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ABSTRACT

An emerging new literature brings unique ideas from corporate finance to the study of international trade and investment. Insights about differences in the development of financial institutions across countries, the role of financial constraints, and the use of internal capital markets are proving central in understanding international economics. The ability to access financial capital to pay fixed and variable costs affects choices firms make regarding export entry and operations, and, as a consequence, influence aggregate trade patterns. Financial frictions and the use of internal capital markets shape decisions that multinationals make regarding production locations, integration, and corporate governance. This article surveys this recent research with the goal of highlighting the main themes it explores, the key results it establishes, and the leading open questions it raises.

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1 Introduction

Until recently, the international economics literature and the corporate finance literature have evolved separately. Research on international trade has focused on the role of economies of scale and cross-country differences in productivity and factor endowments in predicting gains from trade and the pattern of aggregate trade flows according to comparative advantage. Additional insights have emerged from introducing firm heterogeneity in trade participation when there are fixed and variable trade costs. Research on the activities of multinational firms has also emphasized cross-country differences in productivity and factor endowments, as well as trade costs, market size, and economies of scale as the key drivers of the decision to locate production abroad. Moral hazard and intangible assets govern when it is advantageous to offshore production within the boundaries of the firm rather than at arm's length. Much of this work on trade and FDI pays little attention to corporate finance considerations, and effectively assumes that firms can access the financial capital necessary to implement their first-best investment choices. This in part reflects the historical challenges of measuring differences in access to capital across countries and offering motivation for such differences.

The corporate finance literature, on the other hand, has studied how firms obtain the funding needed to pursue attractive business opportunities when financial markets are imperfect. Managers are often assumed to know more about investment alternatives than investors, but to not always act in investors' interest. Information asymmetries and moral hazard make it costly for managers to raise capital from outside the firm, and feature prominently in corporate finance research. This research thus provides frameworks for thinking about how and why access to capital might vary across heterogeneous firms, as well as across countries with different institutional environments. Traditionally, however, the finance literature has concentrated on companies that operate in a single country, and only some strands of this work draw attention to cross-country differences that affect firm decisions.

This survey article reviews new perspectives on international trade and multinational firms that have been generated by bringing unique insights from the corporate finance literature to bear. Section 2 describes work that provided the building blocks for these advances. In the international economics literature, scholars considered how factor endowments shape trade patterns and firm choices about which activities to conduct in which locations. The introduction of heterogeneous firms that incur costs to engage in trade or foreign investment was also important because these costs must be financed. In the corporate finance literature, analyses that extended the treatment of capital market imperfections to an international setting played a valuable antecedent role. Studies established the existence of large differences in the availability of capital across countries, and showed that financial markets are not perfectly integrated across borders. Research on trade credit, or the financial arrangements between firms in buyer-supplier relationships, facilitated the understanding of financial contracts that exporters and importers use to meet their working capital

requirements. Findings about the allocation of capital within firms proved pivotal to the analysis of multinational corporations' financing practices.

Section 3 summarizes the literature that incorporates corporate finance considerations into the study of international trade. It outlines the mechanisms through which financial frictions may impede trade in theory, and discusses the empirical evidence of these mechanisms at both the aggregate and firm levels. It evaluates the impact of financial conditions on international commerce relative to overall production, considering both normal economic times and crisis episodes. Lastly, the section examines the types of financial contracts that support international trade.

Section 4 reviews the literature that brings corporate finance considerations into the study of foreign direct investment. It emphasizes how multinationals may use internal capital markets to pay for fixed costs, address managerial moral hazard, and exploit differences in access to capital across countries. As a result, financial frictions shape multinational decisions regarding production location, integration and corporate governance. This section also addresses how financial factors affect the spillovers that multinational companies have on local firms.

Finally, Section 5 concludes and highlights policy-relevant open questions that might provide fruitful avenues for further advances in this research agenda.

2 Antecedents

2.1 International Trade and Investment

Historically, the international trade and investment literature has taken cross-country differences in capital availability into account, thereby raising the possibility that such differences might affect patterns in trade and multinational activity. However, this literature often makes specific assumptions of what capital is and how its accessibility might vary globally that can be enriched by taking a corporate finance perspective.

International economics frameworks that emphasize endowments of input factors often consider the role of physical capital, as opposed to financial capital. For example, in trade theories that adopt the Heckscher-Ohlin-Vanek notion of comparative advantage, capital endowments are assumed to differ across countries for exogenous reasons. Capital is typically not internationally mobile, and may or may not move freely across sectors within an economy. As a consequence, returns to capital can vary across borders. While analyses in this vein open questions about the potential tradability of physical capital and the role of financial capital, they do deliver the prediction that capital-abundant countries should export relatively more in industries intensive in that input factor.

Similarly, in theoretical models of firms' motives for engaging in foreign investment, capital availability could play a role, but this possibility has traditionally not been examined in detail or through the lens of corporate finance. Consider, for example, research that studies how cross-country differences induce

firms to locate different activities in different places. In a seminal paper, Helpman (1984) develops a two-country, two-sector Heckscher-Olin model in which firms decide where to undertake manufacturing. Labor and a general-purpose input are used to produce differentiated goods. Multinational companies arise as a result of the exogenous variation in the two factor endowments across countries which generate different factor costs. Even though the second input is not labeled physical capital, it shares some characteristics with physical capital in that it is combined with labor in production, and in that sense access to capital may influence the locational choices of multinationals.

The related empirical literature also frequently employs measures of physical as opposed to financial capital. Studies of international trade patterns generally exploit data on investment expenditures instead of firms' financing practices to proxy for the total capital endowment in a country. Research on multinational activity tends to examine the endowments of input factors other than capital. For instance, Carr, Maskus and Markusen (2001), Blonigen, Davies and Head (2003), Yeaple (2003), and Hanson, Mataloni and Slaughter (2005) shed light on how multinationals adjust in response to the relative abundance of skilled and unskilled labor.

Recent developments in international economics facilitated the introduction of corporate finance insights by shifting focus to the operations of individual firms and the various costs they incur to participate in the global economy. In particular, such advances highlighted the role of firm heterogeneity and the distinct fixed and variable costs of international trade and investment. This opened up opportunities to bring financial considerations to bear because the firm is typically the unit of analysis in the field of corporate finance, because firms must fund costs in some manner, and because firms have differential access to capital. A body of work including Melitz (2003), Bernard, Eaton, Jensen and Kortum (2003), and Melitz and Redding (2014) illustrates how the dispersion in productivity and export activity across firms explains micro-level and aggregate trade outcomes, as well as the welfare gains from trade. The presence of both fixed and variable trade costs matters as these affect firms' selection into exporting and export scale respectively, while sunk trade costs influence the dynamics of export entry and expansion. Helpman, Melitz and Yeaple (2004) exemplifies a separate line of inquiry that extends these ideas to the study of multinational enterprises. They study the behavior of heterogeneous firms that choose to serve foreign markets via either exporting or foreign direct investment. After paying a fixed cost to develop a new product variety and learn their productivity, companies face separate fixed and variable costs of exporting and of setting up operations abroad.

These strands of the international economics literature were important antecedents to the new agenda on the effects of financial market development on international trade and investment. Traditional frameworks allowed a role for capital, but typically considered physical capital that cannot move across borders. As we discuss next, research in corporate finance inspired fruitful departures from this premise that feature internationally mobile physical capital and cross-country variation in the availability of financial capital.

2.2 Corporate Finance

Research that challenged the notion that firms are unconstrained in their ability to raise capital to fund investment and that highlighted the vibrant role of firms' internal capital markets has provided key insights for understanding how access to finance might affect trade and multinational activity. Important progress on this topic came from work in corporate finance that illustrated variation in financial institutions across countries. Myers and Majluf (1984) and Jensen and Meckling (1976) considered how information asymmetries and moral hazard influence managers' ability to obtain funds from investors, and scholars subsequently developed frameworks to explain why firms based in different countries face significantly different access to capital. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) pointed to the unequal legal protection of investors across jurisdictions. Others such as Rajan and Zingales (2003) offered alternative explanations based on political and historical factors. Despite the lack of consensus about the precise channels at play, there is considerable agreement in this literature that differences in access to capital exist.

