The impact of cross-delisting from the U.S. on firms' financial constraints

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Abstract

We investigate the impact of cross-delisting on firms' financial constraints. We find that firms that cross-delisted from a U.S. stock exchange face stronger post-delisting financial constraints than their cross-listed counterparts, as measured by investment-to-cash flow and cash-to-cash flow sensitivities. Following a delisting, the sensitivity of investment to cash flow increases significantly, and firms also tend to save more cash out of cash flows. These effects are mainly driven by cross-delisted firms from countries with weaker investor protection and are more predominant after the passage of Rule 12h-6 (of 2007), which made it easier for foreign firms to leave U.S. markets.

Keywords: Cross-delisting; Financial constraints; Information asymmetry; Investment-to-cash flow sensitivity; Cash-to-cash flow sensitivity

JEL Classifications: F30; F31; G15; G30

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1. Introduction

A considerable number of studies document that cross-listing in the United States (U.S.) generates several potential benefits to foreign firms that list their equity in a market with more stringent disclosure standards and better legal protection of minority investors (Coffee, 1999, 2002; Stulz, 1999). Among other things, these rules can reduce opportunities for insider trading (Coffee, 2007), improve firms' access to external finance (e.g., Reese and Weisbach (2002)), relax financial constraints (e.g., Lins, Strickland and Zenner (2005)), and reduce the cost of capital (e.g., Errunza and Miller (2000), Reese and Weisbach (2002), Hail and Leuz (2009)). The required compliance with the Securities and Exchange Commission (SEC) rules represents an obvious cost for firms that cross-list in the U.S. This cost has increased after the adoption of Sarbanes-Oxley Act[3] (SOX) in 2002, making it more difficult for some foreign firms to maintain a U.S. listing. However, on March 21, 2007, the SEC adopted Rule 12h-6[4], which made it easier for a foreign firm to leave a U.S. exchange market. After the passage of Rule 12h-6, more foreign firms delisted from U.S. stock exchanges than in the post-SOX period in 2002. This regime shift motivated some recent studies to explore the determinants and the economic effects of cross-delisting (e.g., Marosi and Massoud (2008), Doidge, Karolyi and Stulz (2010), Fernandes, Lel and Miller (2010), Chaplinsky and Ramchand (2012)). Little is known, however, about the effects of cross-delisting on a firm's real investment decisions and

[3] Sarbanes-Oxley Act (SOX) is a U.S. federal law that predicts enhanced standards for all U.S. public companies.
[4] Under Rule 12h-6 of March, 21, 2007, foreign companies that have and maintain a foreign listing. which is its primary trading market (for at least 12 months preceding deregistration), can qualify for deregistration if the average daily trading volume of the subject class in the U.S. for a recent 12-month period is no more than five percent of the average daily trading volume of that class of securities on a worldwide basis for the same period. Previous Rule 12g-4 applies (with an easier method of counting U.S.-resident holders), but the new eligibility conditions also apply. See http://www.sec.gov/divisions/corpfin/internatl/foreign-private-issuers-overview.shtml.

financial constraints. We know from Karolyi (2012) that the improved ability to make better investment decisions post-cross-listing in the U.S. is what mainly explains the ex-post increase in their market value. Both the release of financial constraints, due to a larger investor base, and the improved corporate governance environment once firms cross-list in a U.S. stock exchange allow managers to undertake more value-enhancing investments. In contrast, leaving U.S. markets may create the reserve effect on the quality of corporate investments and financial constraints, especially in companies with a more pronounced downgrade of their corporate governance.

Motivated by these ideas, herein, we analyze the real economic consequences of cross-delisting from a U.S. exchange by investigating the post-cross-delisting financial constraints, including the sensitivity of investment to cash flows. Our study contributes to this literature in two ways. First, we document an adverse effect on the financial constraints of firms that cross-delist. For instance, after cross-delisting, firms exhibit a higher degree of financial constraints in comparison to the control group of firms that remained cross-listed. We show empirically that the investment-to-cash flow sensitivity of cross-delisted firms is significantly higher than that of the control group of cross-listed firms. Furthermore, we examine the sensitivity of cash to cash flow and find evidence that cross-delisted firms, on average, save more cash out of cash flows than cross-listed firms. Second, we show that these effects are mainly driven by firms from Civil Law countries, which are generally associated with lower levels of legal enforcement and weaker domestic shareholder protection. This evidence seems to be stronger after the passage of Rule 12h-6 (of 2007).

We test our hypotheses using a treatment group of firms that cross-delisted at some point during our sample period – 2000 to 2012 – and two separate control groups of firms: i) a primary control group of foreign firms that remained listed in a U.S. exchange across our sample period; ii) an alternate control group of never-cross-listed firms, i.e., firms that have

never been listed in any market other than the domestic market. Using the control group of never-cross-listed firms allows us to better control for confounding effects around cross-delistings. Those confounding effects may arise from economic and financial events that are unrelated to cross-delisting, such as the potential impact of the financial crisis of 2007-2008. Thereby, our final sample consists of 583 treatment firms from 38 countries, 564 control firms that remained cross-listed throughout the sample period, and 10,397 control firms that have never been cross-listed over the sample period.

To test our main hypotheses, we first employ a difference-in-differences methodology to analyze the differences between treatment and control group of firms. Next, we employ propensity score matching (PSM) to reduce the selection bias that might affect the baseline results. Our main results show that firms (mainly from countries with weaker shareholder protection) become more financially constrained after cross-delisting. Our findings are robust to the use of alternative measures of investment, different estimation techniques, and alternate measures of financial constraints. Our results are consistent with the bonding hypothesis of Coffee (1999, 2002) and Stulz (1999) and suggest a reverse bonding effect post-cross-delisting as firms from countries with poor information disclosure requirements and under weaker investor protection environments are more penalized in their financial constraints.

To the best of our knowledge, this is the first study to examine the real economic effects of cross-delisting. The remainder of this study is organized as follows. Section 2 provides a review of the related literature and outlines our research hypotheses. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 summarizes our main conclusions.

2. Literature review and research hypotheses

The bonding hypothesis of Coffee (1999, 2002) and Stulz (1999) posits that foreign firms that cross-list in the U.S. commit themselves to higher levels of financial disclosure and

transparency to meet the more stringent SEC requirements. In doing so, they improve their standards of corporate governance, which helps reduce their cost of capital. The benefits from cross-listing in the U.S. (in particular on a stock exchange) are expected to be greater for firms that face more financial constraints in their home markets. Financial constraints occur when capital markets frictions impose a wedge between the costs of internal and external financing sources. Previous studies of La Porta *et al*. (1997, 1998), La Porta, Lopez-De-Silanes and Shleifer (2008), and Djankov *et al*. (2008) argue that firms are less financially constrained in economies with more developed capital markets, suggesting that those firms have an enhanced ability to take advantage of their growth opportunities. However, as noted by Karolyi (2012), very few studies examine the corporate investment activity of U.S. cross-listed firms. Lins *et al*. (2005) are one of the first (and one of the few) to provide evidence that firms from emerging markets improve access to external financing following a U.S. listing. The authors document that those firms make almost no mention of capital constraints three years after their U.S. listing[5]. Their argument is that improvements (relative to a firm's home market) in shareholder protection and liquidity help reduce the effects of information asymmetry, which in turn relaxes financial constraints. To test their predictions, they use a sample of foreign listings on U.S. exchange markets, over the 1986-1996 period, and employ the Fazzari, Hubbard and Petersen (1988) methodology by testing the investment sensitivity to cash flow. Under this framework, higher sensitivity of investment to the firm's cash flow means higher degree of financial constraints.

The recent increase in the number of cross-delistings from U.S. exchange markets motivates additional empirical research on the effects of such delistings. Although compliance with SOX (of 2002) provisions has increased the cost of cross-listing, it was mainly after the passage of

[5] Lins, Strickland and Zenner (2005) obtain this information from the notes in the annual form 20F that firms are required to file with the SEC.

Rule 12h-6 of 2007 that the number of foreign firms leaving U.S. markets has spiked. The previous literature on cross-delistings is consistent with the bonding hypothesis, showing that, when foreign firms cross-delist from a U.S. exchange, they observe contrary effect to when they cross-list. On average, firms suffer a reduction in their market value post-cross-delisting, and stock prices react negatively to deregistration[6] announcements (Marosi and Massoud, 2008; Doidge *et al.*, 2010; Fernandes *et al.*, 2010; Hostak *et al.*, 2013). Regarding the reasons to cross-delist from a U.S. exchange market, we can identify in prior research two main sets of explanations. The first relates to two important changes in the regulatory environment of the U.S. markets: (i) the more demanding regulatory requirements imposed by the SOX in 2002, and (ii) the passage of Rule 12h-6 of 2007, which facilitated the deregistration process. Previous studies have found a significantly negative stock price reaction to deregistration announcements before the adoption of Rule 12h-6 (e.g., Marosi and Massoud (2008)), although it was not statistically significant after the Rule (Doidge *et al.*, 2010; Fernandes *et al.*, 2010).

The second set of reasons for cross-delisting and deregistration is related to the determinants and economic consequences for firms. Foreign firms face a trade-off between the costs and benefits of remaining listed on a U.S. stock exchange; for some types of firms, however, the cost may outweigh the benefits. Doidge *et al.* (2010) find that firms that deregister have poor growth opportunities and little need for external finance. They also find that foreign firms with more agency problems have worse stock-price reactions to the adoption of Rule 12h-6 due to investors recognizing an increase in the costs of information asymmetry.

Nevertheless, prior research has not yet documented the real economic consequences of cross-delisting, in particular, the impact on corporate investment. Given this gap in the literature and considering all the above evidence, we develop our research hypotheses concerning the

[6] Deregistration is the procedure that is used to terminate registration with the SEC, which always implies delisting from a U.S. stock exchange.

effects of cross-delisting on firms' financial constraints and investment sensitivities. We borrow from the previous literature (e.g., Fazzari *et al*. (1988), Lins *et al*. (2005)) the idea that a financially constrained firm is one that displays a significant investment sensitivity to cash flow. Previous evidence (e.g., Lins *et al*. (2005)) shows that cross-listing in the U.S. should allow foreign firms to relax the financial constraints they face in their home markets to make value-enhancing investments decisions. Karolyi (2012) highlights that corporate investment activities are one of the main factors explaining the rise in equity market value post-cross-listing. If this is the case, cross-delistings might have the reverse effect. Even when the firm's need for external financing is low, delisting from a U.S. exchange might lead to a higher cost of capital, as the quality of the firm's information environment deteriorates since it is no longer under the stringent disclosure requirements imposed by the SEC. Hereupon, we develop our first testable hypothesis:

Hypothesis 1: The investment-to-cash flow sensitivity should increase following a cross-delisting from a U.S. exchange market.

