International Trade and the Propagation of Merger Waves^{*}

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Cross-border merger activity is growing in importance. We map the global trade network each year from 1989 to 2016 and compare it to cross-border and domestic merger activity. Trade-weighted merger activity in trading partner countries has statistically and economically significant explanatory power for the likelihood a given country will be in a merger wave state, at both the cross-border and domestic levels, even controlling for its own lagged merger activity. The role of trade as a channel for transmitting merger waves is confirmed using import tariff cuts and trade sanctions as instruments to mitigate endogeneity. Overall, the full trade network helps our understanding of merger waves and how merger activity propagates across borders.

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1. Introduction

Recent contributions in the mergers and acquisition literature have begun to explore the rich panel of international data. Early papers studying cross-border acquisitions like Rossi and Volpin (2004) have been joined by Erel, Liao and Weisbach (2012) and Makaew (2012), who attempt to better understand the dynamics of cross-border acquisitions. Erel et al. (2012) and Makaew (2012) both find broad support for neo-classical explanations that highly productive firms will buy less productive firms and that the data reveal the potential for financial conditions such as local stock market conditions or exchange rate differences to increase merger activity. They also find support for gravity-model explanations for activity based on geographic proximity, total trade and culture. Ahern, Daminelli and Fracassi (2015) demonstrate the role of culture in explaining who merges with whom. At the same time, other studies such as Ahern and Harford (2014) have examined how the network of specific industry-level trade relationships helps explain domestic U.S. acquisition activity. In this paper, we build on the extant literature to investigate the role of trade flows in transmitting merger activity across countries.

Specifically, we use country and industry-level import and export data from 1989 to 2016 to build a network representation of global trade flows. We then combine and compare this network with all domestic and cross-border mergers over the same period from the Thomson Financial SDC dataset. As expected, there is substantial correlation between the trade network and cross-border activity, confirming prior results based on bilateral flows and gravity models. Trade-weighted cross-border activity also strongly predicts domestic merger activity, emphasizing the economic importance of the phenomenon. We further show that the most central countries in the trade network significantly overlap with the most central countries in the merger network. The few countries such as China and Russia that are relatively central in the trade network, but not in the merger network, tend to have significant barriers to foreign direct investment and/or poor legal development. A comparison of the structure of the trade and merger networks between the years 1989, 2002 and 2016 also reveals fundamental changes, in particular a strong densification trend of both networks through time.

After establishing the overall concordance between the two networks, we turn to understanding the dynamics of how merger activity spreads around the world. If exports reduce the need to acquire foreign production, then trade would substitute for direct investment through acquisitions, and the effect would be negative. Alternatively, if trade activity facilitates merger activity or provides an economic link causing merger activity in one country to affect mergers in another, we will find a positive, complementary effect.

The central endeavor of our paper is to test whether trade flows explain the pattern of M&A activity diffusion across countries. Two-real world examples provide anecdotal evidence that this could be the case. A first one is in the automobile industry. Germany is a main import source in this industry for the U.K. (more than 35% of U.K. automobile products are imported from Germany). The German automobile industry underwent M&A waves in 1998 and 2006 (33% of the total merger activity of our sample period in the same industry happened in 1998 and 10% in 2006) that were followed by corresponding waves in the U.K. in 1999 and 2007 respectively (32% in 1999 and 8% in 2007). Thus, the magnitude of the corresponding M&A waves was also similar. The second case concerns the pharmaceutical industry. The Netherlands imports more than 25% of its pharmaceutical products from Germany. In 2006, a consolidation wave in Germany (30% of total merger activity of our sample period in the same industry happened in 2006) was followed by corresponding wave in the Netherlands in 2007 (60% in 2007). These two examples suggest that M&A waves in a given industry propagate across borders to the countries connected through trade-flows. By establishing that these examples are representative in the aggregate data, we provide evidence that adds to the forces explaining merger activity as well as an explanation for why merger waves are correlated across countries, creating global merger waves.

Drawing from the trade literature, we propose the following micro-foundation for the effect we observe in the data. Firms start to export to capture new business opportunities. By doing so, they learn how to do business in the export destination (local business practices, customers/consumer expectations, logistic and regulatory constraints, political environment, etc.). As their exports grow, they simultaneously become more informed about the export destination and become more exposed to the business conditions in that

destination, the latter reinforcing the benefit of learning. Although the micro-foundation acts at the firm level, we test for and observe the mechanism through its aggregation into merger waves at the country and country-industry level. That is, merger waves will not propagate across borders without the learning and exposure mechanism operating at the firm level to cause them to react to a merger wave in a trade partner location with their own merger wave. We further develop this framework and its connection to our empirical strategy in Section 2.

This potential for trade to substitute for or create dynamic complementarity with mergers is the mechanism that we are seeking to capture and understand. To do so, we build year-by-year measures of the intensity of merger and acquisition (M&A) activity in a given country or country-industry, both at the cross-border and the domestic levels. We then test whether we can explain when a subject country engages in high merger activity using the trade network-weighted intensity of connected countries' merger activity. We show that, controlling for other factors, the intensity of M&A activity in countries that have significant trade with the subject country strongly and positively explains merger activity in the subject country. Further, this holds when we repeat this at the country-industry level rather than the country-level. Merger activity along trade relationships transmits to both further cross-border mergers as well as purely domestic mergers, emphasizing the economic importance of these interactions.

In the next part of our study, in an effort to identify causal relations, we ask how shocks to trade relationships affect real cross-border investment in the form of mergers and acquisitions. Our sample period spans many major tariff cuts, a substantial source of increase in global trade, and trade sanctions that immediately decrease the domestic firm's business exposure to a trading partner, and further force the domestic firm to identify alternative partners and channels for its trade. We use these exogenous shocks on trade flows as instruments with a two stages least square (2SLS) estimator to test whether the positive correlation between the intensity of M&A activity in connected countries and merger activity in the subject country is driven by omitted variables and/or simultaneity. Our procedure explicitly accounts for the first stage estimation source of sampling variance by using a percentile-t bootstrap procedure adjusted for the

panel data structure of our dataset. Our results are confirmed: weighted M&A activity in connected countries obtained using the predicted trade flows generated in the first stage using import tariff cuts and transactions remain a strong predictor of M&A activity in subject countries.

To further establish the importance of the trade network as a mechanism for propagation of merger activity, we implement a placebo test. Specifically, we randomly shuffle the trade links and repeat our estimation. With the randomly-assigned trade-activity weights, trade-weighted merger activity in one country has no predictive power for merger activity in another. We also control for geographic and cultural proximity, which could drive both trade and mergers, as well as stock market valuation differences and connected countries' trade-weighted stock returns, as a measure of economic integration. Our inferences are unchanged.

We present a set of additional analyses at the country-pair level. We start by exploring whether trade relations and location in the trade network help to predict future cross-border M&A activity. Our results highlight that the lagged subject's imports from a connected country are a strong predictor of cross-border M&A volume of the subject country with the connected country, both inbound (the acquirer is from the connected country) and outbound (the acquirer is from the subject country) merger activity. Moreover, location in the network (the subject's centrality) strengthens this predictive power. These findings hold true even after controlling for country-pair fixed effects and a set of time-varying country characteristics. We then complement this investigation by a Granger causality test (Granger, 1969) to determine whether it is really trade flows that drive merger activity and not the reverse. The Granger causality test provides clear support to this interpretation.

Finally, we investigate whether the learning part of the learning and exposure mechanism introduced in Section 2 is at play¹. Our international setup offers such an opportunity, as business practices across the world exhibit a high degree of heterogeneity. We start by study a sample of 85 firms with an IPO

¹ Ahern and Harford (2014) provide evidence that the business exposure part of the mechanism is explaining M&A spillovers across U.S. industries.

in 1994 or later, listed for at least 10 consecutive years, undertaking at least one cross-border acquisition. The sample is limited to firms that went public early in their lifecycle. Using the Dumitrescu and Hurlin (2012) test of Granger causality for heterogeneous panels, we confirm that, for these 85 firms, foreign sales “Granger causes” cross-border M&As. This result provides suggestive evidence that the micro-foundation we posit to explain the causal relation between trade-flows and M&A activity is effectively at play for at least specific samples of firms. We then turn to an exploration of the impact of potential barriers to learning. We focus on cultural differences between the countries, using the Hofstede (2001) four culture dimensions (individualism, uncertainty avoidance, power distance and future orientation). Our results clearly show that cultural distance negatively impacts the role of trade flows as a channel of M&A diffusion across countries, consistent with our learning hypothesis. Lastly, we investigate whether the quality of property rights in the foreign country, proxied by measures of quality of institutions provided by the International Country Risk Guide (ICRG), also play a role. Under the learning hypothesis, we expect that better property rights protection will provide more incentives to learn to do business abroad and allow the firm to translate its learning into an acquisition without fear of expropriation. Our results support this prediction and show moreover that this is value creating for acquirers.

Our study makes several contributions. First, we contribute to the broad literature on the causes and consequences of mergers and acquisitions. Much of this research has focused on explaining the motivations behind individual mergers (e.g., Betton, Eckbo and Thorburn 2008, for an extensive review) and their value implications. More closely related to our work, some authors have studied the timing of merger activity, whether at the industry or aggregate level, and its tendency to cluster in so-called “waves.” Beginning with Mitchell and Mulherin (1996), and continuing with the work of Shleifer and Vishny (2003), Rhodes-Kropf, Robinson and Viswanathan (2005), Harford (2005), and Ahern and Harford (2014), a stream of papers have added to our understanding of the forces that cause a merger wave to continue and then to propagate through the economy along industry connections. We extend this literature by establishing how merger waves propagate across borders and by estimating how much of a given country and industry’s merger activity can

be explained by M&A intensity in trade partners. Our study demonstrates that understanding cross-border activity is more than just an international analog of the domestic findings; we draw on the trade and FDI literature to microfound the complementarity of the learning and exposure channels (discussed further in the next section) that are particularly relevant in the international context. We further present evidence consistent with this complementarity hypothesis. Unlike the study of domestic M&A, we are able to take advantage of our international setup to provide evidence that studies of domestic merger activity must take into account activity in trade-linked countries, and that this is increasingly important over time as trade increases. Further, we are able to contribute to the much smaller, but growing literature on cross-border acquisitions, demonstrating the importance of trade-weighted activity even in the presence of existing variables like cultural distance, trust, FX and relative stock valuation proxies.

Second, there is a deep literature studying foreign direct investment (FDI). Many of these papers make use of gravity models which relate the amount of investment between two countries to the economic size of the two countries and measures of distance, which can be geographical, cultural or otherwise (e.g., Portes and Rey 2004; Chan, Covrig and Ng 2005; di Giovanni 2005; Siegel, Licht and Schwartz 2011). We add to this literature by incorporating network-level information into our models to explain mergers and acquisitions as one important form of FDI. Specifically, our measure of connected M&A activity incorporates the intensity of trading activities among countries and, this way, the structure of the trade flows network. Further, by using all of the connections in a trade-weighted approach, we are effectively accounting for all of the potential sources of gravity, rather than evaluating effects in a pair-by-pair setting. Finally, our setup allows us to uncover the role of time-varying country characteristics as factors affecting the sensitivity of M&A propagation through the trade network.

Overall, our work furthers the understanding the spread of merger activity along trade lines. In particular, assuming a long-term trend toward increased connectivity through trade, the trade network will become increasingly dense. Our results suggest that this will lead to a larger portion of a given country's merger activity being influenced by merger activity in other countries.

2. Economic foundation and empirical strategy

2.1 From international trade flows to M&A transactions

The neo-classical view of M&As posits that these transactions are mainly driven by synergies (Eckbo 2014), while leaving room for other factors to contribute to merger motivations, such as agency conflicts (Jensen and Meckling, 1976), behavioral biases (e.g., hubris (Roll 1986); overconfidence (Malmendier and Tate 2008)), or transitory (mis-)valuations (Shleifer and Vishny 2003; Rhodes-Kropf and Vishwanathan 2004). Aside from mis-valuation, these other factors tend to have idiosyncratic effects on merger activity, and so in this framework, the merger wave literature views merger waves as responses to a shock to the merging firms' business environment (Mitchell and Mulherin 1996; Harford 2005). Further, the reallocation of assets due to the merger wave is itself a shock to related firms' business environment.

Absent trade flows, a merger wave in a foreign country could be irrelevant to related domestic firms. Conversely, strong trade flows both make the merger wave increasingly relevant to domestic firms as well as provide them with motivation and information to act. Specifically, strong trade flows mean that the shock to the foreign business environment that generated the merger wave, and the reshuffling of asset ownership reflected in the wave, affect the domestic firm's business outlook through its trade-induced exposure to the foreign market, a mechanism shown to help explain M&A spillovers across U.S. industries in Ahern and Harford (2014). At the same time, the information gained over time through increased trading puts the domestic firm in a position to identify the best acquisition (foreign or domestic) to respond, both to reposition itself following the shock and potentially to mitigate its risk going forward. The heightened merger activity creates the impetus for it to act, lest its preferred target be acquired. In this way, aggregated to the industry or country level, increased trade flows transmit merger waves across borders.

