Their Pain Is Your Gain: Market Competition and Foreign Currency Exposure *

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Abstract

This paper constructs firm-specific foreign currency exposure from novel data on foreign sales, foreign debt, and competition networks. I show that "unexposed" firms with high exposure to foreign borrowing rivals experience greater operating profitability after local currency depreciation. Consistent with strategic behavior, this rise in profitability varies across financial conditions and market structures, concentrating on financially weak rivals and industries with higher market concentration, lower entry barriers, and higher inventories. These results provide novel evidence on how and why strategic competition influences the pass-through of currency risk between firms.

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1 Introduction

A longstanding puzzle in the international finance literature is that, at the aggregate level, exchange rates appear disconnected from real variables (e.g., Meese and Rogoff 1983; Itskhoki and Mukhin 2021). Using aggregate variables might hide the complexity and heterogeneity in individual firms' responses to exchange rate shocks. As product market concentration has surged over the past three decades (e.g., Autor et al. 2020; De Loecker et al. 2020), one overlooked channel is how interactions with product market rivals influence the pass-through of currency risk between firms. In this paper, I construct *firm-specific* foreign currency exposure and introduce a new dimension on currency debt composition and product market competition to explain the muted response of economic activity to exchange rate shocks.[1]

My study reveals an intriguing finding that product market competition can mitigate the propagation and amplification of currency risk. While financial conditions of firms with unhedged foreign currency liabilities tend to be weakened following local currency depreciation (e.g., Alfaro et al. 2019; Niepmann and Schmidt-Eisenlohr 2021), their "unexposed" peers without foreign currency exposure gain a strategic advantage in product market competition and interactions. Recent work in product market competition has shown that liquidity-constrained firms tend to raise markups to gain higher short-run cash flows at the cost of lower future customers. In response, their unconstrained rivals can gain a customer base and thus increase their sales and profit margins (Chevalier and Scharfstein 1996; Gilchrist et al. 2017; Dou and Ji 2021).

The lack of evidence on the transmission of currency risk between competing firms has two main origins. First, the granular-level data on foreign currency exposure and competitor relationships are not available in the literature. Second, it is difficult to isolate the spillover effect in competition networks from the direct impact of currency depreciation. To address these empirical challenges, I collect a comprehensive multi-country sample of *firm-level* data on foreign sales, foreign debt, and competition networks from 2006 to 2022. By using micro data, I then identify, for the first time, unexposed firms that have no direct links to currency risk but that compete with firms borrowing in foreign currency in the local product market. Thus, I isolate an important channel of market competition in the spillover of currency risk.

To set the stage for this study, I first define firms with no foreign revenue, no foreign debt, and no foreign assets as unexposed firms. As confirmed in placebo tests, these firms are unlikely to be directly affected by currency depreciation. I next match unexposed firms to their local competitors (i.e., ultimate parent firms in the same country) by using an extensive firm-level database of competitor pairs either based on firms' self-disclosed information or collected from firms' annual reports

[1] The exchange rate disconnect narrowly refers to the lack of correlation between exchange rates and macro variables (e.g., Itskhoki and Mukhin 2021). More generally, this puzzle speaks to the heterogeneous response of aggregate output to exchange rate movements (e.g., Agarwal 2021). My paper emphasizes the importance of uncovering micro-level heterogeneity to understand macroeconomic shocks. Kaplan and Violante (2018) provides an excellent survey of model frameworks in this literature.

and other data sources. As a result, competitors may neither necessarily be in the same four-digit SIC industry nor connect through common market leaders (Dou, Johnson, and Wu 2023). For my next step, I construct unexposed firms' *indirect* foreign currency exposure as a weighted average of their competitors' foreign sales and foreign debt at the end of each year, using competitors' assets and sales as weights or equal weighting. As each firm may have different pairs of competitors, even firms in the same industry can have different indirect foreign currency exposure.

The rationale for the empirical measure is that if associated competitors borrow more foreign debt or export more products, then an unexposed firm is more *indirectly* exposed to currency risk through product market competition and interactions. In general, the magnitude and variation of an unexposed firm's *individual* indirect foreign currency exposure is plausibly exogenous to its own choice and determined by both its position in the competition network *and* by competitors' choices of export and currency debt. To confirm, the constructed indirect foreign exposures have modest correlations with unexposed firms' underlying characteristics.

I examine whether unexposed firms with high indirect foreign exposure exhibit differential changes in operating performance following local currency depreciation. As depreciation has opposing effects on firms' cash flows via trade and debt exposures, I consider indirect foreign sales exposure and indirect foreign debt exposure together.[2] The identifying assumption is that the matching of unexposed firms with their foreign-exposed competitors is uncorrelated with unobserved determinants of their sensitivities to currency depreciation that are unexplained by observed firm characteristics and a host of fixed effects. In other words, aggregate exchange rate shocks generate variations in responses across unexposed firms and over time, which are arguably unrelated to underlying causes of variations in product market competition, as well as variations in competitors' foreign currency exposure.

I find that, on average, unexposed firms with higher *indirect* foreign debt exposure significantly perform better than those with lower exposure after local currency depreciation. My primary performance measurement is cash-based operating profitability, which is devoid of accounting accruals adjustment and which better aligns with future market valuation (Ball et al. 2016). My baseline results imply that a one-standard-deviation increase in indirect foreign debt exposure will lead to an additional rise in operating profitability between 0.18% and 0.20% in response to a one-standard-deviation depreciation in local currency. These estimates translate to an increase in operating profits between $9.7 million and $10.85 million per unexposed firm. In large depreciation periods with a cumulative currency depreciation above 20%, the coefficient of the interaction between indirect foreign debt exposure and the depreciation dummy increases to a range of 1.67% and 1.94%, which is a 29% - 34% rise relative to the unconditional average profitability level.

[2] On the one hand, currency depreciation increases the competitiveness of exporting firms, thus raising their revenue (i.e., competitiveness effect). On the other hand, firms that hold foreign currency-denominated debt see an increase in their debt burden when the exchange rate depreciates (i.e., balance sheet effect). My empirical setting aims to isolate the competition effect between unexposed firms and their rivals after accounting for the competitiveness effect and the balance sheet effect. Of note, Michaux (2012) proposes a unified framework with all three channels to study the currency composition of debt.

Across all regression specifications, the loadings on the interaction between indirect foreign sales exposure and currency depreciation remain modest and statistically insignificant. Thus, indirect foreign debt exposure dominates indirect foreign trade exposure in explaining cross-sectional differences in the operating performance of unexposed firms in depreciation periods. Therefore, performance improvement is less likely to originate from the increased competitiveness of exporting industries. More importantly, I do not find significant results on the two sources of indirect foreign exposure in appreciation periods, regardless of the weighting schemes used to construct measures. The asymmetric effect that only arises from indirect foreign debt exposure in depreciation periods further rules out alternative channels on demand shocks and other confounding network relations (e.g., Acemoglu et al. 2012; Dou et al. 2023).