Almeida, Campello and Weisbach (2004) present an alternative model to test the level of financial constraints. Instead of investment, they test the cash-to-cash flow sensitivity, where "cash" is the ratio of cash and marketable securities to total assets. The rationale is that financially constrained firms exhibit higher cash-to-cash flow sensitivity because they tend to save more cash from their cash flows. The excess cash flows over cash holdings does not indicate a greater ability to predict future investment opportunities, but how easy it is for a firm to raise external capital. Almeida *et al*. (2004) argue that cash-to-cash flow sensitivity is positively correlated with proxies for financial constraints and that this relation is systematically stronger and less ambiguous than what we can observe using investment-to-cash flow sensitivity. This argument leads us to our second hypothesis:

Hypothesis 2: The cash-to-cash flow sensitivity should increase following a cross-delisting from a U.S. exchange market.

According to the bonding hypothesis, foreign firms that cross-list in the U.S., in particular on exchange markets, benefit from an improvement in their information environment (Coffee, 1999, 2002; Stulz, 1999), which is more relevant for firms domiciled in countries with poor shareholder protection (La Porta *et al.*, 2008). Moreover, Fernandes *et al.* (2010) show negative stock price reactions to firms leaving U.S. stock exchanges, with a greater effect observed when those firms are from countries with a poor quality information environment and weaker investor protection. They interpret their results as being consistent with the bonding hypothesis. Based on these ideas, we formulate our last hypothesis:

Hypothesis 3: The increase in financial constraints post-cross-delisting should be more severe for firms from countries with weaker shareholder protection.

3 Data and methodology

3.1 Data

Starting from the universe of foreign firms cross-listed on the major U.S. stock exchanges, we identify all cross-delistings that occurred between 2000 and 2012[7]. We use firms listed on major stock exchanges (New York Stock Exchange (NYSE) and NASDAQ) to ensure better data availability and similar listing requirements. We obtain a list of all foreign firms with equity shares registered and reporting with the SEC from the SEC website. Next, we search EDGAR's archive[8] for all Form 15s filed between 2000 and 2012 and identify firms that delisted during our sample period. Most firms traded in the U.S. issue American Depositary

[7] Our sample period starts in 2000 because information about foreign firms registered and reporting with the SEC is not available in 1995 and in 1999 at the SEC website.

[8] Electronic Data Gathering, Analysis, and Retrieval system (EDGAR's) provided by the SEC.

Receipts[9] (ADRs) are managed by a U.S. depositary bank, such as the Bank of New York or Citibank. Thereby, we complement and manually cross-check the data obtained from SEC's sources with those obtained from the websites of NYSE, NASDAQ, Over-The-Counter Bulletin Board (OTCBB) and Over-The-Counter (OTC) Markets Portal. Firms that move from one major exchange to another are not treated as delisted, whereas firms that delisted from an exchange market and moved to an OTC market or "Pink Sheets" are treated as delisted.

We exclude financial firms (SIC codes between 6000 and 6999) and utilities (SIC codes between 4900 and 4949) because their accounting figures are ruled by special statutory requirements. Firm financial data are from Thomson Reuters WorldScope; bond ratings are from Thomson Reuters Securities Data Corporation (SDC) database; industry- and country-level variables are from a variety of sources, as described in detail in Appendix A.

To reduce the effect of outliers, all the variables are winsorized at the 1% in each tail of the distribution. All variables in U.S. dollars are Consumer Price Index (CPI) adjusted considering 2000 prices. We further eliminate observations with negative or missing information on sales, market value, capital expenditures, book value of equity, and debt. Following prior literature (e.g., Loureiro and Taboada (2015)), we exclude firms with total assets lower than $10 million to make firms more comparable across countries. We exclude firms that are only listed in 2012 because we require at least two years of observations.

This data screening results in a final longitudinal panel of 583 treatment firms from 38 countries, a primary control group of 564 firms that remained cross-listed over the sample period, and an alternate control group of 10,397 firms that have never been cross-listed over our 2000-2012 sample period, nor in the three years prior to the beginning of the period.

[9] Foreign firms can obtain or issue equity financing by using Level 1, 2 or 3 ADRs. The Level 1 ADR is the only ADR' Level quoted on the OTC market. A Level 2 ADR provides shares listed and traded on the U.S. exchange markets. The Level 3 ADR is used when a company has made a public offering in the U.S. Our sample includes only Level 2 and Level 3 ADRs.

3.2 Sample description

Table 1 describes our sample by country, including the number of observations and the number of firms that have been cross-listed on U.S. exchange markets from 2000 to 2012. Additionally, we provide the same information for the cross-delisted (treatment) firms and the two control groups of cross-listed and never-cross-listed firms.

[Insert Table 1 here]

Overall, the main sample comprises 1,147 foreign firms, 583 treatment (cross-delisted) firms and 564 control (cross-listed) firms. To overcome confounding effects around delisting events, we also use an alternate control sample of 10,397 purely domestic listed firms (the "never-cross-listed" control group). Hence, the treatment group has 4,187 firm-year observations, the primary control group of cross-listed firms counts for 4,891 firm-year observations, and the alternate control group of never-cross-listed firms counts for 87,965 observations.

According to Chaplinsky and Ramchand (2012), we classify delisting in three main groups: (1) involuntary, (2) as result of mergers and acquisitions (M&A), and (3) voluntary. Involuntary cross-delistings are those foreign firms that were disqualified by NYSE or NASDAQ or did not meet SEC registration requirements. Companies that were cross-delisted due to M&As are shown separately in the table, although in some analyses they are included in the voluntary group. The voluntary group comprises companies that made the decision to cross-delist. We further split this group into three categories: (i) firms that cross-delisted before March 21, 2007 and deregister under Rule 12g-4; (ii) firms that cross-delisted after March 21, 2007, and deregister under Rule 12h-6; and (iii) "other reasons", i.e., firms that changed their headquarters to the U.S., went private or moved to OTCBB or to another OTC market.

Overall, most of the cross-delisted firms are from Common Law countries[10] (61.8%), followed by French Law countries (21.4%) and German-Scandinavian Law countries (16.8%).

Table 2, Panel A, provides descriptive statistics for the main firm-level variables by treatment group, control group of cross-listed firms, and a control group of never-cross-listed firms, as well as the statistical significance of univariate comparisons between treatment and control groups. Panel B of Table 2 reports univariate comparison between pre- and post-delisted groups and the differences in means and medians between those groups and the control groups of cross-listed and never-cross-listed firms, for all the main variables.

[Insert Table 2 here]

In Panel A of Table 2, we observe that the treatment group has, on average, lower total assets, lower *Q* and *Sales Growth* (i.e., lower growth opportunities), and lower corporate profitability (*ROA*) than the control group of cross-listed firms. The average investment ratio is also lower for treatment firms. Although this difference is statistically significant, it is not economically large. Treatment firms are more levered and display higher probability from financial distress (measured by *O-Score*) when compared with cross-listed firms. Regarding the comparison between treatment firms and never-cross-listed firms, treatment firms are, on average, larger and have a higher *Q* and higher leverage but are less profitable (*ROA*) than never-cross-listed firms. Moreover, the differences between the treatment group and control group of never-cross-listed firms are statistically significant at the 1 percent level.

Panel B of Table 2 shows that the differences in means and medians between treatment and control firms (cross-listed group) pre- and post-cross-delisting are, on average, statistically significant at the 1 percent level. Moreover, post-cross-delisting firms invest less, hold less cash

[10] We follow La Porta, Lopez-De-Silanes and Shleifer (2008) and assign firms according to the legal origin of domestic markets.

reserves, have lower growth opportunities, are more levered and exhibit higher probability of financial distress than in the pre-delisting period.

3.3 Measuring the investment-to-cash flow sensitivity

To test hypothesis 1 – that investment-to-cash flow sensitivity increases post-cross-delisting – we follow the previous literature (e.g., Fazzari *et al.* (1988), Lins *et al.* (2005)) and employ a difference-in-differences methodology. Our baseline specification is the following equation:

$$I_{i,t} = \alpha_i + \beta_1 CF_{i,t} + \beta_2 Treat_i + \beta_3 Delist_{i,t} + \beta_4 CF_{i,t} \times Treat_i \times Delist_{i,t} + \beta_5 CF_{i,t} \times Treat_i + \beta_6 CF_{i,t} \times Delist_{i,t} + \beta_7 Delist_{i,t} \times Treat_i + \gamma_1 Q_{i,t-1} + \gamma_2 SIZE_{i,t-1} + \lambda_k + \eta_j + \gamma_t + \varepsilon_{i,t} \quad (1)$$

where the dependent variable $I_{i,t}$ is a measure of corporate investment for firm *i* in year *t*. In most regressions, $I_{i,t}$ is measured as the ratio of capital expenditures scaled by lagged property, plant and equipment (PPE). $CF_{i,t}$ is the net income plus depreciation and amortization expenses scaled by lagged total assets. $Treat_i$ is an indicator variable, which is equal to one if firm *i* is included in our treatment group, and zero otherwise. $Delist_{i,t}$ is an indicator variable that is equal to one if treatment firm *i* is delisted in year *t*, and zero otherwise. $Q_{i,t-1}$ controls for growth opportunities and corresponds to the normalized stock price, measured as the market value of equity plus the book value of assets minus the book value of equity scaled by the book value of total assets. The variable $SIZE_{i,t-1}$, the logarithm of total assets, is included to control for the impact of firm size on corporate investment decisions. In our main regressions, we also include dummies to control for country, λ_k, industry[11], η_j, and year, γ_t. Because of the fixed effects framework, some of the coefficients in equation (1) drop out due to collinearity.

[11] We assign firms to industries using the classification scheme of Fama and French (1997), based on 48 industry portfolios.

Regarding our baseline specification (1), the main coefficient of interest is β_4 ($CF_{i,t} \times Treat_i \times Delist_{i,t}$), which captures the change in investment-to-cash flow sensitivity following the cross-delisting event for our treatment group, relative to the control groups. Per hypothesis 1, we predict a positive coefficient β_4, which means an increase in investment-to-cash flow sensitivity after cross-delisting.

4. Empirical results

4.1 Investment-to-cash flow sensitivity following cross-delisting from U.S. exchange markets

To test whether investment-to-cash flow sensitivity increases post-cross-delisting (hypothesis 1), we estimate several alternative specifications of equation (1). Table 3 shows the results.

[Insert Table 3 here]

As in previous studies (e.g., Fazzari *et al*. (1988), Lins *et al*. (2005)), we find that investment is positively related to cash flow. As shown in Panel A of Table 3, coefficient β_1 ($CF_{i,t}$) is statistically significant across models. Consistent with our first hypothesis, we predict a positive and statistically significant coefficient β_4 ($CF_{i,t} \times Treat_i \times Delist_{i,t}$), suggesting that post-cross-delisting firms will face more restrictions to access external financing, thus making investments more dependent on internal sources. Coefficient β_4 captures the changes in investment sensitivity to cash flow after cross-delisting for our treatment group, relative to the control groups of cross-listed and never-cross-listed firms. Using our baseline (model (1)) as an example, a one-standard-deviation increase in $Cash\ Flow$ (0.17 – see Panel A of Table 2) represents an increase of 0.009 in investment prior to the cross-delisting event for the average treatment firm, which is associated with a 2.8% increase in investment[12]. In the post-cross-

[12] The sum of the coefficients is (0.2366+-0.1864) x 0.17=0.0085. The mean of our investment variable is 0.30 (from Panel A of Table 2). Therefore, a 0.0085 increase is equivalent to a 2.8% (0.0085/0.30) increase in investment.

delisting period, a one-standard-deviation increase in $Cash\ Flow$ (0.0422) corresponds to a 14.1% increase in investment[13].

