eta_t + \epsilon_{it}. \quad (1)$$

In Eq. (1), α is the mean value of Tobin's q for US firms in 2001 when the control variables equal zero and is not reported in the tables. The year fixed effects, η_t, capture the valuation deviations for US firms relative to 2001. The non-US year fixed effects (β_t^{non-US}) estimate the difference in valuations between non-US and US firms (i.e., non-US valuations minus US valuations) each year, after controlling for firm characteristics, GDP growth, the exchange rate, and industry fixed effects (Z_{it}^c). Consequently, β_t^{non-US} multiplied by -1 is our estimate of the US premium. For the remainder of the paper, we report the US premium each year as a positive difference in the valuations of US firms and those of comparable non-US firms.[2] To account for the potential influence of outliers, we also estimate quantile regressions that use the median as the measure of central tendency.

[2] Alternatively, in Eq. (1), we can estimate the US premium (US – non-US) directly by replacing the non-US year fixed effects, β_t^{non-US}, with US year fixed effects, β_t^{US}. If we do that, α is the mean value of Tobin's q for non-US firms in 2001 when the control variables equal zero and the year fixed effects, η_t, capture the valuation deviations for non-US firms relative to 2001. In this way, the US year fixed effects, β_t^{US}, would directly estimate the US premium each year. However, in later analysis, we need to estimate US premiums separately for non-US firms from DMs and from EMs. We cannot do that with US year fixed effects. For consistency, we estimate all of our regressions with non-

Panel a of Figure 1 plots the US premium each year, estimated from the OLS and median regressions. The OLS US premium is positive and significant each year from 2001 to 2018. That is, US firms have higher valuations compared to non-US firms after controlling for fundamentals. The estimates of the US premium obtained from the median regression are generally smaller in magnitude but they are also positive and significant in each of the 18 years of our period of analysis.

To test whether the US premium is significantly different after the crisis, we drop the year fixed effects and non-US year fixed effects in Eq. (1) and replace them with what we call period fixed effects. The β_t^{non-US} are now defined as non-US *period* fixed effects, where *t* equals 1 to 3 and where Period 1 is the pre-crisis period (2001 to 2007), Period 2 is the crisis period (2008 to 2009), and Period 3 is the post-crisis period (2010 to 2018). The η_t are US period fixed effects where *t* equals 2 or 3 so that Period 1 is the omitted pre-GFC period for US firms.

Models (1) and (2) of Table 4, Panel a report US premium estimates (β_t^{non-US} coefficients multiplied by –1) for each period along with the coefficients on the control variables and the R^2, adjusted R^2, and number of observations. Model (1) reports the OLS panel regression results and Model (2) reports the median regressions. The US premium is positive and significant in each period in both models. In Model (1), the US premium equals 0.218 in the pre-crisis period (or 15.5% of the average US firm's pre-GFC Tobin's *q* of 1.398), 0.115 in the crisis period, and 0.242 in the post-crisis period (or 16.5% of the average US firm post-GFC *q* of 1.470). As noted in Figure 1, the estimated premia in the median regression are smaller: 0.175, 0.109, and 0.202 in the respective periods. In both models, firms with higher sales growth and profitability have a significantly higher *q*, as confirmed in prior research, while firms with higher levels of leverage and greater asset tangibility, have a significantly lower *q*. Firms domiciled in countries with higher GDP growth, both contemporaneous and one-year-ahead, have a significantly higher *q*. Firms in countries experiencing a currency depreciation (higher US dollar exchange rate return) are associated with a higher Tobin's *q*. Larger firms have a lower *q* in the OLS regressions and a higher *q* in the median regressions. The (adjusted) *R*-squares are 23.5% and 22.0% for Models (1) and (2), respectively. *F*-tests in Panel b evaluate whether the US premium in the pre-crisis period equals that in the post-crisis period. For

US fixed effects that estimate the difference in valuations between non-US and US firms and multiply the coefficients by –1 to get the US premium.

the OLS regression, the difference is 0.024, but is not statistically significant as the *F*-statistic of 2.19 has a *p*-value of 0.139. When we turn to the median regression, the difference is slightly larger at 0.027 and is statistically significant at the 1% level. It follows that the evidence provides no support for the view that globalization keeps increasing after the GFC and mixed support for the view that it reverses.

To investigate formally whether the US premium evolves differently for DM and EM markets, we use the same approach as in Models (1) and (2). To estimate the US premium separately for DM and EM countries, we modify Eq. (1). We replace non-US year fixed effects, or β_t^{non-US}, with year fixed effects separately for non-US DMs, β_t^{DM}, and for non-US EMs, β_t^{EM}. That is, we estimate the modified panel regression:

$$q_{it} = \alpha + \beta_t^{DM} + \beta_t^{EM} + \gamma_1' X_{it} + \gamma_2' Z_{it}^c + \delta_i + \eta_t + \epsilon_{it.} \quad (2)$$

As above, the β_t^{DM} and β_t^{EM} coefficient estimates are multiplied by –1 in order to report the positive US premium each year for firms from DMs and for firms from EMs. The coefficients on the firm- and country-level controls are not allowed to differ for firms from DM and EM countries. The year and industry fixed effects, along with firm-level clustering of standard errors remain in effect as before. And, we estimate Eq. (2) using OLS and quantile regressions using the median.

Panels b and c of Figure 1 show estimates of OLS and median US premiums each year from 2001 to 2018 for, respectively, non-US DMs and EMs. The figure shows distinctly different patterns among DMs and EMs. For both DMs and EMs, the US premium is always positive. The OLS premium is almost always higher than the median premium. The difference between the OLS premium and the median premium is higher for EMs than DMs. The US premium for DMs appears to increase after the GFC. In contrast, it appears to fall for EMs.

In Models (3) and (4) of Table 4, we replace the DM-year, EM-year, and year fixed effects with period fixed effects and show the US premiums for DMs and EMs in each of the three periods. The table confirms that these US premiums in the pre-GFC, GFC, and post-GFC periods are statistically significantly positive and further that the pattern is one of divergence among DMs and convergence among EMs. That is, the OLS US premium for DMs in the pre-GFC period is 0.196 (or 14.0% of the average US firm's pre-GFC Tobin's *q* of 1.398) and *widens* to 0.267 in the post-GFC period (or 18.2% of the average US firm's post-GFC Tobin's *q* of 1.470). The OLS US premium for EMs in the pre-GFC period is 0.263 (18.8% of the

average US firm's pre-GFC *q*) and it *narrows* to 0.210 in the post-GFC period (14.3% of the average US firm's post-GFC *q*). Similar patterns of divergence among DMs and convergence among EMs arise for the median regressions. The coefficients on Sales growth, Operating income, Leverage, Asset tangibility, Log(Assets), as well as country-level GDP growth rates and exchange rate returns remain statistically significant with the same signs as in Models (1) and (2).

In Panel b of Table 4, we present *F*-statistics separately for DMs and EMs on the pre- and post-GFC differences in US premiums. For DMs, the average pre- and post-GFC difference of 0.071 (divergence) in the OLS regressions is associated with an *F*-statistic of 17.56 (*p*-value less than 0.001). For EMs, the average pre- and post-GFC difference of -0.052 (convergence) in the OLS regressions is associated with an *F*-statistic of 8.40 (*p*-value of 0.004). The respective *F*-statistics for divergence among DMs and convergence among EMs for the median regressions are associated with the same reliable statistical inference though the economic magnitudes implied by pre- and post-GFC differences are smaller.

These changes in US premiums among DMs and EMs are consistent with evidence that DMs and EMs evolve differently after the GFC, especially the evidence concerning the differing evolution of capital flows between DMs and EMs after the GFC discussed in the introduction. Before the GFC, our evidence is consistent with the view that both direct (investment restrictions) and indirect (weaker institutions) barriers that segment financial markets are likely to be larger among EMs than among DMs. While the US premiums for DMs and EMs are both reliably positive, the US premium for EMs is about 34% larger than it is for DMs. After the GFC, the US premium widens for DMs and narrows for EMs so that the US premium for DMs is larger than it is for EMs. Specifically, the EM US premium is about 21% lower than the DM US premium.

We now provide evidence on the robustness of the results for DMs and EMs presented in Table 4. First, though we adjust Tobin's *q* by capitalizing R&D for US firms, this approach is new in the international literature. It is therefore important to assess whether our inferences are impacted by this adjustment. Adjusting *q* by capitalizing R&D for US firms has the effect of reducing the US premium since it increases the denominator of *q* for US firms but not for non-US firms. We show in Model (1) of Table 5 that using the unadjusted Tobin's *q* increases the pre-GFC US premium for DMs from 0.196 (Table 4) to 0.374, nearly double the adjusted estimates. The US premium estimated using OLS increases by almost 100 basis points

from before the GFC (0.374) to after the GFC (0.465) without the adjustment, as opposed to by 71 basis points (from 0.196 to 0.267 in Table 4) with the adjustment. For EMs, using the adjusted Tobin's *q* reduces the pre-GFC US premium from 0.428 to 0.263. The post-GFC US premium estimated using OLS decreases by 20 basis points and the decrease is not statistically significant.

Since Tobin's *q* is the present value of future cash flows, it is important to investigate the sensitivity of our results to alternative measures of expectations. In Model (2) of Table 5, we add future sales growth to the regression. Doing so reduces the sample size, but does not affect our inferences. We also collected data on analyst forecasts to compute the change in forecasted earnings per dollar of book value between years one and two. These forecasts are available only for a subset of firms. We lose more than 100,000 firms when we estimate Model (3) with these forecasts. Using these forecasts reduces the increase in the US premium for DMs but increases the decrease in the US premium for EMs. As a result, the change in the difference in the US premium between DMs and EMs from before the GFC to after the GFC is largest for Model (4) at 0.157 and is highly significant.

Lastly, we investigate the stability of the changes in the US premium. We show the results in Model (4). We divide the post-GFC period into two equal sub-periods, from 2010 to 2014 and from 2015 to 2018. We find different results for DMs and EMs. For DMs, the US premium increases from the first sub-period to the second. For EMs, the US premium increases as well. While the US premium is significantly higher for both sub-periods for DMs relative to the pre-GFC period, the US premium for the first sub-period for EMs is significantly lower than for the pre-GFC period but the premium for the second sub-period is not significantly lower.

