Globalization and Insider Trading: Evidence from Cross-Border Mergers and Acquisitions

Lixiong Guo*
University of Mississippi

Xueting Zhang†
University of New South Wales

Abstract

We investigate whether globalization has led to more aggressive insider trading before merger announcements due to barriers to cross-border law enforcements on foreign traders. Using a sample of 10,600 M&As around the world between 1990 and 2017, we find that the level of abnormal trading in target firm stocks is significantly higher before cross-border deals than domestic deals. Using the staggered entry into the Multilateral Memorandum of Understanding (MMoU) of 2002 by securities regulators around the world as a shock to the degree of cooperation among securities regulators, we find that entry into the MMoU by an acquirer-target country pair significantly reduces abnormal trading prior to cross-border deal announcements between the country pair relative between other country pairs. The higher level of abnormal trading concentrates in cross-border deals where the acquirer is from a country with weak legal institutions, high corruption and low social norms, and where the target is in a country with strong legal institutions against insider trading. Our evidence reveals an unnoticed effect of globalization on insider trading and suggests that the divergence in economic and legal integration presents a thorny challenge for maintaining securities market integrity around the world.

Keywords: Insider Trading, Informed Trading, Cross-border, Mergers and Acquisitions, Globalization, Law, Culture.

JEL Classification: G34, G38, K22, K4

*Lixiong Guo (Corresponding Author) is with the School of Business Administration, University of Mississippi. USA. Email: lguo@bus.olemiss.edu.

† Xueting Zhang is with the School of Banking and Finance, University of New South Wales, Sydney, Australia. Email: sherry.zhang@unsw.edu.au.

1. Introduction

Globalization in the past three decades has significantly increased cross-border flow of capital, goods, services and information. While country borders are no longer barriers to many economic activities around the world, they still play an important role in defining the effective reach of a country's laws. This combination of fast economic integration and slow legal integration provides a fertile ground for cross-border frauds as agents in one country can profit from fraudulent activities in another country but face significantly lower legal risk than domestic residents in the other country who engage in the same illegal activity. This link between globalization and cross-border frauds has gone largely unexplored in existing literature on globalization. In this paper, we investigate a fast-growing area of globalization, cross-border mergers and acquisitions (M&As), and its effect on a particular type of financial fraud, trading on material non-public information on forthcoming mergers by insiders or their tippees, legally defined as insider trading. Insider trading undermines investor confidence in the fairness and integrity of securities markets and is illegal in almost all countries since the 1990s.[3] The main question we investigate is whether there is evidence that foreign traders have exploited the mismatch between insider trading profits and legal risk in cross-border M&As and traded more aggressively than domestic traders.

Both domestic and cross-border M&A deals are prone to insider trading because acquirers typically pay a large premium for target stocks.[4] Traders who purchase target stocks or call options

[3] SEC Fast Answers for Insider Trading: "Because insider trading undermines investor confidence in the fairness and integrity of the securities markets, the SEC has treated the detection and prosecution of insider trading violations as one of its enforcement priorities."

[4] Meulbroek (1992) reports 183 cases of illegal insider trading episodes in the period 1979–1989, of which 145 were takeover-related. The median insider profit per episode was $24,673, and the median penalty was $21,000 during her sample period.

prior to the public announcement of a deal often stand to earn a big return upon the announcement.[5] Target country securities regulators are the primary regulators to prosecute insider trading in cross-border M&As. From their perspective, traders who obtain the merger information from the foreign acquirer are mostly residents of foreign jurisdictions. For these foreign traders, although their illegal trades take place on the target country's market, the key evidence needed for prosecuting them is in most cases under the control of foreign jurisdictions. For example, an executive in a foreign acquirer can tip her friend about the forthcoming cross-border M&A deal. Based on this information, her friend purchases the target firm's stock on the target country's stock market. The key evidence to prove that her friend traded on insider information is likely to include their communication records and proof of their relations. Such information is typically under the control of the acquirer country. To obtain it, the target country regulators usually need cooperation from authorities in the acquirer country. However, such help may not always be readily available and sometimes can be impossible to obtain. Hence, although the target country regulators typically claim jurisdiction over foreign traders, they face greater challenges in building evidence against foreign traders than domestic ones. Securities regulators around the world have voiced similar concerns. For example, the former Chairman of Australian Securities and Investments Commission (ASIC), Tony D'Aloisio, once said: "(These) evidentiary difficulties can become even more pronounced when the alleged offender, or some aspect of the conduct, is located in a foreign jurisdiction." In the same vein, a special agent in charge of the New York office of the Federal Bureau of Investigation (FBI) once said: "it's always a challenge for us to get records that

[5] Although there are other strategies of profiting from inside information prior to the announcement of M&A deals, they are more sophisticated and thus less likely to be known by unsophisticated insiders.

are in the control of countries other than the U.S". A 2012 Bloomberg article summarizes the situation with the title "Insider Traders outside U.S. Safe from American Prisons".[6]

In addition to the difficulty of obtaining records from foreign jurisdictions, target country regulators can also have difficult in bringing foreign offenders to justice. For example, U.S. lawyers often recommend foreign defendants facing insider-trading charges in the U.S. not to come to the U.S. to avoid the risk of incarnation. These barriers to cross-border law enforcement can significantly lower the legal risk faced by foreign traders relative to domestic traders in terms of both the probability of conviction and the severity of the punishment.[7]

According to Becker (1968), the optimal level of crime depends on the marginal costs (penalty) of the illegal activity and its marginal benefits. Since foreign traders face lower legal risk than domestic traders, Becker's theory predicts that they should have greater incentives to trade on insider information than domestic insiders *ceteris paribus*, especially when the jurisdiction of the foreign acquirer, where the vast majority of foreign insiders are likely to reside, does not have close legal cooperation with the target firm's jurisdiction.

The above arguments assume that trading costs for foreign and domestic traders are similar and foreign traders have no home bias in trading. However, the literature on investor home bias suggests that unfamiliarity with foreign countries may reduce the incentives of foreign insiders to trade outside their own country. In addition, foreign traders may also face legal restrictions or higher transaction cost of cross-border trading. These differences between foreign and domestic

[6] In a SEC case against a trader in Spain, the SEC lost the case because the trader wiped his hard drive clean and trashed a laptop. The director of the SEC's Market Abuse Unit at the time, said: "He was in Spain and there were limitations on what we could do."

[7] The lower risk is not so much in detection but mainly in proving the case and the punishment. For example, the regulator is more likely to drop a charge and less likely to pursue criminal charges against foreign insider traders, because of the difficult of obtaining implicating evidence from a foreign country. An ex-assistant U.S. attorney once said that the SEC requested the government consider charges against overseas traders less frequently.

traders suggest that foreign traders with inside information about forthcoming cross-border M&As may trade less than domestic traders in the target countries. Whether the barrier to cross-border law enforcement has led to more or less aggressive insider trading by foreigner than domestic traders is ultimately an empirical question.

We examine this question in a global sample of 10,600 acquisitions made by acquirers from 65 countries on target firms in 33 countries announced between 1990 and 2017. Following the definition of insider trading laws in most jurisdictions, insiders include corporate insiders, constructive insiders (who are professionals hired by the acquirer or the target firm to work on the deal such as investment bankers and lawyers), and anyone who are tipped by the first two types of insiders. Insider trading laws in general also prohibit tipping. Ideally, we want to compare the trades of foreign and domestic insiders using detailed transaction data. However, given the wide range of people who engage in insider trading and the secrecy of such activities, such data are simply not available.[8] We thus use aggregate measures of suspicious trading to proxy for the level of insider trading before takeover announcements, following a long tradition of the insider/informed trading literature. Like Acharya and Johnson (2010), we postulate that these measures have a monotonically relation with the amount or likelihood of insider activity given that a bid occurred. On stock markets, we construct two measures of abnormal returns over two preannouncement windows, [-5 day, -1 day] and [-10 day, -1 day], using the daily standardized residuals from a first stage regression which establishes the "normal" level of daily stock returns. The first measure, *Max*, equals the maximum daily standardized residual over the pre-bid window.

[8] Insider trading data are available in some countries but such data only cover trading by corporate insiders in their own company securities. Such data are not very useful for our study for two reasons. First, corporate insiders are unlikely to trade in their own firm securities before mergers because they can be easily sued for insider trading. Second, corporate insiders in the acquirer are not required to disclose their trades in target firm securities. Third, such data do not cover trades by constructive insiders and tippees.

The second measure, *Sum*, equals the sum of the positive daily standardized residuals over the pre-bid window. On the options market, we construct a *Max* and a *Sum* measure of abnormal call volume in a similar fashion.

Since aggregate measures cannot distinguish trades by foreign and domestic traders, our empirical strategy for detecting whether foreign traders are more aggressive than domestic insiders is by comparing the aggregate measures between cross-border and domestic M&As in the same target country and year after controlling for observable differences in target firm and deal characteristics. The key assumption we maintian is that the contribution to the aggregate measures by target traders is similar across the two types of deals because they are both domestic traders and thus subject to similar legal risk of insider trading. However, traders on the acquirer side are subject to different level of legal risk of insider trading between the two types of deals because they are located in different jurisdictions. Hence, any differences in the aggregate measures between the two types of deals should be mainly driven by different levels of insider trading by acquirer side traders after controlling for different deal and target firm characteristics which can affect the pre-bid target stock price run-ups. The target firm and deal characteristics we control include bidder toeholds and rumours (Jarrell and Poulsen, 1989), stock liquidity, offer premium, and number of advisors (Acharya and Johnson, 2010) and other target characteristics. We also include target industry fixed effects to account for heterogeneity in market anticipation and information environment by industry.

We find that both measures of abnormal returns over both pre-bid windows are significantly higher for cross-border deals than domestic deals, suggesting that foreign traders trade more aggressively than domestic traders do prior to merger announcements in the target country's stock markets. Since we control for deal and target firm characteristics, our finding does

not seem to be driven by differences between cross-border and domestic deals. To further address this concern, we match each cross-border deal with a domestic deal in the same target country and industry based on target firm characteristics using a propensity score model. We continue to find a higher pre-bid abnormal return for cross-border deals than domestic deals. Our result is also robust to using price run-up ratios to measure the level of insider trading (Del Guercio, Odders-White, Ready, 2017; Meulbroek, 1990; Griffin, Hirschey and Kelly, 2011). The price run-up ratio measure is based on the idea that if the offer premium is determined before the price run-up, then pre-bid insider trading should cause a larger proportion of the total price movement being incorporated in target stock price before the takeover announcement.

We then investigate how acquirer and target country characteristics affect the difference in levels of abnormal trading before cross-border deals versus domestic deals. First, we examine how legal institutions that restrict insider trading in the target country affect the difference. In target countries with strong legal institutions, insider trading laws are likely to be strictly binding for domestic traders. Since the existence of barriers to cross-border law enforcement makes the law less binding for foreign traders there should be a clear wedge between the incentives to trade on insider information between foreign and domestic traders. Consistent with this prediction, we find that the difference in insider trading between the two types of deals in the same target country is significantly larger when the target country has strong legal institutions as measured by the insider tading restriction index, insider trading law index and the Rule of Law index. Second, we explore how insider trading law and cultural norms in the acquirer country could affect the level of pre-bid insider trading in the target's stock market. In terms of the strength of legal institutions, countries with weak law and institutions are less likely to and less able to participate in international cooperation. Moreover, residents in these countries are probably used to the lax

regulation environment with respect to insider trading. Consequently, M&A transactions initiated by acquirers in weak-governance countries may provide a breeding ground for information leakage and cross-border insider trading. In terms of social and cultural norms, an emerging literature on the role of culture suggests that cultural norms have significant influence on a person's intrinsic motivation to engage in illicit activities (see for example Cooter (2000), Fisman and Miguel (2007), DeBacker, Heim, and Tran (2012)). Thus, cultural norms may affect insider trading in the target firm securities by acquirer insiders, especially considering that insider trading is a secret individual activity so personal values and social norms are likely to be important determinants of individuals' actions. These insiders are not restricted to top executives and board members in the acquiring firm. Instead, they include everyone who gets access to the confidential information, such as lawyers, investment bankers, financiers, the so called "constructive insiders". This circle expands quickly as the deal announcement date draws closer and the chance of a leakage increases geometrically. Hence, cultural norms can also have a greater impact on the likelihood of insider trading than internal governance of the acquiring firm. Using a sample of cross-border deals and proxies for country-level insider trading law and cultural norms, we find that cross-boder deals involving acquirers from countries with weak legal institutions, more acceptance of cheating on taxes, and high corruption are associated with greater intensity of insider trading. This provides further evidence that some of the trades on the target country's financial market are driven by inside information leaked from foreign acquirers.

We also compare the level of insider trading in cross-border deals between countries that have close relations, specifically the U.S. and Canada, we find that cross-border deals between the U.S. and Canada are not associated with higher levels of insider trading, while cross-border deals

between acquirers from the rest of the world and targets in the U.S. and Canada exhibit a significantly higher level of insider trading.

To see if there is also more insider trading on options markets, we examine the difference in insider trading on the options markets for a subsample cross-border and domestics deals where the target firms are U.S. firms with exchanged traded options. An important advantage of examining option trading is that insider trading can be more precisely detected because insiders are likely to trade in certain series of stock options, which reveals their possession of deal-specific non-public information. Suspicious trading in these particular series relative to other series provides strong evidence that traders have inside information. We construct a *Max* and a *Sum* measure of unusual call volume in a similar way to our stock market measures. Since a target firm can have multiple series of traded options which differ in maturities and strike prices, we aggregate the number of calls traded each day into a single daily volume. Then, we construct the *Max* and *Sum* measures. We only consider calls because buying calls generate higher returns than selling puts when the underlying stock prices go up. If a trader has accurate inforamtion about the announcement date of a deal, then short-dated options that expire shortly after the announcement date should be preferred to long-dated options. Hence, we only include options that expire within 60 days of the deal announcement date. Consistent with the stock market finginds, we find that abnormal call option volume is significnatly higher in the preannouncement periods of cross-border deals than domestic deals.

We admit that our evidence so far is indirect. However, the robustness of the evidence from both the stock and options markets, over different preannouncement windows, and for different measures of insider trading and the consistency of the cross-sectional variations with the explanation based on barriers to cross-border law enforcement provide overwhelming support for

our hypothesis that barriers to cross-border law enforcement result in more insider trading in cross-border deals than domestic deals. It would be difficult to reconcile this body of evidence with alternative explanations, especially ones based on market anticipation. The cross-sectional variations are also important on their own because they help us better understand the determinants of preannouncement insider trading in cross-border deals and such information can help regulators to prioritize their enforcement resources on deals that are most prone to insider trading.

To directly address all the concerns with the indirect evidence, we exploit a quasi-natural experiment in the degree of cooperation among securities regulators in different countries This experiment is unique in the sense that it provides direct evidence on illegal insider trading without using actual insider trading data which is no available. As far as we know, we are the first to use this quasi-natural experiement. In 2002, the International Organization of Securities Commissions (IOSCO) introduced the first Multilateral Memorandum of Understanding Concerning Consultation and Cooperation and the Exchange of Information (MMoU) in history. Signatories of the MMoU agree to cooperate with other signatories in combating securities law violations around the world, which among other things include exchange of information with other signatories. An important feature of this expriment is that countries signed the MMoU in a staggered fashion. By exploiting these staggered exogenous shocks to the degree of coordination between securities regulators across country pairs caused by the staggered entry into the MMoU, we are able to establish a causal relation between the strengthening of cooperation between securities regulators in two countries and the prevalence of preannouncement insider trading in cross-border deals between the two countries relative to cross-border M&As between other country pairs. Because the MMoU should have no effect on legal insider trading, if our indirect evidence is driven by trading on legitimate information, we should find no change in the level of

abnormal trading from before to after a acquirer-target country pair both signed the MMoU. Otherwise, if we find a significant fall in the level of abnormal trading around the year when both the acquirer and target countries have signed the MMoU, then the fall can only be explained by illegal insider trading. Consistent with our main hypothesis, we find that insider trading in cross-border deals between an acquirer-target pair significantly fall from before to after both countries have signed the MMoU relative to cross-border deals in the same target country but where the acquirer country was not a signatory of the MMoU by the year.

As a further robustness check that the difference in the level of abnormal trading between cross-border and domestic deals is not driven by unobserved differences in target insider incentives to trade on insider information, we compare abnormal stock returns of the cross-border and domestic M&A target firms before their quarterly earnings announcements. We control for country by year fixed effects, industry fixed effects and other factors related to abnormal stock returns prior to earnings announcements. Consistent with the presence of informed trading before earnings surprises, we find that the abnormal stock return before earnings surprise is in the same direction as the earnings surprises and is statistically significant. However, the difference in the abnormal return before earnings surprises for cross-border and domestic M&A target firms is not statistically significant. Hence, there is no evidence that insiders in cross-border M&A target firms are more likely to trade on insider information than those in domestic M&A target firms or that information leakage is greater in cross-border M&A target firms than domestic M&A target firms before earning surprises.

Our study relates to several strands of literature. First, it is linked to a large insider trading literature that documents significant abnormal trading before major corporate announcements. Most of these studies focus on insider trading in the U.S. We contribute to this literature by

providing evidence of abnormal trading in target firm securities in 52 countries. Similar to our study, Griffin, Hirschey, and Kelly (2011) also examine insider trading using an international sample of takeovers but they focus on the cross-country differences in domestic inside trading. To the best of our knowledge, we are the first study to examine how the level of abnormal trading is different before cross-border deals and domestic deals. Although barriers to cross-border law enforcement have the potential to lead to more aggressive insider trading before the announcements of cross-border deals than before domestic deals as we argue in the paper, foreign insiders may face other constraints in cross-border trading or cross-border tipping. Hence, it is an empirical question as to whether this is actually happening systematically in practice. Our evidence suggests that it is, which raises an important red flag for regulators and policy makers. In addition, most of the existing studies of trading on inside information use U.S. data and have focused on various U.S. insiders, such as registered corporate insiders, wealthy individuals, and institutional investors (Bodnaruk, Massa, and Simonov (2009), Agrawal and Nasser (2012), Cohen, Frazzini, and Malloy (2008), Griffin, Shu, and Topaloglu (2012)). Although we do not have data on the identity of all traders who trade before the acquisition announcement, our evidence suggests that in cross-border deals a significant number of insider trades could potentially be traced to foreign insiders and their tippees.

Second, our paper is related to the stream of research that examines the effectiveness of insider trading law and enforcement actions in the U.S. (Seyhun (1992), Agrawal and Jaffe (1995), Bhattacharya et al. (2000), Del Guercio, White, and Ready (2015)). In general, these studies find both public and private enforcement of insider trading laws have some deterrence effects on insider trading. Del Guercio, White, and Ready (2015) find that more intensive SEC public enforcement in recent time periods in the U.S. has significantly reduced the prevalence of insider trading prior

to earnings and takeover announcements relative to the 1980s. These studies either focus on trades by registered insiders in U.S. firms or implicitly assume that the deterrence effect of insider trading law in the U.S. is the same for domestic and foreign insiders. Bris (2005) studies the effectiveness of insider trading laws and their first enforcement in a global context. He finds that insider trading enforcement increases both the incidence and profitability of insider trading, but harsher insider laws work better at reducing the incidence of illegal insider trading. Like the U.S. studies above, Bris (2005) assumes the deterrent effect of a country's insider trading laws on domestic and foreign insiders is the same. In contrast, our evidence suggests that insider trading law and enforcement actions have a weaker deterrence effect on foreign insiders than domestic insiders. Although stricter enforcement of a country's insider trading laws can reduce insider trading by both domestic and foreign insiders, without close cooperation among securities regulators in the jurisdictions of the foreign insiders, it will widen the difference in insider trading by domestic and foreign insiders.

None of these studies examine what can deter cross-border insider trading. However, as we pointed out, deterring insider trading in cross-border deals needs close cooperation among securities regulators in different jurisdictions. The SEC recognized this issue back in the 1980s at the dawn of the globalization. Regulators in other jurisdictions came to the same conclusion as their economies become more involved in the globalization process. This consensus is behind the IOSCO's adoption of the MMoU and its push to expand the network to all regulators in the world. To the best our knowledge, this paper is the first study to examine whether closer cooperation among securities regulators in different jurisdictions can deter cross-border insider trading. Our evidence that the MMoU reduces cross-border insider trading implies that it probably has helped to deter other forms of cross-border frauds and increased investor confidence in investing in cross-

listed firms, initial public offering of foreign firms in their market, etc. Future research can look into these questions.

Third, this paper is related to the literature on cross-country spillovers. A number of papers show that cross-listing on foreign exchanges with stricter corporate governance and disclosure requirements bond a firm to higher governance standards and thus causes a positive governance spillover to the cross-listing firm (Reese and Weisbach (2002), Doidge (2004)). In parallel, some studies document a positive corporate governance spillover through cross-border mergers and acquisitions (e.g. Rossi and Volpin (2004), Bris, Brisley, and Cabolis (2008), Martynova and Renneboog (2008)). Overall, these papers document a positive impact of cross-border transactions on the internal governance of firms. In contrast, we show that, in terms of financial markets, cross-border mergers and acquisitions can have a negative effect on the integrity of financial markets globally and the negative effect varies with the social and cultural norms of the acquirer country.

Fourth, we contribute to the literature on how social and cultural norms affect economic behaviour. Fisman and Miguel (2007) show that corruption norms are positively related to parking violations by UN diplomats in New York City. DeBacker, Heim, and Tran (2012) find U.S. firms with foreign owners from countries with higher corruption norms evade more taxes. We show that social and cultural norms that are more tolerant of illicit activities and corruption are also related to more exploitation and leakage of inside information about forthcoming mergers.

2. Data and Sample

2.1. Sample Construction

Our global M&A sample is obtained from Thomson Reuters Securities Data Corporation (SDC) database. We begin with all deals announced between 1991 and 2017 and then apply a series of filters. We require that the deal is classified as “merger”, “acquisitions” or “acquisition

of majority interests", the acquirer owned less than 50% of the target's stock before the transaction and was seeking to acquire 50% or more of the target's stock after it so that the transactions resulted in a change in control, and the deal value paid by the acquirer, excluding fees and expenses, is greater than US$1 million. LBOs, spinoffs, recapitalizations, self-tender offers, exchange offers, repurchases, partial equity stake purchases, acquisitions of remaining interest, and privatizations are excluded. Some firms receive multiple takeover bids within a short period of time. This could due to either the emergence of competing bids or sequential bids made by the same bidder with revised terms. To avoid information contamination from prior takeover bids, we only keep takeover bids that were not preceded by another bid over the previous 12 months. To be able to calculate our pre-bid abnormal stock return measures and control for firm characteristics, we require that target firms are publicly listed and have daily stock return data available in the Datastream database and financial statement data in Worldscope database. Target firms also need to have a minimum of 60 non-zero trading days prior the deal announcements to be included in our sample. This ensures that the benchmark model of daily stock returns for the target firm can be reasonably estimated using daily stock return data during the 90 days prior to the deal announcement.

Deals are classified into cross-border deals and domestic deals based whether the acquirer and the target are headquartered in the same country. A deal is a cross-border deal if the acquirer is not headquartered in the target's country. Otherwise, the deal is a domestic deal. In a small number of deals, the target firm does not have listings on its headquarters country's market, instead, its stock is listed in the market of another jurisdiction. For these cases, we use the target firm's listing jurisdiction as the target country because that is the domestic jurisdiction of the regulators which oversee trading in the target stock. When such a target firm is acquired by another firm in

its headquarters country, we would classify the deal as a cross-border deal even though both are headquartered in the same country. This may sound counter intuitive, however, the relation between regulators and insiders in such a deal closely resembles that in cross-border deals except that not only insiders in the foreign acquirer faces lower legal risk but also insiders in the target firm. Hence, the classification is in the spirit of our classification of cross-border and domestic deals. However, when such a target firm is acquired by a firm headquartered in its stock listing country, the deal would be classified as a domestic deal under our scheme even though insiders from the target firm's headquarters country obviously face lower legal risk of insider trading on its listing country's markets. To make sure that the level of insider trading in domestic deals are cleanly measured within each target country, which is an important benchmark with which we compare insider trading in cross-border deals in this paper, we exclude these deals from our analysis.

Our empirical strategy is to compare the level of abnormal trading in target firm securities between cross-border and domestic deals that occurred in the same target country. To make sure that we have a minimum number of both types of deals in a target country for comparison, we require that a target country to have a minimum of five cross-border and five domestic deals to be included in our sample.

After applying these sample restrictions, we obtain a final sample of 10,600 M&As in 33 target countries with acquirers coming from 65 countries. The total number of acquiring and targe firms involved is 14,510. Table 1 describes the number and value of cross-border deals in our sample by year. We see that cross-border deals as a fraction of total number of deals in a year have significantly increased from 1990 to 2017. In the final sample year of 2017, cross-border deals account for close to 35% of deals in the world. Over the entire sample period, cross-border deals

account for about 25% of the deals both by number and value. Table 2 reports the distribution of all deals and cross-border deals by target and acquirer country. In the acquirer column, the number for each country represents deals where the acquirer is headquartered in the country. The table shows that U.S., Canada and the U.K. have the most active domestic takeover markets in the world. They are also the most popular target countries and the top three acquirer countries for cross-border deals. The list of acquirer country is much longer than the list of target countries because thirty-two countries, including China and Ireland, have fewer than 5 public firms being targeted by foreign acquirers over our sample period and thus are excluded from target countries but their firms are active acquirers of foreign firms and thus are included in acquirer countries.

2.2. Measuring Insider Trading Activity

We follow Acharya and Johnson (2010)[9] and construct two return-based measures of suspicious trading in a target firm's stock. The data for the calculation is from Datastream International. Specifically, we first estimate a regression model to establish the normal level of a target firm's daily stock return using daily data 90 days prior to the deal announcement. The independent variables of the model include a constant, lagged daily volume and return of the target firm stock, day-of-week dummies, and contemporaneous daily volume and return for the target country local stock market index from the Datastream database. The daily residuals from the regression is then standardized by the sample standard deviation of the residuals. We then use the standardized daily residuals to construct two measures of abnormal stock trading activities over each of the two event windows, [-5 day, -1 day], and [-10 day, -1 day] where event day 0 is the deal announcement date. Two event windows are used to increase the likelihood of detecting insider trading. If there are systematic differences in the timing of insider trades by foreign and

[9] We have also constructed abnormal trading measures using the CAR model and the constant model with similar results.

domestic insiders, then using a longer window increase the chance to capture all of them but at the expense of greater noises in the measure. The first measure, *Sum*, equals the sum of all positive daily standardized residuals in the event window. The second measure, *Max*, equals the maximum daily standardized residuals over the event window. The *Sum* measure is designed to detect insider trades by traders who break up their trades over days in order to minimize their price impacts. The *Max* measure is designed to detect aggressive trading by insiders with short-lived information or facing strong competition from other insiders who concentrate their trades in one day. The two measures complement each other in detecting different strategies of insider trading. Since we do not have information on which trading strategy is employed by insider traders in each deal, using both measures increase the likelihood of detecting insider trading. Although on average these measures should be positively correlated with the existence of insider trading, it should be noted that we use these measures to identify cross-sectional variation in the likelihood or amount of suspicious trading across deals, not to assess the occurrence of insider trading before any particular deal.

2.3. Measuring Country-level Law and Institutions against Insider Trading

To identify the effect of country-level legal institutions on the level of insider trading activities, we get data on three indices that can proxy for the strictness of a country's legal institutions against insider trading. All three measures are widely used in existing literature. The first measure is the insider trading restriction index (*IT Restriction*) from the 1996, 1998 and 1999 Global Competitiveness Report based on the following question: "Insider trading is not common in the domestic market (1 = strongly disagree, 7 = strongly agree)". Following Denis and Xu (2013), we take the average of all executive responses in a given country as the country's index value. Larger values of the index indicate greater insider trading restriction within the country. The second

measure is the insider trading law index (*IT Law*) obtained from Beny (2005) which ranges from 0 to 4. It measures the strictness of insider trading laws in a country. This index is calculated by summing one for each of the four statements which is true: 1) insiders are prohibited from tipping outsiders about material non-public information and/or encouraging them to trade on such information for private gain; 2) tippees are prohibited from trading on material non-public information they have received from corporate insiders; 3) monetary penalties are expected to be greater than the insiders' trading profits; and 4) violation of the insider trading law is a criminal offence[10].

Although these two indices are directly related to insider trading laws, there are no recent data on them. Thus, their values in the late 1990s and early 200s may not accurately reflect the strictness of insider trading law enforcement for the later years in our sample, especially in countries that introduced recent legislative reform regarding insider trading. Hence, we limit our sample period to years before and including 2006 when using these two indices.

In order to have a time-varying proxy that covers our entire sample period, we obtain the Rule of Law index from the Worldwide Governance Indicators (WGI). These indicators are constructed by World Bank and are updated annually. According to the WGI dataset, the Rule of Law index measures "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". It measures the strength of legal institutions in a country. Since all countries in our sample have passed an insider trading law, we expect that countries with better Rule of Law also have stricter enforcement of their insider trading law. We expect that countries with strong legal institutions to also have strong institutions against insider

[10] Detailed definition and construction of the public enforcement index are described in Beny (2005).

trading. Higher values of this index indicate greater strength. The summary statistics of these indices by country are reported in Appendix A2.

To check the validity of these indices in capturing the effectiveness of each country's legal institutions, we regress our insider trading metrics prior to the announcements of domestic deals in each target country on the three country-level indices one at a time, along with other control variables and industry and year fixed effects. We expect that insider trading to be less prevalent in countries with stronger legal institutions against insider trading. Consistent with this, we find that the coefficient estimate on each of the three indices is negative and statistically significant at conventional levels. The results hold for both the [-5,-1] and [-10,-1] preannouncement windows. These results also suggest that our insider metrics are comparable across countries, which in turn means that the method we use to construct them does a good job of filtering out cross-country differences in daily stock returns. For brevity, we only report the results for preannouncement window [-5, -1] in Appendix A4[11].

2.4. Measuring Acquirer Country Cultural and Social Norms

We employ two measures to capture individuals' tendency to engage in unethical activities in a country. The first measure is the annual Corruption Perception Index (CPI) published by Transparency International. It is computed annually based on the informed views of analysts, business people and experts from different countries. Countries with higher levels of corruption have lower CPI values. To make interpretation easier, we reverse the CPI scale. In our analyses, a higher corruption index corresponds to a higher level of corruption.

[11] To save space, we only present test results for the [-5, -1] window in the reminder of the paper. Results for the [-10, -1] window are materially indifferent.

The second measure uses a dataset, the World Values Survey (WVS), which provides detailed survey responses from representative national samples of at least 1000 individuals within a country across more than 80 countries and over several years. The survey collects comparative data on values and belief systems among peoples around the world. All surveys are conducted through face-to-face interviews at the respondents' homes and in their respective national languages. Survey data from the WVS have been widely used in the finance and economic literature (e.g. La Porta et al. (1997), Dyck and Zingales (2004), Alm and Torgler (2006), Pevzner, Xie, and Xin (2015)).

We measure the tendency of people to disobey rules and laws based on the following question from the WVS:

Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between (on a ten-point scale where 1 = never and 10 = always): Cheating on taxes if you have a chance.

Survey respondents are asked to choose a score from a ten-point scale. Due to the qualitative nature of this question, the natural cut-off would be at the value of one. Thus, we recode the responses to the question to one if a survey participant reports that the action can never be justifiable and zero otherwise. We then calculate a country-level measure by averaging the recoded responses within each country.

2.5. Summary Statistics

In Panel A of Table 3, we report the summary statistics of target firm and deal characteristics by deal type. All variables are winsorized at the 1% and 99% tails. The table shows that cross-border deals and domestic deals are systematically different in some important dimensions. Cross-border deals tend to target larger firms, pay higher premium and use more cash

payments. Somehow, cross-border deal target firms tend to have less liquid stocks as measured by daily stock turnover and the Amihud stock illiquidity measure. Consistent with cross-border deals being more complex than domestic deals, cross-border deals employ more advisors than domestic deals. However, cross-border deals are no more likely to be preceded by rumours than cross-border deals. Given that some of the characteristics are correlated with the level of preannouncement insider trading according to prior studies, these comparisons highlight the importance of controlling for target and deal characteristics when attributing higher level of insider trading to the differential legal risk faced by foreign and domestic traders.

Panel B of Table 3 reports univariate comparisons of our insider trading metrics between domestic and cross-border deals over preannouncement windows [-5, -1] and [-10, -1], respectively. The table shows that, first, insider trading metrics are positive and statistically different from zero in both domestic and cross-border deals, suggesting the presence of insider trading in both types of deals. Second, the metrics are between 3.5% and 4.7% higher for cross-border deals than domestic deals, suggesting higher level of insider trading in cross-border deals than domestic deals. The differences are all statistically significant at the conventional levels. This provides preliminary support for our main hypothesis.

3. Empirical Results

3.1. Baseline Analyses

Although the univariate results are supportive of our hypothesis, they can be due to systematic differences between the two types of deals. In this section, we estimate OLS regressions to explicitly control for the observable and unobservable differences. The dependent variable is one of our insider trading metrics and the key explanatory variable, *Cross*, is an indicator for whether the deal is a cross-border deal in the target country. For control variables, we include

target firm size, bid premium, percentage of cash payment, target firm book-to-market ratio, target firm leverage, target stock volatility, target firm beta, target stock liquidity, number of advisors, a toehold indicator, and a rumour indicator. In all specifications, we include target country by year fixed effects so that the coefficient on *Cross* is estimated from deviations from a time-varying level of insider trading in domestic deals in the target country. We also include industry fixed effects to account for the possibility that firms in certain industries are more likely to become the targets of cross-border acquisitions and these industries also tend to have higher preannouncement stock price run-ups, say, because there is more public information available for predicting takeovers in these industries. Industries are defined by Fama and French 48 industry definitions. Standard errors are two-way clustered by target country and year.

Table 4 reports the regression results. We find that the coefficient on our key independent variable, *Cross*, is positive and statistically significant for both the *Sum* and *Max* measures of abnormal returns over both [-5,-1] and [-10,-1] windows, suggesting that insider trading is more prevalent in cross-border deals than domestic deals even after we control for observable differences across deals and unobservable omitted variables at the target country by year and industry level. In terms of control variables, bid premium is positively related to preannouncement abnormal returns, consistent with higher expected abnormal announcement returns attract greater insider trading. The coefficient on the rumor indicator is positive and statistically significant, consistent with information leakage ahead of deal announcements. The coefficient here captures informed trading based on public information rather than insider information. Table 3 shows that cross-border deals on average employ more advisors than domestic deals. Acharya and Johnson (2010) find that more insiders are associated with more insider trading. Thus, we control for the

combined number of advisors but we do not find the coefficient on this variable statistically significantly.

3.2. Matched Sample Tests

In this section, we match each cross-border deal in our sample with a domestic deal in the same target country and industry and having the closest propensity score among those within a 0.1 radius of the propensity score of the cross-border deal. The propensity score model predicts the likelihood of being a cross-border deal and is estimated using all sample deals. The dependent variable is an indicator for cross-border deal and the predictors include all target- and deal-characteristics in the baseline model. Cross-border deals without matched domestic deals are excluded from the matched sample. In Appendix A3, we examine the balance in covariates of cross-border and domestic deals in the matched sample. Even though some characteristics are still significantly different, the magnitudes of the differences are quite small. Most characteristics are no longer statistically significant. Table 5 presents the regression results using the matched sample.[12] Over both preannouncement windows, we find that the coefficient on *Cross* remains positive and statistically significant for both the *Sum* and *Max* measures of insider trading.

3.3. Target Country Legal Institutions against Insider Trading

If barriers to cross-border law enforcement drive the difference in insider trading between cross-border and domestic deals, we expect the difference to be greater in target countries with strict enforcement of insider trading laws. This is because in these countries insider trading restrictions likely have a strong deterrent effect on domestic insiders and thus a relaxation of the deterrent effect on foreign insiders due to barriers to cross-border law enforcement is likely to have

[12] All our regression results presented in the reminder of the paper are based on the matched sample. We repeated all the tests using the full sample and the results are similar.

a discernible effect on the level of insider trading by foreign insider relative to domestic insiders. In contrast, in countries with weak insider trading law enforcement, the law likely have a weak deterrent effect on even domestic insiders. This makes the barriers to cross-border law enforcement a less important factor in affecting the insider trading incentives of foreign relative to domestic insiders.

To test this prediction, we re-estimate the baseline regression by adding interaction terms between *Cross* and the three country-level proxies for the strength of insider trading law enforcement sequentially. The three proxies are the insider trading restriction index (*IT Restriction*) obtained from the Global Competitiveness Report, insider trading law index (*IT Law*) obtained from Beny (2005), and the rule of law index obtained from the Worldwide Governance Indicators (WGI). The first two indices are time-invariant and only for the time period 1990-2006, while the last one is updated by World Bank annually and available for 1990-2017. In the IT restriction and IT Law columns, we include target country, industry and year fixed effects. In the Rule of Law columns, we include target country by year and industry fixed effects. We report the regression results in Table 6. We find that the coefficient on the interaction of *Cross* and each of the three country-level proxies for the strictness of insider trading law enforcement is positive and statistically significant, suggesting that the difference in the level of insider trading between cross-border and domestic deals is significantly positively related to the strictness of insider trading law enforcement in the target country.

3.4. Acquirer Country Legal Institutions against Insider Trading

Insider trading on the target country's markets in cross-border deals can also vary with the strength of legal institutions in the acquirer country. First, foreign acquirers in countries with strong legal institutions are likely to have stricter rules against insider trading and the leakage of

material non-public information. Second, foreign insiders in countries with strict enforcement of insider trading laws are more aware of the legal risk of insider trading and thus are more cautious in insider trading on the target country's markets as well. Hence, we expect that insider trading in cross-border deals is less prevalent when the acquirer is in a country with stronger legal institutions.

To test this variation, we use all cross-border deals in our sample. Since our objective is not to compare insider trading in cross-border and domestic deals, we exclude all domestic deals. We then estimate an OLS regression in which we regress the insider trading metrics on the three proxies of country-level legal institutions, the Insider Trading Restriction Index (*IT Restriction*), the Insider Trading Law Index (*IT Law*) and the Rule of Law index, one at a time. These indices are discussed in Section 2 and used in Section 3.3. (In section 3.3. they are used to proxy for the legal institutions in the target countries.). We include target country, industry and year fixed effects in columns 1 through 4, and target country by year and industry fixed effects in columns 5 and 6. The inclusion of the target country or target country by year fixed effects means that the insider trading metrics are compared across cross-border deals in the same target country or same target country-year from different acquirer countries. The results are reported in Table 7. We find that the coefficients on all three indices of strength of legal institutions are negative and statistically significant, suggesting that among cross-border M&As targeting firms in a country, those where the acquirer is from a country with strong legal institutions are associated with lower level of insider trading than those where the acquirer is from a country with weak legal institutions.

3.4. Acquirer Country Social Norms

We next examine whether value, social norms, and attitudes across acquirer countries affect the frequency and intensity of insider trading in cross-border M&A deals in the same target country. Besides legal considerations, the incentives of foreign acquirer insiders to trade or tip

others to trade on the confidential information they have are also influenced by social or cultural factors. As related parties in the acquirer country, either corporate insiders or other agents such as lawyers, consultants, and investment bankers, start to possess confidential information, the decision of whether to profit out of the non-public information is usually bounded by the behavioural standards that their society adopts and follows as a whole. According to the theory of norms and the law proposed by Cooter (2000), violations of laws are not only legal and economic decisions but also involve social and ethical considerations. Within a society, social norms basically take the form of approval or disapproval from the other members from the society, and it usually guide an individual's feelings of pride or shame. When a social norm has been internalized in an individual's own value system, behaviour following or against the norm will also result in feelings of self-respect or guilt. Therefore, norms can impact individuals' decisions on whether to comply with the law, especially legal requirements that are not consistent with norms. In the case of insider trading, although it is illegal, norms may fail to consider insider trader to be unethical. Societies that collectively place less importance on stopping insider trading behaviour can simultaneously have weak anti-insider-trading social norms. If market participants' values are influenced by cultural norms, then cross-cultural differences may be an important determinant of market participants' compliance with the insider trading law and other forms of behaviour even in the same legal environment.

Therefore, market participants from countries where insider trading is collectively considered acceptable may exhibit lower level of compliance with the insider trading laws in a foreign country. We adopt two measures that capture individuals' tendency to disobey rules and laws in a country which are likely to be positively related to their attitude towards insider trading. The first measure is the annual Corruption Perception Index (*CPI*) published by Transparency

International. It measures the corruption level of a country. We reverse the CPI scale so a higher corruption index corresponds to higher levels of corruption. Corruption social norms can also reflect individuals' tendency to participate in illicit or unethical activities. Fisman and Miguel (2007) study parking violations among United Nations diplomats living in New York City and show that diplomats from countries with high level of corruption accumulated significantly more unpaid parking violations. DeBacker, Heim, and Tran (2012) find that corporations with owners from high corruption countries evade more tax in the U.S. The *CPI* is one of the most commonly used indicator of corruption worldwide and has been employed in several academic studies (e.g. Djankov et al. (2002), Barth et al. (2009), DeBacker, Heim, and Tran (2015)).

The second measure, *Cheat on Tax*, is from the World Values Survey (WVS). It measures the tendency of people in a country to disobey rules and laws based on their attitude toward cheating on tax. We choose this cultural value because it is closely related to the behaviour of insider trading. Similar to insider trading, illegal tax evasion is not universally accepted as highly unethical. Tax morale generally reflect individual's social norm of compliance in a country. Alm, Sanchez, and De Juan (1995) use experimental methods and find that higher tax compliance can be attributable to higher "social norm" of compliance. Dyck and Zingales (2004) use this question to measure a country's rate of tax compliance and establish a negative association between tax compliance and private benefits of control. Therefore, the level of tax morale in a society should to some extent be positively correlated with the extent to which insiders linked to foreign acquirers obey their fiduciary duty to the shareholders in their firm. We expect that, among all cross-border deals targeting firms in a given country, the intensity of insider trading prior to the deal announcement should be higher if the acquirer is from a country with social and cultural norms that are more tolerant of illicit activities.

We estimate the same regression model as in the previous section but replace the main explanatory variable with our culture indexes and present the regression results in Table 8. Columns 1and 2 report the results using CPI as the key independent variable, while Columns 3 and 4 show the results for Cheat on Tax. As shown in the table, the coefficients on both *CPI* and *Cheat on Tax* are positive and significant, suggesting that the level of insider trading prior to the announcements of cross-border deals is significantly negatively related to the acquirer country's level of corruption and tax morale.

3.5. Insider trading activity within and outside the US-Canada Group

In this section, we examine the level of insider trading in cross-border deals between countries that are closely connected, specifically the United States (US) and Canada. Due to geographic and historical conditions, the US and Canada share not only the longest international border, but also deeply integrated economies in the world. They enjoy the largest bilateral trade and the closest investment relationship in the world. For example, there is no tariff on most goods passed between the two countries since 1987. More than $1.8 billion bilateral trade a day in goods and services take place cross the border of US and Canada. The two countries also work closely from federal level to local level in security and law enforcement. Given the close relations and thus cooperation between the two counties, our hypothesis suggests that cross-border deals between these two countries should not display significantly higher insider trading activity compared to domestic deals.

To test this conjecture, we limit our sample to deals with targets only in these two countries while no restrictions are imposed on the acquirer country. We create two indicator variables to represent deals within and outside the US-Canada group. Specifically, *US_CA_Group* is a dummy variable that equal to one if a deal is a cross-border deal and the foreign acquirer is from US or

Canada, and zero otherwise. *Non_US_CA_Cross* equals one if a deal is a cross-border deal but the foreign acquirer is from neither the U.S. nor Canada, and zero otherwise. We estimate a regression where the dependent variable is a measure of abnormal trading activity and the key independent variables are these two dummies. Table 9 shows the regression results of this analysis. Consistent with our prediction, the results show that cross-border deals between US and Canada are not associated with higher abnormal trading activity than domestic deals, while cross-border deals involving acquirers from outside the U.S. and Canada exhibit significantly higher level of insider trading than domestic deals. This finding provides further evidence that closer legal integration between two countries reduces the difference in the level of insider trading between cross-border and domestic deals.

3.6. Informed Option Trading in U.S. Target Firms

Prior to M&A announcements, insider traders are also likely to trade on the options market. Cao, Chen and Griffin (2005) find that the options market displaces the stock market for information-based trading the periods immediately preceding takeover announcements but not in normal times. Augustin, Brenner and Subrahmanyam (2019) find that informed trading exists in 25% of the takeovers in their sample but only 9% of them also exhibit abnormal stock returns. They also find the options volume is predictive of stock volume, but stock volume is not predictive of options volume. We lastly examine if cross-border deals are associated with a higher level of suspicious option trading prior to the deal announcement.

We obtain daily option trading data from the OptionMetrics database, which is only available for U.S. firms. We match this data with all deals in which the target firm is a U.S. public firms. Of the 4,466 M&A deals targeting U.S. firms in our sample, only 1,209 deals have available option trading data. Thus, the subsample for this analysis covers 1, 209 deals with available option

trading data from 1990 - 2017. We focus on the daily trading volume of all call options because buying calls generate higher returns than selling puts when the underlying stock price goes up. Augustin, Brenner and Subrahmanyam (2019) find that among the 408 litigated insider trading cases of insider trading in the U.S. by the SEC and DOJ, 258 are investigated as a results insider trading in stocks only, and 150 involve insider trading in options. In cases involving insider trading in options, insiders almost exclusively purchased OTM call options and only 6% of the cases involving the sales of put options. They also find that the insider trades are primarily executed in short-dated options, with an average time to expiration of 1.87 months. The litigated trades are on average approximately 7% out of money, executed within the 21-day period before the announcement. The median trade occurs 11 days prior to the announcement. If a trader has accurate inforamtion about the timing of the public announcement of the deal, then short-dated options that expire shortly after the announcement date should be preferred to long-dated options. Hence, we only include options that expire within sixty days[13]. Following Acharya and Johnson (2010), we estimate the benchmark level of daily call volume using a regression that includes a constant, lagged option volume, lagged volume and returns of the underlying stock, and contemporaneous market volume using daily data 90 days prior to the announcement date. Similar to the stock data, we calculate *Sum*, the summation of the estimated daily standardized residuals, and *Max*, the maximum of the standardized residuals in windows [-5, -1]. We also employ a second measure that scales option volume by delta. We calculate *Sum* and *Max* for delta scaled option volume. The data for delta is obtained from the OptionMetrics database using end-of-day pricing and implied volatilities based on a binomial model.

[13] We have also investigated trading activities for options with maturity less than 30 days, 90 days, one year, and all types of options. We obtain very similar results.

Table 10 reports the regression results for evidence of informed option trading. The results are similar to those on the stock markets. Cross-border deals are preceded by significantly higher level of suspicious option trading activity compared to domestic deals, controlling for a number of control variables and fixed effects. This indicates that foreign informed traders also take advantage of their private information by trading call options in the option market.

4. A Quasi-Natural Experiment

Foreign insider traders face lower legal risk than their domestic counterparties because of two barriers to cross-border law enforcement. The first is information sharing between the jurisdiction where the illegal trades occurred and the jurisdiction where the critical information for investigation is based at. The second is extraditing a foreign offender to the target country to face trial. Closer cooperation and more effective information exchange between the foreign and the domestic authorities can help to reduce these barriers and thus help to level the legal field for foreign and domestic insiders. In this section, we explore a change in the level of information sharing and enforcement cooperation among securities regulators around the world to rule out the alternative explanations for our findings that the higher level of abnormal trading in cross-border deals is driven by more accurate market anticipation of deal announcements based on legitimate public information.

4.1. Background of International Cooperation in Securities Law Enforcement

Securities regulators have recognized at the early stage of globalization that the combination of globalization and technological advances can facilitate both cross-border flow of capital and cross-border flow of fraud. As a result, regulators must be able to gather and share information with their regulatory partners worldwide to detect, investigate and prosecute fraud effectively. The SEC attorneys wrote “the reality in a global market is that for a jurisdiction to

ensure that it has an effective domestic enforcement regime, the jurisdiction must provide as well as receive international cooperation." The SEC shares information through a variety of formal and informal mechanisms. Each year, the SEC makes a large number of request for assistance to foreign jurisdictions and has brought an increasing number of cases against foreign individuals and companies based on the information obtained from foreign regulators.

The most important element in determining whether a cooperation is possible is the underlying legal authority of securities regulators to obtain and provide information. There are two dimensions to this. First, jurisdictions must have domestic legislation enabling domestic regulators to gather and share information with foreign securities regulators. However, many jurisdictions only have limited or no ability to cooperate across borders. For example, in some jurisdictions, domestic legislation does not allow domestic regulators to share certain information with their foreign partners. Since cooperation is often reciprocal, a jurisdiction which cannot share information under its control requested by foreign jurisdictions tend not to get information sharing from the other jurisdictions either when it requests help across-borders.

The U.S. is an outlier in this regard because the SEC has broad domestic authority to gather information on behalf of foreign securities regulators. The SEC's power to assist foreign securities regulators is as broad as the SEC's domestic investigative power. The SEC may seek voluntary production of information and documents on behalf of a foreign regulators. The SEC also has the power to compel information and documents from individuals (whether regulated by the SEC or not), brokerage firms, banks, telephone companies, internet service providers, and other third parties.

Another key dimension in information sharing is the ability of the receiving authority to maintain the confidentiality of the information provided. The ability to use foreign information for

routine regulatory and enforcement purposes is another key element in any information sharing arrangement.

International multilateral initiatives play an important role in raising the standard of information sharing on a global scale. Indeed, they can help securities regulators obtain the necessary domestic legal authority to share information with foreign securities regulators. In 2002, the International Organization of Securities Commissions (IOSCO) initiated a move for its member countries to enter a multilateral memorandum of understanding, the official name of which is Multilateral Memorandum of Understanding Concerning Consultation and Cooperation and the Exchange of Information (MMoU). It is the first global multilateral arrangement for improving enforcement cooperation among securities regulators. This MMoU sets a standardized process for cross-border cooperation and facilitates information exchange between signatories in the process of investigating offences relating to illegal activities in the securities markets.[14] According to the MMoU, signatories can make requests to one another for information and documents held in files or transaction records in bank and brokerage accounts to be used in civil or administrative proceedings. A person's statement or testimony could also be taken if required. Distinct from earlier bilateral arrangements, the MMoU rigorously reviews the ability of a legal authority to cooperate before it can officially become a signatory, which creates incentives for jurisdictions which are unable to engage in effective information sharing with foreign authorities to change domestic legislation to gain the ability. The entry into the MMoU is not automatic and requires a country to apply and be approved. As a result, countries entered into the MMoU in a staggered fashion.

[14] Information requests can be made in the process of investigating a list of offences relating to insider dealing, market manipulation, the issuance and sale of securities and derivatives, market intermediaries and exchanges. A full list of the specific types of offences is set out in Paragraph 4 of the MMoU.

The MMoU should strengthen the ability of securities regulator in one signatory country to enforce its domestic insider trading laws on residents of another signatory country. According to the IOSCO website, the number of information requests made under the MMoU has increased dramatically from only 56 requests in 2003 to 4,803 requests in 2017. This suggests that MMoU does have significant effects on the information exchange and cooperation among securities regulators, a significant part of the growth is due to the expansion of the universe of signatories. However, since memorandums of understanding are not mandatory, whether the MMoU is effective at raising the legal risk faced by foreign insiders is still an empirical question. To the extent that it does, then the MMoU offers an ideal empirical setting to test whether the higher level pre-bid abnormal trading in cross-border deals we document is driven by the differential legal risk faced by domestic and foreign insiders. First, entering into the MMoU by a country pair should only affect illegal insider trading. This provides a sharp test of whether our baseline finding is driven by illegal insider trading or informed trading based on legitimate information. Second, countries entered the MMoU in a staggered fashion after its initiation in 2002. For example, the U.S. Securities and Exchange Commission (SEC) and the Australian Securities and Investments Commission (ASIC) were among the first to enter the MMoU in 2002, while the U.K. Financial Conduct Authority (FCA) signed the MMoU in 2003, the China Securities Regulatory Commission (CSRC) in 2007 and the Japanese Financial Services Agency (FSA) in 2011. This allows us to construct powerful counterfactuals. The MMoU affects cross-border deals in which both the acquirer and target countries are signatories of the MMoU but does not affect cross-border deals in which only one or neither country is a signatory of the MMoU. Furthermore, since target firms in a country can be acquired by firms from different countries, we can fully control for any time-varying omitted variables that are related to changes in insider trading in a target country's

market while still identify the MMoU effect from variations in the years in which both the acquirer and target countries entered the MMoU across deals involving target firms from the same country. The MMoU effect is identified from changes in insider trading in cross-border deals between an acquirer country and a target country from before to after both countries entered the MMoU relative to that in other deals (both cross-border and domestic) involving target firms from the same country. Lastly, because the decisions to enter the MMoU are made by governments, they are exogenous to decisions to trade illegally by insiders except through the change in legal risk faced by insiders.

We estimate the effect of MMoU in a regression that exploits the staggered treatments of acquirer-target country pairs by the entry into the MMoU by both countries as follows:

$$y_k = \gamma Cross_k * MMoU_{ijt} + \theta X_k + \mu_{ij} + \tau_{jt} + \varepsilon_k$$

where k indexes deals, i indexes acquirer countries, j indexes target countries, and t indexes years. The dependent variable y_k equals to the level of abnormal trading in a preannouncement window for deal k. $Cross_k$ equals 1 when the deal is a cross-border deal and 0 otherwise. $MMoU_{ijt}$ equals 1 if both country i and j have entered the MMoU by year t and 0 otherwise. X_k is a vector of target firm and deal characteristics. When i does not equal j, μ_{ij} represents time-invariant fixed effects for cross-border deals between acquirer country i and target country j. When i equals j, μ_{ij} represents the time-invariant fixed effects for domestic deals in the target country j. Together, they control for time-invariant differences in the level of abnormal trading for domestic deals across different countries and for cross-border deals between different acquirer-target country pairs. τ_{jt} represents target country by year fixed effects. They control for any unobserved time-varying shocks to insider trading in target country j, for example, changes in the

strictness of insider trading law enforcement by target country regulators which affect the level of abnormal trading in the preannouncement period of both domestic and cross-border deals. The coefficient of interest is γ. It measures the average change in y_k from before to after both countries i and j enter the MMoU relative to other cross-border deals involving target firms in country j but where the acquirer country did not experience a change in compliance with the MMoU in the year as well as all domestic deals in country j in the year. If the MMoU is effective at deterring insider trading by foreign insiders and the higher level of abnormal trading before the announcement of cross-border deals is partially driven by illegal insider trading by foreign insiders, then we expect γ to be negative and statistically significant.

Table 11 report the regression results. The dependent variable in column 1 and 2 is the SUM and MAX measure of abnormal stock returns over the preannouncement window (-5 day, -1 day) respectively. In both columns, the coefficient estimate of γ is negative. The coefficient is statistically significant at the 5% level for both measures of abnormal trading. In unreported results, we find that coefficient estimate of γ is also negative for both the SUM and MAX measure over the (-10 day, -1 day) window but the estimate is not statistically significant at conventional levels. This is probably due to the larger noises in the dependent variable over the longer window which makes it difficult to detect the effect of the MMoU. The fact that we are able to detect a significant effect of MMoU on the difference in the level of abnormal trading over the 5-day event window between domestic and cross-border deals in the same target country provides strong support to our hypothesis that barriers to cross-border law enforcement is a driver of the higher level of pre-bid insider trading in cross-border deals than domestic deals.

5. Additional Analyses

5.1. Using Alternative Insider Trading Metric: Price Run-up Ratio before M&A Announcements

Our current measures of insider trading are based on abnormal price run-ups during the preannouncement periods. An alternative way to measure insider trading is to look at the fraction of the total price increase of target stock that is realized before the public announcement of the deal. Insider trading during the preannouncement period should cause a greater fraction of the total event impact to be realized prior to the takeover announcement. This suggests that the simple run-up ratio, calculated as the ratio of the abnormal return in the preannouncement period to the total abnormal return from both the preannouncement and announcement periods, can be used as a measure of insider trading. Unfortunately, this simple ratio has undesirable properties as discussed in Schwert (1996). The main issue is that measurement errors in the total return can cause the denominator of the ratio to be 0 or flip its sign. To address this measurement error problem, we follow Del Guercio, Odders-White, and Ready (2017) and use a two-stage regression approach to estimate the run-up ratio and test if the average run-up ratio for cross-border deals is significantly greater than that for domestic deals.

In the first stage, we estimate the expected total return impact of a deal as the fitted value from the following regression:

$$\tilde{r}_{ijt}^{tot} = \sum_{m=1}^{M} d_m Z_{im} + d_j + d_t + \varepsilon_{ijt}$$

where $\tilde{r}_{ijt}^{tot}$ is the total market-adjusted return from deal i targeting firm in country j in year t. It is calculated as the sum of daily residuals from a market model over event days -20 through +1. The market model parameters are estimated using daily returns over event days -146 through -21 and the market index is the target country's market index in the Datastream database. Following

Del Guercio, Odders-White, and Ready (2017), we require positive volume on both the trading day and the previous trading day for a trading day to be included in the estimation, and we exclude trading days with an absolute return exceeding 25%. If the number of trading days after applying these filters is fewer than 100, we calculate the residuals over the next 22 days by subtracting the daily market index return directly from the target firm's daily stock return. Otherwise, we sum the daily residuals from the market model over the next 22 trading days. Z_{im} terms are observable characteristics of the target firm and the deal. d_j and d_t are target country and year fixed effects respectively.

The second-stage regression gives the estimate of interest and is specified as follows:

$$\tilde{r}_{ijt}^{pre} = a\left[\theta_1 \tilde{r}_{ijt}^{tot} + (1-\theta_1)E[\tilde{I}_i]\right] + b\left\{Cross_i\left[\theta_1 \tilde{r}_{ijt}^{tot} + (1-\theta_1)E[\tilde{I}_i]\right]\right\} + \sum_{k=1}^{K} c_k\left\{X_{ik}\left[\theta_1 \tilde{r}_{ijt}^{tot} + (1-\theta_1)E[\tilde{I}_i]\right]\right\} + \theta_2(\tilde{r}_{ijt}^{tot} - E[\tilde{I}_i]) + d_j + d_t + \varepsilon_{ijt}$$

where $\tilde{r}_{ijt}^{pre}$ is the total market-adjusted pre-announcement returns over event days -20 to -1 for deal i targeting firm in country j in year t. It is calculated in the same way as $\tilde{r}_{ijt}^{tot}$ except the daily residuals are summed over days -20 to -1. d_j and d_t are target country and year fixed effects respectively. The first independent variable in this regression is the weighted average event impact, $\theta_1 \tilde{r}_{ijt}^{tot} + (1-\theta_1)E(\tilde{I}_i)$, where $E(\tilde{I}_i)$ is the expected total event return estimated from the first-stage regression and the weighing factor, θ_1 ,equals to the ratio of the variance of announcement impacts to the variance in the total returns over the 20-day pre-announcement period and the 2-day announcement period. Its coefficient, a, equals to the average price run-up ratio for domestic deals. The second independent variable is the interaction between the weighted average event impact with a cross-border deal indicator, $Cross_i$. The coefficient of this second term, b, is our variable of interest. It measures the average incremental price run-up ratio for cross-border deals

above domestic deals. A positive b indicates that cross-border deals are preceded with more insider trading than domestic deals. The next k independent variables are constructed by interacting the weighted average event impact with each of the control variables, X_{ik}, which are demeaned so that the coefficient estimate of a can be interpreted as the average run-up ratio for domestic deals in the sample. The last independent variable is the difference between the realized total return impact and the expected total return impact for the event.

Table 12 reports the estimates from the second-stage regression for the full sample and the matched sample of cross-border and domestics deals. In the full sample (Column 1), the coefficient estimate for a is 0.462, which means that the average run-up ratio is 46.2% for domestic deals in our international sample of M&As. The coefficient of interest is b. Consistent with more insider trading before the announcements of cross-border deals than domestic deals, the coefficient estimate for b is positive and statistically significant at the 1% level. The magnitude of the coefficient estimate suggests that the average run-up ratio for cross-border deals is about 6.5% (0.038/0.462=.065) higher than domestic deals at 53%. Column 2 reports the estimates from the matched sample, whose size is about 60% smaller due to the drop of unmatched deals. Although the smaller sample size reduces the power of the test, we continue to find that cross-border deals are associated with a higher average run-up ratio than domestic deals. The average run-up ratio for cross-border deals is 4.4% higher than domestic deals and the difference is statistically significant at the 10% level.

5.2. Insider Trading Before Earnings Surprises

We argue that the difference in the level of pre-bid abnormal trading between cross-border and domestic deals is mainly driven by foreign insiders associated with foreign acquirers. Our inference is based on the fact that target firms in both the cross-border and domestic deal we

compare insider trading are domestic firms and thus their insiders are subject to similar legal risk. As a result, the difference in legal risk of insider trading is mainly on the side of insiders associated with the acquirers. A concern in this inference is that cross-border deal targets can be systematically different from domestic deal targets. Although we control for observable target and deal characteristics in regressions and even use propensity score matching to match cross-border and domestic deals, there can still be unobserved differences between target firms of cross-border and domestic deals. For example, cross-border target firms may be more closely followed by analysts and investors, as a result, some investors are able to predict price moving news ahead of public announcements based on legitimate sources of information. In addition, cross-border target firms may have more serious insider trading problems than domestic deal target firms to start with, in which case, it is the target insiders that drive the difference in insider trading between cross-border and domestic deals. In this section, we examine abnormal trading prior to the announcements of another type of major corporate news by target firms in our sample, the earnings announcements. If target firms of cross-border deals endogenously exhibit a higher level of abnormal trading prior to major corporate news announcements, we expect to observe similar differences prior to earnings announcements.

The earnings announcements we examine is the announcement on annual earnings made at the end of the fiscal year prior to the merger announcement in our sample. Unlike merger announcements which are almost always positive news for the target stock, earnings surprises can be either positive or negative. Earnings surprise is measured as the difference between the median analyst earnings forecast and the actual annual earnings per share (EPS), scaled by the closing price on the earnings announcement day. Similar to the how we construct insider trading measures for mergers, we construct a SUM and a MAX measure of abnormal stock returns in the direction

of earnings surprises over the (-5 day, -1 day) event window relative to the earnings announcement date. For example, if the earnings surprise is negative, we add up the negative daily residuals from the market model over the preannouncement window to construct the SUM measure and so on. We then regress the insider trading metrics on

Although we try to account for the difference in target firms between cross-border deals and domestic deals by including a series of target characteristics as controls and fixed effects, our results may still be driven by certain unobservable factors that affect both the choice of target firms by foreign acquirers and pre-announcement abnormal stock trading in these target firms. In this sub-section, we directly gauge this concern by performing a falsification test. If target firms of cross-border deals endogenously exhibit a different level of pre-announcement insider trading, we would observe such pattern before not only merger announcements but also the other corporate announcements.

To test this, we look at annual earnings announcements, which also convey important corporate information and often lead to large price movement that potentially induce insider trading. Specifically, for each target company in our sample, we construct our insider trading proxies in advance of its annual earnings announcements one-year prior to the merger announcements. Unlike merger announcements which are mostly positive news for the target, earnings announcement can contain either good or bad news. Some of the good news or bad news is anticipated by the market and thus has already being impounded in the stock price before the earnings announcement. Market reactions to earnings announcement are toward the unanticipated component. Insider trading would mostly occur according to how much unexpected information the earnings figures contain, i.e. earnings news unanticipated by the market. Therefore, we regress our insider trading measure with the interaction of the cross-border dummy and proxy for earnings

surprise to compare the levels of insider trading activities corresponding to earnings surprise before public earnings announcements. Earnings surprise is measured as the difference between the median of analysts' earnings forecast and the actual annual earnings per share (EPS), scaled by the closing price on the announcement day. We control for the same set of target characteristics and fixed effects as in the baseline model as well as variables commonly used in the earnings announcement literature, including the inverse of the closing stock price one-month before the earnings announcement, the number of analyst forecasts for annual EPS before the earnings announcement, negative earnings indicator, and the number of days between the fiscal year end and the earnings announcement date. Data on analyst forecasts and earnings announcements are obtained from the I/B/E/S database.

Table 13 reports the results of the falsification test. Columns 1 and 2 shows the results using the Sum and Max measures of insider trading as the dependent variables. The coefficients of Cross×Surprise in all specifications are statistically insignificant and their magnitude are close to zero. In Column 3, we perform the two-stage regression model for price run-up in advance of earnings announcements and report the second-stage regression results. The coefficient on *Cross* remains statistically insignificant, suggesting that target firms of cross-border deals do not show significantly different level of insider trading depending on earnings news before earnings announcements compared to domestic deals. Therefore, our baseline finding is unlikely driven by potential unobservable features in cross-border targets that endogenously affect the level of insider trading.

6. Conclusions

The combination of cross-border M&As and barriers to cross-border law enforcement creates a situation where foreign insiders can trade on insider information on the target country’s

market without the same level of fear as domestic insiders. We find that this has led to more prevalent and aggressive insider trading in target firm securities before the announcements of cross-border deals than domestic deals. Specifically, we find that the level of abnormal trading in target firm stocks is significantly higher before cross-border deal announcements than domestic deals. In a subsample of M&As targeting U.S. firms with exchange-traded options, we find that that cross-border deals are associated with significantly higher level of suspicious call option trading activity compared to domestic deals. These findings are robust to a batch of robustness checks.

To attribute the higher level of insider trading before the announcement of cross-border deals to trading by insiders linked to foreign acquirers, we exploit staggered exogenous increases in cooperation between securities regulators in the acquirer and the target countries. These shocks should only affect the incentives of foreign traders. We find that pre-bid insider trading in target stocks significantly fall after both countries of a cross-border deal signed the Multilateral Memorandum of Understanding (MMoU) on information exchange and assistance sponsored by International Organization of Securities Commissions relative to cross-border deals which did not undergo this shock in the year. We also examine variations in the difference in the level of insider trading between cross-border and domestic deals with target and acquirer country characteristics. Focusing on legal institutions and culture norms in acquirer countries, we find that the level of pre-bid insider trading is significantly lower when the acquirer is from a country with strong rule of law and social and culture norms that are less tolerant of tax avoidance and corruption. On the target country side, we find that the difference in level of insider trading between cross-border and domestic deals is more pronounced when the target country has strict insider trading law

enforcement or strong rule of law, consistent with insider trading law being more binding for domestic insiders in these countries.

Overall, our results are consistent with an equilibrium where foreign insiders have greater incentives than domestic insiders to trade directly or tip others to trade on inside information before the announcement of M&A deals due to barriers to cross-border law enforcement. Our evidence shows an important way in which cross-border M&As have negatively affected the integrity of the financial markets around the world and raises an important question for regulators to address in the era of globalization. Our evidence on the impact of globalization on insider trading is not only of interest to researchers studying the price discovery process before M&As announcements but also to regulators and policy makers around the world. To our knowledge, we are the first to explicitly study the consequences of a divergence between fast economic integration and slow progress in legal cooperation in the globalization process. Insider trading before the announcement of cross-border M&As is just one manifestation of potentially many other negative consequences that have not been systematically known yet. Future research can expand on our framework and identify other activities that regulators and policy makers should pay close attention to and devise ways to solve in the process of globalization.

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Table 1: Distribution of Cross-border Deals by Year

This table presents the number and total value (in millions of US$) of cross-border deals and their proportions in the total number and value of both domestic and cross-border deals by year. The data are obtained from the SDC database from 1990 to 2017. Cross-border deals are defined as M&A deals where the bidder and the target are from different countries, while domestic deals are defined as those where the bidder and the target are in the same country.

	Number of Deals			Deal Value		
Year	All	Cross-border Deals	% Cross-border Deals	All	Cross-border Deals	% Cross-border Deals
1990	53	13	24.53%	13,426.90	3,866.40	28.80%
1991	72	8	11.11%	14,827.77	1,402.61	9.46%
1992	61	6	9.84%	15,064.59	1,204.19	7.99%
1993	60	7	11.67%	12,308.15	671.58	5.46%
1994	72	9	12.50%	14,768.85	2,080.65	14.09%
1995	154	24	15.58%	34,342.45	5,771.02	16.80%
1996	138	13	9.42%	32,612.40	3,205.04	9.83%
1997	246	39	15.85%	83,559.72	13,220.42	15.82%
1998	445	63	14.16%	104,730.16	17,251.86	16.47%
1999	661	101	15.28%	151,888.60	23,114.38	15.22%
2000	552	113	20.47%	118,247.59	23,678.20	20.02%
2001	448	92	20.54%	74,074.30	22,178.79	29.94%
2002	368	67	18.21%	59,335.96	14,612.49	24.63%
2003	451	68	15.08%	75,229.23	11,496.88	15.28%
2004	418	74	17.70%	83,747.53	17,995.99	21.49%
2005	518	110	21.24%	101,809.61	26,049.50	25.59%
2006	609	137	22.50%	131,097.89	29,833.64	22.76%
2007	645	179	27.75%	151,756.55	49,184.07	32.41%
2008	565	151	26.73%	103,177.40	34,447.27	33.39%
2009	515	116	22.52%	69,917.23	18,116.72	25.91%
2010	530	140	26.42%	96,993.78	22,326.57	23.02%
2011	491	133	27.09%	97,649.43	33,184.10	33.98%
2012	465	124	26.67%	87,340.43	24,256.35	27.77%
2013	408	116	28.43%	69,516.58	22,597.52	32.51%
2014	418	123	29.43%	85,408.76	31,839.59	37.28%
2015	453	155	34.22%	81,976.05	31,046.56	37.87%
2016	398	141	35.43%	87,375.12	28,989.96	33.18%
2017	386	132	34.20%	83,614.49	28,882.40	34.54%
Total	10,600	2,454	23.15%	2,135,797.50	542,504.75	25.40%

Table 2: Sample Distribution by Country

This table presents the total number of deals and the total number of cross-border deals by target country and acquirer country. The sample covers the period from 1990 to 2017. M&A deals data are obtained from the SDC database.

	Target Country		Acquirer Country	
Country	N of All	N of Cross-Border	N of All	N of Cross-Border
United States	4,466	726	4,240	500
Canada	866	382	846	362
United Kingdom	1,022	299	957	234
Australia	685	209	547	71
Germany	187	83	188	84
France	228	79	232	83
Singapore	197	71	195	69
Sweden	195	69	179	53
Hong Kong	242	65	286	109
Norway	128	57	87	16
Japan	942	36	971	65
Malaysia	188	35	177	24
Netherlands	88	34	149	95
Denmark	63	30	52	19
Poland	75	29	49	3
Switzerland	53	27	74	48
India	144	26	142	24
New Zealand	53	23	40	10
South Africa	100	20	104	24
Belgium	34	16	52	34
Finland	34	16	35	17
Taiwan	108	15	103	10
Thailand	92	15	78	1
Israel	20	14	50	44
Italy	69	13	82	26
South Korea	158	13	155	10
Indonesia	18	11	17	10
Spain	34	10	52	28
Greece	26	9	19	2
Brazil	24	7	28	11
Austria	15	5	22	12
Chile	17	5	13	1
Philippines	29	5	30	6
China			150	150
Ireland			41	41
Luxembourg			36	36
Mexico			16	16
United Arab Emirates			15	15
Iceland			12	12
Cyprus			11	11
Mauritius			11	11
Russia			11	11
Bahamas			5	5
Colombia			5	5
Qatar			5	5

Argentina	3	3
Turkey	3	3
Bahrain	2	2
Kazakhstan	2	2
Lithuania	2	2
Malta	2	2
Papua New Guinea	2	2
Saudi Arabia	2	2
Vietnam	2	2
Bulgaria	1	1
Egypt	1	1
Estonia	1	1
Ghana	1	1
Jamaica	1	1
Morocco	1	1
Nigeria	1	1
Peru	1	1
Portugal	1	1
Romania	1	1
Slovak	1	1

Table 3: Summary Statistics

This table reports summary of target and deal characteristics by domestic and cross-border deals (Panel A) and univariate comparisons of insider trading metrics between domestic and cross-border deals (Panel B). For each deal, the target country is chosen to be the domestic country. If the bidder is from the target firm's country, the deal is defined as a domestic deal. Otherwise the deal is defined as a cross-border deal. All variables are defined in the Appendix. The last two columns show results from t-tests for differences in means and Wilcoxon rank-sum tests for differences in medians between domestic and cross-border deals. The sample period is 1990-2017. M&A data are obtained from the SDC database. Firm-level financial data are obtained from Datastream and Worldscope. All variables are defined in the Appendix.

Panel A: Target and Deal Characteristics

	Domestic Deals				Cross-border Deals				Domestic minus Cross	
	Mean	Median	SD	N	Mean	Median	SD	N	Mean	Median
Target Characteristics										
Size ($US Million)	174.671	82.63	231.397	8102	207.546	102.616	280.37	2443	-32.875***	-5.429***
Leverage	0.217	0.16	0.224	8146	0.189	0.119	0.223	2454	0.028***	7.348***
BM	1.865	1.292	3.396	8146	2.157	1.429	3.373	2454	-0.292***	-4.618***
Volatility	0.005	0.002	0.008	8146	0.006	0.003	0.01	2454	-0.001***	-9.254***
Turnover	1.259	0.714	1.846	8145	1.174	0.635	2.034	2454	0.085*	4.989***
Amihud	0.007	0	0.035	8146	0.009	0	0.044	2454	-6.690***	-1.686*
Beta	0.515	0.412	0.472	8146	0.554	0.449	0.499	2454	-0.039***	-3.742***
Deal Characteristics										
Premium	34.032	27.39	47.995	8146	40.721	32.065	56.101	2454	-0.125***	-6.13***
Cash	0.512	1	0.5	8146	0.636	1	0.481	2454	-0.002***	-10.854***
Advisors	3.341	3	2.309	8146	4.012	4	2.748	2454	-0.671***	-9.904***
Rumor	0.033	0	0.178	8146	0.037	0	0.189	2454	-0.004	-1.004
Toehold	0.232	0	0.422	8146	0.235	0	0.424	2454	-0.003	-0.345

Panel B: Univariate Comparisons of Insider Trading Metrics between Cross-Border and Domestic Deals

	(-5 day, -1 day)		(-10 day, -1 day)	
	Sum	Max	Sum	Max
Domestic	2.268***	1.466***	4.081***	1.918***
Cross-border	2.375***	1.518***	4.248***	1.992***
Dom. - Cross.	-0.107***	-0.052*	-0.167***	-0.075***
T-stats for Difference	-2.339	-1.717	-2.879	-2.402

Table 4: Differences in Pre-Bid Abnormal Trading Between Cross-Border and Domestic Deals

This table presents results from regression analyses of the difference in level of pre-bid insider trading between domestic and cross-border deals. The sample period is 1990-2017. M&A data are obtained from the SDC database. Firm-level financial data are obtained from Datastream and Worldscope. We construct two metrics of insider trading over two preannouncement event windows following Acharya and Johnson (2010). All variables are defined in the Appendix. In all columns, we include target country by year fixed effects and industry fixed effects. Standard errors are two-way clustered by target country and year. T-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-10 day, -1 day)	
	Sum	Max	Sum	Max
	(1)	(2)	(5)	(6)
Cross	0.173***	0.080**	0.240***	0.095**
	(2.828)	(1.988)	(3.258)	(2.407)
Size	0.106***	0.057***	0.133***	0.044***
	(5.362)	(4.453)	(4.792)	(3.188)
Leverage	0.076	0.024	0.201*	0.067
	(0.763)	(0.344)	(1.732)	(0.940)
BM	-0.007	-0.006	-0.007	-0.008*
	(-0.944)	(-1.165)	(-1.044)	(-1.778)
Volatility	-11.839***	-5.450***	-20.653***	-4.537*
	(-3.570)	(-2.686)	(-4.878)	(-1.943)
Turnover	-0.004	-0.010	-0.007	-0.010
	(-0.293)	(-1.138)	(-0.434)	(-1.238)
Amihud	1.104*	1.011**	1.394	0.920*
	(1.717)	(2.220)	(1.603)	(1.885)
Beta	-0.051	-0.062**	0.068	-0.031
	(-1.186)	(-2.297)	(1.169)	(-1.002)
Premium	0.005***	0.003***	0.009***	0.003***
	(9.000)	(7.432)	(11.977)	(8.862)
Cash	-0.034	-0.013	-0.077	-0.032
	(-0.709)	(-0.409)	(-1.419)	(-1.005)
Advisers	-0.010	-0.009	-0.026**	-0.016**
	(-0.970)	(-1.343)	(-2.116)	(-2.277)
Rumor	0.535***	0.441***	0.598***	0.484***
	(3.588)	(3.935)	(3.609)	(4.552)
Toehold	-0.172***	-0.100***	-0.166**	-0.083**
	(-3.391)	(-3.055)	(-2.319)	(-2.321)
Observations	10,464	10,464	10,464	10,464
Adj. R-squared	0.051	0.039	0.063	0.044

Table 5: Matched Sample Results

This table reports the results for the baseline tests using the matched sample. We match each cross-border deal in our sample with a domestic deal using a propensity score matching (PSM) procedure which matches deals based on all the target- and deal-characteristics we control in the baseline model. Specifically, within the same industry and trading country of the target firm, we match each cross-border deal with the domestic deal that has the closest propensity score to it among those whose propensity score is within a radius of 0.1 of the cross-border deal. Cross-border deals with no matched domestic deals are excluded from the sample. The sample covers the period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. The dependent variables are measures of suspicious heavy trade or unusually large positive price movement following Acharya and Johnson (2010). Detailed definitions of all variables are included in the Appendix. All regression specifications include target country-year fixed effects and industry fixed effects. Standard errors are two-way clustered by country and year. All specifications include target-country-year fixed effects. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-10 day, -1 day)	
	Sum	Max	Sum	Max
	(1)	(2)	(3)	(4)
Cross	0.274***	0.150***	0.334***	0.158***
	(4.340)	(3.541)	(4.275)	(3.596)
Size	0.116***	0.052**	0.165***	0.040*
	(3.597)	(2.411)	(4.125)	(1.760)
Leverage	-0.080	-0.086	0.123	-0.039
	(-0.494)	(-0.790)	(0.613)	(-0.341)
BM	-0.008	-0.001	0.007	-0.002
	(-0.874)	(-0.105)	(0.562)	(-0.258)
Volatility	-7.016	-2.436	-18.837***	-0.937
	(-1.310)	(-0.678)	(-2.844)	(-0.251)
Turnover	-0.005	-0.007	-0.021	-0.001
	(-0.208)	(-0.420)	(-0.712)	(-0.061)
Amihud	2.620**	2.469***	2.730*	1.464*
	(2.116)	(2.974)	(1.783)	(1.694)
Beta	-0.039	-0.013	0.017	-0.031
	(-0.518)	(-0.268)	(0.188)	(-0.606)
Premium	0.005***	0.003***	0.009***	0.004***
	(7.692)	(6.149)	(11.740)	(8.121)
Cash	-0.057	-0.016	-0.196**	-0.049
	(-0.769)	(-0.316)	(-2.144)	(-0.952)
Advisers	0.008	-0.002	-0.027	-0.008
	(0.496)	(-0.160)	(-1.370)	(-0.754)
Rumor	0.458**	0.443***	0.438*	0.452***
	(2.514)	(3.623)	(1.946)	(3.552)
Toehold	-0.087	-0.052	0.111	0.026
	(-1.034)	(-0.927)	(1.070)	(0.451)
Observations	4,147	4,147	4,147	4,147
Adj. R-squared	0.070	0.061	0.091	0.070

Table 6: Variation by Target Country Legal Institutions

This table reports the regression results of interacting cross-border dummy with different proxies of target country insider trading law indexes using the matched sample. We match each cross-border deal in our sample with a domestic deal using a propensity score matching (PSM) procedure which matches firms on all target- and deal-characteristics controlled in the baseline model. Specifically, within the same industry and trading country, we match each cross-border deal with a domestic deal that has the smallest difference in propensity score from the cross-border deal among those with a difference less than 0.1. We drop cross-border deals for which a domestic deal cannot be found using the above procedure. Columns (1)-(4) use sample for the period 1990-2006, while Columns (5)-(6) cover the full sample period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. All variables are defined in the Appendix. Columns 1 through 4 include target country and year fixed effects, while columns 5 and 6 include target country by year fixed effects. All columns include industry fixed effects. Standard errors are two-way clustered by target country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-5 day, -1 day)		(-5 day, -1 day)	
VARIABLES	Sum	Max	Sum	Max	Sum	Max
	(1)	(2)	(3)	(4)	(5)	(6)
Cross × IT Restriction	0.098***	0.077**				
	(2.883)	(2.817)				
Cross × IT Law			0.148***	0.104***		
			(3.350)	(2.981)		
Cross × Rule of Law					0.072*	0.057**
					(1.753)	(2.462)
Cross	-0.012	-0.115	-0.033	-0.088	0.154	0.048
	(-0.050)	(-0.639)	(-0.155)	(-0.610)	(0.790)	(0.648)
Size	0.198***	0.095***	0.198***	0.096***	0.110**	0.051*
	(4.362)	(3.215)	(4.351)	(3.220)	(2.655)	(1.946)
Leverage	0.266	0.173	0.263	0.175	-0.211	-0.119
	(1.211)	(0.933)	(1.202)	(0.938)	(-0.956)	(-0.999)
BM	0.016	0.011	0.016	0.011	-0.013	-0.004
	(1.445)	(1.019)	(1.449)	(1.025)	(-1.544)	(-0.598)
Volatility	-15.187*	-0.444	-14.792*	-0.256	-14.483	-6.934
	(-2.054)	(-0.111)	(-1.963)	(-0.063)	(-1.621)	(-1.199)
Turnover	0.005	0.016	0.004	0.015	-0.029	-0.023
	(0.291)	(1.340)	(0.217)	(1.244)	(-0.684)	(-0.885)
Amihud	5.409	2.463	5.333	2.424	1.393	1.628
	(1.441)	(1.486)	(1.424)	(1.449)	(0.691)	(1.298)
Beta	-0.035	-0.089	-0.037	-0.089	-0.037	-0.026
	(-0.329)	(-1.127)	(-0.340)	(-1.137)	(-0.289)	(-0.308)
Premium	0.007***	0.003***	0.007***	0.003***	0.005***	0.003***
	(7.600)	(4.728)	(7.635)	(4.768)	(5.692)	(2.956)
Cash	-0.054	-0.034	-0.051	-0.030	0.009	0.042
	(-0.701)	(-0.784)	(-0.680)	(-0.704)	(0.103)	(1.144)
Advisors	0.008	0.022	0.008	0.022	0.009	-0.001
	(0.252)	(0.983)	(0.245)	(0.977)	(0.267)	(-0.084)
Rumor	0.544	0.516*	0.544	0.514*	0.524	0.480
	(1.638)	(1.797)	(1.648)	(1.802)	(1.019)	(1.069)
Toehold	0.104	0.234**	0.100	0.231*	-0.076	-0.064
	(0.641)	(2.104)	(0.608)	(2.062)	(-1.320)	(-1.265)
Observations	1,359	1,359	1,355	1,355	3,734	3,734
Adj. R-squared	0.060	0.039	0.061	0.040	0.067	0.053

Table 7: Abnormal Trading Activities and Acquirer Country Legal Institutions

This table reports the regression results of insider trading measures on acquirer country law indexes including Rule of Law, Insider Trading Restriction Index constructed based on the survey responses from the Global Competitiveness Report, and the Insider Trading Law Index from Beny (2005). The sample includes only cross-border M&A deals. Columns (1)-(4) use sample for the period 1990-2006, while Columns (5)-(6) cover the full sample period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. We construct measures of suspicious heavy trade or unusually large positive price movement following Acharya and Johnson (2010). All regression specifications include target-country-year fixed effects and industry fixed effects. Standard errors are two-way clustered by country and year. Standard errors are two-way clustered by country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-5 day, -1 day)		(-5 day, -1 day)	
VARIABLES	Sum	Max	Sum	Max	Sum	Max
	(1)	(2)	(3)	(4)	(5)	(6)
IT Restriction	-0.290**	-0.184**				
	(-2.276)	(-2.219)				
IT Law			-0.281***	-0.188***		
			(-3.366)	(-4.380)		
Rule of Law					-0.184***	-0.148***
					(-3.721)	(-3.619)
Size	0.228***	0.113***	0.218**	0.097**	0.135***	0.065*
	(2.981)	(3.108)	(2.515)	(2.447)	(2.887)	(2.017)
Leverage	-0.026	-0.072	-0.185	-0.144	0.024	-0.032
	(-0.093)	(-0.381)	(-0.652)	(-0.760)	(0.113)	(-0.224)
BM	0.017	0.003	0.016	0.002	-0.003	-0.003
	(0.685)	(0.215)	(0.637)	(0.165)	(-0.284)	(-0.442)
Volatility	-32.435***	-10.454	-33.968***	-11.984	-10.312*	-2.723
	(-3.147)	(-1.595)	(-2.992)	(-1.688)	(-2.048)	(-0.781)
Turnover	-0.004	-0.014	-0.002	-0.010	-0.026	-0.022
	(-0.074)	(-0.449)	(-0.028)	(-0.304)	(-0.835)	(-1.600)
Amihud	2.241	3.044	2.095	2.967	-0.321	-0.101
	(0.333)	(1.160)	(0.305)	(0.983)	(-0.605)	(-0.250)
Beta	-0.078	-0.092	-0.098	-0.100	0.019	-0.004
	(-0.447)	(-0.751)	(-0.563)	(-0.788)	(0.183)	(-0.049)
Premium	0.011***	0.006***	0.011***	0.006***	0.004***	0.002***
	(8.113)	(6.189)	(7.188)	(5.442)	(7.760)	(5.269)
Cash	0.213	0.119	0.177	0.088	-0.025	-0.051
	(1.297)	(1.361)	(0.920)	(0.869)	(-0.297)	(-0.884)
Advisors	-0.040	-0.010	-0.019	0.006	-0.021	-0.015
	(-0.918)	(-0.376)	(-0.465)	(0.233)	(-1.003)	(-1.328)
Rumor	1.095***	0.738*	1.101***	0.740**	0.617	0.501
	(3.014)	(2.033)	(3.110)	(2.097)	(1.653)	(1.572)
Toehold	-0.373	-0.138	-0.379*	-0.158	-0.143	-0.077
	(-1.586)	(-1.072)	(-1.849)	(-1.366)	(-1.339)	(-1.141)
Observations	819	819	774	774	2,253	2,253
Adj. R-squared	0.095	0.080	0.101	0.084	0.072	0.072

Table 8: Abnormal Trading Activities before Cross-border Deal Announcement and Acquirer Country Social Norms

This table reports the regression results of insider trading measures on two measures of social norms: tax morale value and Corruption Perception Index (CPI) in acquirer country. The sample covers the period 1990-2017 and includes only cross-border M&A deals. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. We construct measures of suspicious heavy trade or unusually large positive price movement following Acharya and Johnson (2010). All regression specifications include target-country-year fixed effects and industry fixed effects. Standard errors are two-way clustered by country and year. Standard errors are two-way clustered by country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-5 day, -1 day)	
VARIABLES	Sum	Max	Sum	Max
	(1)	(2)	(3)	(4)
CPI	0.005***	0.004***		
	(3.193)	(3.178)		
Cheat on Tax			0.996*	0.753*
			(1.802)	(1.946)
Size	0.135***	0.065*	0.144***	0.069**
	(2.918)	(2.043)	(2.899)	(2.168)
Leverage	0.030	-0.027	-0.077	-0.072
	(0.143)	(-0.187)	(-0.358)	(-0.493)
BM	-0.003	-0.003	-0.005	-0.006
	(-0.246)	(-0.399)	(-0.477)	(-0.819)
Volatility	-10.284**	-2.696	-10.176	-2.267
	(-2.053)	(-0.781)	(-1.655)	(-0.559)
Turnover	-0.027	-0.023	-0.042	-0.030***
	(-0.845)	(-1.612)	(-1.492)	(-2.877)
Amihud	-0.326	-0.106	-0.570	-0.190
	(-0.614)	(-0.264)	(-1.049)	(-0.428)
Beta	0.020	-0.003	0.033	-0.003
	(0.191)	(-0.040)	(0.320)	(-0.035)
Premium	0.004***	0.002***	0.004***	0.002***
	(7.699)	(5.271)	(7.493)	(5.386)
Cash	-0.021	-0.048	0.024	-0.020
	(-0.258)	(-0.832)	(0.261)	(-0.333)
Advisors	-0.020	-0.015	-0.017	-0.012
	(-1.003)	(-1.334)	(-0.798)	(-1.030)
Rumor	0.618	0.502	0.597	0.480
	(1.637)	(1.555)	(1.624)	(1.542)
Toehold	-0.139	-0.073	-0.147	-0.084
	(-1.320)	(-1.109)	(-1.373)	(-1.192)
Observations	2,253	2,253	2,168	2,168
Adj. R-squared	0.072	0.072	0.070	0.064

Table 9: Insider trading activity within and outside the US-Canada Group

This table reports the results comparing US-Canada cross-border deals and the other cross-border deals with US and Canada targets. The sample includes all deals with targets from either the US or Canada. Each cross-border deal is matched with a domestic deal using the propensity score matching (PSM) procedure. *US_CA_Group* equals to one if a deal is a cross-border deal between the US and Canada, and zero otherwise. *Non_US_CA_Cross* equals one if a deal is a cross-border deal between a US or Canada target and non-US non-Canada foreign acquirer, and zero otherwise. The sample covers the period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. We construct measures of suspicious heavy trade or unusually large positive price movement following Acharya and Johnson (2010). All specifications include interacted target country-year fixed effects and industry fixed effects. Standard errors are two-way clustered by country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	Return	
VARIABLES	Sum	Max
	(1)	(2)
US_CA_Group	0.235*	0.145
	(1.700)	(1.654)
Non_US_CA_Cross	0.483***	0.258***
	(4.738)	(4.491)
Size	0.076	0.020
	(1.228)	(0.514)
Leverage	-0.118	-0.143
	(-0.603)	(-1.107)
BM	-0.002	0.001
	(-0.128)	(0.121)
Volatility	-13.921*	-7.126
	(-1.733)	(-1.221)
Turnover	-0.034	-0.020
	(-1.251)	(-1.017)
Amihud	3.618*	3.190**
	(1.773)	(2.015)
Beta	0.159	0.117*
	(1.598)	(1.796)
Premium	0.004***	0.002***
	(3.818)	(3.217)
Cash	-0.143	-0.054
	(-1.196)	(-0.730)
Advisors	-0.003	-0.001
	(-0.116)	(-0.051)
Rumor	-0.283	-0.165
	(-1.078)	(-0.979)
Toehold	-0.041	0.016
	(-0.300)	(0.201)
Observations	2,126	2,126
Adj. R-squared	0.073	0.061

Table 10: Abnormal Option Trading Activities

This table reports the regression results for abnormal option trading activity. The sample covers deals where the target firm is a US firm with traded equity options data available from the OptionMetrics for the period 1996-2017. M&A deal data are obtained from SDC database. Firm-level financial data are from Datastream and Worldscope. The dependent variables in this table are different measures of abnormal option volume over the (-5 day, -1 day) event window for call options written on a target firm's stock with an expiration date which is within 60 days after the actual deal announcement date. We construct two measures of abnormal option volume: *Sum* equals to the sum of daily residuals from a benchmark model, and *Max* equals to the maximum of the daily residuals from the benchmark model. We estimate a benchmark call option volume for each deal where the dependent variable is daily aggregate volume of call options which expire within 60 days of the deal announcement date and independent variables are a constant, lagged option volume, lagged volume and returns of the underlying stock, and contemporaneous market volume. The benchmark model is estimated using daily stock and option data 90 days prior to the deal announcement date. In columns 3 and 4, we weight each call option series by its delta when calculating the aggregate daily trading volume, where the data for delta is obtained from the OptionMetrics database which calculates it using end-of-day pricing and implied volatilities based on a binomial model. All models include industry and year fixed effects where industries are defined by Fama and French 48 industry definition. Standard errors are two-way clustered by industry and year. T-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	Window (-5, -1)			
	Option Volume		Option Volume Delta	
VARIABLES	Sum	Max	Sum	Max
	(1)	(2)	(3)	(4)
Cross	0.270**	0.220*	0.220*	0.175
	(2.265)	(1.923)	(1.886)	(1.582)
Size	0.298***	0.207***	0.212***	0.139**
	(5.124)	(4.515)	(3.079)	(2.487)
Leverage	-0.290**	-0.252**	-0.178	-0.114
	(-2.304)	(-2.440)	(-1.471)	(-1.309)
BM	0.000**	0.000**	0.000**	0.000*
	(2.300)	(2.226)	(2.497)	(2.045)
Turnover	0.016	0.013	0.009	0.008
	(1.182)	(1.161)	(0.721)	(0.947)
Amihud	-0.007	-0.008	-0.679*	-0.604*
	(-0.294)	(-0.402)	(-1.885)	(-2.078)
Beta	0.238*	0.192**	0.197	0.147
	(1.941)	(2.153)	(1.526)	(1.582)
Volatility	-7.596	-7.369	-7.420	-7.252
	(-1.264)	(-1.486)	(-0.852)	(-1.063)
Premium	0.002**	0.001*	0.003	0.002
	(2.325)	(1.796)	(1.507)	(1.303)
Cash	-0.093	-0.066	-0.030	-0.027
	(-0.631)	(-0.585)	(-0.205)	(-0.243)
Advisors	0.006	0.016	0.008	0.015
	(0.208)	(0.687)	(0.307)	(0.689)
Rumor	0.692**	0.542**	0.543**	0.376
	(2.477)	(2.181)	(2.146)	(1.439)
Toehold	-0.173	-0.092	-0.114	-0.022
	(-1.179)	(-0.773)	(-0.724)	(-0.159)
Observations	1,209	1,209	1,113	1,113
Adj. R-squared	0.134	0.103	0.140	0.122

Table 11: The effect of MMoU on preannouncement insider trading in cross-border deals

This table examines how an increase in cross-border cooperation among regulators after the entry into the IOSCO Multilateral Memorandum of Understanding Concerning Consultation and Cooperation and the Exchange of Information (MMoU) affects the level of insider trading before cross-border M&A announcements. The MMoU is a global multilateral arrangement that facilitates information exchange between signatories in the process of investigating offences relating to illegal activities for the purpose of regulatory enforcement in the securities markets. The sample covers the period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. The dependent variables are the SUM and MAX measure of insider trading over the event window (-5 day, -1 day) constructed following Acharya and Johnson (2010). MMoU is an indicator for the post period that both the target and acquirer country officially became signatories of the IOSCO MMoU. All other variables are defined in the Appendix. All models include acquirer country*target country fixed effects and target country*year fixed effects. Standard errors are two-way clustered by target country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

VARIABLES	Sum (-5 day, -1 day)	Max (-5 day, -1 day)
	(1)	(2)
Cross*MMoU	-0.226**	-0.116**
	(-2.182)	(-2.433)
Size	0.082**	0.045*
	(2.468)	(1.906)
Leverage	0.075	0.020
	(0.802)	(0.505)
BM	-0.007	-0.005
	(-0.571)	(-0.791)
Volatility	-16.751***	-8.227**
	(-3.936)	(-2.694)
Turnover	-0.001	-0.007
	(-0.029)	(-0.617)
Amihud	2.380**	1.964***
	(2.348)	(3.339)
Beta	-0.046	-0.055
	(-0.534)	(-0.949)
Premium	0.005***	0.003***
	(5.366)	(5.189)
Cash	-0.016	-0.003
	(-0.158)	(-0.057)
Advisors	-0.004	-0.005
	(-0.416)	(-0.671)
Rumor	0.402	0.345*
	(1.453)	(1.801)
Toehold	-0.160**	-0.069
	(-2.344)	(-1.493)
N	10,016	10,016
R-squared	0.211	0.202

Table 12: Price Run-up Ratio Test

This table reports the results of the second-stage regression for price run-up following Del Guercio, Odders-White, and Ready (2017) using the full sample and the matched sample. The dependent variable is the cumulative market-adjusted pre-announcement returns over the 20 days to 1 day prior to the announcement. Run-up Ratio is the coefficient of a factor weighted average of the realized total event return and the expected total event return (the expected total return impact) estimated from the first-stage regression. The weighting factor is calculated as the ratio of the residual variance from the pre-announcement market-model regressions to the sum of residual variance in returns over the 20-day pre-announcement period and the 2-day announcement period from the first-stage regression. All variables in the regression are interacted with the weighted average total event return. Unexpected Total Return is the difference between the realized total event return and the expected total event return estimated using the residuals from the first-stage regression. The sample covers the period 1990-2017. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. Detailed definitions of all variables are included in the Appendix. All regression specifications include target-country and year fixed effects. Standard errors are two-way clustered by country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	Full Sample	Matched Sample
	(1)	(2)
Cross	0.065***	0.084***
	(5.249)	(5.686)
Weighted Average Total Event Return (Run-up Ratio)	0.416***	0.495***
	(8.402)	(6.355)
Size	-0.031***	-0.041***
	(-6.681)	(-5.841)
Leverage	0.101***	0.163***
	(4.443)	(4.499)
BM	-0.001	0.002
	(-0.627)	(0.880)
Turnover	0.021***	0.018***
	(7.335)	(4.504)
Amihud	0.713***	1.945***
	(5.649)	(9.201)
Beta	0.091***	0.111***
	(7.524)	(6.723)
Volatility	-0.599	-6.348***
	(-1.642)	(-9.861)
Premium	0.000	0.000***
	(0.008)	(9.189)
Cash	-0.116***	-0.101***
	(-9.848)	(-5.582)
Advisors	-0.023***	-0.012***
	(-8.612)	(-3.302)
Rumor	0.286***	0.330***
	(7.501)	(6.878)
Toehold	-0.038**	-0.055**
	(-2.361)	(-2.484)
Unexpected Total Return	0.446***	0.398***
	(35.774)	(22.557)
Observations	10,009	4,031
Adj. R-squared	0.385	0.447

Table 13: Insider Trading before Earnings Surprises

This table reports the results from a falsification test based on abnormal trading around earnings announcements of target firms in our matched sample of cross-border and domestic deals. The sample covers the period 1990-2017. Each cross-border deal is matched with a domestic deal using a propensity score matching (PSM) procedure. Earnings announcement and forecast data are from the I/B/E/S database. International M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. The dependent variables in columns 1 and 2 are the SUM and MAX measure of abnormal stock returns over the preannouncement window (-5 day, -1 day) relative to the earnings announcement date constructed following Acharya and Johnson (2010). The dependent variable in column 3 is the total abnormal stock return over the event window (-20 day, -1 day) around the earning announcement date. Column 3 is the second stage of a two-stage regression that is specified to estimate the average price run-up ratio of price run-up over (-20 day, -1 day) to the total return over (-20 day, -1 day). All models include target country by year interaction fixed effects and industry fixed effects. Standard errors are two-way clustered by target country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)	
VARIABLES	Sum	Max
	(1)	(2)
Cross × |Surprise|	-0.003	-0.002
	(-1.476)	(-1.296)
Cross	-0.007	0.032
	(-0.135)	(0.936)
|Surprise|	0.018**	0.011**
	(2.070)	(1.977)
Size	0.001	-0.012
	(0.036)	(-0.679)
Leverage	0.070	0.019
	(0.463)	(0.228)
BM	0.001	0.003
	(0.184)	(0.651)
Volatility	-0.380	-0.224
	(-1.059)	(-1.013)
Turnover	-0.008	-0.006
	(-0.641)	(-0.795)
Amihud	-5.759	-7.076
	(-0.477)	(-0.954)
Price	-0.006	0.001
	(-0.999)	(0.296)
Beta	0.113*	0.055
	(1.810)	(1.528)
Estimates	-0.003	-0.002
	(-0.385)	(-0.415)
Loss	-0.192***	-0.125***
	(-2.914)	(-3.370)
Reporting Lag	-0.001	-0.000
	(-0.621)	(-0.473)
Observations	5,123	5,123
Adj. R-squared	0.110	0.113

Appendix

A1: Variable Definitions

Variable Name	Definition
Insider trading Measures	
Sum	The summation of the daily standardized residuals obtained from a regression specification with a constant, lagged volume and returns, day-of-week dummies, and contemporaneous market volume and returns index using daily data 90 days prior to the merger announcement date following Acharya and Johnson (2010).
Max	The maximum of the standardized residuals from the same regression specification.
Target Firm Characteristics	
Size	The natural logarithm of market capitalization in US dollars.
Leverage	Total debts relative to total assets.
BM	The book value of assets divided by market capitalization.
Volatility	The standard deviation of monthly returns during the previous 12 months before the announcement.
Turnover	The cumulative monthly trading volume during the year divided by the total number of shares outstanding at the beginning of the corresponding period.
Amihud	Log of the average of the Amihud (2002) illiquidity ratio over a one-year period 90 days prior to the M&A announcement.
Beta	The firm beta with respect to country index estimated using daily stock returns over a one-year period 90 days prior to the M&A announcement.
Deal Characteristics	
Cross	A dummy variable equal to one if the acquirer and target of a deal come from different countries, and zero otherwise.
Premium	The bid premium defined as the percentage difference between bid price and the target's stock price four weeks prior to announcement.
Cash	A dummy variable indicating whether the majority (greater than 50%) of the deal proceeds are paid by cash.
Advisor	The total number of advisors worked for the target and acquirer firms in a deal.
Rumor	A dummy variable indicating whether there are rumours about the deal prior to the announcement.
Toehold	A dummy variable equal to one if the acquire has a toehold in the target prior to the announcement of the deal, and zero otherwise.
Country Indexes	
Insider Trading Restriction Index	Insider trading restriction index from the 1996, 1998 and 1999 Global Competitiveness Report based on the following question: "Insider trading is not common in the domestic market (1 = strongly disagree, 7 = strongly agree)".
Insider Trading Law Index	Insider trading law index from Beny (2005).
Rule of Law	Time-varying measure of the power of legal institutions in a country that restricts insider trading in general extracted from the Worldwide Governance Indicators (WGI) constructed by the World Bank last updated in 2013.
Cheat on Tax	The tendency of people to evade tax in a country based on the following question from the World Values Survey (WVS): "Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between (on a scale from 1 to 10): Cheating on taxes if you have a chance".

CPI	The annual Corruption Perception Index published by Transparency International.
Other Variables	
Surprise	The earnings announcement surprise defined as the absolute value of the deviation between the most recent median analysts' earnings forecast and the actual annual earnings per share (EPS), scaled by the most recent closing price.
Price	The inverse of the closing stock price one-month before the earnings announcement.
Estimates	The number of analyst forecasts for annual EPS before the earnings announcement.
Loss	A dummy variable equal to one if annual EPS for the company is negative, and zero otherwise.
Reporting Lag	The number of days between the fiscal year end and the earnings announcement date as reported by the I/B/E/S.

A2: Country Indexes (Mean or a single index)

Country Index	Insider Trading Restriction	Insider Trading Law Index	Rule of Law	Corruption Perceptions Index	Tax Morale Level
Argentina	3.71	NA	-0.30	95	0.23
Australia	5.30	3	1.77	11	0.33
Austria	4.71	2	1.87	23	0.41
Bahamas	NA	NA	1.01	24	NA
Bahrain	NA	NA	0.30	52	NA
Belgium	4.92	3	1.33	16	0.60
Brazil	3.55	2	-0.19	66	0.48
Bulgaria	3.47	NA	-0.07	66	0.37
Canada	5.01	4	1.79	10	0.31
Chile	4.43	NA	1.37	22	0.34
China	3.41	NA	-0.37	89	0.42
Colombia	3.58	NA	-0.42	85	0.23
Cyprus	NA	NA	1.05	31	0.29
Denmark	5.69	3	1.91	1	0.33
Egypt	3.67	NA	-0.18	85	0.26
Estonia	NA	NA	1.36	27	0.49
Finland	5.12	3	1.98	3	0.43
France	4.58	4	1.41	27	0.50
Germany	5.13	3	1.67	13	0.41
Ghana	NA	NA	-0.34	56	0.16
Greece	3.46	2	0.73	66	0.52
Hong Kong	4.14	3	1.51	19	0.38
Iceland	4.14	NA	1.88	13	0.41
India	3.15	2	0.02	78	0.48
Indonesia	3.24	2	-0.59	95	0.21
Ireland	5.06	3	1.70	19	0.42
Israel	3.98	NA	0.96	36	NA
Italy	3.73	3	0.56	66	0.41
Jamaica	NA	NA	-0.48	78	NA
Japan	5.05	2	1.34	16	0.17
Kazakhstan	NA	NA	-0.55	109	0.45
Lithuania	NA	NA	0.79	38	0.62
Luxembourg	5.74	3	1.83	9	0.51
Malaysia	3.59	2	0.53	47	0.59
Malta	NA	NA	1.21	41	0.19
Mauritius	3.68	NA	0.92	44	NA
Mexico	3.39	1	-0.57	92	0.34
Morocco	NA	NA	0.24	72	0.17
Netherlands	4.82	3	1.80	8	0.42
New Zealand	5.41	NA	1.87	2	0.38
Nigeria	NA	NA	-1.08	115	0.47
Norway	4.33	1	1.92	6	0.50
Papua New Guinea	NA	NA	-0.92	120	NA
Peru	3.80	NA	-0.66	78	0.40
Philippines	3.20	2	-0.40	78	0.59
Poland	3.94	NA	0.72	34	0.47
Portugal	4.20	3	1.17	31	0.43

Qatar	NA	NA	0.91	27	NA
Romania	NA	NA	-0.01	66	0.38
Russia	3.03	NA	-0.89	115	0.56
Saudi Arabia	NA	NA	0.20	52	NA
Singapore	5.41	3	1.66	7	0.42
Slovak	NA	NA	0.47	49	0.45
South Africa	3.79	2	0.11	62	0.52
South Korea	3.88	4	0.96	41	0.28
Spain	4.25	3	1.15	36	0.41
Sweden	5.14	3	1.88	4	0.46
Switzerland	4.92	3	1.88	6	0.42
Taiwan	3.23	3	1.02	34	0.37
Thailand	3.59	3	-0.01	78	0.53
Turkey	3.61	NA	-0.03	59	0.13
United Kingdom	5.32	3	1.69	14	0.38
United States	5.13	4	1.55	19	0.32
United Arab Emirates	NA	NA	0.48	25	NA
Vietnam	6.35	NA	-0.42	103	0.19
Mean	4.29	2.73	0.71	46	0.39
Standard deviation	0.84	0.76	0.92	33	0.12

A3: Descriptive Statistics of the Matched Sample

	Domestic Deals				Cross-border Deals				Domestic minus Cross	
	Mean	Median	Stdev	N	Mean	Median	Stdev	N	Diff. in Mean	Diff. in Median Rank Test
Target Characteristics										
Size ($USMillions)	175.412	85.943	219.113	2136	196.146	99.033	262.89	2138	-20.734***	-2.539**
Leverage	0.176	0.104	0.205	2143	0.182	0.112	0.215	2143	-0.007	-0.373
BM	2.369	1.537	3.696	2143	2.11	1.425	3.121	2143	0.258**	2.699***
Volatility	0.006	0.003	0.009	2143	0.006	0.003	0.008	2143	0.000*	-1.833*
Turnover	1.12	0.738	1.335	2143	1.15	0.651	1.697	2143	-0.03	3.198***
Amihud	0.009	0	0.034	2143	0.008	0	0.031	2143	-0.414	-0.26
Beta	0.541	0.427	0.517	2143	0.557	0.448	0.506	2143	-0.016	-1.219
Deal Characteristics										
Premium	40.107	30.43	52.31	2143	40.522	31.73	55.785	2143	-0.034**	-0.799
Cash	0.595	1	0.491	2143	0.629	1	0.483	2143	0.001	-2.257**
Advisors	3.845	4	2.453	2143	3.929	4	2.632	2143	-0.084	-0.473
Rumor	0.039	0	0.194	2143	0.038	0	0.191	2143	0.001	0.238
Toehold	0.229	0	0.42	2143	0.23	0	0.421	2143	-0.001	-0.073

A4: Validation of the Insider Trading Measures

This table reports the regression results of the insider trading measures on country-level insider trading law indexes. The sample includes only domestic deals and covers the period 1990-2017. Data on M&A deals are obtained from SDC. Firm-level financial data are from Datastream and Worldscope. The dependent variables are measures of unusually large abnormal stock returns over the preannouncement window (-5 day, -1 day) constructed following Acharya and Johnson (2010). All variables are defined in the Appendix. All models include industry and year fixed effects. Standard errors are two-way clustered by country and year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels using two-tailed tests, respectively.

	(-5 day, -1 day)		(-5 day, -1 day)		(-5 day, -1 day)	
VARIABLES	Sum	Max	Sum	Max	Sum	Max
	(1)	(2)	(5)	(6)	(9)	(10)
Rule of Law	-0.311***	-0.134***				
	(-4.795)	(-3.251)				
IT Restriction			-0.226***	-0.098*		
			(-2.801)	(-1.806)		
IT Law					-0.089*	-0.082**
					(-1.679)	(-2.307)
Size	0.095***	0.051***	0.128***	0.064***	0.128***	0.062***
	(4.704)	(4.102)	(4.172)	(3.113)	(4.158)	(2.994)
Leverage	0.070	0.011	-0.041	-0.078	-0.035	-0.081
	(0.668)	(0.150)	(-0.276)	(-0.773)	(-0.236)	(-0.805)
BM	-0.005	-0.005	-0.005	-0.003	-0.005	-0.003
	(-0.660)	(-0.866)	(-0.568)	(-0.568)	(-0.578)	(-0.555)
Volatility	-16.012***	-8.410***	-11.972*	-7.526*	-12.561**	-7.295*
	(-4.265)	(-3.772)	(-1.886)	(-1.765)	(-1.972)	(-1.710)
Turnover	-0.002	-0.009	0.006	-0.005	0.017	0.002
	(-0.129)	(-1.157)	(0.257)	(-0.293)	(0.681)	(0.142)
Amihud	1.762***	1.374***	2.663	1.664	3.162	1.822
	(2.939)	(3.426)	(1.307)	(1.216)	(1.558)	(1.340)
Beta	-0.093*	-0.086***	-0.153*	-0.122**	-0.130	-0.115**
	(-1.948)	(-2.853)	(-1.814)	(-2.154)	(-1.556)	(-2.062)
Premium	0.005***	0.003***	0.006***	0.003***	0.006***	0.003***
	(10.491)	(9.130)	(7.911)	(6.425)	(7.989)	(6.562)
Cash	-0.058	-0.028	-0.164**	-0.085*	-0.149**	-0.069
	(-1.195)	(-0.899)	(-2.480)	(-1.913)	(-2.224)	(-1.542)
Advisors	-0.021*	-0.016**	-0.005	-0.001	-0.010	0.001
	(-1.935)	(-2.237)	(-0.285)	(-0.102)	(-0.565)	(0.101)
Rumor	0.339***	0.394***	0.210	0.362***	0.155	0.315***
	(2.782)	(4.176)	(1.186)	(3.034)	(0.866)	(2.622)
Toehold	-0.139***	-0.078**	-0.112	-0.030	-0.140	-0.071
	(-2.586)	(-2.242)	(-1.327)	(-0.528)	(-1.623)	(-1.220)
Observations	8,145	8,145	4,381	4,381	4,363	4,363
Adj. R-squared	0.040	0.031	0.035	0.025	0.034	0.026