Cross-Country Competitive Effects of Cross-Listings

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Abstract

This paper studies the cross-country competitive effects of foreign listings on U.S. exchanges. We show that incumbent U.S. firms respond strongly negatively to foreign listings and weakly positively to foreign delistings. The performance decline of U.S. firms is related to the competitive advantages that foreign firms receive from placing their shares in the United States and is observed in both the short-run and the long-run for a variety of metrics. The competition impact differs widely across various country, industry, and firm characteristics. Our findings highlight an important role of international markets in influencing the operating performance and corporate decision-making of U.S. firms.

JEL classifications: D22; F30; G14; G15; G32; M41

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1. Introduction

The theoretical finance literature has long assessed how financially sound firms use their "long purse" to prey on financially vulnerable peers and drive them out of business (see Telser, 1966; Fudenberg and Tirole, 1986; Bolton and Scharfstein, 1990). Subsequent studies have shown that firms can negatively affect their rivals not only by using basic predation strategies, such as lowering the prices of their goods, but also through the competitive effects of corporate decisions (e.g., Chevalier, 1995; Phillips, 1995; Campello, 2003; Hsu, Reed, and Rocholl, 2010; and others).[1] All these papers examine the *within-country* competitive impact of corporate decisions.

The international finance literature, in its turn, has extensively studied (i) the impact of a foreign firm's cross-listing on its own valuation and risk characteristics (e.g., Foerster and Karolyi, 1999; Errunza and Miller, 2000; Lang, Raedy, and Yetman, 2003; Doidge, Karolyi, and Stulz, 2004, 2009; Hail and Leuz, 2009), (ii) the spillover effects of cross-listing firms on their domestic rivals' stock returns and trading volume (Melvin and Valero-Tonone, 2003; Lee, 2003; Zhang, 2009), and (iii) the effect of foreign listed firms on their domestic market liberalization and development (e.g., Bekaert, Harvey, and Lumsdaine, 2002; Errunza, Hogan, and Hung, 1999; Karolyi, 2004; Sarkissian and Schill, 2004). The general view of all these studies is that foreign listing placements in developed markets, especially in the United States, are beneficial to firms and their respective *home* markets based on various performance metrics.[2]

What the extant literature has not addressed yet is whether the financial decisions of a foreign firm have any competitive effects on domestic firms in host markets, that is, the *cross-country* competitive impact of corporate decisions. In particular, it is unclear whether foreign

[1] Chevalier (1995), Phillips (1995), Kovenock and Phillips (1995, 1997), and Campello (2003, 2006) show that a firm's financing choice influences its conduct in the product market and the conduct of its industry rivals. Liu and Parlour (2009), and Campello, Lin, Ma, and Zou (2011) examine the competitive effects of corporate hedging decisions. Fresard (2010) shows that large cash reserves lead to systematic future market share gains at the expense of industry rivals. Chen, Ho, and Ik (2006) find that rivals of firms announcing new products experience negative wealth effects. Hsu, Reed, and Rocholl (2010) show that firms respond negatively to completed IPOs of their competitors and positively to their withdrawal.

[2] Some authors challenge these conclusions, observing that sizable firm-specific gains from foreign listing is a short-lived phenomenon (see Gozzi, Levine, and Schmukler, 2008; Sarkissian and Schill, 2009, 2016; Siegel, 2004).

firms cross-listed in a given market, by potentially improving their competitive positions in that market, cause any significant changes on local firms in the *host* country.[3] Our study is about this issue: we focus on the impact of cross-listings of foreign firms on the stock returns and operating performance metrics of competing U.S. firms and the possible mechanisms behind the findings.[4]

We hypothesize that foreign listings may affect their rival firms in the listed market through three not mutually exclusive channels: financial, growth, and visibility. The first channel (financial) is through increased financial benefits for foreign listed firms (e.g., easy access to credit markets, equity issuance, acquisitions of U.S. firms). Many studies find that the cost of capital declines over the short to medium term following a cross-listing in the U.S. market (e.g., Alexander, Eun, and Janakiramanan, 1988; Foerster and Karolyi, 1999; Errunza and Miller, 2000; Hail and Leuz, 2009; Sarkissian and Schill, 2009). Cross-listing also eases foreign firms' capital constraints by facilitating equity offerings in a deep and liquid stock market (see Reese and Weisbach, 2002; Tolmunen and Torstila, 2005). Indeed, foreign listing has often been recognized as a strategic move for foreign listed firms to pursue a rapid equity-funded expansion in U.S. territory via sales expansion and acquisitions of U.S. firms.[5] Therefore, foreign firms can take advantage of the lower cost of financing to pursue an equity-finance expansion in the host market and compete against their U.S. rivals, leading to a decline in performance of their U.S. competitors.

The second channel (growth) is through product market penetration. Foucault and Gehrig (2008) and Foucault and Fresard (2012) show that firms cross-listed in the United States make better investment decisions and achieve higher investment-to-price sensitivity than firms that never cross-list. Furthermore, Fanto and Kermel (1997) show that foreign listings facilitate the

[3] Few papers on the spillover effects of cross-listings focus on the stock return impact of their domestic competitors. Karolyi (2006) states: *"these studies seek to understand the real consequences of cross-listing events … But the focus is almost always on what happens to the equity trading environment (stock returns, trading volume) for those firms, and not on the current and future operating performance of the listing firms and their competitors"*.

[4] We also consider the implications for U.S. firms of delistings of foreign firms from the U.S. market.

[5] For example, with respect to the 1993 Daimler-Benz cross-listing on the NYSE, it is known that: *"Fund raising is not the only advantage of listing; there are strategic benefits as well. Banexi's Dahm stresses that acquisitions are facilitated by a listing- perhaps paying for the acquisitions with shares – and there are tax advantages too."* Fisher, M. (1993), "Can German firms resist a U.S. listing?" Corporate Finance, Apr. 1993, 101, p. 23.

foreign firms' expansion into the U.S. market; for example, foreign firms with access to a deeper financial market can compete against their U.S. rivals by constructing new plants and stores. Pagano, Roell, and Zechner (2002) observe that U.S. exchanges attract high-tech and export-oriented European firms that rapidly expand and increase their foreign presence after the listing. A vast literature shows that U.S. firms with deep financial pockets are able to increase their market share at the expense of their rivals (e.g., Phillips, 1995; Chevalier and Scharfstein, 1996; Opler and Titman, 1994; Khanna and Tice, 2000; Fresearch, 2010). Therefore, foreign firms that expand their sales and investments in the U.S. market following cross-listing exert higher competition pressures on their U.S. counterparts and, hence, negatively affecting their performance.

The third channel (visibility) is through increased prominence for foreign firms listed on U.S. exchanges due to changes in media attention and investor recognition (Baker, Nofsinger, and Weaver, 2002; Lang, Lins, and Miller, 2003; Ahearne, Griever, and Warnock, 2004). Radebaugh, Gebhardt, and Gray (1995) point out that a non-financial benefit for Daimler-Benz of being listed on the NYSE is the publicity: its quotations are published in more than 700 U.S. newspapers. Indeed, cross-listing enables foreign firms to capitalize on their product market reputation by raising consumer demand through advertising and improved relations with suppliers and employees. An increase in the visibility of foreign cross-listed firms is likely to turn some investor attention away from similar U.S. firms and, therefore, negatively affect their performance.

Our foreign listing sample consists of 1,737 listings from 47 countries and includes all listings on regular U.S. exchanges from 1950 to 2011. We measure the impact of foreign listings by calculating the *relative asset ratio* of the total asset value of foreign listed firms to that of incumbent U.S. firms in each industry-year pair, and we define a 'foreign listing event' as an industry-year in which its relative asset ratio is above 5% (1% or 10%), and that it is not preceded or followed by a larger impact of other foreign listings in the surrounding four years. Then we select all U.S. competitors in the same four-digit SIC codes with available information

within four years around the foreign firm listing event year (two years before the event year and two after). We obtain 181 foreign listing events in 135 industries that are matched to 1,742 rivals.

The objective of this study is three-fold. First, we examine the impact of the listings of foreign firms on U.S. stock exchanges on stock returns and the operating performance of their U.S. rivals. We start by analyzing the valuation impact on U.S. firms from listing and delisting of their foreign competitors on U.S. exchanges. We find that U.S. rivals underperform significantly in both the short-run and the long-run. The 60-day underperformance around the listing date is negative 2%, while the long-run drop in returns for the 24-month post-event period is about 16%. We further show that the listing of a foreign firm in the United States reduces its average U.S. counterpart's EBIT by 12.1%, ROA by 0.7%, and market share by 0.4%. However, the foreign listing decisions are not perfectly random events. To address the concern that our results may be driven by changes in the macroeconomic environment or industry trends, we adopt a matching difference-in-difference (DID) approach. We create a matched sample of U.S. firms in industries that *do not* experience any listing events. To ensure comparability, we match firms that operate in industries affected by foreign listing events (treated firms) with otherwise similar firms in industries that *do not* experience any listing events (matched firms). This allows us to compare two similar sets of U.S. firms, with the only difference between them being their exposure (or the absence of it) to foreign listings. Using the DID approach, we show that the listing of a foreign firm in the U.S. market reduces its U.S. rival's EBIT, ROA, and market share by 17.6%, 0.6%, and 0.8% respectively, relative to comparable firms that do not experience any listing events.

Second, we explain the decline in performance of U.S. rivals after the listings of foreign firms by examining the relation between cross-sectional differences in the underperformance of U.S. competitors and the competitive advantages foreign firms gain from foreign, namely, *financial*, *growth* and *visibility* advantages. First, U.S. rivals experience more significant performance losses if a foreign listed firm takes advantages of the lower cost of financing by adopting an equity-financed expansion strategy through issuing equity on U.S. exchanges or

acquiring U.S. targets. The U.S. rivals' underperformance is more severe when a foreign competitor experiences a higher market reaction to its listing decision and has a higher market valuation after listings. This evidence is consistent with our conjecture that U.S. rival firms experience more operating performance decline if foreign firms gain more financial benefits through listing on U.S. exchanges. Second, foreign listed firms experiencing higher growth in assets, sales, and capital investments, and having a higher portion of foreign sales, exert more pressure on the performance of U.S. incumbents. This is consistent with our argument that foreign listing facilitates the product market penetration of foreign firms in the host market, especially for firms with higher growth potential, leading to the subsequent decline in performance of their U.S. rivals. Finally, we proxy the visibility of foreign listed firms by institutional holdings, analyst following, and trading volume, and show that U.S. incumbents experience worse performance if their foreign competitors enjoy higher visibility after listing on U.S. exchanges. This is consistent with a conjecture that foreign firms listed in the United States drive away the attention of investors from their U.S. rivals and negatively affect their rivals' operating performance.

Third, we investigate how the performance decline of U.S. rivals is related to country-level characteristics of their foreign listed peers. We identify several such attributes that could be related to capital market gains from a foreign listing in the United States: investor familiarity (geographic, economic, industrial, and cultural proximities), relative market size, investor protection rules, disclosure standards, and market liquidity. The proximity between two countries plays an important role in foreign listing decisions and foreign listed firms with higher economic and industry proximity achieve significant return premiums in the five-year period after the listing (Sarkissian and Schill, 2004, 2009). Hence, U.S. rivals should experience greater competition pressures when foreign listed firms come from markets with higher geographic, economic, cultural, and industrial proximities with the U.S. market. Second, as argued in Coffee (1999, 2002), Stulz (1999), and Doidge et al. (2004, 2009), U.S. foreign listing premiums can be explained by improvements in investor protection and information dissemination by bonding to a

host market with more stringent legal and disclosure standards. In addition, many papers find that foreign firms listed on U.S. exchanges seek greater liquidity and achieve significant liquidity improvements post-listing (Werner and Kleidon, 1996; Domowitz, Glen, and Madhavan, 1998; Foerster and Karolyi, 1998). Therefore, foreign listed firms should have more valuation gains if the U.S. market capitalization to GDP ratio, U.S. investor protection, and U.S. disclosure standards are higher than the corresponding measures in their home countries. We find consistent support for our conjectures.

Next, we examine how the impact of foreign listings on U.S. rivals varies across industry and U.S. firm characteristics. We show that U.S. firms in competitive industries are less immune to rivalry from their foreign listed peers (Hoberg and Phillips, 2010). In line with the findings that foreign listing decisions are related to their export routes and product market trades (Saudagaran, 1988; Mittoo, 1992; Pagano et al., 2002), we see particularly detrimental effects on U.S. rivals in industries with high proportions of foreign sales. Likewise, cross-listed foreign firms have a higher cost of capital gains in industries with stronger reliance on external finance to realize growth. We find that U.S. rivals in such industries exhibit larger performance losses. Moreover, the underperformance of U.S. rivals is more evident among smaller, younger firms, and firms with lower market shares that are less immune to competition and more prone to financial distress (Buzzell, Gale, and Sultan, 1975; Smallwood and Conlick, 1979; Ortiz-Molina and Phillips, 2014).

Our paper provides novel evidence of cross-country rivalry by establishing the link between cross-listings studies and studies on product market competition, adding to the growing empirical literature on the competitive effects of corporate decisions (Chevalier, 1995; Phillips, 1995; Kovenock and Phillips, 1995, 1997; Campello, 2003, 2006; Liu and Parlour, 2009; Campello et al., 2011; Chen et al., 2006). The main distinction between our study and the above-mentioned papers is that we show that corporate decisions not only of domestic firms but also of

foreign firms have direct competitive effects on local rivals.[6] Cross-listing, unlike IPOs or SEOs, comes with or without equity issuance.[7] This allows the investigation of multidimensional competitive effects besides those that arise from the loosening of financial constraints due to equity issuance. In addition, a multi-country setting allows us to look at host–home market determinants of the strength of competitive effects of corporate decisions and uncover new cross-market linkage mechanisms. The competitive effects that we observe, however, while largely negative for U.S. rivals' performance in the two years following the listings, benefit the U.S. economy as a whole in the long term.[8] Thus, our findings highlight an important role played by foreign financial markets in shaping the operating performance and corporate decision-making of U.S. firms and, hence, the U.S. market as well.