The coefficients of *SIZE* and *Q* have the expected sign: $Q_{i,t-1}$ captures growth opportunities and is positively related to investment; $SIZE_{i,t-1}$ is negatively related to investment, suggesting that larger firms tend to invest significantly less as a percentage of total assets.

We estimate different specifications of equation (1) to check the robustness of our baseline results. In model (2), we use firm fixed effects, instead of country and industry fixed effects. The results are similar in sign and magnitude to the ones shown in the baseline model.

In model (3), we use a matched sample of treatment and control firms from the cross-listed group. The use of matched samples is important because in our experiment firms are not randomly assigned to the treatment group, which may raise concerns about sample selection issues. One problem in this type of experiments is that one is not able to observe the counterfactual, i.e., there may be some omitted variables that simultaneously affect the decision to cross-delist and our outcome variables (i.e., firms' investment decisions). To address this issue, we use the propensity score matching (PSM) methodology proposed by Rosenbaum and Rubin (1983). In the PSM procedure, we match each treatment firm to a control firm in the same industry, country, year, and with the closest *SIZE*. We use PSM technique selecting the nearest neighbor with replacement[14] to find the best match(es) for each treatment firm[15]. As

[13] The sum of coefficients is (0.2366+0.1979+-0.1864) x 0.17=0.0422. Thus, a 0.0422 increase is equivalent to a 14.1% (0.0422/0.30) increase in investment.

[14] We apply the matching technique with the nearest neighbor and caliper, which corresponds to a propensity score range (the common support region). The proper caliper is computed following Wang *et al.* (2013) and corresponds to 0.2 of the propensity score standard deviation. The common support region condition is imposed by a trimming process as suggested by Smith and Todd (2005).

[15] The quality of matching is tested using the likelihood-ratio (LR) Chi^2 test, which tests the goodness-of-fit of the probit model used in the propensity score estimation; if the propensity score is the most suitable one, the coefficients of such a specification should not be significantly different from zero. In the robustness tests, we use PSM with some alternative matching variables. In all cases, we test the difference in means of the key variables used in the matching procedure and find no significant differences between treated and matched firms.

shown in model (3), the results are very similar to those obtained with the non-matched control sample, namely, we still find a positive and statistically significant β_4.

A potential concern of this analysis is that our treatment sample includes different types of delisting. We split cross-delisted firms into two groups, depending on whether the delisting was voluntary or involuntary. Models (4) and (6) display the estimations of our equation (1) for each group of delisted firms, and models (5) and (7) show the results of matched samples of cross-listed firms. The magnitude is similar to the previous results, although the significance is weaker. One possible explanation is that differences in economic, institutional, and regulatory environments might undermine our results. We account for such differences in hypothesis 3, tested in section 4.3.

To mitigate concerns about confounding events (e.g., changes in the economic or regulatory environment that are unrelated to the cross-delisting event) around the same time of cross-delisting, we estimate our baseline model using a control sample of non-matched (model (8)) and matched (model (9)) sample of never-cross-listed firms. The results are similar to those previously obtained.

In Panel B of Table 3, we estimate equation (1) using two different measures of corporate investment: i) capital expenditures scaled by lagged total assets minus cash and short-term investments[16]; ii) asset growth. Asset growth captures all investment activities, such as acquisitions and divestitures[17]. We estimate the regressions using the same control samples – matched and non-matched cross-listed and never-cross-listed firms. Once again, the results show coefficients with the same sign and similar statistical significance as those previously obtained. We also replicate our baseline model and alternative specifications in Table 3,

[16] The denominator of this investment measure (total assets minus cash and short term investments) reflects the invested capital.

[17] Kumar and Ramchand (2008) provide evidence that over 40% of their sample of cross-listed firms in U.S. exchange markets acquire a U.S. local firm after they cross-list.

requiring, at least, three years of data before and after cross-delisting. The results are consistent to those in Panel A.

To address concerns that our results might be driven by the significant number of Canadian firms in our sample, we re-estimate all models in Table 3, excluding all Canadian firms. We find that both the sign and magnitude of our main coefficient of interest β_4 is very similar to what we have documented before, meaning that our results are not driven by firms from a single country. In addition, we also re-estimate the baseline specification controlling for the ADR type, i.e., Level 3 *versus* Level 2, and obtain identical results. Taken altogether, the results presented in Table 3 provide strong evidence supporting hypothesis 1.

4.1.1 Investment-to-cash flow sensitivity: Additional robustness checks

Since Kaplan and Zingales (1997), the use of investment-to-cash flow sensitivity as a measure of financial constraints has been challenged in the literature and requires additional tests to be reliably used in certain samples of firms. We evaluate this measure by testing the model using pre-sorted subsamples of financially constrained and unconstrained firms. The literature offers a number of proxies to sort firms into these categories with mixed empirical results (see, e.g., Almeida *et al.* (2004) for a discussion). To select the best proxies to classify firms into financially constrained and unconstrained, we employ the Lemmon and Zender (2010) modification test of Shyam-Sunder and Myers (1999), which accounts for debt capacity concerns, and examine the quality of several measures proposed in the literature[18]. The model indicates that the Payout Ratio and Bond Rating are reliable proxies to classify firms as financially constrained/unconstrained.

[18] We start with four alternative proxies to assign firms into "constrained" and "unconstrained" groups: Payout Ratio, as in Almeida *et al.* (2004); KZ index, proposed by Lamont *et al.* (2001); WW index, proposed by Whited and Wu (2006); and Bond Rating as in Almeida *et al.* (2004). We then apply the Lemmon and Zender (2010) model, which identifies *Payout Ratio* and *Bond Rating* as the best proxies for financial constraints (this analysis is explained in detail in the Internet Appendix).

Following Almeida *et al*. (2004), we compute the Payout Ratio as the ratio of total distributions to shareholders (both dividends and stock repurchases) divided by the operating income. Every year, firms are classified as financially constrained (unconstrained) whenever they are in the bottom (top) three deciles of the annual payout. For Bond Rating, we classify firms as financially constrained if they have outstanding public debt and have not received a debt rating during our sample period. To deal with the lack of bond rating information for most of the firms in our sample, we adopt an alternative approach. Earlier studies (e.g., Almeida *et al*. (2004), Lemmon and Zender (2010)) interpret the presence of rated debt as a signal that firms can access relatively low-cost debt markets, suggesting a large debt capacity. Some firms, however, may simply choose not to issue (rated) debt, even if they have the ability to do so. To minimize these concerns, we follow Lemmon and Zender (2010) and use a predictive (logit) model of whether a firm has a bond rating in a given year[19]. Firms are classified as financially constrained (unconstrained) if the estimated probability of having a rated debt falls into the bottom (top) terciles of the distribution.

Therefore, we re-estimate equation (1) using a matched sample of treatment and control firms from the cross-listed firms, separated by groups of constrained and unconstrained firms according to the financial constraint measures *Payout* Ratio and *Rating*. We refine the matching procedure to accommodate financial constraints by estimating the propensity scores based on year, industry, country and the corresponding financial constraints measure, using the nearest neighbor technique (with replacement).

[Insert Table 4 here]

[19] The dependent variable is one if a firm has a debt rating in a given year, and zero otherwise. The covariates in the logit regression are SIZE (log of total assets), Fixed Assets ratio, Tobin's *Q*, Leverage ratio, firm AGE, and the Standard Deviation of stock returns. We also include industry, year and country fixed effects. All covariates are lagged one period and are described in Appendix A.

The results, shown in Table 4, are very similar to those in our baseline specification. The coefficient β_4 is positive and statistically significant for the financially constrained group, but not for the unconstrained group[20]. This evidence supports the investment-to-cash flow sensitivity as a reliable measure of financial constraints and provides additional support for our hypothesis 1.

4.2 Cash-to-cash flow sensitivity following cross-delisting from U.S. exchange markets

In the previous sections, we interpret the increase in investment sensitivity to cash flow as firms becoming more financially constrained post-cross-delisting. However, a similar effect may also occur in other situations unrelated to financial constraints – e.g., when cash flows contain information about the relation between investment demand and growth opportunities. Thus, following Almeida *et al.* (2004), an alternative to the sensitivity of investment to cash flows is to test the sensitivity of cash holdings to cash flow. The authors show that financial constraints are related to a firm's propensity to save cash from cash inflows, which they refer to as the cash flow sensitivity of cash. Thus, financially unconstrained firms should not display a systematic propensity to save cash, while firms that are constrained should have a positive cash-to-cash flow sensitivity. One advantage of using this model, instead of investment-to-cash flow sensitivity, is to avoid concerns of potential multicollinearity problems when including Q and $Cash\ Flow$ because both variables capture growth opportunities. Therefore, a stream of literature initiated by Kaplan and Zingales (1997) argues that the higher investment-to-cash flow sensitivity of constrained firms documented by Fazzari *et al.* (1988) is probably affected by a measurement error in the construction of Q variable (e.g., Erickson and Whited (2000), Gomes (2001), Alti (2003), Moyen (2004)).

[20] In addition, we also use a proxy to measure illiquidity proposed by Amihud (2002), based on the average ratio of absolute return scaled by trading volume. As expected, post-cross-delisted firms exhibit higher illiquidity than in the pre-cross-delisting period.