One notable contribution of this research is that it generated measures of capital market imperfections and the availability of external finance in a country. Some of these are direct measures, such as indicators of the depth of debt and equity markets collected in Beck, Demirguc-Kunt, and Levine (2000). Others capture the underlying institutional characteristics that cause differences in financial development across economies. These include accounting standards, creditor rights (Djankov, McLiesh, and Shleifer 2007), and protections against self-dealing (Djankov, La Porta, Lopez-de-Silanes, and Shleifer 2008), among others. As La Porta, Lopez-de-Silanes, and Shleifer (2008) observe, many of these institutions are tied to the legal origin of a country, or the alternative legal traditions concerning control over economic life that were established by the 19th century and then spread throughout the world.

This line of inquiry gained further traction by showing that cross-country differences materially affect a wide range of firm financial choices and real outcomes. The state of financial institutions has been found to influence the issuance of stock and debt, ownership dispersion, the premium associated with owning shares with voting rights, dividend payout policy, and numerous other dimensions of companies' financial activities. Access to capital also appears to have sizable consequences for firm investment and performance. In countries with well-functioning capital markets, for example, firms are more likely to obtain the funding needed to pursue growth opportunities. Levine (2005) and La Porta, Lopez-de-Silanes, and Shleifer (2008) review the rich evidence in this literature for various effects at the country, industry, and firm level.

One implication of this work is that firms are often constrained by the capital market conditions in the country where they are based. This idea is corroborated in studies of firms' fund-raising practices and on asset pricing. Research indicates that companies with operations in only one country typically rely on local external capital providers, even though international debt issuance has been on the rise as Henderson, Jegadeesh, and Weisbach (2006) demonstrate. Asset prices also signal that capital markets are not perfectly

integrated across borders, as documented in Bekaert and Harvey (1995) and Bekaert, Harvey, Lundblad, and Siegel (2011).

These insights indicate that local financial institutions might impede firms that are considering becoming exporters or investing abroad. Given that physical capital requires large up-front investments of financial capital, the above work in corporate finance can help motivate the common assumption in international economics that the endowment and use of physical capital differ across countries. At the same time, since firms need funding to pay for both fixed and variable costs, of both labor and physical capital inputs, access to financial capital may play a role beyond that of physical capital in standard international economics frameworks.

Research on internal capital markets suggests a caveat to the importance of local financial conditions. In particular, multinational firms might be well-positioned to tap into international sources of finance through the use of internal capital markets. Since Meyer and Kuh (1957), evidence of high sensitivity of investment to internal cash flows has drawn attention to the idea that there is gap between the costs of internal and external funds. Other work has directly examined whether shocks to the availability of capital inside the firm impact firm outcomes. For example, Blanchard, Lopez-de-Silanes, and Shleifer (1994) find that companies which receive a cash windfall tend to keep it inside the firm, using it to fund new investment and support failing business activity. Lamont (1997) shows that the oil price decrease of 1986 had large effects on the investments of non-oil subsidiaries of oil companies. This strand of literature raises the possibility that while enterprises based in a single location are likely to be constrained by their domestic capital market conditions, corporations with affiliates in multiple countries might be able to use internal capital markets opportunistically.

Prior research also sheds light on the different kinds of external capital available to firms. Specifically, it explores the relative use of debt and equity financing, and examines different varieties of these two broad types of financial contracts. Studies of trade and multinational activity that introduce corporate finance considerations usually do not distinguish between these financing options. For example, analyses of the impact of firms' need to fund export costs generally consider the overall availability of capital without demarcating between the forms that capital might take. One exception is that capital providers – and scholars – have recognized a set of financial practices used to meet working capital needs associated with international trade. These financial arrangements are often referred to as “trade finance”. In some respects, trade finance resembles domestic trade credit extended between buyers and suppliers.

Finally, empirical contributions in corporate finance have developed identification methods that prove valuable in assessing how access to capital affects international trade and investment. A fruitful approach to establishing causality has been a difference-in-differences technique that combines the cross-country variation in financial development with the exogenous cross-sector variation in financial

vulnerability, or the extent to which firms must rely on costly sources of external finance. While the level effect of financial development on various economic outcomes including trade and multinational activity might be biased in simple-minded specifications, its differential impact across sectors would not be, because the influence of reverse causality and omitted variables should not vary systematically with sectors' financial characteristics. This approach permits the inclusion of various fixed effects, such that interaction coefficients of interest are identified purely from the variation across industries within countries and not polluted by any observed or unobserved country conditions unrelated to finance.

The two most common measures of sectors' financial vulnerability are external finance dependence, which was developed in Rajan and Zingales (1998), and asset tangibility, which has been used in many papers including Claessens and Laeven (2003).[1] They are defined respectively as the share of capital expenditures not financed with internal cash flows from operations, and the share of plant, property and equipment in the total book value of assets. These indicators proxy firms' need for outside capital and ability to raise funds by pledging collateral. They are meant to capture intrinsic, technological features of the manufacturing process in a sector that are exogenous to individual producers. The variables are constructed from US data such that they are not endogenous to countries' level of financial development. Since the US boasts one of the most advanced financial systems, the measures arguably approximate companies' optimal financing and asset structure in a financially unconstrained environment, or at least the systematic cross-sector variation in these firm choices.

3 International Trade and Corporate Finance

The field of international trade traditionally abstracts away from firms' financing decisions and assumes that companies are able to operate at their first-best optimum. However, conducting international trade requires routine access to external capital. Whether domestic producers or exporters, most firms incur large upfront costs that cannot be funded out of retained earnings or internal cash flows from operations. These outlays may be fixed costs like investments in research and development, market research, advertising or capital equipment; or variable costs associated with input purchases, advance salary payments, or land and equipment rental fees. Firms engaged in international trade are likely to face more stringent capital constraints than other firms for three main reasons. First, entering foreign markets involves additional upfront expenses. Fixed trade costs include gauging market profitability; investing in market-specific capacity, product customization and regulatory compliance; and setting up and maintaining foreign distribution networks. Variable trade costs comprise transportation costs, duties, and freight insurance. Second, cross-border shipping and delivery typically take 60 days longer than domestic orders, further aggravating exporters'

[1] Later sections discuss other measures, including the inventory-to-sales ratio (for short-run working capital needs) and buyer-supplier trade credit intensity (an alternative to external finance).

working capital needs relative to domestic manufacturers. Finally, transnational operations often entail increased risks. Currency fluctuations can change the domestic value of expected cash flows, and if a contractual breach occurs, it may be difficult to resolve given differences in laws and practices across jurisdictions.

The first subsection of this part of the survey describes some of the theoretical literature on how access to capital affects trade patterns. This work generates empirical predictions for country and firm-level outcomes, during stable times and crisis periods, and the evidence for those predictions is reviewed in the second subsection. The final subsection discusses recent research on the practices that firms employ to meet short-term working capital needs associated with trade.

3.1 Key mechanisms

Frictions that inhibit access to financial capital can affect aggregate trade flows through three key channels: firm entry into domestic production, domestic producers' entry into exporting, and exporters' trade performance. Moreover, tight credit conditions can disrupt trade activity differentially across sectors depending on their financial vulnerability.

The precise mechanisms generating these distortions hinge on the nature of the underlying financial friction. There might be asymmetric information between lenders and borrowers that leads to adverse selection or moral hazard due to endogenous default. Alternatively, there might be no information asymmetry but imperfect contract enforcement due to weak institutions. Regardless, firms would face inflated interest rates or be credit rationed. While these different mechanisms have distinguishing features, they often share the same implications for observable trade outcomes of interest. Theoretical studies in the literature thus typically adopt whichever micro-foundations guarantee tractability.