The rest of the article is organized as follows. Section 2 examines the stock return performance of U.S. rival firms. Section 3 examines the long-run financial performance of U.S. rival firms. Section 4 analyzes three impact channels and the influence of market, industry, and firm attributes. Section 5 discusses alternative hypotheses for our findings. Section 6 concludes.

2. Stock Market Performance of U.S. Incumbent Firms

2.1. Foreign Listing Data Sample

Our study period is from 1950 to 2011. We construct our foreign listing sample from several sources and restrict it to placements on regular U.S. exchanges (AMEX, NYSE, and NASDAQ) and to countries not classified as tax havens. We collect ADR data using the Citigroup ADR database and screen U.S. exchanges for direct foreign listings (e.g., from Canada, Israel). Finally, we cross-check the data with foreign listing codes from CRSP and leave only those foreign firms in our cross-listing sample that have identifiable SIC codes. We also

[6] The United States has attracted about 40% of all cross-listings between the 1950s and 2000s (Sarkissian and Schill, 2016). Thus, it must have encountered the highest competition among all other countries with foreign listings.
[7] The proportion of foreign listings with equity offerings was 14–47% in 1980–1998 (Sarkissian and Schill, 2009).
[8] See Bils and Klenow (2004), Irvine and Pontiff (2009), and London (2004). For example, Bloom and Van Reenen (2007) show that U.S. firms benefit from competition through improved management practices.

restrict our sample to first-time foreign listings in the United States, and we do not require that the first foreign listing is preceded by a domestic listing. This selection procedure leaves us with a final sample of 1,737 foreign listings (direct or Level II or III ADRs) from 47 countries. In addition, following Chaplinsky and Ramchand (2008), we obtain a sample of foreign firms that delisted from U.S. exchanges using CRSP data. CRSP provides information on the delisting codes and dates of both U.S. and foreign firms. We restrict our foreign delisting sample to CRSP delisting codes 400–499, 535–591, and 600–610, but exclude delistings due to exchange change or mergers and acquisitions. This results in 526 delisting securities of non-U.S. firms in our sample period.

Table 1 shows the frequency distribution of foreign listings on U.S. exchanges across countries, time, and industries. Panel A highlights the distribution of foreign listings across countries and calendar periods. The largest number of foreign listings in the United States comes from Canadian firms, which account for about 40% of our sample. The United Kingdom and Israel rank as the second and third largest suppliers of listings to U.S. exchanges, respectively. Across calendar periods, the United States attracted the largest volume of foreign listings (885) during the 1990s. In contrast, there were only five listings in the 1950s. Panel B depicts the distribution of foreign listings based on the industry classification by SIC division structure.[9,10] We observe that the vast majority of foreign firms belong to the Mining and Manufacturing industries and that the distribution of listings in different industries varies greatly across countries. For example, 84% of foreign listings in the Mining industry originate from Canada, while Israeli listings are primarily in the Manufacturing and Service industries. Finally, Panel C shows the distribution of foreign delistings across countries and calendar periods. Most of these events are concentrated in the 1990s and 2000s. Canada has the largest number of delisted firms, the majority of which occurred in the 1990s, and is the only country with recorded delistings from U.S. exchanges in the pre-1980 period.

[9] There are eight industry divisions under this classification, but we combine the Wholesale Trade and Retail Trade into a single industry category Trade. Likewise, we combine Services and Public Administration.
[10] See https://www.osha.gov/pls/imis/sic_manual.html.

2.2. Cumulative Abnormal Returns of U.S. Firms

We start our analysis of the impact of foreign listing and delisting on U.S. rival firms by examining cumulative abnormal returns (CARs) around the dates of all foreign firms in our sample listed in and delisted from the United States, respectively. The cumulative abnormal returns are calculated based on the three-factor Fama–French model (Fama and French, 1993).[11]

Since we have a different number of U.S. competitors matched with each listing depending on the industry, to avoid biasing the weight of abnormal returns towards industries with larger number of firms, we construct a portfolio of competitors for each listing. Specifically, we define the portfolio *k* return at time *t*, $R^P_{k,t}$, as the equally-weighted average of stock returns at time *t*, $R_{i,t}$, across all matched U.S. industry competitors, namely:[12]

$$R^P_{k,t} = \frac{1}{N_k}\sum_{i=1}^{N_k} R_{i,t} \,, \tag{1}$$

where N_k is the number of matched U.S. competitors in the same industry for a given listing *k*. Then we calculate daily CARs as the sum of the residuals from the Fama–French model as:

$$CAR_k = \sum_{t=-T}^{T} (R^P_{k,t} - R_{f,t} - \hat{\alpha}_k - \hat{\beta}_k (R_{m,t} - R_{f,t}) - \hat{s}_k SMB_t - \hat{h}_k HML_t) \,, \tag{2}$$

where $R_{f,t}$ is the daily return on the three-month Treasury bill, $R_{m,t}$ is the daily return on the CRSP value-weighted market index, and SMB_t and HML_t are the Fama–French size and book-to-market factors for day *t*, respectively. The coefficients $\hat{\alpha}_k$, $\hat{\beta}_k$, $\hat{s}_k$, and $\hat{h}_k$ are the OLS estimated three-factor model coefficients from the estimation period, which runs between day –255 and day –30 prior to the foreign listing date. *T* is the duration of the event window.

Panel A of Table 2 reports the CARs of U.S. incumbents over various short-run windows around the foreign listing and delisting events. This table also shows the number of portfolios

[11] Our results are similar for CARs based on the market or Carhart four-factor models. They are available on request.
[12] Our results remain intact if we switch to a value-weighted portfolio of rival firms using market capitalization as weighting scheme.

and the p-value of average CARs. We use four event windows: (–5; +5), (–10; +10), (–20; +20), and (–30; +30) days. We observe that CARs from foreign listing events across all four windows are negative and significant at the 1% level. Moreover, they generally increase in magnitude with window horizon from –0.8% for the ten-day window, to –2.2% for the 40-day window, and –1.7% for the 60-day window. In contrast, CARs from foreign delisting events are positive and significant for all event windows at least at the 10% level, except for the 10-day window. The CARs from delisting are markedly smaller than those from listings in any given window.

To deepen our understanding of the dynamics of CARs of U.S. incumbent firms around the listing and delisting dates of foreign firms, in Figure 1, Plot A we show these series over the entire 60-day window around the respective events. We can see that the decrease (increase) in CARs from foreign firm listings (delistings) starts before the event, although the largest changes in returns occur after the event dates in both cases. The pre-listing and pre-delisting run-ups may be attributed to the announcement effect. Foerster and Karolyi (1999) report that the median difference between the announcement and listing dates of foreign firms listed in the U.S. is 44 days.[13] Thus, Table 2A and Figure 1A indicate that such corporate events of non-U.S. firms as listing on or delisting from a U.S. exchange have profound short-term performance implications for competing U.S. firms in the same industries.

The next question is to determine whether the observed patterns of U.S. firm returns around listing and delisting dates of foreign firms is a short-lived phenomenon or whether they continue in the long-run too. For this task, we calculate long-run CARs for each listing and delisting event following our approach for short-run CARs. Specifically, we apply the Fama–French model by regressing the pre-event monthly excess returns of portfolio *k* on the market, size, and book-to-market portfolios. We restrict our sample portfolios to at least 15 months of pre-listing data for estimation. Then, we cumulate the estimated residuals for each event window.

[13] We focus on the listing dates instead of announcement dates since most of the announcement dates are not available.

Table 2, Panel B shows the test results. We report CARs over four long-run windows spanning 6, 12, 18, and 24 months after both the listing and delisting events.[14] We observe that the long-run performance of U.S. rival firms follows the short-run downward trend. While their average CARs one year after the foreign listing event is almost –8%, by the end of the second year the underperformance approaches –16%. The CARs of any event window are always statistically significant. On the delisting side, the reaction of U.S. incumbent firms is almost nil. There is no evidence of statistical significance in CARs for any of the four event windows. To visualize the long-term patterns in the performance of U.S. incumbent firms around the listing and delisting dates of foreign firms, in Figure 1, Plot B we show these series over the entire 24-month window after the respective events. The observed patterns fully reflect the corresponding results over various window estimations from Table 2B.

Thus, consistent with short-run results in Table 2A and Figure 1A, Table 2B and Figure 1B again highlight a more profound and long-lasting impact of foreign listings, rather than delistings, on the stock market performance of U.S. incumbent firms. The asymmetry in the duration of the impact of listing and delisting events is not surprising, since a cross-listed firm may influence U.S. firms during the whole cross-listing period, while a delisted firm's influence cannot be prolonged much after its withdrawal from a U.S. exchange. Due to these observations, our subsequent analysis only focuses on the effects of foreign listing events on U.S. firms.

3. Financial Performance of U.S. Incumbent Firms

In the previous section, we showed the drastic impact that foreign firm listings have on the stock market performance of their competing U.S. firms. In this section, we further examine the long-run financial performance of U.S. incumbents.

[14] We consider a two-year maximum long-run window for listing events. This is supported by a series of long-run studies, all of which report that the largest impact of various corporate events usually lasts the first two years after the event (see, e.g., Loughran and Ritter, 1995, 1997, for IPOs and SEOs, respectively; Dharan and Ikenberry, 1995, for new exchange listings; and Sarkissian and Schill, 2009, for cross-listings).

3.1. Foreign Listing Events

To assess the impact of a foreign listing on its U.S. industry competitors, we define the industry using the four-digit SIC codes and construct our listing events as follows.[15] Since foreign listings are not isolated in times, often we have multiple listings in an industry in any given year, or we have consecutive listings within several years. For example, there were 20 foreign listings in the Gold and Silver Ores industry (SIC=1040) in 1982, followed by another 12 foreign listings in the same industry in 1983. The challenge in this situation is to focus on only those foreign listings the impact of which on U.S. competitors is likely to be the most important and not contaminated by the effect of preceding or subsequent foreign listing events. To isolate the foreign listing event with the largest impact, we measure the importance of foreign listings by the relative ratio of the total assets of foreign firms listed on U.S. exchanges to that of U.S. rivals and select those industry-years in which such ratio exceeds 5% (or 1% or 10% as alternatives). This procedure allows us to avoid accounting for listing events associated with small foreign firms. Then, we select only those industry-years that are not preceded or followed by a larger foreign listing within four years surrounding the listing year.

The above foreign listing selection procedure for U.S. competing firms gives us 181 'foreign listing events' across 135 industries. It has at least two benefits. First, we are able to produce a relatively clean pre- and post-event period to conduct the performance comparison of competing U.S. firms around foreign listing events. Second, the selected events spread evenly across time and are not subject to composition bias. Note that the relative surges and contractions in the foreign listing activity documented by Sarkissian and Schill (2016) in the U.S. and other countries are observed in our sample as well. For example, as we pointed out earlier, in the 1990s, the U.S. attracted the largest share of foreign listings in its history (more than 50% of the

[15] We restrict our definition of industry competitors to the four-digit SIC codes because firms at a less disaggregated level are more likely to include suppliers or clients rather than direct competitors of foreign companies.

sample). If we use the full sample of foreign listings, the unbalanced weights towards the surge in U.S. listings in the 1990s may bias our results.[16]

With the sample of foreign listing events that can potentially affect U.S. companies having been identified, we then select all U.S. industry competitors who are listed on regular U.S. exchanges in the same industry-year. We restrict our sample selection of U.S. rivals to firms in the CRSP/Compustat merged database with stock returns, financial performance measurements and control variables available around foreign listing events. We have 1,742 incumbent industry competitors matching our 181 foreign listing events, representing 270 foreign listing placements. In other words, on average, there are 10 U.S. competitors per foreign listing event.

3.2. Three Mechanism Measures

To investigate the relationship between the long-run operating performance of U.S. rival firms and foreign firms' competitive advantages from listings on U.S. exchanges, we construct a variety of financial, growth, and visibility measures for foreign firms. Stock market information is from CRSP and accounting information is from Compustat. The information on foreign sales and assets are from Worldscope. Information on analyst following is from I/B/E/S.[17]

To capture the possible financial advantages that foreign firms may gain after cross-listing on U.S. exchanges, we construct two sets of measures that proxy the lower cost of financing and adoption of an equity-financed expansion strategy after listing. First, we construct two variables: one is a 20-day window of cumulative abnormal returns of foreign listings, and another one is a foreign firm Tobin's Q. A higher cumulative abnormal return of a foreign firm

[16] In addition, Sarkissian and Schill (2009, 2016) find that foreign listing activity in any given market coincides with high valuations of that market. Dittmar and Dittmar (2008) show that other corporate events in the United States, such as issuances of IPOs and SEOs, also occur in waves and are correlated with strong U.S. economic and financial performance. Therefore, without our foreign listing selection scheme, the average performance of U.S. rival firms is more likely to be driven by hot market conditions during which most domestic equity issuance and foreign listing placements occur, rather than cross-listing events themselves. Since our selection of events is evenly distributed across the sample period, our analysis is not biased towards those hot market valuation and equity issuance periods.

[17] I/B/E/S gives analyst coverage information from 1975, so our sample of rival firms reduces in the test of visibility.

on a U.S. exchange and a higher Q indicate higher expected financial gains from this listing (Foerster and Karolyi, 1999; Miller, 1999). CAR (0, +20) is the 20-day cumulative abnormal return of foreign firms after cross-listing in the United States based on the world market model. Tobin Q is the ratio of the total asset and market values of the firm less its book value over the total asset value in the year of listing. Second, we construct two dummy variables that can capture an equity-financed expansion strategy of foreign firms after listing on U.S. exchanges: one indicates whether this listing is accompanied by an equity issuance in the United States, while the other one indicates whether a foreign firm acquires a U.S. target within two years after the listing. These two variables directly specify whether a foreign firm takes advantage of the lower cost of financing and expands its business in the United States by acquiring U.S.-domiciled target firms.

To measure the product market penetration of foreign firms into the U.S. market, we compute the foreign firms' total asset growth, total sales growth, foreign sales percentage, and capital expenditure following the year of listing. A foreign firm with higher asset (sales) growth, more capital investments, and higher percentage of foreign sales is more likely to exert pressure on its U.S. peer firms. Asset Growth (Sales Growth) is computed as the log change in total assets (sales). The percentage of foreign sales is computed as foreign sales divided by the total sales; the percentage of foreign assets is foreign assets divided by total assets. Capital Expenditure is the ratio of capital expenditures over the lagged total assets.

To measure the increased prominence of foreign firms after cross-listing, we compute the foreign firms' institutional holdings, analyst coverage, and trading volume following the year of listing. Institutional holdings is a dummy that is equal to one if a foreign listed firm is held by at least one institutional block holder, and is zero otherwise. Analyst coverage is a dummy variable that is equal to one if a foreign listed firm is followed by an analyst, and zero otherwise. Trading volume is the total shares traded in the year of listing scaled by the total shares outstanding.

3.3. Main Variable Construction

To examine the impact of foreign listings on U.S. rival firms' business performance, we use the EBIT, return on assets (ROA), and market share (MkShr) of U.S. firms. EBIT is the earnings before interest and taxes normalized by firm sales. ROA is the return on assets computed as the firm's revenue minus total operating expenses divided by total assets. MkShr is the firm sales divided by total industry sales.

Our set of control variables includes five U.S. firm characteristics. The first firm-level variable is size, which is related to product efficiency (e.g., economies of scale) and market power, and is measured by the log of the firm's total assets. Spence (1977) shows that a firm's operating performance changes over time, increasing briefly at the beginning of its life span, then increasing less or even decreasing at later stages. To address the concern that the incumbent firms' performance may be varying across their life-cycle, our second variable is firm age. This is defined as the number of years since the firm's first trading date on a U.S. stock exchange. The third variable is firm leverage. Financial distress negatively impacts firm performance (e.g., Opler and Titman, 1993). Debt may also influence strategic interaction among competitors, customers and/or suppliers. Brander and Lewis (1986) argue that firms exhibit more aggressive product market strategies by choosing positive debt levels. Chevalier (1995) finds that firms undertaking leveraged buyouts with a substantial increase of their leverage face more intense competitive pressure from rival firms.[18] Therefore, we expect that more leveraged U.S. firms will see larger losses from listings of competing foreign firms on U.S. exchanges. We define leverage as the long-term debt divided by the sum of long-term debt and market value of equity one year before the foreign listing year. To control for the firm's valuation level, our fourth variable is its market-to-book ratio calculated as the total market capitalization divided by the book value of equity. Finally, Blanchard, Lopez-de-Silanes, and Shleifer (1994) and Harford (1999) find that

[18] In addition, Phillips (1995) finds that firms which increase their debt either lose market share or fail to gain it when smaller rivals exit the industry. Campello (2003), consistent with the model of Chevalier and Scharfstein (1996), finds that leverage has a negative impact on sales growth among firms in industries where rival firms are on average less levered, especially during recessions.

large cash holdings often lead to firm inefficiencies. Our fifth variable is therefore the firm's cash holdings defined as the dollar amount of cash and short-term investments divided by the total assets.

3.4. Descriptive Statistics

Table 3 shows descriptive statistics of foreign listed and incumbent U.S. firms. Panel A reports the distribution of cross-listing events over industries and calendar decades. Industry abbreviations are as in Table 1. Note that most of the cross-listing events occur in the 1990s, in contrast to Table 1, where most of cross-listings in our sample occur in the 2000s. Cross-listings of manufacturing firms constitute 57% of the events sample, compared to only 35% in the overall sample of foreign listed firms.

Panel B of Table 3 shows the summary statistics of foreign firm characteristics in the sample of 270 foreign firms in 181 listing events. They are divided into three categories that proxy for different competitive advantages gained by foreign firms through cross-listing, namely financial gains, product market penetration, and increased visibility. This panel shows that the average Tobin Q of foreign listed firms is around 2.8 and the average 20-day CAR around the listing date is approximately 0.8%, which are consistent with the prior findings on the valuation and market reaction of foreign listings (Foerster and Karolyi, 1999; Miller, 1999; Sarkissian and Schill, 2009). In our sample of 270 foreign listed firms, there are 22% and 19% of listing firms are accompanied either by an equity issuance in U.S. exchanges within one year after listing or by a U.S. target takeover within two years after the listing. Furthermore, among 145 foreign firms with foreign sales data, we find that a firm has on average over 50% of its sales in a non-domestic market. Foreign listed firms experience rapid growth in assets and sales, which is consistent with prior findings that export-oriented foreign firms expand their business in the United States (Pagano et al., 2002). Moving to the visibility measures, on average about 14% of foreign firms are held by at least one institutional block holder and about 25% of foreign firms

are followed by at least one financial analyst in the year of listing. The average trading volume of a listed foreign firm is approximately 17%.

Panel C of Table 3 compares the main performance measures and other characteristics of U.S. rival firms to those of foreign firms. The last two columns report the difference in the means for each characteristic between foreign and U.S. firms, Diff (F-US), and the corresponding absolute t-statistic. We observe that foreign firms, in comparison to U.S. industry competitors, are much larger and have a much higher market share. The average total assets and market shares are 16bln (3bln) and 12.3% (5.6%), respectively, for foreign (competing U.S.) firms. In contrast, U.S. firms have a significantly higher market-to-book ratio. The other two performance metrics, EBIT and ROA, are statistically indistinguishable between foreign and U.S. firms. Foreign and U.S. firms are in general comparable in terms of leverage and cash holdings.

3.5. Aggregate Performance Tests

We now proceed to examine the potential changes in U.S. firms' overall performance around the placement of shares on U.S. exchanges by foreign firms. We start by conducting a multivariate test of U.S. industry competitors around listing events using the following model:

$$Perf_{i,t} = \alpha + \beta PL_{i,t} + \boldsymbol{\delta X}_{i,t} + Industry_i + Year_t + \varepsilon_{i,t} \quad (3)$$

where $Perf_{i,t}$ is one of the corresponding performance metrics of firm i in years t, i.e., its EBIT, ROA, or market share. $PL_{i,t}$ is a post-listing dummy variable which is equal to one for each of the two years after the foreign listing event year and zero for each of the two years before the listing event year. Vector $\boldsymbol{X}_{i,t}$ consists of independent variables, including our five firm-level controls. We also account for industry fixed effects, $Industry_i$, to control for time-invariant differences across industries, and year fixed effects, $Year_t$, to control for aggregate macroeconomic shocks.

Table 4 shows the impact of foreign listings in the United States for three aggregate business performance metrics of U.S. firms. It also reports the number of observations and the adjusted R-squared for each regression. Baker and Wurgler (2002) and Schill (1999) find that

managers are more likely to issue new equity when industries have high valuations. Sarkissian and Schill (2012, 2016) observe market and industry waves in foreign listings, and that firms are usually placed overseas when they are highly valued. Therefore, it is important to impose robust-cluster standard errors at the industry-year level to account for error correlations across different industries and time periods. The first three columns report the estimates of PL for our foreign listing events defined based on the 5% relative ratio of foreign firm assets to those of competing U.S. firms; columns 4–6 do so for the alternative 1% ratio; and finally columns 7–9 for the second alternative 10% ratio. We have 251 (140) foreign listing events (industry-years) using 1% (10%) relative asset ratio, which are matched with 371 (211) foreign listed firms and 2,561 (1,309) corresponding U.S. incumbent firms. Irrespective of the different cutoffs of the relative asset ratio, the coefficient on PL is negative and significant in all regressions. This indicates that the overall financial performance of U.S. rival firms deteriorates after the listing of their foreign rivals on U.S. exchanges, which is consistent with findings on long-term stock market performance in Section 2. In economic terms, for example, for our main specification based on the 5% ratio, the listing of a foreign firm in the U.S. reduces its average U.S. counterpart's EBIT by around 12%, ROA by 0.7%, and market share by 0.4%.

The reported coefficients on control variables are generally intuitive. Firms with larger total assets exhibit consistently higher EBIT, ROA, and market share. A similarly positive, yet economically and statistically weaker, relationship exists between older firms and some performance metrics. Furthermore, the performance of a more leveraged firm is inferior to that of a less leveraged firm. Finally, U.S. firms with higher market-to-book ratios and those with larger cash reserves perform worse than firms with lower valuation ratios and less cash holdings.

The main concern with the Table 4 results is that the observed pattern in the performance of U.S. rivals may not be confined to firms that operate in industries that face pressure from foreign listed firms. Rather, it simply reflects a market-wide trend in our data sample. To exclude this possibility, in the following tests, we use a difference-in-difference (DID) approach. Specifically, we construct a matched sample of firms that do not belong to industries

experiencing foreign listing events and compare their performance with our existing sample of ("treated") firms, which are influenced by such events. We select a "matched" firm for each of the 1,742 U.S. rivals from "non-treated" firms based on their key characteristics one year before the event. Following Almeida et al. (2012), we match firms on the basis of their size (logarithm of total assets), growth opportunities (market-to-book ratio), firm leverage, cash holdings, and ROA in the one year preceding the event. We use a matching algorithm that minimizes the Mahalanobis distance across all these matching characteristics and select its closest neighbor as a match. That is, for each treated firm *i*, we find a matched firm *j* with the lowest Mahalanobis distance value.[19] Following this procedure, we have 1,742 matched firms.

Table 5 shows the comparison of matching firm characteristics between rival and matched U.S. firms. It reports the means, medians, and the 25th and 75th percentiles of the distribution for each variable, as well as the difference test with the corresponding p-value between average estimates in the matched and treated samples (last column). Panel A presents the univariate comparison between the two samples of firms for the five matching variables. As we can see, the matched firms are fairly close to the treated firms across all five firm characteristics: the difference test is insignificant in all instances. In other words, the matching process removes any meaningful differences between the two groups along the matching firm characteristics.

Another concern is that the timing of a foreign firm's entry into U.S. exchanges is based on a deliberate choice by the firm and is thus endogenous. Foreign firms may list in the United States when they experience high growth opportunities, whereas their U.S. competitors may have (or be expected to have) difficulties in sustaining growth. Hence, it is important to select matching firms with similar growth prospects as those firms affected by foreign listing events. In Panel B of Table 5 we show the univariate comparison of growth opportunities between treated and matched firms one year before the listing. We use six different proxies for firms' growth

[19] Mahalanobis distance is measured as $\| X_i - X_j \| = ((X_i - X_j)' W_X^{-1} (X_i - X_j))^{1/2}$, where X is a k-dimensional vector of covariates and W_X^{-1} is the inverse of the covariance matrix of the covariates.

opportunities: (i) Earnings Estimates, which is the average earnings per share (EPS) estimate from I/B/E/S for the next fiscal year; (ii) LT EPS Growth from I/B/E/S, which is the average long-term earnings growth rate for the next five years; (iii) Analyst Recommendations, which is the average recommendation from I/B/E/S measured on a five-point scale; (iv) Sales Growth (SalesGr); and (v) Total Asset Growth. Note that the number of observations for Earnings Estimates, LT EPS Growth, and Analyst Recommendation are much lower than for other firm characteristics because of data availability. We observe that one year before the listing event, treated firms and matching firms show similar sales growth and total asset growth. In addition, financial analysts' expectations of the future growth of earnings and investment recommendations are also similar for both samples of firms. The difference test in the last column of the panel shows no statistical discrepancy in the average estimates of any proxy for firm growth opportunities between the matched and treated samples. This indicates that prior to the listing events, financial analysts viewed the growth prospects of treated and matching firms to be similar.

Thus, we can conclude that we are able to identify two samples among publicly traded U.S. firms that are statistically identical to each other across a variety of firm-specific characteristics, including several variables that could reflect potential growth opportunities. The only substantive difference between the two samples is whether the U.S. firms experience a foreign listing event in their respective industry. This result allows us to implement the difference-in-difference (DID) method and examine whether the aggregate underperformance of U.S. rivals from listing of foreign firms on U.S. exchanges shown in Table 4 is unique to this sample of U.S. firms. This approach converts our model (3) into the following:

$$Perf_{i,t} = \alpha + \beta(PL_{i,t} \times Treated_{i,t}) + \gamma Treated_{i,t} + \boldsymbol{\delta X}_{i,t} + Industry_i + Year_t + \varepsilon_{i,t}, \quad (4)$$

where *Treated* is the treated sample dummy, which is equal to one for U.S. incumbent firms in industries experiencing foreign listing events and is zero otherwise. All control variables are the same as in regression model (3). The main coefficient of interest is β, which measures the

changes in performance metrics surrounding a listing event for treated U.S. incumbent firms relative to their corresponding matching firms.

