# Foreign Acquisition and Credit Risk: Evidence from the U.S. CDS Market

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## Abstract

This article empirically analyzes the effect of foreign block acquisitions on U.S. target firms' credit risk as measured by their credit default swap (CDS) spreads. Foreign block purchases lead to a greater increase in the target firms' CDS premia post-acquisition compared to domestic block purchases. This effect is stronger when foreign owners are geographically and culturally more distant, and when they obtain majority control. The findings are consistent with an asymmetric information hypothesis, in which foreign owners are less effective monitors due to information barriers.

## I.   Introduction

The United States has become a recipient of foreign direct investment (FDI) in recent decades, as foreign corporations purchase U.S. companies or establish new plants on U.S. soil.[1] According to estimates by the United Nations Conference on Trade and Development, FDI in the United States peaked in 2008, reaching $310 billion. During the 2008–2009 global financial crisis, foreigners dramatically reduced their investment in the United States, but the trend reversed in the following years. The main driving force behind this surge in FDI has been cross-border acquisitions, which have become a large component of the total U.S. takeover activity (UNCTAD (2013)).[2]

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[1]FDI includes green-field investment in new assets in a foreign country and acquisition of preexisting foreign assets.

[2]A well-known case includes the $3 billion cash injection into Chesapeake Shale by Norway's StatoilHydro in Nov. 2008 in exchange for a 32% stake.

Several studies assess the role of foreign ownership in firm efficiency, productivity, corporate governance, risk sharing, value creation, and liquidity provision (see, e.g., Harris and Ravenscraft (1991), Doms and Jensen (1998), Aitken and Harrison (1999), Ferreira and Matos (2008), Arnold and Javorcik (2009), Aggarwal, Erel, Ferreira, and Matos (2011), Chen (2011), and Chari, Chen, and Dominguez (2012)). The evidence mainly suggests that acquisitions by foreign investors are beneficial for acquired firms' productivity and shareholders. Nevertheless, there is limited and mixed evidence on the wealth effects of acquisitions for bondholders. For instance, Maquieira, Megginson, and Nail (1998) document insignificant wealth effects for bondholders in domestic acquisitions. In contrast, Billett, King, and Mauer (2004) find that actual takeovers benefit target bondholders, especially when the target is rated below investment grade. Moreover, the literature on the market for corporate control, often referred to as the "takeover market," suggests that acquisitions in general can be detrimental to a firm's credit risk (e.g., Qiu and Yu (2009), Billett, Jiang, and Lie (2010), Francis, Hasan, John, and Waisman (2010), Furfine and Rosen (2011), and Eisenthal-Berkovitz, Feldhütter, and Vig (2020)). In the end, it is unclear whether foreign acquisitions are beneficial or detrimental to acquired firms' credit risk.

In this article, I examine whether block purchases by foreign investors influence the credit risk of U.S. target firms using a sample of 1,273 block acquisitions from 2001 to 2018. I begin by studying the impact of foreign block acquisitions on target firms' credit default swap (CDS) spreads. A CDS contract represents insurance against the default of an entity. The CDS premium is the annual payment of such a contract, and it is expressed as a percentage of the contract value. Therefore, CDS spreads provide a direct measure of the market price of a firm's credit risk. In addition, empirical evidence suggests that CDS spreads are informative and a timely measure of credit risk, and that they lead the corporate bond market in terms of price discovery (e.g., Blanco, Brennan, and Marsh (2005), Jorion and Zhang (2007), and Lee, Naranjo, and Velioglu (2018)).[3] Applying a difference-in-difference (DiD) approach, I find that the CDS premia of foreign-acquired firms increase on average by 47 basis points (bps) after acquisition compared with those of domestically acquired firms. This effect is robust to controlling for a large set of firm characteristics and (high-dimensional) fixed effects. I also document cross-sectional differences that are related to acquirer type and deal characteristics.

An empirical challenge in estimating the post-acquisition change in credit risk might arise if foreign investors simply select certain types of acquisition targets. To address the selection concerns, I use the propensity weighting approach with overlap weights proposed by Li, Morgan, and Zaslavsky (2018). Consistent with the previous results, I find that foreign-acquired firms experience a substantial increase in their CDS premia after acquisition compared with the control (matched) group of firms.

Having documented a positive impact of foreign acquisitions on credit risk, I next investigate the mechanisms that plausibly account for the main findings.

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[3]Note that the advantage of using CDS spreads as a measure of credit risk depends on the relative illiquidity and liquidity risk in CDSs (Longstaff, Mithal, and Neis (2005), Qiu and Yu (2012)). For example, Longstaff et al. (2005) argue that compared with corporate bonds, CDS spreads are less affected by liquidity due to their contractual nature as it is relatively easier to trade large notional amounts of CDS contracts.

Several studies show that investors located near a firm have an advantage in information acquisition over distant investors due to having relatively easier access to value-relevant information about the firm (see, e.g., Brennan and Cao (1997), Coval and Moskowitz (1999), Hau (2001), Petersen and Rajan (2002), Kang and Kim (2008), (2010), and Baik, Kang, and Kim (2010)). Furthermore, since investors' monitoring costs increase with the physical and cultural distance from the target because of the extra communication and transportation costs, foreign investors have weaker incentives to engage in monitoring activities in the host country compared with domestic investors (Kang and Kim (2008), (2010)). Consistent with this argument, I find a larger increase in the credit risk of U.S. target firms when foreign acquirers are geographically or culturally more distant.

The evidence supports an asymmetric information explanation whereby the reduced ability of foreign investors to monitor managers exacerbates agency problems. In particular, managers are better able to hide potentially value-decreasing and risk-increasing activities from outside shareholders when there is high information asymmetry. One indication of information asymmetry is idiosyncratic equity volatility; higher values of such volatility may make it easier for managers to conceal risk-increasing activities because they might simply be interpreted as reflecting a random outcome of greater ex ante uncertainty (Dierkens (1991), Moeller, Schlingemann, and Stulz (2007), and Panousi and Papanikolaou (2012)). In line with this argument, I find a significant increase in target firms' idiosyncratic equity volatility after a foreign acquisition, which in turn is associated with an increase in credit risk. I also report a surge in dispersion of analysts' earnings forecast after a foreign acquisition, which provides further evidence on the increased uncertainty regarding the future value of acquired firms.

Finally, I use corporate bond yield spreads as an alternative measure of credit risk. Compared with domestically acquired firms, foreign-acquired firms experience a substantial increase in their yield spreads after acquisition. The literature on empty creditors, pioneered by Bolton and Oehmke (2011), suggests that creditors who have access to credit hedging technology are less likely to engage in costly monitoring and intervene in borrowers' governance (Morrison (2005), Parlour and Winton (2013)). In response to reduced monitoring, borrowing firms potentially have more opportunities to direct their efforts and resources toward risky projects (Chang, Chen, Wang, Zhang, and Zhang (2019), Chen, Leung, Song, and Avino (2019)). Consistent with the monitoring channel, I find that foreign-acquired CDS firms experience a larger increase in their yield spreads post-acquisition relative to non-CDS firms. Collectively, the findings suggest that foreign block acquisitions are associated with a greater increase in the target firms' credit risk post-acquisition compared to domestic block acquisitions.

This article contributes to the literature in several ways. First, it adds to the emerging and rapidly growing literature on the role of foreign investors. A large body of literature studies the effect of foreign ownership on firm performance (see, e.g., Aitken and Harrison (1999), Arnold and Javorcik (2009), Chen (2011), and Chari et al. (2012)). These studies focus on the effects of foreign ownership on plant-level productivity measures, such as total factor productivity, labor productivity, or firm-level profitability. The rationale in these studies is that if there are gains from foreign acquisitions, they should be ultimately reflected in firms'

performance. This work extends this strand of literature by suggesting that foreign investors also strongly influence the firm's risk profile. In addition, the article contributes to the literature on the impact of mergers and acquisitions (M&As) on target firms' bondholder wealth. This line of work mostly focuses on U.S. domestic deals (e.g., Maquieira et al. (1998), Billett et al. (2004)). The increase in credit spreads after a foreign acquisition directly impacts the wealth of existing debtholders. While debtholders do bear the risk and take losses when a firm's value deteriorates, they do not share the potential upside gains of risk-taking activities that only accrue to stockholders and management. Finally, this work adds to the growing empirical research that measures credit risk using CDS spreads (e.g., Qiu and Yu (2009), Augustin and Izhakian (2020)).[4] The article shows that the creation of sizeable foreign ownership stakes leads to a significant increase in CDS premia.

The remainder of the article is organized as follows: Section II develops testable hypotheses. Section III describes the data. Section IV presents the empirical results. Section V provides evidence from the U.S. bond and equity markets. Section VI examines the economic channels, Section VII provides further analyses, and Section VIII concludes.

## II.    Hypotheses Development

Foreign ownership plays a prominent role in firm-level risk in the micro-founded models of Obstfeld (1994) and Acemoglu and Zilibotti (1997) that focus on financial diversification. Both models introduce a trade-off between risk and productivity at the microeconomic level: Firms must choose between safe low-productivity investments and risky high-productivity investments. The desire to achieve better diversification pushes investments toward risky projects. Thus, if foreign investors buy shares of a firm for diversification purposes, we expect to find a positive link between foreign ownership and firm-level risk. The reason is that foreign investors are more tolerant with respect to shifting their investments toward risky projects due to their internationally diversified portfolios. Such international diversification motivates foreign owners to push managers to undertake riskier but also revenue- and profit-generating projects to create higher shareholder value (Faccio, Marchica, and Mura (2011)). Hence, foreign owner-ship increases a firm's credit risk if managers pursue more profitable but riskier projects that are beneficial for shareholders but detrimental to bondholders (Rhoades and Rutz (1982)).

In addition, the higher information acquisition and monitoring costs that arise across borders and are exacerbated by distance are crucial in justifying the relation between foreign acquisitions and firm-level credit risk. Foreign investors' infor-mational disadvantage is one of the main reasons for their reluctance to invest in foreign markets (see, e.g., Brennan and Cao (1997), Kang and Stulz (1997), Hau (2001), Dvořák (2005), and Chan, Menkveld, and Yang (2008)). Foreign investors typically face information barriers due to physical, linguistic, or cultural distance

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[4]Augustin, Subrahmanyam, Tang, and Wang (2014) provide an extensive survey of the literature on CDS.

when they engage in global investment activities (see, e.g., Coval and Moskowitz (1999), Ivković and Weisbenner (2005), Chan et al. (2008), Kang and Kim (2008), (2010), and Baik et al. (2010)). The presence of asymmetric information due to unfamiliarity with foreign markets exacerbates agency problems and renders it difficult to effectively monitor managers abroad. For instance, Kang and Kim (2008) find that the information asymmetry that arises from geographic distance is an important determinant of block acquirers' governance activities regarding targets. Since foreign investors face barriers in obtaining valuable private information about the target firms, their incentives to engage in monitoring activities are likely to be weaker than domestic investors. Moreover, high information asymmetry implies that managers are better able to hide potentially value-destroying risky activities from outside shareholders (Dierkens (1991), Moeller et al. (2007), and Panousi and Papanikolaou (2012)). Consequently, the decreased ability of shareholders to monitor managers due to information barriers incentivizes managerial risk-taking and thereby increases the riskiness of target firms.

The preceding discussions suggest that foreign acquisitions play a vital role in target firms' credit risk. The first hypothesis to be tested is:

*Hypothesis 1.* Foreign block acquisitions are associated with a significant increase in target firms' credit risk.

I explore cross-sectional differences in the extent to which the impacts of foreign ownership on target firms' credit risk are related to acquirer and takeover characteristics. The first dimension I consider is the country of origin of the acquirer. Chari, Ouimet, and Tesar (2010) show that when a developed-country multinational firm acquires an emerging market firm, there is an economically large increase in the acquiring firm's stock price. The gains to the acquiring firm's shareholders are attributed to the better institutional and corporate governance practices that developed-market acquirers bring to emerging economies. In addition, Chen (2011) finds that targets acquired by firms from industrialized countries exhibit the best post-acquisition performance, consistent with the predictions of Helpman, Melitz, and Yeaple's (2004) model.[5] I partition the sample based on whether an acquirer is from a developed or an emerging market, motivated by marked differences in the efficiency of debt enforcement and differences in shareholders' rights protection and governance systems across countries (Djankov, Hart, McLiesh, and Shleifer (2008), La Porta, Lopez-de Silanes, Shleifer, and Vishny (2000)). This discussion leads to the following hypothesis:

*Hypothesis 2.* The impact of foreign block acquisitions on target firms' credit risk is stronger (weaker) when the acquirers are from emerging (developed) markets.

The effect of foreign investors on the target firm's policy may also vary with the cross-sectional heterogeneity in the acquired stakes. Grossman and Hart (1986) postulate that acquirers are likely to be undermined by the target's "opportunistic

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[5]Helpman et al. (2004) propose that firms that invest abroad must overcome larger fixed costs and barriers. As a result, foreign-acquiring firms have to be more productive.

and distortionary" behavior if the residual control right is not attained. Consistent with this argument, Chari et al. (2010) find that the percentage of post-acquisition ownership is one of the most impactful deal characteristics of the premium paid to target shareholder wealth in cross-border acquisitions. Cronqvist and Fahlenbrach (2009) also report that large shareholders play an important role in corporate policy choices and firm performance. On the other hand, block ownership of foreign investors might exacerbate agency problems due to asymmetric information and difficulties in monitoring managers abroad. For instance, Kim and Mathur (2008) find that large blockholders, especially those geographically close to target firms, can actively pursue post-acquisition governance activities in them, including board representation and replacing ineffective management. Thus, managers are more able to mask their activities from outside shareholders and take risk-increasing activities in a target firm with concentrated foreign ownership. Cross-sectional heterogeneity in the block size yields additional predictions on the effect of foreign purchases on targets' credit risk. This discussion leads to the following hypothesis:

*Hypothesis 3.* The association between foreign block purchases and credit risk is stronger (weaker) with majority control (minority control).

Previous studies have shown that the method of payment and the degree of diversification play significant roles in acquisitions' successful completion and wealth effects (see, e.g., Eckbo, Giammarino, and Heinkel (1990), Shleifer and Vishny (2003), and Dong, Hirshleifer, Richardson, and Teoh (2006)). The method of payment is characterized as either cash, which represents all-cash acquisitions, stock, or mixed. Using cash as a means of exchange is likely to increase the liquidity of the acquired firm and wealth gains, and thus might decrease its credit risk (e.g., Eckbo and Langohr (1989), Billett et al. (2004)). Furthermore, announcement returns for cash deals are consistently found to be higher than those for stock deals, both for the acquirer and the target (Andrade, Mitchell, and Stafford (2001)). This suggests testing the following hypothesis:

*Hypothesis 4.* The impact of foreign block acquisitions on target firms' credit risk is less pronounced in deals financed solely by cash.

Finally, the degree of diversification is another relevant deal characteristic that has consequences for the target firm's credit risk. In a diversifying deal, the core business activities of the acquirer and target are rather different relative to a horizontal deal. As a result, diversifying acquisitions may intensify agency problems, allow poor segments to drain resources from better-performing segments, and misalign the incentives of central and divisional managers, all of which may have value-reducing effects and thereby increase credit risk (see, e.g., Stulz (1990), Berger and Ofek (1995), and Laeven and Levine (2007)). This discussion leads to the following hypothesis:

*Hypothesis 5.* The impact of foreign block acquisitions on target firms' credit risk is more pronounced in diversifying deals.

## III.   Data Description

I focus on the U.S. market and use 4 main data sources: Security Data Corporation's (SDC) Merger and Corporate Transactions database for block acquisitions, IHS Markit for CDSs, the Trade Reporting and Compliance Engine (TRACE) for corporate bond transaction prices, and the Center for Research in Securities Prices (CRSP) for stock returns.

### A.   Block Acquisitions

The SDC sample of transactions contains deals involving at least 5% post-acquisition of public U.S. target companies that were announced and completed between Jan. 2001 and Dec. 2018.[6] I focus on publicly traded U.S. targets, since open financial markets in the United States have led to a substantial number of cross-border block acquisitions, and public U.S. firms are required to disclose detailed accounting data. Similar to Erel, Liao, and Weisbach (2012), I exclude leveraged buyouts, spin-offs, recapitalizations, self-tender offers, exchange offers, repurchases, acquisitions of remaining interest, privatizations, and buybacks.[7] My sample includes only those target firms that remain independent units and whose financial data are publicly available after acquisition.

Table 1 presents information by country of origin on the number and value of acquisitions of U.S. firms. The top 5 foreign countries whose firms acquired U.S. targets over the period 2001–2018 are Canada, the United Kingdom, Japan, France, and Germany.

Figure 1 details the number and total value (in billions of U.S. dollars) of cross-border transactions into the United States by foreign firms over the years 2001–2018. We observe increased foreign acquisitions in the 2004–2007 period preceding the financial crisis, and in 2013–2016, in both the number and value of deals.

### B.   CDS and Bond Yields

The CDS data set includes weekly quotes for a broad cross section of firms over the years 2001–2019. CDS data are obtained from the IHS Markit Group. The data consist of CDS spreads for different maturities and the number of distinct contributors for each daily quote, in addition to contract type, base currency, and company-related information. IHS Markit receives contributed CDS data from market makers' official books and records, which undergo rigorous data cleaning to ensure that only the highest quality data are used in forming composite prices. I use all CDS quotes written on U.S. corporate entities and denominated in

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[6]The SDC database includes information about some characteristics of the target and acquiring firms such as name, country, industry sector, and primary SIC classification. For each transaction, SDC also provides information about the date on which the transaction was announced, the date on which it became effective or was withdrawn, the percentage of shares acquired before and after the transaction is completed, the value of the transaction, the number of bidders, the method of payment, and whether the target firm is delisted as a result of an acquisition.

[7]I also eliminate firms from countries that are considered to be tax havens (as defined by OECD (2008)): The Bahamas, Bermudas, British Virgin Islands (United Kingdom), Cayman Islands, Cook Islands, Cyprus, Isle of Man, Jersey, Liechtenstein, Marshall Islands, Mauritius, Netherlands Antilles, Panama, and U.S. Virgin Islands (United States).

TABLE 1

Number and Value of Block Acquisitions of U.S. Targets by
Foreign Firms over the Period 2001–2018

Table 1 provides a breakdown of transactions by the acquirer country. The first column lists the name of the acquirer country.
The second column presents the number of transactions. The third column shows the fraction of total transactions accounted
for by the acquirer country. The fourth column presents the total nominal transaction value in millions of U.S. dollars. The final
column shows the average nominal transaction value in millions of U.S. dollars by the acquirer country.

| Acquirer Country | No. of Transactions | Percentage of Total Transactions | Nominal Transaction Value (in $Millions) | Average Transaction Value (in $Millions) |
|---|---|---|---|---|
| Canada | 218 | 23.83 | 207,797.11 | 1,093.67 |
| United Kingdom | 127 | 13.88 | 201,147.00 | 1,812.14 |
| Japan | 60 | 6.56 | 107,392.59 | 1,789.88 |
| France | 59 | 6.45 | 113,371.95 | 2,267.44 |
| Germany | 48 | 5.25 | 109,058.59 | 2,478.60 |
| Switzerland | 40 | 4.37 | 102,520.69 | 2,770.83 |
| Australia | 32 | 3.50 | 41,486.15 | 1,481.65 |
| China | 30 | 3.28 | 22,474.55 | 898.98 |
| Netherlands | 28 | 3.06 | 25,053.40 | 1,193.02 |
| Italy | 25 | 2.73 | 19,757.42 | 1,097.63 |
| Israel | 23 | 2.51 | 32,038.49 | 1,456.30 |
| India | 21 | 2.30 | 1,553.70 | 81.77 |
| Sweden | 19 | 2.08 | 17,185.37 | 954.74 |
| Spain | 17 | 1.86 | 18,450.23 | 1,230.02 |
| Hong Kong | 15 | 1.64 | 5,310.48 | 442.54 |
| Russian Federation | 15 | 1.64 | 4,796.66 | 368.97 |
| Republic of Ireland | 14 | 1.53 | 6,840.99 | 570.08 |
| Singapore | 13 | 1.42 | 54,748.08 | 4,977.10 |
| Denmark | 12 | 1.31 | 9,731.81 | 884.71 |
| South Korea | 11 | 1.20 | 3,557.28 | 395.25 |
| United Arab Emirates | 10 | 1.09 | 3,670.00 | 407.78 |
| Norway | 10 | 1.09 | 8,930.83 | 992.31 |
| Mexico | 9 | 0.98 | 8,779.95 | 1,254.28 |
| Finland | 9 | 0.98 | 7,082.58 | 885.32 |
| Luxembourg | 9 | 0.98 | 4,489.35 | 748.23 |
| Brazil | 7 | 0.77 | 4,367.50 | 873.50 |
| Taiwan | 6 | 0.66 | 1,475.55 | 295.11 |
| South Africa | 5 | 0.55 | 7,042.14 | 1,760.53 |
| Belgium | 5 | 0.55 | 5,176.02 | 1,294.01 |
| New Zealand | 4 | 0.44 | 57,925.93 | 14,481.48 |
| Iceland | 3 | 0.33 | 1,421.65 | 473.88 |
| Austria | 3 | 0.33 | 451.32 | 150.44 |
| Argentina | 2 | 0.22 | 5,307.74 | 2,653.87 |
| Poland | 2 | 0.22 | 435.23 | 217.61 |
| Chile | 2 | 0.22 | 209.16 | 104.58 |
| Bahrain | 1 | 0.11 | 110.00 | 110.00 |
| Costa Rica | 1 | 0.11 | 12.50 | 12.50 |
| Total | 915 | 100.00 | 1,221,159.98 | 54,960.75 |

U.S. dollars. I focus on the 5-year CDS premia on senior unsecured debts, since they
are the most liquid contracts. I require that contracts have a modified restructuring
clause prior to Apr. 2009 ("CDS Big Bang") and a no restructuring clause afterward,
since these are the most common in the United States.[8]

I obtain monthly bond pricing information from TRACE for the years 2002–
2019. I follow the data-cleaning procedure of Bessembinder, Kahle, Maxwell,
and Xu (2009) to eliminate canceled, commissioned, and corrected trades. I then
obtain bond characteristics information (callable, convertible, fixed coupon, etc.)
from the Mergent Fixed Income Securities Database (FISD). Following Jostova,
Nikolova, Philipov, and Stahel (2013), I eliminate preferred shares, non-U.S.
dollar-denominated bonds, bonds with unusual coupons, bonds with warrants,
bonds that are mortgage- or asset-backed, and bonds that are convertible or are

[8]For more information about documentation clauses, see ISDA Credit Derivatives Definitions
published in Feb. 2003.

FIGURE 1

Foreign Block Acquisitions over the Years 2001–2018

Figure 1 displays the number (left axis) and total deal value (right axis; in billions of U.S. dollars) of block acquisitions of U.S. target firms by foreign market firms over the years 2001–2018. Data on block acquisitions announcements are retrieved from Thomson One Banker.
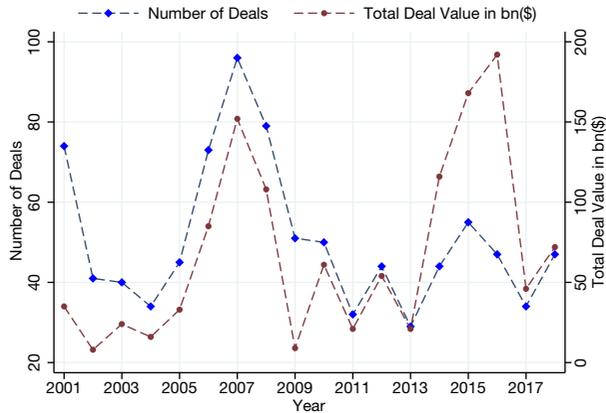


part of unit deals (i.e., features that would result in differential pricing). I further require that bonds be senior unsecured to keep bond yield spreads comparable to CDS spreads. Next, I calculate firm-level bond yield spread relative to a maturity-matched Treasury yield, which is based on the last transaction in the TRACE database for the bond in the corresponding month.

   In addition, I obtain firm annual financial information from the Compustat North America database, daily stock price information from the CRSP, and analyst earnings forecasts from the Institutional Brokers Estimate System (I/B/E/S) database. Information provided to the SDC on target firms allows matching across these databases. During this process, I lose observations because some of the target firms are renamed after the acquisition or are delisted. In addition, some target firms are acquired more than once by both the U.S. and foreign acquirers. To avoid any compounding effects, I only include the first of multiple acquisitions over the sample periods in the main analysis. The final sample contains weekly CDS premium information on 1,273 completed block acquisitions, of which 276 are accomplished by foreign firms over the period 2001–2018.[9] Table A1 in Appendix A describes how I get to this number of transactions after applying the filters above.

## C.   Variables

   To isolate the effect of foreign acquisitions on credit risk, I control for a set of firm characteristics that previous studies identify as important determinants of CDS spreads (see, e.g., Augustin and Izhakian (2020)). The main control variable is firm leverage, defined as total debt divided by total assets. I also control for firm size,

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[9]Although the SDC sample period in this study is from 2001 to 2018, I use the CDS and yield spreads from the late months of 2019 to capture the post-acquisition effects of deals that occurred in the later months of 2018.

TABLE 2

Summary Statistics

Table 2 reports summary statistics of the main variables employed in the article. The sample includes information on 1,273 completed block acquisitions, of which 276 are made by foreign firms over the period 2001–2018. I obtain CDS information from IHS Markit, accounting data from Compustat, and stock price from the CRSP database. Panel A presents descriptive statistics of the variables before and after acquisition. Panels B and C present descriptive statistics for foreign-acquired and domestic-acquired firms, respectively. Refer to Appendix B for variable definitions.

| | Pre-Acquisition | | | | Post-Acquisition | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Mean | Median | Std. Dev. | N | Mean | Median | Std. Dev. |
| Panel A. Whole Sample | | | | | | | | |
| CDS_SPREAD (bps) | 283,288 | 182.333 | 111.239 | 206.242 | 312,915 | 201.073 | 118.206 | 210.498 |
| LIQUIDITY | 283,288 | 1.741 | 1.792 | 0.636 | 312,915 | 1.730 | 1.792 | 0.598 |
| SIZE | 283,288 | 10.130 | 9.901 | 1.612 | 312,915 | 10.289 | 10.086 | 1.646 |
| LEVERAGE | 283,288 | 0.284 | 0.265 | 0.155 | 312,915 | 0.296 | 0.275 | 0.157 |
| PROFITABILITY | 283,288 | 0.119 | 0.114 | 0.070 | 312,915 | 0.116 | 0.113 | 0.070 |
| STOCK_VOLATILITY | 283,288 | 0.024 | 0.022 | 0.019 | 312,915 | 0.024 | 0.021 | 0.023 |
| Panel B. Foreign Acquired Firms | | | | | | | | |
| CDS_SPREAD (bps) | 64,704 | 155.341 | 108.635 | 189.135 | 69,322 | 223.780 | 130.357 | 203.715 |
| LIQUIDITY | 64,704 | 1.792 | 1.792 | 0.641 | 69,322 | 1.753 | 1.792 | 0.597 |
| SIZE | 64,704 | 10.368 | 10.021 | 1.810 | 69,322 | 10.481 | 10.222 | 1.838 |
| LEVERAGE | 64,704 | 0.283 | 0.254 | 0.144 | 69,322 | 0.289 | 0.268 | 0.137 |
| PROFITABILITY | 64,704 | 0.125 | 0.123 | 0.069 | 69,322 | 0.121 | 0.120 | 0.069 |
| STOCK_VOLATILITY | 64,704 | 0.025 | 0.020 | 0.013 | 69,322 | 0.029 | 0.024 | 0.017 |
| Panel C. Domestically Acquired Firms | | | | | | | | |
| CDS_SPREAD (bps) | 218,584 | 190.323 | 116.131 | 210.491 | 243,592 | 194.611 | 119.370 | 216.525 |
| LIQUIDITY | 218,584 | 1.726 | 1.792 | 0.634 | 243,592 | 1.724 | 1.792 | 0.598 |
| SIZE | 218,584 | 10.059 | 9.866 | 1.542 | 243,592 | 10.235 | 10.057 | 1.583 |
| LEVERAGE | 218,584 | 0.284 | 0.269 | 0.159 | 243,592 | 0.298 | 0.280 | 0.162 |
| PROFITABILITY | 218,584 | 0.118 | 0.111 | 0.071 | 243,592 | 0.115 | 0.110 | 0.070 |
| STOCK_VOLATILITY | 218,584 | 0.024 | 0.022 | 0.020 | 243,592 | 0.023 | 0.021 | 0.023 |

defined as the natural logarithm of the total book value of assets, and firm profitability (ROA), defined as operating income before depreciation, amortization, and taxes divided by total assets. I also employ CDS depth, the number of dealers that contributed to the quote formation, as a CDS-level proxy for liquidity following Qiu and Yu (2012). In addition, I control for equity volatility, because Merton's (1974) model predicts that the credit spread is linked to stock return volatility. I winsorize all continuous and unbounded variables at the 1% and 99% levels to mitigate the effects of outliers. Appendix B provides a detailed description of the variables and their sources.

Table 2 reports the summary statistics of the main variables of interest. Panel A presents the descriptive statistics for the entire sample, whereas Panels B and C present summary statistics for foreign-acquired and domestically acquired samples, respectively. Compared with domestically acquired firms, foreign-acquired firms have, on average, higher CDS spreads and stock volatility after acquisition.

To gauge first insights into the association between CDS spreads and foreign acquisitions, I examine their cross-sectional relation over time. Figure 2 plots the average CDS spreads in log for foreign-acquired firms (solid line) vs. domestic-acquired firms (dashed line) over the weekly time series. The result indicates that foreign-acquired firms experience approximately 100 bps increase in their CDS spreads post-acquisition compared with domestically acquired firms.[10]

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[10]From Figure 2, $\exp(5.4) - \exp(4.8) = 99.9$ bps.

FIGURE 2

CDS Premium

Figure 2 presents the average CDS spreads in log for foreign-acquired firms (solid line) vs. domestic-acquired firms (dashed line) over the weekly time series.
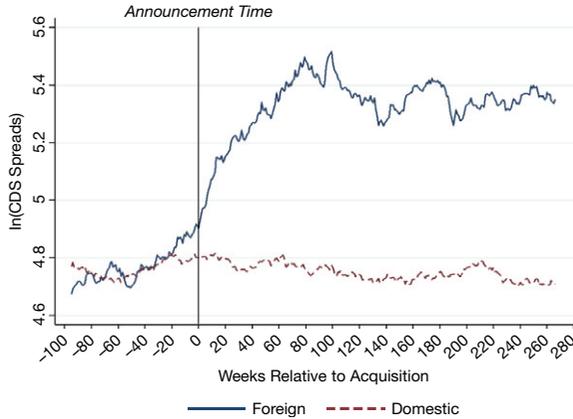


The univariate comparisons suggest that target firms acquired by foreign firms exhibit, on average, higher CDS spreads post-acquisition relative to domestically acquired firms. Hence, below I employ a formal regression framework.

## IV.    Empirical Analysis

I use DiD and propensity score overlap weighting approaches to identify the effect of foreign acquisition on credit risk.

### A.    Difference-in-Difference Approach

The DiD regression model is written as follows:

$$(1) \quad \ln(\text{CDS\_SPREAD}_{i,t}) = \alpha_i + \alpha_t + \beta \text{POST}_t \times \text{FOREIGN}_i + \theta X_{i,t} + \epsilon_{i,t},$$

where $\ln(\text{CDS\_SPREAD}_{i,t})$ represents the credit risk measures for firm $i$ in week $t$. Similar to Bai and Wu (2016) and Augustin and Izhakian (2020), I use the natural logarithm of CDS spreads to account for skewness in the data.[11] $\text{POST}_t$ is the posttreatment indicator, which equals 1 in the post-acquisition time period, and 0 otherwise. To reduce the risk of capturing other confounding events, I restrict the sample period to 5 years before and 5 years after acquisition. $\text{FOREIGN}_i$ is the treatment variable that equals 1 for foreign-acquired firms (treatment group), and 0 for domestic-acquired firms (control group). Thus, the key independent variable is the interaction term, $\text{POST}_t \times \text{FOREIGN}_i$, which equals 1 if a target firm is acquired

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[11]I obtain qualitatively similar results (not reported) if I use levels or percentage changes in CDS spreads.

by a foreign investor and if the time period is post-acquisition, and 0 otherwise. The main coefficient of interest is $\beta$, which captures the DiD effect and yields the percentage of CDS premium differential that can be attributed to foreign acquisitions. $X_{i,t}$ denotes the vector of control variables for firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity.[12] Moreover, $\alpha_i$ and $\alpha_t$ are firm and time fixed effects, respectively. I include firm fixed effects to control for the impact of unobservable time-invariant firm characteristics. I also use time fixed effects (i.e., year dummies) to capture time-varying omitted variables.[13] The standard errors of the estimated coefficients allow for clustering of observations by firm, but the conclusions are not affected if I allow clustering by both firm and year.

Table 3 reports the coefficient estimates of model (1). I employ different specifications that use different sets of fixed effects to absorb unobserved factors. In column 1, I report the results by controlling for a full range of controls and include rating, acquirer nation, industry (2-digit SIC code), and year fixed effects. The coefficient on the interaction term is positive and highly statistically significant (coefficient: 0.305, $t$-statistic: 3.21).[14] To alleviate concerns that the time fixed

TABLE 3

Effect of Foreign Block Acquisitions on Target Firms' CDS Spread

Table 3 presents DiD estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The $t$-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln(CDS_SPREAD) | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| POST × FOREIGN | 0.305*** | 0.288*** | 0.271*** | 0.256*** | 0.319*** |
| | (3.210) | (3.200) | (4.030) | (3.530) | (3.610) |
| LIQUIDITY | −0.001 | 0.010 | 0.041* | 0.061*** | 0.047** |
| | (−0.030) | (0.310) | (1.750) | (3.340) | (2.250) |
| SIZE | −0.181*** | −0.184*** | −0.084 | −0.087* | −0.102** |
| | (−7.480) | (−7.590) | (−1.600) | (−1.910) | (−2.130) |
| LEVERAGE | 1.537*** | 1.592*** | 1.192*** | 1.229*** | 1.339*** |
| | (9.230) | (9.530) | (6.300) | (7.310) | (7.590) |
| PROFITABILITY | −4.728*** | −4.661*** | −3.545*** | −3.129*** | −3.327*** |
| | (−12.320) | (−11.580) | (−10.700) | (−8.740) | (−10.170) |
| STOCK_VOLATILITY | 0.052*** | 0.046*** | 0.027*** | 0.021*** | 0.026*** |
| | (14.270) | (13.880) | (9.640) | (11.220) | (10.060) |
| Rating FE | Yes | Yes | Yes | Yes | Yes |
| Acquirer nation FE | Yes | Yes | No | No | No |
| Industry FE | Yes | No | No | No | No |
| Year FE | Yes | No | Yes | No | Yes |
| Industry × Year FE | No | Yes | No | Yes | No |
| Target FE | No | No | Yes | Yes | No |
| Target × Acquirer FE | No | No | No | No | Yes |
| No. of obs. | 596,203 | 596,203 | 596,202 | 596,202 | 596,202 |
| Adj. $R^2$ | 0.639 | 0.675 | 0.805 | 0.838 | 0.820 |

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[12]The results are qualitatively the same when I use the lagged values of control variables.

[13]Note that $POST_t$ and $FOREIGN_i$ drop out of the regressions due to the inclusion of firm and time fixed effects.

[14]In untabulated tests, I also find that the results are robust to inclusion of additional control variables such as stock return of the target firms.

effects might not appropriately account for industry dynamics, I include industry year fixed effects in column 2. This inclusion ensures that I compare foreign-acquired and domestic-acquired firms within the same industry at the same point in time, which allows me to control for unobserved changes in industry conditions. This specification yields a slightly lower point estimate (coefficient 0.288, $t$-statistic: 3.20). In column 3, I replace acquirer nation and industry fixed effects with target firm fixed effects to control for firm-specific time-invariant unobservables. The results are virtually the same (coefficient: 0.271, $t$-statistic: 4.03). Column 4 presents the results when I include rating, target firm, and industry year fixed effects together (coefficient: 0.256, $t$-statistic: 3.53). In a more stringent specification, I replace firm fixed effects with target acquirer fixed effects to absorb unobserved heterogeneity in target and acquirer firms. This setting allows within target–acquirer variation and increases the likelihood that any difference in CDS spreads is due to foreign acquisition. As shown in column 5, we observe a slightly higher point estimate (coefficient: 0.319, $t$-statistic: 3.61).[15] Consistent with Hypothesis 1, these results indicate that foreign block purchases lead to a greater increase in the target firms' credit risk post-acquisition compared to domestic block purchases. Economically, the coefficient on the interaction term in column 4 implies that foreign-acquired firms experience, on average, 47 bps higher CDS spreads than domestically acquired firms after acquisition.[16]

   I also analyze the reaction of CDS spreads to foreign block acquisitions over a 1–5-year window. The changes in post-acquisition CDS spreads are calculated relative to the year prior to the acquisition ($t = -1$), where $t = 1, \dots, 5$ denotes post-acquisition years.

   The results in Table 4 show that CDS spreads start to increase in years 1–5 following a foreign acquisition, and the increase is statistically significant. Column 1 shows that over a 1-year window, CDS spreads increase, on average, by 47 bps for foreign-acquired firms relative to domestic-acquired firms and also relative to the year prior to the acquisition. The results in columns 2–5 reveal that the relative increase in the CDS spreads of foreign-owned firms appears to persist over the 5 years following acquisition. These findings reliably reveal the robust and significant link between foreign block purchases and firm-level CDS spreads of the target firm.

   The key identifying assumption underlying the DiD estimation technique is that the parallel trends assumption is satisfied; that is, in the absence of treatment, both treated and control firms should experience parallel trends in the outcome variable. Following Angrist and Pischke (2009), I perform a test to assess whether the parallel trends assumption holds in the setting of this study. To investigate trends in CDS spreads prior to acquisition, I include both leads and lags in model (1), running from 2 years before to 5 years after acquisition. As shown in Figure 3, treated and control firms exhibit similar trends in CDS spreads prior to acquisition.

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[15]In the rest of the article, I include industry $\times$ year and target firm fixed effects, but the results are robust to using different sets of fixed effects.

[16]Specifically, $d[\ln(y)]/dx = [1/(y)]dy/dx$ and $dy = d[\ln(y)]/dx \times (y)dx$. For example, when quantifying the effect of foreign acquisition ($dx$) on the change in CDS spreads ($dy$), foreign dummy increases from 0 to 1, so $dx = 1$. The change in CDS spreads ($dy$) from its mean value (182.333) is then equal to $0.256 \times (182.333) \times 1 = 47$, which amounts to 25.6% of CDS spreads.

TABLE 4

Effect of Foreign Block Acquisitions on Target Firms' CDS Spreads over 1–5-Year Window

Table 4 reports DiD estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms over a 1–5-year window following acquisition. I set $t = 0$ for the weeks in the year of acquisition, for the weeks in the years following the acquisition $t = 1, \dots, 5$, and for the weeks in the year prior to the acquisition $t = -1$. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The $t$-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln(CDS_SPREAD) | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| POST × FOREIGN_1 | 0.256*** (2.780) | | | | |
| POST × FOREIGN_2 | | 0.251*** (2.670) | | | |
| POST × FOREIGN_3 | | | 0.255*** (3.100) | | |
| POST × FOREIGN_4 | | | | 0.245*** (2.750) | |
| POST × FOREIGN_5 | | | | | 0.241*** (2.740) |
| LIQUIDITY | 0.048*** (2.680) | 0.049*** (2.820) | 0.045*** (2.650) | 0.042** (2.560) | 0.044*** (2.680) |
| SIZE | −0.059 (−1.250) | −0.059 (−1.330) | −0.051 (−1.210) | −0.050 (−1.170) | −0.051 (−1.170) |
| LEVERAGE | 1.206*** (6.380) | 1.187*** (6.780) | 1.179*** (6.890) | 1.200*** (7.000) | 1.210*** (6.950) |
| PROFITABILITY | −3.107*** (−8.790) | −2.978*** (−8.780) | −2.699*** (−8.050) | −2.593*** (−7.710) | −2.573*** (−7.610) |
| STOCK_VOLATILITY | 0.017*** (7.600) | 0.017*** (8.310) | 0.018*** (9.370) | 0.018*** (9.860) | 0.019*** (10.520) |
| Rating FE | Yes | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes | Yes |
| No. of obs. | 124,976 | 184,861 | 241,933 | 294,397 | 342,502 |
| Adj. $R^2$ | 0.869 | 0.866 | 0.864 | 0.860 | 0.856 |

More precisely, the estimates show no effects in the 2 years before acquisition, with sharply increasing effects on CDS spreads in the first 2 years after acquisition, then flatten out with a permanently higher rate of spreads for foreign acquisitions.[17]

Next, I examine whether the positive effect of foreign acquisition on the target's CDS spread depends on acquirer and takeover characteristics. To do so, I first divide my sample into various subgroups consisting of i) acquisitions from developed vs. emerging markets, ii) majority vs. minority control, iii) acquirer and target firms in different industries (diversifying) vs. horizontal deals, and iv) acquisitions financed solely by cash vs. other payment methods. Second, I use nested models (e.g., $POST_t \times FOREIGN_i \times STAKE_i$) to assess the differences in these subgroups.

Panel A of Table 5 reports the coefficient estimates for subgroups. The result in column 1 shows that targets acquired by developed-market firms tend to experience

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[17]In untabulated results, I also perform several placebo (falsification) tests in which I falsely assume that treatment occurs. The estimated treatment effect is statistically insignificant in all experiments, which suggests that treated and control firms tend to exhibit similar trends before acquisition.

FIGURE 3

Estimated Impact of Foreign Acquisitions on CDS Spreads

The dependent variable in Figure 3 is the log of CDS spreads. Estimates are from equation (1), which allows for effects before, during, and after acquisition. Vertical lines mark 2 standard errors.
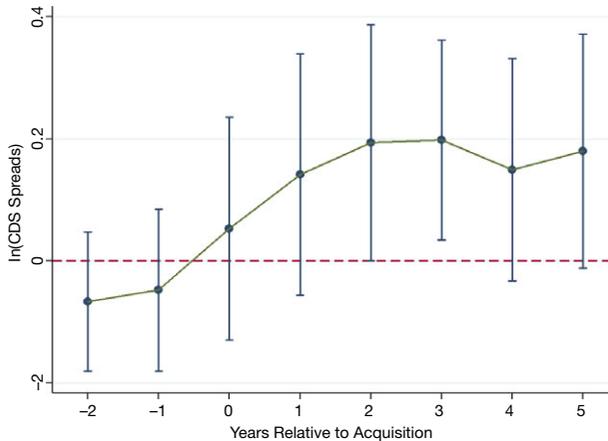


a significant increase in their CDS spread following acquisition relative to domestic-acquired firms. The coefficient on the interaction term in column 2 is positive but insignificant for targets acquired by emerging-market firms. These results do not lend support to Hypothesis 2, as partitioning the sample based on whether an acquirer is from a developed or an emerging market does not completely take into account the heterogeneity in physical and cultural distance among foreign acquirers.[18] Consistent with Hypothesis 3, the results in column 3 indicate that post-acquisition CDS spread changes in the 51%–100% ownership (majority control) category are much larger than those in the 5%–50% ownership (minority control) category in column 4: The coefficient on the interaction term in log is about 0.24 vs. 0.17. Consistent with Hypothesis 4, the results show that post-acquisition CDS spreads in column 6 for diversifying deals (target and acquirer in different industries) are much larger than the spreads in column 5 for horizontal deals (target and acquirer in the same industry): The coefficient on the interaction term in log is about 0.26 and statistically significant vs. 0.15 and insignificant. In addition, consistent with Hypothesis 5, the results in column 7 suggest that the change in CDS spread is smaller in cash transactions relative to noncash transactions in column 8. Panel B of Table 5 reports the coefficient estimates for nested models. The results indicate that only differences between majority vs. minority deals are statistically significant.

Overall, these findings suggest that compared with domestically acquired firms, foreign-acquired firms experience a substantial increase in their CDS premia (perceived credit risk goes up) after acquisition. This effect is stronger when the

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[18]In Section VI, I provide evidence that the impact of foreign acquisitions on target firms' CDS spreads is stronger when foreign acquirers are geographically or culturally more distant. In the end, the results suggest that physical and cultural distance matter rather than differences in the level of development of the countries.

TABLE 5

Target Firms' CDS Spreads Change Across Differences in Subgroups

Table 5 presents DiD estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms. Panel A presents results by dividing the sample into various subgroups consisting of (1) acquisitions from developed vs. emerging markets, (2) majority vs. minority control, (3) acquirer and target firms in different industries (diversifying) vs. horizontal deals, and (4) acquisitions financed solely by cash vs. other payment methods. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Panel B reports nested model estimates to assess the differences in these subgroups, where DEVELOPED equals 1 for developed countries and 0 otherwise, MAJORITY equals 1 for majority control and 0 otherwise, DIVERSIFYING equals 1 for diversifying deals and 0 otherwise, and CASH equals 1 for cash payment and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The t-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

*Panel A. Subgroups*

| Dep. Var. | In(CDS_SPREAD) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Developed | Emerging | Majority | Minority | Horizontal | Diversifying | Cash Only | Others |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| POST × FOREIGN | 0.259*** | 0.221 | 0.242*** | 0.174 | 0.148 | 0.262*** | 0.152** | 0.209** |
| | (3.330) | (1.560) | (2.590) | (1.320) | (1.570) | (2.810) | (2.070) | (2.360) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Rating FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of obs. | 575,967 | 482,411 | 507,699 | 88,503 | 179,484 | 416,718 | 199,635 | 396,567 |
| Adj. $R^2$ | 0.838 | 0.836 | 0.834 | 0.870 | 0.856 | 0.836 | 0.839 | 0.844 |

*Panel B. Nested Models*

| Dep. Var. | In(CDS_SPREAD) | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| POST × FOREIGN × DEVELOPED | 0.036 | | | |
| | (0.750) | | | |
| POST × FOREIGN × MAJORITY | | 0.142** | | |
| | | (2.040) | | |
| POST × FOREIGN × DIVERSIFYING | | | 0.107 | |
| | | | (1.440) | |
| POST × FOREIGN × CASH | | | | 0.094 |
| | | | | (1.120) |
| Controls | Yes | Yes | Yes | Yes |
| Rating FE | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes |
| No. of obs. | 596,202 | 596,202 | 596,202 | 596,202 |
| Adj. $R^2$ | 0.837 | 0.837 | 0.837 | 0.837 |

acquirer obtains majority control, and the effect persists over the 5 years following acquisition and does not reverse.[19]

## B.   Propensity Overlap Weighting Approach

The identification in the previous section relies on the assumption that differences in the timing of foreign acquisitions across firms are exogenous once we control for observable time-varying firm characteristics and firm fixed effects. Endogeneity problems could still arise due to the selection of target firms. To address this possibility, I rely on the propensity weighting approach with overlap weights proposed by Li et al. (2018) to improve the covariate balance between the

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[19]These results also hold when I exclude financial firms from my sample.

treatment and control groups (see also Bartram, Conrad, Lee, and Subrahmanyam (2019), Colonnello, Efing, and Zucchi (2019)). This method proceeds in 2 steps. First, the probability of treatment (the propensity score) is estimated in a logit model. Second, observations are weighted with their respective treatment propensities to create a synthetic sample in which the distribution of covariates is balanced across treated and control firms. The overlap weights are chosen as

$$
(2) \qquad w_{i,t}(x_t) = \begin{cases} p_{i,t}(x_t), & \text{for } Z_{i,t} = 0, \\ 1 - p_{i,t}(x_t), & \text{for } Z_{i,t} = 1, \end{cases}
$$

where $Z_{i,t} = 1$ for treated observations (in my application, foreign-acquired firms = 1). $p_{i,t}(x_t)$ is the propensity score for treatment defined as $\Pr(Z_{i,t} = 1 \mid X_{i,t} = x_t)$, and $X_{i,t}$ are the covariates. Hence, a treated firm $Z_{i,t} = 1$ is weighted by its propensity to be assigned to the control group, and a control firm $Z_{i,t} = 0$ is weighted by its propensity for treatment.

These overlap weights have several desirable features, according to Li et al. (2018). First, they assign more importance to observations with scores around 0.5 and reduce the importance of observations with scores close to 0 or 1. Second, being bounded between 0 and 1, the overlap weights do not need to be truncated or winsorized. Third, the method generates "the most overlap in the covariates between treatment groups" (Li et al. (2018)). The pretreatment distribution of covariates is balanced between the treatment and control group so that the treatment is uncorrelated with observables. Finally, propensity (overlap) weighting allows for exact balance in the covariates' means, even in small samples. No observations need to be discarded, as can be necessary in traditional propensity score matching.[20]

I apply the overlap weights method to the case of foreign-acquired (treated) and domestic-acquired (control) firms by matching firm characteristics. I use the logit model to compute the overlap weights and generate a synthetic sample with improved covariate balance (see Figure A1 in Appendix A).

Table 6 reports the DiD model for firms' CDS spreads estimated in this synthetic sample with weighted observations. Column 1 reports the results when I match based on control variables (size, liquidity, leverage, profitability, and stock volatility). Consistent with the previous findings, the estimates indicate that the CDS spreads of foreign-acquired firms increase significantly after acquisition compared with matched domestic-acquired firms. In particular, the CDS spreads increase, on average, by 0.248 log points (corresponding to 45 bps change in spreads) for foreign-acquired firms relative to the matched sample and relative to the pre-acquisition period. In column 2, I match based on Altman's (1968) Z-score, which has been shown to predict corporate default (e.g., Bharath and Shumway (2008)). Since takeover risk is priced in the cross section of stock returns and corporate bond returns, in column 3, I also match based on takeover vulnerability following Cremers, Nair, and John (2009). Moreover, Li et al. (2018) recommend using a rich logit model to compute the overlap weights. Therefore, in column 4,

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[20]Results are robust to using alternative propensity score weighting methods such as target weights or inverse propensity score weighting (e.g., Hirano, Imbens, and Ridder (2003), Busso, DiNardo, and McCrary (2008)).

TABLE 6

Propensity Overlap Weighting

Table 6 presents DiD combined with propensity overlap weighting estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms. The specifications are estimated in a synthetic sample in which the pretreatment distribution of covariates is balanced across treated and control firms using the overlap weights method proposed by Li et al. (2018). In column 1, the overlap weights are based on a logit model that regresses a foreign acquisition dummy on the following covariates: size, leverage, profitability, stock volatility and industry, rating, and year fixed effects. In column 2, the overlap weights are based on Altman $Z$-scores, and in column 3, the overlap weights are based on takeover probability. In column 4, the overlap weights are based on a richer logit specification that includes size, leverage, profitability, stock volatility, Altman $Z$-scores, and takeover probability. All specifications include industry × year, rating, and target firm fixed effects. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The $t$-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. *, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln (CDS_SPREAD) | | | |
| --- | --- | --- | --- | --- |
| | Controls | Z_SCORES | TAKEOVER | All |
| | 1 | 2 | 3 | 4 |
| POST × FOREIGN | 0.248*** | 0.253*** | 0.257*** | 0.249*** |
| | (2.950) | (3.300) | (3.550) | (3.000) |
| LIQUIDITY | 0.066*** | 0.063*** | 0.062*** | 0.066*** |
| | (3.370) | (3.240) | (3.290) | (3.510) |
| SIZE | −0.085 | −0.089* | −0.093 | −0.094 |
| | (−1.590) | (−1.680) | (−1.610) | (−1.620) |
| LEVERAGE | 1.194*** | 1.211*** | 1.233*** | 1.192*** |
| | (6.290) | (6.390) | (6.330) | (6.160) |
| PROFITABILITY | −3.074*** | −3.061*** | −3.079*** | −3.048*** |
| | (−7.780) | (−7.920) | (−7.270) | (−7.040) |
| STOCK_VOLATILITY | 0.020*** | 0.020*** | 0.020*** | 0.020*** |
| | (10.250) | (10.240) | (9.910) | (9.970) |
| Rating FE | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes |
| No. of obs. | 594,836 | 594,836 | 535,566 | 535,349 |
| Adj. $R^2$ | 0.844 | 0.843 | 0.843 | 0.844 |

I estimate an additional specification with more covariates (size, liquidity, leverage, profitability, stock volatility, Altman $Z$-scores, and takeover vulnerability). All of these checks confirm that the main findings are robust to using alternative procedures to control for selection bias.

As a further robustness check, I conduct a difference-in-difference-in-difference (triple-difference) estimation combined with propensity overlap weighting test to capture the effects of acquisition announcements.[21] I apply the overlap weights method to the case of acquired (treated) and nonacquired (control) firms by adding 343 nonacquired CDS firms to the sample.[22] In this way, I match the targets acquired by foreign and domestic firms to identical twins (nonacquired firms). I then assign the same placebo takeover dates to the nonacquired firms. Table A2 in Appendix A reports the triple-difference model for firms' CDS spreads estimated in this synthetic sample with weighted observations. Consistent with previous findings, the results indicate that foreign-acquired firms experience a larger increase

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[21]For instance, Furfine and Rosen (2011) find that on average, merger announcements are associated with an increase in default risk.

[22]These are all public U.S. firms that have traded CDS with nonmissing control variables but have not received foreign or domestic acquisitions during the sample period.

in their CDS premia after acquisition compared with nonacquired firms. These findings strengthen the argument that foreign acquisitions matter rather than acquisitions per se.

To summarize, I conduct a battery of tests to alleviate endogeneity concerns and provide strong support for the main result, whereby the creation of sizeable foreign ownership stakes leads to a significant increase in target firms' credit risk.

## V.    Evidence from Bond and Equity Markets

In this section, I perform additional robustness tests using alternative variables as measures of credit risk. More specifically, I investigate the impact of foreign block acquisitions on target firms' bond yield spreads and stock volatility.

### A.    Foreign Acquisitions and Corporate Bond Yields

Several studies have investigated the impact of takeovers in the corporate bond market, both ex ante and ex post (see, e.g., Maquieira et al. (1998), Billett et al. (2004), Qiu and Yu (2009), Billett et al. (2010), Francis et al. (2010), and Eisenthal-Berkovitz et al. (2020)). Following this literature, I use corporate bond yield spreads as an alternative measure of credit risk. Table 7 presents the results of a panel regression of bond yield spreads on the interaction dummy and controls. The result in column 1 indicates that foreign-acquired firms experience, on average, 0.3% higher yield spreads than domestically acquired firms after acquisition.[23]

The empty creditor literature, pioneered by Bolton and Oehmke (2011), suggests that access to a credit hedging technology weakens creditors' incentives to engage in costly monitoring and to intervene in borrowers' governance (Morrison (2005), Parlour and Winton (2013)). The reduced creditor monitoring provides borrowing firms with more incentives to increase risk-taking activities and invest in riskier projects (Chang et al. (2019), Chen et al. (2019)). Thus, exploiting cross-sectional tests on firms with and without CDS, we would expect stronger effects for foreign-acquired CDS firms. Consistent with the monitoring channel, the results in columns 2–4 indicate that foreign-acquired CDS firms experience a larger increase in their yield spreads compared with non-CDS firms following acquisition. These results also strengthen the argument that foreign acquisitions matter rather than acquisitions per se.

### B.    Foreign Acquisitions and Stock Volatility

I also investigate the impact of foreign block acquisitions on target firms' stock volatility, since equity volatility is closely associated with credit risk (see, e.g., Campbell and Taksler (2003)). Following Ben-David, Franzoni, Moussawi, and Sedunov (2021), I use the stock's daily return volatility measured over the calendar quarter as a dependent variable. Thus, the volatility is constructed at a quarterly frequency for the main sample that includes CDS firms only. I then decompose the

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[23]The economic magnitude of coefficient estimates for yield spreads is smaller compared to CDS spreads, possibly because a sizeable proportion of bond yield spreads is determined by the premium for nondefault factors such as liquidity, taxes, and other frictions (see, e.g., Longstaff et al. (2005), Augustin et al. (2014)).

TABLE 7

Effect of Foreign Block Acquisitions on Target Firms' Yield Spreads

Table 7 reports DiD estimates of bond yield spreads for treated (foreign-acquired) and control (domestic-acquired) firms. The estimates in the "All Firms" column represent the overall sample of 2,751 deals with consecutive bond trades available. The "CDS Firms" column presents estimates for the subsample of 1,425 deals if the firm has traded CDS with bond trades available. The "Non-CDS Firms" column presents estimates for the subsample of 1,326 deals if the firm has no traded CDS with bond trades available. The dependent variable is the natural logarithm of the firm-level bond yield spread (relative to a maturity-matched Treasury yield) and is based on the last transaction in the TRACE database for the bond in the corresponding month. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. The additional term, CDS_FIRMS, is an indicator variable that equals 1 for CDS firms and 0 for non-CDS firms. Relevant independent variables are firm characteristics (size, leverage, profitability, and stock volatility) and bond characteristics (duration, age, and credit rating). See Appendix B for variable definitions. The *t*-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln(YIELD_SPREAD) | | | |
| --- | --- | --- | --- | --- |
| | All Firms | | CDS Firms | Non-CDS Firms |
| | 1 | 2 | 3 | 4 |
| POST × FOREIGN × CDS_FIRMS | | 0.005*** | | |
| | | (3.180) | | |
| POST × CDS_FIRMS | | 0.003 | | |
| | | (0.570) | | |
| FOREIGN × CDS_FIRMS | | 0.001 | | |
| | | (0.520) | | |
| CDS_FIRMS | 0.002 | 0.001 | | |
| | (0.670) | (0.200) | | |
| POST × FOREIGN | 0.003** | 0.002 | 0.003** | 0.001 |
| | (2.160) | (0.360) | (2.040) | (0.170) |
| DURATION | 0.009*** | 0.009*** | 0.009*** | 0.007*** |
| | (15.450) | (15.480) | (15.860) | (4.640) |
| BOND_AGE | 0.003*** | 0.003*** | 0.003*** | 0.004*** |
| | (5.970) | (5.950) | (4.750) | (3.060) |
| CREDIT_RATING | 0.026*** | 0.026*** | 0.024*** | 0.027*** |
| | (13.250) | (13.230) | (11.220) | (6.990) |
| SIZE | −0.023** | −0.023** | −0.016 | −0.059*** |
| | (−2.550) | (−2.560) | (−1.500) | (−3.610) |
| LEVERAGE | 0.001*** | 0.001*** | 0.001*** | 0.002*** |
| | (4.720) | (4.760) | (3.180) | (3.490) |
| PROFITABILITY | −0.004*** | −0.004*** | −0.004*** | −0.003*** |
| | (−5.450) | (−5.450) | (−4.260) | (−2.960) |
| STOCK_VOLATILITY | 0.006*** | 0.006*** | 0.006*** | 0.006*** |
| | (19.690) | (19.700) | (16.480) | (11.680) |
| Industry × Year FE | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes |
| No. of obs. | 163,120 | 163,120 | 120,730 | 42,390 |
| Adj. $R^2$ | 0.831 | 0.831 | 0.822 | 0.862 |

total volatility (VOL) in its systematic (SVOL) and idiosyncratic (IVOL) components by using the Fama–French 3-factor model.[24]

Table 8 reports the DiD estimates.[25] The coefficient on the interaction term in column 1 shows that foreign block acquisitions are associated with higher volatility (VOL) following acquisition, compared with domestic block acquisitions. The results in column 2 document a negative but insignificant association between

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[24]I obtain similar results when using the capital asset pricing model.

[25]Following Ben-David et al. (2021), I restrict the sample period to 1 quarter before and 8 quarters after acquisition to avoid the risk of capturing other confounding events. I report the results for 1 quarter before and 2 quarters after acquisition, but the conclusion holds when I narrow or expand the length of the sample period.

TABLE 8

Effect of Foreign Block Acquisitions on Target Firms' Stock Volatility

Table 8 presents DiD estimates of stock volatility for treated (foreign-acquired) and control (domestic-acquired) firms. The dependent variable is total volatility (VOL) in column 1, its systematic component (SVOL) in column 2, and its idiosyncratic component (IVOL) in column 3. VOL is the stock's daily return volatility measured over the calendar quarter. IVOL is estimated by regressing daily individual stock returns on the Fama–French 3 factors and then computing the quarterly standard deviation of the regression residuals. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Following Ben-David et al. (2021), relevant independent variables include the natural logarithm of the market cap (ln(MC)), book-to-market ratio (BM), past 6-month returns (P6M_RET), inverse price ratio (1/PRICE), and Amihud illiquidity measure (Amihud (2002)). See Appendix B for variable definitions. The t-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | VOL 1 | SVOL 2 | IVOL 3 |
|---|---|---|---|
| POST × FOREIGN | 0.107*** (3.380) | −0.239 (−0.250) | 0.091*** (3.450) |
| ln(MC) | −0.271** (−2.290) | 1.617** (2.170) | −0.248** (−2.240) |
| A_RATIO | 149.913*** (2.620) | 36.271 (0.070) | 150.073** (2.330) |
| 1/PRICE | 2.780*** (2.780) | −2.685 (−1.040) | 2.824*** (2.950) |
| P6M_RET | −3.228 (−0.480) | −80.947** (−2.250) | 1.348 (0.210) |
| BM | 3.943*** (3.740) | −16.792*** (−2.790) | 4.191*** (4.260) |
| Industry × Year FE | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes |
| No. of obs. | 3,022 | 3,022 | 3,022 |
| Adj. $R^2$ | 0.596 | 0.443 | 0.635 |

foreign block acquisitions and systematic risk (SVOL). The results in column 3 indicate that compared with domestically acquired firms, foreign-acquired firms experience a larger increase in the idiosyncratic component of daily stock volatility following acquisition. These findings are reasonable, since foreign-acquired firms face large financial exposure to foreign markets and less dependence on local financial markets post-acquisition (Bekaert, Harvey, and Lumsdaine (2002)). Taken together, the results suggest that foreign block acquisitions are associated with a greater increase in the risk profile of target firms post-acquisition relative to domestic block purchases.

## VI.    Why Do Foreign Acquisitions Increase Credit Risk?

As discussed in Section II, investors located near a firm have an advantage over distant investors due to having relatively easier access to valuable information about the firm (see, among others, Coval and Moskowitz (1999), Petersen and Rajan (2002), Kang and Kim (2008), (2010), and Baik et al. (2010)). Given that information acquisition and monitoring costs increase with physical and cultural distance, foreign acquirers might have weak incentives to monitor their distant targets (Kang and Kim (2008), (2010)). Consequently, difficulties in monitoring make it harder to prevent suboptimal decisions by managers. In this section, I examine whether the positive effect of foreign acquisition on the target's CDS spread varies with physical and cultural distance between acquirers and targets.

To do so, I use the circle distance between the capital cities of foreign acquirers and U.S. targets as a proxy for geographic distance.[26] For cultural differences, I use the absolute difference in uncertainty avoidance index (Hofstede's (2001) national cultural value) between the foreign acquirer's country and the United States.

Next, I divide foreign acquirers into various subgroups consisting of i) long physical distance (above sample median) vs. short physical distance (below sample median), ii) large cultural distance (above sample median) vs. short cultural distance (below sample median), and iii) acquirers from Canada vs. acquirers from other foreign countries. In addition, I use nested models to assess the differences in these subgroups.

Panel A of Table 9 reports the coefficient estimates for these subgroups. Column 1 shows that targets acquired by remote foreign firms tend to experience a significant increase in their CDS spread following acquisition relative to domestic-acquired firms. The coefficient on the interaction term in column 2 is positive but insignificant for targets acquired by geographically proximate foreign acquirers. The results in column 3 indicate that the increase in post-acquisition CDS spread is larger for acquirers with large cultural distance than those with small cultural distance in column 4. In addition, the results in column 5 show that the change in CDS spread is smaller for acquirers from Canada relative to acquirers from other foreign countries in column 6. Panel B of Table 9 reports the coefficient estimates for nested models. The results indicate that the coefficients from these subgroups are significantly different from each other. Overall, these findings suggest that the post-acquisition increase in target firms' credit risk is stronger when foreign acquirers are geographically or culturally more distant. These results are consistent with the hypothesis that informational asymmetry and monitoring costs arise across borders and are exacerbated by distance.

The presence of asymmetric information due to unfamiliarity with foreign markets increases difficulties in effectively monitoring managers abroad, and in turn might exacerbate agency problems. One proxy for asymmetric information between management and shareholders is a high value of idiosyncratic stock volatility, because investors might interpret this as reflecting a random outcome of greater ex ante uncertainty (Dierkens (1991), Moeller et al. (2007), and Panousi and Papanikolaou (2012)). In such an environment, managers of high-volatility firms might be more willing to undertake risk-enhancing activities because their actions are more likely to be hidden from shareholders. Consequently, the results in Section V suggest that the high level of idiosyncratic equity volatility of foreign-acquired firms after acquisition is a signal to the market that managers are more able to hide risk-increasing activities from outside shareholders.

The dispersion of analysts' earnings forecast is another proxy for increased uncertainty regarding the prospects of acquired firms (e.g., Moeller et al. (2007)). Prior research establishes a positive relation between bond credit spreads and

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[26]Following Erel et al. (2012), I obtain the latitude and longitude of the capital cities of each foreign country from MapsOfWorld.com to calculate the great-circle distance between the foreign acquirers and the U.S. targets. The standard formula to calculate great-circle distance is $3963.0 \times \arccos [\sin(\text{LAT1}) \times \sin(\text{LAT2}) + \cos(\text{LAT1}) \times \cos(\text{LAT2}) \times \cos(\text{LON2} - \text{LON1})]$, where LON and LAT are the longitudes and latitudes of the acquirer and target country locations, respectively.

TABLE 9

Geographic Distance and Cultural Differences

Table 9 presents DiD estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms in subgroups based on geographic and cultural distance. Panel A presents results by dividing the foreign acquirers into various subgroups consisting of (1) long physical distance (above sample median) vs. short physical distance (below sample median), (2) large cultural distance (above sample median) vs. short cultural distance (below sample median), and (3) acquirers from Canada vs. acquirers from other foreign countries. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Panel B reports nested model estimates to assess the differences in these subgroups, where PHYSICAL_DISTANCE equals 1 for long physical distance (above sample median) and 0 otherwise, CULTURAL_DISTANCE equals 1 for large cultural distance (above sample median) and 0 otherwise, and OTHER_COUNTRIES equals 1 for non-Canadian acquirers and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The t-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Subgroups

| Dep. Var. | In(CDS_SPREAD) | | | | | |
|---|---|---|---|---|---|---|
| | Long Physical Distance | Short Physical Distance | Large Cultural Distance | Small Cultural Distance | Canada | Other Countries |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| POST × FOREIGN | 0.253*** | 0.122 | 0.232*** | 0.138* | 0.142* | 0.239*** |
| | (3.870) | (0.820) | (3.190) | (1.910) | (1.710) | (3.100) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Rating FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of obs. | 554,829 | 503,550 | 521,167 | 537,212 | 488,977 | 569,399 |
| Adj. $R^2$ | 0.839 | 0.835 | 0.839 | 0.835 | 0.835 | 0.838 |

Panel B. Nested Models

| Dep. Var. | In(CDS_SPREAD) | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| POST × FOREIGN × PHYSICAL_DISTANCE | 0.171*** | | |
| | (3.840) | | |
| POST × FOREIGN × CULTURAL_DISTANCE | | 0.129* | |
| | | (1.780) | |
| POST × FOREIGN × OTHER_COUNTRIES | | | 0.147** |
| | | | (2.350) |
| Controls | Yes | Yes | Yes |
| Rating FE | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes |
| No. of obs. | 596,202 | 596,202 | 596,202 |
| Adj. $R^2$ | 0.838 | 0.837 | 0.837 |

the dispersion of analysts' earnings forecasts (see, e.g., Buraschi, Trojani, and Vedolin (2013), Güntay and Hackbarth (2010)). Figure 4 shows that foreign-acquired firms (solid line), on average, experience higher exposure to dispersion in analysts' earnings forecasts compared with domestic-acquired firms (dashed line) after acquisition.[27] Taken together, these findings support the asymmetric

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[27]I obtain analyst forecasts of earnings per share from the IBES database over the period 2001–2019. This database contains individual analysts' forecasts organized by forecast date, and the last date the forecast was revised and confirmed as accurate. The data set also contains forecast horizons of 1–3-year-ahead and long-run forecasts. I use only 1-year-ahead forecasts on EPS to avoid losing too many observations and to ensure the highest explanatory power. To circumvent the problem of using stock-split adjusted data, I use unadjusted data. I extend each forecast date to its revision date. If an analyst makes more than one forecast per month, I take the last forecast that was confirmed.

FIGURE 4

Dispersion of Analysts' Earnings Forecasts

Figure 4 presents the dispersion of analysts' earnings forecasts for foreign-acquired firms (solid line) vs. domestic-acquired firms (dashed line) over the monthly time series.
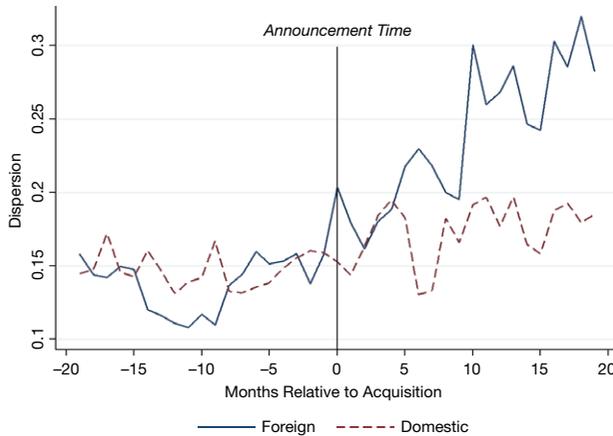


information explanation, whereby the reduced ability of investors to monitor managers exacerbates agency problems and thereby increases the riskiness of target firms.

## VII.   Additional Tests

In this section, I first examine alternative explanations for the increase in credit risk post-acquisition. Second, I conduct additional analyses by using data on multiple, second, and failed transactions.

### A.   Wealth Transfer

An alternative explanation for the increase in targets' credit risk after foreign acquisition might be driven by a potential transfer of wealth between targets' shareholders and bondholders. The hypothesis of wealth expropriation has its origins in Galai and Masulis (1976) and Jensen and Meckling (1976), who show that in a levered firm, shareholders are motivated to undertake riskier investments to transfer wealth from bondholders. When applied to acquisitions, the wealth-expropriation hypothesis suggests that shareholders of target firms earn positive excess returns at the expense of bondholders, who earn negative excess returns. If the increase in targets' credit risk associated with foreign takeovers documented so far is partly explained by a wealth transfer, we expect to find differential abnormal shareholder returns around announcements of foreign vs. domestic acquisitions.

Table 10 presents stock price reactions around acquisitions for foreign vs. domestic target firms. Abnormal returns are calculated based on the Fama–French 3-factor model estimated using daily returns over the year ending 42 calendar days

TABLE 10

Cumulative Abnormal Returns of Acquired CDS Firms

Table 10 presents the daily stock price response of acquired CDS firms around block acquisitions announced between 2001 and 2018. Abnormal returns are calculated based on the Fama–French 3-factor model estimated using daily returns over the year ending 20 calendar days prior to acquisitions. I require at least 120 daily return observations to estimate the betas. I report CARs (in percentage) over 7 event windows: $(-1, +1)$, $(-2, +2)$, $(-3, +3)$, $(-5, +5)$, $(-10, +10)$, $(-15, +15)$, and $(-20, +20)$. Heteroscedasticity-robust $t$-statistics are reported in parentheses. *, **, indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Foreign Acquisitions (1) | | | | Domestic Acquisitions (2) | | | | Difference (1) − (2) | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | N | Mean | Median | Std. Dev. | N | Mean | Median | Std. Dev. | Diff. | ($t$-Stat) |
| CAR $(-1, +1)$ | 254 | 0.79** | 0.04 | 4.99 | 935 | 0.32 | 0.10 | 7.34 | 0.47 | (1.20) |
| CAR $(-2, +2)$ | 254 | 0.33 | −0.17 | 5.91 | 935 | 0.31 | 0.03 | 7.41 | 0.02 | (0.03) |
| CAR $(-3, +3)$ | 254 | 0.40 | −0.03 | 6.10 | 935 | 0.20 | 0.08 | 7.49 | 0.20 | (0.45) |
| CAR $(-5, +5)$ | 254 | 0.15 | −0.32 | 8.22 | 935 | 0.27 | 0.19 | 8.66 | −0.12 | (−0.20) |
| CAR $(-10, +10)$ | 254 | −0.32 | −0.34 | 9.71 | 935 | 0.47 | 0.34 | 11.00 | −0.79 | (−1.11) |
| CAR $(-15, +15)$ | 254 | −0.41 | −0.48 | 12.08 | 935 | 0.73* | 0.57 | 13.14 | −1.14 | (−1.31) |
| CAR $(-20, +20)$ | 254 | −0.41 | −0.94 | 15.06 | 935 | 0.65 | 0.64 | 15.63 | −1.05 | (−0.98) |

prior to acquisition announcements. I require at least 100 daily return observations to estimate market beta. The results show positive and significant abnormal returns of 0.79% only in the 3-day window around the time of the acquisition announcement. However, when I extend the event window, cumulative abnormal returns are neither economically nor statistically significant for foreign acquisitions. More importantly, the difference in abnormal returns between foreign and domestic acquisitions is not significantly different from each other, which is consistent with the findings in Dewenter (1995).

The average CARs of the acquired CDS firms are smaller compared to the evidence in the M&A literature (see, e.g., Bris and Cabolis (2008), Ferreira, Massa, and Matos (2010), and Frésard, Hege, and Phillips (2017)). For instance, a recent article by Frésard et al. (2017) reports that the average 3-day CARs for targets are 9.9% in their sample of horizontal cross-border transactions. There are several reasons why CARs are smaller in the main sample. First, the sample includes also minority control (5%–50% ownership), whereas the studies in the M&A literature, in general, include only deals in which acquirers obtain a majority and/or full control of target firms. As shown in Panel A of Table A3 in Appendix A, when I exclude minority acquisitions and financial firms from the sample, the average 3-day CARs for the target are 6.52% and 5.13% for foreign and domestic deals, respectively. Furthermore, previous research shows that larger firms tend to earn lower abnormal returns in M&As than smaller firms (see, e.g., Moeller, Schlingemann, and Stulz (2004), Alexandridis, Fuller, Terhaar, and Travlos (2013)). As CDS contracts tend to be written on larger firms (e.g., Chang et al. (2019), Augustin and Izhakian (2020)), CDS firms are more likely to earn lower abnormal returns around acquisition announcements. In Panel B of Table A3 in Appendix A, I replicate the results for a full sample of block acquisitions that include both CDS and non-CDS firms, and are announced and completed between Jan. 2001 and Dec. 2018. For this sample, the average 3-day CARs for the target are 7.22% and 6.91% for foreign and domestic block acquisitions, respectively. Taken together, the evidence indicates that CDS firms have relatively lower CARs around the announcement period.

Overall, the evidence suggests that the increase in target firms' credit risk after foreign acquisition is unlikely to arise from a wealth transfer between a target's shareholders and bondholders.[28]

## B.   Multiple, Second, and Failed Transactions

I conduct further analysis in this section regarding the robustness of my results. First, several target firms have undergone multiple acquisitions over the sample period. Thus, in column 1 of Table 11, I include all transactions for each target firm. The conclusion remains unchanged compared with those obtained from the final sample. Column 2 shows the results for target firms that undergo a second foreign acquisition over the sample period. Again, I obtain a significant increase in the CDS spreads of the same target firm, followed by the next foreign acquisition.

If foreign acquisitions drive the change in the credit risk of acquired firms, we expect no significant differences between foreign and domestic failed transactions.

### TABLE 11
#### Multiple, Second, and Failed Transactions

Table 11 presents DiD estimates of CDS spreads for treated (foreign-acquired) and control (domestic-acquired) firms based on various subgroups consisting of multiple acquisitions in column 1, second acquisition in column 2, and withdrawn deals in column 3. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST × FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The $t$-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln(CDS_SPREAD) | | |
|---|---|---|---|
| | Multiple Acquisitions | Second Acquisition | Failed Transactions |
| | 1 | 2 | 3 |
| POST × FOREIGN | 0.231** | 0.247*** | 0.121 |
| | (2.110) | (2.630) | (0.980) |
| LIQUIDITY | 0.082*** | 0.077*** | 0.060* |
| | (3.860) | (3.730) | (1.850) |
| SIZE | −0.107** | −0.117** | −0.326*** |
| | (−2.250) | (−2.110) | (−3.110) |
| LEVERAGE | 1.309*** | 1.385*** | 0.807*** |
| | (7.920) | (7.240) | (2.970) |
| PROFITABILITY | −3.047*** | −3.115*** | −4.400*** |
| | (−7.340) | (−7.890) | (−4.660) |
| STOCK_VOLATILITY | 0.022*** | 0.021*** | 0.019*** |
| | (10.130) | (10.820) | (4.030) |
| Rating FE | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes |
| No. of obs. | 1,012,690 | 176,541 | 71,412 |
| Adj. $R^2$ | 0.833 | 0.843 | 0.851 |

[28]Another possible alternative explanation for the increase in targets' credit risk after foreign acquisition might be due to the transfer of credit risk from the acquirer to target firms (see, e.g., Billett et al. (2004), Furfine and Rosen (2011)). In particular, it might be that the typical foreign acquisition is risk-increasing from the target's point of view because the typical acquirer has a higher default risk than the typical target. For the 123 acquisitions for which I have CDS data for foreign acquirers, untabulated results show that foreign acquirers' CDS spreads also increase after acquisition. This evidence suggests that the increase in targets' credit risk after foreign acquisition is unlikely to arise from risk transfer.

The results in column 3 show that the change in the credit risk is not significantly different between the 2 groups. This finding provides a strong indication that foreign acquisition drives the increase in the credit risk of target firms following acquisition.

## VIII.    Conclusion

I examine the impact of foreign block acquisitions on U.S. target firms' credit risk. Using firm-level evidence, I find that foreign block purchases lead to a larger increase in the target firms' credit risk post-acquisition compared with domestic purchases. The results are robust to using different identification techniques, such as DiD, triple difference, and propensity score matching.

The findings are consistent with an asymmetric information hypothesis. In particular, foreign investors might be less effective monitors due to information barriers. The informational disadvantage of foreign owners might lead managers to hide potentially value-decreasing and risk-increasing activities from outside shareholders. Consistent with this view, I find a larger effect when foreign owners are geographically and culturally more distant, and when they obtain majority control. This interpretation is reinforced by the evidence that a large increase is also observed in idiosyncratic stock volatility, which is usually reflective of the manager's ability to mask his/her activities.

The findings provide new insights into the literature on the consequences of foreign ownership. In particular, for governments that are devising policies for foreign takeovers, these results do not necessarily imply that foreign ownership is undesirable because they trigger higher CDS premia. No policy prescription can overlook the beneficial role played by foreign investors in terms of firm efficiency and productivity, corporate governance, risk sharing, and liquidity provision. Further investigation is necessary before a verdict can be reached on the overall impact of foreign ownership on financial markets.

# Appendix A. Additional Tables and Figures

## TABLE A1

### Sample Selection and Construction

Table A1 presents the sample selection and construction. The second column shows the number of deals. The third column presents the number of unique target firms. The final column shows the number of unique acquirer firms.

| | Selection Criteria | | |
|---|---|---|---|
| | No. of Deals | No. of Target Firms | No. of Acquirer Firms |
| Block acquisitions of public U.S. firms announced between Jan. 2001 and Dec. 2018 | 53,905 | 48,982 | 30,531 |
| Excluding leveraged buyouts, spin-offs, recapitalizations, self-tender offers, exchange offers, repurchases, acquisitions of remaining interest, privatizations, and buybacks | 45,089 | 42,154 | 27,335 |
| Excluding deals without transaction value | 22,530 | 21,069 | 13,680 |
| Merging with Compustat | 5,989 | 5,212 | 3,783 |
| Merging with TRACE and Mergent FISD | 2,751 | 2,141 | 1,766 |
| Merging with IHS Markit CDS | 1,643 | 1,167 | 1,073 |
| Keeping the first of multiple acquisitions | 1,273 | 1,167 | 986 |
| Final sample | 1,273 | 1,167 | 986 |

## TABLE A2

### Triple Difference

Table A2 presents the triple-difference estimation combined with propensity overlap weighting estimates of CDS spreads for treated (acquired) and control (nonacquired) firms. The specifications are estimated in a synthetic sample in which the pretreatment distribution of covariates is balanced across treated and control firms using the overlap weights method proposed by Li et al. (2018). In column 1, the overlap weights are based on a logit model that regresses a treated dummy on the following covariates: size, leverage, profitability, stock volatility and industry, rating, and year fixed effects. In column 2, the overlap weights are based on Altman $Z$-scores, and in column 3, the overlap weights are based on takeover probability. In column 4, the overlap weights are based on a richer logit specification that includes size, leverage, profitability, stock volatility, Altman $Z$-scores, and takeover probability. All specifications include industry $\times$ year, rating, and target firm fixed effects. The dependent variable is the natural logarithm of 5-year CDS spreads. The key explanatory variable is the interaction term, POST $\times$ TREATED $\times$ FOREIGN, which equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise. The additional term, TREATED, is an indicator variable that equals 1 for firms in the treatment group (acquired firms) and 0 for firms in the control group (nonacquired firms). Relevant independent variables are firm size, leverage, profitability, stock volatility, and CDS depth as a proxy for liquidity. See Appendix B for variable definitions. The $t$-statistics reported in parentheses are computed using robust standard errors clustered at the target firm level. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| Dep. Var. | ln (CDS_SPREAD) | | | |
|---|---|---|---|---|
| | Controls | Z_SCORES | TAKEOVER | All |
| | 1 | 2 | 3 | 4 |
| POST × TREATED × FOREIGN | 0.242*** | 0.241*** | 0.252*** | 0.264*** |
| | (2.740) | (3.620) | (3.530) | (2.800) |
| POST × TREATED | 0.015 | 0.022 | 0.039 | 0.022 |
| | (0.570) | (1.000) | (1.230) | (0.700) |
| POST × FOREIGN | 0.008 | 0.011 | 0.019** | 0.014 |
| | (1.030) | (1.490) | (2.080) | (1.470) |
| TREATED × FOREIGN | −0.011 | −0.024 | −0.032 | −0.007 |
| | (−0.330) | (−1.010) | (−1.220) | (−0.190) |
| LIQUIDITY | 0.000 | 0.021 | −0.006 | −0.014 |
| | (0.030) | (0.870) | (−0.220) | (−0.460) |
| SIZE | −0.153*** | −0.121** | −0.172*** | −0.201*** |
| | (−3.120) | (−2.400) | (−2.900) | (−3.270) |
| LEVERAGE | 1.008*** | 1.052*** | 1.104*** | 1.131*** |
| | (5.740) | (6.110) | (5.580) | (5.710) |
| PROFITABILITY | −2.482*** | −2.589*** | −2.931*** | −2.994*** |
| | (−7.860) | (−8.780) | (−8.000) | (−7.350) |
| STOCK_VOLATILITY | 0.018*** | 0.020*** | 0.021*** | 0.020*** |
| | (8.890) | (10.360) | (9.190) | (8.150) |
| Rating FE | Yes | Yes | Yes | Yes |
| Industry × Year FE | Yes | Yes | Yes | Yes |
| Target FE | Yes | Yes | Yes | Yes |
| No. of obs. | 635,856 | 690,866 | 594,005 | 546,673 |
| Adj. $R^2$ | 0.823 | 0.822 | 0.827 | 0.834 |

## TABLE A3
### Cumulative Abnormal Returns

Table A3 presents the daily stock price response of U.S. target firms around block acquisitions announced between 2001 and 2018. Abnormal returns are calculated based on the Fama–French 3-factor model estimated using daily returns over the year ending 20 calendar days prior to acquisitions. I require at least 120 daily return observations to estimate the betas. I report cumulative abnormal returns (CARs; in percentage) over 7 event windows: $(-1, +1)$, $(-2, +2)$, $(-3, +3)$, $(-5, +5)$, $(-10, +10)$, $(-15, +15)$, and $(-20, +20)$. Panel A presents results by excluding minority controls (5%–50% ownership) and financial firms. Panel B reports results for a full sample of block acquisitions that include both CDS and non-CDS firms. Heteroscedasticity-robust $t$-statistics are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | Foreign Acquisitions (1) | | | | Domestic Acquisitions (2) | | | | Difference (1) − (2) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | Median | Std. Dev. | N | Mean | Median | Std. Dev. | Diff. | ($t$-Stat) |
| *Panel A. Excluding Minority Acquisitions and Financial Firms* | | | | | | | | | | |
| CAR (−1, +1) | 167 | 6.52*** | 2.31 | 4.13 | 613 | 5.13** | 2.06 | 6.07 | 1.39 | (0.63) |
| CAR (−2, +2) | 167 | 4.65** | 2.02 | 4.96 | 613 | 5.51** | 2.14 | 6.22 | −0.86 | (−0.33) |
| CAR (−3, +3) | 167 | 4.30** | 1.64 | 5.72 | 613 | 5.45** | 2.12 | 6.68 | −1.15 | (−0.82) |
| CAR (−5, +5) | 167 | 3.72* | 1.48 | 7.21 | 613 | 6.01** | 2.40 | 7.77 | −2.29 | (−0.91) |
| CAR (−10, +10) | 167 | 2.76 | 1.26 | 8.34 | 613 | 6.18** | 2.51 | 9.23 | −3.42 | (−1.17) |
| CAR (−15, +15) | 167 | 2.37 | 1.13 | 10.50 | 613 | 7.32*** | 2.86 | 11.06 | −4.95* | (−2.17) |
| CAR (−20, +20) | 167 | 2.42 | 1.04 | 13.29 | 613 | 6.08** | 2.46 | 14.49 | −3.66 | (−1.49) |
| *Panel B. All Deals That Include Both CDS and Non-CDS Firms* | | | | | | | | | | |
| CAR (−1, +1) | 780 | 7.22*** | 4.59 | 8.91 | 3,426 | 6.91*** | 4.13 | 10.05 | 0.31 | (0.76) |
| CAR (−2, +2) | 780 | 7.67*** | 4.48 | 9.70 | 3,426 | 7.46*** | 4.16 | 10.76 | 0.21 | (0.46) |
| CAR (−3, +3) | 780 | 8.13*** | 4.23 | 10.46 | 3,426 | 7.79*** | 4.19 | 11.21 | 0.34 | (0.71) |
| CAR (−5, +5) | 780 | 8.70*** | 4.56 | 11.86 | 3,426 | 8.49*** | 4.52 | 13.63 | 0.21 | (0.39) |
| CAR (−10, +10) | 780 | 8.09*** | 3.98 | 14.47 | 3,426 | 8.86*** | 4.27 | 15.23 | −0.77 | (−1.17) |
| CAR (−15, +15) | 780 | 10.36*** | 5.17 | 18.17 | 3,426 | 10.74*** | 5.08 | 19.04 | −0.38 | (−0.46) |
| CAR (−20, +20) | 780 | 11.92*** | 6.01 | 21.44 | 3,426 | 11.54*** | 5.51 | 22.15 | 0.38 | (0.40) |

## FIGURE A1
### Covariate Balancing of Sample Firms

Figure A1 shows the kernel density for treatment and control firms before and after applying the overlap weighting method proposed by Li, Morgan, and Zaslavsky (2018). The two densities plotted on the left side of the figure depict the predicted probability (i.e., propensity score) of acquisition for foreign-acquired firms (blue) and control firms (red dashed) before the matching. The two densities plotted on the right side of the figure depict the propensity score of acquisition for foreign-acquired firms (blue solid) and the matched (overlap weighting) domestic-acquired firms (red dashed).



*Graph A. Before Overlap Weighting*  —— Treated  − − − Control

*Graph B. After Overlap Weighting*  —— Treated  − − − Control
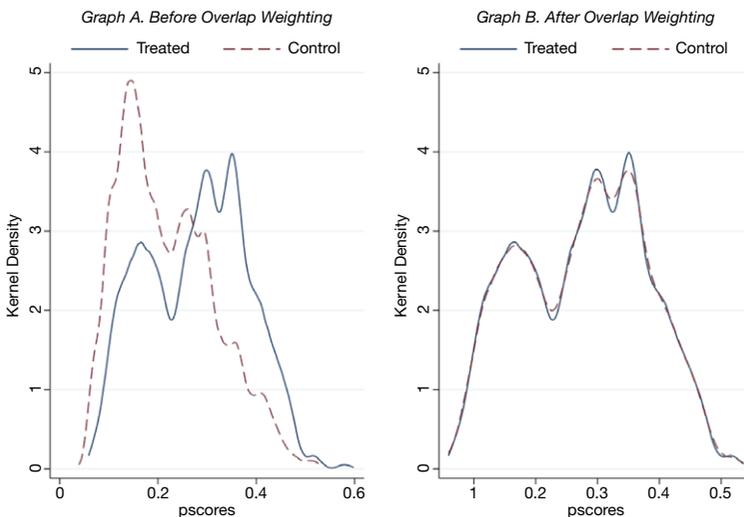
# Appendix B. Definition of Variables

ln(CDS_SPREAD): The natural logarithm of 5-year CDS spread. Source: IHS Markit Group

POST × FOREIGN: A dummy variable equals 1 if the target firm is acquired by a foreign investor and if the time period is post-acquisition, and 0 otherwise.

SIZE: The natural logarithm of total book value of assets. Source: Compustat

LEVERAGE: Total debt (the sum of long-term and short-term debt) divided by total assets. Source: Compustat

PROFITABILITY: Return on assets, which is the operating income before depreciation, amortization, and taxes divided by total assets. Source: Compustat

LIQUIDITY: CDS depth, the number of dealers that contributed to the quote formation, which I use as a CDS-level proxy for liquidity following Qiu and Yu (2012). Source: IHS Markit Group

STOCK_VOLATILITY (VOL): Stock return volatility, which is the standard deviation of daily stock log returns measured over the calendar quarter (at a quarterly frequency). Source: CRSP

YIELD_SPREAD: Firm-level bond yield spread relative to a maturity-matched Treasury yield, which is based on the last transaction in the TRACE database for the bond in the corresponding month. Source: TRACE and FISD

DURATION: The weighted average debt duration. Source: TRACE and FISD

BOND_AGE: The weighted age of bonds for each firm for each year as a measure of debt liquidity. Source: TRACE and FISD

CREDIT_RATING: Firm's long-term credit rating prior to the event. Ratings are provided by S&P, Moody's, or Fitch, in availability order, where letter grades are converted to numerical scales from AAA (1) to D (22). Source: S&P and FISD

IVOL: Idiosyncratic stock volatility. IVOL is estimated by regressing daily individual stock returns on the Fama–French 3 factors and then computing the quarterly standard deviation of the regression residuals. Source: CRSP

SVOL: Systematic component of stock return volatility. Source: CRSP

ln(MC): The natural logarithm of market capitalization of the stock at the end of the month. Source: CRSP

1/PRICE: The inverse of the nominal share price at the end of the month. Source: CRSP

A_RATIO: Amihud ratio: Absolute return scaled by daily dollar volume in millions of U.S. dollars, average within the quarter. Based on Amihud (2002). Source: CRSP

P6M_RET: Past 6-month return, which is the firm's 6-month return over the 2 quarters prior to analysis. Source: CRSP

BM: Book-to-market, which is the stock's book value of equity relative to market value of equity. Source: CRSP and Compustat

DISPERSION: The dispersion of analysts' earnings forecasts, measured by the standard deviation of the forecasts. Source: IBES

Z_SCORES: Altman's Z-score, defined as $3.3 \times (\text{EBIT}/\text{AT}) + 0.99 \times (\text{SALE}/\text{AT}) + 0.6 \times (\text{ME}/\text{LT}) + 1.2 \times (\text{ACT}/\text{AT}) + 1.4 \times (\text{RE}/\text{AT})$ (Altman (1968)). Source: CRSP and Compustat

TAKEOVER: Firm-specific level of takeover vulnerability based on the index developed by Gompers, Ishii, and Metrick (2003) that incorporates 24 takeover provisions. Following Cremers et al. (2009), I use a linear transformation of this index, TAKEOVER = 24 − G. A higher value indicates a higher vulnerability to takeover. Source: IRRC

PHYSICAL_DISTANCE: Geographic distance, which is the great-circle distance between foreign acquirers and U.S. targets. Source: MapsOfWorld.com

CULTURAL_DISTANCE: Cultural differences, which is the absolute difference in uncertainty avoidance index (Hofstede's national cultural value) between the foreign acquirer's country and the United States. Source: Hofstede's (2001) website

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