Given our previous results, and per hypothesis 2, we predict a significant and positive relation between cash holdings and cash flow for treatment firms post-cross-delisting. As in Almeida *et al*. (2004), we model the firm's decision to change its cash holdings as a function of a number of sources and uses of cash, such as capital expenditures, net acquisitions, changes in noncash net working capital, and changes in short-term debt:

$$\Delta CASH_{i,t} = \alpha_i + \beta_1 CF_{i,t} + \beta_2 Treat_i + \beta_3 Delist_{i,t} + \beta_4 CF_{i,t} \times Treat_i \times Delist_{i,t} + \beta_5 CF_{i,t} \times Treat_i + \beta_6 CF_{i,t} \times Delist_{i,t} + \beta_7 Delist_{i,t} \times Treat_i + \gamma_1 Q_{i,t-1} + \gamma_2 SIZE_{i,t-1} + \gamma_3 Expenditures_{i,t} + \gamma_4 Acquisitions_{i,t} + \gamma_5 \Delta NWC_{i,t} + \gamma_6 \Delta STD_{i,t} + \lambda_k + \eta_j + \gamma_t + \varepsilon_{i,t} \quad (2)$$

where $\Delta CASH_{i,t}$ is the change in cash and marketable securities scaled by lagged total assets of firm *i* in year *t*. $CF_{i,t}$ is the net income plus depreciation and amortization expenses scaled by lagged total assets. $Treat_i$ is an indicator variable equal to one if firm *i* is included in our treatment group, and zero otherwise. $Delist_{i,t}$ is an indicator variable equal to one if treatment firm *i* is delisted in year *t*, and zero otherwise. $Q_{i,t-1}$ is the market value of equity plus the book value of assets minus the book value of equity scaled by the book value of total assets. $SIZE_{i,t-1}$ is the logarithm of total assets. $Expenditures_{i,t}$ is capital expenditures scaled by lagged total assets. $Acquisitions_{i,t}$ is net assets from corporate acquisitions scaled by lagged total assets. $\Delta NWC_{i,t}$ is the change in non-cash net working capital scaled by lagged total assets. $\Delta STD_{i,t}$ corresponds to the change in short-term debt scaled by lagged total assets. As before, in our main regressions, we control for country, industry and year fixed effects and cluster standard errors by firm and year. Panel A of Table 5 reports the results of the estimations of equation (2).

[Insert Table 5 here]

Consistent with hypothesis 2, we find that firms in the treatment group exhibit a higher propensity to save cash from cash flows post-cross-delisting, as coefficient β_4 ($CF_{i,t} \times Treat_i \times Delist_{i,t}$) is positive and significant in almost all regression models. Taking model (1) as an

example, a standard deviation increase in $Cash\ Flow$ (0.17 – Panel A of Table 2) represents an increase of 0.014 in cash changes prior to cross-delisting[21]. Following cross-delisting, the increase in cash changes associated with a one-standard deviation increase in $Cash\ Flow$ is 0.0245[22]. The results are identical when we use matched and non-matched control samples of cross-listed and never-cross-listed firms and different combinations of year, country, industry, and firm fixed effects. We find similar increases in cash-to-cash flow sensitivities after voluntary or involuntary cross-delistings, although of slightly higher magnitude in the latter. We elaborate more on the impact of different reasons to cross-delist in section 4.3. In Panel B of Table 5, we test the robustness of the cash-to-cash flow model in capturing financial constraints. Our procedure is identical the one we used to test the robustness of the investment-to-cash flow model in section 4.1.1. In brief, we use the two alternate measures of financial constraints – *Payout Ratio* and *Rating* – to both select the best matches for treatment firms under the PSM technique (along with industry, country and year) and to sort firms into two categories of financially constrained and unconstrained.

For the financially constrained groups, the results are very similar to what we find in our previous tests - a positive and statistically significant β_4 - whereas the unconstrained groups exhibit non-significant coefficients. These results validate the use of cash-to-cash flow sensitivity as a proxy for financial constraints.

Nonetheless, and despite this type of evidence, a branch of the literature still questions whether cash-to-cash flow sensitivity captures financial constraints. For instance, Riddick and Whited (2009) find that cash is negatively related to cash flow because firms lower cash holdings to take investment opportunities. Moreover, Bao, Chan and Zhang (2012) argue that the cash

[21] The sum of coefficients is (0.0829-0.0005) x 0.17=0.014. The mean of the ΔCash and Marketable securities variable (not reported) is 0.01. Therefore, a 0.014 increase in ΔCash represents 140% (0.014/0.01) of its mean.

[22] The sum of coefficients is (0.0829+0.0619-0.0005) x 0.17=0.0245. Thus, a 0.0245 increase is equivalent to a 245% (0.0245/0.01) increase.

sensitivity to cash flow is asymmetric, i.e., firms invest more in productive assets when they have positive cash flows, thus saving less cash. However, this may not be true when cash flows are negative, meaning that cash-to-cash flow sensitivity may show a different pattern depending on the sign of the cash flow. To address these concerns, we adapt the model proposed by Bao *et al.* (2012) to our baseline specification. In brief, we sort our sample into two groups – "positive"/"negative" – depending on the sign of the cash flows and re-estimate our baseline model. We then compare the coefficient of interest, β_4, between the two groups and find them to be statistically identical. The results suggest that, in our sample, the sensitivity of cash to cash flow is not asymmetric to positive/negative cash flows[23]. Overall, these results lend further support to hypothesis 2.

4.3 Delisting reasons, country corporate governance and different responses to financial constraints post-cross-delisting

Our treatment sample includes a variety of firms with different motivations to cross-delist and from countries with different corporate governance standards. Therefore, the expected outcomes with respect to their financial constraints after cross-delisting may also differ. To address this problem, we first analyze the reasons why firms cross-delist and how they may interfere with the above-documented increase in investment-to-cash flow sensitivity post-cross-delisting. After the passage of Rule 12h-6 of 2007, cross-delisting became easier and less costly. A larger and more diversified number of firms voluntarily cross-delisted whenever the anticipated gains did not cover the costs of remaining listed on a U.S. stock exchange. This exit intrigued scholars in recent years (e.g., Marosi and Massoud (2008), Doidge, Karolyi and Stulz (2010), Fernandes, Lel and Miller (2010)), given the well-known benefits of cross-listing

[23] We also replicate this analysis using the investment-to-cash flow sensitivity model to address similar asymmetry concerns. Similarly, we find no support of an asymmetric pattern for positive/negative cash flows. For brevity, we do not tabulate these results, but they are available in the Internet Appendix, Table II.

widely documented in the literature. In our analysis, we also focus on voluntary cross-delisting and split it into two different periods - pre and post the passage of Rule 12h-6. We then add another division by legal origin to capture the degree of shareholder protection – High (Common Law) and Low (Civil Law) – following the standard literature (e.g., La Porta *et al.* (1997; 1998), La Porta *et al*. (2008), Djankov *et al*. (2008)). We estimate equation (1) for each group, using as a control the primary sample of cross-listed firms. Table 6 shows the results. [Insert Table 6 here]

In models (1) and (2) in Table 6, Panel A, we find a similar increase in investment-to-cash flow sensitivity for firms that cross-delisted pre- or post-rule. However, the pattern is different when we split the groups into High/Low shareholder protection. We find no significant changes in investment-to-cash-flow sensitivity after cross-delisting for firms from countries with better shareholder protection (models (3) and (4)), independent of whether the delisting occurred pre- or post-rule. In contrast, we uncover a significant increase in the sensitivity of investment to cash flow following a cross-delisting for firms domiciled in countries with weaker shareholder protection: in models (5) and (6), coefficient β_4 ($CF_{i,t} \times Treat_i \times Delist_{i,t}$), which captures the changes in investment sensitivity to cash flow post-cross-delisting, is positive and statistically significant, thus supporting our hypothesis (3). Furthermore, the magnitude of coefficient β_4 is larger for the group of firms that cross-delist after compared with before the passage of Rule 12h-6. This evidence is consistent with the argument that firms from Common Law countries have easier access to external financing in their home markets, since their legal regime requires stronger information disclosure and offers better shareholder protection. This finding is also consistent with the bonding hypothesis that predicts a lower marginal benefit of cross-listing in the U.S. for firms from countries with better shareholder protection. Similarly, the reverse effect of cross-delisting should be less severe for firms from these countries.

In Panel B of Table 6, we replicate the analysis for cash-to-cash flow sensitivity by estimating equation (2) using the same subsamples. The results show that coefficient β_4 is only significant in models (1) and (6). However, the increase in cash-to-cash flow sensitivity post-cross-delisting is stronger for firms from the group of weaker shareholder protection and not statistically significant for firms from countries with a better legal environment. Albeit weaker, these results still support our hypothesis 3.

We are aware that several firms that are cross-listed on a U.S. exchange may be simultaneously cross-listed on another major market, such as the London Stock Exchange. Thus, cross-delisting from the U.S., while remaining cross-listed in London, may mitigate the reverse bonding effect. We estimate equations (1) and (2) using a restricted sample of firms that remained cross-listed in London after delisting from the U.S., and we find non-significant coefficients for the variable of interest β_4 $(CF_{i,t} \times Treat_i \times Delist_{i,t})$[24]. This result is also consistent with our hypothesis 3, suggesting that U.S. cross-delisted firms that remain in an environment with strong shareholder protection are less affected by an increase in financial constraints post-delisting.

5. Conclusions

In this study, we provide new evidence for the real economic effects of cross-delisting from U.S. stock exchanges on firms' financial constraints and investment sensitivities. We employ a difference-in-differences methodology to test our main hypotheses that post-cross-delisting firms become more financially constrained due to a deterioration of their information environment. Our sample consists of 583 firms from 38 countries that cross-delisted from a U.S. exchange, 564 cross-listed control firms, and 10,397 never-cross-listed control firms, over the

[24] The coefficient for our variable of interest is 0.0362 (-0.0596), with a p-value of 0.865 (0.580), regarding the investment-to-cash flow sensitivity (cash-to-cash flow sensitivity) models, respectively. The number of observations, however, is significantly smaller for U.S. cross-delistings that remained listed in London. For brevity, these results are not reported but are available in the Internet Appendix, Table III.

2000-2012 period. We document an increase in investment- and cash-to-cash flow sensitivities following a cross-delisting from U.S. exchange markets for our group of treatment firms compared to each of the control groups of cross-listed or never-cross-listed firms. This result is quite persistent and does not depend on whether the cross-delisting was voluntary or involuntary; it also does not depend on whether the cross-delisting occurred before or after Rule 12h-6 of 2007, which made deregistrations and cross-delistings easier and less costly. The results are robust to several tests to validate that financial constraints are captured by the sensitivity of investment and cash to cash flows. Our evidence supports the argument that post-cross-delisting firms become more financially constrained. We also show that this effect is stronger for firms domiciled in countries with weaker shareholder protection, i.e., those expected to lose more after cross-delisting from U.S. stock exchanges. Our results also suggest that this effect is more predominant after the adoption of Rule 12h-6 (of 2007).

Overall, our findings are consistent with the bonding hypothesis. While foreign firms (especially those from countries with weaker shareholder protection) are able to improve their information environment and reduce financial constraints after cross-listing on a U.S. exchange market, the opposite effect is expected should those firms leave the U.S. markets. Consistent with this view, our study provides evidence of adverse real economic consequences that affect firms' investment decisions.

References

Almeida, H., Campello, M. and Weisbach, M., 2004. The cash flow sensitivity of cash, *The Journal of Finance,* 59 (4), 1777-1804. *doi: 10.1111/j.1540-6261.2004.00679.x.*

Alti, A., 2003. How sensitive is investment to cash flow when financing is frictionless? *The Journal of Finance,* 58 (2), 707-722. *doi: 10.1111/1540-6261.00542.*

Amihud, Y., 2002. Illiquidity and stock returns: cross-section and time-series effects, *Journal of Financial Markets,* 5, 31–56. *doi: 10.1016/S1386-4181(01)00024-6.*

Bao, D., Chan, K. and Zhang, W., 2012. Asymmetric Cash Flow Sensitivity of Cash Holdings. *Journal of Corporate Finance,* 18, 690-700. *doi: 10.1016/j.jcorpfin.2012.05.003.*

Chaplinsky, S. and Ramchand, L., 2012. What drives delistings of foreign firms from U.S. Exchanges? *Journal of International Financial Markets, Institutions and Money*, 22 (5), 1126– 1148. *doi: 10.1016/j.intfin.2012.06.003*.