The importance of international trade flows as a cross-border M&A transmission channel is reinforced by the very challenging nature of these transactions. Cross-border transactions add several layers of complexity. In particular, understanding foreign legal systems and political institutions, corresponding

business practices and cultural values, accounting rules and fiscal idiosyncrasies requires time and effort. Gordon and Bovenberg (1996) highlight that costs of acquiring information can be a significant determinant of firm's investment decisions. Erel et al. (2012) suggest that information asymmetry relative to target country environment is likely to increase merger costs. Ahern et al. (2015) emphasize frictions created by differences in cultural values between acquirer and target countries as a factor increasing integration costs and reducing expected wealth creation. In line with this argument, the authors document that cultural differences reduce cross-border merger volume and expected synergy gains. Siegel et al. (2011) report that cultural distance has negative effects on cross-border investment flows, including mergers and acquisitions, providing evidence consistent with increased costs of integration. Lim, Makhija and Shenkar (2016) find that cultural distance reduces target premiums but that this negative correlation is weakened when acquirers are familiar with the target culture. Learning through exposure to foreign markets is a necessary prerequisite to undertaking cross-border acquisitions successfully.

We discuss these neo-classical and learning-based foundations of the role of trade flows in the diffusion of M&As across countries in the context of merger waves and, indeed, the role of trade can be more easily detected by the econometrician at the industry and aggregate level. Nonetheless, these micro-foundations act at the firm level and can be sketched as the following highly stylized process: firms start to export to capture new business opportunities. By doing so, they learn how to do business in the export destination. As their exports grow, they simultaneously become more informed about the export destination and become more exposed to the business conditions in that destination, the latter reinforcing the benefit of further learning. Costs and risks related to cross-border acquisitions decrease and firms become more reactive to shocks to their foreign business environment, including asset ownership reshuffling due to M&A waves. Thus, our complementarity hypothesis is as follows: The complementarity of the trade-induced learning and exposure leads firms to respond to shocks in connected countries by undertaking both domestic and foreign acquisitions. Our empirical strategy is designed to test this hypothesis by identifying connected countries and measuring their merger intensity.

We highlight one real-world example of our proposed mechanism from Cisco. This archetypal multiple acquirer (217 M&A transactions over the 1989 to 2017 period according to the Thomson Financial SDC Database) started undertaking cross-border transactions in 1996 with the acquisition of Metaplex, an Australian firm. Over the whole 1989 to 2017 period, out of 217 transactions, Cisco went abroad 37 times. We collected Cisco exports in the Compustat segment database to put them in relation with Cisco cross-border acquisitions. These are reported only until 1997 due to a change in reporting format in 1998. Subfigure A of Figure 1 reports the evolution of Cisco exports through time for this subperiod. Subfigure B of Figure 1 displays the corresponding partition through time of the domestic and cross-borders transactions. The correlation with end of the nineties U.S. M&A waves is clearly apparent as well as the correlation between Cisco domestic and cross-border activities. Putting in relation Cisco exports and cross-border M&A activities suggests that after a period of developing exports that started in the beginning of the nineties, Cisco began to develop its M&A activities abroad, likely facilitated by knowledge gathered through foreign activities and motivated by increased foreign economic exposure.

2.2 Empirical strategy

Ideally, we would assemble a large international sample of firms and track this large cohort from their birth, collecting their exports through time as well as their foreign and domestic acquisitions. Of particular interest also would be to have a full description of the firm level exports and imports portfolio (sales and purchases by countries). Using these data, we would be in position to test whether exports and/or imports drive cross-border acquisitions (at least in a Granger causality meaning), whether cross-border M&As are targeted to countries with respect to which firms are more exposed and whether foreign merger activity that specifically affects the subject firm's trading partners engenders a response from the subject firm. These data are not available however, especially in an international context. For example, even if we limit our attention to U.S. firms, we are only able to observe aggregate foreign sales that include not only exports but also sales by foreign subsidiaries (using databases like Worldscope and Compustat). With these data, it is therefore

impossible to study the dynamics of exports and cross-border mergers as finely as we would need to. A direct test of our mechanism is simply not possible with available data.

Motivated from UK/Germany and Netherlands/Germany examples, our empirical strategy studies the relation between spikes in M&A activity in subject countries and M&A activity in connected countries, the intensity of connections being a function of trade flows. This strategy is designed to be a second-best approach to uncover the role of the trade connections in transmitting merger activity through a combination of learning and exposure on the part of the firm in the subject country. This allows us to test whether subject countries react to variation in M&A activity in countries to which they are most connected in terms of trade flows. Noting that the M&A market is characterized by waves at the aggregate level (Andrade, Mitchell and Stafford, 2001) and at the industry level (Mitchell and Mulherin 1996; Harford 2005), we focus on factors explaining these regime shifts (that we label as high M&A states) and, in particular, their propagation at the international level.

This empirical strategy is however exposed to a potential main omitted factor: the overall economic integration of the countries under examination. Indeed, trade flows clearly also proxy for economic integration between countries, and our results could be driven by this omitted factor. We do our best to address this issue. Our specifications include country fixed effects, and so will control for the part of economic integration that is stable through time (our country-pair analysis is similarly able to control for country-pair fixed effects). Our specifications also include measures of country centrality, that capture the intensity of country connections with other countries across sample period (time-varying), proxying (at least partially) for economic openness and integration. We test the robustness of our results to the inclusion of a measure of stock market correlation, another way to control for time-varying degree of economic integration.

We benefit from an international setup that provides us import tariff cuts and trade sanctions as exogenous shocks to trade flows. By positively shocking trade flows, import tariff reductions will shock the

learning and exposure effects discussed above. In contrast, trade sanctions² immediately decrease the domestic firm's business exposure to a trading partner, and further they also force the domestic firm to identify alternative partners and channels for its trade. These effects will immediately dampen the relevance of a merger wave in the sanctioned country for its trading partners in the domestic country, causing a muted reaction to the foreign wave. Because trade sanctions are typically targeted, both in country and duration, they are unlikely to affect the overall integration of the two economies (at least in the short-run). Rather, they help us to identify the importance of the trade connections specifically. We use import tariff cuts and trade sanctions as instruments in the framework of a 2SLS procedure to test in our empirical section whether our results are driven by omitted variables and/or simultaneity.

Finally, we report evidence supporting the conclusion that exports are a channel to learn about doing business abroad. We start studying a panel of IPO firms that we track over more than 10 years. While the sample is too small to allow for generalization, we implement a Granger causality test to show that trade flows predate cross-border M&A for these firms. We then investigate interactions between barriers (cultural distance) and incentives (property rights protection) to learning and trade flows as a learning channel.

3. Data

We employ two primary datasets: one covering trade data and another covering mergers. The trade data come from the UN ComTrade database, which provides data on imports and exports for different commodity classifications BEC (Broad Economic Categories), HS (Harmonized System) and SITC (Standard Industrial Trade Classification)). The data starts from as far back as 1962 depending on the commodity classification. Since our analysis is based on country level and industry level, for consistency purposes, we choose SITC Rev.3 (revision 3) commodity classification for both country and industry levels. This allows us to convert SITC Rev.3 into ISIC Rev.3 (revision 3 of international standard industrial

² We thank an anonymous referee for suggesting this additional analysis.

classification)³. The data on SITC Rev.3 starts in 1988. One limitation of the ComTrade database is that imports/exports data do not start for all countries from 1988 and countries join the list along the years. The most notable examples are United States and Germany for which the data is available from 1989 and 1991 respectively. We decide therefore to choose 1989 as the starting year of our analysis period. We have imports and exports between 100 countries from 1989 to 2016 and we are able to exclude re-imports and re-exports. We have the data at both the country level and the industry level. Panel A of Table 1 describes the trade data.

The international trade network contains very few missing edges; within the top 100 countries, there are very few pairs of countries with literally no trade between them. The mean percentage of imports or exports for a country-pair is about 1.2%, and among country-pairs accounting for at least 1% of one of the partners' trade, the amount is around 5%.

Our merger data come from Thomson Financial's SDC dataset. We start with all cross-border mergers between the 100 UN ComTrade countries from 1989 to 2016. A country must have at least 1 cross-border merger per year or 28 cross-border mergers over the span of 28 years. We include deals classified as 'Completed' and 'Withdrawn', whether the acquirer and target status is public, private or subsidiary. We exclude transactions where the transaction value is missing. We also exclude acquisitions of partial interest, buybacks, recapitalizations, and exchange offers. These filters yield a sample of 49,905 cross-border transactions worth \$16.710 trillion and 174,899 domestic transactions worth \$41.549 trillion across 74 countries. We present summary statistics for the merger dataset in Panel B of Table 1 and graph them in Figure 2.

³ Data on mergers and acquisitions reported in SDC are identified as US standard industrial classification (SIC) 1987 and no direct correspondence is available between SITC and SIC codes. However, we can convert SITC Rev.3 and US SIC 1987 to common ISIC Rev.3. The European Commission provides the correspondence table between SITC Rev.3 and ISIC Rev.3, and US SIC 1987 and ISIC Rev.3. The correspondence tables are extracted directly from the European Commission website.

The graph shows the familiar merger waves of the 1990s and 2000s and establishes that the well-studied U.S. merger waves coincide with those of the rest-of-the-world. Panel B of Table 1 summarizes the pairwise connections in the panel. The cross-border merger network is considerably sparser than the trade network. In fact, 62% of country-pairs have no recorded mergers between them. The average pairwise merger activity is 9 transactions worth \$3.1 billion. As is to be expected in the context of mergers and a sparse network, the data are skewed, with the 95th percentile of pairs having 29 mergers and the maximum being 2,968 (Canadian acquisitions in the United States), followed by 2,576 (United Kingdom acquisitions in United States, unreported). Panel B of Table 1 also reports corresponding figures for cross-border and domestic mergers. As expected, domestic mergers represent the largest portion of the merger market activity with 174,899 transactions in our sample but the share of cross-border mergers is sizeable (49,905 transactions).

We collect additional information needed for control variables in the DataStream database (for currency exchange rates, stock market valuations and stock returns), in the International Country Risk Guide (ICRG), Political Risk Guide for investment profile and quality of institutions, from the World Bank for indicators such gross domestic product (GDP) and import tariffs, and from the Threat and Imposition of Economic Sanctions (TIES) database for trade sanctions, from the ICRG database for quality of institutions and from the Hofstede website for cultural dimensions. All variable definitions and corresponding descriptive statistics are provided in Appendix 1 of the paper.

4. The Trade and Merger Networks

Part of our contribution is descriptive: documenting the global trade and merger networks over time. To do so, we use network visualization software (Gephi) to create figures representing snapshots of the networks at various points during our sample period.

4.1 The Trade Network over Time

We begin with a discussion of the trade network. Figure 3, subfigures A through C show the export network based on dollar value of exports in 1989, 2002 and 2016, respectively. The corresponding subfigures A through C of Figure 4 restrict the analysis to the 15 most active countries (we provide these country lists in Internet Appendix A). In these network representations, circle sizes (nodes) are proportional to the degree of centrality of countries and connection (edge) thicknesses are a function of the intensity of exports between the countries (the nodes). Comparing across the subfigures of Figure 3, it is clear that the trade network has become denser over time with a greater value of goods flowing through it. While many of the same countries remain the largest nodes in the network, the relative size of the next two tiers increases as more countries develop and increase their trade with the rest of the world. While we do not show it here, similar inferences can be drawn from the import network.

The number of nodes and density of the network makes it hard to see the emergence of some countries, so in Figure 4 we include only the 15 most active countries. Focusing on these countries reveals interesting insights. In 1989, exports between USA, Japan and Canada are clearly driving world trade flows. In 2002, probably as a consequence of the NAFTA agreement activation from 1994, export flows between USA, Canada and Mexico dominate the network. Japan is still strongly connected to USA but not significantly more than Mexico. Concerning European countries, France and Germany interactions are dominant (recall that Germany is not in the 1989 UN ComTrade database, explaining its absence from Figure 4, Subfigure A). The rise of China is clearly evident in Subfigure C of Figure 4 (year 2016), with dominant connections with USA and Hong Kong. NAFTA is still clearly visible. The shift of Japan toward China also stands out.

4.2 The Merger Network over Time

Figure 5, Subfigures A through C present the visualizations of the merger network, using the same conventions (size of nodes proportional to degree of centrality and thickness of edges proportional to M&A

activity). Again, one can see the increasing density of the cross-border merger network through time. While the U.S. and Great Britain remain the largest nodes, the relative size of other countries increases over time, just as in the trade network. In comparison with the trade network visualization provided in Figure 3, the sparsity of the merger network is also clearly apparent, meaning that there are many more pairs of countries with no merger activity than there are pairs with no trade.

In the remaining sections, we compare the sample-long networks of merger and trade activity. We also use the year-by-year trade network centrality measures to explain the dynamics of merger activity around the world.

4.3 Comparing the Networks

Figures 3, 4 and 5 allow one to visually compare the networks and draw conclusions about their similarities. In Panel A of Table 2, we list the 15 most central countries in the import, export and merger networks. It is immediately clear that many countries appear on all three lists. We note that the countries appearing on the import or export lists but not appearing (or appearing in the last positions) on the mergers list tend to have barriers to FDI or poor legal development (e.g. Russia and China)⁴. In Internet Appendix A, we provide the corresponding lists for years 1989, 2002 and 2016 because Figures 3, 4 and 5 highlight how the trade and merger networks change through time. Noteworthy in the export lists is the rise of China, which ranks number one in 2016, ahead of the United States. China's rise goes hand-in-hand with the global rise of Asiatic countries. In the 2016 top-15 countries list, Japan, South Korea, Hong Kong and Singapore appear in addition to China, accounting for one third of the list. The import lists also show the rise of China (from absence in 1989 to second in 2016). Another noteworthy fact is the appearance of India in the 2016 import list (ranked fourteenth), another sign of the changing structure of Asiatic country economies. The

⁴ The Heritage Foundation ranks Russia and China 144 and 153 respectively among 186 countries around the world on their economic freedom index in 2016. The economic freedom index comprises of four sub-components (1) Rule of Law (property rights, freedom from corruption); (2) Limited Government (fiscal freedom, government spending); (3) Regulatory Efficiency (business freedom, labor freedom, monetary freedom); and (4) Open Markets (trade freedom, investment freedom, financial freedom). For more details on the subcomponents, see <http://www.heritage.org/index/about>

merger lists confirm the steady, if unsurprising, central role of the United States and the United Kingdom in cross-border activities. Maybe more unexpected is the rise of Hong Kong, from absence in 1989 to the seventh spot in 2016 (down from fourth in 2002), probably by acting as an entry to Asiatic countries (the main destination country of cross-border acquisitions from Hong Kong is China, by far).