Kletzer and Bardhan (1987) first showed that in the presence of financial frictions, better access to capital becomes a source of comparative advantage. They consider a two-country world with two sectors, only one of which requires external finance. Legal frameworks vary across countries and affect the payoffs to firms' lenders and equity holders in case of bankruptcy. With moral hazard and endogenous default, producers are relatively more credit rationed in the country with weaker creditor rights' protection, and this country therefore specializes in the financially less dependent industry.[2]

This comparative advantage result has proven very powerful and robust to alternative modeling assumptions about the nature of financial frictions, firm production and competition. For example, Matsuyama (2005) derives consistent predictions in a Ricardian model with a continuum of sectors, in which firms can credibly pledge only a fraction of their revenues to pay workers. This fraction depends on countries' contract enforcement level and sectors' agency problems. The country with stronger institutions thus

[2] See also Ju and Wei (2011).

specializes in sectors with worse agency problems. Beck (2002) analyzes a richer model of the loan market with financial intermediaries. Due to asymmetric information and search costs, entrepreneurs can use only part of savers' capital in production. Financially developed economies have lower search costs, which gives firms access to cheaper and more abundant external finance. In a world with one homogeneous product and a differentiated-good sector with fixed costs, countries are not perfectly specialized, but financially advanced nations have a competitive edge in the sector with economies of scale.

These frameworks illustrate that in the absence of trade costs and firm heterogeneity, financial frictions are operative only because they affect general production, such that either all or no producers in a sector export. The other channels, however, are important as they determine whether international commerce is more sensitive to financial shocks than domestic activity. These issues are particularly relevant to developing countries that rely on trade for economic growth but suffer from weak financial institutions. They are also pertinent given the recent movement in trade theory towards micro-founded models that place more emphasis on the firm in order to better understand the determinants and consequences of global trade.

Manova (2013) establishes that the interaction of financial frictions with firm heterogeneity disrupts aggregate trade by precluding potentially profitable firms from exporting and restricting exporters' sales abroad. She introduces credit constraints in a multi-country, multi-sector model following Melitz (2003), in which firms receive exogenous productivity draws, incur fixed and variable production costs, and face fixed and variable trade costs. Exporters' sector of activity pins down how much external finance they need and how much tangible assets they can collateralize to raise capital. While there is no informational asymmetry in credit markets, the quality of countries' financial institutions governs the probability that loan contracts are enforced. Since more productive suppliers earn higher revenues, they can offer lenders greater returns and secure more funding. If firms require outside finance only for fixed trade costs, credit rationing increases the productivity cut-off for exporting above the first best. If exporters need external capital for their variable expenses as well, credit constraints also force firms to reduce their foreign sales below the first best. Financial development mitigates these distortions, and its effect is bigger in financially more vulnerable sectors. Financially advanced countries thus have higher exports in industries that are financially more vulnerable because more firms are able to become exporters and because exporters realize higher trade flows. When companies incur destination-product specific trade costs, tight credit conditions also restrict their number of export destinations, product scope in each destination, and sales by destination-product. This corresponds to distortions along the extensive and intensive margins within exporters.

Manova (2013) focuses on the need to fund additional costs of engaging in trade but does not consider the impact of there being longer lags between production and sales revenues. Feestra, Li and Yu (forthcoming) incorporate both of these factors in a Melitz framework. They model banks that do not observe firms' productivity and cannot verify whether loans are used towards domestic production or exporting. Firms

truthfully reveal their type by choosing from a schedule of loan contracts that banks offer. Because international shipments take longer than domestic transactions, exporters face tighter credit constraints than domestic firms; a given exporter, however, experiences the same constraint in serving both markets.

The heterogeneous-firm models above typically feature a perfect correlation between companies' productivity, access to capital and export performance. Chaney (2013) shows that this positive correlation may become imperfect by examining an extreme case of exogenous credit misallocation in which firms draw both productivity levels and liquidity endowments in a Melitz setting. Domestic activities are not subject to credit constraints, but fixed trade costs are incurred upfront and must be financed with profits from domestic sales and the exogenous liquidity. Because more efficient firms have higher revenues at home, they require a lower liquidity draw to export. Very productive firms therefore always trade, but some mid-productivity potential exporters cannot because of a low liquidity draw, and some low-productivity would-be domestic firms export because of a high liquidity shock.

3.2 Empirical Evidence

Empirical and theoretical research on trade and finance has evolved in symbiotic tandem, with the latter informing econometric analysis and the former inspiring further theoretical work. The quickly expanding empirical literature has faced two main challenges. First, analyzing the impact of financial market imperfections on international commerce requires data on financial frictions that has only recently become available or remains unobservable. And second, establishing causality demands careful identification strategies that can address various endogeneity concerns. These problems generally present a greater obstacle to understanding micro-level mechanisms than to assessing the resultant effects on firm and aggregate export outcomes. The literature has made tremendous progress in overcoming both challenges and opened the door to future empirical work. While there might be outstanding questions about any one individual study, the cumulative evidence convincingly establishes the significance of well-functioning financial markets for global trade.

3.2.1 Country-level evidence

One strand of the empirical literature documents that a country's financial development importantly shapes its trade activity. A common proxy for the degree of financial development is the amount of external capital available to producers. Access to debt financing is frequently measured with private credit, the total credit extended to the private sector by banks and other financial intermediaries as a share of GDP. Access to large and active equity markets can be quantified respectively with the total value of listed shares as a percent of GDP and the fraction of this value that is traded. Another indicator is the ratio of liquid liabilities of the financial system to GDP, which comprises currency plus demand and interest-bearing liabilities of all financial intermediaries. These outcome-based measures implicitly reflect the ability of the underlying

institutional framework to support financial contracts. They have the advantage of being systematically collected for a large set of countries on an annual basis but the disadvantage of capturing not only the exogenous supply of external capital but also firms' endogenous demand for external capital. An alternative is to use measures of the regulatory and legal framework pertinent to financial markets, but many of these exhibit little or no variation over observed time periods. Examples include contract enforcement, expropriation risk, accounting standards, creditor rights' protection, and minority shareholders' rights. Through the lens of theory, measures of institutional quality correspond to parameters governing financial frictions; these parameters in turn correlate with firms' predicted use of outside finance, which justifies outcome-based proxies.

In the cross-section, financially advanced economies do export more, controlling for GDP and GDP per capita, as indicated by Beck (2002). With outcome-based measures of financial development, however, this relationship could reflect reverse causality: higher export demand could translate into higher observed levels of private credit if firms use external finance but are unconstrained, a point raised by Braun and Raddatz (2008) and by Do and Levchenko (2007). While this concern applies less to primitive proxies of institutional quality, omitted variable bias remains a possibility because of the strong correlations between financial development, general economic development, and broader institutional development.[3]

To address these concerns, papers follow the corporate finance literature and exploit the differences in reliance on costly external finance across sectors.[4] This identification strategy also dovetails with the comparative advantage predictions of the theoretical models discussed above. Beck (2003) shows that financially more developed countries indeed export relatively more in financially more vulnerable industries in a cross-section of 56 countries and 36 industries. He regresses countries' exports by sector on country fixed effects, sector fixed effects, and the interaction of countries' financial development with sectors' external finance dependence. Hur, Raj and Riyanto (2006) extend this analysis to add interactions with sectors' asset tangibility, more measures of financial development, and controls for traditional sources of comparative advantage. These and multiple other studies like Svaleryd and Vlachos (2005) consistently find that financially advanced nations have higher exports in sectors that require more outside capital and in sectors with fewer tangible assets.

Financial reforms constitute a potentially important policy tool for improving trade performance, and provide an identification alternative to cross-sectional analysis. Manova (2008) examines the impact of opening stock markets to foreign capital providers in a panel of 91 economies over 1980-1997. Since the timing of liberalizations depends on complex political processes, it generates exogenous shocks to the cost

[3] While instrumenting financial development with legal origins produces consistent results, this instrument may not satisfy the exclusion restriction.