Coffee, J., 1999. The future as history: the prospects for global convergence in corporate governance and its implications, *Northwestern University Law Review*, 93 (3), 641–708.

Coffee, J., 2002. Racing towards the top? The impact of cross-listing and stock market competition on international corporate governance, *University of Pennsylvania Law Review*, 102 (7), 1757–1831.

Coffee, J., 2007. Law and the market: the impact of enforcement, *Columbia Law Rev*iew, 156 (2), 229–311.

Djankov, S., La Porta, R., Lopez-De-Silanes, F. and Shleifer, A., 2008. The law and economics of self-dealing, *Journal of Financial Economics*, 88 (3), 430–465. *doi:10.1016/j.jfineco.2007.02.007*.

Doidge, C., Karolyi, A. and Stulz, R., 2010. Why do foreign firms leave U.S. equity markets? *The Journal of Finance*, 65 (4), 1507-1553. *doi: 10.1111/j.1540-6261.2010.01577.x*.

Erickson, T. and Whited, T., 2000. Measurement error and the relationship between investment and *q*, *Journal of Political Economy*, 108 (5), 1027-1057. *doi: 10.1086/317670*.

Errunza, V. and Miller, D., 2000. Market segmentation and the cost of capital in international markets, *Journal of Financial and Quantitative Analysis*, 35 (4), 577-600. *doi: 10.2307/2676256*.

Fama, E. and French, K., 1997. Industry costs of equity, *Journal of Financial Economics*, 43 (2), 153-193. *doi: 10.1016/s0304-405x(96)00896-3*.

Fazzari, S., Hubbard, R. and Petersen, B., 1988. Financing constraints and corporate investment, *Brookings Papers on Economic Activity*, 1, 141-206. *doi 10.2307/2534426*.

Fernandes, N., Lel, U. and Miller, D., 2010. Escape from New York: The market impact of loosening disclosure requirements, *Journal of Financial Economics*, 95 (2), 129–147. *doi: 10.1016/j.jfineco.2008.12.010*.

Gomes, J., 2001. Financing investment, *American Economic Review*, 91 (5), 1263–1285. *doi: 10.1257/aer.91.5.1263*.

Hail, L. and Leuz, C., 2009. Cost of capital effects and changes in growth expectations around U.S. cross-listings, *Journal of Financial Economics*, 93 (3), 428–454. *doi: 10.1016/j.jfineco.2008.09.006*.

Hostak, P., Lys, T., Yang, Y. and Carr, E., 2013. An examination of the impact of the Sarbanes-Oxley Act on the attractiveness of U.S. capital markets for foreign firms, *Journal of Accounting Studi*es, 18 (2), 522-559. *doi: 10.1007/s11142-013-9222-2*.

Kaplan, S. and Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints, *Quarterly Journal of Economics*, 112 (1), 169–215. *doi: 10.1162/003355397555163*.

Karolyi, G., 2012. Corporate governance, agency problems and international cross-listings: A defense of the bonding hypothesis, *Emerging Markets Review*, 13 (4), 516-547. *doi: 10.1016/j.ememar.2012.08.001*.

Kumar, P. and Ramchand, L., 2008. Takeovers, market monitoring and international corporate governance, *The Rand Journal of Economics*, 39 (3), 850-874. *doi: 10.1111/j.1756-2171.2008.00041.x*.

La Porta, R., Lopez-De-Silanes, F. and Shleifer, A., 2008. The Economic Consequences of Legal Origins, *Journal of Economic Literature*, 46 (2), 285-332. *doi: 10.1257/jel.46.2.285*.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R., 1997. Legal determinants of external finance, *The Journal of Finance*, 52 (3), 1131-1150. *doi: 10.1111/j.1540-6261.1997.tb02727.x*.

La Porta, R., Lopez-De-Silanes, F., Shleifer, A. and Vishny, R., 1998. Law and finance, *Journal of Political Economy*, 106 (6), 1113–1155. *doi: 10.1086/250042*.

Lamont, O., Polk, C. and Saá-requejo, J. (2001). Financial constraints and stock returns, *The Review of Financial Studies*, 14 (2), 529-554. *doi: 10.1093/rfs/14.2.529*.

Lemmon, M. and Zender, J., 2010. Debt capacity and tests of capital structure theories. *Journal of Financial and Quantitative Analysis,* 45 (5), 1161-1187. *doi: 10.1017/S0022109010000499*.

Lins, K., Strickland, D. and Zenner, M., 2005. Do non-U.S. firms issue equity on U.S. exchanges to relax capital constraints? *Journal of Financial and Quantitative Analysis*, 40 (1), 109–133. *doi: 10.1017/S0022109000001769*.

Loureiro, G. and Taboada, A., 2015. Do improvements in the information environment enhance insiders' ability to learn from outsiders? *Journal of Accounting Research,* 53 (4), 863-905. *doi: 10.1111/1475-679X.12082*.

Marosi, A. and Massoud, N., 2008. You can enter, but you cannot leave . . .—U.S. securities markets and foreign firms, *The Journal of Finance*, 63 (5), 2477–2506. *doi: 10.1111/j.1540-6261.2008.01402.x*.

Moyen, N., 2004. Investment-cash flow sensitivities: constrained versus unconstrained firms, *The Journal of Finance*, 59 (5), 2061–2092. *doi: 10.1111/j.1540-6261.2004.00692.x*.

Ohlson, J., 1980. Financial ratios and the probabilistic prediction of bankruptcy, *Journal of Accounting Research,* 18 (1), 109–131. *doi: 10.2307/2490395*.

Reese, W. and Weisbach, M., 2002. Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings, *Journal of Financial Economics*, 66 (1), 65–104. *doi: 10.1016/s0304-405x(02)00151-4*.

Riddick, L.A., Whited, T.M., 2009. The corporate propensity to save, *The Journal of Finance,* 64, 1729–1766. *doi: 10.1111/j.1540-6261.2009.01478.x*.

Rosenbaum, P. and Rubin, D., 1983. The central role of the propensity score in observational studies for causal effects, *Biometrika*, 70 (1), 41–55. *doi: 10.1093/biomet/70.1.41*.

Shyam-Sunder, L. and Myers, S., 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*. 51 (2), 219–244. *doi: 10.1016/S0304-405X(98)00051-8*.

Smith, J. and Todd, P., 2005. Does matching overcome Lalonde's critique of nonexperimental estimators? *Journal of Econometrics*, 125 (1-2), 305-353. *Doi: 10.1016/j.jeconom.2004.04.011*.

Stulz, R., 1999. Globalization, corporate finance, and the cost of capital, *Journal of Applied Corporate Finance,* 12 (3), 8–25. *Doi: 10.1111/j.1745-6622.1999.tb00027.x*.

Wang, Y., Cai, H., Li, C., Jiang, Z., Wang, L., Song, J. and Xia, J., 2013. Optimal caliper width for propensity score matching of three treatment groups: A Monte Carlo Study, PloS ONE 8(12): e81045. *Doi:10.1371/journal.pone.0081045*.

Whited, T. and Wu, G. (2006). Financial constraints risk. *The Review of Financial Studies,* 19 (2), 531-559. *doi: 10.1093/rfs/hhj012*.

Appendix A - Definitions and sources of the variables

VARIABLE	DEFINITION	SOURCE
Firm-level		
Acquisitions	Net assets from acquisitions divided by lagged total assets.	WorldScope
AGE	Logarithm of the number of years since firms appeared for the first time in the database.	DataStream
Assets Growth	Percentage change in total assets over a one-year period.	WorldScope
Bond Rating	Bond rating from the Standard and Poor's agency.	SDC and DataStream
Capex-to-TA	Capital expenditures (CAPEX) divided by lagged total assets (TA) minus cash and short-term investments.	WorldScope
Cash Flow	Net income plus depreciation and amortization expenses divided by lagged total assets.	WorldScope
Cash Holdings	Cash and marketable securities divided by lagged total assets.	WorldScope
Δ Cash and Marketable securities	Change in cash and marketable securities scaled by lagged total assets.	WorldScope
Delist	Dummy variable that equals one if a firm is delisted from U.S. exchange markets (NYSE or NASDAQ) in a given year, and zero otherwise.	SEC website, DataStream and Citibank
Expenditures	Capital expenditures scaled by lagged total assets.	WorldScope
Fixed Assets ratio	Property, Plant and Equipment (PPE) divided by total assets.	WorldScope
Investment	Capital expenditures (CAPEX) divided by lagged property, plant and equipment (PPE).	WorldScope
Leverage	Total debt (short-term plus long-term debt) divided by total assets.	WorldScope
Market capitalization	Market price (year-end) multiplied by the number of common shares outstanding, denominated in U.S. dollars and converted at fiscal year-end exchange rates.	DataStream
O-Score	$O=1.3-0.4X_1+6.0X_2-1.4X_3+0.8X_4-2.4X_5-1.8X_6+0.3X_7-1.7X_8-0.5X_9$ X_1=log(total assets); X_2=total liabilities-to-total assets; X_3=net working capital-to-total assets; X_4=current liabilities-to-current assets; X_5=1 (if the total liabilities exceed total assets), or 0 otherwise; X_6=net income-to-total assets; X_7=cash flow from operations-to-total liabilities; X_8=1 (if the net income was negative for the last two years), or 0 otherwise; X_9=changes in net income scaled by the net income for the last 2 years.	Ohlson (1980)
Rating	Probability of a firms' debt being rated predicted by a logistic model proposed by Lemmon and Zender (2010).	WorldScope

VARIABLE	DEFINITION	SOURCE
Return on Assets (ROA)	Earnings before interest and taxes (EBIT) divided by total assets.	WorldScope
Sales Growth	Sales growth is measured as the percentage change in sales over year *t-1* to *t*.	WorldScope
SIZE	Logarithm of total assets.	WorldScope
Standard deviation stock returns	Yearly standard deviation of firm-specific weekly returns.	DataStream
(Tobin's) *Q*	Numerator: market value of equity plus book value of assets minus book value of equity. Denominator: book value of assets.	WorldScope
Total Assets (TA)	Total Assets in U.S. dollars, converted at fiscal year-end exchange rates.	WorldScope
Treat	Dummy variable that equals 1 if a firm is included in the treatment group, or 0 otherwise.	SEC website, DataStream and Citibank
ΔNet Working capital (ΔNWC)	Current assets excluding cash and marketable securities divided by current liabilities. Changes in NWC scaled by lagged total assets.	WorldScope
ΔShort-Term Debt (ΔSTD)	Changes in short-term debt scaled by lagged total assets.	WorldScope
Industry-Level		
INDUSTRY	Classification according to Fama and French 48 Industry Codes.	Fama and French (1997)
SIC CODE	4-digit Standard Industrial Classification (SIC) Code.	DataStream
Country-Level		
Legal Origin	Indicator variable that equals one for Common Law (Civil Law) countries, and zero otherwise.	La Porta, Lopez-De-Silanes and Shleifer (2008)