We formally compare the three networks by computing the correlation of the centralities of countries in each network and present the results in Panel B of Table 2. For this exercise, we consider both degree and eigenvector centrality. The centralities of countries in the import and export network are extremely highly correlated (> 0.94). When comparing the import or export networks with the merger networks, we see that while far from the near perfect correlation between the trade networks, the correlations are still quite high, ranging from 0.43 to 0.60. These formal correlations serve to confirm what can be seen informally in the figures and in Panel A of Table 2. They also suggest that trade does not significantly substitute for direct investment through acquisition and preview our finding that trade channels actually complement acquisition activity by transmitting it across countries.

5. The Propagation of Merger Activity through the Trade Network

5.1 Country-level merger activity

Our primary empirical tests are designed to establish the degree to which merger activity in separate countries propagates along trade links. Our independent variable of interest, *Connected M&A*, is the trade-weighted merger activity in connected countries. We use information from the entire network of trade data, weighting merger activity in each country (the nodes) by the amount of trade they do with the subject country (their edges connecting them to the subject country). *Connected M&A* is therefore computed as:

$$Connected\ M\&A_{i,t} = \sum_{j \neq i} W_{i,j,t} \times M\&A_{j,t} \quad (1)$$

where i and j are the subject and connected country respectively, t is the year, $W_{i,j,t}$ is a weighting term based on trade flows between i and j in year t and $M\&A_{j,t}$ is the measure of M&A intensity in country j and year t (either count based or value based, depending on the weighting scheme adopted to compute the dependent variable⁵). For each country i and at each time period t , four *Connected M&A* _{i,t} variables can be computed, depending on the trade flows used to compute $W_{i,j,t}$:

- Subject (i) Imports from Connected (j): $W_{i,j,t}$ is the percentage of country i 's imports that come from country j ;
- Connected (j) Imports from Subject (i): $W_{i,j,t}$ is the percentage of country j 's imports that come from country i ;
- Subject (i) Exports to Connected (j): $W_{i,j,t}$ is the percentage country i 's exports that go to country j ;
- Connected (j) Exports to Subject (i): $W_{i,j,t}$ is the percentage of country j 's exports that go to country i .

Because the *Connected M&A* variables display strong right skewness, a consequence of the relative sparsity of the merger network (see Panel B of Table 1), we winsorize them at 5% in the right tail.

Using *Connected M&A*, we study the probability that a given country i will be in *High M&A State* in year t , defined as the country's merger activity (the number or the dollar value of merger transactions) being in the highest quartile of all values for that country over the sample period in the year under consideration (as we discuss in Section 5.7, our inferences are unchanged if we detrend merger activity first). The *High M&A State* is computed for cross-border mergers and for domestic mergers separately. Our main specification also includes the lagged value of the dependent variable (*High M&A State* _{$i,t-1$}) to account explicitly for country-level merger waves, the degree or eigenvector centrality of the subject country in year t (*Centrality* _{i,t})⁶, interactions between centrality and aggregate worldwide merger activity

⁵ We have re-estimated everything after removing cross-border M&A transactions between the subject country i and the connected country j when computing Connected M&A variable. Our results are unaffected.

⁶ We have to control for the possibility that countries that are highly central in the global trade network will naturally have higher trade-weighted M&A activity any time any country experiences an increase in merger activity. Central

(*M&A Activity*_{*t*}), and a set of country-level time-varying control variables (***Controls***_{*i,t*}).⁷ This leads to the following linear regression equation⁸:

*High M&A State*_{*i,t*} =

$$\alpha_i + \lambda_t + \beta \text{High M\&A State}_{i,t-1} + \gamma \text{Connected M\&A}_{i,t} + \boldsymbol{\vartheta}' \mathbf{Controls}_{i,t} + \varepsilon_{i,t} \quad (2)$$

Bold type face is used to indicate vectors. We use the Arellano-Bond (Arellano and Bond, 1991) estimator for dynamic panel models⁹. Because this specification forms a dynamic panel, we use the Arellano-Bond estimator. Standard errors are clustered at the country level. All specifications also include α_i country fixed-effects and λ_t year fixed-effects¹⁰. Our primary empirical tests are designed to establish the degree to which cross-border and domestic merger activity in connected countries propagate along trade links.

The first set of results is presented in Table 3 where we report estimates of Equation (2) over the sample period using the number of M&A transactions as the measure of M&A intensity and reporting

economies can be more open and more generally globally integrated, making it hard to identify whether this is a trade-channel spread of merger activity, or a correlated response to a general shock.

⁷ Time-varying country level control variables include GDP, GDP Growth, GDP Per Capita, Investment Profile, Quality of Institutions and exchange rate-based variables. Exchange rate based variables are computed similarly to *Connected M&A*, using exchange rates expressed as one subject currency unit in connected currency units and the same weighting scheme as *Connected M&A*. The *Connected Exchange Rate Growth* variable is the weighted average of the end-of-year to end-of-year relative change in the exchange rate and the *Connected Exchange Rate Volatility* is the corresponding standard deviation of the monthly exchange rates over a period of 36 months.

⁸ Angrist and Pischke (2009) Section 3.4.2 discusses the use of linear models with limited dependent variables. The authors show that as long as we are concerned with marginal effects, there is no clear benefit in using non-linear models such as probit or logit ones but that these non-linear specifications come along with more restrictive assumptions. Whether using linear or non-linear models, marginal effects can be interpreted as changes in the probability from switching from one state of the dependent variable to the other one.

⁹ We replicate all our analyses excluding the lagged *High M&A State* variable from Equation (2) and using a classic fixed-effect panel data estimator. Results are reported in the Internet Appendix LJ.

¹⁰ We investigate the robustness of our results using (1) a static regression model without the lagged value of the dependent variable. We obtain qualitatively similar results with stronger statistical significance. The static specification also allows us to implement the Wooldridge (2010) test for strict exogeneity, as advised in Grieser and Hadlock (2019). The Wooldridge (2010) tests do not reject the null hypothesis of strict exogeneity at the usual level of statistical confidence. Results are reported in the Internet Appendix B. We also tested a specification without year fixed-effects and including additional time-varying control variables such as a World stock index. Results are unchanged, but the inclusion of year fixed-effects is our preferred approach because it absorbs all such variables.

estimates for cross-border mergers in Panel A and for domestic mergers in Panel B. Starting with Panel A, the results support our complementarity hypothesis: all measures of trade-weighted M&A activity load positively (and three of the four are significant) for explaining a High M&A State. The effects are strongest (both in terms of coefficient values and statistical significance) for Subject Imports from Connected and Subject Exports to Connected. For example, a change from the 25th to 75th percentile of the Subject Imports (Exports) weighted merger activity increases the probability of a Subject High M&A State by more than 30% (23%). These variables are defined such that they are large when the subject country imports or exports a substantial portion of its total imports or exports to countries that are undergoing merger waves. Thus, they capture times when countries that are important to the subject country are undergoing substantial merger activity. The other two trade-weighted variables capture when the connected countries import or export a large portion of their total imports or exports from the subject country. Thus, they capture times when the subject country is important to the connected countries that are undergoing variation in merger activity, but not necessarily vice-versa. A 25th to 75th percentile change in the Connected-based M&A variables (columns 2 and 4), would result in a 14% and 15% increase in High Merger State likelihood for the Subject country respectively.

Our specification controls for the lagged value of the cross-border M&A State variable, which also loads positively, a result confirming the presence of merger waves in international data (Makaew, 2012). The coefficients on the interactions between centrality measures and aggregate M&A activity are positive and significant in 7 out of the 8 specifications. This means that countries that are more central in the overall global trade network are more likely to be undergoing cross-border merger waves when there is a global merger wave. This result is consistent with the findings in Ahern and Harford (2014), who show that aggregate merger waves in the U.S. coincide with high merger activity in the most central industries in the economy. They explain how once a shock causes merger activity in a central industry, it can quickly cause merger activity in many connected industries, creating an aggregate merger wave. The same mechanism appears to be at work at the international level.

Finally, the importance of trade connections for propagating merger waves is robust to changes in exchange rate growth, their volatility, to both time-varying and time-invariant country characteristics, such as the quality of financial institutions and GDP growth, the latter having a positive effect on cross-border merger activity on its own. Our country fixed-effects absorb time-invariant country characteristics and our year fixed-effects absorb shocks affecting the cross-section of countries in a given year.

In Panel B, we replicate the analysis using only domestic mergers to compute the *High M&A State* dependent variable. The results, although weaker, are similar to the results obtained using cross-border mergers. Only the subject imports from connected and connected exports to subject weighting schemes produce statistically significant results, although all four weights are large, positive and have p-values of 0.13 or less. We hesitate to speculate too much on the marginal p-stats because when we estimate alternative specifications in the Internet Appendix (C and D), the results are typically significant at traditional levels. Taking into account the importance of domestic mergers in overall merger activity, this emphasizes the economic importance of the results uncovered for cross-border mergers. Notably, it shows that purely domestic merger activity is, through trade relationships, substantially impacted by merger activity in other countries.

While we choose the number of transactions as our measure of activity to establish the breadth of the effect, we replicate the analysis using value of transactions to compute the *High M&A State* dependent variable. The results, presented in the Internet Appendix C, are qualitatively the same. Further, we replicate the Table 3 analysis using total merger activity (the sum of cross-border and domestic activity) and again find that our inferences are unchanged [unreported results].

5.2 Industry-level activity

In this section, we refine the unit of observation to the country-industry-year level. In doing so, we more precisely measure our proposed channel while also providing the opportunity to rule out aggregation effects and many other alternative country-level explanations. Panel A of Table 4 replicates Panel A of

Table 3 (cross-border mergers analysis) at the country-industry-year level and Panel B replicates Panel B of Table 3 (domestic mergers analysis). The importance of connected countries' industry-specific M&A activity in predicting a High M&A State is confirmed for cross-border mergers (*Connected M&A* variables load positively and statistically significantly in 6 out the 8 specifications). These results are strongly consistent with results obtained at the country level (Table 3) and support the economic linkage interpretation of the results, while providing evidence that our country-level results are driven by the aggregation of industry-level effects.¹¹ Panel B of Table 3 confirms that domestic M&As based results are weaker, as only one specification delivers statistically significant results. We note however that using the classic least-square dummy variable estimator for static panels, coefficient estimates of our *Connected M&A* variables are statistically significant in 6 specifications out of the 8 tested when M&A activity is measured in number of transactions and in all specifications when it is measure in value of transactions (results reported in the Internet Appendix L.4). Our results at the industry level are therefore sensitive to the chosen specification and estimator.

5.3 Trade Shocks

Having established the baseline impact of trade on propagating merger activity across countries, we investigate whether our results are driven by endogeneity. We focus in particular on trade flows because these are the channels through which we argue that M&A transactions spread across countries. We instrument trade flows using import tariff cuts and trade sanctions. Import tariff cuts and trade sanctions are prime candidates for valid instruments. Indeed, they should directly impact trade flows (the relevance condition) and even if we can't exclude that they are correlated with M&A activity in the country under focus, because tariffs are essentially political decisions driven by economic integration and protectionism motives, violation of the exclusion restriction should remain limited.

¹¹ We replicate Panels A and B when the dependent variable is based on value of transactions and report the results in Internet Appendix D.1. The results are comparable.

We collect import tariff cuts from the World Bank Indicators and identify large tariff cuts as tariff cuts that are five times as high as the average tariff cuts for the country under consideration during our analysis period. Trade sanctions are obtained thanks to the Threat and Imposition of Economic Sanctions (TIES) database¹², that covers the period 1945 to 2006. Sanctions are defined as “actions that one or more countries take to limit or end their economic relations with a target country in an effort to persuade that country to change its policies” (Morgan, Bapat and Kobayashi, 2014). TIES allows us to obtain a sample of 265 sanctions, covering the years 1989 (the starting year of our sample) to 2006 (the last year of the TIES database). Trade sanctions are defined at the country pair level (country A imposes a trade sanction on country B for a given period).