To uncover the drivers of this increase in profitability, I decompose the cash-based operating profitability into three components based on accounting identities: gross profit margin, overhead costs ($SG\&A$), and research and development expenses ($R\&D$). My results show that unexposed firms with high exposure to foreign borrowing rivals experience not only higher gross profits but also lower overhead expenses. These findings are consistent with theoretical predictions in the literature (e.g., Chevalier and Scharfstein 1996; Gilchrist et al. 2017; Dou and Ji 2021). Foreign-borrowing rivals tend to raise their product prices when they face tighter financial constraints due to local currency depreciation. As a result, unexposed firms gain a competitive advantage and collect more profits due to increased demand. Importantly, they raise their own profit margins without worrying too much about losing customer bases, given that their competitors' prices are higher now.

Having established that product market competition can mitigate the spillover of currency risk, I turn to discuss possible economic mechanisms behind the risk mitigation effects. Implied by previous literature (e.g., Chevalier and Scharfstein 1996; Gilchrist et al. 2017; Dou and Ji 2021), I first focus on cross-sectional variations in the financial conditions of foreign exposed rivals. As local currency depreciation increases their debt burden, foreign debt borrowers become more liquidity-constrained and less competitive in the product market.[3] In turn, unexposed firms gain a competitive advantage and tend to expand their market share. Thus, I expect the risk mitigation effect to concentrate on financially vulnerable rivals as it becomes difficult for them to defend their customer bases and compete with their unexposed peers.

To test this hypothesis, I construct two measures of financial weakness: leverage and external financing dependence. For each unexposed firm, I sort its rivals into two groups based on each of these vulnerability measures, from low to high in each country annually, and calculate two versions of indirect foreign debt and foreign sales exposure based on two groups of competitors: one group with financially vulnerable local rivals, and the other group with financially resilient rivals. Consistent with conjecture, the financial condition of rivals is a crucial driver. Specifically, a rise in profitability only occurs if an unexposed firm competes with rivals that have constrained

[3] In industries characterized by low short- and long-run price elasticity of demand, firms with greater liquidity constraints may charge relatively higher profit margins compared to their less liquidity-constrained counterparts in the cross-section.

financial resources. This finding implies that unexposed firms more likely gain new customers from foreign borrowing competitors with less financial flexibility as well as from those operating in industries characterized by high dependence on external financing (Fresard 2010; Koijen and Yogo 2015; Gilchrist et al. 2017).

In addition to financial conditions, firms' strategic response also depends on product market structures when interacting with rivals and facing competition threats (e.g., Fudenberg and Tirole 1984; Bulow et al. 1985). In a concentrated market, unexposed firms have more incentives to leverage their strategic advantages and grab market share from their financially weak rivals since potential economic rents are greater. Meanwhile, if the entry barrier is low, it might be too costly for foreign borrowing rivals to take counteractions and deter competition from unexposed firms. Further, foreign exposed rivals with large inventories credibly look "soft" as they have a high demand for a rapid accumulation of adequate liquid funds and, thus, are more likely to face competition threats. Consequently, unexposed firms compete more fiercely with weakened foreign borrowing rivals in concentrated industries with lower entry barriers and higher inventories.

As I do with the cross-sectional tests on financial conditions, I build two versions of indirect foreign currency exposure based on rivals' industry features, including market concentration, entry barriers, and inventory levels. Consistent with the conjecture, the rise in profitability exhibits heterogeneity between industries with different characteristics and is concentrated only in industries with higher market concentration, lower entry barriers, and higher inventory levels. These cross-sectional results are broadly consistent with the idea that unexposed firms are partly strategic in that they take advantage of weak "soft" rivals and increase shares in product markets with larger potential economic rents.

Therefore, instead of a deterioration in operating performance from intensified competition in product markets after currency depreciation, unexposed firms transform their superior strategic advantages into future profits. Overall, the firm-level results suggest that the product market competition channel partly offsets the adverse effects of currency depreciation on foreign borrowing rivals and thus can explain why there was only a modest negative impact on aggregate output.

Related Literature. This paper contributes to the literature on interactions between strategic competition in the product market and financial constraints (e.g., Titman 1984; Shleifer and Vishny 1992; Busse 2002; Hortaçsu et al. 2013; Phillips and Sertsios 2013; Koijen and Yogo 2015; Corhay et al. 2020; Kim 2021; Dou et al. 2022, 2023; Chen et al. 2022). Firms facing liquidity constraints may charge higher profit margins compared to their less constrained counterparts (Chevalier and Scharfstein 1996; Gilchrist et al. 2017; Dou and Ji 2021), and my empirical results align with these findings.[4] In ways that complement this literature, I investigate the transmission of macro-level

[4]Chen, Dou, Guo, and Ji (2024) develop a model to study the strategic competition between firms in the same industry; in their model, when some firms become financially distressed, their non-distressed counterparts fare better in the non-collusive Nash equilibrium and fare worse in a collusive Nash equilibrium. My finding that unexposed rivals compete to capture more market share and increase their operating profitability is consistent with the model prediction for the non-collusive Nash equilibrium.

exchange rate shocks within competition networks and assess the role of financial conditions and market structure in economic mechanisms.[5]

A closely related paper is Dou, Johnson, and Wu (2023), which uses natural disaster shocks to show the importance of market competition in distress propagation within a given industry. The differences in our respective results may be linked to the different nature of competition networks and shocks. First, Dou, Johnson, and Wu (2023) construct a competition network based on common market leaders (i.e., firms operating in multiple industries), while my definition of competitor pairs is based on a firm's disclosures and other public sources. As a result, each firm in my sample has a unique set of competitors across industries with different price elasticity of demand according to its own and competitors' disclosure. Second, compared to natural disasters, currency shocks occur more frequently but may not necessarily push firms into financial distress. However, the use of unexposed firms in my empirical design complements their work by emphasizing the importance of product market competition to understand macroeconomic shocks.

My paper is also motivated by and contributes to the exchange rate pass-through and exchange rate disconnect literature (e.g., Meese and Rogoff 1983; Lane and Shambaugh 2010; Blanchard et al. 2016; Itskhoki and Mukhin 2021; Lilley et al. 2022). This literature documents that currency risk might spread through various channels, such as through bank lending, dominant currency paradigms, imported intermediate inputs, internal capital markets, local currency pricing, trade links, employment, and other factors that affect aggregate variables and explain the muted response of economic activity to exchange rate shocks (e.g., Acemoglu et al. 2015; Amiti et al. 2014; Auer et al. 2019; Biermann and Huber 2019; Devereux and Engel 2003; Fitzgerald and Haller 2014; Giannetti and Saidi 2019; Gopinath et al. 2010; Giroud and Mueller 2019; Agarwal 2021; Chang et al. 2022; Di Giovanni and Hale 2022). I isolate a novel product market competition channel to understand the exchange rate pass-through across firms by using firm-level currency exposure to mitigate omitted variables and reverse causality in cross-country studies. In doing so, this article provides complementary evidence that strategic competition in the production market can help explain heterogeneity in the response of firms' operating performance to currency depreciation, thus shedding light on the puzzle of exchange rate disconnect.