Table 1: Sample description

Panel A – Sample description by country

	Full sample (exchange)		Cross-delisted			Control			
						Cross-listed		Never-cross-listed	
	No. Firms	Obs.	No. Firms	Obs. **Pre**	**Post**	No. Firms	Obs.	No. Firms	Obs.
Argentina*	7	71	2	11	1	5	60	27	249
Australia	26	138	19	81	40	7	57	83	581
Austria	1	6	1	6	6	0	0	47	538
Belgium	4	26	2	12	1	2	14	44	489
Brazil*	30	295	13	93	16	17	202	42	506
Canada	353	2,188	194	869	200	159	1,319	178	1,571
Chile*	14	129	9	54	31	5	75	80	836
China*	131	592	23	77	2	108	515	1,724	11,727
Colombia*	1	5	0	0	0	1	5	22	189
Denmark	4	39	2	14	8	2	25	59	732
Finland	7	40	6	27	19	1	13	72	902
France	32	236	23	131	83	9	105	340	3,592
Germany	25	147	20	88	86	5	59	201	1,573
Greece	30	167	6	25	3	24	142	137	1,052
Hong Kong	38	253	20	102	33	18	151	684	5,710
Hungary	1	12	1	12	3	0	0	18	167
India*	13	112	4	26	13	9	86	989	6,563
Indonesia*	2	30	0	0	0	2	30	277	2,571
Ireland	17	128	9	39	16	8	89	10	53
Israel	91	704	38	191	71	53	513	84	606
Italy	11	109	6	42	22	5	67	95	923
Japan	24	272	9	71	30	15	201	1,021	11,193
Korea*	12	88	7	28	12	5	60	1,161	9,819
Luxembourg	13	86	8	56	29	5	30	8	53
Mexico*	33	302	16	101	73	17	201	51	555
Netherlands	37	246	26	142	68	11	104	68	661
New Zealand	4	24	3	11	24	1	13	44	364
Norway	15	111	7	47	22	8	64	91	694
Peru*	2	22	1	9	6	1	13	68	635
Philippines*	2	20	1	7	0	1	13	67	632
Poland*	1	2	1	2	11	0	0	192	1,284
Portugal	1	13	0	0	0	1	13	41	444
Russia*	7	58	4	37	12	3	21	163	689
Singapore	6	54	4	30	13	2	24	463	3,924
South Africa*	9	92	3	16	18	6	76	135	1,219
Spain	7	46	4	28	2	3	18	57	649
Sweden	14	74	13	61	63	1	13	171	1,467
Switzerland	12	106	7	42	21	5	64	63	683
Taiwan	11	104	1	9	3	10	95	567	5,271
Turkey*	1	13	0	0	0	1	13	217	1,949
United Kingdom	94	666	66	338	148	28	328	522	4,529
Venezuela*	4	20	4	20	23	0	0	14	121
All Countries	**1,147**	**7,846**	**583**	**2,955**	**1,232**	**564**	**4,891**	**10,397**	**87,965**

Panel B – Sample Description by Year

	Cross-Delisted						Control	
			Voluntary					
	Involuntary	M&A	Pre-Rule 12h-6	Post-Rule 12h-6	Other	Total	Cross-listed	Never-cross-listed
2000	3	8	0		2	*13*	223	2,803
2001	8	20	2		5	*35*	243	3,773
2002	13	21	15		5	*54*	265	4,236
2003	3	16	21		4	*44*	296	5,188
2004	3	10	18		3	*34*	325	5,557
2005	6	25	26		1	*58*	352	6,123
2006	19	13	24		1	*57*	387	6,903
2007	26	6		59	1	*92*	389	7,810
2008	28	0		15	5	*48*	399	8,385
2009	26	3		15	2	*46*	405	8,640
2010	20	3		9	1	*33*	479	8,924

2011	22	5		6	2	*35*	564	9,907
2012	27	1		5	1	*34*	564	9,716
Total	***204***	***131***	***106***	***109***	***33***	***583***	*4,891*	*87,965*

Table 1 describes the sample by country and by year. Panel A shows the number of firms and the total number of firm-year observations for the full sample of cross-listings, and for cross-delisted and control firms by country of origin. *Exchange* refers to all firms that have been listed on U.S. exchange markets over 2000-2012. *Cross-delisted* is the treatment sample: firms that have cross-delisted at some point in time between 2000 and 2012. "Pre" and "Post" are the corresponding number of firm-year observations for the treatment firms before and after the cross-delisting event. *Control* includes two control groups: 1) control group of firms that remained listed over the sample period; 2) control group of never-cross-listed firms. *Denotes a country designated as an emerging market by Standard and Poor's Emerging Market Database. Panel B shows the distribution of treatment and control firms by year, according to the different groups.

Table 2: Summary descriptive statistics

Panel A: Descriptive statistics

									CONTROL							
Subsample:	Full sample				Treatment				Cross-listed				Never-cross-listed			
	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median	SD	N
Total Assets	8.1	1.0	20.6	9,078	5.5	0.8	12.2	4,187	10.6 *	1.3 *	25.4	4,891	0.6 *	0.1 *	1.5	87,965
Investment	0.30	0.20	0.37	9,078	0.29	0.18	0.39	4,187	0.32 *	0.21 *	0.36	4,891	0.34 *	0.15 *	0.72	87,965
Cash Flow	0.06	0.08	0.17	9,078	0.04	0.07	0.18	4,187	0.08 *	0.10 *	0.16	4,891	0.07 *	0.07 *	0.11	87,965
Cash Holdings	0.22	0.13	0.25	9,078	0.21	0.12	0.25	4,187	0.23 *	0.15 *	0.25	4,891	0.16 *	0.11 *	0.17	87,965
Q	1.94	1.42	1.62	9,078	1.82	1.35	1.50	4,187	2.05 *	1.49 *	1.75	4,891	1.50 *	1.15 *	1.06	87,965
Sales Growth	0.08	0.07	0.47	9,078	0.05	0.05	0.45	4,187	0.10 *	0.09 *	0.48	4,891	0.07 *	0.07 *	0.32	87,965
ROA	0.04	0.06	0.17	9,078	0.02	0.05	0.18	4,187	0.06 *	0.07 *	0.16	4,891	0.07 *	0.06 *	0.12	87,965
O-Score	0.08	0.02	0.16	9,025	0.10	0.03	0.19	4,159	0.06 *	0.01 *	0.13	4,866	0.12 *	0.05 *	0.19	87,525
Leverage	0.23	0.21	0.20	9,078	0.25	0.24	0.21	4,187	0.21 *	0.18 *	0.19	4,891	0.23 *	0.21 *	0.19	87,965

Panel B: Univariate Comparisons between Pre- and Post-Delisting and Control Groups

									CONTROL			
Subsample:	Treatment				Cross-listed				Never-cross-listed			
Differences:	**Pre** - **Post**				**Pre** - Control		**Post** - Control		**Pre** - Control		**Post** - Control	
	Mean		Median		Mean		Median		Mean		Mean		Median	
Total Assets	-0.8		-0.1		-5.3 *		-0.5 *		-4.5 *		-0.4 *		4.7 *	0.7 *	5.5 *	0.8 *
Investment	0.04 *		0.02 *		-0.02 *		-0.02 *		-0.06 *		-0.04 *		-0.04 *	0.04 *	-0.08 *	0.02
Cash Flow	-0.02 *		0.00		-0.05 *		-0.03 *		-0.03 *		-0.03 *		-0.04 *	0.00 *	-0.02 *	0.00
Cash Holdings	0.04 *		0.01 *		-0.01 *		-0.03 *		-0.05 *		-0.04 *		0.06 *	0.01 *	0.02 *	0.00
Q	0.40 *		0.11 *		-0.12 *		-0.11 *		-0.52 *		-0.22 *		0.43 *	0.23 *	0.03	0.12 *
Sales Growth	0.04 *		0.00 *		-0.04 *		-0.04 *		-0.08 *		-0.04 *		-0.01	-0.02 *	-0.05 *	-0.02 *
ROA	-0.02 *		-0.01 *		-0.05 *		-0.03 *		-0.03 *		-0.02 *		-0.06 *	-0.02 *	-0.04 *	-0.01 *
O-Score	-0.03 *		-0.00 *		0.03 *		0.02 *		0.06 *		0.02 *		-0.03 *	-0.02 *	-0.00	-0.02 *
Leverage	-0.03 *		-0.01 *		0.03 *		0.06 *		0.06 *		0.07 *		0.01 *	0.03	0.04 *	0.04 *

Table 2 provides descriptive statistics for the full sample of treatment and control groups of cross-listed and never-cross-listed firms between 2000 and 2012. *Total Assets* are in US$ thousand million, reflecting 2000 prices. *Investment* is capital expenditures scaled by lagged PPE. *Cash Flow* is net income plus depreciation and amortization expenses scaled by lagged total assets. *Cash Holdings* is the ratio of cash and marketable securities scaled by lagged total assets. *Q* is measured as the market value of equity plus book value of assets minus book value of equity scaled by the book value of assets. *Sales Growth* is the percentage change in sales over a one-year period. *ROA* is measured as earnings before interest and taxes scaled by total assets. *O-Score* is a measure of predictive financial distress proposed by Ohlson (1980). *Leverage* is the ratio of total debt to total assets. All variables are defined in Appendix A. Panel A shows the mean, median, standard deviation ("SD") and the number of observations ("N") for all our main variables and the statistical significance of univariate comparison between treatment and control groups. Panel B reports the differences in means and medians between the pre- and post-delisted firms and control groups of cross-listed and never-cross-listed firms. Differences in means are tested using the *t*-statistic test, and differences in medians are tested using the Wilcoxon-Mann-Whitney rank-sum test. * Indicates significance at least at the 5 percent level.