[4] In related work, Becker, Chen, and Greenberg (2012) show that financial development increases exports relatively more when trade costs are high as measured, for example, by bilateral distance.

and availability of capital. Removing equity market controls increases exports disproportionately more in sectors that require more outside finance or employ fewer collateralizable assets. This result holds in panel regressions with country, sector and year fixed effects, as well as in event studies that account for country-sector conditions at the time of reform. The effects of liberalizations are not driven by simultaneous trade reforms, but they are stronger when trade costs are high due to restrictive trade policies.

Manova (2013) analyzes the mechanisms through which financial market imperfections disrupt aggregate trade. She regresses bilateral exports by sector on the interaction of financial development in the exporting country with sectors' external finance dependence and asset tangibility, in a panel of 107 countries and 27 sectors in 1985-1995. This allows the inclusion of not only exporter, sector and year fixed effects that reflect non-finance related supply conditions, but also of bilateral trade costs and importer fixed effects that capture demand. The role of financial development is identified separately from that of overall economic and institutional development through interactions of the exporter's GDP per capita, corruption and rule of law with sectors' financial vulnerability.

Manova (2013) decomposes the trade effect of weak financial markets into distortions to firm entry into production, producers' selection into exporting, and average firm-level exports. 75%-80% of the impact of credit constraints on trade is above and beyond that on aggregate production. One third of the trade-specific distortion reflects limited export entry, while two thirds are due to depressed firm-level exports. These results are corroborated by evidence that financially advanced economies serve more destination markets and export more products, especially in financially more vulnerable sectors.[5]

3.2.2 Firm-level evidence

A related line of research examines the consequences of tight credit conditions for export activity at the firm level. The key objective of this literature is to elucidate underlying mechanisms by exploiting the tremendous variation in trade participation and access to external finance across firms, even in the same country and sector. Measuring companies' financial health, however, presents two challenges. First, observed financing practices are endogenous to trade activity. An enterprise might report little use of outside capital and poor export performance either because it is too credit constrained to expand foreign sales, or because it is unconstrained but faces low export demand. Second, the relationship between firms' productivity, size and financial health is complex. In models with credit underprovision, like the one in Manova (2013), size and access to capital are exactly pinned down by productivity. This is not the case in models with credit misallocation, like the one in Chaney (2013). In practice, these firm characteristics are positively but not perfectly correlated. Productivity may thus improve export performance both directly through channels

[5] Chan and Manova (2013) show that financially more developed countries go further down the pecking order of export destinations in financially more vulnerable sectors, where market size and trade costs determine destinations' market potential and position in the pecking order.

suggested by Melitz (2003) and indirectly via superior access to financing. Separately, smaller companies are known to be more liquidity constrained, even conditional on productivity. Controlling for firm size and productivity when regressing export performance on financial health might therefore underestimate the true impact of credit constraints, while omitting these controls might introduce upward bias.

Scholars have taken different approaches to address these challenges, and reached broadly consistent results indicating that frictions inhibiting a firm's access to capital constrain exports. One approach is to examine the relationship between observed measures of companies' financial health and export activity, and check if it is consistent with the presence of financial frictions. This methodology delivers often descriptive and sometimes causal evidence, which are both valuable as necessary and sufficient conditions.

Berman and Héricourt (2010) adopt two standard indicators of financial health from the finance literature to study 5,000 firms in 9 developing economies: liquidity and leverage, calculated respectively as the ratios of cash flows and of total debt to total assets. Firms are considered less credit constrained if they have more liquid assets that can be quickly deployed and fewer outstanding debt obligations, relative to pledgeable collateral, that hinder raising additional funds. Lagged financial health is strongly positively correlated with export entry and more weakly with export revenues, controlling for firm size and productivity. This pattern is more pronounced in sectors with high external finance dependence. Yet conditional on export status, lagged financial health is not significantly associated with export survival or the share of exports in total sales.

In panel data for 9,292 UK firms in 1993-2003, Greenaway, Guariglia and Kneller (2007) also observe that exporters have higher liquidity and lower leverage than non-exporters, controlling for firm size and productivity. However, ex-ante financial health is uncorrelated with export entry, and export starters display worse financial ratios, possibly reflecting entry costs just incurred.

Muûls (2008) reaches similar conclusions using the credit rating of 9,000 Belgian firms in 1999-2005. This rating is constructed by a large credit insurance company based on firms' liquidity, leverage, size and profitability, but not export performance. Conditional on firm size and productivity, firms' credit score positively correlates with export status, total exports, number of export destinations, number of export products, and exports per destination. Within a firm over time, the lagged score does not predict first-time export entry, but is associated with expansion into more foreign markets among exporters.

While consistent with exporters facing credit constraints, these studies demonstrate the difficulty in interpreting endogenous measures of financing practices. Especially in financially advanced countries, such measures may signal companies' demand for capital rather than limited access to capital. Because financial frictions distort firm activity by generating credit rationing or inflated interest rates, however, direct information on the latter can potentially circumvent endogeneity concerns.

Minetti and Zhu (2011) apply this logic in their analysis of 4,680 Italian firms in 2000. Companies are deemed weakly credit rationed if they would have liked to borrow more at the market interest rate but did not try to, and strongly credit rationed if they demanded more credit than they obtained. Since unobserved firm characteristics might determine both access to capital and export success, credit rationing is instrumented with the supply of banking services in a province. Controlling for industry fixed effects and various company attributes including productivity, credit-rationed firms are 39% less likely to export and exporters sell 38% less abroad. These effects are stronger in sectors with exogenously high levels of external finance dependence. While credit rationing depresses domestic sales as well, its impact on trade is significantly greater.

Feenstra, Li and Yu (forthcoming) provide complementary evidence using data on the interest payments of 160,000 Chinese companies in 2000-2008. Guided by a micro-founded model of credit market imperfections, they regress firms' total revenues on firms' total interest payments and their interactions with the share of revenues from exporting and with this export share squared. Motivated by their theoretical results, they instrument interest payments with a model-based estimate of firms' anticipated productivity, and producers' export share with its predicted value from a two-step Heckman procedure that accounts for selection into exporting. Findings indicate that credit constraints indeed become more stringent as firms' export share grows, especially when shipping times are longer and working capital needs therefore more acute.

Manova and Yu (2012) show that financial frictions not only affect whether and how much firms export, but such frictions also restrict exporters to less profitable trade activities.[6] They exploit 2000-2006 data for China, where manufacturers choose between ordinary trade (OT) and processing imported inputs for re-export to foreign buyers; the Chinese firm pays for these imported inputs under processing-with-imports (PI), but not under pure-assembly (PA). While value added and profitability rise from PA to PI to OT, so do liquidity requirements. Financially less healthy companies thus perform more PA than PI than OT in the cross-section, in the panel, and in response to trade reforms. Individual exporters conduct more PA than PI than OT in financially more vulnerable sectors with higher external finance dependence, inventory-to-sales ratios, and asset intangibility. These patterns are more pronounced in financially less developed Chinese provinces where firms face greater difficulties in raising capital. Conversely, the patterns are stronger for exports to financially more developed destinations, where foreign buyers can more easily obtain the funding needed to pursue processing trade with Chinese firms.

[6] In related work, Chan (2014) studies how financial frictions affect firms' decision to export directly or through trade intermediaries, while Lee (2014) examines how membership in a business group relaxes firms' financial constraints and enhances their export performance.

3.2.3 Financial crises

International trade during financial crises has been the focus of a third line of inquiry. Given that crises involve shocks to the cost or availability of external capital, studying their unfolding facilitates the identification of causal effects. From a policy perspective, it is important to assess how crises impact trade because of its contribution to growth in developing countries and pressures for timely intervention. For example, the 2008-2009 global crisis led to an unprecedented collapse in world commerce far exceeding the decline in GDP, and many governments acted aggressively in response.[7] Although credit tightening during crisis episodes is detrimental to trade, concurrent demand shocks, adjustments in inventories and global supply chains, and other crisis features are also important. Research thus faces the challenge of isolating effects related to access to capital.

In principle, crises may or may not affect cross-border trade more than total output. Isolated financial shocks in one country might equally disrupt its general production and exports. Trade might suffer more if the informational asymmetry between banks and firms worsens, given exporters' high liquidity and insurance needs. Alternatively, trade might fall less if foreign transactions become relatively less risky since domestic buyers are more likely to default than importers abroad. Global crises or financial turmoil in a destination country are more likely to disproportionately damage international commerce because foreign and domestic buyers face deleterious conditions. Separately, the manner in which aggregate trade adjusts along different margins may depend on the anticipated duration and severity of the crisis because of sunk export costs.

Iacovone and Zavacka (2009) document that local crises have lasting trade consequences in the medium run, especially when the underlying financial system is weak. In the three years after a banking crisis, a country's exports grow more slowly in sectors that depend more heavily on external finance and sectors that make use of more intangible assets. However, this trend is mitigated in financially developed countries. While recessions also hurt trade more in industries that are more reliant on costly external finance, banking crises exert an effect separate from general economic distress. These patterns emerge in panel data for 81 industries and 21 economies in 1980-2000.

Focusing on the 2008-2009 global crisis, Chor and Manova (2012) show that acute short-run credit tightening also disrupts trade flows, even when broader financial institutions remain unchanged. Moreover, international commerce becomes more sensitive to financial conditions during the crisis – both relative to normal times and compared to overall output. They study monthly US imports from 31 countries in 21 industries between November 2006 and October 2009, and capture monthly movements in the cost of capital with the interest rate at which banks borrow from one another to adjust liquidity positions. Countries with higher interbank rates not only export less on average, but also systematically less in sectors with high

[7] See Auboin (2009) for an analysis of the motives for intervention by the G-20.

dependence on outside finance, few collateralizable assets, and little buyer-supplier trade credit. The crisis magnified these patterns, controlling for an overall production index and subsuming demand and supply shocks with country-month, sector-month and country-sector fixed effects.

The decline in aggregate trade during financial crises is accompanied by sizable differences in performance across firms with varying access to capital. Bricongne, Fontagné, Gaulier, Taglioni and Vicard (2012) find that the 2008-2009 crisis affected French exporters more if they had recently defaulted on credit payments and thus plausibly had restricted borrowing capacity. In monthly data for 105,000 manufacturers, payment incidents are followed by lower export growth by destination-sector. The crisis amplified this link, especially in financially vulnerable sectors. Using balance-sheet measures of financial health, Behrens, Corcos and Mion (2013) find similar results for Belgian firms' exports by destination-sector, while Görg and Spaliara (2014) show that UK firms' export entry was also affected.

Paravisini, Rappoport, Schnabl and Wolfenzon (forthcoming) decompose the impact of the 2008-2009 global crisis on the intensive and extensive margins of Peruvian exporters. The crisis triggered a large reversal in foreign capital flows, which differentially hurt banks' lending capacity depending on their pre-crisis ratio of foreign funding to assets. The share of firms' credit from banks with foreign exposure above the median provides an instrument for their reported credit. Within destination-product markets, surviving exporters lowered sales more if they experienced bigger liquidity shocks, but export entry and exit were unaffected at the destination-product level. Exporters might have completely dropped certain products or markets, however, or stopped exporting altogether.

Berman, de Sousa, Martin and Mayer (2012) show that banking crises in the destination country also disrupt international commerce along the intensive and extensive margins. Aggregate bilateral exports decrease in gravity regressions for 185 exporting and 69 importing nations during 1950-2009 with standard controls, origin-destination and year fixed effects. French data for the 1995-2005 period indicate that individual firms reduce exports and even exit markets undergoing financial turmoil, conditioning on firm-destination and year dummies. The impact of destination-country crises exceeds that of origin-country crises. Moreover, credit crunches cause more damage at longer shipping times, consistent with trade being more sensitive to financial shocks when liquidity needs and importer default risk are bigger.

3.3 International trade finance

Recent research at the intersection of trade and corporate finance has also shed light on common practices used to finance the short-term working capital necessary for international commerce. Various financing arrangements and payment terms have been developed specifically for issues that arise in this context. In each transaction, managers must determine how trade partners share liquidity needs and risk exposure associated with the working capital requirements of trade. A set of standard contracts exist, and these are

often referred to as international trade finance.[8] Under cash-in-advance terms, importers fund the working capital needs by paying exporters before goods are shipped. Under open-account terms, exporters fund the working capital needs and allow importers to pay at a pre-specified time after the goods have arrived at their destination. Other financing agreements make use of some form of bank intermediation such as a letter of credit. In typical transactions financed with a letter of credit, a bank commits to pay on behalf of the importer provided the goods are shipped as contracted, and this commitment is made before goods are shipped.

Antràs and Foley (forthcoming) examine what factors affect the choice of financing terms using detailed transaction-level data for a U.S.-based exporter. They document that sales to locations with weaker contractual enforcement more frequently occur on cash-in-advance terms. This result has important implications because external finance is typically costly in weak institutional environments. To engage in trade, importing firms that likely have the most difficult time obtaining finance appear to be the ones most likely to need it. The analysis also shows that as the exporter establishes a relationship with an importer through repeated interaction, cash-in-advance transactions become less common. This implies that a trading relationship can be a source of capital for firms in countries with poorly functioning institutions.

These facts motivate a model in which cross-country differences in contractual enforcement determine how the working capital requirements of trade are financed. The static version of the model is similar to the one in Schmidt-Eisenlohr (2013). In order to study the dynamic impact of trade partnerships, the theoretical framework assumes that some importers are patient and honor contracts, while others experience liquidity shocks and renege on contracts that are not enforced when a shock occurs. The exporter learns which importers are trustworthy and offers post-shipment payment terms as a trading relationship develops. Regression results provide empirical support for this kind of effect.

Related evidence suggests that other factors also influence the choice of financing terms. Exploiting product-level data for Turkey in 2004-2012, Demir and Javorcik (2014) conclude that higher institutional quality, cheaper capital and tougher market competition in the importing country increase the incidence of post-shipment payment. Conversely, open-account use falls when financing costs are lower in the exporting country and contract enforcement stronger, as Hoefele, Schmidt-Eisenlohr and Yu (2013) find in firm-level surveys for 53 countries. This aligns with evidence in Manova and Yu (2012) that Chinese processing exporters, rather than foreign buyers, more frequently pay for foreign inputs when based in financially more developed provinces but less often when selling to financially more developed countries.

Bank-mediated letters of credit seem most valuable when neither trade party can easily bear the risks of the transaction. Ahn (2011) theoretically motivates the use of letters of credit, and points out that larger

[8] For a discussion of these financing arrangements, see Foley, Johnson, and Lane (2010). The International Trade Administration gives more institutional details in their *Trade Finance Guide*. Castagnino, D'Amato and Sangiácomo (2013) provide an unusually detailed description of exporters' financing practices in Argentina.

trade volumes create incentives for banks to learn more about borrowers' default risk. In his setup, banks do not observe firms' type, but can screen by investing in information acquisition and offer separate domestic and export loan contracts. If export revenues are lower than domestic sales because of trade costs, banks optimally screen exporters less precisely. Default risks are then endogenously higher for cross-border transactions, and firms pay a bigger premium for export loans than for domestic loans. Berman, de Sousa, Martin, and Mayer (2012) propose a related model, in which the probability that the importer fails to pay increases exogenously with shipping times. Olsen (2013) emphasizes how letters of credit offer a valuable financing alternative when banks' reputational concerns exceed those of trading partners. Empirical work including Niepmann and Schmidt-Eisenlohr (2014a,b) augments these theoretical insights.

The manner in which short-term working capital needs are met has also been shown to shape the impact of crises on trading activity. Amiti and Weinstein (2011) identify firm-specific exogenous shocks to trade finance supply by exploiting the unequal exposure of Japanese banks to systemic crises during 1987-1999 and 2008-2010. They conclude that liquidity shocks hurt firms' export growth in general, more during crisis episodes, and more than domestic operations. After a bank's financial health, as reflected by its market-to-book ratio, declines, it extends less trade finance overall and less trade finance as a share of total loans. Manufacturers record slower export growth after their primary transactional bank's financial health deteriorates, suggesting that firms cannot quickly obtain funding from alternative capital providers. This response is stronger during crises and for products transported by sea rather than air because longer transportation times are associated with greater working capital needs. While domestic sales also fall, exports contract more.

The framework in Antràs and Foley (forthcoming) can also be used to model the recent financial crisis as a rise in the prevalence of importer liquidity shocks and a drop in demand. Following these events, new customers are more likely to buy from the exporter on cash-in-advance terms, and importers that previously operated on such terms are most likely to stop trading or reduce their purchases. Empirical evidence is consistent with these patterns. Regarding letters of credit, Ahn (2014) finds that bank liquidity shocks during the 2008-2009 crisis restricted imports to Colombia on letter-of-credit terms.

Thus, a corporate finance perspective is particularly valuable in understanding how firms meet the short-term working capital needs of international trade. A better grasp of these issues also informs how firms might change their trading behavior during times of crisis, and what this in turn implies for policy.

4 Multinational Activity and Corporate Finance

As with international trade, research on multinational firms has not traditionally studied the potential role of corporate finance considerations. The dominant ideas can be traced back to at least Hymer (1960), who observed that foreign direct investment did not seem to be a consequence of variation in interest rates across

countries. Factors like the value of maintaining control, trade costs, and economies of scale have been emphasized in describing why a company with a particular advantage might want to own and operate assets abroad. Intangible assets feature prominently in this work; analyses have drawn attention to the proprietary technology or reputation that multinationals could best exploit within the boundaries of the firm rather than through arm's length transactions with foreign entities. Yeaple (2013) discusses this literature in depth.

Recent work enriches the understanding of multinational activity by bringing insights from finance to bear. Multinationals are unique in that, unlike firms with operations in a single country, they can choose where to raise external funding and can deploy that funding elsewhere through the use of their internal capital market. This may therefore put multinationals at an advantage relative to indigenous firms in some jurisdictions.

Several new strands of literature are emerging. The first subsection below explores how financial frictions affect firms' decision to undertake foreign direct investment, as well as their choice of location and organizational structure for offshore production. This line of work emphasizes the differences in access to capital across countries, and how this determines which multinational activities are conducted in which countries when firms face various fixed costs. The second subsection discusses research analyzing how multinational firms' ability to finance operations, relative to local firms, more generally affects patterns in foreign direct investment. Of particular interest are the impact of wealth effects, currency crises, and stock market mispricing.

The potential for managerial misbehavior in environments with weak investor protection push firms to make distinctive corporate governance choices. These choices include ownership decisions and therefore influence whether firm activities are funded with financial investments by foreign entities. The third subsection reviews work on this topic. The last subsection addresses the effect of financial conditions on spillovers from multinational firms to local firms. Studies in this area indicate that credit constraints can limit the extent of spillovers but that foreign direct investment can alleviate such constraints for local firms.

Because multinationals' ability to tap internal sources of finance features prominently in each of these strands of literature, it is useful to point out that research illustrates the vibrancy of internal capital markets at the outset. Desai, Foley, and Hines (2004), for example, examine whether poor financial institutions restrict multinationals' access to external capital in some jurisdictions, and how they might opportunistically use their internal capital markets to secure funding from locations where it is easier to raise. Using detailed data from the U.S. Bureau of Economic Analysis on U.S. multinational affiliates worldwide, the authors study how the costs of external debt financing vary across institutional environments, where affiliates obtain their debt, and how much debt they secure. Subsidiaries in countries with weak creditor rights and shallow credit markets face higher interest rates, and borrow less from external sources than affiliates located elsewhere, as predicted by Noe (2000). Findings indicate that multinationals exploit their internal

capital markets in response to cross-country differences in the availability of capital and tax rates. The wedge between the cost of borrowing from external lenders and the cost of borrowing from parent companies is larger where credit markets are less developed, and affiliates in such countries borrow more from their parents. Internal borrowing offsets approximately three-quarters of the reduction in external borrowing due to adverse credit market conditions. This suggests that multinationals are likely to be less constrained by local conditions than local firms, but that they are not insensitive to them. Affiliates also appear to be particularly aggressive in taking advantage of the tax benefits of debt when selecting levels of internal borrowing. For example, Huizinga, Laeven and Nicodeme (2008) analyze the capital structure of European multinationals and show that these firms actively use debt in managing their tax exposure.

4.1 Financing Fixed Costs

Foreign direct investment entails substantial fixed costs. If there are financial frictions, the ability to finance these costs can impact multinational activity. Several papers explore this mechanism. For example, Buch, Kesternich, Lipponer, and Schnitzer (2009) model how credit constraints affect firms' choice whether to invest abroad and how much to produce abroad, conditional on making a foreign investment. Entering a new market requires paying a fixed cost, and there are variable costs of production. To pay these costs, the firm has limited internal funds and needs to obtain external debt finance that can be secured with collateral. However, debt contracts are only enforced with some exogenous probability, and lenders face transaction costs if they liquidate collateral. As a result, host countries with stronger contract enforcement and more efficient liquidation procedures are predicted to attract more multinational firms. In addition, the availability of internal capital influences the intensive margin of FDI if collateral constraints are binding for firms. In that case, firms' capacity to borrow from external sources is limited, while high fixed costs relative to internally available funds leave companies with less internal capital to finance production.

The analysis of rich data on German multinationals collected by the Deutsche Bundesbank provides evidence consistent with these theoretical predictions. Results indicate that financial considerations play a significant role in determining the scale of the international activities of German firms. Conditioning on productivity and other controls, firms with higher levels of internal cash flows are more likely to invest abroad and establish more foreign affiliates. Countries with weaker enforcement of contracts host fewer multinational subsidiaries. Moreover, affiliates with more retained earnings have higher sales levels.

Bilir, Chor, and Manova (2014) show that host-country financial conditions affect not only multinationals' entry decision, but also the pattern of affiliates' global sales. They develop a three-country model in which the world comprises two symmetric economies (West and East) and a lower-wage South. Firms draw a productivity level upon entry, and subsequently choose where to manufacture and market their goods. Sufficiently productive Western and Eastern firms both sell at home and export abroad, while the

most efficient Western and Eastern firms base a production plant in South and use it to serve all three markets as a multinational company.

Financial frictions enter because firms require external financing for their fixed costs of production, exporting, and FDI. While capital markets are frictionless in West, creditors are imperfectly protected against endogenous default in South due to weak financial institutions. As a result, Southern firms are credit rationed since they can only raise debt locally. Western firms face no credit constraints in funding their domestic and export activities in the Western loan market but need some Southern financing for their FDI costs because Western financiers are not willing to fully cover these due to incomplete enforceability of collateral claims across borders. In this setting, financial development in South encourages entry by domestic firms, reducing the competitiveness of foreign multinationals in the host market. For each Western affiliate, local sales to South therefore decline, while export sales to West and East rise, both in levels and as shares of the affiliate's total sales. At the same time, Southern financial development alleviates multinationals' liquidity constraints. This induces more foreign multinational entry and increases the aggregate levels of multinational sales to all three markets. All of these patterns are amplified in sectors that depend more on the financial system for external capital. Evidence based on comprehensive data on the location and sales composition of U.S. multinationals' foreign affiliates lends strong support to these theoretical predictions. To the extent that the destination of subsidiary sales speaks to multinationals' incentives to pursue horizontal, vertical, and export-platform FDI, host-country financial development thus appears to jointly impact the incidence, level, and nature of multinational activity.