This paper also contributes to the large and growing literature on the risk implications of external debt positions in the corporate sector (e.g., Aguiar 2005; Chui et al. 2014; Kim et al. 2015; Alfaro et al. 2017; Hardy 2018; Bruno and Shin 2020; Niepmann and Schmidt-Eisenlohr 2021; Du and Schreger 2022; Salomao and Varela 2022). Niepmann and Schmidt-Eisenlohr (2021) find that depreciation reduces the likelihood that a firm with foreign debt repays its loans, and that exchange rate exposure can translate into credit risk for banks. Alfaro, Asis, Chari, and Panizza (2019) meanwhile use a leverage ratio as a proxy for foreign debt exposure and show that

[5] A growing literature on the propagation and amplification of negative shocks in production and financial networks also uses firm-level adverse events, such as bankruptcies, defaults, credit rating downgrades, and natural disasters (e.g., Hertzel et al. 2008; Jacobson and Von Schedvin 2015; Barrot and Sauvagnat 2016; Kolay et al. 2016; Agca et al. 2022; Carvalho et al. 2021; Dou et al. 2023; Elkamhi and Nozawa 2022).

depreciation amplifies the vulnerability of large firms. In contrast to their approach, the basic units of analysis in my paper are unexposed firms without direct foreign currency exposure. Specifically, I exploit the cross-sectional variations in unexposed firms' exposure to foreign borrowing competitors and study their heterogeneous responses to currency depreciation.

The remainder of this paper is structured as follows. In Section 2, I describe my data sources and the construction of my empirical measures. In Section 3, I outline my empirical design and present the main results for unexposed firms. In Section 4, I examine the cross-sectional determinants of risk mitigation and discuss possible mechanisms. I conclude this paper with Section 5.

2 Data and Empirical Measures

I combine several novel and comprehensive databases to obtain information on firm-level foreign sales, firm-level currency debt composition, and firm-level networks of rivals for a large cross-section of firms across many countries. I detail my data sources, sample constructions, and main empirical measures in this section.

2.1 Data Description

I obtain data on debt structure and currency denomination from the FactSet Debt Capital Structure (DCS) database. The DCS dataset begins in 2006 and contains debt structure information of nearly 40,000 reporting entities collected from financial statements, credit agreements, and indentures worldwide. It contains debt instruments and line items that reconcile to balance sheet debt values, including all short-term debt, revolving credit facilities, term loans, and bonds, all to the extent that they can be broken down in filings. I use the *Details* file, which contains details on individual debt instruments included in the DCS dataset (e.g., debt type, coupon, principal outstanding, issuance currency, maturity).

To capture firms' offshore debt issuance activities, I find each reporting entity's ultimate parent firm and its domicile countries and local currencies based on a series of FactSet internal mapping files. I classify debt as foreign-currency-denominated if the issuance currency of the debt instrument is different from the home currency of its ultimate parent firm. To measure firms' foreign sales exposure, I obtain the geographic revenue distribution information from the FactSet Geographic Revenue (GeoRev) database and replace the missing values in foreign sales exposure with zero.

I also obtain firm financial and accounting data from the FactSet Fundamentals (FUNDA) database. After merging the FactSet DCS and GeoRev databases with the Fundamentals database using the FactSet entity identifier (i.e., "*FACTSET_ENTITY_ID*"), I convert outstanding debt values from the DCS database and accounting items from the FUNDA database into U.S. dollars to facilitate comparison and ratio computation. To mitigate data error issues, I delete observations if any foreign debt ratio, local debt ratio, or total leverage ratio is outside the unit interval. The

resultant merged FUNDA-DCS-GeoRev dataset contains all the accounting information and financial ratios used for this study, including firm-level foreign debt, foreign sales, and other firm-level characteristics.

I next obtain information about firm-level competitor pairs from the FactSet Supply Chain Relationships database.[6] It includes competition relationships disclosed by either the firm itself or its rivals (or by both), with the start and end dates for each pair. For this particular database, FactSet collects information from firms' annual reports and a range of other sources, including press releases and announcements, investor presentations, firms' websites, and in-house proprietary research. The comprehensive competitor-pairs data allow me to measure firms' individual competition networks over time.[7]

After following Bessembinder, Chen, Choi, and Wei (2021) and implementing a series of filters and data corrections, I then obtain individual stock and market index data for each country from the S&P Compustat Global and North America database. I match firms (entities) in FactSet to Compustat by using ISIN, SEDOL, CUSIP, and mapping files from FactSet.[8] Monthly and annual exchange rate data (including the dollar index) are from Compustat and the Federal Reserve Bank of St.Louis (FRED).

In Internet Appendix A, I provide more details about the FactSet databases and describe the data cleaning and processing procedures that I employ in the paper.

2.2 Unit of Analysis

To isolate the spillover effect of currency risk through competition networks from the direct impact of currency risk, I restrict my main analysis to unexposed firms with no measurable foreign currency exposure. Specifically, I define "unexposed" firms as those with no foreign debt, no foreign sales, and no foreign assets using micro-level data.[9] By construction, these firms are the least likely to be directly affected by exchange rate shocks.

However, unexposed firms are not necessarily entirely immune to currency risk, for they interact with rivals in the product market who may borrow in foreign currency or export products to international markets. To isolate the product market competition channel, I focus on unexposed firms' *indirect* foreign currency exposure through competition networks.

[6] FactSet's analysts monitor relationships data on a regular basis and continually update the database. FactSet's competitor relationship data are widely used for comparable company analysis, including Gofman et al. (2020) and Katona et al. (2024), among others.

[7] I clean the data by removing duplicate records and redundant relationships whose start and end dates fall within the time period of a longer relationship between the same pair of firms. I also combine multiple relationships between the same pair of firms over different time periods into one continuous relationship.

[8] I thank Roger Chan from FactSet for providing me with helpful feedback and advice on mapping between different layers of identifiers within FactSet datasets.

[9] Specifically, foreign debt information are from the DCS dataset, foreign sales data are from the GeoRev dataset, and foreign assets data are from the FUNDA dataset.

To establish competition networks between unexposed firms and their rivals in local product markets, I identify unexposed firms' connected horizontal rivals via the FactSet Relationships database. These rivals potentially have foreign debt and foreign revenue exposure. I require that the ultimate parent firms of connected rivals come from the same country as the unexposed firms in my analysis. I delete unexposed firms if they only appear in one year of the sample data or if their linked rivals are not available.[10] Using data from Ilzetzki, Reinhart, and Rogoff (2019), I also drop observations at the country-year level for countries whose currencies are pegged.

The final sample contains 4,987 unexposed firms across 46 economies from 2006 to 2022 (i.e., 20 advanced economies (AEs) and 26 emerging market economies (EMEs)). The unexposed firms compete with 8,820 distinct horizontal rivals through 49,584 competition pairs in the local product market. Table A1 illustrates the classifications of countries based on economic development and geographical location.[11]

As a placebo test, Table A2 shows the stock price responses of unexposed firms to local currency depreciation. As expected, unexposed firms do not respond to local currency depreciation regardless of model specifications. In addition, there is no pronounced difference between tradable and non-tradable sectors. These results alleviate concerns about measurement errors in relation to *direct* foreign currency exposure and potential general equilibrium effects.[12]

2.3 Indirect Foreign Currency Exposure

Unexposed firms may have multiple rivals with varying foreign currency exposure. For example, as visualized and demonstrated in Figure 1, suppose that two unexposed firms, Firm A and Firm B, have different sets of product market rivals. Firm A does not compete with foreign exposed rivals, so it has no indirect foreign currency exposure through its competitors. On the contrary, Firm B competes with four foreign exposed rivals (e.g., borrowing in foreign currency) in the competition networks. Consequently, Firm B may be indirectly affected by foreign borrowing rivals' product market competition in response to adverse cash flow shocks from depreciation. In general, if

[10] The average (median) number of local product market rivals for an unexposed firm is 6.7 (3). I also exclude rivals if their accounting and financial information is not available in the merged FUNDA-DCS-GeoRev dataset because their foreign exposure cannot be measured without that information.