We implement our two 2SLS approach as follow. We start by regressing trade flows between country pairs on tariff cuts and trade sanctions in a global pooled regression. Adopting notations of Equation (1), the specification is :

$$W_{i,j,t} = \alpha + \beta \text{TariffCuts}_{i,j,t} + \gamma \text{TradeSanctions}_{i,j,t} + \epsilon_{i,j,t} \quad (3)$$

We then collect fitted values $\widehat{W}_{i,j,t}$ and recompute *Connected M&A*_{*i,t*} as:

$$\text{Connected M\&A}_{i,t}^{fit} = \sum_{j \neq i} \widehat{W}_{i,j,t} \times M\&A_{j,t} \quad (4)$$

Finally, we estimate Equation (2) as :

$$\begin{aligned} \text{High M\&A State}_{i,t} = \\ \alpha_i + \lambda_t + \beta \text{High M\&A State}_{i,t-1} + \gamma \text{Connected M\&A}_{i,t}^{fit} + \boldsymbol{\vartheta}' \text{Controls}_{i,t} + \epsilon_{i,t} \end{aligned} \quad (5)$$

Estimating Equation (3) is a source of sampling variance and ignoring it when computing the standard errors of Equation (5) coefficients would lead to overstating statistical significance. As our 2SLS procedure is not

¹² <http://sanctions.web.unc.edu/>

standard. we instrument a variable – trade flows – used to compute the independent variable of interest - *Connected M&A*_{*i,t*} - and not the independent variable itself. Moreover, in the second stage, our sample has a panel data structure, that generates dependencies between observation units (countries) across years. We adopt a percentile-t pair bootstrap procedure designed to tackle these issues as follows. At the first stage, we generate 500 bootstrap samples from country pairs trade flows (sampling with replacement). For each bootstrap sample, we estimate Equation (1) and collect the β and γ coefficients. We use these estimated coefficients to compute fitted trade flows for all country pairs. Finally, we recompute, for each bootstrap sample, *Connected M&A* variables using the fitted trade flows as in Equation (4). The first stage bootstrap accounts for the sampling variability due to instrumenting trade flows with tariff cuts and trade sanctions. At the second stage, we generate 500 bootstrap samples of our country/year panel data set. To account for the time series correlation, the bootstrap samples are obtained by resampling with replacement at the country level (and not at the country/year level). This guarantees that the time series correlation structure is maintained in the bootstrap samples. The bootstrap samples use the bootstrapped *Connected M&A* variables obtained at the first stage, so that sampling variance due to the first stage is taken into account. For each bootstrap sample, we estimate our eight specifications reported in Table 3. Finally, for the *Connected M&A* variables of interest, we perform a classic percentile-t bootstrap to obtain bootstrap p-values that reported in Table 5, with the corresponding coefficients.

In Table 5 we report results for cross-border mergers, obtained using the number of transactions to compute our High M&A State dependent variable (results obtained the value of transactions are provided in Internet Appendix D.2). These results confirm the evidence provided in Panel A of Table 3: all measures of trade-weighted M&A activity load again positively and all are statistically significant at the ninety-five percent level of confidence. Coefficient point estimates are lower than corresponding statistically significant ones in Table 3, ranging 8.718 to 10.177 depending on the specification but still indicate a significant size effect: a change from the 25th to 75th percentile of the Subject Imports (Exports) weighted merger activity increases the probability of a Subject High M&A State by more than 30% (23%).

We conclude that results reported in Table 3 are not driven by an endogenous relation between trade flows and M&A activity in the country under focus: the portion of trade flows correlated with exogenous shocks from tariff cuts and trade sanctions is enough to capture the positive effect of cross-border M&A activity in connected countries on the probability of observing high M&A activity in the country of interest, despite the inherently noisy nature of our 2SLS approach.

5.4 Placebo Tests

It is natural to be concerned that something other than trade flows could be driving the results, even given our instrument variable based evidence. To address this concern, we create a world with the same merger activity, but with reshuffled trade connections. Specifically, we replicate our country-level merger activity analyses (Table 3) after randomly shuffling the trade flows used to compute the *Connected M&A* variables, keeping everything else the same as in the real data. Panel A of Table 6 replicates the corresponding panel of Table 3 (cross-border waves based on the number of transactions) and Panel B of Table 6, the corresponding panel of Table 3 (domestic waves based on the number of transactions). The results are clear: none of *Connected M&A* variables coefficients are statistically significant. We obtain similar results using value of transactions in place of number of transactions (results reported in the Internet Appendix D.3). Thus, we conclude that trade flows capture the true conduit by which merger activity is transmitted around the world.

5.5 Controlling for Market Valuation Differences, Geographical Distance, Cultural Distance and Stock Returns Correlations

Results reported in Panels A and B of Table 3 show that *Connected M&A* variables play a role in explaining both cross-border and domestic M&A waves. While this finding highlights the economic importance of the mechanism under investigation (domestic M&A accounts for roughly 75% of overall M&A activity), it also might suggest that some latent factors, related to economic integration and correlated with *Connected M&A*, are driving our results. Our empirical strategy makes it difficult, if not impossible,

to exclude all possibility of any such latent factors. However, our country-level analyses include country and year fixed effects and, for country-industry level analyses, the fixed effects are expanded at the country-industry level. These fixed effects already absorb any time constant and country (country-industry) global latent factors. Yet, the latent factor could still vary across time and country in the same way as does trade. We can reduce the scope for such a variable by introducing further controls. In this section, we explicitly control for stock market valuation differentials, geographical and cultural distance between connected and subject countries as well correlation between stock market returns, as proxies for economic integration.

We compute *Connected Stock Market Valuation*, *Connected Geographical Distance*, *Connected Culture Distance* and *Connected Stock Returns* as we do *Connected M&A* in Equation (1), replacing the M&A activity measure by the absolute value of the difference between the equally-weighted Market-to-Book ratio of the subject and connected countries, the geographical distance between the capital of the subject and the connected countries capitals, the absolute value of difference of trust level (e.g., Guiso, Sapienza and Zingales 2006) between the subject and connected countries and stock market returns correlation between subject and connected countries. Market-to-Book ratios and stock returns correlation are computed using data collected in the Worldscope database, geographical distances are computed using data collected from www.mapsofworld.com and trust levels are calculated from the World Value Survey, as in Ahern et al. (2015).

Results are displayed in Table 7 for cross-border waves using number of M&A transactions as measure of M&A intensity. We find qualitatively and quantitatively similar results as in Panel A of Table 3, despite the simultaneous inclusion of our four new control variables, in addition to country characteristics and country and year fixed effects and despite losing almost one third of our sample (from 1,255 observations in Panel A of Table 3 to 911 observations in Table 7). *Connected Stock Market Valuation* has a positive coefficient in all of our specifications, statistically significant in columns 2 and 6. We obtain similar results using the value of M&A transactions as measure of M&A intensity, with increased statistical significance (see Internet Appendix D.4). We conclude from these results that our *Connected M&A*

variables go beyond being simple proxies of economic integration, as this should be adequately spanned by our additional control variables.

5.6 Additional Robustness Checks

The first robustness check that we implement is related to the global rise of the M&A market activity (see Figure 2). We may suspect that our *High M&A State* dependent variable is impacted by this trend and consequently clusters in the second part the 1989 to 2016 period. We investigate this issue by computing the *High M&A State* on the residuals of a regression of the M&A activity measure on a linear time trend at the country level. In this way, by construction, *High M&A State* is unaffected by the global rise in M&A activity. Our inferences are unaffected (see Internet Appendix E).

One may also worry on the discrete nature our *High M&A State* variable and ask whether or results are sensitive to the choice of discretization threshold. We replicate therefore our results using a continuous version of our dependent variable, labelled *High M&A Intensity* (computed either in number of transactions or in value of transactions). Our results are unaffected (see Internet Appendix F).

Given the large role the US has in both trade and M&A, one could also be concerned that we are simply explaining US activity. To check whether it is the case, we replicate Table 3 country level analyses after exclusion of the U.S. from our sample. Our inferences are unchanged (see Internet Appendix G). This is also the case if we exclude The Netherlands and Singapore, two countries acting mainly as shipping hubs or gateways between other countries, and therefore potentially affecting the interpretation of our results (see Internet Appendix H). Note that, in both cases, excluded countries are still taken into account for the Connected M&A variables computation in order to keep constant the structure of the trade flows network and to test precisely if it is the M&A activities in these countries that play a prominent role.

5.7 Predicting cross-border activity at the country-pair level

Our tests so far have used the global trade network to help understand when a subject country or country-industry will undergo a merger wave. In this section, we engage in complementary analysis of the degree to which trade flows and network centrality help to predict a subject country's cross-border merger activity. Specifically, we employ fixed-effects panel regressions where the dependent variables and independent variables are as follows:

- the dependent variable is the proportion of country i 's mergers that happen with country j (relative to all of i 's cross-border mergers). We distinguish the inbound case (the acquirer is from the connected country and the target from the subject country) from the outbound case (the acquirer is from the subject country and the target from the connected country);
- the independent variables of interest are *Subject Imports from Connected* (lagged by one year), the centrality of the Subject Country (also lagged by one year), and an interaction between the two variables. We control for the same set of country factors as we do in our previous tests (GDP, GDP Growth, GDP Per Capita, Investment Profile and Quality of Institutions of both the acquirer and target countries, and exchange rate growth and exchange rate volatility between acquirer and target countries).

Table 8 presents the results. In panel A, we focus on the inbound merger activity and, in Panel B, on the outbound activity. In each case, we report results for the entire sample period using the full panel of all pairwise country combinations, so the dependent variable is country-pair-year. Note that all five specifications include country-pair fixed-effects, which will absorb all of the time-invariant factors like language similarity, cultural proximity, geographical proximity, etc. that will affect cross-border merger activity between the two countries. In Column 1, we add only our trade flow variable. In Columns 2 to 5, we report specifications with the addition of centrality measures and their interaction with the trade flow variable. Our trade network variable is strongly and consistently positively significant, demonstrating that within country-pair variation in the strength of trade flows between the two countries predicts variation in

each country's inbound and outbound cross-border merger activity. Not only is this highly statistically significant but also the economic effect is sizeable: using column 2 specifications in each panel, an increase in lagged imports between a given country-pair from the 25th to 75th percentile value predicts a 13% (25%) increase in the proportion of the inbound (outbound) subject country's mergers with the connected country with respect to the sample average.

Centrality, whether measured as degree or eigenvector, is positive and highly significant for inbound merger activity (Panel A) and negative and significant for outbound merger activity in the full models (Panel B, specifications 4 and 5): more central countries absorb proportionally more mergers but originate fewer ones. This likely reflects the fact that more central countries have more active domestic M&A markets. However, the interaction of centrality and trade flows is positive and significant both for inbound and outbound merger activity, such that the cross-border merger activity of central countries is more sensitive to the strength of the country's trade connections. This last result highlights the importance of trade flows' intensity in the diffusion of cross-border M&A activity.

5.8 Granger Causality

Panels A and B of Table 8 provide evidence that lagged trade flows and network centrality are driving cross-border merger activity. But does lagged cross-border merger activity itself predict trade flow intensity? To investigate this issue, we implement a Granger causality test (Granger, 1969). The Granger causality test rests on a panel vector auto-regression composed of two equations (one for modelling the dynamic of merger activity and the second, the dynamic of trade-flows) at the country-pair level (e.g., Greene 2012). Cross-border merger activity and trade flows intensity are measured as for inbound and outbound merger analyses. Table 9 reports the results for a specification with two lags. We obtain similar results with one lag and three lags and with the inclusion of acquirer and target control variables¹³ Cross-border merger activity and trade flows are clearly auto-correlated, as auto-regressive coefficients are highly

¹³ The inclusion of country specific control variable raises numerical convergence problems.

significant at both lags and in both equations. This is consistent with the existence of M&A waves and business cycles. The Granger causality Wald test clearly supports the conclusion that trade flows *Granger cause* merger activity and but not the reverse.

6. Evidence on the learning mechanism at play

In Section 2, we introduce the learning and exposure mechanism that we hypothesize to be driving the relation between trade flows and cross-border M&A activity. Ahern and Harford (2014) provide evidence that economic exposure to related industries helps explain M&A spillovers across the U.S. industry network. Our results support the conclusion that economic exposure also contributes to cross-border M&A flows. Our international setting offers us the opportunity to investigate the role of learning as an additional driver of M&A diffusion. Indeed, while the U.S. context is characterized by a high level of homogeneity of business practices and conditions, international activities take place in heterogeneous environments that requires significant time and effort to master. As emphasized in Section 2, cross-border acquisitions face many sources of complexity such as legal requirements specific to the target country, particular political institutions, accounting and fiscal idiosyncrasies and different social and cultural values. We posit that by doing business abroad, firms adapt themselves and learn to behave in these new environments. But learning is not observable per se and therefore, validation of this learning mechanism can only rely on indirect evidence. We report three sets of such evidence in this Section. We first track a cohort of IPO firms to test whether export activities predate cross-border M&A activities, as should be the case under the learning hypothesis. Next, we study whether barriers to learning, measured by cultural differences, impede the relation between trade-flows and cross-border M&As, again consistent with learning being a driver this relation. Then, we investigate the extent to which environments offering better protection of property rights foster the relation between trade flows and cross-border M&As as it should be if learning generates positive returns for acquirers. Having sufficient evidence that learning is at work, we finally investigate whether learning creates value for acquirers.

6.1 Evidence from a Cohort of Firms post-IPO

As we explain in Section 2, ideally, we would follow firms post-IPO and track their country-specific trade and acquisition activity, but that is not feasible with available data. In this subsection, we provide suggestive evidence based on what data we can see for firms post-IPO. Specifically, we identify a sample of firms with an IPO in 1994 or later, listed for 10 consecutive years post-IPO with at least one cross-border acquisition. Further, we limit the sample to firms that were smaller than the median IPO (to ensure that the firm went public early in its lifecycle). For this sample of 85 firms, we collect foreign sales from Datastream and then implement a Granger causality test firm-by-firm using a VAR model relating foreign sales and M&A transactions). Figure 6 shows the distribution of coefficients and Chi-squared tests from the exercise. We implement the Dumitrescu and Hurlin (2012) test of Granger causality of heterogenous panels to obtain a sample wide statistic. The test confirms that foreign sales “Granger causes” cross-border M&As at a very high level of statistical significance, consistent with predictions of the learning mechanism.