Table 3: Investment-to-cash flow sensitivity

Panel A: Investment-to-cash flow sensitivity. Main results

Dependent variable: Capex-to-lagged PPE

Control group:	Cross-listed							Never-cross-listed	
Delisting type:				Involuntary		Voluntary			
Subsample:	All		Matched	All	Matched	All	Matched	All	Matched
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CF_t	0.2366***	0.2935***	0.1430*	0.2428***	0.2216**	0.2233***	0.0419	0.3959***	0.1773*
	(3.82)	(3.71)	(1.77)	(3.68)	(2.05)	(3.62)	(0.26)	(9.53)	(1.65)
$Treat_i$	-0.0020		0.0021	0.0117	0.0012	-0.0176	-0.0215	0.0878***	0.0351
	(-0.18)		(0.13)	(0.76)	(0.05)	(-1.24)	(-0.85)	(5.17)	(1.51)
$Delist_t$	-0.0345**	-0.0205	-0.0411**	-0.0306	-0.0256	-0.0271	-0.0358*	-0.0536**	-0.0497*
	(-1.98)	(-1.19)	(-2.10)	(-0.69)	(-0.59)	(-1.38)	(-1.77)	(-2.21)	(-1.71)
CF_t x $Delist_t$ x $Treat_i$	0.1979**	0.2428**	0.1908**	0.2523*	0.2686	0.2187*	0.2160*	0.2263*	0.2173*
	(2.07)	(2.36)	(2.06)	(1.66)	(1.55)	(1.77)	(1.74)	(1.78)	(1.77)
CF_t x $Treat_i$	-0.1864**	-0.1531	-0.0735	-0.0960	-0.0387	-0.2511***	0.0542	-0.2848***	-0.1305
	(-2.26)	(-1.41)	(-0.54)	(-1.11)	(-0.32)	(-2.60)	(-0.28)	(-2.78)	(-0.85)
Q_{t-1}	0.0571***	0.0629***	0.0582***	0.0563***	0.0619***	0.0538***	0.0516***	0.0771***	0.0888***
	(10.57)	(10.28)	(8.00)	(8.77)	(4.96)	(10.28)	(6.44)	(16.20)	(8.94)
$SIZE_{t-1}$	-0.0338***	-0.0600***	-0.0348***	-0.0376***	-0.0515***	-0.0325***	-0.0316***	-0.0667***	-0.0583***
	(-8.73)	(-5.05)	(-10.08)	(7.23)	(-7.10)	(-7.69)	(-6.21)	(-23.85)	(-8.52)
Constant	0.5523***	1.0373***	0.5710***	0.6919***	0.7931***	0.5617***	0.5678***	0.7394***	0.4855***
	(6.04)	(6.30)	(6.31)	(4.45)	(5.28)	(6.13)	(4.75)	(15.62)	(6.45)
Firm FE	No	Yes	No	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations\	9,078	9,078	5,376	6,175	1,958	7,794	3,607	92,152	6,642
R-squared	0.199	0.117	0.201	0.202	0.231	0.202	0.200	0.129	0.153
PROPENSITY SCORE: LR chi^2 (*p*-value)			(0.731)		(0.731)		(0.731)		(0.100)
[CF + CF x Delist x Treat + CF x Treat]	0.2481***	0.3832***	0.2603**	0.3991**	0.4515**	0.1909	0.3121	0.3374**	0.2641*
p-value	(0.008)	(0.000)	(0.011)	(0.028)	(0.028)	(0.144)	(0.128)	(0.038)	(0.097)

Panel B: Investment-to-cash flow sensitivity. Robustness tests. Alternate Measures of Corporate Investment

Control Group:	Cross-listed				Never-cross-listed			
Subsample:	All		Matched sample		All		Matched sample	
Dependent variable:	Capex-to-TA	Asset Growth	Capex-to-TA	Asset Growth	Capex-to-TA	Asset Growth	Capex-to-TA	Asset Growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CF_t	0.1808***	0.7009***	0.1709***	0.5562***	0.1934***	0.9178***	0.1466***	0.7944***
	(8.00)	(11.26)	(4.88)	(3.84)	(16.49)	(28.07)	(5.31)	(10.86)

$Treat_i$	0.0037	-0.0240**	0.0015	-0.0253	0.0325***	0.0463***	0.0157***	0.0221
	(0.90)	(-1.97)	(0.32)	(-1.42)	(7.49)	(2.65)	(2.90)	(1.28)
$Delist_t$	-0.0181***	-0.0221	-0.0188***	-0.0206	-0.0252***	-0.0598***	-0.0189***	-0.0374***
	(-3.09)	(-1.59)	(-3.04)	(-1.35)	(-4.96)	(-3.38)	(-3.27)	(-3.71)
CF_t x $Delist_t$ x $Treat_i$	0.0880***	0.3150***	0.0908***	0.2832***	0.1165***	0.2559**	0.1189***	0.2335**
	(2.86)	(2.80)	(2.85)	(2.51)	(3.72)	(2.23)	(3.82)	(2.03)
CF_t x $Treat_i$	-0.1492***	-0.1368	-0.1401***	0.0243	-0.1493***	-0.2953***	-0.1992***	-0.1271
	(-5.36)	(-1.45)	(-3.31)	(0.15)	(-5.61)	(-3.18)	(-3.77)	(-1.06)
Q_{t-1}	0.0178***	0.0613***	0.0163***	0.0697***	0.01274***	0.0353***	0.0201***	0.0706***
	(9.94)	(8.20)	(6.72)	(6.45)	(13.27)	(8.64)	(8.02)	(8.12)
$SIZE_{t-1}$	-0.0103***	-0.0304***	-0.0103***	-0.0289***	-0.0080***	-0.0192***	-0.0081***	-0.0275***
	(-5.97)	(-7.99)	(-5.58)	(-7.37)	(-12.75)	(-11.43)	(-5.52)	(-7.00)
Constant	0.1830***	0.2890***	0.2101***	0.1783***	0.1225***	0.0267	0.1120***	0.2069**
	(5.34)	(3.11)	(6.13)	(2.10)	(9.59)	(0.59)	(3.78)	(2.11)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,078	9,078	5,384	5,384	92,152	92,152	6,647	6,647
R-squared	0.267	0.236	0.259	0.239	0.144	0.220	0.222	0.266
[CF + CF x Delist x Treat + CF x Treat]	0.1196***	0.8791***	0.1216***	0.8637***	0.1606***	0.8784***	0.0663***	0.9008***
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Table 3 reports regression estimates for equation (1) using different specifications. The dependent variable is *Investment*: capital expenditures scaled by lagged PPE. *Treat* is a dummy variable equal to one for firms included in our treatment group, and zero otherwise. *Delist* $_t$ is an indicator variable equal to one if a treatment firm is delisted in year *t*, and zero otherwise. All variables are defined in Appendix A. In Panel A, models (1) and-(3) show results for the full sample using the primary control group of cross-listed firms. In model (3), we use a control matched sample of cross-listed firms. Models (4)-(7) provide results for different subsamples of treatment firms; the *Involuntary* group comprises firms that were forced to leave U.S. markets; the *Voluntary* group includes firms that decided to leave U.S. exchange markets. In models (8) and (9), we use never-cross-listed firms as the control group. Likelihood-ratio (LR) Chi^2 tests the goodness-of-fit of the probit model used in the propensity score estimation. Panel B reports regression estimates of equation (1) using two alternate measures of corporate investment: i) capital expenditures scaled by lagged total assets minus cash and short-term investment; ii) assets growth, measured as the percentage change in total assets over a one-year period. In all models, standard errors are clustered by firm and year. Regressions include year, industry, and country, and firm fixed effects. The last two rows show the sum and respective *p*-value of the coefficients [CF + CF x Delist x Treat + CF x Treat]. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.

Table 4: Investment-to-cash flow sensitivity. Matched samples

Dependent variable: Capex-to-lagged PPE				
Financial constraint criterion:	Payout Ratio		Rating	
Group:	C	U	C	U
	(1)	(2)	(3)	(4)
CF_t	0.0885	0.4118*	-0.0556	0.1387
	(0.31)	(1.89)	(-0.34)	(0.68)
$Treat_i$	-0.0028	0.0008	0.0248	0.0044
	(-0.13)	(0.03)	(1.17)	(0.11)
$Delist_t$	-0.0337	-0.0117	-0.0364	-0.0464
	(-1.26)	(-0.54)	(-1.3-6)	(-0.93)
CF_t x $Delist_i$ x $Treat_i$	0.2240**	0.0353	0.1769*	0.1777
	(1.97)	(0.15)	(1.71)	(0.54)
CF_t x $Treat_i$	-0.0185	-0.0331	0.1391	-0.2443
	(-0.06)	(-0.12)	(0.78)	(-1.00)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	2,050	1,444	2,050	1,411
R-squared	0.196	0.294	0.181	0.313
PROPENSITY SCORE: LR chi^2 (*p*-value)	(0.731)		(0.100)	
(β_4 Constrained =β_4 Unconstrained) (*p*-value)	(0.099)		(0.997)	
[CF + CF x Delist x Treat + CF x Treat]	0.2940**	0.4140**	0.2604**	0.0721
p-value	(0.030)	(0.027)	(0.016)	(0.809)

Table 4 shows regression estimates of equation (1) using a matched sample of treatment and control groups of financially constrained ("C") and unconstrained ("U") firms. The dependent variable is *Investment*: capital expenditures scaled by lagged PPE. *Cash Flow* is the net income plus depreciation and amortization expenses scaled by lagged total assets. *Treat* is a dummy variable that is equal to one for firms included in our treatment group, and zero otherwise. $Delist_t$ is an indicator variable that is equal to one if a treatment firm is delisted in year *t*, and zero otherwise. The coefficient estimates of control variables (*Size* and *Q*) and the constant are included, but not reported for brevity. All variables are defined in Appendix A. In all models, standard errors are clustered by firm and year. Regressions include firm, year, industry, and country fixed effects, as indicated. The *p*-value of a *z*-test that evaluates whether the coefficient $\beta_4(CF_{i,t} \times Delist_{i,t} \times Treat_i)$ is equal across subsamples of financially constrained ("C") and unconstrained ("U") firms. The likelihood-ratio (LR) Chi^2 test is as described in Table 3. The last two rows show the sum and respective *p*-value of the coefficients [CF + CF x Delist x Treat + CF x Treat]]. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.