[11] Similar to the classification approach in Chaieb, Langlois, and Scaillet (2021), I group the 20 AEs into three regions: (i) North America (Canada and the U.S.), (ii) Developed Europe (Finland, France, Germany, Israel, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom), and (iii) Asia Pacific (Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, and Taiwan). I group the 26 EMEs into four regions: (i) Emerging Asia (China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, Philippines, Thailand, and Vietnam), (ii) Emerging Europe (Poland, Romania, Russia, and Ukraine), (iii) Latin America (Argentina, Brazil, Chile, Colombia, Mexico, and Peru), and (iv) Middle East and Africa (Egypt, Kenya, Nigeria, Oman, South Africa, Turkey, and the United Arab Emirates).

[12] I do not obtain data on unexposed firms' imported intermediate inputs and currency hedging. The placebo test lends support to the identification of unexposed firms. In addition, Alfaro, Calani, and Varela (2022) documents that only a few firms can use foreign currency derivatives to fully hedge cash flow currency risk. Relatedly, Du and Schreger (2022) find that the outstanding amounts of foreign currency liabilities are much larger than the notional outstanding of cross-currency swaps for most countries.

associated competitors borrow more foreign debt or export more products, then an unexposed firm is consequently exposed more to currency risk through product market interactions. My empirical analysis examines how currency shocks differentially affect the operating performance of unexposed firms with different exposure to foreign exposed rivals.

In order to determine each unexposed firm's aggregate exposure to foreign exposed rivals, I use the firm-level database of competitor pairs from FactSet to identify all of its local rivals. I then define an unexposed firm's *indirect* foreign debt exposure (*Ind.FD.Exposure*) and foreign sales exposure (*Ind.FS.Exposure*) associated with horizontal rivals for each year as a weighted average of their local competitors' foreign debt or foreign sales.

$$Ind.FD.Exposure_{i,t} = \sum_{j \in J_i} \left(\frac{w_{i,j}}{\sum_j w_{i,j}} \times Foreign\ Debt_{j,t} \right) \tag{1}$$

$$Ind.FS.Exposure_{i,t} = \sum_{j \in J_i} \left(\frac{w_{i,j}}{\sum_j w_{i,j}} \times Foreign\ Sales_{j,t} \right) \tag{2}$$

in which $w_{i,j}$ is unexposed firm i's competitor j's weight in the computation of indirect foreign currency exposure. To account for different firm sizes and market power in the competition network, I use competitors' assets or sales as weights. Accordingly, $\sum_{j \in J_i} w_{i,j}$ is the summation of assets or sales of firm i's local competitors. Table A3 uses a case of Footstar, Inc. to illustrate the construction of indirect foreign currency exposure.

Therefore, $Ind.FD.Exposure_{i,t}$ captures firm i's exposure at time t to all of its foreign borrowing rivals in local product market. Similarly, $Ind.FS.Exposure_{i,t}$ represents firm i's indirect foreign sales exposure at time t across all of its local competitors. I also use equal weighting for robustness checks. As each firm has different pairs of competitors in my data, even firms in the same four-digit SIC industry can have varying sets of local competitors and, thus, different levels of indirect foreign currency exposure.

The size of *firm-specific* indirect foreign debt exposure and indirect foreign sales exposure is determined by the unexposed firm's position in the competition network *and* its competitors' export and currency debt choices. Thus, the magnitude and variation of indirect exposure measures are arguably less likely related to individual firms' underlying fundamentals or sensitivities to exchange rate movements. The power of the cross-section of firms allows me to examine whether "unexposed" firms with high exposure to foreign currency "exposed" rivals perform better or worse in response to local currency depreciation.

2.4 Summary Statistics

Table 1 reports the descriptive statistics of variables that I use in my analysis. An average unexposed firm has total assets of $5,481 million, sales of $1,628 million, operating profitability of 5.68%, a

leverage ratio of 24.69%, a tangibility ratio of 22.72%, and a cash flow ratio of 13.83%.[13] The sales-weighted indirect foreign debt exposure, on average, is 1.32%, which is close to the assets-weighted version (1.34%) but larger than the equal-weighted version (1%). The average sales-weighted indirect foreign sales exposure is 13.56%, while the assets-weighted and equal-weighted exposures are 13.61% and 10.18%, respectively. Both indirect foreign debt exposure and indirect foreign sales exposure are right-skewed and exhibit large cross-sectional variation. The average annual exchange rate movement is -0.22% with a standard deviation of 6.84%. Definition and construction details can be found in Table 1.

Table 2 shows Pearson (upper triangle) and Spearman (lower triangle) correlations between firm-specific variables. The sales-weighted indirect foreign debt exposure exhibits a Pearson correlation of 0.31 with the sales-weighted foreign sales exposure, implying that some of the unexposed firms' rivals are exporting firms that borrow in foreign currency. This is consistent with the literature that shows exporting firms borrow in foreign currency to hedge against fluctuations in expected earnings in foreign currency (e.g., Colacito et al. 2021). Thus, it is important to consider the two sources of indirect foreign currency exposure together. More importantly, the two indirect foreign currency exposure measures are almost uncorrelated with other observable firm characteristics (except for the correlation of indirect foreign sales exposure and cash ratio at 0.33), lending support to the identifying assumption (which I discuss later in the paper). The patterns are similar for Spearman correlations.

3 Empirical Results on Horizontal Risk Mitigation

This section presents the baseline results on horizontal risk mitigation. I first summarize contrasting theoretical predictions on the direction of currency risk transmission between firms. Next, I outline the empirical model I use to examine the spillover effects of currency depreciation via competition networks. I then present the main empirical results on the operating profitability of unexposed firms.