6.2 Evidence from cultural differences

Ahern et al. (2015) emphasize that cultural differences generate significant frictions that hamper merging parties’ integration. Assuming that cultural differences are barriers to learning, the learning mechanism predicts it will take more trade to learn sufficiently to overcome larger cultural differences and be ready to acquire. Thus, the impact of a given amount of trade on cross-border M&A activity will be weaker when cultural differences are greater. We test this prediction in this Section. We measure cultural differences using the Hofstede’s four culture dimensions (Hofstede 2001). The four dimensions are individualism, uncertainty avoidance, power distance and future orientation. Cultural differences between country pairs are measured using the Euclidean distance¹⁴. Variable definitions and data sources are provided in Appendix 1. We follow the same strategy as in Section 5.7 and study the determinants of cross-border M&A activity at the country-pair level. We add, as determinants of cross-border M&A activity,

¹⁴ We obtain similar results using the Mahalanobis distance, that controls for differences in measurement scales and for collinearity (unreported).

cultural distance and an interaction term between lagged trade links and cultural distance. Table 10 Panel A reports results for inbound M&A activity and Panel B for outbound activity. In Column 1, results are obtained using the aggregate measure of cultural distance while in columns 2 to 5, each cultural dimension difference is used in turn. The results strongly support the prediction that cultural distance acts as a barrier to cross-border M&A activity: in both panels and in each specification, the cultural distance coefficient is negative and strongly statistically significant. Moreover, the coefficient of the interaction term between cultural distance and our trade flow measure is always negative, and statistically significant in eight specifications out of ten (and strongly so in six specifications): not only is cultural distance a barrier to learning, but moreover, consistent with the learning mechanism prediction, cultural distance weakens the effect of a given amount of trade on future cross-border activities. It is worthwhile to note that these results are obtained after controlling for a host of acquirer and target country time varying characteristics, acquirer and target country fixed effects, year fixed effects and explicitly controlling for the geographical distance between country-pairs¹⁵.

6.3 Incentives to learn

Learning to do business abroad is attractive only if the foreign environment provides enough guarantees that profits originating from these activities will accrue to the outside firm: property rights protection matters. Under the learning mechanism, we expect therefore that the better the quality of the foreign country property rights protection, the higher the incentives to learn and adapt oneself to the foreign environment, the more trade-flows should predict cross-border M&As. We use several variables to proxy for the protection of property rights in the foreign country: the country investment profile, provided by the ICRG¹⁶, that accounts for risk of expropriation, payment delays and repatriation of profits (high score means low risk), the country quality of institutions, also provided by ICRG, that aggregates measures of corruption,

¹⁵ Note also that we obtain similar results using Eigenvector centrality to control the subject country position in the country network (see Internet Appendix Table Internet Appendix J).

¹⁶ Available at <https://www.prsgroup.com/explore-our-products/international-country-risk-guide/>.

law and order and bureaucratic quality (again, high score means high quality), and its individual components. As the learning prediction bears on the interaction between the foreign country environment characteristics and the transmission of M&A activity through trade-flows, we adopt again the same specification as in Section 5.7 and add the measure of foreign country property rights protection and its interaction with lagged trade link intensity. Results are reported in Table 11, where firms in the subject country would be evaluating the protection of property rights in the connected (foreign) country. Column 1 displays estimates using investment profile as a measure of property rights, Column 2 using quality of institutions and columns 3 to 5, the components of the latter. The results are strong: coefficients on the interaction terms between our measure of property rights protection and *Connected M&A* are all positive and highly significant, consistent with the learning mechanism prediction. Even more strikingly, the *Connected M&A* coefficient estimates themselves are no longer statistically significant, suggesting that the positive relation between *Connected M&A* variables and cross-border M&A activity reported in Table 3 is driven by the sub-sample of countries offering strong protection of non-domestic investor property rights¹⁷.

Having consistent evidence that export activities help firms to understand the potential and practices of foreign environments, we finally investigate whether this learning process generates value for acquirers, which would establish the incentives that explain the motivation for our learning mechanism to be at play. As explained in Section 2, despite in-depth investigations of SEC filings and analyst reports, we have been unable to collect firm-level data on exports either by geographic areas or even aggregated (the data are typically disclosed as foreign sales (whether exported or produced abroad)). We use as proxy of exports firm-level aggregated foreign sales collected in the Worldscope database, aware that this measure is highly noisy because it encompasses both exports and sales by foreign subsidiaries and doesn't provide information on the specific geographic areas towards which foreign activities are targeted. We measure the value effect of the transaction on the acquirer using the acquirer cumulative abnormal returns (CAR), computed over the

¹⁷ Note also that we obtain similar results using Eigenvector centrality to control the subject country position in the country network (see Internet Appendix Table Internet Appendix K).

[-5, +5] window centered on the announcement date. Abnormal returns are obtained using the market model, the coefficients of which are estimated over the 236-day window, starting 30 days before the announcement date. We include in our specifications a host of acquirer and target country characteristics, acquirer and target country fixed-effects as well as year fixed-effects. Because we show in Table 10 that cultural distance is a barrier to learning, we also investigate the interaction between our learning driver (foreign sales) and the Hofstede-based measure of cultural distance. Table 12 displays estimation results. In Column 1, the subject (acquirer country) foreign sales variable coefficient is positive and statistically significant: assuming that foreign sales help a firm to learn how to develop business activities abroad, the incentive condition is met: learning creates value. In Column 2, the coefficient of the cultural distance variable is negative and statistically significant, confirming the Ahern et al. (2015) results. The interaction between subject foreign sales and cultural distance variables is positive and significant: the higher the barriers to learning, the more learning is value creating, a result that again supports the existence of incentives for acquirers to engage in learning activities.

While there is no perfect test for the learning mechanism given the data available, our conclusion based on the totality of the evidence in Section 6 is that learning is a contributing mechanism behind the sensitivity of a firm's acquisition activity to acquisition activity in trading-partner countries.

7. Conclusion

Markets around the world have become increasingly integrated and both trade and cross-border merger activity have increased. In this paper, we try to further our understanding of the drivers of merger activity by establishing the sign and magnitude of the cross-border transmission of merger activity via trade relationships. To do so, we take a network approach, which, in the context of gravity models, allows us to account for all the sources of gravity in the economic system simultaneously, rather than pair-by-pair.

We find that both the trade and merger networks have become increasingly dense over the past 28 years. Accounting for a number of country characteristics, we show that merger activity in countries

connected to the subject country through trade strongly explains merger activity in the subject country, even controlling for lagged merger activity in the subject country. The economic importance of the results is emphasized by the fact that they largely hold for both cross-border mergers and domestic mergers.

Our additional analyses point to a causal channel for trade: using import tariff reductions and trade sanctions as instruments for trade flows, M&A activity in connected countries remains a strong predictor of high M&A activity in the subject country. Our country-pair level analysis demonstrates that, controlling for proximity, language, culture, etc., variation over time in trade intensity between two countries strongly predicts the proportion of their overall merger activity that will be with each other. This result holds for inbound mergers (mergers initiated by the connected country) and outbound mergers (mergers initiated by the subject country). A Ganger causality test moreover confirms that, while trade flows predict merger activity, the reverse is not true. Finally, we report evidence consistent with learning being an important driver of the role of trade as a channel of M&A spillovers across the world.

Overall, our results establish that the network of trade flows serves as a channel through which merger activity propagates not only across borders, but also domestically, eventually aggregating to a global merger wave. They also emphasize the implication that the influence of external activity on domestic merger activity will continue to grow as trade connections grow.

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Figure 1 – Cisco M&A activities and Exports trade flows:

The figure displays Cisco export sales over the 1989 to 1997 period. Corresponding Cisco M&A activities (Subfigure A), split between domestic transactions and cross-border ones are reported in Subfigure B.

Subfigure A – Cisco Exports

Subfigure B – Cisco M&A activities

Figure 2 – Cross-border Mergers:

The figure shows cross-border mergers and acquisitions across 74 countries for period starting from 1989 to 2016. (Source: SDC Database)

Figure 3 – Exports Network:

Subfigures A to C show the exports network based on \$ value in years 1989, 2002 and 2016, respectively. The size of the nodes represents the degree of centrality and thickness of edges presents the \$ value of exports between partner countries. Degree centrality is a country's number of intercountry connections.

Subfigure A - Exports Network based on \$ Value (1989)

Subfigure B - Exports Network based on \$ Value (2002)

Subfigure C - Exports Network based on \$ Value (2016)

Figure 4 – Exports Network of Top 15 Central Countries:

Subfigures A to C show the exports network of top 15 most central countries based on \$ value in years 1989, 2002 and 2016, respectively. The size of the nodes represents the degree of centrality and thickness of edges presents the \$ value of exports between partner countries. Degree centrality is a country's number of intercountry connections.

Subfigure A - Exports Network based on \$ Value (1989)

Subfigure B - Exports Network based on \$ Value (2002)

Subfigure C - Exports Network based on \$ Value (2016)

Figure 5 - Merger Network:

Subfigures A to C show the merger network based on \$ value in years 1989, 2002 and 2016, respectively. The size of the nodes represents the degree of centrality and thickness of edges presents the \$ value of mergers between partner countries. Degree centrality is a country's number of intercountry connections.

Subfigure A – Merger Network (1989)

Subfigure B – Merger Network (2002)

Subfigure C – Merger Network (2016)

Figure 6 Evidence a Cohort of Firms post-IPO

The figure displays the distribution for the coefficient and Chi-squared test statistic of lagged foreign sales on current cross-border M&A transaction in our sample of 85 firms post-IPO.

Table 1 - Summary Statistics:

This table presents the summary statistics of the sample between 1989 and 2016.

Panel A - International Trade

This table presents summary statistics for international trade flows (Imports and Exports). The trade data is from UN ComTrade Database. Intercountry pairs include all combinations of country pairs. Intercountry pairs >1% are those observations where either Imports % or Export % is greater than 1%. Imports % is the percentage of country j 's products that are purchased by country i . Export % is the percentage of country i 's products that are purchased by country j . All numbers are in percentages.

	Imports %		Exports %	
	Intercountry Pairs	Intercountry Pairs>1%	Intercountry Pairs	Intercountry Pairs>1%
Mean	1.13	4.87	1.18	5.48
Median	0.11	2.67	0.11	2.70
5th Percentile	0.00	1.09	0.00	1.09
95th Percentile	5.52	16.32	5.48	19.66
Frequency Percentages				
0% to 1%	79.32	-	80.90	-
1% to 2%	7.72	37.33	7.05	36.89
2% to 3%	3.64	17.60	3.34	17.47
3% to 4%	2.24	10.81	1.92	10.07
4% to 5%	1.50	7.27	1.31	6.88
>5%	5.58	27.00	5.48	28.69

Panel B - Cross-Border Mergers

This table presents summary statistics for the sample of mergers over the period 1989 to 2016. Merger data are from SDC. Reported in brackets are 2016 millions of U.S. dollars.

	Cross-Border Pairs	Country Level	
		Cross-Border	Domestic
Number of Observations	5,402	74	74
Total Mergers	49,905	49,905	174,899
	[\$16,710,453]	[\$16,710,453]	[\$41,548,499]
Mean	9	674	2,364
	[\$3,087]	[\$225,817]	[\$561,466]
Median	0	109	332
	[\$0]	[\$25,090]	[\$42,903]
5th Percentile	0	5	20
	[\$0]	[\$135]	[\$761]
95th Percentile	29	2,117	10,371
	[\$7,057]	[\$1,306,241]	[\$1,451,998]
Maximum	2,968	10,440	67,001
	[\$971,953]	[\$3,360,558]	[\$24,327,962]
Frequency Percentages			
None	61.51	-	-
1	10.57	-	-
2 to 5	12.62	5.41	-
6 to 20	8.98	17.57	5.41
21 to 50	3.05	14.86	18.92
>50	3.26	62.16	75.68

Table 2: Networks Centrality

Panel A lists the most central countries in the imports-exports and merger networks (based on Degree Centrality). Panel B describes the correlation between country centrality across networks (either Degree Centrality or Eigenvector Centrality). Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. In panel A, * indicates a merger country also in top 15 Imports/Exports countries and in Panel B, statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A - The Most Central Countries in the Imports-Exports and Merger Networks:

Rank	Import Network	Export Network	Merger Network
1	United States	United States	*United States
2	Germany	Germany	*United Kingdom
3	China	China	*France
4	Japan	Japan	*Germany
5	United Kingdom	France	*Netherlands
6	France	United Kingdom	*Canada
7	Italy	Italy	Switzerland
8	Belgium	Belgium	Australia
9	Hong Kong	Canada	*Japan
10	Canada	Netherlands	*Spain
11	Netherlands	Hong Kong	*Hong Kong
12	South Korea	South Korea	*Belgium
13	Spain	Russia	*China
14	Mexico	Singapore	Sweden
15	Singapore	Mexico	*Italy

Panel B - Correlation between Country Centrality across Networks

	Degree Centrality: Imports Network	Degree Centrality: Exports Network	Eigenvector Centrality: Imports Network	Eigenvector Centrality: Exports Network
Degree Centrality: Exports Network	***0.936			
	0.000			
Degree Centrality: Mergers Network	***0.604	***0.487		
	0.000	0.000		
Eigenvector Centrality: Exports Network			***0.946	
			0.000	
Eigenvector Centrality: Mergers Network			***0.429	***0.452
			0.000	0.000

Table 3: The Propagation of Merger Activity through the Trade Network – Country Level

This table reports the effects trade-weighted M&A activity of connected countries on M&A activity of subject country at country level. The dependent variable is High M&A State, defined as the country's cross-border/domestic merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration, and is based on the number of M&A transactions. The independent variables are trade-weighted connected M&As (defined in text). Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. M&A Activity is the aggregate worldwide M&A activity defined, as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Panel A and B present the results of cross-border and domestic merger waves, respectively. Estimates are obtained using the Arellano-Bond estimator for dynamic panel specification. Standard errors are corrected for heteroscedasticity and clustered at country level (p-value is reported below the coefficient estimate). Inclusion of fixed effects is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A – Cross-border waves based on the number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.207 0.000	***0.224 0.000	***0.217 0.000	***0.217 0.000	***0.211 0.000	***0.231 0.000	***0.205 0.000	***0.207 0.000
Connected M&A: Subject Imports from Connected	***16.549 0.000				***16.937 0.000			
Connected M&A: Connected Imports from Subject		2.700 0.200				3.005 0.180		
Connected M&A: Subject Exports to Connected			***17.289 0.000				***17.227 0.000	
Connected M&A: Connected Exports to Subject				**3.624 0.030				**3.359 0.030
Degree Centrality	-0.071 0.590	0.176 0.300	-0.081 0.280	0.015 0.880				
Degree Centrality x M&A Activity	***3.382 0.000	**2.168 0.030	***2.988 0.000	*1.694 0.080				
Eigenvector Centrality					1.129 0.730	2.874 0.360	2.574 0.410	5.766 0.080
Eigenvector Centrality x M&A Activity					***75.716 0.010	37.187 0.270	***98.448 0.000	*55.973 0.090
Connected Exchange Rate Growth: Trade Weighted	***0.082 0.000	***0.073 0.000	***0.087 0.010	**0.086 0.030	***0.081 0.000	***0.070 0.000	***0.084 0.010	**0.086 0.030
Connected Exchange Rate Volatility: Trade Weighted	-0.001 0.330	0.000 0.990	-0.002 0.160	*-0.001 0.100	-0.001 0.290	0.000 0.820	-0.002 0.200	*-0.001 0.100
Investment Profile	-0.026 0.110	-0.020 0.250	-0.022 0.200	-0.017 0.300	-0.018 0.280	-0.012 0.490	-0.027 0.110	-0.025 0.140
Quality of Institutions	**0.045 0.050	*0.046 0.100	*0.047 0.070	0.036 0.190	0.036 0.110	0.040 0.170	*0.048 0.060	0.039 0.150
GDP	0.080 0.860	0.113 0.850	0.328 0.470	0.113 0.820	0.095 0.830	0.210 0.720	0.255 0.570	-0.055 0.920
GDP Growth	***0.014 0.000	***0.014 0.000	***0.015 0.000	***0.018 0.000	***0.013 0.000	***0.015 0.000	***0.013 0.000	***0.016 0.000
Per Capita GDP	0.184 0.710	0.053 0.930	0.011 0.980	0.176 0.730	0.119 0.800	0.044 0.940	-0.091 0.840	0.185 0.730
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1261	1261	1255	1255	1261	1261
Chi ²	1836.236	2090.324	1879.689	2068.534	1535.141	1734.584	1571.27	1904.67

Panel B – Domestic waves based on number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.252	***0.241	***0.250	***0.239	***0.247	***0.242	***0.249	***0.241
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connected M&A: Subject Imports from Connected	*7.859				**8.781			
	0.080				0.050			
Connected M&A: Connected Imports from Subject		2.144				2.365		
		0.130				0.110		
Connected M&A: Subject Exports to Connected			6.964				7.131	
			0.110				0.110	
Connected M&A: Connected Exports to Subject				***4.382				***4.235
				0.000				0.000
Degree Centrality	-0.019	*0.231	-0.116	0.091				
	0.880	0.090	0.260	0.470				
Degree Centrality x M&A Activity	***5.760	2.560	***4.810	2.019				
	0.000	0.140	0.000	0.170				
Eigenvector Centrality					1.364	2.287	*-6.430	-4.233
					0.680	0.560	0.060	0.260
Eigenvector Centrality x M&A Activity					***140.376	48.688	***185.033	**96.352
					0.000	0.330	0.000	0.040
Connected Exchange Rate Growth: Trade Weighted	***-0.090	***-0.094	***-0.089	***-0.091	***-0.092	***-0.096	***-0.088	***-0.090
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connected Exchange Rate Volatility: Trade Weighted	-0.002	0.000	-0.001	0.000	*-0.002	0.000	-0.001	0.001
	0.110	0.830	0.400	0.690	0.090	0.800	0.470	0.470
Investment Profile	0.018	0.023	0.025	0.014	*0.028	*0.030	0.018	0.006
	0.290	0.160	0.140	0.380	0.100	0.060	0.290	0.740
Quality of Institutions	0.025	0.022	0.014	0.017	0.019	0.019	0.015	0.016
	0.330	0.370	0.580	0.490	0.450	0.420	0.570	0.500
GDP	0.016	0.260	-0.026	0.040	0.039	0.305	-0.018	0.093
	0.970	0.600	0.950	0.930	0.930	0.570	0.970	0.850
GDP Growth	0.003	0.000	0.006	0.005	0.004	0.002	0.007	0.006
	0.420	0.950	0.140	0.240	0.320	0.620	0.120	0.170
Per Capita GDP	0.056	-0.218	0.238	0.174	0.064	-0.107	0.274	0.255
	0.900	0.690	0.610	0.740	0.890	0.850	0.540	0.610
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1261	1261	1255	1255	1261	1261
Chi²	1762.456	1888.476	1690.019	947.124	2130.464	1947.818	2030.479	1113.271

Table 4: The Propagation of Merger Activity through the Trade Network – Industry Level

This table reports the effects trade-weighted M&A activity of connected countries on M&A activity of subject country at industry level. The dependent variable is High M&A State, defined as the country-industry's cross-border/domestic merger activity being in the highest quartile of all values for that country-industry over the sample period in the year under consideration, and is based on the number of M&A transactions. The independent variables are trade-weighted connected M&As (defined in text). Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. M&A Activity is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Panel A and B present the results of cross-border and domestic merger waves, respectively. Estimates are obtained using the Arellano-Bond estimator for dynamic panel specification. Standard errors are corrected for heteroscedasticity and clustered at country-industry level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A – Cross-border waves based on the number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.148	***0.150	***0.142	***0.146	***0.152	***0.154	***0.147	***0.152
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connected M&A: Subject Imports from Connected	**1.547				**1.570			
	0.020				0.020			
Connected M&A: Connected Imports from Subject		0.330				0.308		
		0.150				0.180		
Connected M&A: Subject Exports to Connected			***2.025				***2.241	
			0.000				0.000	
Connected M&A: Connected Exports to Subject				***0.748				***0.803
				0.000				0.000
Degree Centrality	**0.293	***0.313	0.159	0.190				
	0.020	0.010	0.220	0.140				
Degree Centrality x M&A Activity	-0.721	-0.772	0.373	0.224				
	0.490	0.470	0.720	0.830				
Eigenvector Centrality					-0.019	-0.025	0.105	0.114
					0.850	0.810	0.310	0.270
Eigenvector Centrality x M&A Activity					2.404	2.697	-2.957	-3.003
					0.290	0.240	0.200	0.200
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3481	3481	3501	3501	3481	3481	3501	3501
Chi ²	247.05	245.61	281.11	267.44	261.50	265.89	278.09	262.49

Panel B – Domestic Waves based on the number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.199	***0.201	***0.185	***0.187	***0.196	***0.197	***0.198	***0.201
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connected M&A: Subject Imports from Connected	1.081				0.948			
	0.120				0.180			
Connected M&A: Connected Imports from Subject		0.221				0.180		
		0.320				0.410		
Connected M&A: Subject Exports to Connected			0.855				**1.147	
			0.170				0.050	
Connected M&A: Connected Exports to Subject				-0.092				-0.037
				0.690				0.870
Degree Centrality	-0.113	-0.099	**0.335	***0.352				
	0.430	0.500	0.020	0.010				
Degree Centrality x M&A Activity	1.139	1.036	0.193	0.195				
	0.400	0.450	0.900	0.900				
Eigenvector Centrality					0.144	0.144	0.044	0.040
					0.320	0.320	0.750	0.770
Eigenvector Centrality x M&A Activity					0.987	1.058	-0.217	-0.026
					0.760	0.750	0.950	0.990
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3481	3481	3501	3501	3481	3481	3501	3501
Chi ²	517.97	520.95	507.82	516.09	535.89	539.43	519.43	527.12

Table 5 – Instrumental Variables Estimates

This table replicates Table 3 results using an instrumental variable approach. The dependent variable is High M&A State, defined as the country's cross-border merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration, and is based on the number of M&A transactions. Trade flows are instrumented by first stage regressions on significant tariff cuts and trade sanctions between country pairs, as described in Section 5.3. Trade-weighted connected M&As independent variables are then recomputed using the predicted trade-flows obtained from the first stage regressions (the first stage Fisher test of tariff cuts and trade sanctions joint significance is 8,763.12, strongly rejecting absence of statistical significance). Degree centrality is a country's number of intercountry connections. M&A Activity is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Estimates are obtained using the Arellano-Bond estimator for dynamic panel specification. Standard errors are reported only for independent variables and obtained using a bootstrap procedure that accounts for the two stage least square procedure (p-value is reported below the coefficient estimate), as described in Section 5.3. Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.225 0.004	***0.227 0.004	***0.235 0.004	***0.235 0.004	***0.233 0.006	***0.234 0.010	***0.218 0.004	***0.219 0.004
Connected M&A: Subject Imports from Connected	**9.096 0.026				**8.718 0.028			
Connected M&A: Connected Imports from Subject		**10.177 0.018				**9.827 0.024		
Connected M&A: Subject Exports to Connected			**9.820 0.030				**9.825 0.026	
Connected M&A: Connected Exports to Subject				**9.886 0.028				**9.591 0.036
Degree Centrality	0.065 0.662	0.059 0.734	-0.087 0.430	-0.081 0.464				
Degree Centrality x M&A Activity	**3.323 0.016	**3.449 0.016	***2.945 0.010	**2.968 0.020				
Eigenvector Centrality					4.343 0.384	3.863 0.370	5.704 0.188	5.190 0.208
Eigenvector Centrality x M&A Activity					*68.805 0.064	*71.321 0.094	**88.603 0.050	*90.116 0.058
Connected Exchange Rate Growth: Trade Weighted	0.090 0.232	0.092 0.214	0.096 0.358	0.098 0.320	0.090 0.226	0.092 0.204	0.092 0.330	0.094 0.316
Connected Exchange Rate Volatility: Trade Weighted	-0.001 0.556	-0.001 0.646	*-0.002 0.068	-0.002 0.078	-0.001 0.560	-0.001 0.598	-0.002 0.086	*-0.002 0.072
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1261	1261	1255	1255	1261	1261
Chi ²	2765.44	2686.17	3495.01	3302.56	2926.52	2859.69	2484.70	2569.08

Table 6 – Placebo Tests

This table reproduces Table 3 estimates after shuffling trade flow across countries. The dependent variable is High M&A State, defined as the country's cross-border/domestic merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration, and is based on the number of M&A transactions. The independent variables are scrambled trade-weighted connected M&As. Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. M&A Activity is the aggregate worldwide M&A activity defined, as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Panel A and B present the results of cross-border and domestic merger waves, respectively. Estimates are obtained using the Arellano-Bond estimator for dynamic panel specification. Standard errors are corrected for heteroscedasticity and clustered at country level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A – Cross-border waves based on the number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.234 0.000	***0.245 0.000	***0.238 0.000	***0.236 0.000	***0.246 0.000	***0.255 0.000	***0.216 0.000	***0.219 0.000
Connected M&A: Subject Imports from Connected	-0.085 0.140				-0.065 0.280			
Connected M&A: Connected Imports from Subject		0.001 0.990				0.005 0.940		
Connected M&A: Subject Exports to Connected			0.028 0.290				0.015 0.570	
Connected M&A: Connected Exports to Subject				-0.009 0.770				-0.009 0.770
Degree Centrality	0.230 0.180	0.134 0.430	-0.044 0.610	-0.052 0.560				
Degree Centrality x M&A Activity	***3.452 0.000	***2.909 0.000	***3.017 0.000	***3.117 0.000				
Eigenvector Centrality					6.155 0.110	2.900 0.420	***8.145 0.010	*5.568 0.080
Eigenvector Centrality x M&A Activity					*62.144 0.070	*60.164 0.060	***85.629 0.010	***90.227 0.010
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1261	1261	1255	1255	1261	1261
Chi ²	2700.88	2516.25	2719.08	3343.78	2834.93	2453.55	2355.22	3115.00

Panel B – Domestic waves based on the number of transactions

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.263	***0.256	***0.242	***0.267	***0.268	***0.252	***0.242	***0.265
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Connected M&A: Subject Imports from Connected	-0.067				-0.050			
	0.400				0.540			
Connected M&A: Connected Imports from Subject		0.020				0.017		
		0.800				0.830		
Connected M&A: Subject Exports to Connected			0.014				0.012	
			0.660				0.720	
Connected M&A: Connected Exports to Subject				-0.019				-0.022
				0.560				0.490
Degree Centrality	0.196	0.179	-0.033	0.018				
	0.190	0.220	0.780	0.880				
Degree Centrality x M&A Activity	***5.193	***5.227	***4.778	***4.136				
	0.000	0.000	0.000	0.010				
Eigenvector Centrality					-1.572	1.680	-4.778	-2.271
					0.710	0.670	0.220	0.520
Eigenvector Centrality x M&A Activity					***109.989	***119.176	***182.364	***158.846
					0.030	0.010	0.000	0.000
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1261	1261	1255	1255	1261	1261
Chi ²	1764.54	1388.53	2341.07	1567.80	2836.20	1329.14	2611.62	1890.03

Table 7 – Controlling for Market Valuation Differences, Geographical Distance, Cultural Distance and Connected Stock Returns Correlations

This table reproduces Table 3 estimates controlling for additional country characteristics. The dependent variable is High M&A State, defined as the country's cross-border merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration, and is based on the number of M&A transactions. The independent variables are trade-weighted connected M&As (defined in text). Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. M&A Activity is the aggregate worldwide M&A activity defined, as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Estimates are obtained using the Arenalio-Bond estimator for dynamic panel specification. Standard errors are corrected for heteroscedasticity and clustered at country level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

	1	2	3	4	5	6	7	8
Lagged High M&A State	***0.228 0.000	***0.236 0.000	***0.234 0.000	***0.235 0.000	***0.231 0.000	***0.246 0.000	***0.220 0.000	***0.220 0.000
Connected M&A: Subject Imports from Connected	**12.558 0.020				***13.601 0.010			
Connected M&A: Connected Imports from Subject		1.869 0.360				2.004 0.360		
Connected M&A: Subject Exports to Connected			***14.287 0.000				***14.585 0.000	
Connected M&A: Connected Exports to Subject				**3.490 0.030				**3.079 0.050
Degree Centrality	-0.108 0.570	0.186 0.440	-0.018 0.850	0.167 0.250				
Degree Centrality x M&A Activity	***4.083 0.000	**3.068 0.030	***3.356 0.010	1.823 0.130				
Eigenvector Centrality					0.024 0.990	1.428 0.670	2.979 0.430	***8.757 0.010
Eigenvector Centrality x M&A Activity					***114.232 0.000	*75.884 0.100	***133.584 0.000	*75.545 0.080
Connected Stock Market Valuation Differences: Trade Weighted	0.173 0.110	***0.126 0.010	0.176 0.200	0.062 0.200	0.172 0.120	**0.120 0.030	0.189 0.200	0.053 0.210
Connected Geographical Distance: Trade Weighted	***0.350 0.010	***0.392 0.000	0.130 0.250	0.070 0.530	**0.289 0.030	***0.331 0.010	0.075 0.500	-0.009 0.930
Connected l Distance: Trade Weighted	0.029 0.900	** -0.292 0.020	0.240 0.280	0.198 0.290	0.072 0.750	-0.191 0.160	0.301 0.180	**0.367 0.030
Connected Stock Return Correlations: Trade Weighted	-0.069 0.450	-0.021 0.810	-0.066 0.460	-0.016 0.860	-0.081 0.390	-0.034 0.710	-0.071 0.440	-0.015 0.870
Country Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	911	911	917	917	911	911	917	917
Chi ²	3990.727	8217.821	3738.101	3724.222	3421.339	7559.716	5698.039	3582.565

Table 8 - Cross-border activity at the country-pair level:

This table reports results of regressions of subject country cross-border M&A activity on lagged trade links between subject and connected countries at the country-pair level. The dependent variable is Country-pair Merger Activity, defined as either proportion of country j 's merger with country i , relative to all of j 's cross-border mergers (*for inbound*) or proportion of country i 's merger with country j , relative to all of i 's cross-border mergers (*for outbound*). The independent variable is 'Subject Imports from Connected', defined as country i 's imports from country j , relative to all of i 's imports, lagged by one period. Degree centrality is a country's number of intercountry connections. Eigenvector centrality score is assigned to a country considering centrality scores of connected countries. M&A Activity is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Panel A reports the results of inbound merger activity and Panel B reports the results of outbound merger activity. Estimates are obtained using the fixed effects regression model. Standard errors are corrected for heteroscedasticity and clustered at country-pair level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A – Inbound Merger Activity

	1	2	4	3	5
Subject Imports from Connected	***0.141 0.000	***0.068 0.001	***0.064 0.003	***0.060 0.004	**0.052 0.020
Degree Centrality		***0.028 0.000		***0.024 0.000	
Degree Centrality * Subject Imports from Connected		***0.732 0.000		***0.733 0.000	
Eigenvector Centrality			***0.071 0.000		***0.043 0.000
Eigenvector Centrality * Subject Imports from Connected			**1.337 0.027		**1.336 0.025
Acquirer Country Characteristics	No	No	No	Yes	Yes
Target Country Characteristics	No	No	No	Yes	Yes
Country-Pair Time Variant Characteristics	No	No	No	Yes	Yes
Country-Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	124496	124496	124496	124496	124496
Adjusted R ²	0.010	0.074	0.043	0.076	0.048

Panel B – Outbound Merger Activity

	1	2	3	4	5
Subject Imports from Connected	***0.363 0.000	***0.307 0.000	***0.267 0.000	***0.279 0.000	***0.237 0.000
Degree Centrality		-0.001 0.422		***-0.010 0.000	
Degree Centrality * Subject Imports from Connected		**0.527 0.011		**0.509 0.011	
Eigenvector Centrality			-0.002 0.395		***-0.026 0.000
Eigenvector Centrality * Subject Imports from Connected			***1.684 0.000		***1.677 0.000
Acquirer Country Characteristics	No	No	No	Yes	Yes
Target Country Characteristics	No	No	No	Yes	Yes
Country-Pair Time Variant Characteristics	No	No	No	Yes	Yes
Country-Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	124496	124496	124496	124496	124496
Adjusted R ²	0.070	0.078	0.083	0.084	0.089

Table 9: Granger Causality Test

The table reports the results of a Granger causality test (Granger, 1969) between merger activity and trade flows. The Granger causality test rests on a panel vector auto-regression composed of two equations (one for modelling the dynamic of merger activity and the second, the dynamic of trade-flows) at the country-pair level. Cross-border merger activity and trade flows intensity are measured as for inbound and outbound merger analyses. P-value is reported below the coefficient estimates. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively. The Wald statistics test the null hypothesis of absence of causal relation from imports to mergers (left Column) and from mergers to imports (right Column).

<i>Response of</i>	<i>Response to</i>	
	Mergers _t	Imports _t
Mergers _{t-1}	***0.301 0.000	0.000 0.695
Mergers _{t-2}	***0.021 0.000	0.000 0.580
Imports _{t-1}	***1.512 0.000	***0.941 0.000
Imports _{t-2}	-0.243 0.186	***0.044 0.338
Wald Test (<i>Prob>Chi2</i>)		
Response of <i>Imports</i> to <i>Mergers</i>	***19.973	
Response of <i>Mergers</i> to <i>Imports</i>		0.307
Number of Observations	10723	
Number of Country-pairs	1899	

Table 10: Cross-border activity at the country-pair level – The role of cultural distance

This table reports results of regressions of subject country cross-border M&A activity on lagged trade links between subject and connected countries and its interaction with the cultural distance at the country-pair level. The dependent variable is Country-pair Merger Activity, defined as either proportion of country j 's merger with country i , relative to all of j 's cross-border mergers (*for inbound*) or proportion of country i 's merger with country j , relative to all of i 's cross-border mergers (*for outbound*). The independent variables are 'Subject Imports from Connected', defined as country i 's imports from country j , relative to all of i 's imports, lagged by one period, 'Cultural Distance', calculated using Euclidian formula and is either based on Hofstede's four culture dimension or based on Hofstede's individual culture dimension and interaction of the both. Degree centrality is a country's number of intercountry connections. M&A Activity is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016. Panel A reports the results of inbound merger activity and Panel B reports the results of outbound merger activity. Column 1 reports the results for cultural distance based on Hofstede's four culture dimensions and columns 2-5 reports the results of cultural distance based on individual culture dimension. Estimates are obtained using the fixed effects regression model. Standard errors are corrected for heteroscedasticity and clustered at country-pair level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

Panel A – Inbound Merger Activity

	All Dimensions	Individualism	Uncertainty Avoidance	Power Distance	Future Orientation
	1	2	3	4	5
Subject Imports from Connected	***0.042 0.000	***0.036 0.000	***0.037 0.000	***0.031 0.000	***0.030 0.000
Cultural Distance	***-0.098 0.000	***-0.082 0.000	***-0.054 0.000	***-0.068 0.000	***-0.036 0.002
Subject Imports from Connected x Cultural Distance	***-0.415 0.000	***-0.508 0.000	***-0.567 0.000	*-0.392 0.075	*-0.393 0.068
Geographic Distance	***-0.373 0.000	***-0.404 0.000	***-0.405 0.000	***-0.441 0.000	***-0.447 0.000
Degree Centrality	0.001 0.185	0.001 0.179	0.001 0.213	0.001 0.208	0.001 0.191
Degree Centrality x Subject Imports from Connected	***0.115 0.000	***0.116 0.000	***0.117 0.000	***0.118 0.000	***0.116 0.000
Acquirer Country Characteristics	Yes	Yes	Yes	Yes	Yes
Target Country Characteristics	Yes	Yes	Yes	Yes	Yes
Country-Pair Time Variant Characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Target Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	74503	74503	74503	74503	74503
Adjusted R ²	0.201	0.192	0.188	0.186	0.180

Panel B – Outbound Merger Activity

	All Dimensions	Individualism	Uncertainty Avoidance	Power Distance	Future Orientation
	1	2	3	4	5
Subject Imports from Connected	***0.055	***0.051	***0.041	***0.036	***0.026
	0.000	0.000	0.000	0.000	0.004
Cultural Distance	***-0.091	***-0.070	***-0.050	***-0.063	***-0.042
	0.000	0.000	0.000	0.000	0.000
Cultural Distance x Subject Imports from Connected	***-0.653	***-1.017	***-0.689	**_-0.586	-0.088
	0.000	0.000	0.001	0.018	0.758
Geographic Distance	***-0.369	***-0.392	***-0.401	***-0.435	***-0.439
	0.000	0.000	0.000	0.000	0.000
Degree Centrality	0.001	0.001	0.000	0.000	0.001
	0.379	0.353	0.486	0.482	0.461
Degree Centrality * Subject Imports from Connected	***0.108	***0.110	***0.111	***0.112	***0.111
	0.000	0.000	0.001	0.000	0.001
Acquirer Country Characteristics	Yes	Yes	Yes	Yes	Yes
Target Country Characteristics	Yes	Yes	Yes	Yes	Yes
Country-Pair Time Variant Characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Target Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	74503	74503	74503	74503	74503
Adjusted R ²	0.196	0.186	0.184	0.183	0.183

Table 11: Cross-border activity at the country-pair level – The role of institutional quality

This table reports results of regressions of subject country cross-border M&A activity on lagged trade links between subject and connected countries and its interaction with the connected's institutional quality. The dependent variable is Country-pair Merger Activity, defined as the proportion of country *i*'s merger with country *j*, relative to all of *i*'s cross-border mergers. The independent variables are '*Subject Imports from Connected*', defined as country *i*'s imports from country *j*, relative to all of *i*'s imports, lagged by one period, '*Institutional Variable*' and interaction of the both. Degree centrality is a country's number of intercountry connections. M&A Activity is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year *t* divided by the total value of all mergers between 1989 and 2016. Estimates are obtained using the fixed effects regression model. Standard errors are corrected for heteroscedasticity and clustered at country-pair level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

	Investment Profile	Quality of Institutions	Corruption	Bureaucratic Quality	Law & Order
	1	2	3	4	5
Subject Imports from Connected	-0.005	** -0.010	-0.001	* -0.010	-0.007
	0.405	0.042	0.838	0.058	0.165
Institutional Variable	0.001	***0.111	*0.090	***-0.291	***0.193
	0.954	0.000	0.075	0.009	0.001
Subject Imports from Connected x Institutional Variable	***3.538	***3.311	***7.592	***11.834	***7.166
	0.000	0.000	0.000	0.000	0.000
Degree Centrality	0.000	0.000	0.000	0.000	0.000
	0.855	0.976	0.992	0.935	0.987
Degree Centrality x Subject Imports from Connected	***0.129	***0.136	***0.136	***0.134	***0.136
	0.000	0.000	0.000	0.000	0.000
Acquirer Country Characteristics	Yes	Yes	Yes	Yes	Yes
Target Country Characteristics	Yes	Yes	Yes	Yes	Yes
Country-Pair Time Variant Characteristics	Yes	Yes	Yes	Yes	Yes
Acquirer Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Target Country Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Number of Observations	124801	124801	124801	124801	124801
Adjusted R ²	0.161	0.171	0.172	0.168	0.166

Table 12: Acquirers' CAR: The value effect of learning

This table reports results of regressions of acquirer's wealth creation around announcement date on the acquirers' international experience and its interaction with the cultural distance at the country-pair level. The dependent variable is acquirer's CAR (-3, +3) and is calculated using market model. The independent variables are *Subject Foreign Sale* which is the natural logarithm of foreign sales in year t , *Cultural Distance*, calculated using Euclidian formula and is either based on Hofstede's four culture dimension or based on individual culture dimension and interaction of the both. Estimates are obtained using the fixed effects regression model. Standard errors are corrected for heteroscedasticity and clustered at country-pair level (p-value is reported below the coefficient estimate). Inclusion of fixed effects and controls is indicated at the end. Statistical significance at 10%, 5%, and 1% is indicated by *, **, and ***, respectively.

	1	2
Subject Foreign Sales	**0.002 0.013	*0.002 0.081
Cultural Distance		** -0.038 0.014
Subject Foreign Sale x Cultural Distance		**0.002 0.040
Firm Size	***-0.006 0.000	***-0.006 0.000
Completed Deals	0.006 0.150	0.007 0.122
Private Target	***-0.009 0.000	***-0.009 0.000
Cash Only	-0.001 0.453	-0.001 0.498
Financial Acquirer	-0.002 0.585	-0.002 0.592
Hostile	** -0.018 0.020	** -0.017 0.023
Toehold	***-0.001 0.000	***-0.001 0.000
Acquirer Country Characteristics	Yes	Yes
Target Country Characteristics	Yes	Yes
Country-Pair Time Variant Characteristics	Yes	Yes
Acquirer Country Fixed Effects	Yes	Yes
Target Country Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Number of Observations	11886	11886
Adjusted R ²	0.035	0.035

Appendix 1:

Panel A of the table defines the variables and Panel B of the table reports the descriptive statistics of dependent variables, variables of interest and control variables.

Panel A. Definition of variables

Variable Name	Definitions
Dependent Variables	
<i>High M&A State</i>	
Cross-border waves based on the number of transactions	It is an indicator variable and is equal to 1 if the subject country's cross-border merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration and 0 otherwise. Cross-border M&A activity is based on the number of M&A transactions (<i>Source: SDC</i>).
Domestic Waves based on the number of transactions	It is an indicator variable and is equal to 1 if the subject country's domestic merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration and 0 otherwise. Domestic M&A activity is based on the number of M&A transactions (<i>Source: SDC</i>).
Cross-border waves based on the value of transactions	It is an indicator variable and is equal to 1 if the subject country's cross-border merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration and 0 otherwise. Cross-border M&A activity is based on the value of M&A transactions (<i>Source: SDC</i>).
Domestic waves based on the value of transactions	It is an indicator variable and is equal to 1 if the subject country's domestic merger activity being in the highest quartile of all values for that country over the sample period in the year under consideration and 0 otherwise. Domestic M&A activity is based on the value of M&A transactions (<i>Source: SDC</i>).
Variables of Interest	
<i>Connected M&A: based on the number of transactions</i>	
Connected M&A: Subject Imports from Connected	It is the trade-weighted merger activity in connected countries. Merger activity is based on number of transactions and trade weights are based on subject imports from connected countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Connected Imports from Subject	It is the trade-weighted merger activity in connected countries. Merger activity is based on number of transactions and trade weights are based on connected imports from subject countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Subject Exports to Connected	It is the trade-weighted merger activity in connected countries. Merger activity is based on number of transactions and trade weights are based on subject exports to connected countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Connected Exports to Subject	It is the trade-weighted merger activity in connected countries. Merger activity is based on number of transactions and trade weights are based on connected exports to subject countries. (<i>Source: SDC and UNComTrade</i>)
<i>Connected M&A: based on the value of transactions</i>	
Connected M&A: Subject Imports from Connected	It is the trade-weighted merger activity in connected countries. Merger activity is based on value of transactions and trade weights are based on subject imports from connected countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Connected Imports from Subject	It is the trade-weighted merger activity in connected countries. Merger activity is based on value of transactions and trade weights are based on connected imports from subject countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Subject Exports to Connected	It is the trade-weighted merger activity in connected countries. Merger activity is based on value of transactions and trade weights are based on subject exports to connected countries. (<i>Source: SDC and UNComTrade</i>)
Connected M&A: Connected Exports to Subject	It is the trade-weighted merger activity in connected countries. Merger activity is based on value of transactions and trade weights are based on connected exports to subject countries. (<i>Source: SDC and UNComTrade</i>)
Control Variables	
Degree Centrality	It is a country's number of intercountry connections (<i>Source: SDC</i>).

Eigenvector Centrality	It is a score assigned to a country considering centrality scores of connected countries (<i>Source: SDC</i>).
M&A Activity	It is the aggregate worldwide M&A activity, defined as the dollar transaction value of all mergers in year t divided by the total value of all mergers between 1989 and 2016 (<i>Source: SDC</i>).
Connected Exchange Rate Growth: Trade Weighted	It is trade-weighted exchange rate growth of connected countries. (<i>Source: Worldscope</i>)
Connected Exchange Rate Volatility: Trade Weighted	It is trade-weighted exchange rate volatility of connected countries. Exchange rate volatility is calculated by taking standard deviation of the exchange rates between acquirer country and target country from 36 months upto 1month prior to deal announced date. (<i>Source: Worldscope</i>)
Investment Profile	Time-varying index measuring the government's attitude toward investment. The investment profile is determined by summing the three following components: (1) risk of expropriation or contract viability; (2) payment delays; and (3) repatriation of profits. Each component is scored on a scale from 0 (very high risk) to 4 (very low risk) (<i>Source: ICRG</i>).
Quality of Institutions	Time-varying index measuring institutional quality of a country, which is calculated by summing the three following components: (1) corruption; (2) law and order; and (3) bureaucratic quality. High score indicates countries' better institutional quality and vice versa (<i>Source: ICRG</i>).
GDP	The natural logarithm of Gross Domestic Product (<i>Source: World Bank</i>).
GDP Growth	Annual growth rate of Gross Domestic Product (<i>Source: World Bank</i>).
Per Capita GDP	Per capita Gross Domestic Product in US dollars (<i>Source: World Bank</i>).
Additional Control Variables	
Connected Stock Market Valuation: Trade Weighted	It is trade-weighted stock market valuation of connected countries. Stock market valuation is based on market-to-book ratio of companies in connected countries for the year under consideration. (<i>Source: Worldscope and UnComTrade</i>)
Connected Geographical Distance: Trade Weighted	It is trade-weighted geographical distance of connected countries from subject country. The geographical distance is calculated using great-circle distance formula which uses the longitude and latitude of the countries. (<i>Source: UNComTrade and www.mapsofworld.com</i>)
Connected Cultural Distance: Trade Weighted	It is trade-weighted cultural distance of connected countries from subject country. The cultural distance is the absolute value of difference of trust level between subject and connected countries. (<i>Source: UNComTrade and WVS</i>)
Connected Stock Returns Correlations: Trade Weighted	It is trade-weighted stock returns correlations of connected countries with subject country. (<i>Source: Worldscope and UnComTrade</i>)
Additional Variables	
Cultural Distance	We extract the scores of Hofstede's four culture dimensions (Individualism, Uncertainty Avoidance, Power Distance and Future Orientation) from Geert Hofstede's website (www.geerthofstede.nl) and calculate the culture differences between Subject and Connected countries based on the four culture dimensions using Euclidean distance formula.
Individualism	We extract the score of Individualism from Geert Hofstede's website (www.geerthofstede.nl) and calculate the culture differences between Subject and Connected countries based on the dimension using Euclidean distance formula.
Uncertainty Avoidance	We extract the score of Uncertainty Avoidance from Geert Hofstede's website (www.geerthofstede.nl) and calculate the culture differences between Subject and Connected countries based on the dimension using Euclidean distance formula.
Power Distance	We extract the score of Power Distance from Geert Hofstede's website (www.geerthofstede.nl) and calculate the culture differences between Subject and Connected countries based on the dimension using Euclidean distance formula.
Future Orientation	We extract the score of Future Orientation from Geert Hofstede's website (www.geerthofstede.nl) and calculate the culture differences between Subject and Connected countries based on the dimension using Euclidean distance formula.

CAR (-5, +5)	The cumulative abnormal returns of acquirer firms calculated over a 11-day window around the announcement date. Abnormal returns are calculated using the market model relative to a local equity market index. The value weighted index for US firms is obtained from CRSP, while for other countries local indices (proxies of market portfolio) are retrieved from Worldscope. The parameters of the market model are 200-days estimation period spread over (-236,-36) (<i>Sources</i> : CRSP, Compustat Global, and authors' calculations).
Foreign Sales	The natural logarithm of foreign sales in year t (<i>Source</i> : Worldscope).
Firm Size	The natural logarithm of the dollar value of M&A deal (<i>Source</i> : SDC).
Completed Deals	Dummy variable equal to 1 if the deal has been completed, and 0 if the deal was withdrawn (<i>Source</i> : SDC).
Private Target	Dummy variable equal to 1 if target firm's public status is "Target", and 0 otherwise (<i>Source</i> : SDC).
Cash Only	Dummy variable equal to 1 if 100% of deal value is paid in cash, and 0 otherwise (<i>Source</i> : SDC).
Financial Acquirer	Dummy variable equal to 1 if acquirer is a financial firm, and 0 otherwise (<i>Source</i> : SDC).
Hostile Toehold	Dummy variable equal to 1 if deal attitude is classified as "Hostile" by SDC, and 0 otherwise (<i>Source</i> : SDC). Dummy variable equal to 1 if acquirer owns non-zero percentage shares in the target firm before the announcement of the deal, and 0 otherwise (<i>Source</i> : SDC).
Corruption	It is the sub-component of quality of institutions. It is a proxy for corruption within the political system. This type of deforms the financial and economic environment, minimize the efficacy of governments and businesses by allowing people to undertake the positions of power based on patronage rather than their actual ability. This presents the political instability. This takes into account the common form of corruptions such as demands for special payments and bribes related to trade (import and export) licenses, tax assessments, exchange controls, etc. PRS is concerned with both actual or potential corruption such as favors-for-favors, discrimination, undue patronage, and according to PRS, such type of corruption poses risks for the foreign business. The sub-component is scored on a scale from 0 (very high risk) to 6 (very low risk) (<i>Source</i> : ICRG).
Law & Order	It is the sub-component of quality of institutions. PRS evaluates (1) <i>Law</i> , evaluation of the strength and impartiality of the legal system, and (2) <i>Order</i> , evaluation of the popular observation of law. The sub-component is scored on a scale from 0 (very high risk) to 6 (very low risk) (<i>Source</i> : ICRG).
Beaurecratic Quality	It is the sub-component of quality of institutions. The strength of institutions and bureaucracy can be used as a shock-absorber that are likely to reduce the number of revisions of the government policy. The countries that have the strength and expertise to administer without fundamental changes in the government policy. The sub-component is scored on a scale from 0 (very high risk) to 4 (very low risk) (<i>Source</i> : ICRG).

Panel B – Descriptive Statistics:

Variable Name	Mean	Standard Deviation	25th pctl.	Median	75th pctl.	Number of Observations
Dependent Variables						
<i>High M&A State</i>						
Cross-border waves based on the number of transactions	0.335	0.472	0.000	0.000	1.000	1255
Domestic Waves based on the number of transactions	0.333	0.471	0.000	0.000	1.000	1261
Cross-border waves based on the value of transactions	0.300	0.459	0.000	0.000	1.000	1255
Domestic waves based on the value of transactions	0.300	0.458	0.000	0.000	1.000	1261
Variables of Interest						
<i>Connected M&A: based on the number of transactions</i>						
Connected M&A: Subject Imports from Connected	0.043	0.013	0.035	0.045	0.053	1255
Connected M&A: Connected Imports from Subject	0.043	0.048	0.009	0.024	0.054	1255
Connected M&A: Subject Exports to Connected	0.042	0.012	0.035	0.042	0.510	1261
Connected M&A: Connected Exports to Subject	0.042	0.046	0.011	0.023	0.050	1261
<i>Connected M&A: based on the value of transactions</i>						
Connected M&A: Subject Imports from Connected	0.044	0.015	0.033	0.045	0.055	1255
Connected M&A: Connected Imports from Subject	0.043	0.048	0.009	0.023	0.054	1255
Connected M&A: Subject Exports to Connected	0.042	0.014	0.034	0.043	0.053	1261
Connected M&A: Connected Exports to Subject	0.042	0.046	0.011	0.023	0.049	1261
Control Variables						
Degree Centrality	6.841	1.293	5.994	6.762	7.782	1255
Eigenvector Centrality	0.09	0.046	0.053	0.093	0.131	1255
M&A Activity	0.040	0.012	0.031	0.043	0.047	1255
Connected Exchange Rate Growth: Trade Weighted	0.007	0.231	0.000	0.000	0.000	1255
Connected Exchange Rate Volatility: Trade Weighted	1.065	9.004	0.001	0.007	0.073	1255
Investment Profile	9.114	2.214	7.500	9.125	11.167	1255
Quality of Institutions	11.128	3.233	8.000	11.500	14.000	1255
GDP	26.356	1.477	25.393	26.280	27.265	1255
GDP Growth	3.257	3.511	1.527	3.204	5.246	1255
Per Capita GDP	9.503	1.170	8.702	9.804	10.417	1255
Additional Control Variables						
Connected Stock Market Valuation Differences: Trade Weighted	0.268	0.155	0.176	0.223	0.308	911
Connected Geographical Distance: Trade Weighted	8.394	0.557	7.934	8.404	8.811	911
Connected Cultural Distance: Trade Weighted	0.296	0.465	0.061	0.146	0.314	911
Connected Stock Returns Correlations: Trade Weighted	0.124	0.149	0.021	0.121	0.227	911
Additional variables:						
Cultural Distance	0.222	0.579	0.411	0.578	0.751	74503
Individualism	0.196	0.278	0.110	0.250	0.430	74503
Uncertainty Avoidance	0.194	0.267	0.110	0.230	0.400	74503
Power Distance	0.176	0.242	0.100	0.210	0.350	74503
Future Orientation	0.163	0.211	0.080	0.170	0.310	74503
CAR (-5, +5)	0.009	0.085	-0.034	0.004	0.047	11886
Foreign Sales	12.924	2.404	11.391	13.044	14.609	11886
Firm Size	7.253	2.21	5.731	7.184	8.601	11886
Completed Deals	0.914	0.280	1.000	1.000	1.000	11886
Private Target	0.512	0.499	0.000	1.000	1.000	11886
Cash Only	0.380	0.486	0.000	0.000	1.000	11886
Financial Acquirer	0.041	0.197	0.000	0.000	0.000	11886
Hostile	0.004	0.065	0.000	0.000	0.000	11886
Toehold	0.536	4.250	0.000	0.000	0.000	11886
Corruption	3.153	1.337	2.000	3.000	4.000	124801
Law & Order	4.279	1.317	3.000	4.500	6.000	124801
Beaurecratic Quality	2.712	0.986	2.000	2.833	4.000	124801