Table 6 shows the DID regressions model (4) results. For the sake of brevity, in this table and thereafter we omit reporting the estimates of the control variables. Similar to Table 4, the first three columns report the DID estimates based on the 5% relative ratio of foreign firm assets to those of competing U.S. firms; columns 4–6 do so for the alternative 1% ratio; and finally columns 7–9 for the second alternative 10% ratio. We see a very consistent picture across all nine columns of the table. The interaction term is negative and significant at the 5% level in all estimations but one (column 2 for ROA), for which the significance is at the 10% level. In columns 1–3, we see that the EBIT, ROA, and market share of U.S. incumbent firms in affected industries decline by 17.6%, 0.6%, and 0.8% respectively from the pre-event levels relative to their matching firms. Since we select our events based on various relative asset ratios (which measure the impact of foreign listed firms on their U.S. rivals), we can determine whether this selection criterion affects our results. In columns 4–6 with a lower asset ratio (1%), we observe marginally weaker estimates of declines in the performance of U.S. incumbent firms. In contrast, in columns 7–9 with a higher asset ratio (10%), we observe even a stronger impact on U.S. incumbent firms' performance. Thus, the larger the asset ratio cutoff level, the more U.S. rival firms suffer from their foreign competitors. Such a consistent result across various model specifications provides substantive evidence that foreign listings indeed significantly and negatively affect U.S. firms in the industries in which these listings take place.

4. Determinants of U.S. Rival Firm Underperformance

In this section, we further investigate three impact channels through which the listings of foreign firms affect U.S. rival companies and how U.S. rival firm underperformance varies across cross-country host–home market, industry and rival firm characteristics.

4.1. Three Impact Mechanisms of Foreign Firms

To explain the decline in performance of U.S. rivals after the listings of foreign firms in U.S. markets, we examine the relationship between cross-sectional differences in the underperformance of U.S. competitors and foreign firms' competitive (*financial*, *growth*, and *visibility*) advantages after cross-listing. We expect to see that foreign firms with stronger financial gains, more rapid product market penetration, and higher visibility among investors will lead to more obvious declines in the performance of their U.S. counterparts. Recall from Section 3.2 that the financial gains of foreign firms are measured by their Tobin Q, 20-day CAR window, U.S. equity issuance, and U.S. target acquisition; product market penetration by foreign firms' total asset growth, total sales growth, percentage of foreign sales, and capital expenditures following the listings; and visibility by whether foreign firms are held by institutional block holders, whether they are followed by analysts, and their trading volume in the listing year. We split our sample based on the median values of these foreign firm characteristics and conduct multivariate tests on the impact of the financial, growth, and visibility channels of U.S. industry rivals around listing events using the DID method and the framework of model (4) with EBIT as our performance measure.

Table 7 presents the test results from the three impact channels on U.S. incumbents. All the subsample splits use the difference-in-difference (DID) regression in column 1 of Table 6. Panel A illustrates how U.S. rival firms' underperformance after foreign firms' listing events is impacted by foreign firms' financial gains. Consistent with our conjecture, we find that U.S. rivals' underperformance is more evident in the events in which foreign listed firms exhibit higher financial gains, as measured by their 20-day CARs and market valuation (Tobin Q). Specifically, the performance decline of U.S. incumbent firms is negative and statistically significant in the events in which foreign listed firms show a higher Q and a higher market reaction from the listing event. Furthermore, we find that U.S. incumbents experience more significant performance losses if foreign listed firms take advantage of the lower cost of financing by adopting an equity-financed expansion strategy through U.S. equity issuance or

target acquisition. The last four columns of Panel A show that the deterioration of the financial performance of U.S. competitors is more negative in the events in which foreign listed firms either issue equity on U.S. exchanges or undertake a U.S. target acquisition after the listing. For example, the coefficient in the subsample of events in which foreign firms issue equity (acquire a U.S. target) is 41% (60%) lower than the coefficient in the subsample of events, in which foreign firms do not issue equity (or do not acquire a U.S. target). This evidence is consistent with our conjecture that U.S. rivals experience more deterioration in their operating performance when foreign listed firms achieve greater financial advantages from their U.S. cross-listings. We also note that the coefficient on *PL*×*Treated* is statistically significant in the subsamples of events in which foreign listed firms do not issue equity or do not acquire U.S. targets. This implies that the various financial benefits of cross-listing that foreign firms obtain in the United States impact the competition dynamics in the U.S. market and drive down the performance of their U.S. rivals.

Panel B of Table 7 illustrates the effect of foreign firms on U.S. rivals' performance through the growth channel. We unequivocally observe that U.S. rivals significantly underperform their matched firms in the events in which foreign listed firms have higher total asset growth and total sales growth. In contrast, *PL*×*Treated* is not statistically significant in the subsamples of events in which foreign listed firms have lower total asset growth or lower total sales growth. This implies that foreign listed firms experiencing higher growth in assets or sales exert more pressure on U.S. incumbent firms' operating performance. In the last four columns, we show that the effect of foreign listings on U.S. competitors is particularly pronounced among those foreign listed firms that are export-oriented and have high capital investments. This implies that foreign firms that are more likely to benefit from U.S. listing through increased exports or investment expansion have a stronger negative impact on their U.S. counterparts' financial performance. In economic terms, across all growth metrics, high-growth foreign firms reduce U.S. rivals' EBIT within two years from the pre-event levels relative to their matching firms by as much as 48%. These findings are consistent with our argument that foreign listing facilitates

the product market penetration of foreign listed firms in the host market, subsequently leading to declines in the performance of U.S. rival firms.

In Panel C of Table 7, we turn to the non-financial benefits of foreign listings – the increased prominence/visibility of foreign listed firms to investors in the U.S. market and the impact of this on the financial performance of their U.S. rivals. We observe that the financial performance of U.S. rival firms is more negative affected in the post-listing period in the events in which the foreign listed firms are more visible to investors, namely, they are held by at least one institutional block holder, followed by at least one financial analyst, or have a higher trading volume in the listing year. For example, U.S. rival firms' EBIT declines by 33–45% within the two-year period following the listing year in the subsamples of foreign listed firms with higher visibility. However, less visible foreign firms, as measured by any visibility metrics, exert less competitive pressures on U.S. domiciled companies. These findings are consistent with arguments that foreign firms listed on U.S. exchanges increase their prominence in the U.S. market by gaining the attention of the media and changes in investor recognition (Baker, Nofsinger, and Weaver, 2002; Lang et al., 2003; Ahearne et al., 2004). This implies that listing in the United States enables foreign firms to capitalize on their product market reputation, which changes the competition dynamics in the U.S. market and imposes negative externality on the operating performance of U.S. rivals.

Thus, Table 7 highlights a significant relationship between cross-sectional differences in the underperformance of U.S. competitors and the foreign firms' competitive advantages that they obtain through U.S. listings, namely: financial gains, product market penetration, and increased visibility. Our results suggest that the underperformance of U.S. incumbents is related to all three of these determinants.

4.2. Market Characteristics

Our next step is to examine the relationship between cross-sectional differences in the underperformance of U.S. rival firms and country-level characteristics of their foreign listed

competitors. We identify several cross-market attributes that have been shown previously to be related to capital market gains from foreign listing: investor familiarity (or proximity) – namely, geographic, economic, industrial, and cultural proximity – as well as relative market size, investor protection rules, financial disclosure standards, and market liquidity.

First, as shown in Sarkissian and Schill (2004), the geographic, economic, cultural, and industrial proximity of a foreign country play a dominant role in the cross-listing decisions from that market.[20] Subsequently, Sarkissian and Schill (2009) find that foreign listed firms with higher economic and industrial proximity achieve a significantly higher return premium within five years after the listing. Hence, we hypothesize that U.S. rivals experience greater competition pressures if foreign listed firms come from markets with higher geographic, economic, industrial, and cultural proximity to the U.S. market.

Table 8 reports the results from the subsample splits of the difference-in-difference (DID) regression in Table 6, column 1 based on the above-mentioned market characteristics. Panel A shows the estimates based on four proximity characteristics of domestic markets of foreign listed firms to the United States, namely geographic, economic, industrial, and cultural. Geographic Proximity is the inverse of the great circle distance between Washington D.C. and the capital cities of markets of cross-listed firms. Economic Proximity is the proportion of exports from a foreign country into the United States. Industrial Proximity is the correlation in the ranked industry distribution of firms listed abroad between foreign country and the United States. Cultural Proximity is a dummy equal to one if a foreign country shares the same language or colonial ties with the United States. All four variables are from Sarkissian and Schill (2004, 2016). The sample splits using the first three proximity measures are made at the median. We observe drastic differences in rival U.S. firm performance between the two subsamples for each of the four proximity metrics. Specifically, foreign firms originating from a country that is proximate to the United States in terms of distance, economic closeness, industrial structure

[20] As argued in Sarkissian and Schill (2004), geographic, economic, industrial, and cultural proximities may be indicative of investor information advantages or reflect some form of psychological tolerance for these stocks by foreign investors.

similarity, and cultural links exert higher competitive pressures on their U.S. counterparts, which result in more significant performance losses of their U.S. rival firms. There are no statistical differences in U.S. firm performance between the treated and matched samples when foreign firms come from less proximate countries. This suggests, as expected, that the negative effects from foreign competition are higher when foreign firms originate from markets more familiar to U.S. investors.

Second, as argued in the vast prior literature (e.g., Coffee, 1999, 2002; Stulz, 1999; Reese and Weisbach, 2002; Doidge et al., 2004, 2009; etc.), the foreign listing premium in the United States can be explained by the improvements in investor protection and information dissemination resulting from bonding to a host market with more stringent legal and disclosure standards. Many papers also find that foreign firms list on U.S. exchanges to seek greater liquidity in a larger market and achieve significant liquidity improvements after listing (Werner and Kleidon, 1996; Domowitz et al., 1998; Foerster and Karolyi, 1998). Finally, foreign listed firms may prefer listing in the United States to make their disclosure standards in line with investor expectations (e.g., Biddle and Suadagaran, 1992). In other words, foreign firms benefit more from listing on U.S. exchanges if they come from countries with larger differences from the U.S. market in terms of market size and liquidity, investor protection, and disclosure standards. Therefore, we hypothesize that foreign listed firms have more valuation gains if the U.S. market cap/GDP ratio, U.S. investor protection, U.S. disclosure standard, and U.S. market liquidity are all higher than the corresponding measure in the foreign firm's home country.

Panel B of Table 8 shows the results based on two market development and two market stringency characteristics of foreign listed firms, namely: market capitalization to GDP ratio (MkCap/GDP), market liquidity (Liquidity), investor protection (Rule of Law), and accounting disclosure standards (Disclosure). MkCap/GDP is a dummy that is equal to one if the U.S. market capitalization to GDP ratio is higher than that of the foreign country. Market capitalization is from Datastream and the *Morningstar Dimson, Marsh, & Staunton* global returns database. The real GDP values are from the historical statistics compiled by Angus

Maddison.[21] Liquidity is a dummy that is equal to one if the U.S. market liquidity is higher than that of the foreign country. Market liquidity is one minus the equally-weighted average ratio of zero daily returns each month across all firms in any given country from Goyenko and Sarkissian (2014) averaged for a given calendar year. The Rule of Law is a dummy that is equal to one if the U.S. investor protection is higher than that of the foreign country, and it is based on the anti-self-dealing index from Djankov et al. (2008). Disclosure is a dummy that is equal to one if the U.S. disclosure standards are higher than that of the foreign country, and is obtained from Bae, Tan, and Welker (2008). Indeed, consistent with our conjectures, we find that U.S. rival firms experiencing a foreign listing event show a lower operating performance relative to their comparables if foreign listings have a higher U.S.–foreign market cap/GDP ratio, a higher U.S.–foreign liquidity ratio, higher U.S.–foreign investor protection, and higher U.S.–foreign disclosure standards. Note that even though there is a statistical difference in results based on the investor protection measure split (Rule of Law), it is driven largely by differences in subsample sizes, as their coefficients on *PL*×*Treated* are close to each other.

4.3. Industry and U.S. Firm Characteristics

Now we move to analyzing how U.S. rival firm underperformance varies across industry and firm characteristics. Here we follow the regression specification in Table 6, column 1. In Panel A of Table 9 we use the following three U.S. industry characteristics: competitiveness, foreign sales, and external finance. First, it is known that competition affects firm performance. For instance, Hoberg and Phillips (2010) find negative externality of industry competition on rivals' cash flows and stock returns. We use the fitted Herfindahl–Hirschman Index (HHI) to measure the industry competition of "treated" industries, which is obtained from the Hoberg–Phillips database and available for SIC codes outside of manufacturing industries. An industry is defined as competitive if it is below the sample median. Second, foreign sales is the proportion of total foreign sales in the "treated" industry one year prior to the listing, computed as the total

[21] All GDP numbers are in 1990 International Geary-Khamis dollars.

foreign sales scaled by the total sales in any given industry. Third, external finance measures the dependence of "treated" industries on external financing, as in Rajan and Zingales (1998), and is computed as capital expenditures minus cash flows from operations to capital expenditures at the industry level. Reese and Weisbach (2002) show that cross-listing eases foreign firm's capital constraints by facilitating equity offerings in a deep and liquid stock market. Therefore, we expect industries that rely more on external financing to benefit more from cross-listing in the United States and, consequently, to exert higher competitive pressures on their U.S. peers. We split the sample at the median values of industry-level variables one year prior to the listing events. We observe that U.S. rivals in more competitive industries, industries with a larger proportion of foreign sales and a greater reliance on external finance, experience more performance deterioration after foreign firm listings on U.S. exchanges.

In Panel B of Table 9 we consider the following three U.S. firm characteristics: market share, size, and age. It is known that smaller firms and firms with limited market share are less immune to rivalry, more prone to financial distress, and may have less growth due to such disadvantages as low economies of scale or insufficient quality signaling (e.g., Buzzell et al., 1975; Smallwood and Conlick, 1979; Ortiz-Molina and Phillips, 2014). Also, younger firms usually have less means to resist negative competition effects than more established firms, and thus their performance should suffer more from foreign listings. The estimation results based on the above U.S. firm characteristics are consistent with expectations. The negative performance impact of foreign firms listed in U.S. markets is more profound on those U.S. rivals that have low market share, small market capitalization, and are young.

5. Further Discussion of Results

All our analysis effectively shows that foreign listing events have a unique and long-lasting impact on rival U.S. firms' stock returns and other performance metrics. A natural question to ask is whether the documented impact on U.S. firms is indeed associated explicitly

with the listing of their foreign competitors on U.S. exchanges. We address these concerns below.

5.1. Direct Competition in U.S. Product Markets

We have established that a cross-listing in the United States improves a foreign firm's competitive position in the U.S. market at the expense of its U.S. rival firms. However, not all listing firms *directly* compete in the U.S. market. To address this concern, we need to conduct our analysis using a subsample of foreign firms that are listed on U.S. exchanges and directly compete with their U.S. counterparts in the United States.

First, foreign firms can directly compete with U.S. rivals by exporting goods to the United States without even being physically present in the U.S. market. Saudagaran (1988) and Pagano et al. (2002) find that large export-oriented companies are more likely to list on foreign exchanges and that foreign sales increase after listings. Therefore, our first test is based on the subsample split between tradable and non-tradable industries, i.e., on the foreign firm tradability metric. We expect a larger effect on U.S. rivals from a foreign listed firm belonging to a tradable industry. Tradable industries are: Agriculture, Forestry and Fishing, Mining, and Manufacturing. Non-tradable industries are: Construction, Transportation, Wholesale and Retail Trade, Finance, Insurance and Real Estate, Services, and Public Administration. Consistent with our view, the first two columns of Table 10 show that only listings of foreign firms belonging to tradable industries negatively and significantly impact the performance of their U.S. rivals.

Second, foreign firms can directly compete with U.S. rival firms by increasing their physical presence in the United States after the listing, e.g., by establishing more sales offices, building more factories, and/or opening more chain stores. However, verifying the physical presence of a foreign business in the United States is not an easy task.[22] Nevertheless, we have

[22] First, there is no universal database that provides such information. Compustat gives information on geographical segments, but most of it is only available after a foreign firm lists on a U.S. exchange. Also, it has non-uniformed categories of geographic segments, e.g., domestic versus non-domestic, or North American versus Asia, that cannot provide sufficient information to verify a foreign firm presence in the U.S. market. Second, it is equally challenging to locate such information through a news search. Except for large foreign firms, we are unable to verify if a foreign

collected information on the physical presence of a foreign business in the United States for all our 270 listings in the 181 foreign listing events.[23] From our event selection, those 270 listings are identified as the most impactful ones. We verify all the foreign listed firms' company history, Wikipedia webpages, SEC filings, and news articles, to identify whether they have a sales office, headquarters, or subsidiaries in the United States prior to the listing on U.S. exchanges. If a foreign firm has already established its sales office, headquarters, or a subsidiary in the U.S. market, then it can be viewed as a direct competitor to U.S. rival firms. In total, we could verify information for 248 cross-listed foreign firms, 189 of which have a U.S. presence. Therefore, 22 listings are removed from this test. We expect that foreign listed firms that compete directly in the U.S. market put larger performance pressures on their peer U.S. firms. The test results are shown in the last two columns of Table 10. We indeed find that only those listings of foreign firms that are explicitly identified as having a business establishment in the United States negatively and significantly impact their U.S. counterparts. Thus, from Table 10 we can conclude that only those foreign firms listed in the U.S. market that are tradable or have a business in the United States negatively affect the performance of their U.S. rivals.

5.2. U.S. Firms with IPO and without IPO Issuance

Since both IPOs and cross-listings occur in waves (see Maksimovic and Pichler, 2001; Sarkissian and Schill, 2016) foreign listing placements may take place around intensive IPO introduction periods. Therefore, it is important to verify that our main findings are independent of the simultaneous issuance of IPOs by U.S. firms. In other words, we want to exclude the possibility that the impact of foreign firm listings on their U.S. rivals comes only from local IPO waves rather than the very presence of foreign firms on U.S. exchanges.

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listed firm has any business in the United States either through the company history on the company's website or through news article searchers like Factiva. Some firms were delisted or acquired several years after listing, which create additional hurdles in achieving any information on their presence in U.S. market prior to listings.

[23] The information collection is very difficult if we turn to smaller foreign listed firms outside of our 181 events.

Table 11, Panel A shows the estimates for the subsamples of IPO and non-IPO issuing U.S. firms for our three asset ratio cut-off samples. We use the specification as in Table 6, column 1. The IPO dates for "treated" firms are obtained from Compustat. The IPO sample includes those "treated" firms which experience IPO issuance in the listing event year or within one or two years before the listing event year. We see that the number of U.S. firms that issue IPOs around the foreign listing events is very small (around 5% of the overall sample). Second, and more importantly, the DID coefficient on *PL*×*Treated* is negative and significant for non-IPO issuing firms, implying that even these firms experience a significant decrease in performance from the presence of their foreign competitors on U.S. exchanges. Note that even though the interaction term is insignificant for IPO issuing firms, the point estimates across three asset ratio samples are all negative and 5–6 times larger than the corresponding estimates for non-IPO firms. This effectively shows that the foreign listing effect may reinforce the long-run underperformance of firms issuing IPOs.

5.3. The Valuation Impact before the Foreign Listing Date

It is possible that cross-listings of foreign firms do not change competition dynamics in the U.S. market and simply reflect the existing growth and expansion of those firms in the United States. To determine whether the foreign listing dates of the U.S. competitors that we identified indeed have a unique valuation impact on U.S. firms, we conduct short-run CAR tests of rival U.S. firms for various periods *before* the cross-listing dates. If the negative valuation impact on U.S. rivals that we documented is driven by the *existing competition* of foreign firms and is unrelated to their foreign listing placements (e.g., in product markets), then we should expect a similar impact on U.S. counterparts from foreign listed firms even *before* their actual listing events.

Figure 2 shows the estimation results. We report the CARs (in percent) of U.S. incumbent firms for the same short-run window of (–30; +30) days as before for two periods before the actual listing date: 6 and 12 months. We do not consider the period of 1–3 months

before the listing because of the potential convolution of our results with (i) the announcement effect of a foreign listing, which occurs on average about 6 weeks prior to the listing placement (see Foerster and Karolyi, 1999), and (ii) other potential leakages of preannouncement information. For the ease of comparison, we also reproduce the corresponding CARs for the listing event from Figure 1A. We can observe that, unlike CARs around the actual foreign listing dates, those CARs 6 and 12 months before the listing do not show any significant declines over the estimation window. Thus, Figure 2 illustrates that the impact of foreign listed firms on U.S. rivals that we documented earlier is unique in a timeline. It is not driven by the continuous influence of foreign firms outside of their listing decision; rather, cross-listings do indeed change the competition dynamics in their host market and exert pressures on U.S. rivals.

5.4. Model Selection Bias

In the previous sections, we have established that after cross-listing on U.S. exchanges, foreign firms exert competitive pressures on U.S. incumbents, causing them sustained performance losses. Furthermore, we also show that this negative impact is stronger for firms with characteristics that are more vulnerable to competition pressures. All these findings are consistent with our three hypotheses. However, the decision to cross-list is endogenous, so that the sample of U.S. firms that experience foreign listing events is not random. As a result, foreign firms in industries that decide to cross-list and choose the United States for their share placements may have unique but unobservable features that simultaneously affect their decision to cross-list and move to the U.S. market, causing a decline in the performance of U.S. rivals.[24] A cross-listing is often associated with time-varying industry trends and changes in firms' investment and growth opportunities (e.g., see Sarkissian and Schill, 2016). For instance, as we mentioned earlier, firms could cross-list in anticipation of changes in their investment and growth opportunities that would ultimately affect their corresponding U.S. rivals.

[24] This is not a problem if the omitted variables are the average cross-sectional industry differences or macroeconomic trends because industry fixed effect and year fixed effect are included in our analysis.

To address this possible sample selection bias, we use the Heckman (1979) two-stage model to gauge whether self-selection affects our findings. For the first stage, we need to select observable variables that determine our sample of "treated" firms, that is, predict U.S. firms in those industries that are more likely to be affected by listings of foreign firms on U.S. exchanges. We assume that foreign firms decide to cross-list when they have larger sales, including foreign sales (Pagano et al., 2002), have high firm and industry valuations (Sarkissian and Schill, 2012, 2016), originate from familiar countries (Sarkissian and Schill, 2004), and when they seek benefits in liquidity (Domowitz et al., 1998), investor protection (e.g., Reese and Weisbach, 2002; Doidge et al., 2004), and improved accounting standards (Biddle and Suadagaran, 1992).

In sum, our first-stage estimation contains 14 instruments. These are firm and industry market-to-book ratios, sales growth, percentage of foreign sales, leverage, industry external finance (as in Rajan and Zingales, 1998), four cross-market proximity measures (economic, industrial, geographic, and cultural) from Sarkissian and Schill (2004), cross-market liquidity from Goyenko and Sarkissian (2014), the anti-self-dealing index from Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), and disclosure measures from Bae, Tan, and Welker (2008). The second-stage estimation includes all five control variables from Table 4.

Table 12 presents the Heckman estimation results. The first-stage estimation shows that the probability of U.S. firms being included in our sample of treated firms increases with higher firm and industry valuations, higher sales growth and foreign sales, as well as economic, geographic, and industrial proximity to the home countries of competing foreign firms. Such characteristics as firm leverage and minority shareholder protection decrease the likelihood of U.S. firms entering the "treated" sample. Columns 3–4 of the table show the second-stage estimation results. We include the inverse Mills ratio into our regression, that is, a nonlinear function of residuals from the first-stage estimation. We use two-year changes in the EBIT of U.S. firms as a dependent variable and the variable of interest is *Treated*. It shows that the treated firms still experience a negative and significant drop in performance after two years from the listing events with the inclusion of inverse Mills ratio. Importantly, the inverse Mills ratio is

insignificant, indicating that the selection bias in the foreign firms' choice of cross-listing in the United States cannot explain our findings on the underperformance of their U.S. rivals. Thus, Table 12 provides evidence that our findings are immune to potential sample-selection endogeneity issues.

6. Conclusions

Using a large sample of listing and delisting events of foreign firms on and from U.S. exchanges between 1950 and 2011, we examine the short-run and long-run impacts of these events on rival U.S. firms. We find that foreign listings have an economically and statistically significant influence on U.S. firms belonging to the same industries. This impact is negative and leads to the underperformance of incumbent U.S. firms. Moreover, using the difference-in-difference methodology between the treated and the matched samples of firms, we find that treated U.S. firms also underperform in terms of aggregate operating performance, such as EBIT, ROA, and market share. We relate this underperformance to three impact channels from foreign firms that list on U.S. exchanges: financial, growth, and visibility. In particular, we find that foreign firms with strong valuations and more positive market reaction around listing dates, as well as those that issue equity or undertake acquisitions in the United States immediately following the listing, induce an economically and statistically significant reduction in rival U.S. firms' performance. Furthermore, we find that foreign firms with good growth prospects, such as those with high asset and sales growth, as well as those with high foreign sales and capital expenditure, exert more competition pressures on their U.S. peer firms. We also show that foreign firms with higher prominence in the U.S. market inflict more performance losses on U.S. incumbent firms. In contrast, the effect from delisting events of foreign firms is positive but mild and short-lived.

We further show that the impact of foreign listings on U.S. rival firms varies depending on the market, industry, and U.S. firm characteristics. U.S. rivals suffer more from foreign

listings when foreign firms originate from markets familiar to the United States and from countries with larger differences to U.S. markets in terms of financial development and disclosure standards. At the industry level, we find that firms in more competitive industries, with high levels of foreign sales and external finance, suffer more from the listings of their foreign rivals on U.S. exchanges. Finally, small, young firms with lower market shares are more vulnerable to the competition pressures of foreign competitors and thus experience more profound drops in operating performance.

Finally, we show that our results are not driven by the existing competition dynamics in the U.S. market and are immune to the sample selection bias. In addition, our results hold for U.S. firms with and without IPO issuance. Our evidence suggests that, through foreign listing placements, international capital markets provide an important venue that greatly affect the performance dynamics of local firms, their corporate decisions, and, therefore, the host market that attracts foreign listings as a whole.

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Table 1
Distribution of foreign listings in the United States

Panel A: Distribution of foreign listings across countries and time

Country	1950-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2011	Total
Argentina					16	4	20
Australia		1		15	16	12	44
Austria					1		1
Belgium					4	2	6
Bolivia				1			1
Brazil					6	9	15
Canada	2	38	25	226	289	166	746
Chile				1	22	2	25
China					15	14	29
Colombia					1	1	2
Denmark				1	5	1	7
Domin. Rep.					1		1
Finland				1	5	1	7
France				3	31	9	43
Germany			1		24	9	34
Ghana					1		1
Greece					4	3	7
Hong Kong					11	4	15
Hungary					1		1
Iceland					1		1
India				1	8	8	17
Indonesia					5		5
Ireland				3	24	7	34
Israel		2	2	22	97	29	152
Italy				4	11	1	16
Japan		1	18	5	9	8	41
Jordan					1		1
Korea					9	8	17
Luxembourg			1	1	10	7	19
Mexico		1	1		35	7	44
Netherlands	2			8	38	14	62
New Zealand				1	8	1	10
Norway				2	8	2	12
Peru					3		3
Philippines		4			2	1	7
Poland					1		1
Portugal					3		3
Russia					5	3	8
Singapore				1	7	2	10
South Africa		1	7	3	8	2	21
Spain				5	4	3	12
Sweden			1	5	13	2	21
Switzerland		1	1	1	13	7	23
Taiwan				1	5	2	8
Turkey					1		1
U.K.	1	9	5	40	99	25	179
Venezuela					4		4
Total	5	58	62	351	885	376	1,737

Table 1 (continued)

Panel B: Distribution of foreign listings across countries and industries

Country	AGR	MNG	CST	MFC	TSP	TRD	FIN	SPA
Argentina				4	7	1	7	1
Australia	1	9		20	1	4	6	3
Austria					1			
Belgium				4		1		1
Bolivia					1			
Brazil		1	1	5	7		1	
Canada	2	326	4	209	44	30	42	89
Chile				9	5	3	7	1
China	1	1		11	8	1	3	4
Colombia				1			1	
Denmark				2	4			1
Dom. Rep.					1			
Finland				6	1			
France		3	3	20	7	1	2	7
Germany				16	4		5	9
Ghana		1						
Greece				1	4		1	1
Hong Kong		1		1	8	2		3
Hungary					1			
Iceland								1
India				4	3		3	7
Indonesia				2	3			
Ireland		1		13	3		5	12
Israel			3	77	10	5	3	54
Italy				11	2		3	
Japan			1	19	4	4	7	6
Jordan					1			
Korea				4	5		4	4
Luxembourg	1	2		7	5	1	2	1
Mexico	1	1	3	14	14	5	4	2
Netherlands		1	1	30	9	4	5	12
New Zealand		1	1	4	3			1
Norway		4		5	3			
Peru		1			1		1	
Philippines	1	2		1	2			1
Poland					1			
Portugal					2		1	
Russia				4	3			1
Singapore				7				3
South Africa		16		3	2			
Spain				2	4		4	2
Sweden		1		14	4			2
Switzerland		3		12	1		5	2
Taiwan				7	1			
Turkey					1			
U.K.		13	2	64	34	11	13	42
Venezuela				3	1	1		
Total	7	388	19	616	226	73	135	273

Table 1 (continued)

Panel C: Distribution of foreign delistings across countries and time

Country	1950-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2011	Total
Argentina					1	3	4
Australia					5	10	15
Austria						1	1
Belgium					1	1	2
Brazil						1	1
Canada		1	2	66	123	78	270
Chile						4	4
China						3	3
Denmark					2	2	4
Dom. Rep.						1	1
Finland						2	2
France					1	13	14
Germany					2	15	17
Greece						2	2
Hong Kong					1	4	5
Hungary						1	1
Iceland						1	1
India						3	3
Indonesia					1	2	3
Ireland					1	6	7
Israel				2	9	25	36
Italy					1		1
Japan					1	7	8
Korea						4	4
Luxembourg						5	5
Mexico					7	7	14
Netherlands					4	15	19
New Zealand					1	2	3
Norway						2	2
Peru						2	2
Philippines					1	2	3
Poland						1	1
South Africa					2	1	3
Spain						2	2
Sweden					1	10	11
Switzerland						1	1
Taiwan						1	1
U.K.				6	13	30	49
Venezuela						1	1
Total	0	1	2	74	178	271	526

This table provides the distribution of foreign listings on (Panels A and B) and delistings from (Panel C) U.S. exchanges in the 1950-2011 period. Panels A and C show the distribution of listings and delistings across countries and time, while Panel B – distribution of foreign listings across countries and eight industries: AGR – Agriculture, Forestry, and Fishing; MNG – Mining; CST – Construction; MFC – Manufacturing; TSP – Transportation; TRD – Wholesale and Retail Trade; FIN – Finance, Insurance and Real Estate; SPA – Services and Public Administration. The foreign listing data come from several sources: Bank of New York and Citigroup ADR databases, Sarkissian and Schill (2004) public dataset and CRSP.

Table 2
Cumulative abnormal returns of rival U.S. firms around foreign firm listing and delisting

Panel A: Short-run CARs

	Listings			Delistings		
Window (days)	Portfolios	CAR (%)	P-value	# Portfolios	CAR (%)	P-value
(-5, +5)	1,568	-0.811***	0.000	498	0.252	0.277
(-10,+10)	1,568	-1.088***	0.000	498	0.802*	0.086
(-20,+20)	1,568	-2.215***	0.000	498	1.507**	0.031
(-30,+30)	1,568	-1.741***	0.000	498	1.370*	0.072

Panel B: Long-run CARs

	Listings			Delistings		
Window (months)	Portfolios	CAR (%)	P-value	# Portfolios	CAR (%)	P-value
(0, +6)	1,567	-4.176**	0.000	498	-0.642	0.352
(0, +12)	1,567	-7.860*	0.000	498	-1.169	0.317
(0, +18)	1,567	-11.549***	0.000	498	-0.121	0.485
(0, +24)	1,567	-15.964***	0.000	498	-0.729	0.423

This table shows the average portfolio cumulative abnormal returns, CARs, (in percent) of U.S. competing firms around listing and delisting dates of foreign firms, as well as the p-values of the average CARs in each event window. The sample period is 1950-2011. Panel A shows the short-run CARs and the event window is in days. Panel B shows the long-run CARs and the event window is in months. The CARs are calculated based on the Fama-French three-factor model using portfolio returns for each industry competitor. The portfolio return is the equally-weighted average of stock returns across all matched U.S. industry competitors in the same 4-digit SIC code for a given foreign listing. Portfolios is the number of identified CARs. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 3
Descriptive statistics of foreign listed and incumbent U.S. firms

Panel A: Distribution of cross-listing events

Industry	1961-1970	1971-1980	1981-1990	1991-2000	2001-2011	Total
AGR				1		1
CST				5		5
FIN			1	9	2	12
MFC	2	6	18	57	21	104
MNG				5	4	9
SPA			1	11	5	17
TRD			1	5	4	10
TSP			3	12	8	23
Total	2	6	24	105	44	181

Panel B: Foreign firms

	Obs.	Mean	Median	P10	P90	SD
Tobin Q	212	2.856	1.344	0.605	5.595	5.336
CAR (0, +20)	264	0.008	0.008	-0.149	0.180	0.150
U.S. Equity Issuance (D)	270	0.215	0.000	0.000	1.000	0.411
U.S. Acquisition (D)	270	0.185	0.000	0.000	1.000	0.389
Asset Growth	223	0.332	0.183	-0.029	0.957	0.478
Sales Growth	218	0.263	0.166	-0.083	0.702	0.585
Foreign Sales (%)	145	0.543	0.592	0.000	0.908	0.315
Capital Expenditure	212	0.155	0.089	0.023	0.382	0.201
Institutional Holdings (D)	270	0.137	0.000	0.000	1.000	0.345
Analyst Coverage (D)	270	0.248	0.000	0.000	1.000	0.433
Trading volume	261	0.173	0.118	0.006	0.401	0.180

Panel C: U.S. incumbent firms vs foreign firms

	U.S. Rival Firms			Foreign Firms				
	Obs.	Mean	SD	Obs.	Mean	SD	Diff (F-US)	t-stat
EBIT	1,742	-0.161	2.018	238	-0.120	1.997	0.041	0.30
ROA	1,742	0.104	0.178	240	0.114	0.134	0.010	0.84
Market Share	1,742	0.056	0.117	242	0.123	0.184	0.067	7.69***
Assets (billions)	1,742	3.118	17.676	262	16.169	66.781	13.051	6.74***
Age (years)	1,742	18.508	16.666	NA	NA	NA	NA	NA
Leverage	1,742	0.178	0.197	234	0.192	0.186	0.014	1.03
M/B	1,742	0.649	0.554	237	0.571	0.500	-0.078	2.05**
Cash	1,742	0.230	0.412	225	0.273	0.498	0.043	1.43

Table 3 (continued)

This table reports the summary statistics of firm characteristics for incumbent U.S. firms (Panel A) and foreign firms listed in the U.S. (Panels B). The sample period is 1950-2011. Accounting information is from Compustat and stock market information is from CRSP. Foreign sales are obtained from Worldscope. All firm characteristics are collected at the end of effective listing year of foreign firms on U.S. exchanges. Panel A shows the distribution of cross-listing events over industries and time. Industry abbreviation is defined in Table 1. The effective foreign listing event is defined as follows. First, we measure the importance of foreign listings by the relative ratio of the total assets of foreign firms listed on U.S. exchanges to that of U.S. rivals and select those industry-years in which such ratio exceeds five percent (one percent, ten percent). Then, the foreign listing event is identified as an industry-year that is not preceded by or followed by a larger impact of foreign listings within four years around the event year. For the 5% relative ratio there are 181 events during the sample period representing 270 foreign listing placements and matching with 1,742 U.S. incumbents. Panel B shows foreign firm characteristics. Tobin Q is the ratio of total asset and market values of the firm less its book value over the total asset value. CAR (0, +20) is the 20-day cumulative abnormal returns of foreign firms after cross-listing in the United States based on the world market model. U.S. Equity Issuance (D) is a dummy for the U.S. equity issuance within a year after foreign listing placement. U.S. Acquisition (D) is a dummy for the U.S. firm takeover within two years of the foreign firm listing on a U.S. exchange. Asset Growth is computed as the percentage change in total assets (in logs). Sales Growth is computed as the percentage change in total sales (in logs). The percentage of foreign sales is computed as foreign sales divided by the total sales. Institutional Holdings is a dummy variable, which is equal to one if a foreign firm is held by at least one block institutional holder, and is zero otherwise. Analyst Coverage is a dummy variable, which is equal to one if a foreign firm is followed by at least one analyst and zero otherwise. Trading Volume is computed as the total shares traded in the listing year divided by the total shares outstanding. Panel C shows the performance and other characteristics of U.S. incumbent firms versus foreign firms. EBIT is the earnings before interest and taxes normalized by firm sales. ROA is the return on assets computed as the firm's revenue minus total operating expenses divided by total assets. Market Share is the firm's sales divided by the total industry sales. Assets is the firm's total assets (in $bln). Age is the total number of years since the firms' first trading date on a U.S. exchange. Leverage is the long-term debt divided by the sum of long-term debt and market value of equity. M/B is the firm's market-to-book ratio computed as market value of equity divided by the book value of equity. Cash is the sum of cash holdings and short term investments divided by total assets. All variables are winsorized at 1% and 99%. P10 and P90 are the 10^{th} and the 90^{th} percentiles of the distribution, respectively. SD is the standard deviation. The last two columns of Panel C show the difference in the means of for each characteristic between foreign and U.S. firms, Diff (F-US), and the corresponding absolute t-statistic. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 4
Multivariate analysis of rival U.S. firms' overall financial performance

	5% asset ratio (foreign/U.S.)			1% asset ratio (foreign/U.S.)			10% asset ratio (foreign/U.S.)		
	EBIT	ROA	MkShr	EBIT	ROA	MkShr	EBIT	ROA	MkShr
PL	-0.121**	-0.007*	-0.004**	-0.093**	-0.006*	-0.002*	-0.156**	-0.010*	-0.005*
	(2.22)	(1.69)	(2.14)	(2.39)	(1.85)	(1.69)	(2.17)	(1.88)	(1.78)
Log(Assets)	0.137***	0.021***	0.032***	0.133***	0.023***	0.033***	0.157***	0.023***	0.032***
	(5.23)	(8.76)	(17.29)	(5.96)	(11.35)	(18.62)	(4.75)	(7.66)	(16.44)
Log(Age)	0.032	0.005*	0.007***	0.001	0.002	0.008***	0.071	0.008*	0.007**
	(0.75)	(1.65)	(3.38)	(0.02)	(0.57)	(3.92)	(1.25)	(1.92)	(2.53)
Leverage	-0.120	-0.092***	-0.022**	-0.193*	-0.084***	-0.024**	-0.092	-0.086***	-0.014
	(0.87)	(7.13)	(2.13)	(1.74)	(7.68)	(2.22)	(0.54)	(5.69)	(1.20)
M/B	-0.008	-0.032***	-0.009***	0.034	-0.030***	-0.006**	-0.025	-0.029***	-0.010***
	(0.12)	(6.01)	(2.95)	(0.69)	(7.01)	(2.37)	(0.27)	(4.71)	(3.03)
Cash	-1.025***	-0.046***	-0.008**	-0.959***	-0.038***	-0.007**	-1.200***	-0.052***	-0.006
	(3.88)	(4.65)	(2.25)	(4.62)	(4.61)	(2.16)	(3.85)	(4.52)	(1.56)
Intercept	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,968	6,968	6,968	10,244	10,244	10,244	5,236	5,236	5,236
R^2	0.151	0.282	0.542	0.149	0.272	0.518	0.159	0.297	0.556

This table shows the results of panel regressions of U.S. incumbent firms' overall financial performance metrics on the foreign listing dummy and relevant control variables. The sample period is 1950-2011. Accounting information is from Compustat and the stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. EBIT is the earnings before interest and taxes normalized by firm sales. ROA is the return on assets computed as the firm's revenue minus total operating expenses divided by total assets. MkShr is the firm's sales divided by total industry sales. PL is the post-listing dummy equal to one for the two years after the foreign listing year and to zero for the two years before the foreign listing year. Other independent variables are defined as in Table 3. All regressions include unreported intercept, year, and industry fixed effects. The standard errors are clustered at industry-year level. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the adjusted R-squared. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 5
Comparison of firm characteristics between rival and matched U.S. firms