3.1 Theoretical Guidance

Risk Propagation. Theory predicts that liquidity shocks and credit risk are propagated and amplified throughout the economy along the balance sheet channel, firm size distribution, or a network of input–output linkages, all of which potentially cause cascades of defaults and systemic failure (e.g., Kiyotaki and Moore 1997; Allen and Gale 2000; Battiston et al. 2007; Gabaix 2011; Acemoglu et al. 2012, 2015). For instance, since firms that hold foreign currency debt tend to be large and systematically important, their corporate fragility can be transmitted further to the

[13] Table A4 additionally reports the summary statistics of unexposed firms' linked competitors. Generally, their competitors are larger in total assets and sales, but the leverage ratio, operating profitability, tangibility, and cash flow ratio are comparable.

rest of the economy through network effects and other spillovers (e.g., Gabaix 2011; Acemoglu et al. 2015; Alfaro et al. 2021; Niepmann and Schmidt-Eisenlohr 2021; Di Giovanni and Hale 2022). Furthermore, a weakened foreign debt borrower tends to reduce its profit margins due to low collusion capacity (e.g., Chen et al. 2024) or high incentives for liquidation sales of inventories to meet liquidity needs (e.g., Koijen and Yogo 2015; Kim 2021). In response to the intensified competition pressure and aggressive pricing strategies, unexposed firms may decrease their profit margins as well to maintain their customer bases or accumulate adequate liquid funds. Thus, based on the risk propagation theories, I propose the following hypothesis:

Hypothesis 1a. *Unexposed firms with high exposure to weakened foreign exposed rivals perform worse following depreciation periods, leading to a currency risk propagation effect.*

Risk Mitigation. Unexposed firms might gain strategic advantages in the short run via strategic competition. Chevalier and Scharfstein (1996), Gilchrist et al. (2017), and Dou and Ji (2021) build theoretical models and show empirical evidence that liquidity-constrained firms tend to raise markups to gain higher short-run cash flows at the cost of losing future customers. In response, their unconstrained rivals maintain or lower markups to increase their customer base and thus increase sales and profit margins.[14] Chen et al. (2024) characterize an equilibrium in which firms repeatedly play a one-shot game without tacit collusion. In this non-collusive Nash equilibrium with an industry, adverse idiosyncratic shocks to one firm will enable other firms within the same industry to gain a competitive advantage, attaining higher cash flows through increased profit margin. When adverse exchange rate shocks weaken their foreign borrowing rivals, unexposed firms can intensify competition to attract more customers and gain market share at the cost of their liquidity-constrained rivals. I thus propose an alternative hypothesis based on the risk mitigation theories, as follows:

Hypothesis 1b. *Unexposed firms with high exposure to weakened foreign exposed rivals perform better following depreciation periods, resulting in a currency risk mitigation effect.*

Since theories are inconclusive and predict that unexposed firms with high indirect foreign currency exposure may perform better or worse after local currency depreciation, it is necessary to empirically investigate the relationship between product market competition and currency risk exposure in depreciation periods. Using micro-data to identify unexposed firms and their indirect foreign exposure ensures that the spillover effect does not confound with the direct impact of currency risk. I exploit the multi-country, multi-industry nature of my sample to study unexposed firms' responses to rivals across different financial conditions and market structures, so I may distinguish between various types of explanations.

[14] Lang and Stulz (1992) show that for a subset of firms that file for bankruptcy, their industry rivals experience positive stock returns that may be driven by the remaining firms' increased market power.

3.2 Empirical Design

To examine whether and to what extent product market interactions affect unexposed peers' operating performance in depreciation periods, I estimate the following regression specifications:

$$OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure_{i,s,c,t-1} \times DEPR_{c,t} + \lambda Indirect\ Exposure_{i,s,c,t-1} + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \quad (3)$$

in which $OP_{i,s,c,t+1}$ is the operating profitability of unexposed firm i in sector s from country c in year $t+1$. Following Ball, Gerakos, Linnainmaa, and Nikolaev (2016), I compute cash-based operating profitability as gross profit (i.e., sales minus the cost of goods sold) minus selling, general, and administrative expenses (excluding research and development expenditures), scaled by total assets. Compared to other operating profitability measures (e.g., Ball et al. 2015; Fama and French 2015), cash-based operating profitability is devoid of accounting accruals adjustments and better aligns with future market valuation.

As discussed earlier, I construct two sources of currency exposure of unexposed firms: indirect foreign debt exposure (*Ind.FD.Exposure*) and indirect foreign sales exposure (*Ind.FS.Exposure*). To mitigate the mechanical effects of changes in competition relationships, I ensure that (lagged) information on competitor pairs is available before the beginning of a fiscal period for each unexposed firm. Thus, reverse causality is not an issue in the empirical measures – unexposed firms can not change their rivals according to their expectation of rivals' operating performance. Since local currency depreciation has opposing balance sheet effects through trade and foreign debt exposures, I consider both of the two indirect foreign currency exposures in my regressions.[15]

$DEPR_{c,t}$ denotes local currency depreciation. Following the literature (e.g., Desai et al. 2008; Bruno and Shin 2020), I use two currency depreciation proxies. $\Delta EX_{c,t}$ is the log change in the nominal bilateral exchange rate against the U.S. dollar for country c in year t, in which $\Delta EX_{c,t} > 0$ represents local currency depreciation periods. For U.S. firms, $\Delta EX_{c,t}$ is calculated as log changes in the inverse of the dollar index from FRED. To capture large depreciation episodes, I also construct a depreciation dummy, *Dep_Dum*, that equals one if the nominal exchange rate increases by over 20% compared to the value of the exchange rate one year earlier. In the regressions, the main effect of $DEPR_{c,t}$ is absorbed by country-year fixed effects.

The lagged firm-specific, time-varying covariates, $X_{i,s,c,t}$, include firm size (*Size*), leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio (*Cash*). I include firm fixed effects (ϕ_i) to account for unobserved, time-invariant firm heterogeneity. Moreover, I add industry-year fixed effects, $\eta_{s,t}$, to control for changes in sectors over time, including firms' need for external financing as well as all other supply and demand shocks that are common to all firms within the same

[15] If an unexposed firm's rival is an exporter and also borrows in foreign currency, then local currency depreciation increases competitiveness and debt burden at the same time. The ultimate effect depends on the extent to which foreign currency liabilities are naturally hedged by foreign sales.

Fama–French 48 industry. I also use additional country-year fixed effects, $\zeta_{c,t}$, to control for time-varying observed and unobserved country characteristics. The multi-country panel dimension allows me to condition on many country-specific policy changes and other macroeconomic shocks by using country-year fixed effects, such as monetary policy changes, financial development, banking regulations, and other country-specific trends.

This empirical design assumes that the matching between unexposed firms and their foreign-currency-exposed competitors is uncorrelated with unobserved determinants of their sensitivities to exchange rate shocks that are unexplained by observed firm characteristics and a host of fixed effects. In other words, aggregate exchange rate shocks generate variations in operating performance across unexposed firms and over time, which are arguably unrelated to underlying sources of variations in product market competition *and* variations in competitors' foreign currency exposure. Therefore, I exploit the cross-sectional heterogeneity in unexposed firms' indirect foreign currency exposure (i.e., *Ind.FD.Exposure* and *Ind.FS.Exposure*) to test whether product market competition amplifies or mitigates currency risk propagation.[16]

My variable of interest is β, which is the regression coefficient on the interaction between *Ind.FD.Exposure* and currency depreciation, captures differences in operating profitability for unexposed firms with high indirect foreign debt exposure relative to those with low exposure following local currency depreciation. I expect to see a negative β if there is a *risk propagation* effect from foreign borrowing rivals to unexposed peers. On the contrary, I expect to see a *risk mitigation* effect (i.e., a positive β) if unexposed firms with high indirect foreign debt exposure perform better after currency depreciation.

3.3 Baseline Results

3.3.1 Average Response

Table 3 shows estimation results for Equation (3). Column (1) shows that the estimated β on indirect foreign debt exposure is positive and significant, which implies if an average unexposed firm experiences a one-standard-deviation increase in sales-weighted exposure to competitors' foreign debt, then its one-year-ahead operating profitability increases by 0.18% ($t = 3.00$), on average, in response to a one-standard-deviation depreciation in local currency. Meanwhile, the interaction between indirect foreign sales exposure and currency depreciation is only 0.05 ($t = 0.61$) and is statistically insignificant.

Columns (2) and (3) report similar results when I use different weighting schemes to compute indirect foreign currency exposures. In particular, the loadings on assets-weighted and equal-weighted *Ind.FD.Exposure* are 0.18 ($t = 2.87$) and 0.20 ($t = 3.44$), respectively. On the contrary,

[16] Since my regression specifications include country-year fixed effects, and the identification strategy relies on the cross-sectional variation in indirect currency exposure of unexposed firms, it mitigates the concerns that other macroeconomic events that coincide with the currency depreciation would bias the estimation.

the coefficients on *Ind.FS.Exposure* are much smaller and remain insignificant. Since an average unexposed firm's assets are \$5,481 million, the point estimates on *Ind.FD.Exposure* from Columns (1)-(3) yield an additional increase between \$9.70 million and \$10.85 million in operating profits per firm, which is economically large.

To account for nonlinear effects of large currency depreciation, I repeat this analysis but instead use a depreciation dummy *Dep_Dum* that denotes depreciation periods when a country's exchange rate experiences a cumulative depreciation of at least 20% within a year. In my sample period, the variation of *Dep_Dum* is mostly observed in emerging market economies. Columns (4)-(6) indicate that in the year after large currency depreciation, the average operating profitability of unexposed firms with high foreign debt exposure is significantly higher than that of unexposed firms with low exposure. The coefficients on the interaction between *Ind.FD.Exposure* and the depreciation dummy imply that a one-standard-deviation increase in indirect foreign debt exposure leads to an incremental increase between 1.67% and 1.94% of cash-based operating profitability after deep depreciation, accounting for 29% to 34% of the unconditional mean of operating profitability in the sample. In contrast, loadings on the interaction between *Ind.FS.Exposure* and the depreciation dummy remain modest and statistically insignificant.

These results have two important implications. First, when currency depreciation increases the debt repayments of their foreign borrowing competitors, unexposed firms with high exposure to rivals perform better than those with low exposure. In other words, I observe a currency risk mitigation effect (Hypothesis 1b) rather than a risk propagation effect (Hypothesis 1a) in the data. This is consistent with the notion that less constrained unexposed firms do not collude with constrained foreign-borrowing competitors but rather compete more intensely with weakened rivals, leading to better operating performance. Second, indirect foreign debt exposure dominates indirect foreign sales exposure in explaining cross-sectional differences in the operating performance of unexposed firms in depreciation periods. Hence, the risk mitigation effect is unlikely to originate from the increased competitiveness of exporting firms and industries during local currency depreciation.

3.3.2 Appreciation Periods

Since unexposed firms earn relatively greater operating profits after local currency depreciation, one natural question is whether the risk mitigation effect reverses in appreciation periods. Generally, foreign borrowing rivals have large firm sizes and sales and are in better positions in competition networks. Currency appreciation hardly changes the status of the "competitive balance" between unexposed firms and their rivals. A precondition of the risk mitigation story is that foreign borrowing rivals are weakened by adverse exchange rate shocks. After that, unexposed firms obtain strategic advantage and intensify competition to gain market share. Therefore, I expect the risk mitigation effect to be asymmetric and only show up in currency depreciation periods.

To test this prediction and capture significant appreciation periods across all countries, I define

an appreciation dummy that equals one if annual log changes in the nominal exchange rate are in the bottom 20% of the country's values in the sample period. Table 4 presents my empirical analysis for Equation (3) in appreciation periods. The signs of the estimated coefficients on the interaction between *Ind.FD.Exposure* and appreciation dummy are all negative and statistically insignificant. Moreover, the coefficients on the interaction between *Ind.FS.Exposure* and the appreciation dummy are close to zero and insignificant, regardless of the weighting schemes.

This asymmetric risk mitigation effect, which only arises from indirect foreign debt exposure in depreciation periods, further mitigates the concerns that omitted variables related to channels other than product market competition confound the current results. For example, if exchange rate shocks lead to demand shocks that affect the "untreated" firms directly, we should see symmetric effects in both appreciation and depreciation periods. Also, if the indirect foreign currency exposure captures confounding relations via supplier-customer networks or common lenders, we should observe a risk propagation effect rather than a risk mitigation effect.

3.3.3 Additional Results

Next, I examine the subsample results of the baseline regression specification. Table 5 presents my estimation results for Equation (3) in the AE and EME subsamples. Due to a lack of information on competition networks for firms in emerging markets, the EME subsample is smaller than the AE sample. However, the risk mitigation effect from indirect foreign debt exposure is more pronounced for EME firms compared to that of AE firms. Over the past decade, EME firms borrowed in foreign currency to take advantage of cheaper funding costs in the international financial market even without a natural hedge in foreign revenues. The tightening of international financial conditions and the strong U.S. dollar would expose foreign debt borrowers to default risk and exchange rate risk because of a currency mismatch on their balance sheets. As a result, unexposed firms in emerging market economies are more likely to interact with weakened foreign-borrowing rivals.

Table 6 shows subsample results based on sector tradability. Following Alfaro et al. (2019), I divide unexposed firms into tradable (e.g., agriculture, mining, manufacturing) and non-tradable sectors (e.g., construction, transportation, communication, utilities, services). Unexposed firms in non-tradable sectors with high indirect foreign debt exposure experience significantly higher operating profitability compared to those with low exposure after currency depreciation. As unhedged currency exposures for firms in non-tradable industries that access international capital markets are particularly adverse, their unexposed peers benefit from a greater competitive advantage in depreciation periods. In contrast, currency mismatches may be less damaging for firms operating in the tradable sector, for such firms may have natural hedges through foreign trade. The regression coefficients of the interaction between indirect foreign debt exposure and currency depreciation are all positive but not precisely estimated for non-tradable unexposed firms.

3.4 Profitability Decomposition

To unlock the drivers of improved operating performance, I decompose cash-based operating profitability into three components based on the accounting identities: (1) gross profit margin (*Gross PMGN*): the difference between sales and cost of goods sold scaled by total assets; (2) overhead cost (*SG&A*): selling, general, and administrative expenses scaled by total assets; and (3) research and development (*R&D*): research and development expenditures scaled by total assets. I estimate the following regression specifications:

$$\begin{aligned} \textit{Gross PMGN}_{i,s,c,t+1} = \alpha + \beta \textit{Indirect Exposure}_{i,s,c,t-1} \times DEPR_{c,t} + \lambda \textit{Indirect Exposure}_{i,s,c,t-1} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{4}$$

$$\begin{aligned} SG\&A_{i,s,c,t+1} = \alpha + \beta \textit{Indirect Exposure}_{i,s,c,t-1} \times DEPR_{c,t} + \lambda \textit{Indirect Exposure}_{i,s,c,t-1} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{5}$$

$$\begin{aligned} R\&D_{i,s,c,t+1} = \alpha + \beta \textit{Indirect Exposure}_{i,s,c,t-1} \times DEPR_{c,t} + \lambda \textit{Indirect Exposure}_{i,s,c,t-1} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{6}$$

Except for the outcome variables, all the right-hand-side variables and fixed effects are the same as Equation (3).

Table 7 reports the estimation results on profitability decomposition. The principal takeaway is that unexposed firms with high exposure to foreign borrowing rivals experience not only higher gross profits but also lower overhead costs than those firms with low exposure. A one-standard-deviation increase in indirect (sales-weighted) exposure to competitors' foreign debt leads to an additional 1.31% ($t = 2.34$) rise in gross profits and a 0.91% ($t = -1.97$) decline in overhead costs after local currency depreciation. Meanwhile, the estimated coefficients on the interaction between indirect foreign sales exposure and the depreciation dummy remain statistically insignificant across all regression specifications.

These decomposition results further rule out the risk propagation from the distressed competition. If distressed foreign debt borrowers set a lower markup to intensify price competition due to either reduced collusion capacity of all firms or high incentives linked to liquidation sales of inventories (Koijen and Yogo 2015; Kim 2021; Chen et al. 2024), unexposed peers tend to respond by lowering their profit margins as well. However, I observe the opposite results in the current setting and data: unexposed firms instead experience a rise in gross profit margins and a decrease in overhead expenses.[17] In other words, unexposed firms set a higher profit margin without losing customers and incurring additional overhead costs, leading to increased profits.

[17] Due to data limitations of global firms, I cannot further disentangle overhead expenses into advertising expenses and other costs.

Taken together, unexposed firms improve their operating performance after currency depreciation weakens their connected foreign-currency-exposed rivals. These results are consistent with model predictions and empirical evidence in Chevalier and Scharfstein (1996), Gilchrist et al. (2017), and Dou and Ji (2021), in which liquidity-constrained foreign debt borrowers become more sensitive to financial conditions and raise markups to gain higher short-run cash flows at the cost of losing future customers. In response, unexposed firms take advantage of opportunities to expand their customer base and grab a higher market share, resulting in higher sales growth and operating performance.

4 Possible Mechanisms

To address potential risk mitigation mechanisms, I explore in this section a set of firm-level and industry-level characteristics related to financial conditions and market structures of connected rivals and examine how the risk mitigation effect varies across these dimensions.

4.1 Financial Vulnerability

My results so far show that unexposed firms experience a rise in operating performance as they obtain strategic competition advantages against their foreign borrowing rivals after local currency depreciation. One potential channel is the interaction between firms' financial conditions and product market competition. Fresard (2010) documents that large cash holdings lead to systematic future market share gains at the expense of industry rivals. Caballero (2021) finds that foreign debt borrowers cut investments in depreciation periods. Dou and Ji (2021) meanwhile build an industry equilibrium model and show that a liquidity-constrained firm's markup becomes more sensitive to its financial condition but less sensitive to its opportunities for customer base growth.

When local currency depreciates, foreign debt borrowers have to service more debt repayments and are thus more likely to be liquidity-constrained. Hence, such firms struggle to defend their customer bases and compete with unexposed peers by setting low markups. Meanwhile, credit-constrained firms tend to invest less in production facilities and, hence, have less capacity to compete with financially sound peers. Consequently, at the expense of weakened foreign debt borrowers, unexposed firms gain advantages in product market competition and tend to expand market share. Therefore, if the channel of market competition offsets the transmission of currency risk, then this risk mitigation should occur primarily through financially vulnerable foreign debt borrowers, as they are more sensitive to financial conditions. Thus, I state the following hypothesis:

Hypothesis 2. *The currency risk mitigation effect is more pronounced if unexposed firms compete with financially vulnerable foreign borrowing rivals.*

To test this hypothesis, I construct two characteristics related to competitors' financial vulnerability: leverage and external financing dependence (EFD). Leverage is the ratio of total debt to

total assets. I follow Rajan and Zingales (1998) to construct *EFD*, which is based on a sample of U.S. public firms obtained from Compustat. Specifically, I construct industry-level external financial dependence measures as the difference between capital expenditures and cash flow from operations divided by capital expenditures. Rajan and Zingales (1998) argue that U.S. industry classification provides a plausibly exogenous measure that can identify differences in external financing dependencies across industries in other countries, as an unrestricted supply of external financing should be available to U.S. public firms.

I sort all unexposed firms' rivals into two buckets based on each of these two financial vulnerability measures, from low to high within each country for each year. Next, I compute indirect foreign debt and foreign revenue exposure separately for each bucket by using the competitors' sales as weights. Thus, for each unexposed firm, I obtain two corresponding values of sales-weighted *Ind.FD.Exposure* and *Ind.FS.Exposure* at the end of each fiscal year: one is based on rivals with above-median financial vulnerabilities (i.e., constrained rivals), and the other is based on those with below-median financial vulnerabilities (i.e., unconstrained rivals). I replace missing values with zero and re-estimate the empirical model in Equation (3) as follows:

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure_{i,s,c,t-1}^{Constr.\ \ Rivals} \times DEPR_{c,t} + \lambda Indirect\ Exposure_{i,s,c,t-1}^{Constr.\ \ Rivals} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{7}$$

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure_{i,s,c,t-1}^{Unconstr.\ \ Rivals} \times DEPR_{c,t} + \lambda Indirect\ Exposure_{i,s,c,t-1}^{Unconstr.\ \ Rivals} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{8}$$

Table 8 reports estimation results of Equations (7) and (8). Risk mitigation effects, captured by the coefficients on the interaction between indirect foreign debt exposure and depreciation, are present only in constrained rivals (i.e., those with high leverage and high external financing dependence). In addition, the coefficients on the interaction between indirect foreign sales exposure and depreciation remain statistically insignificant.

Therefore, in line with Hypothesis 2, the financial constraint of unexposed firms' rivals is a crucial driver of the risk mitigation effect. Instead of profit margins shrinking due to intensified competition in product markets, unexposed firms are more likely to gain a new customer base from foreign borrowing rivals with less financial flexibility; in so doing, these unexposed firms turn their enhanced competitive advantage into future profit margins.

4.2 Industry Competition

Unexposed firms' competitive behaviors depend on how their rivals respond and also on the nature of the market structure (Fudenberg and Tirole 1984; Bulow et al. 1985). In concentrated industries characterized by a high Herfindahl–Hirschman index (*HHI*), unexposed firms have more incentives

or potential to grab market share from weakened foreign borrowing rivals in depreciation periods and thereby modify the equilibrium distribution of expected profits in the product market. Chen et al. (2024) points out, in some extreme cases, predatory behaviors and even full-blown price wars can occur following an adverse distress shock; financially healthy firms (unexposed firms in my setting) may undertake aggressive pricing, even a price war, against weaker rivals to push them out of business and take their market share.