Table 5: Cash-to-cash flow sensitivity

Panel A: Cash-to-cash flow sensitivity. Main results

Dependent variable: ΔCash and Marketable securities-to-lagged total assets

Control group:	Cross-listed							Never-cross-listed	
Delisting type:				Involuntary		Voluntary			
Subsample:	All		Matched	All	Matched	All	Matched	All	Matched
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CF_t	0.0829***	0.1028***	0.0803***	0.0893***	0.0872***	0.0829***	0.0688***	0.0892***	0.0766***
	(4.81)	(4.46)	(4.32)	(4.74)	(2.75)	(4.63)	(3.94)	(9.14)	(5.24)
$Treat_i$	-0.0033**		-0.0016	-0.0063***	-0.0032	-0.0013	-0.0014	0.0088***	0.0049**
	(-2.48)		(-0.47)	(-3.07)	(-0.80)	(-0.79)	(-0.35)	(3.20)	(2.10)
$Delist_t$	-0.0060*	-0.0140**	-0.0057	-0.0050***	-0.0057	-0.0068*	-0.0075	-0.0107***	-0.0079***
	(-1.92)	(-2.47)	(-1.46)	(-2.99)	(.)	(-1.77)	(-1.41)	(-3.67)	(-2.60)
CF_t x $Delist_{,t}$ x $Treat_i$	0.0619**	0.0786**	0.0643**	0.1199	0.1291*	0.0466**	0.0482*	0.0457**	0.0439**
	(2.21)	(2.04)	(2.32)	(1.46)	(1.66)	(2.05)	(1.81)	(2.14)	(2.12)
CF_t x $Treat_i$	-0.0005	-0.0394	0.0032	0.0045	0.0135	-0.0093	0.0039	-0.0119	0.0092
	(-0.02)	(-1.19)	(0.11)	(0.13)	(0.31)	(-0.41)	(0.12)	(-0.78)	(0.74)
Q_{t-1}	0.0064***	0.0055***	0.0068***	0.0056**	0.0075*	0.0065***	0.0067***	0.0023***	0.0066***
	(3.50)	(2.83)	(2.88)	(2.49)	(1.85)	(4.92)	(3.86)	(2.63)	(3.88)
$SIZE_{t-1}$	-0.0033***	-0.0223***	-0.0028***	-0.0042	-0.0049***	-0.0033***	-0.0026**	-0.0019***	-0.0032***
	(-16.25)	(-7.36)	(-2.62)	(.)	(-4.32)	(-7.99)	(-2.53)	(-3.04)	(-3.41)
$Expenditures_t$	0.0092	-0.0312	-0.0206	0.0118	-0.0352*	0.0138	-0.0005	-0.0055	-0.0166
	(0.44)	(-1.21)	(-1.12)	(0.52)	(-1.66)	(0.60)	(-0.02)	(-1.08)	(-0.98)
$Acquisitions_t$	-0.0619**	-0.0797***	-0.0434	-0.0781**	-0.0507	-0.0843***	-0.0726*	0.0381**	0.0075
	(-2.18)	(-2.67)	(-1.08)	(-2.20)	(-0.88)	(-3.42)	(-1.66)	(2.14)	(0.19)
ΔNWC_t	-0.0860***	-0.1070***	-0.1168***	-0.0609*	-0.1085**	-0.0947***	-0.1338***	-0.0474***	-0.0844***
	(-3.92)	(-4.11)	(-4.64)	(-1.91)	(-2.11)	(-3.64)	(-4.19)	(-7.83)	(-7.03)
ΔShort Term $Debt_t$	0.0359*	0.0098	0.0126	0.0459	-0.0283	0.0423	0.0275	0.0513***	0.0166
	(1.71)	(0.41)	(0.45)	(1.64)	(-0.60)	(1.55)	(0.84)	(9.58)	(1.16)
Constant	0.0650***	0.3164***	0.0420***	0.0915*	0.0268	0.0702***	0.1253***	0.0096	0.0372***
	(3.35)	(7.18)	(6.19)	(1.69)	(0.71)	(3.47)	(6.11)	(1.58)	(4.35)
Firm FE	No	Yes	No	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,841	8,841	5,249	6,186	1,962	7,594	3,612	91,604	6,533
R-squared	0.047	0.041	0.050	0.048	0.063	0.049	0.062	0.076	0.057
PROPENSITY SCORE: LR chi^2 (*p*-value)			(0.731)		(0.731)		(0.731)		(0.100)
[CF + CF x Delist x Treat + CF x Treat]	0.1443***	0.1420***	0.1478***	0.2137***	0.2298***	0.1202***	0.1209***	0.1230***	0.1297***
p-value	(0.000)	(0.000)	(0.000)	(0.003)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)

Panel B: Cash-to-cash flow sensitivity. Robustness tests. Matched samples

ΔCash and Marketable securities-to-lagged total assets				
Financial Constraint criterion:	Payout Ratio		Rating	
Group:	C	U	C	U
	(1)	(2)	(3)	(4)
CF_t	0.0687**	0.1317*	0.1160***	-0.0495
	(2.09)	(1.82)	(4.91)	(-0.94)
$Treat_i$	-0.0087	0.0051	0.0006	-0.0104
	(-1.08)	(0.55)	(0.11)	(-0.92)
$Delist_t$	0.0017	-0.0092	-0.0008	-0.0249**
	(0.19)	(-0.72)	(-0.19)	(-2.08)
CF_1 x $Delist_t$ x $Treat_i$	0.0767*	0.0088	0.0894**	0.0325
	(1.92)	(0.18)	(2.37)	(0.43)
CF_t x $Treat_i$	0.0170	-0.0627	-0.0668	0.1559**
	(0.37)	(-0.95)	(-1.62)	(1.98)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	2,055	1,445	2,050	1,411
R-squared	0.073	0.065	0.054	0.080
PROPENSITY SCORE: LR chi^2 (*p*-value)	(0.731)		(0.100)	
(β_4 Constrained =β_4 Unconstrained) (*p*-value)	(0.000)		(0.134)	
[CF + CF x Delist x Treat + CF x Treat]	0.1624***	0.0778	0.1386**+	0.1389**
p-value	(0.000)	(0.226)	(0.000)	(0.046)

Table 5 reports regression estimates for equation (2) using different specifications. The dependent variable is Δ*Cash Holdings*: change in cash and marketable securities scaled by lagged total assets. All variables are defined in Appendix A. In Panel A, models (1)-(3) show results for the full sample using the primary control group of cross-listed firms. In model (3) we use a control matched sample of cross-listed firms. Models (4)-(7) provide results for different subsamples of treatment firms; the *Involuntary* group comprises firms that were forced to leave U.S. markets; the *Voluntary* group includes firms that decided to leave U.S. exchange markets. In models (8) and (9) we use the alternate control group of never-cross-listed firms as the control group. Panel B shows regression estimates of equation (2) using a matched sample of treatment and a control group of cross-listed firms, which includes groups of financially constrained ("C") and unconstrained ("U") firms according to financial constraints criteria. Firms are matched by country, year, industry, and by two alternate financial constraint criteria: *Payout Ratio* and *Rating*. In models (1)-(2), we use *Payout Ratio*, and in models (3)-(4), we use *Rating*; both criteria are described in Table 4. The coefficient estimates of the remaining control variables and the constant are not reported for brevity. In all models, standard errors are clustered by firm and year. Regressions include year, industry, and country, and firm fixed effects. The likelihood-ratio (LR) Chi^2 test is described in Table 3. The *p*-value for the *z*-test is described in Table 4. The last two rows show the sum and respective *p*-value of the coefficients [CF + CF x Delist x Treat + CF x Treat]. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.

Table 6: Cash flow sensitivities. Subsamples of the voluntary group

Panel A: Investment-to-cash flow sensitivity. Subsamples of the voluntary group

Dependent variable: Capex-to-lagged PPE

			Legal Origin			
			High		*Low*	
	Pre-Rule	Post-Rule	Pre-Rule	Post-Rule	Pre-Rule	Post-Rule
	(1)	(2)	(3)	(4)	(5)	(6)
CF_t	0.2206***	0.2258***	0.1441	0.1367	0.7069***	0.7361***
	(3.44)	(3.45)	(1.50)	(1.39)	(2.98)	(4.20)
$Treat_i$	-0.0056	-0.0349*	0.0172	-0.0535*	0.0215	0.0023
	(-0.22)	(-1.78)	(0.40)	(-1.71)	(0.54)	(0.05)
$Delist_t$	-0.0449	0.0288	-0.0750	-0.0357	0.0232	-0.1562**
	(-1.53)	(0.88)	(-1.51)	(0.71)	(0.48)	(-2.22)
CF_t x $Delist_t$ x $Treat_i$	0.2301*	0.2594*	0.4503	0.1675	0.2124*	0.7998**
	(1.86)	(1.67)	(1.51)	(0.12)	(1.66)	(2.04)
CF_t x $Treat_i$	-0.2912*	-0.3017**	-0.3556	-0.2637	-0.3863*	-0.6690**
	(-1.78)	(-2.49)	(-1.51)	(-1.19)	(-1.76)	(-2.32)
(β_4 Pre-Rule =β_4Post-Rule (p-value)	(0.887)		(0.388)		(0.003)	
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,818	6,078	3,079	3,080	1,410	1,519
R-squared	0.205	0.209	0.180	0.178	0.289	0.298

Panel B: Cash-to-cash flow sensitivity. Subsamples of the voluntary group

Dependent variable: ΔCash and Marketable securities-to-lagged total assets

			Legal Origin			
			High		*Low*	
	Pre-Rule	Post-Rule	Pre-Rule	Post-Rule	Pre-Rule	Post-Rule
	(1)	(2)	(3)	(4)	(5)	(6)
CF_t	0.0851***	0.0828***	0.0710***	0.0672***	0.0672***	0.0572***
	(4.57)	(4.45)	(2.89)	(2.79)	(8.75)	(5.28)
$Treat_i$	-0.0029***	-0.0009	-0.0057**	-0.0050	-0.0080**	0.0047
	(-6.65)	(-0.37)	(-2.52)	(-1.43)	(-2.07)	(0.89)
$Delist_t$	-0.0074*	-0.0028	-0.0039	0.0033	-0.0041	-0.0104
	(-1.91)	(-0.50)	(-0.41)	(0.50)	(-0.52)	(-0.88)
CF_t x $Delist_t$ x $Treat_i$	0.0832***	0.0381	0.0354	0.0387	0.0505	0.1440*
	(2.82)	(1.51)	(0.87)	(1.27)	(0.66)	(1.95)
CF_t x $Treat_i$	-0.0227	-0.0216	-0.0185	-0.0236	0.0076	-0.0634
	(-0.98)	(-0.84)	(-0.60)	(-0.65)	(0.87)	(-1.24)
(β_4 Pre-Rule =β_4Post-Rule (p-value)	(0.000)		(0.757)		(0.000)	
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,662	5,924	2,935	2,937	1,402	1,511
R-squared	0.050	0.046	0.044	0.038	0.073	0.062

Table 6 reports regression estimates of equation (1) (displayed in Panel A) and equation (2) (shown in Panel B) for the Voluntary group of firms that decided to leave U.S. exchange markets before ("Pre") and after ("Post") the passage of Rule 12h-6 of 2007. We re-estimate equations (1) and (2) according to Legal Origin, which is an indicator of institutional quality (e.g., La Porta, Lopez-De-Silanes and Shleifer (2008)). We then assign firms to the high (low) group depending on whether they are from Common (Civil) Law countries. The dependent variable is *Investment* (Δ*Cash*): capital expenditures scaled by lagged PPE (change in cash and marketable securities scaled by lagged total assets). The coefficient estimates of the remaining control variables and the constant are not reported for brevity. All variables are defined in Appendix A. The p-value is also reported for a z-test evaluating whether coefficient $\beta_4(CF_{i,t} \times Delist_{i,t} \times Treat_i)$ is equal across voluntary subsamples before ("Pre") and after ("Post") the passage of Rule 12h-6. In all models, standard errors are clustered by firm and year. Regressions include year, industry, and country fixed effects. ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively.