Extending Industry Specialization, Intangibles, and Cross-Border Acquisitions

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ABSTRACT

We investigate the role of industry specialization in cross-border acquisitions. We find that acquirers from more specialized industries in a country are more likely to buy foreign targets in countries that are less specialized in these same industries. The magnitude of this specialization effect is large with 14.6% more deals when the difference in industry specialization between two countries increases by one standard deviation. This relationship is stronger when the cross-country and cross-industry differences in measures of educational attainment and intangible capital are higher. Post-acquisition performance is higher when specialized acquirers purchase assets in less specialized industries. These results are consistent with management and localized industry know-how being mobile factors that provide an advantage that can be deployed on foreign assets.

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"A firm's motive for international expansion and its success are largely determined by its intangible resources", Richard E. Caves (2007)

I Introduction

The last thirty years have witnessed a boom in cross-border mergers and acquisitions, with a large range of countries and industries participating in the globalization of corporate acquisitions. A large literature has developed to understand why firms stretch their boundaries internationally by acquiring foreign assets. Existing research highlights that country characteristics play an important role in explaining both the intensity and direction of cross-border acquisition flows. Differences in countries' institutional quality, corporate governance, tax regimes, labor regulation, currency and stock market valuation, or cultural traits have been found to explain the flow of acquisitions between countries.

In this paper, we focus on the role of *industries* in explaining the geography of global acquisitions. In particular, we develop and test the idea that cross-border acquisitions are driven by differences between countries in their degree of specialization on particular economic activities. We measure the degree of specialization of a country in a given industry by comparing the domestic share of production of that industry to the average share of that industry worldwide. Accordingly, countries are specialized in industries whose share of production (i.e. economic importance) are large compared to the rest of the world. We thus rely on the distribution of specialization across countries and industries to capture skill or economic strength in particular industries.[1]

Specialization reflects differences in the relative efficiency of industries across countries. Such heterogeneity arises because of countries' unequal factor endowments (e.g. labor costs or access to natural resources), but also because of differences in the prevalence of industry-specific assets, such as knowhow, expertise, or

[1] As we detail in the next Section, the reason why industry specialization should procure an advantage for global acquirers is outside the scope of the usual Ricardian or Heckscher-Ohlin-Samuelson theories of international trade that focus on cost or factor availability and immobile factors of production.

human capital. These intangible resources confer some countries an advantage, either comparative or absolute, in certain economic areas, such as watch-making in Switzerland, information technology in the United States, financial and legal services in the United Kingdom, or car manufacturing in Germany.

We argue that these industry-specific intangibles are mobile and can be profitably deployed on existing foreign assets. If so, cross-border acquisitions in a given industry should increase with the specialization of the acquirer's industry, and involve the purchase of assets located in countries that are less specialized in that industry. This idea, which builds on the early intuition of Caves (1971) and Hymer (1976), forms our main hypothesis. Accordingly, the value of acquiring assets abroad arises from the complementarity between target firms' immobile capabilities (e.g. existing machines and equipment, distribution network, or political connections) and acquiring firms' mobile industry-specific resources, reflected by their degree of specialization. This motive is distinct from other motives for cross-border acquisitions such as sourcing cheaper factors of production (Yeaple (2003)), tariff jumping and foreign market access (Brainard (1997)), buying undervalued assets (Erel, Liao, and Weisbach (2012)), extending governance practices abroad (Bris and Cabolis (2008), Rossi and Volpin (2004)), or the presence of institutional investors (Ferreira, Massa, and Matos (2010)).

Based on a large sample of 36,105 horizontal cross-border transactions involving private and public firms from 46 countries and 85 industries, we find strong evidence that differences in specialization are an important driver of global acquisitions.[2] Univariate tests at the deal level reveal that cross-border horizontal transactions occur primarily between firms operating in relatively specialized industries. However, we observe large differences in the degrees of specialization between acquirers and targets. Overall, more than 60% of all transactions involve acquirers that are more specialized than targets. Across all industries, we find that firms in more specialized industries buy assets in less specialized industries. The difference in specialization

[2]Because extending specialized resources abroad mainly operates within industries, our tests focus on horizontal transactions (firms acquiring targets in the same industry but different countries.)

is economically large as acquirers display levels of specialization that are roughly 25% larger than that of targets. This pattern is strong and pervasive as it holds with various measures of specialization, in every year of the sample period, and is present across most countries and industries.

We further analyze the determinants of cross-border acquisition flows (both in numbers of transactions and dollar value) using a gravity model. Traditionally gravity models are used to examine how geographic distance explains the intensity of cross-border relations (e.g. trade or portfolio flows). We follow a similar approach but focus on differences in specialization space, while controlling for other known determinants of cross-border acquisitions. We find strong evidence that the intensity of acquisition flows across country-industry pairs is positively related to differences in industry specialization: The larger is the difference in specialization between two countries in a given industry, the larger is the flow of bilateral horizontal acquisitions. The magnitude of the specialization effect is large. For the average industry, a one standard deviation increase in the difference in specialization between two countries leads to an increase of 14.6% in the number of deals, and a 56.5% increase in aggregate transaction value.

The effect of specialization is distinct from that of countries' characteristics such as country size, the level of economic development, exchange rates, bilateral trade, common legal origin, language, or geographical distance between countries. We also show that the role of specialization in cross-border transactions is robust to the inclusion of country-industry controls (such as size, growth opportunities, or the number of firms of both the acquiring and target industries) and is distinct from that of product market competition. We find that firms are more likely to buy foreign assets in less competitive industries, consistent with Caves (1971) and Neary (2007). We further find that the specialization effect we document mitigates the competitive effect, as firms from more specialized industries are more likely to buy assets in competitive industries, consistent with their mobile intangible resources allowing them to withstand the effects of competitive pressure.

We also explore in a deal-level analysis whether industry specialization predicts

the countries in which an acquirer would pick targets, and the countries from which a target would attract buyers. Selection model estimations (conditional logit) reveal that a country-industry displaying a low degree of specialization is significantly more likely to become a target compared to the same industry in other countries matched on similar cross-border merger activity. In contrast, acquirers are more likely to come from country-industries that exhibit a higher level of specialization.

Next, we investigate the hypothesis that the importance of intangible resources amplifies the specialization effect. We first look at this question at the country level. We find that the impact of industry specialization on acquisition intensity varies systematically with country-level proxies for human and technological capital. We document that differences in industry specialization have the largest effect on acquisition flows when the acquirer country has a higher level of educational attainment than the target country. The economic effect of the differences in educational attainment is roughly 50% larger when the acquirer country has a larger share of its population with a tertiary education or when it allocates a larger fraction of public resources to education. The effect of industry specialization is also magnified when the acquirer country benefits from a larger stock of patents, trademarks or published scientific articles per capita.

We then investigate the importance of human capital and intangibles on the country-industry level, where we are limited to a smaller sample. We use data on intangible assets in 29 European and major OECD countries and data on the use of intangibles in listed firms in our full sample of countries and industries. We find more cross-border horizontal acquisitions when the acquiring country-industry has a larger stock of R&D, larger R&D expenditures, a larger stock of software capital, and employs a higher fraction of skilled people than the industry in a target country.

In the last part of our analysis, we analyze whether differences in specialization are also related to acquisition outcomes. We find that (one- and three-year) operating performance following an international acquisition (by public firms) is significantly better when the acquirer is from a more specialized industry than the target. These results suggest that the benefit of acquiring less specialized foreign

assets is related to the ability of specialized buyers to operate the purchased assets more efficiently by deploying mobile intangible resources.

Our results hold across a host of robustness checks. They remain unaffected when we discard the largest acquirer and target countries, when we modify the estimation method, and when we estimate panel models to further control for time, and country-industry pairs unobserved heterogeneity. In addition, we show that our results are unlikely to reflect reverse causality that would imply that acquirers use their acquisitions in less specialized countries to accentuate the observed differences in specialization. For instance, the role of industry specialization remains strong when we measure specialization over the 1990-1995 period, and use it to explain cross-border acquisitions over the 2006-2010 period.

While we provide novel evidence on the key role played by industry specialization in cross-border acquisitions, we do not analyze foreign investments through building new plants or capacity and thus we do not address the choice between building new capacity (greenfield investments) and acquiring existing producers (brownfield investments).[3] We restrict our attention to international acquisitions for reasons of data availability rather than principle. Company-level transactions data allow us to differentiate bilateral foreign investment flows by country (country of origin and destination), *and* by industry (industry of origin and destination).This disaggregation, which is not available for greenfield investment, is central to our examination of the role of industry specialization for global expansion.

Overall our paper adds to the growing literature examining the determinants of cross-border acquisition flows. We depart from most existing studies by focusing on industries and the importance of mobile industry-specific intangibles, as opposed to country-level determinants. This idea was suggested by Caves (1971) and Hymer (1976), and was recently formalized by Neary (2007) and Nocke and Yeaple (2007). Yet, to the best of our knowledge, ours is the first study to show that the direction and intensity of cross-border acquisitions is related to differences in specialization,

[3]See Nocke and Yeaple (2007).

consistent with firms' willingness to extend specific intangibles abroad.[4] Our results are broadly consistent with the "organizational capabilities" theory of the firm advanced by Lucas (1978), Rosen (1982), or more recently Garicano and Rossi-Hansberg (2006) according to which firm expansion spreads the use of higher-quality intangibles (e.g. knowhow) to a larger set of productive assets. Our findings suggest that this assignment view of firm boundaries extends to foreign assets.

Our results also add to studies that examine the connections between firms' multinationality and intangible assets (see Caves (2007) for a comprehensive survey). Existing research indicates that firms with a multinational presence tend to have a high proportion of intangible assets (e.g. Harris and Ravenscraft (1991)). Foreign expansions follow the development and accumulation of intangible assets (e.g. Yeaple (2003)). Moreover, the value of being a multinational firm increases with firms' intangibles (e.g. Morck and Yeung (1992) or Morck and Yeung (1991). Our findings further show that the distribution of intangibles across countries and industries helps to explain the volume and direction of multinationals' acquisitions.

Related studies use detailed micro-level data to study the role of intangibles in the foreign expansion of U.S. multinationals. For instance, Bloom, Sadun, and Reenen (2012) show that U.S. firms transfer new technology and management practices to their foreign affiliates. Our focus is complementary as we rely on industry data from 46 countries to show that specialization and intangibles determine the geography of multinationals' expansion and capital reallocation across borders through acquisitions.

The rest of the paper is organized as follows. We discuss theoretical foundations and develop our hypotheses in Section II. Section III describes the measures of specialization and the sample of cross-border acquisitions. Section IV presents the specialization profiles of acquiring and target firms. Section V presents empirical

[4]Two papers present results that are related to ours. Brakman, Garretsen, and Marrewijk (2007) look at a sample of cross-border mergers between five OECD countries in 20 aggregate sectors over the period 1980-2004. They document that acquirers are more likely to come from sectors that have a comparative advantage in exporting. Similarly, Feliciano and Lipsey (2010) document the acquisitions of U.S. firms tend to occur in industries in which the acquiring country has a comparative advantage at exporting.

tests of the effect of industry specialization on cross-border acquisitions. Section VI presents the role played by intangibles. Section VII examines post transaction outcomes, whereas Section VIII concludes.

II Hypotheses Development

Our paper draws on the literature on multinational firms and international mergers and acquisitions. Industry specialization plays a prominent role in international economics, going back to David Ricardo's classical example of trade in wine and cloth. Countries differ in the relative efficiency of their industries, and hence they specialize to capitalize on these advantages. Such advantage might not only arise because of country-level differences in labor costs, productivity, natural resources or factor endowments, but also through industry-specific endowment differences, and it could be comparative or absolute.[5] The existence of industry-specific advantage leads to trade, but can also stimulate cross-border investment. The literature views the purchase of assets in foreign countries as a way for firms to extend the use of their mobile specialized assets across foreign markets. On this ground, we examine the role of industry specialization in global acquisitions.

Our hypotheses arise from theory literature on the motives of international acquisitions that is based on formal industrial organization-type models. Our first hypothesis is based on the value of industry specialization for foreign expansion. Neary (2007) and Nocke and Yeaple (2007) develop rationales for cross-border acquisitions based on product market specificities. Their work pertains particularly to horizontal acquisitions that we study. According to Neary (2007), after market liberalization that allows for foreign expansion through acquisitions, firms with a cost advantage – specialized firms – will buy assets in markets with a comparative cost disadvantage. In Cournot-Nash-type models, a horizontal acquisition typically eliminates a competitor and thus produces a bigger advantage for the remaining

[5]While trade theory emphasizes comparative advantage, foreign acquisitions can arise from either comparative or absolute advantage. Our measures of specialization should capture specific industry strength that can be extended abroad, whether it is based comparative or absolute advantage. We remain agnostic as to which of the two is driving cross-border acquisitions.

competitors than for the acquirer itself. Neary (2007) shows that if the cost differential is sufficient, the acquirer will find the acquisition worth its while nonetheless when the acquirer can lower the production cost of its target.

While these papers suggest a link between industry specialization and cross-border acquisitions, they are silent on the sources of the acquirers' advantage (they assume exogenous differences in "costs"). In traditional trade theory, industry specialization is typically the consequence of specific advantage and not one of its origins. However, the recent trade literature paints a more complex picture of the relationship between industry specialization and comparative (or absolute) advantage. First, such advantages are not solely generated by country-level endowment differences, but also by industry-specific endowment differences. Second, it recognizes that external economies (producers in a specialized industry benefiting from externalities, in particular agglomeration economies) are frequently a key determinant of local industry strength (e.g. Krugman, Obstfeld, and Melitz (2011) or Grossman and Rossi-Hansberg (2010)). Prominent among these is the importance of industry clusters of development and production know-how (e.g. Porter (1990)). Third, the theory of multinational firms recognizes firm-specific assets, such as technological know-how, marketing knowledge, management expertise and human capital, as the main driver behind a firm's decision to make cross-border acquisitions (e.g. Caves (2007)). Many of these assets are likely to benefit from spillovers from industry specialization and agglomeration effects.

This literature forms the basis for our first hypothesis:

Hypothesis 1 *Cross-border acquisition intensity increases with differences in industry specialization between the acquiring and target firms in the same industry.*

Our second hypothesis is based on the importance of intangible assets and the difficulties in finding contractual or market solutions in view of market frictions when the use of these assets is extended to foreign markets by multinational firms, as was emphasized in early work by Hymer (1976) and Caves (1971). This work is

closely related to the transaction cost theory of the firm (e.g. Williamson (1979)) and the property rights theory of the firm (e.g. Grossman and Hart (1986)), that emphasizes the difficulties and impossibilities of contracting for the use of intangible firm-specific assets. Even if contracts are feasible, firms may be reluctant to rely on them for fear that they cannot effectively protect their property rights or expose themselves to hold-ups and similar problems.

The international business literature frequently refers to the resource-based view of the firm (e.g. Penrose (1959) or Wernerfelt (1984)) according to which a firm's competitive advantage is rooted in its complementary capabilities or intangible assets. These papers invariably view intangible assets, in particular firm-specific knowledge, technological or marketing know-how, management expertise and human capital, as the proprietary resources and capabilities that generate an advantage in international acquisition and foreign direct investment (e.g. Hymer (1976)), but also as the resources that firms can most easily deploy abroad (e.g. Caves (2007)).

In the industrial organization-based literature, Nocke and Yeaple (2007) also emphasize the different role of mobile (intangible assets) and immobile factors of production. Finally, there is substantial empirical evidence showing that firms generate value in international acquisitions when they expand the use of their specific assets abroad (e.g. Doukas and Travlos (1988), Morck and Yeung (1991), Morck and Yeung (1992), or Markides and Ittner (1994)). Based on these theories and findings, we formulate our second hypothesis:

Hypothesis 2 *The flow of cross-border acquisitions explained by differences in industry specialization increases in measures of human capital and intangible assets.*

III Data

This section describes our sample and how we construct the data used in the tests. It consists of three main blocks: (1) the measures of industry specialization, (2) the

mergers and acquisition data, and (3) country-level variables.

A Industry Specialization

Our objective is to develop a measure of specialization for each country and industry. To do so, we follow the concept of "revealed comparative advantage" that is extensively used in the literature on international trade. As explained in Krugman, Obstfeld, and Melitz (2011) a country is considered to have a comparative advantage in a given industry when the importance of that industry's exports relative to the rest of the world's exports in that industry is large. Following our theoretical considerations in Section II, countries tend to be specialized in industries in which they have a comparative (or absolute) advantage, and specialization further enhances such advantage through economies of scale, external economies and agglomeration effects. Thus we measure industry specialization in terms of the total economic importance of industries, and not exports.

Following the original formulation by Balassa (1965) and replacing exports by measures of total output or total employment, we define $w_{i,c,t}$ as the share of industry i's production (or employment) in country c's total production (or employment) in year t and compute industry specialization, SP, as follows:

$$SP_{c,i,t} = \frac{w_{c,i,t}}{\frac{1}{N_c}\sum_k w_{k,i,t}} \tag{1}$$

where N_c is the number of countries in our sample. At time t, country c is defined as being specialized in industry i if the share of i's production ($w_{c,i}$) in country c's total production is larger than the average share of i's production worldwide ($\frac{1}{N_c}\sum_k w_{k,i}$). A country is relatively specialized in industries for which $SP_{c,i,t}$ is higher than one, i.e., when production in these industries is more than expected on the basis of the average importance in worldwide production. As a result, a higher value of SP indicates a higher degree of specialization.

To fix ideas, this definition implies for instance (as shown empirically below) that Switzerland is highly specialized in manufacturing watches and clocks. This is because the share of the watch industry (in the total Swiss output) is much larger

in Switzerland than in any other country. In our analysis we remain agnostic about the origin of specialization.[6] We hypothesize that industry specialization reveals strengths in specific economic sectors. This strength could originate from unique country- or industry-specific factors such as natural resources, know-how, expertise, scale, cluster effects, or specific governmental policies. To wit, we abstract from the reasons Switzerland is highly specialized in manufacturing watches, but use the fact that Switzerland has a clear local advantage in producing watches relative to the rest of the world to analyze the geography and industry composition of cross-border acquisitions.[7]

We use disaggregated firm-level data for publicly listed companies from Worldscope to measure specialization for each country-industry-year observation ($SP_{c,i,t}$). We focus on the period 1990 to 2010. We consider two variables to capture industries' importance: total sales and total employment. We define industries based on three-digit International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3) used by the United Nations Statistics Division.[8] We thus classify each firm in Worldscope into a three-digit ISIC code using the primary SIC codes provided by Worldscope and the correspondence between ISIC and SIC described in the Appendix. We further exclude natural resources industries because, by definition, countries without access to natural resources cannot specialize in these industries, potentially introducing censoring and biases in our estimations.[9]

The starting sample comprises 1,067,534 observations on 50,886 distinct firms, corresponding to 46 countries, 89 industries, and 21 years. Ideally, we would like to compute $SP_{c,i,t}$ for every country-industry-year observation, that is 85,974 observations (46×89×21). However, Worldscope does not contain sales or employment data for each possible country-industry-year observation.[10] Thus, we impose a minimum of three countries with non-missing industry-year observations on sales or

[6] See Costinot (2009) for more about the origin of comparative advantage and specialization.

[7] We discuss the potential endogeneity of our measure of specialization in Section V.D.

[8] https://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=2

[9] Including natural resources industries in the analysis delivers very similar results (see the Internet Appendix).

[10] This happens because of incomplete coverage or because of the absence of publicly traded companies in every sector and every country.

employment (across 46 countries) to remain in the sample, and exclude all industry-year observations that do not meet this requirement. This steps eliminates 5,520 industry-year observations with missing sales, and 5,796 observations with missing employment, corresponding to four industries. For the remaining observations, we assume that a missing country-industry-year observation reflects the absence of economic activities in these industries, and set $w_{i,c,t}$ to zero.[11] Out of 85,974 possible observations, we have 80,454 (non-missing) measures of specialization based on sales ($SP(sales)$) and 80,178 based on employment ($SP(emp)$) spanning 85 distinct industries.

[Insert Table 1 Here]

Table 1 presents descriptive statistics on our measures of industry specialization (based on sales and employment) across countries. Panel A reveals that, by construction, the average level of specialization worldwide is equal to unity. Notably, the within-country distribution of specialization appears highly skewed. While there are many industries that are present in each country in similar proportion (i.e. nonspecialized industries), a few industries account for a disproportionately large fraction of each country' activities. We also note an important heterogeneity in the average degree of specialization across countries. For instance, the United States, Japan, Australia, or Switzerland display a large average degree of specialization (all well above unity – indicating more diversity in highly specialized industries) compared to countries like Venezuela, Hungary, or Czech Republic.[12]

To further illustrate the differences in specialization patterns across countries and industries, Panel B of Table 1 reports the two most specialized industries in each country, where specialization is based on sales and averaged over the period 1990-2010. For instance, and as indicated above, we observe that the most specialized industry in Switzerland is the "Manufacture of watches and clocks". Similarly, Germany is (relatively) specialized in "Retail trade", the UK in "Legal, accounting,

[11] All our results continue to hold if we only consider non-missing observations to compute $w_{i,c,t}$. The resulting sample is however much smaller.

[12] The link between average country specialization and economic development is strong. Hence, we control for such factors in the multivariate analysis below.

and auditing activities", Russia in "Transport via pipeline", and the US in "Renting of transport equipment" and "Education". Overall, Table 1 underlines an important heterogeneity in industry specialization across countries.

We acknowledge that, while informative, our measure of industry specialization is imperfect. Indeed, Worldscope only includes data on public firms, rendering our measures probably biased towards activities that feature more public equity capital. However, one advantage of using Worldscope's is that its broad coverage enables us to measure specialization for a large set of countries, industries, and years. Nevertheless, as an alternative, we use aggregated industry-level data on total output and employment from the United Nation Industrial Development Organization (UNIDO) Indstat4 database. This database has output and employment data that covers all firms - both private and publicly traded. Industries in the UNIDO database are defined at the ISIC three-digit level, covers the manufacturing sector between 1990 and 2006, and is limited to a subset of countries. We have information on 47 manufacturing industries (out of 89) and 43 countries (out of 46).[13] As before, we only retain observations if at least three countries report non-missing industry-year observations on sales or employment, and set $w_{c,i,t}$ to zero for the missing country-industry-year observations. Among the 42,441 possible observations, we have 33,637 measures of specialization based on sales and 32,766 measures of specialization based on employment. Reassuringly, the correlation between Worldscope-based and UNIDO-based measures of specialization is 0.28 (for $SP(sales)$) and 0.24 (for $SP(emp)$).

B Mergers and Acquisitions Data

Our sample of transactions is obtained from the Security Data Corporation's (SDC) Mergers and Corporate Transaction database and includes all deals (domestic and cross-border) announced between 1990 and 2010 that are completed by the end of 2012. Similar to Erel, Liao, and Weisbach (2012) we exclude LBOs, spinoffs, recapitalizations, self-tender offers, exchange offers, repurchases, partial equity stakes, acquisitions of remaining interest, privatizations, as well as deals in which the target

[13] The missing countries are Hong Kong, Taiwan, and Venezuela.

or the acquirer is a government agency. We consider public, private and subsidiary acquirers and targets. We limit our attention to the 46 largest countries (see Table 1). This subset represents 93% of all SDC transactions and 96% of the world equity market capitalization (in 2010).[14] We only retain transactions where both the acquirer and target have non-missing measures of specialization (this eliminates 1,048 transactions). Our sample includes 365,496 transactions with a total value of $21 trillion. We use the primary Standard Industrial Classification (SIC) provided by SDC to assign each acquirer and target to one of 85 distinct ISIC industries.

[Insert Table 2 Here]

Table 2 displays the characteristics of our sample of global mergers and acquisitions. Panel A indicates that during our sample period 22.2% of all transactions (81,139) involve firms from different countries. Cross-border deals have a total value of $5.9 trillion, or 27.4% of all deal value.[15] In line with Erel, Liao, and Weisbach (2012) and Ahern, Daminelli, and Fracassi (2010), Panel B reveals that the world market for acquisitions exhibits a substantial geographic heterogeneity. The US, the UK, Canada and Japan account for the majority of transactions. Among the possible 2,116 country pairs (46×46), 1,571 (70.8%) feature at least one transaction. On average, firms in a given country are involved in deals in 34 different countries. Notably, 73% of all cross-border transactions (and 83% of total deal value) occur between firms from developed countries, where development levels are taken from the Standard and Poor's Emerging Market Database.

Relevant for our investigation, acquisitions comprise a strong industry component. Across all deals (domestic and cross-border) 44% occur between firms operating in the same industries. This fraction is roughly similar between domestic deals and cross-border deals. There is a total of 36,105 cross-border horizontal transactions, representing a total value of $3.2 trillion or 54% of all cross-border transactions. These transactions are the main focus of our analysis. Notably cross-

[14] This figure is based on data from the Worldbank in 2010.

[15] UNCTAD (2013) reports a cumulative cross-border M&A volume of $7.18 trillion worldwide for the 1990-2010 period. Including natural resources, our sample contains cross-border deals with a combined value of $6.5 trillion, and thus appears to cover 90% of the global volume based on values.

border horizontal deals span a non-negligible part of the potential global network in each industry. Across the 175,950 possible horizontal cross-border pairs (46 × 45 × 85), 11,433 (or 6.5%) feature at least one transaction. The average industry has horizontal deals involving 125 country-pairs. The analysis below indicates that industry specialization plays an important role in explaining observed acquisition patterns in cross-border horizontal mergers and acquisitions.

C Country Characteristics

Existing research indicates that countries' economic, institutional, cultural, and geographical characteristics are associated with the direction and intensity of cross-border acquisition activity. Since such characteristics are likely related to the patterns of industry specialization, we control for a host of country factors in our tests. All the variables used in the analysis are further detailed in the Appendix.

Following Ahern, Daminelli, and Fracassi (2010), we use data from the Worldbank on annual GDP and GDP per capita to capture a country's size and level of development. Using data from the World Integration Trade Solution (WITS), we compute bilateral trade flows (imports and exports) between two countries. We obtain data on the average corporate tax rate for each country from the Economic Freedom Index. We also identify if two countries have double-taxation and bilateral investment treaty agreements for each year in our sample from the United Nation Conference on Trade and Development (UNCTAD) database. We obtain national exchange rates from Datastream, and define the nominal exchange rate returns (between each pair of countries) as the average annual difference in the logarithm of the monthly exchange rate. We obtain real exchange rate returns by using each country's consumer price index and convert all nominal returns to the 2000 price level for Europe.

We use data from Djankov, Porta, de Silanes, and Shleifer (2008) to capture different institutional characteristics. Similar to Ahern, Daminelli, and Fracassi (2010) we consider a country's legal origin. We also consider language and religion as cultural factors related to cross-border acquisitions. As in Stulz and Williamson

(2003) we gather data on the primary language spoken in each country (English, Spanish, or Others) from CIA World Factbook 2008. We also consider the dominant religion in each country (Catholic, Protestant, Muslim, Buddhist or Others). We further obtain the geographical distance between each country's largest city (in terms of population) or its capital from the Centre d'Etude Prospective et d'Information Internationale (CEPII). To alternately measure the geographic closeness between countries, we use a dummy variable that is equal to one if two countries share a common border.

Finally, in order to examine more directly whether our results are related to country-level stock of intangible capital, we consider several factors related to human and technological capital. Following Barro and Lee (2013), we consider the fraction of public spending on eduction in total government expenditures as well as the fraction of the labor force with a tertiary eduction to measure the stock of human capital in a given country. These variables are from the Barro-Lee Educational Attainment Dataset.[16] Similarly, we measure countries' stocks of technological capital using information from the Worldbank on the number of patents per capita, the number of trademarks per capita, and the number of articles published in scientific journals per capita.

IV Profile of Acquirers and Targets

We start our investigation by examining the univariate patterns of specialization across all mergers and acquisitions. For each transaction, we compare the degree of specialization of the acquirer' industry to that of the target. We report these univariate comparisons in Table 3. Several notable results emerge from this table.

[Insert Table 3 Here]

In Panel A, we first observe that across all transactions (including domestic, cross-border, horizontal and non-horizontal), participating firms appear to be relatively specialized. The average values of SP for both acquirers and targets are larger

[16] Available at http://www.barrolee.com/

than one. This suggests that, perhaps unsurprisingly, takeover transactions mostly involve firms operating in industries exhibiting high degrees of specialization. Across all deals, and with both measures of specialization ($SP(sales)$ and $SP(emp)$), we observe almost no difference in the average (and median) degree of specialization between acquirers and targets.

Yet, we see a very different picture when we look separately at domestic and cross-border deals. In domestic deals, targets appear to be more specialized than acquirers (with average values of SP between 1.981 and 2.033 for targets and between 1.854 and 1.898 for acquirers). In sharp contrast, acquirers appear to be more specialized than targets in cross-border transactions (with average values of SP between 1.894 and 1.908 for acquirers and a value of 1.501 for targets).

The difference in specialization is even larger in Panel B where we focus only on horizontal transactions. Acquirers display degrees of specialization that are roughly 25% larger than targets. These differences are statistically and economically significant. For instance, while the average (median) value of $SP(sales)$ is 1.981 (1.235) for acquirers, it amounts to 1.458 (0.886) for targets. This clear pattern indicates that for cross-border transactions involving firms from the same industry, more specialized acquirers buy less specialized target.

The effect of specialization if sizeable. Panel C indicates that more than 63% of all horizontal cross-border transactions involve acquirers that operate in more specialized industries than targets. Together these transactions amount to \$2.3 trillion, or 67% of the total value of cross-border horizontal transactions over our sample period. In all, a substantial fraction of asset ownership reallocations across borders occurs between more specialized acquirers and less specialized target firms.

[Insert Figures A, B, C, and D Here]

Figures A, B, C and D highlight that the observed difference in specialization between acquirers and targets in horizontal cross-border deals is present across countries, time, and industries. Figures A and B display the average difference in SP (labeled ΔSP) by acquirer and target countries (sorted in ascending order). For

acquirer countries, we observe that ΔSP is positive in 36 countries out of 46 countries in our sample. For target countries, ΔSP is positive in 40 countries, based on employment (similar for sales).[17] Figure C further confirms the finding that acquirer is more specialized than target holds for every single year in our sample. Finally, Figure D displays ΔSP by industry. Here again, ΔSP is positive in 72 distinct industries, and negative in only 13 industries for sales (69 v. 16 for employment).

The above univariate results reveal important differences in specialization between acquirers and targets in cross-border transactions that involve firms in the same industry. Overall, acquirers are significantly more specialized than targets. This is consistent with the hypothesis that firms acquire foreign assets to extend their specialization overseas. Moreover, the univariate results highlight important variation between countries, industries, and time. We account for these differences in the next section.

V Multivariate Analysis

To more formally examine the interplay between differences in specialization and the distribution of acquisition activities across countries and industries, we turn to a multivariate analysis. We start by discussing the empirical specification, present the main results, and subject our estimates to a battery of robustness tests.

A Gravity Model

We model the distribution of horizontal acquisition flows across countries with a gravity specification. Gravity models have a long tradition in international economics to study the effect of "geographic" distance on the intensity of cross-country relations such as trade flows (e.g. Anderson and van Wincoop (2004) or Anderson (2011)) or portfolio flows (e.g. Portes and Rey (2005)). They have recently been used to analyze acquisition flows (e.g. Ahern, Daminelli, and Fracassi (2010) and Karolyi and Taboada (2014)). Instead of examining the effect of geographic dis-

[17] Taiwan is an outlier with very few deals.

tance on the intensity of cross-border flows, we focus on the effect of difference in the *specialization* space. Our baseline specification is as follows:

$$log(1 + V_{c,c',i}) = \alpha + \beta \Delta SP_{c,c',i} + \gamma X_c + \delta X_{c'} + \eta X_{c,c'} + \upsilon_i + \varepsilon_{c,c',i}, \qquad (2)$$

where $V_{c,c',i}$ is the aggregate volume of horizontal acquisitions in industry i between acquirer country c and target country c'. We use two measures for V: the total number of acquisitions (#Acq.) and the total dollar value of acquisitions ($Acq.). The variable of interest, $\Delta SP_{c,c',i}$ measures the difference in specialization between countries c and c' in industry i. The vectors X_c, $X_{c'}$, and $X_{c,c'}$ include acquirer and target country-level characteristics, as well as country-pair characteristics (e.g. common border or language). The vector υ_i includes industry fixed effects.

Arguably mergers and acquisitions occur only when the combined expected benefits of the acquirer and target are positive. When benefits are negative we should observe no transaction. As a result the dependent variable $V_{c,c',i}$ is naturally truncated at zero. In our context, this happens frequently as country-industry pairs featuring at least one transaction over the 1990-2010 period represents only 6.5% of the sample. We account for this truncation by estimating equation (2) using a Tobit specification. We further account for the possible within-country correlation by clustering standard errors at the acquirer and target country level.

In our baseline tests, we focus primarily on cross-sectional variation and ignore the time-series dimension that we consider in Section V.D. Thus in our cross-sectional tests, we take the average values of all variables over the sample period. We collapse all 21 years into a single cross-sectional regression with 175,950 country-industry pairs ($46 \times 45 \times 85$ combinations of acquirer country, target country, and industry). As a result of this aggregation, X_c and $X_{c'}$ capture country-level effects. For instance, any effect that occurs because the acquirer country is larger or more developed than a target country is absorbed by the country variables.[18] Similarly, any effect that occurs because of a particular industry characteristic is absorbed

[18]We obtain similar results if we include acquirer and target country fixed effects instead of country level variable (see Appendix), but prefer to use country variables to compare (and validate) the effects of country characteristics with that documented by existing research.

by υ_i. Table 4 provides summary statistics for all variables used in the gravity estimations.

[Insert Table 4 Here]

To wit, the coefficient of interest in equation (2) β measures whether, for a given industry i, the intensity of cross-border acquisitions between (acquirer) country A and (target) country B is linked to differences in their specialization in i, after controlling for country and industry effects. In particular, a positive β coefficient would indicate that, for a given industry i, acquisitions flow from countries that are more specialized in i (e.g. watch-making in Switzerland) to countries that are less specialized in i (e.g. watch-making in the United States).

B Baseline Results

Table 5 presents the results of the gravity where the dependent variables are either the (log of the) number of deals (ln(#Acq.)) or the (log of the) aggregate value of deals (ln($Acq.)). The measures for the difference in specialization between country-industry pairs $\Delta SP_{c,c',i}$ are based on industry sales $\Delta SP(sales)$ and industry employment $\Delta SP(emp)$ (computed from Worldscope). Notably, the estimated coefficients on ΔSP (β) are positive across all specifications. All estimates are highly significant with t-statistics ranging between 7.4 and 11.4.

[Insert Table 5 Here]

The economic magnitude of the effect of specialization differences on the intensity of cross-border acquisitions is substantial. A one-standard deviation increase in $\Delta SP(sales)$ is associated with a 14.7% increase in the number of deals, and a 52.9% increase in the aggregate value of deals. Similarly, a one-standard deviation change in $\Delta SP(emp)$ is associated with 13.7% more deals, and an aggregate value of deals that is larger by 48.4%.[19]

The baseline gravity specifications contain a large number of control variables, capturing effects that are known to influence cross-border acquisition activity. The

[19]The variables ΔSP are normalized to a unit variance so the coefficients reported in Table 5 and following tables can be interpreted directly.

estimates reported in Table 5 are in line with previous research. For instance, larger economies (measured by log GDP) participate more in cross-border acquisitions. More developed countries, as measured by their GDP per capita, also feature more cross-border horizontal transactions. We also see more cross-border deals when country-pairs display more bilateral trade. Consistent with Erel, Liao, and Weisbach (2012), we find that an appreciation of the acquirer currency relative to the target currency positively influences deal flows. Moreover, transaction intensity increases with closer geographic proximity, and also when countries share the same language or the same legal origin (but not when they have the same religion).

[Insert Table 6 Here]

In Table 6, we replace the Worldscope-based specialization measures with measures constructed from all private and public firms from UNIDO (as defined in Section III.A). Because UNIDO only covers the manufacturing sector for 43 countries, the size of the sample is considerably reduced. Remarkably, the estimated coefficient for ΔSP remains positive and significant in all specifications. Even though the economic magnitude of the specialization effect is reduced in these specifications, it remains considerable with a 5% increase in number of deals and a 20% increase in value of deals with a one-standard deviation increase in ΔSP.

C Country-Industry Factors

Arguably, differences between country-*industry* pairs can potentially influence acquisition activity. For instance differences in size, growth opportunities, or the number of firms between the acquiring and target industry could be related to differences in specialization patterns and also transaction intensity.[20] To assess whether the above results are driven by such differences we include proxies for each country-industry average valuation and size as well as the number of firms populating each country-industry.[21]

[20] See for instance Rhodes-Kropf, Robinson, and Viswanathan (2005) for the role of valuation in domestic acquisitions and Erel, Liao, and Weisbach (2012) for cross-border acquisitions.

[21] Note that we cannot include acquirer and target country-industry fixed effects because our measure of bilateral specialization is symmetric, in the sense that for a given industry i, the difference in specialization between the acquiring country c and the target country c', labeled as

[Insert Table 7 Here]

We use the average market-to-book ratio in each country-industry to measure valuation, and the (log of the) sum of assets to measure size. We further count the number of firms in each country-industry. These measures are computed as averages over the sample period. Because some country-industry observations do not feature any publicly listed company in Worldscope, we are able to measure these variables for about half of all country-industry pairs. Table 7 indicates that our results are unaffected by the inclusion of these country-industry variables. Our main variable of interest ΔSP remains positive and strongly significant in all four specifications.[22] Reflecting that part of the specialization effect is related to differences in valuation, size, and firm count, the economic significance slightly decreases (by about 40%) but remains substantial and strongly significant.

D Reverse Causality and Omitted Variables

While the above results are consistent with differences in specialization having a large effect on the volume of cross-border acquisitions, there is a possibility that our interpretation suffers from a reverse causality or omitted variable bias. Indeed, one concern is that reverse-causation leads specialization differences to increase in response to cross-border acquisition activity. Another concern is that both industry specialization and the intensity of cross-border acquisition could be correlated with factors not included in our estimations.

To examine the issue of reverse causality, we re-estimate our baseline gravity equation (2) but we allow for a very long time lag between the measurement of specialization and cross-border acquisition activity. The results are shown in Table 8. In Panel A, we measure difference in specialization over the 1990-1999 period, whereas the dependent variables (deal activity) over the interval 2000-2010. In Panel B we further measure difference in specialization over the 1990-1995 period and use it to explain deal activity over the interval 2006-2010 period. Overall, the results

$\Delta SP_{c,c',i}$ is equal to $-1 \times \Delta SP_{c',c,i}$. This implies that acquirer and target country-industry fixed effects ($\alpha_{c,i}$ and $\alpha_{c',i}$) are collinear with $\Delta SP_{c,c',i}$.

[22] For brevity we only report the coefficients on ΔSP.

remain unchanged. These lagged structures largely mitigate the concern that reverse causality is the driving force behind our results.

[Insert Table 8 Here]

To investigate the potential effect of omitted variables, we take advantage of the panel structure of the sample. Introducing the time dimension in the gravity equation (2) allows us to include country-industry-pair fixed effects, and hence capture any fixed difference across country-industry-pairs. By doing so, the coefficient of interest (β) in equation (2) measures how the volume of acquisitions in a given country-industry-pair changes when the difference in specialization ($\Delta SP_{c,c',i,t}$) changes.

However, estimated on the full panel sample, the gravity model expands to more than 3.6 million observations ($46 \times 45 \times 85 \times 21$). With only 36,105 horizontal acquisitions during the sample period, the number of zeros in the dependent variable inflate to more than 99% of the sample, pushing the unconditional deal incidence in a given country-industry-year pair close to zero. For this reason, we report in Table 9 the results obtained from the full panel of 21 years as well as an aggregation of three sub-periods of seven years where we average the dependent and independent variables across each sub-period.

[Insert Table 9 Here]

The results reported in Table 9 reveal that our conclusions continue to hold when we control for unobserved differences between country-industry pairs (together with country-level controls). When we focus on the three-period aggregation (Panel A), the estimated coefficients on ΔSP are all positive and significant. Albeit smaller, the economic magnitude of the specialization effect remains substantial. When the difference in specialization in a given country-industry-pair increases by one standard-deviation, we observe an increase of about 1.1% (1% and 1.2%) in the number of deals in this pair and a 9% (7.4% and 10.5%) increase in acquisition value.[23]

[23]The smaller economic magnitude is somewhat expected as the source of variation in these panel specifications is within country-industry pairs as opposed to between country-industry pairs in our baseline (cross-sectional) estimation. The significance of ΔSP is further remarkable as industry

E Product Market Competition

In Table 9 we consider the role of product market competition. Caves (1971) argues that imperfect competition, in particular the possession of differentiated products, is an important determinant in international acquisitions as it shields the acquirer from competitive pressure in the foreign market. Similarly, Neary (2007) predicts that firms are less likely to target assets overseas in more competitive industries. In his model, firms make acquisitions in order to limit competition in the industry in which they hold an advantage. The smaller the number of competitors, the larger will be the increase in market share for the remaining firms if one of the competitors is taken over. Thus, Neary (2007) specifically predicts that the less competition in a given industry, the more likely firms will be to enter overseas markets through acquisitions. Overall, as product market competition in a particular country-industry could be related to the degree of specialization, we evaluate the effect of competition on our conclusions.

We measure the intensity of product market competition in target industries using the Lerner Index, or price-cost margin, following Nickell (1996). The price-cost margin we use is operating profits divided by sales (from Worldscope). We measure competition in a given country-industry-year as one minus the average price-cost margin.[24] Table 10 reports the results. Panel A reveals that, all else equal, the intensity of international acquisitions is significantly lower in competitive target industries. Estimates on the measures of competition in target country-industry are negative and significant. This is true for both measures of acquisition flows (in number and value) and for both measures of specialization. While intense competition in the product market appears to dampen foreign acquisitions, the effect

specialization is highly persistent across countries and industries. The autocorrelation estimates are 0.92 for $SP(sales)$ and 0.87 for $SP(emp)$. In the Internet Appendix, we report results using OLS as (non-linear) Tobit estimations with a large number of fixed effects could be inefficient and biased. The results are qualitatively similar.

[24] A value of one indicates perfect competition (price equal marginal cost) while values below one indicate some degree of market power. As explained by Aghion, Bloom, Blundell, Griffith, and Howitt (2005), one advantage of the Lerner Index is that it does not rely on any particular definition of geographic markets (unlike other indicators such as the Hirschman-Herfindahl index). This is particularly relevant in our setting as multinational firms operate in global markets.

of specialization on acquisition flows remains positive and substantial.

[Insert Table 10 Here]

To further understand the interplay between specialization and competition, we interact the difference in specialization between the aquirer and target industy (ΔSP) with the intensity of competition of the target industry. Results are presented in Panel B. The interactive effect is positive and significant across all specifications, indicating that the specialization effect we document above mitigates the competitive effect. The flow of acquisition is markedly larger when the difference in specialization is large and the target industry is more competitive, consistent with the advantage of specialized buyers allowing them to withstand the effects of competitive pressure in foreign markets.

F Deal-level Evidence

To provide a different perspective on the role of specialization in cross-border acquisitions, we estimate selection models at the deal-level that predict the probability for a firm in a given country-industry group to become an acquirer or a target in cross-border horizontal transaction. We run conditional logit regressions where the dependent variable $Deal_{c,i,m,t}$ is equal to one if the target firm (acquiring firm) in a given deal m is from country c and industry i. For each deal, the specification includes one observation for the actual country-industry of the target (acquirer), and multiple similar control observations that could have been potential targets (acquirers) in deal m.

We construct the control sample as follows. For each target (acquirer) of a deal that occurred in year t, we select five country-industry observations corresponding to the same industry as the actual target (acquirer), but located in *different* countries. We pick these observations from the pool of target (acquirer) country-industry-year observations that feature at least one cross-border transaction, and select the five closest observations in terms of the number of transactions.[25] The explanatory

[25] We match on transaction volume because we showed earlier that participation in cross-border transactions and industry specialization are correlated. As a result, our selection model could pro-

variables in our conditional logit models include the targets' (acquirers') measure of specialization SP, country characteristics (similar as in the gravity specification (2)), and deal fixed effects for each target (acquirer) and its controls.

[Insert Table 11 Here]

The first two columns of Table 11 presents coefficient estimates from the conditional logit model that predict targets. The estimated coefficient on SP are negative and significant at the 1% level for both measures of specialization. In line with the above gravity results, targets are significantly less likely to be chosen from countries with a higher degree of industry specialization compared to other countries with a similar level of (target side) deal activity in cross-border transactions. Columns 3 and 4 report results relative to the probability of becoming acquirers. We observe positive and significant estimates for SP in both columns, indicating that acquirers in cross-border horizontal deals are more likely to come from country-industries that exhibit a higher level of specialization.[26]

VI Intangible Capital

According to our main hypothesis, cross-border acquisitions are driven by relative advantages that originate in localized industry-specific assets, that we capture using differences in specialization across countries and industries. As these specialized assets should be (1) mobile, and (2) difficult to contract upon or replicate by outsiders, they are likely to be intangible. This section provides evidence consistent with this claim. First, we rely on measures of human and technological capital at the country-level and test whether the effect of industry specialization on cross-border acquisition flows is stronger when the acquirer country benefits from a larger stock of intangible capital compared to that of the target country. Second, we use disaggregated data on human and technological capital at the level of industries, and directly test if differences in intangibles between country-industries explain the

duce biased results if we did not limit the set of possible target countries to those with comparable deal activity.

[26] Unreported results indicate that these results continue to hold if we further control for the size and growth opportunities of the target industries or acquirer industries.

intensity of cross-border acquisitions.

A Country Human Capital

We first consider human capital. We rely on two measures of country-level education as proxies for the stock of human capital. First, following Barro and Lee (2013) we consider the fraction of population that obtains a higher (tertiary) education. Second, we use the fraction of public spending on education (to total public spending). To assess the role of these two variables on the acquisition-specialization sensitivity, we partition the sample in two sub-samples based on the median of the country-pair differences. Accordingly, we assign to the "High" partition the country pairs where the difference in education proxies (between the acquirer and the target country) are above the median, and to the "Low" partition the pairs that are below the median.[27] We then estimate the gravity specification (2) separately for each partition and compare the estimated coefficients across partition.

[Insert Table 12 Here]

Table 12 reports the results of the cross-country-pairs estimations. For brevity we only display the coefficients for ΔSP as well as the p-value of the test that assesses whether ΔSP is significantly larger in the "High" partition than in the "Low" partition. In support of our hypothesis, we observe that the link between specialization and cross-border horizontal acquisitions is larger in the "High" partition than in the "Low" partition. This pattern emerges in all specifications. The differences across partitions are both statistically and economically signifcant. The effect of specialization on acquisition intensity is roughly two times larger when the acquirer country benefits from a large share of highly educated people in its population relative to the target country. In the same vein, the effect of specialization is about 40% larger when there is a large difference in the spending on education between acquirer and target country.

[27] Note that because partitioning variables are differences at the country-pair level, the median are zero by construction. Hence, the "High" and "Low" partition capture positive and respectively negative differences in the partitioning variables.

B Country Technological Capital

Next, we investigate whether the effect of specialization on global acquisition flows also varies with countries' stock of technological capital. Our hypothesis implies that the benefit for firms to extend their local specialization overseas should be positively related to their country's technological advancement.

We use various measures of technology advancement at the country-level as proxies for the stock of intellectual capital. First, we measure the importance of technology and innovation by using the ratio of (public and private) R&D spending to GDP. Second, following Adams (1990) we measure the stock of technological knowledge with the number of patents per capita, the number of trademark per capita, and the number of scientific articles per capita. We again assign each country-pair into a "High" or a "Low" partition based on the median country-pair differences of each variable. Table 13 presents the results of the cross-partition estimations.

[Insert Table 13 Here]

We observe notable differences between the "High" and "Low" partitions. Across all specifications, the acquisition-specialization sensitivity is markedly larger when the acquirer country enjoys a larger stock of technological capital (the "High" partitions). The contrasts are economically important as coefficient estimates are almost 50% larger in the "High" partitions. Moreover, the differences across partitions are statistically significant in 12 out of the 16 estimations. Overall, the flow of horizontal cross-border acquisitions from more specialized to less specialized industries increases even more when country pairs exhibit larger differences in technological capital.

C Country-Industry Human and Technology Capital

Alternatively, we use more granular measures of human and technological capital at the level of industries for a subset of countries to directly examine whether differences in intangibles between country-industry observations are related to acquisitions intensity. We rely on two variables to measure the stock of human capital.

Data comes from the EU KLEMS Growth and Productivity Accounts (KLEMS).[28] This database contains industry-level measures of output, inputs and productivity for 25 European countries, as well as the US, Japan, Korea and Australia for the period from 1970 onwards. We measure human capital using the ratio of high-skilled labor compensation to total compensation, and the ratio of hours worked by high-skilled persons engaged to total hours worked. We average these variables for each available country and industry over our sample period, which represent 73,665 country-industry observations (22 countries and 85 industries).[29]

We rely on four variables as proxies for the stock of technological capital at the industry level. From the same source, we use the stock of software capital as well as the stock of computing and communication equipment (both measured in 1995 prices). We have 43,290 non-missing country-industry observations (or 11,544 non-missing country-industry pair observations). In addition, we aggregate firm-level data on R&D expenditures from Worldscope to compute the stock of R&D capital (using the perpetual inventory method as detailed in Falato, Kadyrzhanova, and Sim (2014)) and the intensity of R&D expenses (R&D over assets) for each available country-industry observation (123,165 country-industry observations).

[Insert Table 14 Here]

Table 14 reports cross-sectional tobit estimations of gravity models similar to the baseline specification 2 but where we replace the difference in specialization (ΔSP) in a given industry between country pairs with direct differences in human and technology capital (that we label $\Delta Intangibles$). We observe positive and significant coefficients for the measures of human capital, indicating that there are more horizontal transactions between two countries (in a given industry) when the acquiring industry has a larger stock of human capital than the target industry. We also observe positive coefficients for three out of four measures of technological capital. All else equal, acquisition intensity is stronger when the acquiring industry benefits from larger stocks of software assets or R&D capital. Although limited to

[28] See O'Mahony and Timmer (2009) for a description of the KLEMS dataset.

[29] The KLEMS dataset contains data at the level of 32 industries. We manually map the three-digit ISIC code we use throughout the paper to the KLEMS industries.

a subset of country-industry pairs, these results lend further support for the idea that the intensity of cross-border acquisitions is related to differences in intangible assets across countries and industries.

VII Ex Post Performance and Robustness

In this section, we examine whether ex post acquisition outcomes depend on the specialization profile of both the acquirers and targets and discuss additional robustness checks.

A Ex Post Performance

An important obstacle to measuring ex post acquisition performance is that two separate firms exist before the transaction, and one or two firms might exist after the transaction, depending on the transaction type. As in Hoberg and Phillips (2012) we avoid this issue by considering only the ex post change in performance of acquirers, measured relative to the first set of numbers available after the transaction effective date. We thus implicitly assume that performance accrues over time as it takes time for specialized acquirers to deploy their intangible assets on newly purchased foreign assets.[30]

We examine changes in operating income over assets from year $t+1$ to year $t+2$, or $t+4$ (one- and three-years horizons). As information on performance is available only for public companies, we focus on public firms acquiring public or private targets in horizontal cross-border transactions. To isolate the effect of specialization differences on post-acquisition performance, we restrict our attention to firms that only acquire assets in cross-border horizontal transactions over the horizons we consider. Moreover, because changes in performance can reflect underlying industry trends, we benchmark acquirers' performance by contrasting it to that of matched industry peers. For each acquirer, we select the closest peer (by size) that

[30]Note that by examining post-changes only we bias our analysis towards not finding results due to a reduction in power, but we avoid complications of measuring performance in year $t-1$.

(1) operates in the same country and industry, and (2) that is not involved in any acquisition during a six-year window surrounding the transaction.[31]

[Insert Table 15 Here]

Table 15 reports the results of OLS regressions where the ex post changes in performance (at different horizons) are the dependent variables. The sample includes 4,997 acquisitions made by 3,636 distinct firms from 46 countries and 84 industries. All specifications include control variables as well as country-pairs, industry, and year fixed effects. We observe that the estimated coefficients for ΔSP are positive across all performance horizons and with both measures of specialization. They are significant in three specifications out of four. Acquisitions where acquirers are more specialized than targets appear to be associated with increased ex post profitability. The results are economically substantial. For instance, a one standard deviation increase in $\Delta SP(sales)$ is associated with an increase in profitability of 0.60% over one year, and the same level of 0.60% is maintained over three years.

We recognize that looking at acquirers' ex post outcomes does not necessarily identify the (causal) effects of cross-border transactions on firm performance.[32] Our analysis indicates, however, that differences in specialization between acquirers and targets are associated with better operating performance. Consistent with our main hypothesis, this finding suggests that the benefits of extending specialization abroad arise because of the enhanced ability of specialized buyers to operate the acquired assets more efficiently.

B Additional Robustness Tests

We perform additional analyses to verify the robustness of our findings that we report (together with other ancillary tests discussed in the text) in an Internet Appendix. These additional tests are built around our cross-sectional gravity speci-

[31] To mitigate the effect of outliers, we winsorize the performance measures at the 1% level. Moreover, to reduce survivorship issues, we assign any missing values for a given horizon the value of the last known horizon (as in Hoberg and Phillips (2012)).

[32] Indeed, our results could be explained by a selection story where more specialized buyers are better able to find valuable foreign assets, that lead to post-transaction increased in performance.

fications of cross-border horizontal acquisition flows (equation (2)). With respect to our baseline cross-sectional results reported in Table 5, we first estimate the gravity equation using OLS, a count model and the Poisson Pseudo-Maximum-Likelihood (PPML) method developed by Silva and Tenreyro (2006) to capture the count nature of the dependent variables (in the presence of many zeros).[33] Second, we include acquirer and target country fixed effects instead of country level control variables. Third, we scale the flow (both in number and value) of cross-border horizontal acquisitions in a given industry between two countries by the intensity of domestic horizontal acquisition in the target industry. Fourth, we exclude observations from the U.S. and the U.K. as these two countries account for a non-trivial fraction of all transactions. Fifth, we replace our baseline measure of specialization with one that exclude sales realized abroad. Sixth, we estimate the baseline gravity models separately for tradable and non-tradable sectors and find no significant differences (although the effect of specialization is larger in non-tradable sectors). Overall, our findings are robust to these alternative estimations and specifications.

VIII Conclusions

We examine whether industry specialization and industry-specific intangibles are important in explaining the flow and direction of cross-border acquisitions. Our central hypothesis is whether firms can extend industry specialization arising from intangible assets by acquiring assets in foreign markets. We find strong empirical support for this hypothesis, focusing on a large sample of horizontal transactions involving 46 countries and 85 industries.

We find large differences in the degrees of industry specialization between acquirers and targets. For a given industry, the larger the difference in specialization between two countries, the larger is the flow of bilateral acquisitions (both in numbers and dollar value). The direction of acquisitions goes from acquirers in industries in which their home country is more specialized buying targets in countries where

[33] This estimation is performed using the `ppml` command available in Stata. Further details are available here: http://privatewww.essex.ac.uk/ jmcss/LGW.html

that industry is less specialized. The magnitude of the specialization effect is large. We rule out reverse causality where specialization arises from acquisition activity based on regressions with long lags.

We further show that the effect of specialization on the intensity of cross-border acquisitions is related to measures of intangibles. We estimate that the specialization effect is stronger when the acquirer countries have higher educational attainment, spend more on R&D, and enjoy larger stocks of patents or trademarks. At the country-industry level we find that industry specialization plays a larger role when the acquirer comes from a country-industry pair with higher measures of human and technological capital - including R&D, the fraction of high skilled workers and the stock of information and communication technology - than the industry of the target country.

We estimate deal-level selection models to predict the countries in which targets and acquirers are chosen, and find that acquirers look for targets in countries that are less specialized, and that firms from more specialized countries are selected as acquirers. We also find that the volume of cross-border acquisition is larger when the target industry is more concentrated, consistent with firms wishing to minimize competition when they enter foreign markets; in contrast, firms from specialized industries are more likely to enter more competitive industries, consistent with specialization helping firms survive in a highly competitive environment. Examining ex post performance, we find that difference in specialization between acquirers and targets is related to acquisitions outcomes as we observe better one- and three-year post-acquisition operating performance when more specialized acquirers purchase assets in less specialized industries.

We conclude that the distribution of specialization across countries and industries is important in explaining the geography of global acquisitions, consistent with firms extending specialized intangibles overseas via foreign acquisitions. Our findings support the proposition that the existence and prevalence of specialized assets such as human capital and intellectual capital are important factors in understanding firms' international expansion.

Appendix 1: Definition of the Variables

- **#Acq.**: Number of cross-border horizontal acquisitions between two countries (Source: SDC)
- **$Acq.**: Dollar value of cross-border horizontal acquisitions between two countries (Source: SDC)
- **SP(sales)**: Degree of specialization of an industry in a given country, computed as the share of the industrys sales in its country total sales, divided by the average share of sales in the industry across all countries. The sales are aggregated across public firms in each country-industry (Source: Worldscope and own calculations).
- **SP(emp)**: Degree of specialization of an industry in a given country, computed as the share of the industrys employment in its country total employment, divided by the average share of employment in the industry across all countries. Employment is aggregated across public firms in each country-industry (Source: Worldscope and own calculations).
- **GDP**: Gross domestic product (Source: Worldbank)
- **GDP/capita**: Gross domestic product per capita (Source: Worldbank)
- **Trade**: Bilateral imports and exports (Source: World Integration Trade Solution (WITS))
- **%Tertiary Education**: Fraction of the labor force with a tertiary education (Source Barro-Lee Educational Attainment Dataset).
- **%Education Spending**: Fraction of public spending on education (Source Barro-Lee Educational Attainment Dataset).
- **#Patents/capita**: Number of deposited patents per capita (Source: Worldbank)
- **#Trademarks/capita**: Number of deposited trademarks per capita (Source: Worldbank)
- **#Articles/capita**: Number of scientific articles per capita (Source: Worldbank)
- **Exchange rate return**: Difference in the logarithm of the monthly real exchange rate (Source: Datastream)
- **Distance**: Geographic distance between capitals, calculated following the great circle formula, which uses latitudes and longitudes of the most important city (in terms of population) or its official capital (Source: CEPII).
- **Common Border**: Dummy that equals one if two countries share a common border (Source: CEPII).
- **Same Religion**: Dummy that equals one if two countries share the same religion, where the religion is defined as the dominant religion of a country (Source: CIA World Factbook 2008).

- **Same Language**: Dummy that equals one if two countries share the same language, where the language is defined as the primary spoken language of a country (Source: CIA World Factbook 2008).
- **Same Legal System**: Dummy that equals one if two countries share the same legal system, classified into four groups: Common, Civil, German, or Scandinavian (Source: Djankov et al. 2006).
- **Corporate Tax Rate**: Country corporate tax rate (in percentage) (Source: Economic Freedom Index).
- **Double-Tax Treaty**: Dummy that equals one if two countries have signed a double-taxation treaty (Source: UNCTAD).
- **Bilateral Investment Treaty**: Dummy that equals one if two countries have signed bilateral investment treaty (Source: UNCTAD).
- **Total Assets**: Total Assets (Source: Worldscope)
- **Market-to-book**: Book value of assets minus book value of equity plus market value of equity, divided by the book value of assets (Source: Worldscope).
- **1-Lerner**: Measure of product market competition computed as one minus the average price-cost margin ratio in an industry, where the price-cost margin is computed as operating profits before depreciation and amortization over sales (Source: Worldscope)
- **OI/A**: Operating income divided by total assets (Source: Worldscope)
- **R&D Stock**: Stock of R&D capital computed using the perpetual inventory method $G_{i,t} = (1-\delta)G_{i,t-1} + R\&D_{i,t}$, where $G_{i,t}$ is the end-of-period stock of R&D capital for firm i and δ is the depreciation rate of R&D capital set to 15% as in Falato, Kadyrzhanova, and Sim (2014) (Source: Worldscope)
- **R&D/Assets**: Ratio of R&D expenditures to total assets (Source: Worldscope)
- **High Skill (%comp)**: (country-industry) ratio of high-skilled labor compensation to total compensation (Source: EU KLEMS variable *LABHS*)
- **High Skill (%hours)**: (country-industry) ratio of hours worked by high-skilled persons engaged to total hours worked (Source: EU KLEMS variable *H-HS*)
- **Software (%capital)**: (country-industry) stock of software capital over total capital, in 1995 prices (Source: EU KLEMS variable *K-Soft*)
- **ICT Stock (%capital)**: (country-industry) stock of computing and communication equipment of total capital, in 1995 prices (Source: EU KLEMS variable *K-ICT*)

Appendix 2: Mapping between ISIC and SIC

Our various data sources are based on different industry classifications, notably the US Standard Industrial Classification (SIC 1987) classification and the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 3) classification. To make the industry classification systems compatible, we define industries as the finest possible partition of industries in the 3-digit ISIC Rev. 3 system such that the 3-digit SIC 1987 classification is a refinement of this partition; that is, none of the 3-digit industries in the SIC 1987 has an intersection with two or more industries in the partition of industries we define. This yields a partition of 101 industries.[34]

[34]Existing concordances between ISIC and SIC classifications do not exclude overlap, i.e. individual 3-digit SIC industries corresponding to more than one 3-digit ISIC industries, and vice versa.

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Table 1: Measures of Specialization – Descriptive Statistics

This table presents descriptive statistics for our two main measures of industry specialization as presented in Section III.A. *SP(sales)* is specialization based on total sales, and *SP(emp)* is specialization based on total employment. Data on sales and employment are from Worldscope. The sample covers 46 countries, 85 distinct industries and the period 1990-2010. Industries are defined based on three-digit ISIC classification (see Appendix 2). Panel A displays aggregate summary statistics (average, median as well as 10th and 90th percentiles) for each country. Panel B displays the two most specialized industries (highest *SP(sales)*) for each country (highest SP(sales)) aggregated over the whole sample period.

Panel A	*SP(sales)*				*SP(emp)*			
Country	Average	10th	Median	90th	Average	10th	Median	90th
Argentina	0.51	0.00	0.00	0.78	0.34	0.00	0.00	0.00
Australia	1.38	0.00	0.29	4.19	1.22	0.00	0.10	3.42
Austria	0.76	0.00	0.00	1.99	0.81	0.00	0.00	2.56
Belgium	0.88	0.00	0.00	2.50	1.02	0.00	0.00	2.73
Brazil	0.51	0.00	0.08	1.50	0.67	0.00	0.00	2.10
Canada	1.26	0.00	0.42	3.03	1.08	0.00	0.22	2.90
Chile	0.75	0.00	0.00	2.26	0.79	0.00	0.00	2.50
China	1.08	0.00	0.35	2.49	1.11	0.00	0.28	2.65
Colombia	0.58	0.00	0.00	1.87	0.59	0.00	0.00	1.35
Czech Republic	0.39	0.00	0.00	0.50	0.41	0.00	0.00	0.55
Denmark	0.87	0.00	0.01	2.51	0.91	0.00	0.01	2.78
Finland	1.00	0.00	0.04	2.45	1.10	0.00	0.04	2.61
France	1.37	0.00	0.59	3.64	1.51	0.00	0.57	3.76
Germany	1.50	0.00	0.31	3.24	1.47	0.00	0.31	3.31
Greece	0.75	0.00	0.11	2.27	0.74	0.00	0.03	2.22
Hong Kong	1.38	0.00	0.51	3.11	1.34	0.00	0.27	3.77
Hungary	0.53	0.00	0.00	0.78	0.58	0.00	0.00	0.91
India	0.96	0.00	0.23	2.71	0.74	0.00	0.00	2.00
Indonesia	1.03	0.00	0.12	2.79	1.02	0.00	0.00	2.37
Ireland	0.72	0.00	0.00	2.13	0.73	0.00	0.00	2.06
Israel	0.80	0.00	0.00	2.06	0.61	0.00	0.00	1.80
Italy	0.68	0.00	0.09	2.09	0.76	0.00	0.11	2.31
Japan	2.02	0.08	0.91	6.10	2.00	0.10	0.66	5.74
Korea	1.37	0.00	0.40	3.77	1.34	0.00	0.47	3.14
Luxemburg	0.60	0.00	0.00	0.38	0.50	0.00	0.00	0.14
Malaysia	1.22	0.00	0.55	3.55	1.10	0.00	0.03	3.32
Mexico	0.94	0.00	0.00	2.94	0.76	0.00	0.00	2.20
Netherlands	0.99	0.00	0.15	2.26	1.26	0.00	0.14	2.82
New Zealand	1.15	0.00	0.00	3.18	0.92	0.00	0.00	1.40
Norway	1.14	0.00	0.00	1.90	1.49	0.00	0.00	2.55
Peru	0.54	0.00	0.00	1.75	0.40	0.00	0.00	1.18
Philippines	0.75	0.00	0.00	2.11	0.67	0.00	0.00	1.56
Poland	0.71	0.00	0.00	2.01	0.65	0.00	0.00	1.69
Portugal	0.54	0.00	0.00	1.52	0.54	0.00	0.00	1.60
Russia	0.44	0.00	0.00	0.66	0.40	0.00	0.00	0.87
Singapore	1.70	0.00	0.55	4.21	1.41	0.00	0.00	4.20
South Africa	1.28	0.00	0.28	3.56	1.29	0.00	0.17	3.31
Spain	0.74	0.00	0.00	1.83	0.79	0.00	0.00	1.93
Sweden	1.18	0.00	0.21	3.64	1.11	0.00	0.16	3.08
Switzerland	1.81	0.00	0.14	4.30	1.99	0.00	0.13	3.30
Taiwan	1.49	0.00	0.22	4.06	1.38	0.00	0.08	3.31
Thailand	0.97	0.00	0.34	2.63	1.23	0.00	0.07	3.28
Turkey	0.86	0.00	0.00	2.00	0.82	0.00	0.00	2.02
UK	1.46	0.02	0.67	3.03	1.81	0.03	0.65	3.94
USA	2.26	0.17	1.20	4.98	2.42	0.16	1.00	5.94
Venezuela	0.15	0.00	0.00	0.18	0.18	0.00	0.00	0.00
World	1.00	0.00	0.06	2.64	1.00	0.00	0.00	2.55

Panel B	**Top#1**	**Top#2**
Argentina	Manufacture of footwear	Basic iron and steel
Australia	Repair of personal and household goods	Advertising
Austria	Architectural, engineering and others	Other wholesale
Belgium	Insurance and pension funding	Retail sale of food, beverages and tobacco
Brazil	Education	Retail trade in specialized stores
Canada	Repair of personal and household goods	Printing and service activities
Chile	Education	Sea and coastal water transport of freight
China	Non-scheduled air transport	Education
Colombia	Spinning, weaving and finishing of textiles	Beverages
Czech Republic	Tobacco products	Casting of metals
Denmark	Sea and coastal water transport of freight	Sea and coastal water transport of passengers
Finland	Television and radio transmitters	Paper and paper products
France	Electric lamps and lighting equipment	Tanning and dressing of leather
Germany	Retail trade not in stores	Sale, maintenance and repair of motor vehicles
Greece	Human health activities	Precious and non-ferrous metals
Hong Kong	Sea and coastal water transport of passengers	Education
Hungary	Plastics products	Refined petroleum products
India	Electric lamps and lighting equipment	Education
Indonesia	Tobacco products	Sale, maintenance and repair of motor vehicles
Ireland	General purpose machinery	Dairy products
Israel	Insurance and pension funding	Architectural and engineering activities
Italy	Aircraft and spacecraft	Motor vehicle and equipment
Japan	Accumulators, primary cells, primary batteries	Electrical equipment
Korea	Television and radio receivers	Other wholesale
Luxemburg	Structural metal products, tanks, reservoirs	Basic iron and steel
Malaysia	Sale, maintenance and repair of motor vehicles	Hotels and accommodation
Mexico	Glass and glass products	Restaurants, bars and canteens
Netherlands	Renting of construction or demolition equipment	Meat, fish, fruit, vegetables, oils and fats
New Zealand	Renting of transport equipment	Legal, accounting, and auditing activities
Norway	Oil and gas extraction	Non-scheduled air transport
Peru	Grain mill products and starched products	Legal, accounting, and auditing activities
Philippines	Education	Beverages
Poland	Renting of construction or demolition equipment	Wearing apparel, except fur apparel
Portugal	Products of wood, cork, and straw	Retail sale of food, beverages and tobacco
Russia	Transport via pipelines	Railway and tramway locomotives
Singapore	Building and repairing of ships and boats	Electronic valves and tubes
South Africa	Railway and tramway locomotives	Chemical and Fertilizer Minerals
Spain	Railway and tramway locomotives	Repair of personal and household goods
Sweden	Domestic appliances	Wearing apparel, except fur apparel
Switzerland	Watches and clocks	Electricity distribution, wire and cable
Taiwan	Office, accounting and computing machines	Casting of metals
Thailand	Miscellaneous Manufactures	Manufacture of footwear
Turkey	Domestic appliances	Glass and glass products
UK	Legal, accounting, and auditing activities	Advertising
USA	Renting of transport equipment	Education
Venezuela	Structural metal products, tanks, and reservoirs	Monetary intermediation

Table 2: Mergers and Acquisitions - Descriptive Statistics

This table describes the sample of mergers and acquisitions. Data are from SDC Platinum M&A Database. We include mergers and acquisitions where more than 50% of the target shares are owned by the acquirer after the transaction. We exclude LBOs, spinoffs, recapitalizations, self-tender offers, exchange offers, repurchases, acquisitions of remaining interests, privatizations as well as deals involving government agencies. The sample is 1990-2010. Panel A displays the breakdown of transactions across domestic, cross-border, horizontal and non-horizontal for the whole sample. Panel B displays the number of transactions (N), the dollar value of transactions (V in $bn), the fraction of cross-border transactions (C), the fraction of horizontal transactions (H) and the fraction of cross-border horizontal transactions (C&H) separately for each acquirer and target country. Industries are defined based on three-digit ISIC classification (see Appendix 2).

Panel A	Total	Domestic	Cross-Border
Number of deals	365,496	284,357	81,139
	(100%)	(77.80%)	(22.20%)
Value of deals (in Billion)	$21,612	$15,694	$5,918
	(100%)	(72.60%)	(27.40%)
Number of Horizontal Deals	162,098	125,993	36,105
	(44.60%)	(44.70%)	(44.50%)
Number of Non-Horizontal Deals	203,398	158,364	15,034
	(55.40%)	(55.30%)	(55.50%)

Panel B	Acquirer Country					Target Country				
	N	V ($bn)	C	H	C&H	N	V ($bn)	C	H	C&H
Argentina	756	51	15%	50%	9%	1,443	73	56%	53%	32%
Australia	11,560	461	17%	42%	7%	12,412	419	22%	43%	10%
Austria	2,073	37	50%	47%	25%	1,976	47	48%	45%	23%
Belgium	2,913	155	51%	46%	24%	2,940	95	51%	46%	25%
Brazil	2,343	163	9%	55%	5%	3,515	241	39%	52%	19%
Canada	13,497	565	31%	47%	15%	13,537	532	31%	45%	14%
Chile	483	17	23%	51%	14%	716	30	48%	51%	26%
China	6,240	156	10%	35%	4%	8,540	255	34%	36%	14%
Colombia	180	7	32%	65%	23%	324	22	62%	60%	37%
Czech Republic	766	5	9%	43%	4%	1,488	32	53%	47%	27%
Denmark	3,326	77	37%	47%	18%	3,394	81	39%	47%	19%
Finland	4,695	112	26%	43%	11%	4,664	95	26%	43%	11%
France	16,725	1025	29%	45%	15%	17,055	817	30%	43%	13%
Germany	19,478	839	29%	45%	14%	20,754	947	34%	43%	14%
Greece	941	27	19%	47%	9%	945	31	19%	48%	10%
Hong Kong	5,862	320	39%	36%	13%	5,344	250	33%	38%	12%
Hungary	771	3	9%	37%	5%	1,370	20	49%	43%	25%
India	4,371	87	19%	39%	11%	5,079	121	30%	37%	13%
Indonesia	594	25	14%	41%	4%	996	36	49%	45%	23%
Ireland	2,045	77	58%	43%	26%	1,736	53	50%	44%	24%
Israel	1,117	60	44%	40%	22%	1,154	51	46%	39%	22%
Italy	6,604	426	25%	44%	13%	7,527	459	34%	41%	14%
Japan	17,926	700	14%	38%	5%	16,527	642	7%	38%	3%
Korea	3,145	201	12%	28%	5%	3,404	221	19%	30%	8%
Luxemburg	701	64	92%	40%	35%	328	76	83%	46%	37%
Malaysia	7,169	94	13%	34%	5%	6,946	92	11%	35%	4%
Mexico	825	149	33%	49%	19%	1,417	160	61%	49%	31%
Netherlands	7,737	434	48%	44%	22%	6,526	423	39%	43%	17%
New Zealand	2,042	35	20%	44%	8%	2,557	52	36%	42%	14%
Norway	3,053	81	35%	48%	18%	3,150	99	37%	47%	18%
Peru	166	7	11%	41%	6%	290	15	49%	49%	29%
Philippines	569	15	13%	41%	5%	827	29	40%	43%	18%
Poland	1,337	16	8%	43%	4%	2,323	43	47%	45%	23%
Portugal	1,206	49	22%	43%	11%	1,457	50	36%	46%	20%
Russia	3,863	64	6%	34%	2%	4,361	60	17%	37%	8%
Singapore	4,368	154	47%	32%	17%	3,451	98	33%	32%	12%
South Africa	2,340	75	16%	39%	7%	2,546	72	23%	40%	10%
Spain	6,978	368	18%	48%	10%	8,094	334	30%	46%	14%
Sweden	7,496	268	39%	46%	19%	6,918	344	33%	43%	15%
Switzerland	4,912	483	50%	45%	22%	4,249	361	43%	45%	19%
Taiwan	896	56	37%	41%	15%	973	63	42%	41%	18%
Thailand	1,413	22	10%	35%	5%	1,885	31	32%	37%	14%
Turkey	501	24	11%	39%	5%	820	49	46%	42%	21%
UK	41,309	2508	25%	42%	10%	39,568	2149	22%	43%	10%
USA	138,096	11042	15%	48%	7%	129,752	11432	10%	48%	4%
Venezuela	108	7	21%	48%	9%	218	12	61%	54%	35%
World	365,496	21,613	26%	43%	12%	365,496	21,613	38%	44%	18%

Table 3: Specialization Profile of Acquirers and Targets

This table presents the mean and median differences in the degree of specialization between the acquirer's industry (A) and the target's industry (T) at the transaction level. We consider two measures of specialization, where *SP(sales)* is specialization based on total sales, and *SP(emp)* is specialization based on total employment. Data on sales and employment are from Worldscope. The sample covers 46 countries, 85 distinct industries and the period 1990-2010. Industries are defined based on three-digit ISIC classification (see Appendix 2). We report the average and median degree of specialization. We separate transactions between domestic and cross-border. Panel A includes all transactions (N=365,496). Panel B includes all horizontal transactions (N=162,098). Panel C further indicates the fraction of all horizontal cross-border transactions and the fraction of the dollar value in these transactions for which the degree of specialization of the acquirer is larger than that of the target (A.SP(x)>T.SP(x)). We test for the significance of the mean (t-test) and median (sign-rank test) difference in the degree of specialization between the acquirer and target, and report the significance levels next to the mean and median for the acquirer. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A: All Transactions		Domestic	Cross-Border	All
A. SP(sales)	Mean:	1.854***	1.894***	1.863**
	Median:	0.993***	1.094***	1.021***
T. SP(sales)	Mean:	1.981	1.501	1.874
	Median:	1.153	0.823	1.084
A. SP(emp)	Mean:	1.898***	1.908***	1.900
	Median:	0.863***	0.930***	0.870***
T. SP(emp)	Mean:	2.033	1.501	1.915
	Median:	0.968	0.730	0.918

Panel B: Horizontal Transactions		Domestic	Cross-Border	All
A.SP(sales)	Mean:	2.165	1.981***	2.124***
	Median:	1.219	1.235***	1.222
T. SP(sales)	Mean:	2.165	1.458	2.008
	Median:	1.219	0.858	1.124
A. SP(emp)	Mean:	2.246	2.017***	2.195***
	Median:	1.036	1.083***	1.046***
T. SP(emp)	Mean:	2.246	1.467	2.073
	Median:	1.036	0.768	0.963

Panel C: Horizontal Cross-Border Transactions	%(# of deals)	$ value	%($ value)
A.SP(sales)>T.SP(sales)	63.58%	$2.38 Bn.	67.50%
A.SP(emp)>T.SP(emp)	63.06%	$2.36 Bn.	66.90%

Table 4: Summary Statistics of Variables used in Gravity Models

This table presents summary statistics (means, standard deviations, percentiles, and the number of observations) for each variable used in the gravity models we estimate. Observations are at the country-industry-pair level in Panel A, the country-level in Panel B, the country-pair level in Panel C, and the country-industry level in Panel D. All variables are defined in Appendix 1. The sample covers 46 countries, 85 distinct industries and the period 1990-2010. Industries are defined based on three-digit ISIC classification (see Appendix 2). Δ indicates the difference between acquirer and target country. The unit of observation is at the country-industry pair.

Statistics:	Mean	Std.Dev	25th	50th	75th	N
			Panel A: Country-Industry-Pair Variables			
ln(#Acq.)	0.07	0.31	0.00	0.00	0.00	175,950
ln($Acq.)	0.14	0.81	0.00	0.00	0.00	175,950
$\Delta SP(sales)_{WS}$	0.00	3.27	-0.53	0.00	0.53	175,950
$\Delta SP(emp)_{WS}$	0.00	3.44	-0.49	0.00	0.49	175,950
$\Delta SP(sales)_{UNIDO}$	0.00	1.92	-0.61	0.00	0.61	77,658
$\Delta SP(emp)_{UNIDO}$	0.00	1.92	-0.61	0.00	0.61	77,658
			Panel B: Country-Level Variables			
ln(GDP)	25.33	1.27	24.22	25.15	26.13	175,950
ln(GDP/capita)	8.76	1.16	7.90	9.15	9.71	175,950
ln(Bilateral Trade)	13.14	2.11	11.76	13.19	14.60	175,950
%Tertiary Education	34.20	17.17	23.44	28.82	44.00	160,650
%Education Spending	14.21	3.94	11.52	13.22	15.93	168,300
#Patent/Pop.	491.07	645.01	83.86	221.91	615.01	172,125
#Trademark/Pop.	1287.57	946.12	510.48	1142.51	1664.03	164,475
#Articles/Pop.	358.26	333.97	57.82	275.22	698.74	172,125
			Panel C: Country-Pair Variables			
Exchange Rate Return	0.00	0.09	-0.03	0.00	0.03	175,950
ln(Distance)	8.62	1.00	7.92	9.05	9.29	175,950
Common Border	0.05	0.21	0.00	0.00	0.00	175,950
Same Religion	0.30	0.46	0.00	0.00	1.00	175,950
Same Legal System	0.25	0.43	0.00	0.00	1.00	175,950
Same Language	0.11	0.32	0.00	0.00	0.00	175,950
ln(ΔCorporate Tax Rate)	0.07	0.05	0.03	0.06	0.10	175,950
Double-Tax Treaty	0.36	0.48	0.00	0.00	1.00	175,950
Bil. Investment Treaty	0.16	0.36	0.00	0.00	0.00	175,950
			Panel D: Country-Industry-Level Variables			
Market-to-Book	1.53	0.69	1.12	1.36	1.73	120,915
Total Assets	1415.19	3959.84	97.98	277.18	940.80	123,165
#Firms	162.80	518.75	18.00	49.00	134.00	123,165
1-Lerner	0.91	0.08	0.88	0.93	0.95	122,940
High Skill (%Comp)	0.18	0.14	0.09	0.15	0.24	73,665
High Skill (%Hours)	0.11	0.10	0.04	0.08	0.15	73,665
Software (%capital)	0.02	0.02	0.01	0.01	0.02	43,290
ICT stock (%capital)	0.08	0.08	0.03	0.05	0.11	43,290
R&D (%capital)	0.02	0.05	0.00	0.00	0.01	123,165
R&D/Assets	0.01	0.02	0.00	0.00	0.00	123,165

Table 5: Specialization and Cross-Border Acquisitions: Baseline Estimation

This table presents cross-sectional Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). The control variables include average acquirer and target country characteristics, as well as country-pair characteristics. All variables are defined in Appendix 1. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
ΔSP	0.146***	0.133***	0.565***	0.496***
	(11.933)	(11.403)	(8.699)	(7.922)
log(Acq. GDP)	0.360***	0.360***	1.085***	1.084***
	(6.419)	(6.387)	(4.131)	(4.105)
log(Tar. GDP)	0.269***	0.269***	0.928***	0.928***
	(5.133)	(5.123)	(3.757)	(3.746)
log(Acq. GDP/capita)	0.466***	0.464***	1.561***	1.552***
	(13.741)	(13.675)	(10.303)	(10.233)
log(Tar. GDP/capita)	0.073**	0.074**	0.207	0.21
	(2.357)	(2.372)	(1.466)	(1.478)
log(Bilateral Trade)	0.623***	0.623***	2.730***	2.729***
	(5.736)	(5.714)	(5.200)	(5.174)
Exchange Rate Return	0.118***	0.120***	0.479***	0.489***
	(4.717)	(4.813)	(4.332)	(4.425)
log(Geographic Distance)	-0.279***	-0.279***	-0.775***	-0.776***
	(-5.667)	(-5.659)	(-3.234)	(-3.225)
Shared Border	-0.008	-0.008	-0.205*	-0.205*
	(-0.340)	(-0.347)	(-1.821)	(-1.821)
Same Religion	-0.004	-0.004	-0.193*	-0.193*
	(-0.161)	(-0.160)	(-1.738)	(-1.738)
Same Language	0.228***	0.228***	1.014***	1.015***
	(8.113)	(8.111)	(8.123)	(8.112)
Same Legal Origin	0.166***	0.166***	0.591***	0.589***
	(5.896)	(5.875)	(4.635)	(4.619)
log(ΔCorporate Tax Rate)	-0.024	-0.024	-0.184*	-0.184*
	(-1.161)	(-1.157)	(-1.959)	(-1.954)
Double-Tax Treaty	-0.042*	-0.042*	-0.092	-0.092
	(-1.936)	(-1.951)	(-0.916)	(-0.924)
Bilateral Investment Treaty	-0.018	-0.019	-0.139	-0.14
	(-0.871)	(-0.882)	(-1.442)	(-1.453)
#Obs.	175,950	175,950	175,950	175,950
Pseudo R^2	0.32	0.32	0.23	0.23

Table 6: Specialization and Cross-Border Acquisitions: UNIDO

This table presents cross-sectional Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). we replace the baseline measures of specialization based on Worldscope by two measures based on UNIDO (see Section III.A for details). The sample is thus restricted to manufacturing industries. Baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
ΔSP	0.052***	0.046**	0.189*	0.198*
	(2.878)	(2.525)	(1.781)	(1.952)
log(Acq. GDP)	0.340***	0.340***	1.151***	1.156***
	(10.368)	(10.415)	(7.309)	(7.381)
log(Tar. GDP)	0.283***	0.284***	1.062***	1.063***
	(9.762)	(9.769)	(7.425)	(7.426)
log(Acq. GDP/capita)	0.407***	0.408***	1.277***	1.272***
	(12.412)	(12.412)	(8.487)	(8.474)
log(Tar. GDP/capita)	-0.009	-0.009	-0.121	-0.116
	(-0.358)	(-0.359)	(-0.996)	(-0.962)
log(Bilateral Trade)	0.732***	0.731***	3.318***	3.313***
	(15.182)	(15.189)	(14.298)	(14.305)
Exchange Rate Return	0.122***	0.122***	0.567***	0.568***
	(4.856)	(4.851)	(4.542)	(4.546)
log(Geographic Distance)	-0.204***	-0.204***	-0.488***	-0.490***
	(-7.998)	(-8.005)	(-3.574)	(-3.590)
Shared Border	-0.004	-0.004	-0.211**	-0.211**
	(-0.225)	(-0.221)	(-2.156)	(-2.153)
Same Religion	0.038*	0.038*	-0.061	-0.062
	(1.827)	(1.825)	(-0.541)	(-0.546)
Same Language	0.139***	0.139***	0.736***	0.737***
	(5.807)	(5.810)	(6.413)	(6.426)
Same Legal Origin	0.104***	0.104***	0.404***	0.404***
	(4.297)	(4.300)	(3.455)	(3.459)
log(ΔCorporate Tax Rate)	-0.030	-0.030	-0.219**	-0.220**
	(-1.409)	(-1.415)	(-1.992)	(-2.004)
Double-Tax Treaty	-0.049**	-0.049**	-0.108	-0.107
	(-2.443)	(-2.444)	(-1.047)	(-1.043)
Bilateral Investment Treaty	-0.039*	-0.039*	-0.230**	-0.230**
	(-1.910)	(-1.910)	(-2.086)	(-2.086)
#Obs.	77,658	77,658	77,658	77,658
Pseudo R^2	0.32	0.32	0.22	0.22

Table 7: Specialization and Cross-Border Acquisitions: Country-Industry Characteristics

This table presents cross-sectional Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). We include proxies for acquirer and target country-industry size, valuation and number of firms. We measure size as the average (logarithm) total assets in each country-industry over the sample period. We measure valuation as the average market-to-book ratio in each country-industry. We measure the number of firms as the average firm count in each country-industry. Baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
ΔSP	0.078***	0.071***	0.273***	0.247***
	(5.501)	(5.379)	(4.031)	(3.805)
Acq. Size	0.072***	0.072***	0.316***	0.316***
	(5.558)	(5.545)	(5.437)	(5.428)
Tar. Size	0.051***	0.051***	0.267***	0.268***
	(3.967)	(3.987)	(4.421)	(4.432)
Acq. MB	0.121***	0.125***	0.631***	0.642***
	(10.530)	(11.053)	(11.669)	(12.055)
Tar. MB	-0.018	-0.022	-0.005	-0.018
	(-1.185)	(-1.466)	(-0.067)	(-0.246)
Acq. #Firms	0.137***	0.138***	0.569***	0.573***
	(17.268)	(17.229)	(14.725)	(14.715)
Tar. #Firms	0.081***	0.080***	0.352***	0.348***
	(10.230)	(10.148)	(9.081)	(9.015)
Baseline Controls	Yes	Yes	Yes	Yes
#Obs.	91,188	91,188	91,188	91,188
Pseudo R^2	0.29	0.29	0.20	0.20

Table 8: Specialization and Cross-Border Acquisitions: Reverse Causality

This table presents cross-sectional Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). In Panel A, the dependent variable is the total flow of acquisitions (in # or $ value) in a given country-industry-pair over the 2000-2010 period. The variable of interest, ΔS, is the average difference in specialization (in a given industry) between the acquirer and the target country computed over the period 1990-1999.) In Panel B, the dependent variable is the total flow of acquisitions (in # or $ value) in a given country-industry-pair over the 2006-2010 period. The variable of interest, ΔS, is the average difference in specialization (in a given industry) between the acquirer and the target country computed over the period 1990-1995. Baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
Panel A: SP(1990-1999) - Acquisitions(2000-2010)				
ΔSP	0.116***	0.097***	0.450***	0.354***
	(9.060)	(7.973)	(5.939)	(4.731)
Controls	Yes	Yes	Yes	Yes
#Obs.	171,810	171,810	171,810	171,810
Pseudo R^2	0.30	0.30	0.22	0.22
Panel B: SP(1990-1995) - Acquisitions(2006-2010)				
ΔSP	0.101***	0.086***	0.422***	0.350***
	(7.081)	(6.515)	(4.807)	(4.095)
Controls	Yes	Yes	Yes	Yes
#Obs.	169,740	169,740	169,740	169,740
Pseudo R^2	0.29	0.29	0.21	0.21

Table 9: Specialization and Cross-Border Acquisitions: Panel Data

This table presents panel Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the difference in specialization (in a given industry) between the acquirer and the target country. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). The control variables include acquirer and target country characteristics, as well as country-pair characteristics. All variables are defined in Appendix 1. In Panel A, we split the sample period (1990-2010) into three sub-periods of seven years, and average all variables over these three sub-periods. In Panel B, we consider the full panel of 21 years. All specifications include time fixed effects, as well as country-industry-pair fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
Panel A: three seven-year sub-periods				
ΔSP	0.010***	0.012***	0.074***	0.105***
	(2.580)	(3.022)	(3.300)	(4.104)
Baseline Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Country-industry-pair FE	Yes	Yes	Yes	Yes
#Obs.	527,850	527,850	527,850	527,850
Pseudo R^2	0.01	0.01	0.01	0.01
Panel B: Full Panel of 21 years				
ΔSP	0.008*	0.011**	0.068*	0.105***
	(1.861)	(2.418)	(2.275)	(3.254)
Baseline Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Country-industry-pair FE	Yes	Yes	Yes	Yes
#Obs.	3,694,950	3,694,950	3,694,950	3,694,950
Pseudo R^2	0.01	0.01	0.01	0.01

Table 10: Specialization and Cross-Border Acquisitions: Product Market Competition

This table presents cross-sectional Tobit estimations of the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(#Acq.)) or dollar value (ln($Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). In Panel A, we include a proxy for the degree of product market competition in the target country-industry. We measure competition using one minus the Lerner Index. In Panel B, we further interact the difference in specialization with the measure of competition. We present the marginal effect of the difference in specialization when competition is evaluated at the mean of the median (at the bottom of the Table). The baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). The dependent variables are not standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Dep. Variable:	ln(#Acq.)		ln($Acq.)	
SP(x)	SP(sales)	SP(emp)	SP(sales)	SP(emp)
	Panel A: Level Effect			
ΔSP	0.044***	0.037***	0.186***	0.154***
	(10.701)	(10.018)	(8.769)	(7.897)
Target (1-Lerner)	-0.368**	-0.368**	-1.498**	-1.486***
	(-2.514)	(-2.510)	(-2.103)	(-2.080)
Baseline Controls	Yes	Yes	Yes	Yes
#Obs	122,940	122,940	122,940	122,940
Pseudo R^2	0.30	0.30	0.20	0.20
	Panel B: Interaction Effect			
ΔSP	-0.066	-0.058	-0.326	-0.227
	(-1.435)	(-1.352)	(-1.406)	(-1.109)
Target (1-Lerner)	-0.455***	-0.448***	-1.907***	-1.814***
	(-3.031)	(-3.014)	(-2.599)	(-2.499)
[ΔSP] x [Tar. (1-Lerner)]	0.122**	0.105**	0.565**	0.421*
	(2.436)	(2.280)	(2.257)	(1.914)
Baseline Controls	Yes	Yes	Yes	Yes
#Obs	122,940	122,940	122,940	122,940
Pseudo R^2	0.30	0.30	0.20	0.20
E[ΔSP | Mean]	0.043**	0.037**	0.186**	0.154*
E[ΔSP | Median]	0.046**	0.039**	0.197**	0.162*

Table 11: Specialization and Cross-Border Acquisitions: Deal-level analysis

This table presents estimates from conditional logit models predicting the probability for a firm to become target (acquirer) in a horizontal cross-border transaction. For each deal, the dependent variable is equal to one for the actual target (acquirer) and zero for five matched targets (acquirers), selected as the closest country-industry observations based on the number of (contemporaneous) transactions, taken from the pool of all country-industry observations with at least one transaction. The variable of interest is the measure of specialization. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). Target or acquirer country characteristics as well as country pairs' characteristics are included but not reported for brevity. All estimations include deal fixed effects. Standard errors are clustered at the deal level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Prob(Target)		Prob(Acquirer)	
SP(x):	SP(sales)	SP(emp)	SP(sales)	SP(emp)
SP	-0.040***	-0.024***	0.028***	0.019***
	(-11.05)	(-8.17)	(12.40)	(9.59)
Controls	Yes	Yes	Yes	Yes
Deal FE	Yes	Yes	Yes	Yes
#Obs.	210,461	210,458	208,882	208,882
Pseudo. R^2	0.15	0.15	0.13	0.13

Table 12: Specialization and Cross-Border Acquisitions: Country Human Capital

This table presents cross-country-pairs Tobit estimations of the baseline gravity model (equation (2)) split by country differences in the stock of human capital. The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(# of Acq.)) or dollar value (ln($ of Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). We measure the stock of human capital using two variables: The fraction of the population that obtains a higher education (Panel A), and the fraction of public spending on education (Panel B). We compute the difference (Δ) in these measures between the acquirer and target country. We partition the sample in two groups, High and Low, based on the median values of these differences (which are zero by construction). The baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. Industries are defined based on three-digit ISIC classification (see Appendix 2). All specifications include industry fixed effects. To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. We further report the p-value corresponding to a unilateral (F-)test of whether the estimate of ΔSP in the High partition is larger than in the Low partition (H>L). Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

SP(x):	SP(sales)						SP(emp)					
Dep. Var.:	ln(#Acq.)			ln($Acq.)			ln(#Acq.)			ln($Acq.)		
Group:	High	Low	(H>L)	High	Low	(H>L)	High	Low	(H>L)	High	Low	(H>L)
						Panel A: Δ(% Tertiary Education)						
ΔSP	0.196***	0.100***	(0.000)***	0.690***	0.442***	(0.042)**	0.173***	0.099***	(0.000)***	0.595***	0.412***	(0.079)*
	(11.333)	(5.442)		(8.180)	(4.223)		(10.472)	(5.537)		(7.224)	(3.997)	
#Obs.	80,325	80,495		80,325	80,495		80,325	80,495		80,325	80,495	
						Panel B: Δ(%Education Spending)						
ΔSP	0.189***	0.128***	(0.017)**	0.717***	0.493***	(0.073)*	0.170***	0.114***	(0.016)**	0.646***	0.410***	(0.044)**
	(10.046)	(5.633)		(7.703)	(4.275)		(9.946)	(5.074)		(7.377)	(3.634)	
#Obs.	73,100	73,270		73,100	73,270		73,100	73,270		73,100	73,270	

Table 13: Specialization and Cross-Border Acquisitions: Country Technological Capital

This table presents cross-country-pairs Tobit estimations of the baseline gravity model (equation (2)) split by country differences in the stock of technological capital. The dependent variable is the total flow of cross-border horizontal acquisitions, in number (ln(# of Acq.)) or dollar value (ln($ of Acq.)), in a given country-industry-pair over the 1990-2010 period. The variable of interest, ΔSP, is the average difference in specialization (in a given industry) between the acquirer and the target country over the sample period. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). We measure the stock of technological capital using four variables: The ratio of (public and private) R&D spending to GDP (Panel A), the number of patents per capita (Panel B), the number of trademarks per capita (Panel C), and the number of scientific articles per capita (Panel D). We compute the difference (Δ) in these measures between the acquirer and target country. We partition the sample in two groups, High and Low, based on the median values of these differences (which are zero by construction). The baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. We further report the p-value corresponding to a unilateral (F-)test of whether the estimate of ΔSP in the High partition is larger than in the Low partition (H>L). Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

SP(x):	SP(sales)						SP(emp)					
Dep. Var.:	ln(#Acq.)			ln($Acq.)			ln(#Acq.)			ln($Acq.)		
Group:	High	Low	(H>L)	High	Low	(H>L)	High	Low	(H>L)	High	Low	(H>L)
						Panel A: Δ(R&D/GDP)						
ΔSP	0.186***	0.105***	(0.001)***	0.688***	0.530***	(0.168)	0.170***	0.095***	(0.001)***	0.611***	0.453***	(0.134)
	(12.513)	(4.934)		(8.630)	(4.504)		(11.868)	(4.447)		(7.890)	(3.761)	
#Obs.	80,410	80,410		80,410	80,410		80,410	80,410		80,410	80,410	
						Panel B: Δ(Patent/Pop.)						
ΔSP	0.180***	0.117***	(0.010)***	0.678***	0.486***	(0.112)	0.168***	0.102***	(0.003)***	0.623***	0.376***	(0.034)**
	(11.572)	(5.740)		(8.284)	(4.401)		(11.423)	(5.009)		(7.987)	(3.355)	
#Obs.	84,150	84,150		84,150	84,150		84,150	84,150		84,150	84,150	
						Panel C: Δ(Trademark/Pop.)						
ΔSP	0.181***	0.126***	(0.025)**	0.691***	0.435***	(0.049)**	0.165***	0.110***	(0.014)**	0.615***	0.351***	(0.026)**
	(10.108)	(60.73)		(7.896)	(4.047)		(9.753)	(5.282)		(7.416)	(3.199)	
#Obs.	76,755	76,755		76,755	76,755		76,755	76,755		76,755	76,755	
						Panel D: Δ(Articles/Pop.)						
ΔSP	0.182***	0.107***	(0.003)***	0.659***	0.543***	(0.239)	0.170***	0.091***	(0.000)***	0.608***	0.421***	(0.090)*
	(12.414)	(5.052)		(8.565)	(4.480)		(12.408)	(4.288)		(8.239)	(3.448)	
#Obs.	84,150	84,150		84,150	84,150		84,150	84,150		84,150	84,150	

Table 14: Specialization and Cross-Border Acquisitions:

Country-Industry Measures of Human and Technological Capital

This table presents cross-sectional Tobit estimations similar to the baseline gravity model (equation (2)). The dependent variable is the total flow of cross-border horizontal acquisitions in a given country-industry-pair over the 1990-2010 period. The flow is in number of deals (ln(#Acq.)). The variables of interest are average differences in measures of intangibles in a given industry between the acquirer and the target country over the sample period (ΔIntangibles). We consider six measures of intangibles: The stock of R&D, the ratio of R&D over assets, the fraction of high skilled workers in terms of total compensation, the fraction of high skilled workers in terms of total hours worked, the stock of software capital, and the stock of information and communication technology capital. All the variables are defined in the Appendix. The baseline control variables (average acquirer and target country characteristics, as well as country-pair characteristics) are included but not reported for brevity. All specifications include industry fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	Human Capital		Technological Capital			
Measure:	High Skill (%Comp)	High Skill (%Hours)	Software Stock	ICT Stock	R&D Stock	R&D/Assets
	(1)	(2)	(3)	(4)	(5)	(6)
ΔIntangibles	0.043***	0.055***	0.072***	0.012	0.027***	0.022***
	(3.292)	(4.185)	(3.578)	(0.0625)	(3.369)	(2.878)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
#Obs	34,196	34,196	11,544	11,544	94,020	94,020
Pseudo R^2	0.29	0.29	0.30	0.30	0.26	0.26

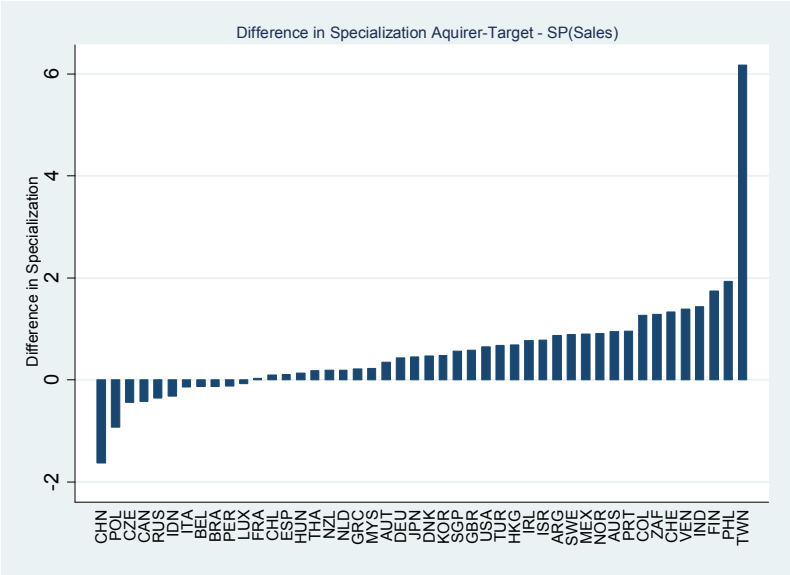
Table 15: Specialization and Cross-Border Acquisitions (Ex Post) Performance

This table presents OLS regressions on acquirers' change in performance following cross-border horizontal acquisitions. We define performance as operating income over assets, and examine changes from year t+1 to year t+1 (one-year horizon), or t+4 (three-year horizon), where t=0 is the year of the acquisition. We restrict our attention to firms that only acquire assets in cross-border horizontal transactions over the three-year horizon. We adjust the performance of each acquirer by subtracting the performance of a matched peer, where peers are the closest firms in terms of size that active in the country-industry of the acquirer and do not participate in any acquisition during a six-year window surrounding the transaction. The variable of interest, ΔSP, is the difference in specialization between the country-industry of the acquirer and that of the target, measured in year t=0. We consider two measures of specialization, one based on sales (SP(sales)) and one based on employment (SP(emp)). All specifications include the following control variables: logarithm of acquirer assets, the relative size of the acquirer compared to the target, and a dummy variable indicating whether the transaction is a merger. Moreover, all specifications include industry, time, and country-pair fixed effects. Industries are defined based on three-digit ISIC classification (see Appendix 2). To facilitate economic interpretation, all dependent variables are standardized to have a unit variance. Standard errors are clustered at the acquirer-target country pair level. We report t-statistics in parenthesis. Symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Perf. Measure	Operating Income (Over assets)			
SP(x):	SP(sale)		SP(emp)	
Horizon:	one-year	three-year	one-year	three-year
ΔSP	0.006**	0.006**	0.004*	0.005**
	(2.177)	(2.450)	(1.873)	(1.968)
log(Assets)	0.006	0.003	0.006	0.003
	(1.498)	(0.751)	(1.542)	(0.804)
Acq. Relative Size	0.009***	0.009***	0.009***	0.009***
	(4.090)	(3.609)	(4.020)	(3.540)
Merger Dummy	0.001	-0.001	0.001	-0.001
	(1.170)	(-0.141)	(0.220)	(-0.119)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Country-Pair FE	Yes	Yes	Yes	Yes
#Obs.	4,343	4,343	4,343	4,343
Adj. R^2	0.17	0.20	0.17	0.20

Figure A: Difference in Specialization by Acquirer Country

This figure presents the average difference in specialization between acquirers and target in horizontal cross-border acquisitions by acquirer country based on the two main measures of industry specialization presented in Section III.A. SP(sales) is specialization based on total sales (reported in the top Panel), and SP(emp) is specialization based on total employment (reported in the bottom Panel). Data on sales and employment are from Worldscope. The sample covers 46 countries, 85 distinct industries and the period 1990-2010.



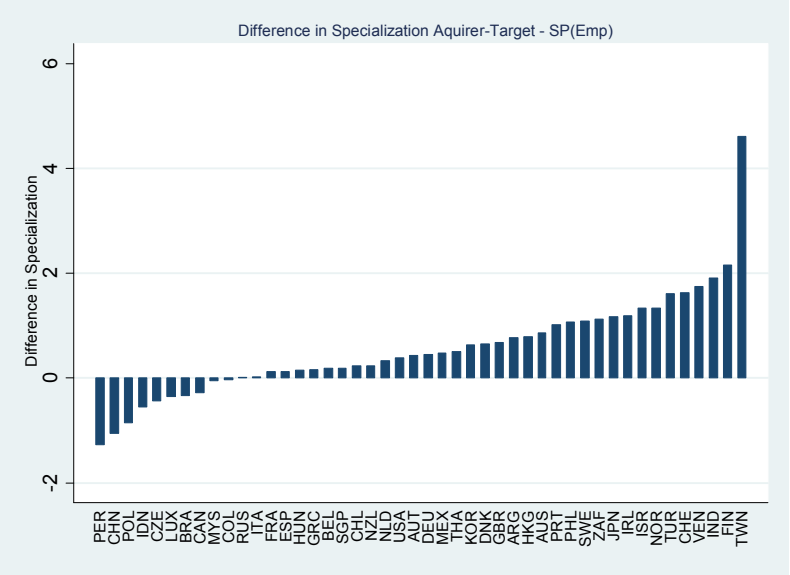
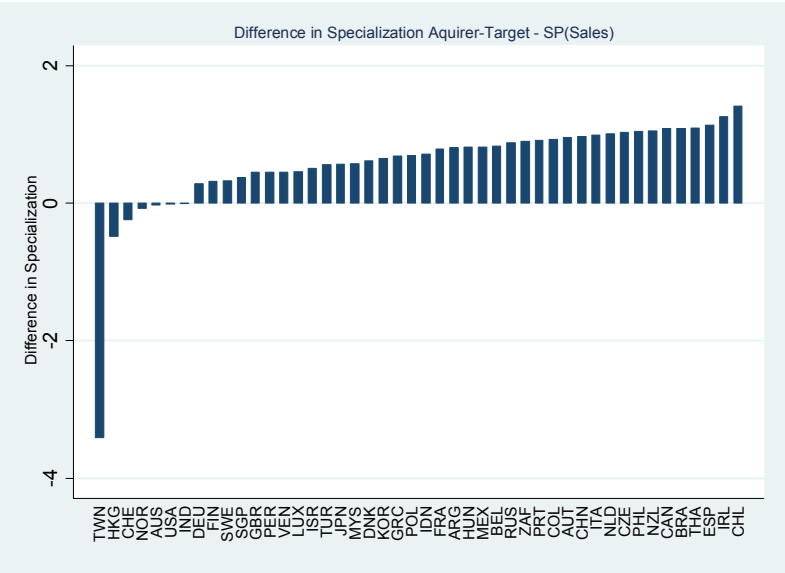


Figure B: Difference in Specialization by Target Country

This figure presents the average difference in specialization between acquirers and target in horizontal cross-border acquisitions by target country based on the two main measures of industry specialization presented in Section III.A. SP(sales) is specialization based on total sales (reported in the top Panel), and SP(emp) is specialization based on total employment (reported in the bottom Panel). Data on sales and employment are from Worldscope. The sample covers 46 countries, 85 distinct industries and the period 1990-2010.



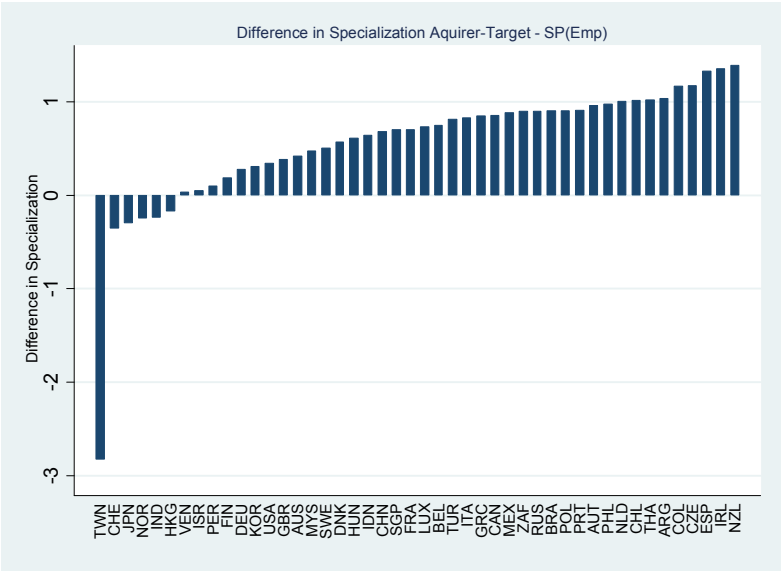
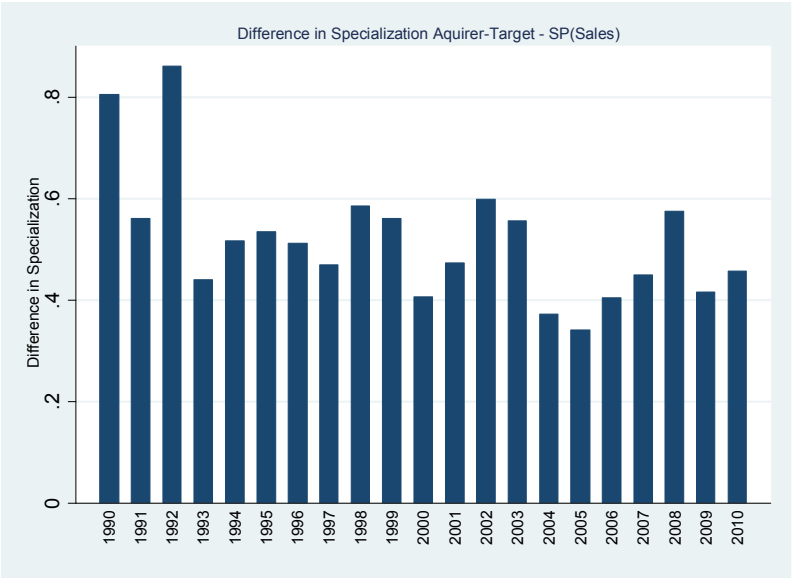


Figure C: Difference in Specialization by Year

This figure presents the average difference in specialization between acquirers and target in horizontal cross-border acquisitions by year based on the two main measures of industry specialization presented in Section III.A. SP(sales) is specialization based on total sales (reported in the top Panel), and SP(emp) is specialization based on total employment (reported in the bottom Panel). Data on sales and employment are from Worldscope. The sample covers 46 countries, 85distinct industries and the period 1990-2010.



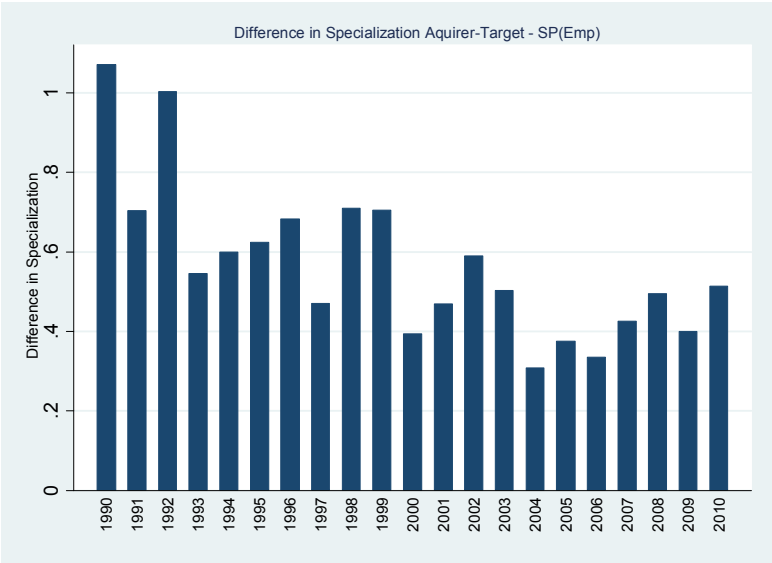


Figure D: Difference in Specialization by industry

This figure presents the average difference in specialization between acquirers and target in horizontal cross-border acquisitions by industry country based on the two main measures of industry specialization presented in Section III.A. SP(sales) is specialization based on total sales (reported in the top Panel), and SP(emp) is specialization based on total employment (reported in the bottom Panel). Data on sales and employment are from Worldscope. The sample covers 46 countries, 85 distinct industries and the period 1990-2010. Industries are defined based on three-digit ISIC classification (see Appendix 2).