It follows from the evidence in Table 5 that we have robust evidence that the US premium for DMs increases after the GFC relative to the US premium for EMs. However, the estimates of the US premium presented in Table 4 are biased if there are omitted variables that are related to changes in Tobin's *q* but not included in our regression if these variables are correlated with the location of a firm. It is important to remember that our approach focuses on changes in the US premium rather than the level. Hence, for our results to be biased, it must be that the valuation of firms changes due to changes in correlated omitted variables. We deal with this issue in a number of different ways. First, we investigate in the next section the evolution of the US premium for cross-listed firms. Cross-listed firms should have a lower US premium

than other non-US firms. We find that this is the case, which supports our approach. Second, we examine possible explanations for the existence of the US premium arising from different evolutions of sectors and types of firms that may be reflected in our estimates of the US premium. We show that our inferences hold when we focus on subsamples that are not affected by these issues.

4. Financial globalization, cross-listings, and the US premium.

In this section, we investigate how the evolution of the US premium differs between non-US firms that are cross-listed in the US versus non-US firms that are not.[3] A long literature – see the review in Karolyi (2012) – supports the view that cross-listing leads to greater convergence in required expected returns for equity and in equity values. As a result, cross-listed firms should be valued more closely to US firms and, if there is a US premium with cross-listed firms, it should be smaller than for non-US firms that do not have a cross-listing in the US. If the US premium evolves for cross-listed firms as it does for other non-US firms, one would have to conclude that the results discussed in Section 4 are driven by factors other than the evolution of financial globalization.

To perform our analysis, we identify non-US firms that are cross-listed on the major US stock exchanges via Level 2 or 3 American Depositary Receipts (ADRs), via direct listings, or via other means from a variety of sources.[4] These sources include: the ADR divisions at Bank of New York Mellon, Citibank, JP Morgan, websites at the New York Stock Exchange and Nasdaq, the Center for Research in Security Prices (CRSP), firms' annual reports, SEC Form 20-F filings, and Factiva searches. Information from the various data sets is manually cross-checked and verified. Data provided by Citibank and CRSP

[3] Using a sample period that mostly precedes ours, namely 1989 to 2006, Frésard and Silva (2012) find a discount for cross-listed firms. They do not adjust for differences in the capitalization of R&D, so that their estimates of Tobin's *q* for US firms are higher than ours. The increase in the US premium that results from omitting the capitalization of R&D is consistent with the magnitude of their discount for cross-listed firms.

[4] Non-US firms can also secondarily list in US markets via Securities and Exchange Commission (SEC) Rule 144a private placements or in the over-the-counter (OTC) market, which includes in turn both Pink Sheets and OTC Bulletin Board issues. Before an SEC regulatory change on September 5, 2008, ADRs listed on the OTC market were generally sponsored ADRs, so that they were issued following an agreement between the depository bank and the issuer of the common stock. Firms with such OTC cross-listings as well as Rule 144a listings had higher valuations in most years compared to domestic peers though their valuations were higher before cross-listing as well (Doidge, Karolyi, and Stulz, 2004, 2009). Following the regulatory change of September 5, 2008, depository banks have initiated more than one thousand new unsponsored OTC ADR programs with ADRs trading on the Pink Sheets market. Existing evidence is that the value of the firm's common stock falls with the establishment of the unsponsored ADRs trading on the Pink Sheets market (Iliev, Miller, and Roth, 2014). As a result of these considerations, we do not separately examine firms with Rule 144a and OTC cross-listings.

allows us to keep track of both active and inactive issues for US listings. We keep track of listing dates and changes in firms' listing status, either through upgrades, downgrades, or de-listings. We set a dummy equal to one for the years in which a firm is listed on a US stock exchange at the end of the calendar year ("cross-listed"). All other firms are classified as local.

Table A.II in the Appendix presents the number of local and cross-listed firms from 2001 to 2018 for non-US countries and separately for DMs and EMs. As before, the sample includes non-financial firms with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in Worldscope/Compustat. The counts of cross-listed firms reveal a distinct pattern of declines in counts from a peak in 2003 of 525 to a low of 358 in 2012. Overall, the drop from the peak to the final count of 368 in 2018 represents a 30% decline in the number of cross-listed firms. The decline in counts almost exclusively takes place among DMs.

The next step in our analysis is to estimate the US premium each year from 2001 to 2018 for non-US countries, but separately for firms that have a cross-listing on a US exchange ("Cross") and those that do not ("Local"). To do so, we modify Eq. (1). We replace the year fixed effects for non-US countries (β_t^{non-US}) with year fixed effects for local firms (β_t^{Local}) and for cross-listed firms (β_t^{Cross}), where *t* equals 2001 to 2018. We estimate:

$$q_{it} = \alpha + \beta_t^{Local} + \beta_t^{Cross} + \gamma_1' X_{it} + \gamma_2' Z_{it}^c + \delta_i + \eta_t + \epsilon_{it.} \quad (3a)$$

We also estimate the US premiums separately for DMs and EMs:

$$q_{it} = \alpha + \beta_t^{DM,Local} + \beta_t^{DM,Cross} + \beta_t^{EM,Local} + \beta_t^{EM,Cross} + \gamma_1' X_{it} + \gamma_2' Z_{it}^c + \delta_i + \eta_t + \epsilon_{it.} \quad (3b)$$

The year and industry fixed effects plus firm-level clustering of standard errors remain in effect. As before, the US premium in year *t* equals the β_t coefficient multiplied by –1.

Doidge, Karolyi, and Stulz (2004) provide the first tests of the valuation differences between non-US firms that have a cross-listing on a US exchange and those that do not. They test whether valuations of cross-listed firms are different from the valuations of local firms after controlling for firm and country characteristics. They find evidence of a cross-listing premium, i.e., cross-listed firms have Tobin's *q* valuation ratios that are higher than local firms, an economically and statistically robust result. Doidge, Karolyi, and Stulz (2009) in a follow-up study confirm the persistence of the cross-listing premium for US cross-listings for most of the 1990s and early 2000s. Nevertheless, during the 2000s, important regulatory

changes took place with respect to cross-listings in US markets that have made it easier for such firms to delist and deregister from US markets to escape the regulatory burdens and to remove potential governance benefits. Ghosh and He (2017) point to a dissipation of the cross-listing premium following the passage of the Securities and Exchange Commission's Rule 12h-6. Gagnon and Karolyi (2018), by contrast, affirm a positive cross-listing valuation premium with a clinical study of another influential event; namely, the passage of the US Supreme Court's *Morrison v. National Australia Bank* ruling that restricts key fraud-related provisions to foreign firms cross-listed on US exchanges.

Figure 2, Panel a shows estimates of the US premium for non-US cross-listed and local firms. There is a sharp difference between the plot of the US premium for local firms and cross-listed firms. The US premium for local firms is positive and large. The US premium for cross-listed firms mostly hovers close to zero except during the GFC. Panels b and c of Figure 2 show results for, respectively, DMs and EMs. The evolution of the US premium for DM cross-listed firms is similar to the evolution of the US premium for cross-listed firms in Panel a. In contrast, the US premium for EM cross-listed firms tends to be positive outside the GFC. Though it is smaller than the US premium for local firms, it is not negligible.

Figure 3, Panel a shows the cross-listing premium for non-US firms. To estimate the cross-listing premium each year, from Eq. (3a), we take the difference between the coefficients for exchange listed firms, β_t^{Cross}, and local firms, β_t^{Local}. The cross-listing premium is stable across the sample period. It lies within a range of 0.25 to 0.40, with only one year with a notable decline during the GFC in 2008. These estimates are similar in magnitude to those reported in Doidge, Karolyi, and Stulz (2004, 2009) for earlier periods in the 1990s and early 2000s. Panel b of Figure 3 presents the estimates of the cross-listing premium separately for cross-listed firms (relative to their local counterparts) from DMs and EMs, from Eq. (3b). The magnitude of the premium is consistently higher for DMs with only one year's exception (2008) during the GFC. The cross-listing premium does not appear to be declining post-GFC for DMs, but it does appear to be declining for EMs.

In Table 6, Model (1) shows estimates of the US premium for non-US countries when we replace the year fixed effects in Eq. (3a) with period fixed effects. For brevity, we now suppress the coefficients on the control variables. We find no evidence of a positive US premium for cross-listed firms. In both the pre- and post-GFC period, the US premium for cross-listed firms is negative, but not significantly different from

zero. The difference between the pre- and post-GFC US premiums is not significantly different from zero either. Model (2) shows separate estimates of the US premium for cross-listed firms from DMs and EMs. In the pre-GFC period, cross-listed firms from DMs have a negative US premium (-0.093, with *t*-statistic of -2.77) and it becomes insignificant (-0.059, with a *t*-statistic of -1.11) post-GFC. The cross-listed firms from EMs have a US premium pre-GFC (0.099, *t*-statistic of 1.79), but it also becomes insignificant post-GFC. The change in the US premium for cross-listed firms is insignificant for both DM and EM firms. This evidence shows that, in contrast to local firms, cross-listed firms appear to be valued like US firms after the GFC, consistent with the view that cross-listing is a mechanism that fosters financial globalization.

We turn next to the cross-listing premium, which equals $\beta_t^{Cross} - \beta_t^{Local}$. We evaluate the statistical significance of the cross-listing premium with an *F*-test. In Table 6, Panel a, we report the associated *t*-statistic from this test. For non-US countries, in Model (1) of Table 6, the cross-listing premium is positive and significant both before (0.284), during (0.196), and after the GFC (0.280). There is no significant change in the cross-listing premium from before to after the GFC. The *F*-statistic associated with this small change is 0.01 (*p*-value of 0.921). Similarly, with Model (2), the premium is positive and significant both before, during, and after the GFC for cross-listed firms from DMs and from EMs alike, so that the cross-listing premium does not change for DM firms and EM firms from before the GFC to after the GFC.[5] The corresponding *F*-statistics for the changes in cross-listing premiums among DMs is 0.41 (*p*-value of 0.522) and among EMs is 0.18 (*p*-value of 0.672).

5. Understanding the differing evolution of the US premium between DMs and EMs.

In Section 3, we show that the worldwide US premium does not decrease from before to after the GFC and that the evidence for an increase is mixed. We then show the US premium evolves differently for DMs and EMs. Specifically, there is a significant increase in the US premium for DMs and a significant decrease for EMs. We next investigate several possible explanations for our findings about the evolution of the US premium. These investigations are helpful to understand whether industry or firm characteristics omitted

[5] Though the earlier work uncovering the cross-listing premium by Doidge, Karolyi, and Stulz (2004, 2009) did not evaluate its sensitivity to whether the country is an emerging or developed market, it did evaluate several correlates, including (log of) Gross National Product (GDP), stock market capitalization relative to GDP, liquidity ratio of value of shares traded to average market capitalization from the IFC Emerging Stock Markets Handbook, as well as anti-director rights, accounting standards, and judicial efficiency from La Porta, Lopez-de-Silanes, and Shleifer (1998).

from our base regression models can explain our results, as well as in providing further insights in the nature of the US premium and of its dynamics.

5.1. The US premium and industry changes.

As discussed in the introduction, the GFC was a massive shock to international trade flows, but it affected EMs differently from DMs so that the share of EMs in global trade increased. This differential impact of the trade shock across DMs and EMs could produce an increase in the US premium for firms in DMs and a decrease in the US premium for firms in EMs if our valuation model does not capture the full impact of the trade shock on valuations through our control variables. Therefore, we explore the evolution of firm valuations among DMs and EMs separately for traded goods and non-traded goods sectors. To define traded versus non-traded goods sectors, we use information in Mian and Sufi (2014, Appendix Table 1 of their 2012 working paper). The traded goods sector mostly includes manufacturing, e.g., motor vehicle parts, semiconductor and other electronics, aerospace products and parts, etc. The non-traded goods sector includes the retail sector and restaurants, construction, and other sectors such as hospitals, traveler accommodation, and building services.

To estimate US premiums for traded goods ("Traded") and non-traded goods ("Not Traded") sectors for DM and EM firms, we modify Eq. (2). We replace period fixed effects, η_t, with period fixed effects for firms in Traded sectors (η_t^T) and for firms in Not Traded sectors (η_t^{NT}). We also replace the period fixed effects for non-US developed markets (β_t^{DM}) and for emerging markets (β_t^{EM}) with period fixed effects by type ($\beta_t^{DM,T}$, $\beta_t^{DM,NT}$, $\beta_t^{EM,T}$, $\beta_t^{EM,NT}$). We estimate:

$$q_{it} = \alpha + \beta_t^{DM,T} + \beta_t^{DM,NT} + \beta_t^{EM,T} + \beta_t^{EM,NT} + \gamma_1' X_{it} + \gamma_2' Z_{it}^c + \delta_i + \eta_t^T + \eta_t^{NT} + \epsilon_{it}. \quad (4)$$

Note that the coefficients on the firm- and country-level controls are not allowed to differ for firms from DM and EM countries or from different sectors. The industry fixed effects plus firm-level clustering of standard errors remain in effect. As before, the US premium between US firms and non-US DM firms for each sector and between US firms and EM firms for each sector in each period *t* equals the β_t coefficient multiplied by –1. The US premiums are estimated each period, after controlling for firm characteristics, GDP growth, the exchange rate, and industry fixed effects.

Model (1) in Table 7 presents the results on the pre- versus post-GFC US premium for DMs versus EMs, and separately for those firms in the traded goods sector and those in the non-traded goods sector. Again, we do not report the coefficients on the control variables for the sake of brevity. For firms in DMs, the US premium evolves similarly for firms in the traded goods sector and non-traded goods sector. There is a statistically significant widening of the US premium among DM firms in the traded goods sector (0.199 pre-GFC to 0.291 post-GFC) that is somewhat more acute than that in the non-traded goods sector (0.191 pre-GFC to 0.238 post GFC). The respective *F*-statistics on the pre- versus post-GFC differences imply both changes are significant (*F*-statistics of 15.59, *p*-value less than 0.001, for traded goods DM firms and of 3.73, *p*-value of 0.053, for non-traded goods DM firms). There is a significant narrowing in the US premium among EMs in the traded goods sector (0.276 pre-GFC to 0.225 post-GFC) and in the non-traded goods sector (0.244 pre-GFC to 0.191 post-GFC). Both changes are of similar magnitude and both are statistically significant differences by their respective *F*-statistics. We conclude from this analysis that the trade shock does not explain why the US premium increases for DMs and falls for EMs after the GFC.

The US also experienced a post-GFC boom in valuations of firms in technology-related sectors. If we define firms in Industry 5 (business equipment, computers, software and electronic equipment) in the Fama and French (1997) 10-industry classification scheme as high-tech firms, 13.33% of firm-year observations are from high-tech firms in DMs, 13.77% in EMs, and 23.15% in the US.[6] It is therefore plausible that the growth in valuations of technology firms in the US would show up as an increase in the US premium if our regression model includes systematic errors for US tech firms, so that these firms are valued more than our model predicts because of characteristics we do not capture. If the superior performance of US tech firms is the explanation for the evolution of the US premium, we should find that the US premium increases among DMs and among EMs only within the tech sector and not within the non-tech sector. To examine the US premium for high-tech firms, we adapt the same approach as in Eq. (4) except that we define the two types of firms as "High-tech" versus "Not high-tech."

Model (2) in Table 7 presents the findings. We find that our overall results are concentrated among firms outside the high-tech sector, so that the success of US tech firms cannot be the explanation for our

[6] The fraction of firm-year observations from high-tech firms is stable across the sample period for DMs and EMs, but is slightly lower in the US after the GFC.

findings. For firms in DMs, the US premium does not change from before to after the GFC for firms in the high-tech sector. The US premium for DMs in the high-tech sector is 0.150 pre-GFC and it widens to 0.175 post-GFC but the difference is insignificant (*F*-statistic of 0.27, *p*-value of 0.60). Among DM firms that are outside the high-tech sector, the US premium expands, as in previous tables – the pre-GFC US premium is 0.205 and it widens significantly to 0.283 post-GFC (*F*-statistic of 19.07, *p*-value less than 0.001). For EMs, the US premium significantly widens for firms in the high-tech sector consistent with the premise of a US-specific technology valuation boom. The pre-GFC US premium among EMs in the high-tech sector is 0.186 and it widens to 0.278 post-GFC. This difference is statistically significant (*F*-statistic of 3.82, *p*-value of 0.05). The narrowing in the US premium among EM firms that we see overall is concentrated among firms outside the high-tech sector (0.279 pre-GFC to 0.203 post-GFC).

5.2. The role of differences in firm characteristics.

Typically, young firms have growth opportunities and invest a lot. As they do so, some growth opportunities are used up, but new growth opportunities only infrequently replace the ones that are used up. As a result, Tobin's *q* falls with firm age (Loderer, Stulz, and Waelchli, 2016). Kahle and Stulz (2017) provide data showing that US firms become older during our sample period. To the extent that the population of firms ages differently across countries, this could lead to a change in the US premium that would have nothing to do with the GFC. Below, we investigate whether shifts in firm-age distributions can explain the changes in the US premium.

Relatedly, an important change among US firms over time is that intangible assets have become more important (see Kahle and Stulz, 2017, for data and references). Though R&D is an important source of intangible assets for firms, other intangible assets, such as organization capital, have grown in importance. As a result of this evolution, tangible assets are less important on balance sheets. In general, only a fraction of all intangible assets appears on a firm's balance sheet. As discussed earlier for R&D, countries can differ in how they allow firms to capitalize intangible investments such as R&D. In general, many forms of intangible assets are not capitalized at all across the world. If these forms of intangible assets have become more important in the US compared to non-US DMs and EMs, this could lead to an increase in the US premium. Unfortunately, for a large, global sample like ours, there is no easy way to obtain reliable

estimates of non-balance-sheet intangible assets. Instead, we investigate whether the US premium evolves differently for firms depending on the importance on their balance sheet of reported tangible assets. We take the percentage of assets that are tangible assets as a proxy for the importance of intangible assets – that is, firms with a low fraction of tangible assets on their balance sheet are intangible-asset-intensive firms.

Table 8 presents our findings examining the impact of possible changes in firm-age distribution and tangibility of assets across countries on our results. Our asset tangibility ratio equals net property, plant, and equipment (gross minus accumulated depreciation) divided by total assets. We define a firm as of high asset tangibility if its ratio exceeds the median value of asset tangibility in 2009 computed for all firms in the restricted sample. A firm is classified as old if it is listed for more than five years. Age is the current year minus the year of the first listing given by BDATE code in Datastream for non-US firms and by LINKDT in Compustat, the first effective link date between CRSP and Compustat for US firms.

Table 8 presents the findings for old versus young firms in Model (1) and for high- versus low-tangibility in Model (2) using the same specification of Eq. (4) and as exhibited in Table 7 for the sector splits. In Model (1), we see the familiar widening post-GFC of the US premium among DM firms not only among the old firms, but also among the young firms. Both are statistically significant differences. Interestingly, though the absolute magnitude of the US premium among younger firms is smaller, the economic magnitude of the *change* in the US premium from before to after the GFC is relatively greater for those younger firms. The pre-GFC US premium of 0.098 doubles in magnitude to 0.179, while that for older firms widens from 0.224 pre-GFC to 0.269 post-GFC. Both are statistically significant differences from pre- to post-GFC by the *F*-statistics, but economically the change for younger firms is much larger. For the EM firms, there is a stark difference in the evolution of the US premium between older and younger firms. The familiar narrowing of the US premium in EMs arises only for the older firms from 0.286 pre-GFC to 0.205 post-GFC; Panel b confirms the difference is statistically significant (*F*-statistic of 17.5, *p*-value less than 0.001). For younger firms in EMs, there even appears to be a widening of the US premium from 0.190 pre-GFC to 0.227 post-GFC, though it is not significant (*p*-value of 0.386).

Model (2) reveals that the widening of the US premium among DMs and the narrowing of the US premium among EMs is concentrated among those firms with high asset-tangibility ratios. The pre-GFC US premium for DMs of 0.167 nearly doubles in magnitude to 0.278 post-GFC among DMs, a significant

difference (*F*-statistic of 25.16, *p*-value less than 0.001), and the pre-GFC US premium for EMs of 0.257 narrows to 0.186 post-GFC (F-statistic of 9.10, *p*-value of 0.003). Among low-asset-tangibility firms around the world, we do see a significant widening of the US premium gap among DMs from 0.215 pre-GFC to 0.254 post-GFC, but no significant difference post-GFC for EMs.

It is striking that our main findings on the differing evolution of the US premium among DMs and EMs from pre- to post-GFC mostly concentrate among older firms and those that have proportionally more tangible assets. It affirms the findings in the previous sub-section at the sector level that the results are stronger among firms that are not in the high-tech sector.

We conduct one more test of the hypothesis that links trade integration with financial integration, but now the test is at the firm-level. That is, we distinguish between firms around the world that are multinationals (MNCs) and those that are domestic firms. We do so using definitions of MNCs from Dyreng, Hanlon, Maydew, and Thornock (2017) and Jang, Wang, and Zhang (2020). Specifically, we define a firm as an MNC in a year if the absolute value of foreign income or foreign income taxes is greater than zero in that year, or in any of the previous three years. Using this definition, the number of MNCs in the US falls from about 1,516 in 2001 to 1,489 in 2018, but given the decline in the number of US firms, the percentage of MNCs in the sample increases from 52% to 69%. The MNC sample in DMs declines from 2,114 in 2001 (33%) to 1,547 in 2018 (21%) while the number of MNCs in EMs grows from 450 in 2001 (13%) to 774 in 2018 (7%). Model (3) in Table 8 shows that the widening US premium among DMs arises in both the MNC and non-MNC subsamples, like we found for traded-goods and non-traded-goods sectors in Table 7, but the effect is stronger in the MNC sub-sample (increase from 0.144 pre-GFC to 0.224 post-GFC). Similarly to the results in the non-traded-goods sectors in Table 7, the narrowing of the US premium among EMs arises among the non-MNC subsample.

6. Climate change risks and the US premium.

As discussed earlier, the debate around whether deglobalization is taking place focuses on the role of the GFC. The argument is that the GFC caused a reversal of globalization, starting with large drops in trade in goods and trade in financial assets. However, an important development during the post-GFC period is that governments, investors, and firms become increasingly more concerned about environmental risks

generally and climate change related risks specifically, but have done so differentially between the US, DMs and EMs. We next explore an important potential implication of this development for our main findings.

It is well-known that a growing fraction of investors are tailoring their portfolios so that they invest less or not at all in so-called "brown" stocks, namely stocks of firms that are high carbon producers or otherwise have a detrimental impact on the environment (for reviews, see, among others, Giglio, Kelly, and Stroebel, 2021; Matos, 2020; Starks, 2023). If investors have a home bias, changes in the demand for brown stocks that differ across countries will impact brown-versus-not brown stock valuations differently across countries. Non-US DMs appear much more focused on climate issues and their investors much more reluctant to invest in brown stocks than either the US or EMs. According to Morningstar's global sustainable fund statistics as of the first quarter of 2023, Europe represents 84% of the global $2.75 trillion sustainable assets under management and 77%, or 5,410 of the 7,030 count of sustainable funds.[7] It is, therefore, possible that attitudes of investors and regulators towards high carbon producers may have contributed to deglobalization by impacting the cost of capital of firms differently across countries. This factor contributing to deglobalization is likely unrelated to the GFC.

It is plausible that differing attitudes of countries towards climate change risks could play an important role in the differing evolution of the US premium between DMs and EMs. We have already seen that this differing evolution is stronger in older firms with more tangible assets and firms that are not in tech industries. Brown firms are more likely to be older firms with more tangible assets and are less likely to be in tech industries.

To examine the conjecture that differing attitudes of countries towards climate change risks contributed to the increase in the US premium for non-US DMs, we obtain data from the MSCI database of stock-level ESG Ratings. The MSCI ESG Ratings are a successor to the MSCI KLD data. MSCI is the world's largest provider of ESG ratings (Eccles and Stroehle, 2018; Pastor, Stambaugh, and Taylor, 2022) and covers more firms than other ESG raters, such as Asset4, KLD, RobescoSAM, Sustainalytics, and Vigeo Eiris (Berg et al., 2022). These ratings are produced using public information about companies. MSCI looks at 33 ESG

[7] See April 25, 2023 Morningstar Report, entitled "Global Sustainable Fund Flows: Q1 2023 in Review," and especially Exhibits 1 and 2.

key issues divided into three pillars: environmental, social, and governance. For each firm, the annually updated data is carried forward monthly until the next update. To get annual data for each company *i*, we keep the last available observation in a year. We use the "Environmental Pillar Score," or E_Score. We compute E_score averages across all firms in each of the Fama-French 49 industries each year. Some industries have few firms with E_Scores earlier in our sample period. Therefore, we use industry average E_Scores in 2018 to rank industries. We select the 15 industries with the worst E_Scores scores as "brown" industries. We then estimate the US premium separately for brown and other, not-brown industries for DMs and EMs following the format of the regressions in Tables 7 and 8.

We report these results in Table 9, and again for brevity we do not report coefficients for the control variables. The increase in the US premium for brown industries in DMs is large. Before the GFC, the premium for these brown industries is 0.159, or 11.4% of the average US firm Tobin's *q* of 1.40. After the GFC, the premium almost doubles to 19.4% (or 0.285 relative to average US Tobin's *q* of 1.47). The accompanying *F*-statistic of 19.11 (*p*-value less than 0.001) confirms this economically large increase in the US premium is statistically significant. The US premium still increases for other, not-brown industries in DMs, but by a much smaller increment economically as it goes from 14.9% (0.209 on the same average US Tobin's *q* of 1.40) to 17.6% (0.258 relative to 1.47). It is notable that, before the GFC, the US premium for brown industries in DMs is lower than it is for other industries (0.159 versus 0.209), but after the GFC the US premium is higher for brown industries (0.285 versus 0.258). These changes in the US premium between brown and other firms in DMs are economically large and statistically significant.

Turning to EMs, there is no difference in the evolution of the US premium for brown industries and other industries. Specifically, the premium for brown industries falls from 18.2% (0.254 relative to the average US Tobin's *q* of 1.40) to 13.8% (or 0.203 relative to the average US Tobin's *q* of 1.47) with a *F*-statistic of 2.712 (*p*-value of 0.10). The premium for other, not-brown industries similarly falls from 19.0% (0.265) to 14.5% (0.213). This decline in premium is significant at the 2% level (*F*-statistic of 5.67). In contrast with the DM results, the changes in US premiums among brown and other, not-brown EM firms is statistically indistinguishable.

The current relative valuations of brown firms are quite different after the GFC than before. This section shows that this evolution is central to the increase in the US premium for DM firms and the decrease in the

US premium for EM firms. Before the GFC, brown firms do not have a greater US premium in DMs than other firms, but after the GFC they do. In contrast, the US premium falls similarly for brown and other firms in EMs. This evolution makes sense given that investors in DMs appear to be more concerned about climate risks than investors in the US or in EMs, and that the governments in these countries approach transition commitments and attendant regulations and laws quite differently.

7. Conclusions.

If the world were flat because of globalization, we would expect that it does not matter where a firm is located for its valuation. Firms with identical operating cash flows located in different countries would be valued the same. It is well-known that before the GFC, on average, US firms were valued more highly than non-US firms. We call this valuation difference the US premium. We show that, for firms from DMs, the US premium is larger after the crisis than before. By contrast, the US premium for firms from EMs falls. In percentage terms, the US premium for DMs increases by 27% while the US premium for EMs falls by 24%. We investigate extensively whether the contrasting evolutions of the US premium for firms from DMs compared to those from EMs is due to differences in industry composition or in firm characteristics across these countries. We find that the US premium for DM and EM firms evolves more similarly for young firms and firms with less tangible assets. So, the differing evolution of the US premium for DM firms and for EM firms is concentrated among old economy firms – older firms in industries that have a high ratio of tangible assets to total assets.

So, is financial globalization in reverse after the 2008 global financial crisis? Our evidence suggests that it is between the US and DMs, but not between the US and EMs. This is a counterintuitive finding at first. At least, it is so until we learn that the main mechanism that seems to lead to this differing globalization reversal between the US and DMs likely has nothing to do with the 2008 crisis itself. It seems instead to be the greater focus on sustainability and ESG objectives in DMs than in the US and in EMs. We find that the valuations of firms in brown industries in non-US DMs fell significantly relative to comparable firm valuations in the US and this decline among brown industries in EMs did not take place. Though this mechanism does not explain the increase in the US premium for firms in DMs fully, it explains much of that increase. It follows from this that differences across countries in the importance given to sustainability and ESG considerations can decrease the extent to which financial markets across the world are integrated.

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Table 1. Number of firms by year.

This table reports the number of firms in the sample for non-US countries and for the US. The sample includes 51 countries that have at least five years of sequential data with complete data on firm characteristics for at least 20 firms. We drop country-years that do not have at least 20 firms with complete data in a given year (see Section 2). For this set of country-years, Panel a shows the number of non-US (US) firms in Worldscope (Compustat) that have data on market cap in a given year. Non-US countries are divided into developed and emerging countries based on MSCI classifications ("Unrestricted sample"). The period before the global financial crisis, Pre-GFC, includes 2001 to 2007. The period after the crisis, Post-GFC, includes 2010 to 2018. Panel b reports the number of non-financial firms with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics (Tobin's *q*, sales growth, operating income, leverage, asset tangibility, and assets) ("Restricted sample").

Panel a. Unrestricted sample

Year	All non-US	Developed markets	Emerging markets	US
2001	18,772	12,946	5,826	5,752
2002	19,163	13,007	6,156	5,319
2003	19,484	12,971	6,513	5,000
2004	20,399	13,324	7,075	4,965
2005	23,710	14,979	8,731	4,888
2006	26,062	15,672	10,390	4,802
2007	27,406	16,312	11,094	4,717
2008	27,807	16,272	11,535	4,467
2009	27,404	15,802	11,602	4,231
2010	27,467	15,622	11,845	4,092
2011	27,583	15,433	12,150	3,963
2012	27,405	15,108	12,297	3,866
2013	27,450	14,990	12,460	3,893
2014	27,438	14,935	12,503	4,023
2015	27,522	14,948	12,574	3,980
2016	27,546	14,855	12,691	3,858
2017	27,885	15,002	12,883	3,806
2018	28,496	15,408	13,088	3,761
Total	458,999	267,586	191,413	79,383
Total Pre-GFC	154,996	99,211	55,785	35,443
Total Post-GFC	248,792	136,301	112,491	35,242

Panel b. Restricted sample

Year	All non-US	Developed Markets	Emerging Markets	US
2001	8,898	6,490	2,408	2,922
2002	9,362	6,644	2,718	2,966
2003	9,832	6,759	3,073	2,866
2004	10,249	6,896	3,353	2,850
2005	10,723	7,107	3,616	2,738
2006	11,302	7,378	3,924	2,710
2007	12,451	7,737	4,714	2,642
2008	13,035	7,776	5,259	2,591
2009	13,077	7,685	5,392	2,578
2010	13,446	7,704	5,742	2,493
2011	13,701	7,711	5,990	2,416
2012	13,700	7,616	6,084	2,358
2013	13,771	7,576	6,195	2,325
2014	13,778	7,567	6,211	2,307
2015	13,783	7,545	6,238	2,289
2016	13,732	7,458	6,274	2,277
2017	13,927	7,465	6,462	2,224
2018	13,859	7,395	6,464	2,172
Total	222,626	132,509	90,117	45,724
Total Pre-GFC	72,817	49,011	23,806	19,694
Total Post-GFC	123,697	68,037	55,660	20,861

Table 2. Average number of firms by country.

This table reports the average number of firms in each country. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. Non-US countries are divided into developed and emerging countries based on MSCI classifications. For developed markets, Panel a reports the years in which a country is included in the sample, the average number of firms in the country over the full period from 2001 to 2018, the period before the global financial crisis, Pre-GFC, from 2001 to 2007, and the period after the crisis, Post-GFC, from 2010 to 2018. Panels b and c show the same for the US and for emerging markets.

Panel a. Developed markets

Nation	Years in sample	Full Period	Pre-GFC	Post-GFC
Australia	2001-2018	370	260	445
Austria	2001-2018	53	52	51
Belgium	2001-2018	74	76	71
Canada	2001-2018	498	468	508
Denmark	2001-2018	74	76	72
Finland	2001-2018	84	77	88
France	2001-2018	368	378	355
Germany	2001-2018	367	390	344
Hong Kong	2001-2018	655	455	809
Ireland-Rep	2001-2018	40	42	39
Israel	2001-2018	157	87	205
Italy	2001-2018	184	180	183
Japan	2001-2018	2,811	2,882	2,738
Netherlands	2001-2018	108	119	98
New Zealand	2001-2018	54	41	65
Norway	2001-2018	101	88	108
Portugal	2001-2018	42	42	40
Singapore	2001-2018	287	222	335
Spain	2001-2018	102	101	102
Sweden	2001-2018	159	137	177
Switzerland	2001-2018	154	156	151
United Kingdom	2001-2018	620	671	574
Average		335	318	344

Panel b. US

Nation	Years in sample	Full period	2001-2018	Post-GFC
US	2001-2018	2,486	2,741	2,277

Panel c. Emerging markets

Nation	Years in sample	Full Period	Pre-GFC	Post-GFC
Argentina	2001-2018	45	42	47
Brazil	2001-2018	213	197	223
Bulgaria	2007-2018	30	24	30
Chile	2001-2018	104	94	110
Colombia	2003-2018	25	19	29
Croatia	2007-2018	60	65	58
Czech Republic	2001-2018	16	24	10
Egypt	2004-2018	67	38	76
Greece	2001-2018	155	167	140
India	2001-2018	713	307	1,008
Indonesia	2001-2018	205	129	269
Jordan	2007-2018	26	20	27
Luxembourg	2003-2018	27	21	31
Malaysia	2001-2018	401	342	443
Mexico	2001-2018	89	88	90
Nigeria	2008-2018	31	.	33
Pakistan	2001-2018	83	49	108
Peru	2001-2018	55	34	69
Philippines	2001-2018	89	70	105
Poland	2001-2018	129	69	172
Romania	2007-2018	36	32	36
Russian Fed	2001-2018	182	89	219
South Africa	2001-2018	143	125	158
South Korea	2001-2018	919	612	1,165
Taiwan	2001-2018	848	638	1,015
Thailand	2001-2018	228	160	282
Turkey	2001-2018	155	111	188
Ukraine	2007-2018	40	22	43
Average		183	133	221

Table 3. Summary statistics.

This table reports firm-level summary statistics. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. Variable definitions are in Appendix Table A.I. Non-US countries are divided into developed and emerging countries based on MSCI classifications. Panels a, b, c, and d show summary statistics for all non-US countries, for developed markets, for emerging markets, and for the US, respectively. Summary statistics are provided for the full period from 2001 to 2018, the period before the global financial crisis, Pre-GFC, from 2001 to 2007, and the period after the crisis, Post-GFC, from 2010 to 2018.

	N	Tobin's *q*	Sales Growth	Operating Income	Asset Tangibility	Leverage	Log(Assets)
				Panel a. All non-US			
Full period	222,626						
Mean		1.046	0.078	0.045	0.329	0.322	13.101
Median		0.789	0.032	0.047	0.295	0.274	12.794
Pre-GFC	72,817						
Mean		1.057	0.110	0.049	0.344	0.319	13.138
Median		0.826	0.051	0.049	0.316	0.271	12.823
Post-GFC	123,697						
Mean		1.075	0.055	0.043	0.319	0.316	13.084
Median		0.789	0.022	0.045	0.280	0.265	12.782
				Panel b. Developed markets			
Full period	132,509						
Mean		1.025	0.082	0.042	0.302	0.304	13.252
Median		0.776	0.029	0.045	0.260	0.253	12.945
Pre-GFC	49,011						
Mean		1.052	0.105	0.044	0.318	0.306	13.243
Median		0.825	0.043	0.046	0.286	0.257	12.925
Post-GFC	68,037						
Mean		1.047	0.063	0.041	0.290	0.292	13.262
Median		0.768	0.021	0.045	0.241	0.238	12.970
				Panel c. Emerging markets			
Full period	90,117						
Mean		1.076	0.071	0.049	0.369	0.349	12.880
Median		0.806	0.038	0.049	0.352	0.308	12.592
Pre-GFC	23,806						
Mean		1.066	0.121	0.059	0.398	0.347	12.920
Median		0.829	0.074	0.056	0.388	0.302	12.644
Post-GFC	55,660						
Mean		1.108	0.046	0.045	0.354	0.345	12.867
Median		0.812	0.023	0.045	0.333	0.304	12.572
				Panel d. US			
Full period	45,724						
Mean		1.396	0.085	0.048	0.260	0.225	13.840
Median		1.097	0.040	0.066	0.166	0.158	13.664
Pre-GFC	19,694						
Mean		1.398	0.102	0.045	0.255	0.216	13.631
Median		1.117	0.053	0.065	0.172	0.141	13.417
Post-GFC	20,861						
Mean		1.470	0.075	0.051	0.263	0.225	14.051
Median		1.137	0.033	0.067	0.160	0.165	13.943

Table 4. The US premium before and after the global financial crisis.

Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's q. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{non-US}, from Eq. (1), is the estimate of the difference in valuations between non-US and US firms in each period *t*. β_t^{DM} and β_t^{EM}, from Eq. (2) provide the same estimates, separately for firms from DMs and EMs and US firms. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. A constant is estimated but not reported. Models 1 and 3 (2 and 4) are OLS (median) regressions. *t*-statistics are adjusted for clustering by firm. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1) OLS	(2) Median	(3) OLS		(4) Median	
Panel a. Regressions	Non-US	Non-US	DM	EM	DM	EM
US Premium: Pre-GFC	0.218***	0.175***	0.196***	0.263***	0.161***	0.198***
	(16.91)	(21.77)	(14.74)	(17.18)	(19.57)	(20.88)
US Premium: GFC	0.115***	0.109***	0.106***	0.127***	0.116***	0.093***
	(8.68)	(11.93)	(7.71)	(8.12)	(12.22)	(8.70)
US Premium: Post-GFC	0.242***	0.202***	0.267***	0.210***	0.224***	0.168***
	(14.77)	(20.33)	(15.64)	(11.76)	(21.77)	(15.46)
Sales growth	0.214***	0.140***	0.215***		0.141***	
	(21.70)	(25.52)	(21.89)		(24.44)	
Operating income	1.980***	1.675***	1.980***		1.673***	
	(25.04)	(38.63)	(25.07)		(37.51)	
Leverage	-0.896***	-0.484***	-0.898***		-0.488***	
	(-55.86)	(-47.59)	(-56.05)		(-48.43)	
Asset tangibility	-0.028	0.082***	-0.0292		0.0790***	
	(-1.44)	(7.13)	(-1.52)		(6.85)	
Log(Assets)	-0.019***	0.012***	-0.0189***		0.0124***	
	(-7.18)	(7.80)	(-6.91)		(8.03)	
GDP growth	1.765***	0.926***	1.764***		0.816***	
	(15.52)	(14.89)	(14.90)		(12.51)	
GDP growth (+1)	2.190***	1.342***	2.208***		1.277***	
	(25.93)	(27.06)	(25.06)		(24.46)	
Exchange Rate	-0.050***	-0.067***	-0.0520***		-0.0767***	
	(-3.37)	(-8.14)	(-3.54)		(-9.15)	
Period FE	Yes	Yes	Yes		Yes	
Industry FE	Yes	Yes	Yes		Yes	
Observations	268,350	268,350	268,350		268,350	
R-squared	0.235	0.220	0.236		0.220	
Adjusted R-squared	0.235		0.236			

Table 4, continued.

	(1) OLS	(2) Median	(3) OLS		(4) Median	
Panel b. F-tests	Non-US	Non-US	DM	EM	DM	EM
Post-GFC – Pre-GFC	0.024	0.027***	0.071***	-0.052***	0.063***	-0.030***
F-statistic	2.19	7.45	17.56	8.40	37.22	7.32
p-value	(0.139)	(0.006)	(0.000)	(0.004)	(0.000)	(0.007)
Pre-GFC: DM – EM			-0.067***		-0.037***	
F-statistic			33.33		26.77	
p-value			(0.000)		(0.000)	
Post-GFC: DM – EM			0.057***		0.056***	
F-statistic			22.708		73.12	
p-value			(0.000)		(0.000)	
Post – Pre: DM – EM			0.123***		0.093***	
F-statistic			94.22		178.55	
p-value			(0.000)		(0.000)	

Table 5. The US premium before and after the global financial crisis: Robustness checks.

Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. With the exception of model (1), R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{DM} and β_t^{EM}, from Eq. (2), are estimates of the difference in valuations between non-US firms from DMs and EMs and US firms each period *t*. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. The table reports variations of model (3) of Table 4, where Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. Model (1) does not capitalize R&D, model (2) adds future sales growth, model (3) adds analyst forecasts, and model (4) splits the post-GFC period into two sub-periods, where Post-GFC 1 is from 2010 to 2014, and Post-GFC 2 is from 2015 to 2018. A constant is estimated but not reported. *t*-statistics are adjusted for clustering by firm. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)		(2)		(3)		(4)	
Panel a. Regressions	DM	EM	DM	EM	DM	EM	DM	EM
US Premium: Pre-GFC	0.374***	0.428***	0.202***	0.277***	0.161***	0.202***	0.194***	0.266***
	(24.06)	(24.47)	(14.80)	(17.77)	(10.93)	(10.58)	(14.58)	(17.37)
US Premium: GFC	0.249***	0.260***	0.118***	0.141***	0.0603***	0.0446**	0.105***	0.134***
	(15.68)	(14.75)	(8.38)	(8.81)	(3.87)	(2.21)	(7.65)	(8.57)
US Premium: Post-GFC	0.465***	0.403***	0.273***	0.208***	0.184***	0.0683***		
	(23.14)	(19.42)	(15.57)	(11.28)	(10.27)	(3.41)		
US Premium: Post-GFC 1							0.255***	0.196***
							(15.03)	(10.92)
US Premium: Post-GFC 2							0.288***	0.250***
							(13.43)	(11.31)
Sales growth	0.272***		0.202***		0.307***		0.215***	
	(24.99)		(20.36)		(22.41)		(21.91)	
Operating income	1.098***		2.162***		3.437***		1.998***	
	(14.48)		(25.27)		(31.45)		(25.26)	
Leverage	-1.025***		-0.869***		-1.284***		-0.891***	
	(-60.57)		(-53.08)		(-55.86)		(-55.73)	
Asset tangibility	-0.0636***		-0.0267		0.0179		-0.0241	
	(-3.15)		(-1.36)		(0.72)		(-1.26)	
Log(Assets)	-0.0196***		-0.0169***		-0.0202***		-0.0191***	
	(-6.77)		(-6.12)		(-6.41)		(-7.01)	
GDP growth	1.872***		1.532***		1.448***		1.923***	
	(15.38)		(13.20)		(8.55)		(16.05)	
GDP growth (+1)	2.191***		1.968***		2.349***		2.188***	
	(23.98)		(21.94)		(18.89)		(24.85)	
Exchange Rate	-0.0299*		-0.0847***		-0.125***		-0.0202	
	(-1.95)		(-5.95)		(-7.02)		(-1.36)	
Sales Growth (+1)			0.260***					
			(32.46)					
EPS forecast difference					0.0508***			
					(11.61)			
Period FE	Yes		Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes		Yes	
Observations	268,350		241,044		143,353		268,350	
R-squared	0.231		0.256		0.343		0.240	
Adjusted R-squared	0.231		0.256		0.343		0.240	

Table 5, continued.