Panel A: Matching firms and treated firms one year before the listing events

Matching Variables	Group	Obs.	Mean	P25	Median	P75	Diff (M-T)
Log(Assets)	Treated	1,742	5.431	3.818	5.175	6.921	0.003
	Matched	1,742	5.433	3.883	5.274	6.845	[0.990]
Log(Age)	Treated	1,742	4.890	4.190	4.938	5.679	0.041
	Matched	1,742	4.932	4.233	5.021	5.722	[0.629]
Leverage	Treated	1,742	0.174	0.004	0.106	0.298	-0.001
	Matched	1,742	0.173	0.005	0.105	0.290	[0.979]
M/B	Treated	1,742	0.635	0.297	0.490	0.797	-0.008
	Matched	1,742	0.627	0.302	0.494	0.800	[0.834]
Cash	Treated	1,742	0.218	0.022	0.079	0.278	-0.017
	Matched	1,742	0.201	0.020	0.068	0.249	[0.671]
ROA	Treated	1,742	0.106	0.065	0.124	0.183	0.009
	Matched	1,742	0.115	0.080	0.128	0.182	[0.524]

Panel B: Growth opportunities between matching firms and treated firms one year before the listing

Matching Variables	Group	Obs.	Mean	P25	Median	P75	Diff (M-T)
Earnings Estimates	Treated	738	0.912	0.323	0.698	1.303	0.021
	Matched	738	0.933	0.388	0.758	1.313	[0.872]
LT Earnings Growth	Treated	592	16.781	11.203	15.229	20.307	-0.618
	Matched	592	16.163	11.370	14.642	19.508	[0.571]
Analyst Recommendation	Treated	540	2.109	1.718	2.090	2.466	-0.058
	Matched	540	2.051	1.698	2.018	2.410	[0.286]
Sales Growth	Treated	1,742	0.157	0.023	0.116	0.262	-0.014
	Matched	1,742	0.142	0.026	0.100	0.216	[0.607]
Total Assets Growth	Treated	1,742	0.150	0.004	0.094	0.219	-0.004
	Matched	1,742	0.145	0.004	0.092	0.211	[0.822]

Table 5 (continued)

This table shows the univariate comparison of firm characteristics between U.S. firms in industry experiencing foreign listing events and similar U.S. firms in industries that do not experience any foreign listing event one year prior to the listing event year. Panel A presents the univariate comparison for the matching variables and Panel B presents the univariate comparison of various proxies of growth opportunities. We define firms that operate in industries experiencing a foreign listing event in the listing year as the "treated" firms. We select a "matched" firm for each of 1,742 U.S. rivals from "non-treated" firms based on their key characteristics one year before the event. The sample consists of 1,742 treated and 1,742 matched firms. Following Almeida, Campello, Laranjeira, and Weisbenner (2012), the matching metrics includes firm size (logarithm of total asset), growth opportunities (market-to-book ratio), leverage, cash holdings, and ROA during the year that precedes the events. The matching algorithm that minimizes the Mahalanobis distance across all matching characteristics selecting the closest neighbor as a match. Specifically, for each treated firm *i*, a matched firm *j* is such that the Mahalanobis distance is given by: $\|X_i - X_j\| = ((X_i - X_j)' W_x^{-1} (X_i - X_j))^{1/2}$, where X is a k-dimensional vector of covariates and W_X^{-1} is the inverse of the covariance matrix of the covariates. Assets is the firm's total assets (in logs). M/B is the firm's market-to-book ratio computed as market value of equity divided by the book value of equity. Age is the total number of years since the firms' first trading date on a U.S. exchange (in logs). Leverage is the long-term debt divided by the sum of long-term debt and market value of equity. Cash is the sum of cash holdings and short term investments divided by total assets. ROA is the return on assets computed as the firm's revenue minus total operating expenses divided by total assets. There are six different proxies for firms' growth opportunities: Earnings estimates, which is the average earnings per share (EPS) estimates from I/B/E/S for the next fiscal year; Analyst Recommendations, which is the average recommendation from I/B/E/S measured on a five-point scale; LT EPS growth from I/B/E/S, which is the average long-term earnings growth rate estimated for the next five-year period; Sales Growth, which is the percentage growth of sales in logs; and Total Asset Growth, which is the percentage growth of total assets in logs. The last columns show the difference between "treated" firms and "matched" firms, and the *p*-values from *t*-test on equality of means across treated and matched samples. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 6
Difference-in-difference analysis of rival U.S. firms' overall financial performance

	5% asset ratio (foreign/U.S.)			1% asset ratio (foreign/U.S.)			10% asset ratio (foreign/U.S.)		
	EBIT	ROA	MkShr	EBIT	ROA	MkShr	EBIT	ROA	MkShr
PL×Treated	-0.176***	-0.006*	-0.008***	-0.111***	-0.008***	-0.007***	-0.203***	-0.009**	-0.009***
	(2.85)	(1.67)	(3.86)	(2.64)	(2.73)	(4.84)	(2.74)	(2.09)	(3.71)
Treated = 1	0.273***	0.024	-0.033***	0.086	0.021**	-0.020***	0.267***	0.023*	0.006
	(3.27)	(1.64)	(2.99)	(1.48)	(2.57)	(3.08)	(3.16)	(1.87)	(0.61)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	13,936	13,936	13,936	20,488	20,488	20,488	10,472	10,472	10,472
Pseudo R^2	0.379	0.341	0.749	0.391	0.308	0.721	0.474	0.336	0.752

This table shows the results of difference-in-difference (DID) regressions of U.S. incumbent firms' overall financial performance metrics on the foreign listing dummy, treated dummy, interaction between foreign listing dummy and treated dummy, and other variables. The sample period is 1950-2011. Accounting information is from Compustat and the stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. For the 5% relative ratio there are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. We define firms that operate in industries experiencing a foreign listing event in listing year as the "treated" firms. We select a "matched" firm for each of 1,742 U.S. rivals from "non-treated" firms based on their key characteristics one year before the event. Treated is equal to 1 for the U.S. incumbent firms in industries experiencing foreign listing events and 0 otherwise. The variable of interest is difference-in-difference estimate PL×Treated, which measures the changes in performance between treated firms and matched firms during the four years around the listing year. EBIT is the earnings before interest and taxes normalized by firm sales. ROA is the return on assets computed as the firm's revenue minus total operating expenses divided by total assets. MkShr is the firm's sales divided by total industry sales. PL is a dummy equal to one for the two years after the foreign listing year and to zero for the two years before the foreign listing year. Other independent variables are defined as in Table 3. All the regressions include unreported intercept, year and industry fixed effects. The standard errors are clustered at industry-year level. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the pseudo R-squared. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.
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Table 7
Three impact mechanisms on rival U.S. firms: Foreign firm characteristics

Panel A: Financial channel

	Tobin's Q		CAR (0, +20)		U.S. Equity Issuance		U.S. Acquisition	
Dep. Var. = EBIT	Low	High	Low	High	No	Yes	No	Yes
PL×Treated	0.037	-0.229**	-0.080	-0.292**	-0.162**	-0.229**	-0.121*	-0.196**
	(0.82)	(1.99)	(1.34)	(2.43)	(2.13)	(1.99)	(1.69)	(1.97)
Treated = 1	-0.030	0.976***	0.119**	0.432**	0.333***	0.148	0.131	0.188
	(0.91)	(3.32)	(2.33)	(2.21)	(2.88)	(1.32)	(0.28)	(1.12)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,592	5,896	6,696	6,664	9,384	4,552	9,920	4,016
Pseudo R^2	0.231	0.425	0.142	0.509	0.446	0.282	0.781	0.649

Panel B: Growth channel

	Asset Growth		Sales Growth		Foreign Sales (%)		Capital Expenditure	
Dep. Var. = EBIT	Low	High	Low	High	Low	High	Low	High
PL×Treated	0.046	-0.472***	0.081	-0.478***	-0.086	-0.468**	-0.146	-0.206**
	(1.00)	(3.33)	(1.61)	(3.49)	(1.37)	(2.39)	(1.45)	(2.53)
Treated = 1	-0.018	0.671***	0.021	0.986***	0.010	0.748**	0.312	0.419***
	(0.41)	(2.78)	(0.34)	(3.63)	(0.17)	(2.02)	(1.62)	(2.62)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,512	6,344	6,368	6,360	5,176	4,856	6,368	6,328
Pseudo R^2	0.221	0.406	0.148	0.429	0.320	0.489	0.460	0.265

Panel C: Visibility channel

	Institutional Holders		Analyst Following		Trading Volume	
Dep. Var. = EBIT	No	Yes	No	Yes	Low	High
PL×Treated	-0.007	-0.448**	-0.116	-0.326***	-0.042	-0.367***
	(0.15)	(2.27)	(1.52)	(2.77)	(0.71)	(2.89)
Treated = 1	0.064	0.531***	0.221*	0.254**	0.087	0.229***
	(0.93)	(1.99)	(1.73)	(2.18)	(1.17)	(2.46)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,224	3,816	8,808	5,128	6,176	7,560
Pseudo R^2	0.228	0.278	0.467	0.315	0.156	0.429

Table 7 (continued)

This table shows the subsample splits of difference-in-difference (DID) regressions in Table 6 column 1 based on the three impact channels from foreign firms listed on U.S. exchanges. The sample period is 1950-2011. There are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. Accounting information is from Compustat and the stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. Panel A shows the changes in U.S. rival firms' EBIT after the listing of foreign firms through the financial channel, which is proxied by foreign firms' Tobin's Q, 20-day cumulative abnormal returns (CARs), as well as equity issuance in the United States and U.S. target firm acquisition. Tobin's Q is the ratio of the total asset value less book value of equity plus market value of equity over the total asset value. CARs are computed based on the world market model. Panel B shows the changes in U.S. rival firms' EBIT after the listing of foreign firms through the growth channel, which is proxied by foreign firms' total asset growth, sales growth, foreign sales percentage, and capital expenditure. Panel C shows the changes in U.S. rival firms' EBIT after the listing of foreign firms through the visibility channel, which is proxied by the institutional holdings, analyst coverage, and trading volume of foreign firms in the year of listing. These variables are defined in Table 3. We define firms that operate in industries experiencing a foreign listing event in listing year as the "treated" firms. We select a "matched" firm for each of 1,742 U.S. rivals from "non-treated" firms based on their key characteristics one year before the event. Treated is equal to one for the U.S. incumbent firms in industries experiencing foreign listing events, and is zero otherwise. The variable of interest is difference-in-difference estimate PL×Treated, which measures the changes in financing, growth, or visibility metrics between treated firms and matched firms during the four years around the listing year. Other independent variables are defined as in Table 3. All regressions include unreported intercept and industry and year fixed effects. The standard errors are clustered by industry-year. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the pseudo R-squared. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 8
Effect of market characteristics on the performance of rival U.S. firms

Panel A: Market proximity characteristics

	Geographic Prox.		Economic Proximity		Industrial Proximity		Cultural Proximity	
Dep. Var. = EBIT	Low	High	Low	High	Low	High	Low	High
PL×Treated	0.014	-0.346***	-0.067	-0.238**	-0.021	-0.364***	0.046	-0.402***
	(0.28)	(3.25)	(0.98)	(2.19)	(0.39)	(3.05)	(0.97)	(3.54)
Treated = 1	-0.043	0.555***	0.109*	0.204	0.043	0.322***	-0.052	0.605***
	(-0.59)	(2.78)	(1.72)	(1.62)	(0.73)	(2.47)	(0.79)	(2.92)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,296	7,640	7,120	6,816	7,576	6,360	5,960	7,976
Pseudo R^2	0.202	0.454	0.554	0.269	0.125	0.498	0.256	0.401

Panel B: Market development and stringency characteristics

	MkCap/GDP		Liquidity		Rule of Law		Disclosure	
Dep. Var. = EBIT	Low	High	Low	High	Low	High	Low	High
PL×Treated	-0.030	-0.223***	0.001	-0.201***	-0.180	-0.206***	-0.092	-0.220***
	(-2.75)	(3.02)	(0.01)	(2.74)	(1.55)	(2.68)	(1.39)	(2.59)
Treated = 1	0.593	0.307***	0.251	0.308***	0.318***	0.283**	0.416*	0.316**
	(1.58)	(2.82)	(1.12)	(3.18)	(3.17)	(2.53)	(1.92)	(2.43)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2,360	11,576	1,576	12,360	2,488	11,448	3,672	10,264
Pseudo R^2	0.401	0.385	0.485	0.379	0.357	0.386	0.352	0.388

This table shows the subsample splits of difference-in-difference (DID) regressions in Table 6 column 1 based on various cross-market characteristics. The sample period is 1950-2011. There are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. Accounting information is from Compustat, and stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. Panel A shows the results based on four cross-market proximity characteristics of foreign listed firms. Geographic Proximity is the inverse of the great circle distance between the capital cities of home and host countries of cross-listings. Economic Proximity is the proportion of exports from a foreign country into the U.S. Industrial Proximity is the correlation in the ranked industry distribution of firms listed abroad between foreign country and the U.S. Cultural Proximity is a dummy equal to one if a foreign country shares the same language or colonial ties with the U.S. All three variables are from Sarkissian and Schill (2004, 2016). Panel B shows the results based on four other cross-market characteristics of foreign listed firms. MkCap/GDP is a dummy equals to one if the U.S. market capitalization to GDP ratio is higher than that of the foreign country. Market capitalization is from Datastream and the Morningstar Dimson, Marsh, & Staunton global returns database. The real GDP values come from the historical statistics for the world economy by Angus Maddison. Liquidity is a dummy equals to one if the U.S. market liquidity is higher than that of the foreign country. Market liquidity is one minus the equally-weighted average ratio of zero daily returns each month across all firms in a given country from Goyenko and Sarkissian (2014) averaged for a given calendar year. The Rule of Law is a dummy equals to one if the U.S. investor protection is higher than that of the foreign country, and it is based on the anti-self-dealing index from Djankov, et al. (2008). Disclosure is a dummy equals to one if the U.S. disclosure standards are higher than that of the foreign country, and it is from Bae, Tan, and Welker (2008). Other independent variables are defined as in Table 3. All regressions include unreported intercept and industry and year fixed effects. The standard errors are clustered by industry-year. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the pseudo R-squared. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 9
Effect of U.S. industry and firm characteristics on the performance of rival U.S. firms

Panel A: Industry characteristics

	Competitiveness		Foreign Sales		External Finance	
Dep. Var. = EBIT	High	Low	High	Low	High	Low
PL×Treated	-0.506***	-0.030	-0.385***	0.035	-0.524***	-0.030
	(2.87)	(0.69)	(3.15)	(1.09)	(2.93)	(1.15)
Treated = 1	0.217	0.116	0.393***	0.182	0.808***	0.122*
	(1.59)	(1.43)	(2.91)	(0.99)	(2.88)	(1.66)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,552	5,424	6,688	6,756	6,052	6,052
Pseudo R^2	0.463	0.246	0.375	0.216	0.377	0.143

Panel B: U.S. firm characteristics

	Market Share		Size		Age	
Dep. Var. = EBIT	High	Low	Large	Small	Old	Young
PL×Treated	-0.026	-0.358***	-0.012	-0.449***	-0.040	-0.280**
	(0.87)	(2.75)	(0.87)	(3.18)	(1.06)	(2.38)
Treated = 1	0.035	0.593***	0.022	0.523***	0.056	0.416***
	(1.32)	(3.90)	(0.90)	(3.20)	(1.23)	(2.98)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	6,968	6,960	6,968	6,968	6,968	6,968
Pseudo R^2	0.183	0.417	0.307	0.403	0.514	0.427

This table shows the subsample splits of difference-in-difference (DID) regressions in Table 6 column 1 based on U.S. industry and firm characteristics. The sample period is 1950-2011. There are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. Accounting information is from Compustat, and stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. Panel A presents the subsample results of DID regressions based on four industry-level characteristics of "treated" firms: Competitiveness, Foreign Sales, and External Finance. We use the fitted Herfindahl-Hirschman Index (HHI) to measure the industry competition of "treated" industries, which is obtained from Hoberg-Phillips Database. An industry is defined as competitive if it is below the sample median. Foreign sales is the proportion of total foreign sales in "treated" industry one year prior to the listing event, computed as total foreign sales scaled by total sales in a given industry. External finance measures the dependence on external finance of "treated" industries as in Rajan and Zingales (1998), computed as capital expenditures minus cash flows from operations to capital expenditures at the industry level. In Panel A we split the sample based on the median values of industry-level variables one year prior to the listing events. Panel B shows the subsample results of DID regressions based on U.S. rival firm characteristics. The sample splits are based on sample medians of market share, firm size, and firm age of "treated" firms one year prior to the listing events. All the three variables are defined as in Table 3. The standard errors are clustered by industry-year. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the pseudo R-squared. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 10
Subsample tests for foreign firms with and without direct product market presence in the United States

	Industry Tradability		U.S. Business Presence	
Dep. Var. = EBIT	Yes	No	Yes	No
PL×Treated	-0.256***	-0.042	-0.274***	0.006
	(2.73)	(1.31)	(2.99)	(0.10)
Treated = 1	0.269***	0.285	0.373***	0.163
	(3.00)	(1.61)	(3.12)	(1.51)
Intercept/Controls	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes
Obs.	8,556	5,380	10,392	3,544
Pseudo R^2	0.388	0.300	0.388	0.299

This table shows the subsample splits of difference-in-difference (DID) regressions in Table 6 column 1 based on U.S. industry and firm characteristics. The sample period is 1950-2011. There are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. Accounting information is from Compustat, and stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. Industry Tradability in columns 1-2 refers to whether a foreign firm belongs to tradable or non-tradable industry. Tradable industries are: Agriculture, Forestry and Fishing, Mining, and Manufacturing. Non-tradable industries are: Construction, Transportation, Wholesale and Retail Trade, Finance, Insurance and Real Estate, Services, and Public Administration. Foreign Sales in the United States in columns 3-4 consists of foreign firms that are directly identified to have sales office, headquarters, or subsidiaries in the United States. The standard errors are clustered by industry-year. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the pseudo R-squared. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

Table 11
Subsamples tests for IPO and non-IPO issuing U.S. firms

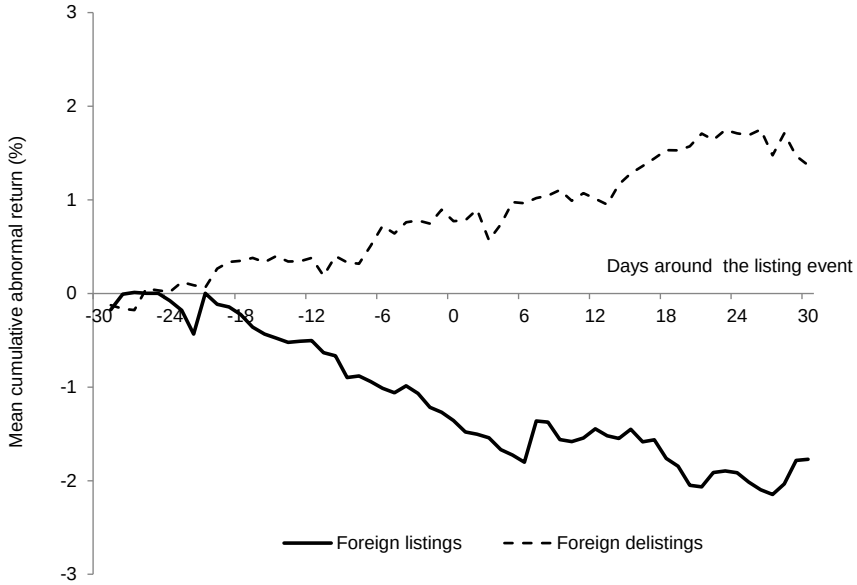
	5% asset ratio		1% asset ratio		10% asset ratio	
Dep. Var. = EBIT	IPO	Non-IPO	IPO	Non-IPO	IPO	Non-IPO
PL×Treated	-0.864	-0.150**	-0.498	-0.082**	-0.867	-0.189**
	(-1.14)	(-2.56)	(-1.05)	(-2.12)	(-1.01)	(-2.52)
Treated = 1	0.289	0.263***	-0.985	0.076	-0.884	0.237***
	(0.66)	(3.21)	(-0.93)	(1.30)	(-0.51)	(2.77)
Intercept/Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry/Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	720	13,216	1,024	19,464	488	9,984
R^2	0.763	0.304	0.752	0.311	0.772	0.371

This table shows the impact of foreign firm listings on the performance of U.S rival firms with and without IPO issuance. The sample period is 1950-2011. Accounting information is from Compustat and the stock market information is from CRSP. The effective foreign listing event is defined as in Table 3. For the 5% relative ratio, there are 181 events during the sample period representing 270 foreign listing placements and 1,742 U.S. incumbents. IPO dates for "treated" firms are obtained from Compustat. IPO sample includes those "treated" firms which experience IPO issuance in the listing event year or within one or two years before the listing event year. The estimation specification is the same as in Table 6, column 1. All regressions include unreported intercept and control variables, as well as industry and year fixed effects. The standard errors are clustered by industry-year. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.

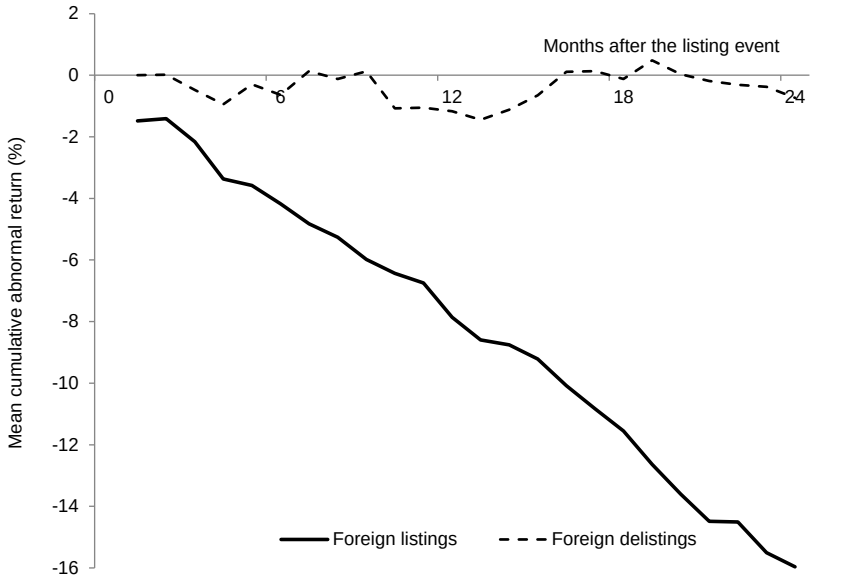
Table 12
Heckman selection model

First Stage: Probit Model (Treated = 1)		Second Stage: OLS Two-Year Changes in EBIT	
Log(Assets)	0.003	Treated = 1	-0.239*
	(0.28)		(1.88)
Leverage	-0.376***	Inverse Mills Ratio	-0.153
	(3.49)		(0.76)
M/B	0.079***	Log(Assets)	-0.001
	(3.00)		(0.05)
Sales Growth	0.125**	Log(Age)	-0.072**
	(2.29)		(2.30)
Foreign Sales (%)	1.317***	Leverage	-0.136
	(11.17)		(0.78)
Industry External Finance	0.024***	M/B	0.042
	(2.95)		(0.45)
Industry M/B	0.097***	Cash	0.260
	(7.25)		(1.34)
Geographic Proximity	-0.012**		
	(2.34)		
Economic Proximity	0.004***		
	(5.46)		
Industrial Proximity	0.274***		
	(4.04)		
Cultural Proximity	-0.447***		
	(7.56)		
Liquidity	-0.002		
	(0.07)		
Law	-0.514***		
	(6.81)		
Disclosure	0.030		
	(0.76)		
Intercept	Yes	Intercept	Yes
Industry FE	Yes	Industry FE	Yes
Obs.	99,589	Obs.	99,329
Pseudo-R^2	0.176	Adj. R2	0.010

This table presents the results of Heckman selection model. The first column shows the first-stage estimation of probit model using a sample of 1,742 "treated" firms and all the other U.S. firms that do not experience a foreign listing event in the listing event year. The second column shows the second-stage OLS estimation by including inverse Mills ratio. The instruments for the first stage model are: firm and industry market-to-book ratios, sales growth, percentage of foreign sales, leverage, industry external finance, four cross-market proximity measures (geographic, economic, industrial, and cultural) from Sarkissian and Schill (2004), cross-market liquidity from Goyenko and Sarkissian (2014), the anti-self-dealing index from Djankov, La Porta, Lopez-de-Silanes, and Shleifer, (2008), and disclosure measure from Bae, Tan, and Welker (2008). The control variables in the second-stage estimation are from Table 6. The absolute *t*-statistics are in parentheses. The table also reports the number of observations and the R-squared. ***, **, * indicate significance at 1%, 5%, and 10% levels, respectively.



Plot A: Short-run cumulative abnormal returns of rival U.S. firms



Plot B: Long-run cumulative abnormal returns of rival U.S. firms

Figure 1. Cumulative abnormal returns of rival U.S. firms around foreign firm listing and delisting. This figure shows short-run (Plot A) and long-run (Plot B) average cumulative abnormal returns, CARs, (in percent) of U.S. competing firms around listing (solid line) and delisting (dashed line) dates of foreign firms on and from U.S. exchanges, respectively. The cumulative abnormal returns are calculated based on the Fama-French three-factor model. The event window in Plot A is 60 days around listing and delisting dates of foreign firms. The event window in Plot B is the 24-month period after the listing and delisting dates. The sample period is 1950-2011.

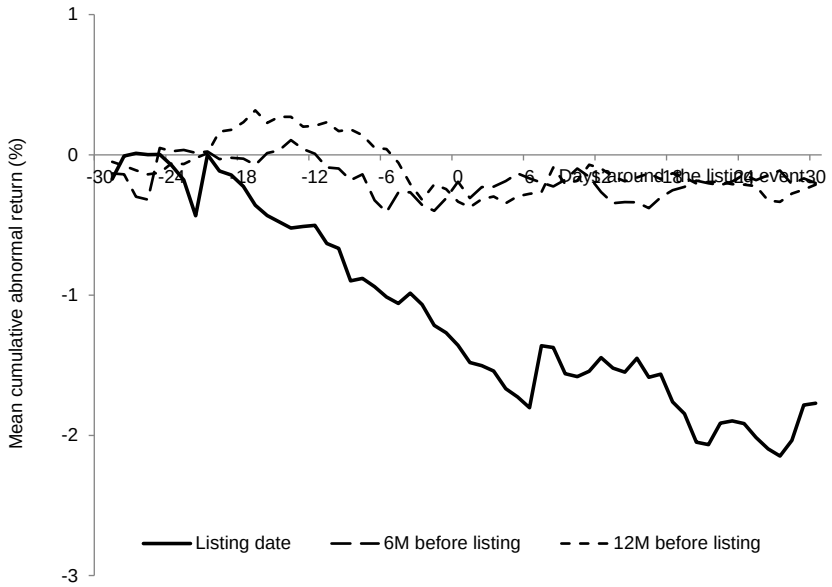


Figure 2. Cumulative abnormal returns of rival U.S. firms before foreign listing dates. This plot shows the average portfolio cumulative abnormal returns, CARs, (in percent) of U.S. competing firms around the actual foreign listing events (solid line, same as in Figure 1), those six months (6M) before the listing event (long dashed line), and those twelve months (12M) before the listing event (shorter dashed line) within the 60-day window. The cumulative abnormal returns are calculated based on the value-weighted market model. CAR is defined as the equally-weighted average of CARs across all U.S. industry competitors for a given foreign listing. The sample period is 1950-2011.