Manova, Wei and Zhang (forthcoming) offer related evidence that multinational firms exploit their internal capital markets opportunistically to overcome fixed trade costs that stand-alone domestic firms may not be able to. In transaction-level customs data for China, foreign-owned affiliates and joint ventures export respectively 62% and 50% more than native firms in sectors highly reliant on costly external finance relative to financially less vulnerable sectors. Moreover, this pattern is magnified for export destinations that entail higher trade costs. This comparative-advantage result obtains controlling for firm fixed effects, and extends to different dimensions of export activity such as the number of destination-product markets and sales in each market. The empirical analysis also conditions on other sector characteristics that are known to determine FDI operations including R&D, physical capital, human capital and contract intensity. Moreover, comparative statics indicate that financial considerations have an economic effect on par with or greater than the impact of factor cost minimization, contractual imperfections, and property rights protection. These findings are consistent with the idea that multinationals might be more likely to operate in financially more vulnerable sectors because they face less competition from local firms in such sectors, as in Bilir, Chor and Manova (2014) above, as well as with the notion that multinationals may prefer to offshore production intra-

firm rather than arm's-length in such industries, as in Antràs, Desai, and Foley (2009) below. Bustos (2007) also provides evidence from Argentina that is in line with these mechanisms.

4.2 Exploiting Relative Access to Capital

4.2.1 Wealth Effects

When external capital markets are imperfect, internal capital markets also play a central role in explanations of foreign direct investment based on relative wealth effects. The relative wealth of investors located in different countries can shift for a variety of reasons, and one reason that has been emphasized in the literature is exchange rate fluctuations. Froot and Stein (1991) point out that depreciations of the U.S. dollar have historically been associated with large FDI flows into the U.S. and develop a theory that rationalizes this observation. In their model, information frictions in capital markets make external financing more expensive than internal financing. An entrepreneur can only borrow a fraction of the required investment for a project, and the rest must be funded with internal wealth. The depreciation of the domestic currency lowers the wealth of domestic entrepreneurs relative to foreign entrepreneurs. As a consequence, foreign entrepreneurs are able to bid more for domestic assets than domestic entrepreneurs, and depreciations trigger increased foreign investment. Compared to other kinds of capital inflows, inward FDI is likely to be particularly prone to information asymmetries. Consistent with this claim, the relationship between depreciation and foreign direct investment inflows is not apparent for other kinds of capital inflows.

Klein and Rosengren (1994) consider an alternative justification for the positive relation between currency depreciations and inward FDI. They propose that local currency depreciation may reduce the costs of producing domestically. Although such an effect would not favor foreign investors over domestic ones, it might stimulate domestic growth and some of this growth might be financed by foreign investors. In tests that explicitly control for relative wages and use differences in stock market performance to capture relative wealth effects, the authors document that relative wealth effects are operative but relative wage effects are not. Dwenter (1995) reaches similar conclusions using detailed data on foreign acquisitions of U.S. targets over the 1975-1989 period.

4.2.2 Crises

Just as in the trade literature, crises provide a powerful setting to assess the importance of access to capital for multinational firm activity. Klein, Peek, and Rosengren (2002) explore how FDI can be constrained by weak conditions in the source-country banking sector. More specifically, they examine the collapse of the banking sector in Japan in the 1990's, and study its effects on the foreign investment activity of Japanese firms in the U.S. Firms with ties to less healthy banks were less likely to invest abroad. These findings do not seem to merely reflect a decline in the demand for loans, both because the analysis conditions on firms'

profitability and stock valuation, and because companies based in other countries increased their foreign direct investment over the sample period.

Currency crises are also revealing events. During such episodes, firms in the tradable sector are supposed to experience positive shocks to export competitiveness. However, depreciations often increase the leverage of companies that have borrowed on foreign currency terms and raise the financing constraints of different types of firms to different degrees. In particular, multinationals can access internal sources of capital when local external capital is scarce. Desai, Foley and Forbes (2008) empirically analyze the effects of large currency depreciations on multinational and local manufacturers that produce tradable goods in emerging markets. Following depreciations, the affiliates of U.S. multinationals increase sales, assets, and investment more quickly and by greater amounts than local firms. There is little evidence that differential access to global product markets creates distinctive investment opportunities for these two types of firms. Instead, tests reveal that credit constraints play a decisive role. Local firms with the most leverage and with the shortest term debt reduce investment the most. In addition, U.S. parent companies infuse their affiliates with new capital in response to sharp depreciations.

In a similar vein, Blalock, Gertler and Levine (2008) use extensive data on Indonesian manufacturing firms to examine how foreign-owned and domestic-owned firms responded to the large currency devaluation that took place in 1997. While access to capital limited the ability of local firms to take advantage of improved terms of trade, foreign-owned exporters substantially increased investment and employment relative to their domestic counterparts.

Related work studies international mergers and acquisitions during crises and arrives at similar conclusions. Krugman (1998) provides anecdotal evidence that currency crises in Asia in the late 1990s allowed foreign firms with sufficient liquidity to buy Asian firms at discounted prices; he labels such investments “fire-sale FDI.” Aguiar and Gopinanth (2005) study a large sample of cross-border mergers and acquisitions following currency crises in Asia. They present evidence that liquidity-rich foreign firms purchase more assets at times when domestic firms are financially constrained. Moreover, local firms that are more capital constrained sell for lower prices, controlling for a wide range of other factors. Thus, work on currency crises illustrates how internal capital markets allow multinational firms to grow through both new investments and acquisitions after severe depreciations.

4.2.3 Stock Market Mispricing

Internal capital markets also provide a channel through which stock market mispricing can affect foreign direct investment. Even in the largest and most liquid public equity markets, the combination of limits to cross-country arbitrage and either fluctuations in risk aversion by local investors or irrational expectations can cause cross-market mispricings; prices may differ from the theoretical ideal price that would obtain in perfectly integrated and efficient world markets. As an example, consider the findings in Froot and Dabora

(1999) concerning shares of Royal Dutch, which trades mainly in the US, and of Shell Transport, which trades mainly in the UK. Royal Dutch and Shell pay dividends in a fixed 60:40 ratio. If the US-UK capital markets were informationally efficient and perfectly integrated, the relative share price would also be fixed at this ratio, yet it varies from 36:40 to 66:40 over the sample period that Froot and Dabora (1999) survey. Moreover, the relative price of Royal Dutch tends to increase when the US market rises relative to the UK market, suggesting that broad, country-level investor demand pressures affect local valuations. These kinds of mispricing create arbitrage possibilities for multinationals.

Baker, Foley and Wurgler (2009) describe and test two hypotheses concerning how multinational firms might exploit the imperfect integration of world markets when making FDI decisions. The first is a cheap-financial-capital hypothesis, in which FDI flows are an opportunistic use of the relatively low-cost financial capital available to overvalued source-country firms. The second is a cheap-assets hypothesis, in which FDI flows reflect the purchase of undervalued host-country assets. Evidence suggests that foreign direct investment increases sharply with source-country stock market valuations – particularly the component of valuations that is predicted to revert the next year, and especially in the presence of capital account restrictions that limit other mechanisms of cross-country arbitrage. These results are consistent with the cheap-financial-capital channel but provide no support for the cheap-assets channel. Thus, mispricing appears to affect international investment because multinational firms use their internal markets to arbitrage differences in the cost of capital.

4.3 Responding to Governance Challenges

In environments where investor protection is weak and external sources of finance are costly, there is more scope for managerial misbehavior. Capital providers can be reluctant to commit funds to a firm unless certain ownership and incentive structures are in place. Antràs, Desai, and Foley (2009) analyze how the financial response to a managerial moral hazard problem can explain the emergence of multinational firms. They develop a model in which a firm endowed with a particular technology exploits that technology in countries with differing levels of financial development. External investors are a potential source of funding but are concerned about managerial misbehavior, especially in settings where investor protection is weak. Technology developers can better monitor local entrepreneurs who utilize the technology. The possibility of managerial misbehavior thus induces the developer of the technology to hold an ownership claim in the foreign project and, in certain cases, to also provide it with financial capital. As such, multinational firms and FDI flows arise endogenously in response to the presence of moral hazard and poor creditor rights.

Several predictions follow from the theory. First, arm's length licensing should be more common, relative to the deployment of technology through affiliate activity, in countries with strong investor protection. Second, the share of activity financed by capital flows from the multinational parent should decrease in the quality of investor protection in the host economy. Third, ownership shares held by

multinational parents should fall with creditor rights' protection. These results reflect the fact that monitoring by the developer of the technology is more critical where investor protection is weaker. The model also implies that stronger investor protection reduces the need for monitoring and therefore allows for a larger scale of activity. All of these predictions receive empirical support in data for the behavior of US multinationals abroad.[9]

Ju and Wei (2010) also present a theory in which multinationals exist because firms use internal capital markets in response to governance challenges. In their setting, poor governance in a country lowers the profitability of investment and prevents the efficient allocation of capital across projects. Therefore, domestic savings leave the country to be invested in locations where financial institutions function well. This savings is allocated to firms that are well governed and that subsequently return capital to the domestic market in the form of inward foreign investment. Thus two-way capital flows bypass inferior financial institutions. Patterns in aggregate capital flow data are consistent with these predictions. Developed countries with strong financial institutions tend to be net suppliers of foreign direct investment but to attract significant net flows of financial capital, while the opposite often holds for developing countries with weak financial institutions.

4.4 Spillovers

Linkanges between multinational affiliates and indigenous local firms are a key channel through which inward FDI can benefit host economies. Recent research has highlighted how issues related to capital availability can either facilitate or retard the development and magnitude of positive spillovers. Studies on spillovers within industries, such as Haddad and Harrison (1993) or Aitken and Harrison (1999), find scant evidence that increased activity by foreign firms generates positive externalities for local firms. However, work that examines spillovers through backward linkages establishes more promising results. Using detailed data from Lithuania, Javorcik (2004) presents evidence of productivity spillovers from foreign investment to local suppliers in upstream sectors. Blalock and Gertler (2008) document similar patterns in data from Indonesia.

Javorcik and Spatareanu (2009) consider if liquidity constraints limit domestic firms' ability to benefit from their relationships with the local affiliates of multinational firms. Empirical analysis for the Czech Republic reveals that Czech firms supplying multinationals are less financially constrained than those that are not. However, these differences appear to reflect selection effects rather than changes that relax financing constraints when a supply relationship begins. Czech firms that become multinational suppliers do

[9] Marin and Schnitzer (2011) also study the financing decisions of multinational firms in a model that stresses managerial incentives. Their model, however, takes the existence of multinational firms as given and considers an incomplete-contracting setup as opposed to the complete-contracting setup in Antràs, Desai, and Foley (2009). Financing decisions are used to govern the incentives of managers, such that projects are locally financed if managerial incentive problems are more severe.

not appear to be constrained even before doing so. These findings suggest that strong local financial institutions facilitate the creation of firms that might be able to form backward linkages with foreign companies and enjoy any potential benefits of doing so.

Related work explores the connection between foreign direct investment and economic growth, and finds that it tends to only be positive when local financial markets are well developed. Alfaro, Chanda, Kalemli-Ozcan and Savek (2004) theoretically develop the idea that better financial conditions allow agents to take advantage of spillovers that might flow from inward foreign investment. In this model, local entrepreneurs must incur a set of costs to start a business, and well-functioning capital markets make it easier for them to meet these costs. If this credit constraint is overcome, the entrepreneur can establish an entity that can supply multinationals and subsequently become more efficient because of spillovers. Empirically, the authors observe that economic growth is more significantly impacted by FDI inflows in countries with well-developed financial markets. Alfaro, Kalemli-Ozcan and Savek (2008) extend this analysis to show that the growth effects of foreign investment in financially advanced countries occur through gains in total factor productivity rather than through factor accumulation.

Harrison, Love and McMillan (2004) consider if, by bringing in scarce capital, foreign direct investment relaxes local financing constraints. Using an estimation specification derived from an Euler equation, they study the investment activity of firms in a broad set of countries. Foreign investment reduces the cash-flow sensitivity of investment not just for foreign-owned firms, but for domestic-owned firms as well. These findings suggest that FDI inflows are associated with a reduction in firm-level credit constraints even for purely domestic firms. However, Harrison and McMillan (2003) point out that these results do not hold in all environments. They take a similar approach to study investment activity in the Ivory Coast, where interest rates are fixed such that credit is rationed and where many banks have strong ties to France. In this context, borrowing by foreign firms exacerbates the financial constraints faced by purely domestic firms by crowding them out from the local capital market. Thus, foreign investment need not expand access to credit for all firms.

5 Conclusions and Future Research

This article surveys research at the intersection of international economics and corporate finance. Recent work illustrates how international trade and multinational activity are affected by the credit constraints firms face and by firms' ability to make use of internal capital markets. Differences in access to financial capital explain variation in trade participation at the country, industry, and firm level. Firms need to fund fixed and variable costs of cross-border transactions, and these transactions often tie up capital for longer periods of time than domestic transactions and involve distinct risks. Credit constraints also play a role in determining which firms choose to conduct operations in multiple countries and what kinds of activities they perform in

different jurisdictions. Through their internal capital markets, multinational firms can raise funding in one location and deploy it elsewhere. Internally available financial capital gives multinationals an advantage over purely domestic firms in some circumstances. Financial considerations often shape the extent to which multinationals generate spillovers for local firms.

A number of directions for future research appear promising.[10] Some of the topics discussed in this article would benefit from additional work. For instance, there remains much scope for better understanding the mechanisms through which financial frictions operate. Notably, a considerable body of work connects the extent to which a firm engages in international activity with the firm's productivity. Given that more productive firms tend to have higher earnings and therefore more internal sources of capital, it would be helpful to discern whether the effects of productivity in part reflect access to capital. In a dynamic context, access to capital may also be important for firms' ability to make productivity-enhancing investments. Separately, relatively little is known about the various types of trade finance. Researchers have shed little light on how various transaction features such as product characteristics might influence the choice of trade finance. Likewise, the role of trade finance insurance is understudied.

Credit constraints could affect the welfare gains associated with trade and foreign investment, yet little attention has been paid to this possibility. As weak financial markets generate capital underprovision and misallocation, countries may respond sub-optimally to reforms and not reap the full benefits of globalization. Financial frictions may similarly distort how exports and FDI react to other shocks such as demand or exchange-rate movements. In addition, credit constraints may importantly shape firms' and countries' position in global value chains, with implications for profits, technological spillovers, and long-run growth. A deeper understanding of these issues would inform debates about the benefits and costs of international engagement.

Future research could also explore how credit constraints and the use of internal capital markets by multinationals shape the international transmission of shocks. Shocks to the availability of capital in one country appear to limit exports and foreign investment from that country. Trade and multinational operations could therefore be channels for contagion that are further agitated by capital constraints.

Finally, an open policy question is whether financial frictions in trade and foreign investment warrant government intervention. Nearly every country in the world has some form of government export credit agency, and these organizations often expand their scale of activity during crisis episodes. This generates debates about the sensibility of public provision of financing for particular types of economic transactions. While improving financial contractibility and liberalizing capital flows might be first best, these options

[10] Early investigations into some of these topics include Berman and Berthou (2009), Carluccio and Fally (2012), Brooks and Dovis (2013), Caggese and Cuñat (2013), Kalemli-Ozcan, Kim, Shin, Sørensen and Yesiltas (2013), Felbermayr, Heiland and Yalcin (2013), and Kohn, Leibovici and Szkup (2014).

might be difficult to achieve. However, WTO in principle restricts subsidies that differentially benefit exporters over non-exporting firms. These issues are further complicated by the political pressures that governments face to protect domestic jobs, and by the rise in global production networks that blur the distinction between domestic and foreign content in traded goods.

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