Panel b. F-tests	DM	EM	DM	EM	DM	EM	DM	EM
Post-GFC – Pre-GFC	0.090***	-0.025	0.071***	-0.069***	0.023	-0.134***		
F-statistic	19.82	1.37	16.98	13.96	1.49	34.16		
p-value	(0.000)	(0.242)	(0.000)	(0.000)	(0.222)	(0.000)		
Pre-GFC: DM – EM:	-0.053***		-0.075***		-0.041***			
F-statistic	19.23		41.74		6.25			
p-value	(0.000)		(0.000)		(0.012)			
Post-GFC: DM – EM:	0.062***		0.065***		0.116***			
F-statistic	25.59		29.19		50.94			
p-value	(0.000)		(0.000)		(0.000)			
Post – Pre: DM – EM	0.115***		0.140***		0.157***			
F-statistic	77.36		120.60		66.48			
p-value	(0.000)		(0.000)		(0.000)			
Post-GFC 1 – Pre-GFC							0.062***	-0.069***
F-statistic							13.73	15.49
p-value							(0.000)	(0.000)
Post-GFC 2 – Pre-GFC							0.094***	-0.016
F-statistic							19.24	0.48
p-value							(0.000)	(0.490)
Post-GFC 2 – Post-GFC 1							0.033*	0.054***
F-statistic							3.55	9.09
p-value							(0.060)	(0.003)
Pre-GFC: DM – EM							-0.072***	
F-statistic							38.69	
p-value							(0.000)	
Post-GFC 1: DM – EM							0.059***	
F-statistic							25.64	
p-value							(0.000)	
Post-GFC 2: DM – EM							0.038**	
F-statistic							6.28	
p-value							(0.012)	
Post 1 – Pre: DM – EM							0.131***	
F-statistic							121.54	
p-value							(0.000)	
Post 2 – Pre: DM – EM							0.110***	
F-statistic							45.09	
p-value							(0.000)	
Post 2 – Post 1: DM – EM							-0.021*	
F-statistic							2.94	
p-value							(0.087)	

Table 6. The US premium before and after the global financial crisis: Local vs. cross-listed firms.

Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. Model (1) reports estimates for non-US countries. β_t^{Local} and β_t^{Cross}, from Eq. (3a), are estimates of the difference in valuations between non-US local firms and US firms in each period *t* and between non-US firms cross-listed on US stock exchanges and US firms. $\beta_t^{DM,Local}$, $\beta_t^{EM,Local}$, $\beta_t^{DM,Cross}$, $\beta_t^{EM,Cross}$, from Eq. (3b) provide the same estimates, separately for firms from DMs and EMs. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. A constant is estimated but not reported. In model (1), the cross-listing premium equals Cross-listed – Local, ($\beta_t^{Cross} - \beta_t^{Local}$). In model (2) it equals $\beta_t^{DM,Cross} - \beta_t^{DM,Local}$ for DMs and $\beta_t^{EM,Cross} - \beta_t^{EM,Local}$ for EMs. *t*-statistics are adjusted for clustering by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period.

	(1)			(2)					
	Non-US Firms			Developed Markets			Emerging Markets		
Panel a. Regressions	Local	Cross-listed	Cross-listed – Local	Local	Cross-listed	Cross-listed – Local	Local	Cross-listed	Cross-listed – Local
US Premium: Pre GFC	0.238***	-0.046	0.284***	0.218***	-0.093***	0.311***	0.275***	0.099*	0.176***
	(18.38)	(-1.55)	(10.00)	(16.31)	(-2.77)	(9.57)	(17.89)	(1.79)	(3.19)
US Premium: GFC	0.128***	-0.068**	0.196***	0.119***	-0.088**	0.208***	0.138***	-0.021	0.158***
	(9.59)	(-2.05)	(6.15)	(8.61)	(-2.11)	(5.05)	(8.70)	(-0.46)	(3.53)
US Premium: Post-GFC	0.258***	-0.022	0.280***	0.286***	-0.059	0.345***	0.222***	0.070	0.152***
	(15.70)	(-0.54)	(7.07)	(16.72)	(-1.11)	(6.629)	(12.34)	(1.43)	(3.21)
Controls		Yes				Yes			
Period FE		Yes				Yes			
Industry FE		Yes				Yes			
Observations		268,350				268,350			
R-squared		0.237				0.238			
Adjusted R-squared		0.237				0.238			
Panel b. F-tests	Local	Cross-listed	Cross-listed – Local	Local	Cross-listed	Cross-listed – Local	Local	Cross-listed	Cross-listed – Local
Post-GFC – Pre-GFC	0.020	0.024	0.004	0.067***	0.033	0.034	-0.053***	-0.029***	-0.023
F-statistic	1.53	0.31	0.01	15.91	0.37	0.41	8.47	0.27	0.18
p-value	(0.216)	(0.577)	(0.921)	(0.000)	(0.544)	(0.522)	(0.004)	(0.602)	(0.672)
Pre-GFC: DM – EM:				-0.057***	-0.192***	0.135**			
F-statistic				23.76	9.49	4.52			
p-value				(0.000)	(0.002)	(0.034)			
Post-GFC: DM – EM:				0.063***	-0.129*	0.192***			
F-statistic				27.69	3.56	7.67			
p-value				(0.000)	(0.059)	(0.006)			
Post – Pre: DM – EM				0.120***	0.063	0.057			
F-statistic				88.54	0.69	0.56			
p-value				(0.000)	(0.408)	(0.454)			

Table 7. The US premium before and after the global financial crisis: By industry groups.

Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{DM} and β_t^{EM}, from Eq. (4), are estimates of the difference in valuations between non-US firms from DMs and EMs and US firms each period *t* in each column. Coefficients are estimated separately for firms in traded vs. not traded industries (model 1), and high-tech vs. not high-tech industries (model 2). The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. A constant is estimated but not reported. *t*-statistics are adjusted for clustering by firm. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)				(2)			
	Traded		Not traded		High tech		Not high tech	
Panel a. Regressions	DM	EM	DM	EM	DM	EM	DM	EM
US Premium: Pre GFC	0.199***	0.276***	0.191***	0.244***	0.150***	0.186***	0.205***	0.279***
	(11.03)	(13.92)	(10.02)	(11.06)	(4.45)	(4.77)	(14.48)	(17.32)
US Premium: GFC	0.084***	0.109***	0.132***	0.151***	0.094***	0.054	0.125***	0.157***
	(4.47)	(5.33)	(6.74)	(6.83)	(2.77)	(1.48)	(8.40)	(9.37)
US Premium: Post-GFC	0.291***	0.225***	0.238***	0.191***	0.175***	0.278***	0.283***	0.203***
	(12.61)	(9.53)	(9.54)	(7.19)	(3.79)	(6.47)	(15.60)	(10.47)
Controls	Yes				Yes			
Period FE	Yes				Yes			
Industry FE	Yes				Yes			
Observations	268,350				268,350			
R-squared	0.236				0.239			
Adjusted R-squared	0.236				0.239			

Panel b. F-tests	DM	EM	DM	EM	DM	EM	DM	EM
Post-GFC – Pre-GFC	0.092***	-0.051**	0.048*	-0.053**	0.025	0.092*	0.078***	-0.077***
F-statistic	15.59	4.41	3.73	3.86	0.27	3.82	19.07	15.86
p-value	(0.000)	(0.036)	(0.053)	(0.050)	(0.603)	(0.051)	(0.000)	(0.000)
Pre-GFC: DM – EM:	-0.077***		-0.053***		-0.036		-0.074***	
F-statistic	25.89		10.50		0.949		38.98	
p-value	(0.000)		(0.001)		(0.330)		(0.000)	
Post-GFC: DM – EM:	0.066***		0.047***		-0.103***		0.081***	
F-statistic	15.84		7.57		7.28		42.67	
p-value	(0.000)		(0.006)		(0.007)		(0.000)	
Post – Pre: DM – EM	0.142***		0.101***		-0.070		0.155***	
F-statistic	72.86		27.03		2.63		140.49	
p-value	(0.000)		(0.000)		(0.105)		(0.000)	

Table 8. The US premium before and after the global financial crisis: By firm characteristics.

Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{DM} and β_t^{EM}, from Eq. (4), are estimates of the difference in valuations between non-US firms from DMs and EMs and US firms each period *t* in each column. Coefficients are estimated separately for firms that are old vs. young (model 1), firms with high asset tangibility vs. low asset tangibility (model 2), and MNCs vs non MNCs (model 3). The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. A constant is estimated but not reported. *t*-statistics are adjusted for clustering by firm. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)				(2)				(3)			
	Old		Young		High asset tangibility		Low asset tangibility		MNC		Not MNC	
Panel a. Regressions	DM	EM	DM	EM	DM	EM	DM	EM	DM	EM	DM	EM
US Premium: Pre GFC	0.224***	0.286***	0.098***	0.190***	0.167***	0.257***	0.215***	0.248***	0.144***	0.238***	0.223***	0.257***
	(15.84)	(17.69)	(3.79)	(6.61)	(10.11)	(14.11)	(11.82)	(11.00)	(7.71)	(9.47)	(12.42)	(13.34)
US Premium: GFC	0.108***	0.128***	0.095***	0.142***	0.144***	0.203***	0.104***	0.111***	0.065***	0.071***	0.164***	0.175***
	(7.29)	(7.58)	(2.85)	(4.21)	(8.32)	(10.60)	(5.52)	(5.00)	(3.66)	(3.05)	(7.29)	(7.44)
US Premium: Post-GFC	0.269***	0.205***	0.179***	0.227***	0.278***	0.186***	0.254***	0.224***	0.224***	0.265***	0.268***	0.179***
	(14.64)	(10.57)	(4.99)	(6.71)	(12.68)	(8.04)	(11.12)	(9.11)	(9.62)	(9.16)	(10.57)	(6.94)
Controls	Yes				Yes				Yes			
Period FE	Yes				Yes				Yes			
Industry FE	Yes				Yes				Yes			
Observations	268,350				268,350				268,350			
R-squared	0.239				0.236				0.237			
Adjusted R-squared	0.239				0.236				0.237			
Panel b. F-tests	DM	EM	DM	EM	DM	EM	DM	EM	DM	EM	DM	EM
Post-GFC – Pre-GFC	0.045**	-0.081***	0.082*	0.037	0.111***	-0.071***	0.039*	-0.024	0.081***	0.027	0.045*	-0.079***
F-statistic	6.38	17.46	3.58	0.75	25.16	9.10	2.82	0.82	10.62	0.75	3.02	8.67
p-value	(0.012)	(0.000)	(0.058)	(0.386)	(0.000)	(0.003)	(0.093)	(0.365)	(0.001)	(0.387)	(0.082)	(0.003)
Pre-GFC: DM – EM:	-0.062***		-0.093***		-0.090***		-0.034*		-0.095***		-0.035***	
F-statistic	26.60		16.80		49.79		3.24		17.10		7.63	
p-value	(0.000)		(0.000)		(0.000)		(0.072)		(0.000)		(0.006)	
Post-GFC: DM – EM:	0.064***		-0.048*		0.092***		0.03		-0.041		0.089***	
F-statistic	25.46		3.12		47.84		2.632		2.46		49.78	
p-value	(0.000)		(0.080)		(0.000)		(0.105)		(0.117)		(0.000)	
Post – Pre: DM – EM	0.126***		0.045		0.182***		0.063***		0.054*		0.124***	
F-statistic	88.07		1.73		158.26		8.84		3.39		76.86	
p-value	(0.000)		(0.187)		(0.000)		(0.003)		(0.066)		(0.000)	

Table 9. The US premium before and after the global financial crisis: Brown vs. not brown industries.
Panel a reports estimates of the US premium each period. We estimate regressions from 2001 to 2018 in which the dependent variable is Tobin's q. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{DM} and β_t^{EM}, from Eq. (4), are estimates of the difference in valuations between non-US firms from DMs and EMs and US firms each period t in each column. Coefficients are estimated separately for firms in brown vs. not brown industries. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Pre-GFC is from 2001 to 2007, GFC is from 2008 to 2009, and Post-GFC is from 2010 to 2018. A constant is estimated but not reported. *t*-statistics are adjusted for clustering by firm. Panel b reports *F*-tests that test whether the estimates are significantly different in the pre- and post-GFC periods and whether the estimates for DMs and EMs are significantly different each period. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Brown		Not brown	
Panel a. Regressions	DM	EM	DM	EM
US Premium: Pre-GFC	0.159***	0.254***	0.209***	0.265***
	(6.78)	(9.78)	(13.29)	(14.59)
US Premium: GFC	0.110***	0.151***	0.110***	0.122***
	(4.67)	(5.95)	(6.70)	(6.57)
US Premium: Post-GFC	0.285***	0.203***	0.258***	0.213***
	(9.98)	(6.55)	(12.49)	(9.96)
Controls	Yes			
Period FE	Yes			
Industry FE	Yes			
Observations	268,350			
R-squared	0.236			
Adjusted R-squared	0.236			
Panel b. F-tests	DM	EM	DM	EM
Post-GFC – Pre-GFC	0.127***	-0.051*	0.049**	-0.052**
F-statistic	19.11	2.71	5.80	5.67
p-value	(0.000)	(0.100)	(0.016)	(0.017)
Pre-GFC: DM – EM:	-0.095***		-0.056***	
F-statistic	25.02		16.06	
p-value	(0.000)		(0.000)	
Post-GFC: DM – EM:	0.083***		0.045***	
F-statistic	15.61		9.85	
p-value	(0.000)		(0.002)	
Post – Pre: DM – EM	0.178***		0.101***	
F-statistic	63.15		43.75	
p-value	(0.000)		(0.000)	

Figure 1. The US premium.
This figure shows the US premium each year from 2001 to 2018 estimated from OLS and median regressions in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. Variable definitions are in Appendix Table A.I. β_t^{non-US}, from Eq. (1), is the estimate of the difference in valuations between non-US and US firms each year. β_t^{DM} and β_t^{EM}, from Eq. (2) provide the same estimates, separately for firms from DMs and EMs and US firms. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Panel a shows the US premium for non-US countries. Panels b and c show the US premium for DMs and EMs.

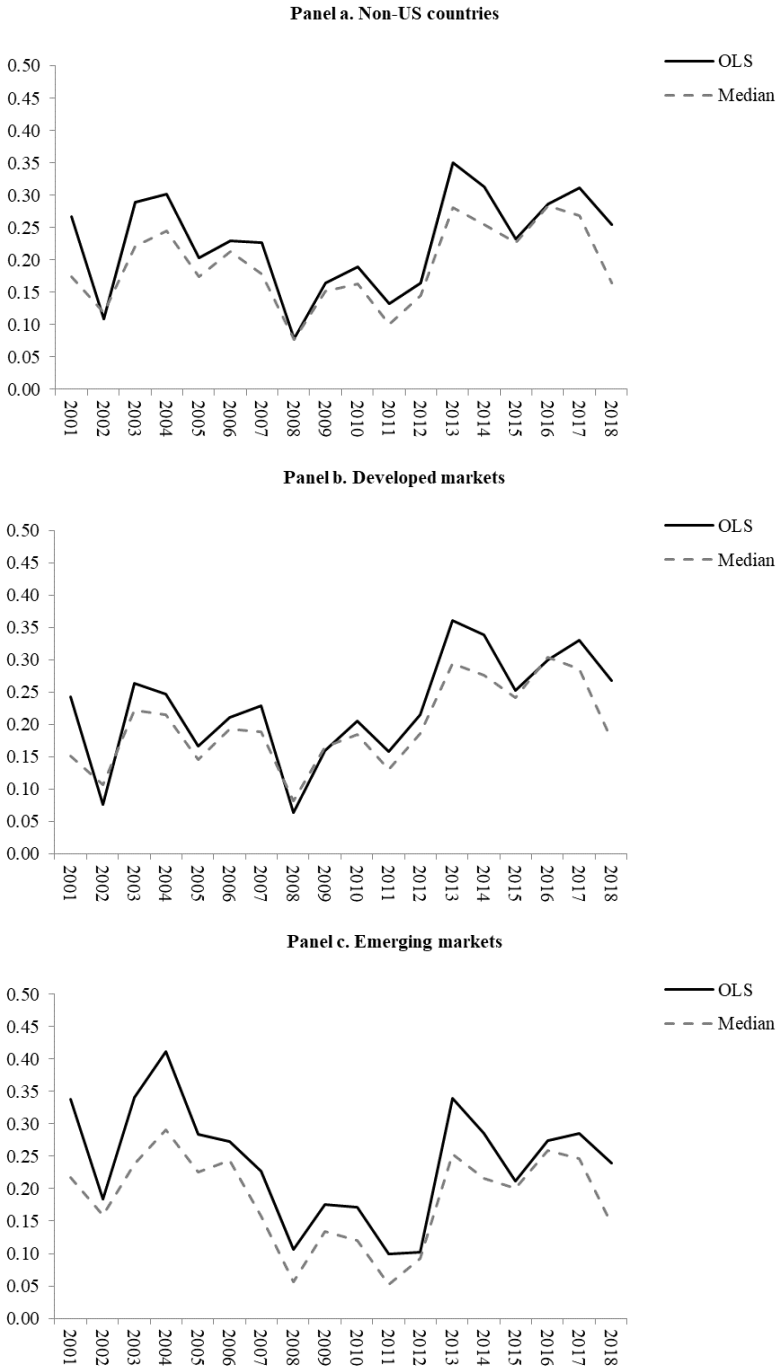

Figure 2. The US premium for local and cross-listed firms.
This figure shows the US premium each year from 2001 to 2018 estimated from OLS regressions in which the dependent variable is Tobin's q. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{Local} and β_t^{Cross}, from Eq. (3a), are estimates of the difference in valuations between non-US local firms and US firms in each period t and between non-US firms cross-listed on US stock exchanges and US firms. $\beta_t^{DM,Local}$, $\beta_t^{EM,Local}$, $\beta_t^{DM,Cross}$, $\beta_t^{EM,Cross}$, from Eq. (3b) provide the same estimates, separately for DMs and EMs. The β_t estimates are multiplied by –1 in order to report the US premium as the positive difference in the valuations of US firms and those of comparable non-US firms. Panel a shows the US premium for non-US countries; Panels b and c show the US premium for DMs and EMs.

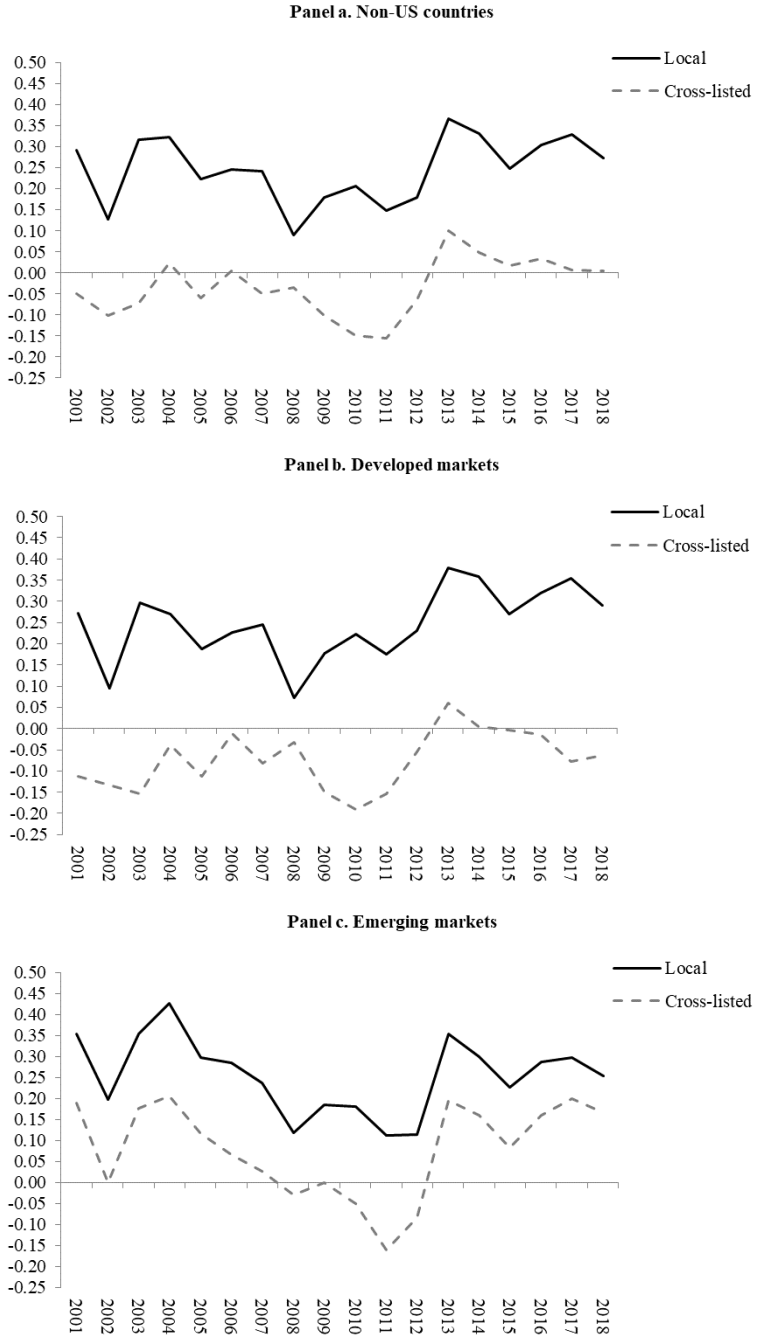

Figure 3. The cross-listing premium.
This figure shows the cross-listing premium each year from 2001 to 2018 estimated from OLS regressions in which the dependent variable is Tobin's *q*. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. R&D is capitalized for US firms. Variable definitions are in Appendix Table A.I. β_t^{Local} and β_t^{Cross}, from Eq. (3a), are estimates of the difference in valuations between non-US local firms and US firms in each period *t* and between non-US firms cross-listed on US stock exchanges and US firms. $\beta_t^{DM,Local}$, $\beta_t^{EM,Local}$, $\beta_t^{DM,Cross}$, $\beta_t^{EM,Cross}$, from Eq. (3b) provide the same estimates, separately for DMs and EMs. The cross-listing premium each period equals $\beta_t^{Cross} - \beta_t^{Local}$ in Panel a and $\beta_t^{DM,Cross} - \beta_t^{DM,Local}$ for DMs and $\beta_t^{EM,Cross} - \beta_t^{EM,Local}$ for EMs in Panel b.

Panel a. Non-US countries

Panel b. Developed and emerging markets

APPENDIX

Table A.I. Variable Definitions and Data Sources.

Variable	Definition and data source
Asset tangibility	Equals net property, plant, and equipment divided by total assets. Net property, plant, and equipment equals gross property, plant, and equipment minus accumulated depreciation (Sources: Worldscope and Compustat).
Brown industries	Equals 1 for the 15 Fama-French 49 industries with the lowest average Environmental Pillar Score in 2018. (Source: Firm-level ESG ratings from the MSCI ESG Ratings Database).
Developed / emerging market	DM equals 1 if the country is classified as a developed market by MSCI. Equals 0 otherwise. EM equals 1 if the country is not classified as a developed market by MSCI. Equals 0 otherwise. (Source: https://www.msci.com/market-classification).
EPS forecast difference	Equals EPS forecast for year 2/book value of equity per share – EPS forecast for year 1/book value of equity per share. If book value of equity is less than zero, it is set to missing. (Source: IBES).
Cross-listed firm	Equals 1 if a firm is listed on an exchange in the United States (AMEX, NYSE or NASDAQ) in a given year via Level 2 or 3 American Depositary Receipts, direct listings, or by other means. Equals 0 otherwise. (Sources: Bank of New York, Citibank, JP Morgan, the NYSE, NASDAQ, CRSP, SEC filings, annual reports, Factiva).
Exchange rate	For non-US countries, equals the home currency per USD spot rate annual return, from https://data.imf.org/. A positive return indicates a depreciation of the home currency. For the US, we use the dollar risk factor from Lustig, Roussanov, and Verdelhan (2011), what they call "RX," which is an equally weighted average of excess returns on non-US dollar currencies per USD available in the forward market.
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency. (Source: World Bank's WDI Database and Statistics Bureau, Republic of China (Taiwan)).
High asset tangibility (low asset tangibility)	Equals 1 if a firm's asset tangibility is greater than the median value of asset tangibility in 2009 computed for all firms in the restricted sample. Equals 0 otherwise. Low asset tangibility equals 1 if high asset tangibility equals 0. (Sources: Worldscope and Compustat).
High-tech (not high-tech)	Equals 1 if a firm is in industry 5 (Business equipment – computers, software, and electronic equipment) in the Fama-French 10 industry classification scheme. Equals 0 otherwise. Not high-tech equals 1 if high-tech equals 0. (Source: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_10_ind_port.html).
Leverage	Equals the book value of short-term debt plus long-term debt divided by the sum of the market value of equal, short-term debt, and long-term debt. (Sources: Worldscope and Compustat).
Local firm	Equals 1 if a firm is not listed on an exchange in the United States (AMEX, NYSE or NASDAQ) in a given year via Level 2 or 3 American Depositary Receipts, direct listings, or by other means. Equals 0 otherwise. (Sources: Bank of New York, Citibank, JP Morgan, the NYSE, NASDAQ, CRSP, SEC filings, annual reports, Factiva).
Log(Assets)	Equals the log of total assets (in millions of US dollars). Total assets are adjusted for CPI inflation where 2018 is the base year. CPI inflation equals the annual percentage change in the consumer price index for each country. (Sources: Worldscope, Compustat, the World Bank's WDI Database, and Statistics Bureau, Taiwan).
MNC (not MNC)	Equals 1 in year *t* for a firm if the absolute value foreign income (Worldscope item: WC08741 for non-US firms; Compustat item: PIFO for US firms) or foreign income taxes (Worldscope item: WC18187; Compustat item: TXFO) is greater than zero in year *t*, or in any of the previous three years.
Old (young)	A firm is classified as old if is listed for more than 5 years. Age equals year minus the year in which a firm is first listed. To identify the first year of listing, we use the BDATE code in Datastream for non-US firms (first date for which price data is available for a company's equity series). For US firms we use LINKDT in Compustat, the first effective link date between CRSP and Compustat. Equals 0 otherwise. Young equals 1 if old equals 0. (Sources: Datastream and Compustat).
Operating income	Equals operating income (total revenue minus total operating expenses) divided by total assets. (Sources: Worldscope and Compustat).
Sales growth	Equals the two-year geometric average of annual inflation-adjusted growth in sales. CPI inflation equals the annual percentage change in the consumer price index (CPI) for each country. (Sources: Worldscope, Compustat, the World Bank's WDI Database, and Statistics Bureau, Republic of China (Taiwan)).
Tobin's *q*	For the numerator, we use the book value of short-term debt plus long-term debt and add the market value of equity. For the denominator, we use the book value of total assets. (Sources: Worldscope and Compustat).
Traded (not traded)	Equals 1 for firms classified as traded by Mian and Sufi (2014). Equals 0 otherwise. Not traded equals 1 if traded equals 0 (includes non-tradable industries, construction, and other). We use mappings from the US Census Bureau and the NAICS to SIC crosswalk to convert NAICS codes to SIC codes (Worldscope does not have SIC codes). (Sources: Appendix Table 1 from the 2012 working paper version of Mian and Sufi (2014), Worldscope and Compustat, https://www.census.gov/eos/www/naics/concordances/concordances.html, and https://www.naics.com/naics-to-sic-crosswalk-2/).

Table A.II. Number of local non-US and cross-listed firms.

This table shows counts of local non-US firms and non-US firms cross-listed on US stock exchanges from 2001 to 2018. The sample includes non-financial firms from 51 countries with at least $100 million in assets (inflation adjusted) and complete data on firm characteristics in a given year. Counts are shown for non-US countries and separately for DMs and EMs (based on MSCI classifications). Non-US firms that are cross-listed on a US stock exchange in a given year are classified as cross-listed that year. All other firms are classified as local. Propensity to cross-list is the percentage of all publicly-listed firms that are cross-listed on US stock exchanges in a given year.

	Non-US countries				Developed markets				Emerging markets			
Year	Local	Cross-listed	Total	Propensity	Local	Cross-listed	Total	Propensity	Local	Cross-listed	Total	Propensity
2001	8,384	514	8,898	5.78%	6,088	402	6,490	6.19%	2,296	112	2,408	4.65%
2002	8,839	523	9,362	5.59%	6,241	403	6,644	6.07%	2,598	120	2,718	4.42%
2003	9,307	525	9,832	5.34%	6,360	399	6,759	5.90%	2,947	126	3,073	4.10%
2004	9,732	517	10,249	5.04%	6,507	389	6,896	5.64%	3,225	128	3,353	3.82%
2005	10,224	499	10,723	4.65%	6,732	375	7,107	5.28%	3,492	124	3,616	3.43%
2006	10,824	478	11,302	4.23%	7,021	357	7,378	4.84%	3,803	121	3,924	3.08%
2007	12,038	413	12,451	3.32%	7,451	286	7,737	3.70%	4,587	127	4,714	2.69%
2008	12,643	392	13,035	3.01%	7,510	266	7,776	3.42%	5,133	126	5,259	2.40%
2009	12,697	380	13,077	2.91%	7,425	260	7,685	3.38%	5,272	120	5,392	2.23%
2010	13,077	369	13,446	2.74%	7,448	256	7,704	3.32%	5,629	113	5,742	1.97%
2011	13,337	364	13,701	2.66%	7,459	252	7,711	3.27%	5,878	112	5,990	1.87%
2012	13,342	358	13,700	2.61%	7,367	249	7,616	3.27%	5,975	109	6,084	1.79%
2013	13,409	362	13,771	2.63%	7,323	253	7,576	3.34%	6,086	109	6,195	1.76%
2014	13,412	366	13,778	2.66%	7,308	259	7,567	3.42%	6,104	107	6,211	1.72%
2015	13,413	370	13,783	2.68%	7,281	264	7,545	3.50%	6,132	106	6,238	1.70%
2016	13,363	369	13,732	2.69%	7,194	264	7,458	3.54%	6,169	105	6,274	1.67%
2017	13,558	369	13,927	2.65%	7,206	259	7,465	3.47%	6,352	110	6,462	1.70%
2018	13,491	368	13,859	2.66%	7,139	256	7,395	3.46%	6,352	112	6,464	1.73%
Total	215,090	7,536	222,626		127,060	5,449	132,509		88,030	2,087	90,117	
Average	11,949	419	12,368	3.39%	7,059	303	7,362	4.11%	4,891	116	5,007	2.32%