On the other hand, foreign-borrowing rivals can commit to being tough competitors in the future to drive down the expected profits of unexposed firms if such deterrence is feasible. However, when the entry barrier is low, it is more costly or less credible for foreign exposed rivals to look/act tough and deter unexposed firms' entry and competition. Consequently, unexposed firms can optimally expand their market share and equilibrium profits, given foreign exposed rivals may strategically accommodate their entry. Taken together, I propose the following testable hypothesis:

Hypothesis 3. *The currency risk mitigation effect is more pronounced if unexposed firms compete with foreign borrowing rivals in industries with higher market concentration or lower entry barriers.*

To test this prediction, I construct a market concentration measure, *HHI*, which is the sum of squared market shares of firms competing in each Fama-French 48 industry. To measure entry barriers, I follow Li (2010) and use the sales-weighted average fixed assets of an industry. I sort industries into tertiles based on their previous year's *HHI* and entry barriers. For each unexposed firm, I construct two versions of sales-weighted indirect foreign currency exposures based on their rivals' industries: one in industries with high *HHI* or entry barriers (top tertile) and the other in industries with low *HHI* or entry barriers (middle and bottom tertiles). I then estimate the following regression specifications:

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure_{i,s,c,t-1}^{HiComp\ Rivals} \times DEPR_{c,t} + \lambda Indirect\ Exposure_{i,s,c,t-1}^{HiComp\ Rivals} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{9}$$

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure_{i,s,c,t-1}^{LoComp\ Rivals} \times DEPR_{c,t} + \lambda Indirect\ Exposure_{i,s,c,t-1}^{LoComp\ Rivals} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{10}$$

Table 9 shows estimation results of Equations (9) and (10). Consistent with Hypothesis 3, risk mitigation effects exhibit heterogeneity across industries with different characteristics and are concentrated in industries with high market concentration or low entry barriers. This evidence implies that unexposed firms act strategically and compete aggressively for market shares in concentrated industries (i.e., those for which the potential economic rents are greater). In addition, unexposed firms compete with weakened rivals in product markets in which the costs of entry are low and, accordingly, where it might be too costly for foreign-exposed rivals to deter entry and competition.

4.3 Inventory Level

When firms compete fiercely in the absence of tacit collusion, firms often rely on the liquidation sales of inventories to survive liquidity shortages and financial constraints (e.g., Koijen and Yogo 2015; Kim 2021). When foreign borrowing rivals face increasing levels of distress risk, customers may become overly concerned about product quality and postpone their purchases to wait for deeper discounts. As a result, in industries for which firms hold large amounts of inventory, unexposed firms can take advantage of customers' strategic waiting behavior and compete aggressively to attract customers away from their weakened rivals.

Accordingly, foreign borrowing firms in industries with higher inventory levels are more likely to have liquidity needs or face pressure to retain customers; as a result, such firms are more vulnerable to potential predatory behaviors of unexposed firms with financial slack. Therefore, I propose the next hypothesis as follows:

Hypothesis 4. *The currency risk mitigation effect is more pronounced if unexposed firms compete with foreign borrowing rivals with higher inventories or in industries with higher inventory levels.*

To test this hypothesis, I construct both firm-level and industry-level inventory amounts and sort rivals into two groups based on their two types of inventory amounts; similarly, I construct two versions of unexposed firms' indirect foreign currency exposure with high inventory (above median) and low inventory (below median). I then estimate the following regression specifications:

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure^{HiInv\ Rivals}_{i,s,c,t-1} \times DEPR_{c,t} + \lambda Indirect\ Exposure^{HiInv\ Rivals}_{i,s,c,t-1} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{11}$$

$$\begin{aligned} OP_{i,s,c,t+1} = \alpha + \beta Indirect\ Exposure^{LoInv\ Rivals}_{i,s,c,t-1} \times DEPR_{c,t} + \lambda Indirect\ Exposure^{LoInv\ Rivals}_{i,s,c,t-1} \\ + \Gamma' X_{i,s,c,t} + \phi_i + \eta_{s,t} + \zeta_{c,t} + \varepsilon_{i,s,c,t} \end{aligned} \tag{12}$$

Table 10 shows estimation results of Equations (11) and (12). Risk mitigation effects are concentrated in rivals or industries with high inventory levels, consistent with Hypothesis 4. Rivals with large amounts of inventory credibly look "soft" as they have a high demand for rapid accumulation of adequate liquid funds. Consequently, unexposed firms intensify competition with "soft" weak rivals and gain relatively in depreciation periods.

4.4 Discussion

My empirical results are complementary to Dou, Johnson, and Wu (2023) in understanding the importance of product market competition in risk propagation. Dou, Johnson, and Wu (2023) finds stronger within-industry distress spillovers in industries with high entry barriers, high inventories, or high financial constraints. Our differences in results may be due to our using different definitions

of competition networks, different types of focal firms, and different nature of shocks. First, for my definition, I use competition pairs disclosed by firms or their rivals (or both), although these peers may not necessarily share the same four-digit SIC industry nor connect through common market leaders. Moreover, foreign debt borrowers in my paper tend to be large firms in each country that operate in industries characterized by a low price elasticity of demand. When such firms face greater liquidity constraints, they may charge relatively higher markups compared to their less liquidity-constrained counterparts (e.g., Chevalier and Scharfstein 1996; Gilchrist et al. 2017; Dou and Ji 2021). As a result, unexposed firms can intensify competition and capture more market share at the expense of weakened rivals. Lastly, compared to natural disasters, currency shocks occur more often and may not necessarily push firms into financial distress and, thus, are less likely to invoke distressed competition.

5 Conclusion

In this paper, I build a comprehensive dataset with firm-specific foreign currency exposure by using novel data on foreign sales, foreign debt, and competition relationships. I exploit the cross-sectional variation in indirect currency exposure of unexposed firms and compare their differential operating performances during local currency depreciation. I document novel *risk mitigation effects* that unexposed firms with high exposure to weakened foreign debt borrowers perform better than those with low exposure after local currency depreciation.

The operating profitability decomposition shows that unexposed firms with high indirect foreign debt exposure experience a rise in gross profit margin and a decline in overhead costs. To investigate the possible mechanisms, I exploit the heterogeneity across firms or industries with different characteristics. The risk mitigation effect is concentrated in financially vulnerable rivals and in industries with higher market concentration, lower entry barriers, and higher inventories. This implies that unexposed firms gain a relatively competitive advantage in markets with greater potential share to grab, when rivals have less financial flexibility or high demand for rapid accumulation of adequate liquid funds, and where deterring competition is costly.

One aggregate implication of these findings is that counterforces from strategic competition can mitigate the propagation and amplification of adverse exchange rate shocks, thereby providing a new dimension of currency debt composition and product market competition to address the puzzle of exchange rate disconnect. With respect to future research, a full-fledged structure model of trade, currency composition of debt, and monopolistic competition in the product market for firms in a small open economy with exchange rate risk is needed to provide a unified framework and rationalize the magnitudes I observe in this paper.

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Figure 1: Unexposed Firms' Indirect Foreign Currency Exposure

This figure depicts a scenario with two unexposed firms: Firm A and Firm B. I define "unexposed" firms as those with no foreign debt, no foreign sales, and no foreign assets using micro-level data from FactSet. In the local product market, Firm A does not have foreign exposed rivals (among its competition network), while Firm B competes with four foreign exposed rivals (e.g., borrowing in foreign currency). As a result, Firm B has a higher *indirect* foreign currency exposure from local rivals than Firm A. My empirical analysis compares the operating performance of unexposed firms with varying indirect foreign currency exposure after local currency depreciation.

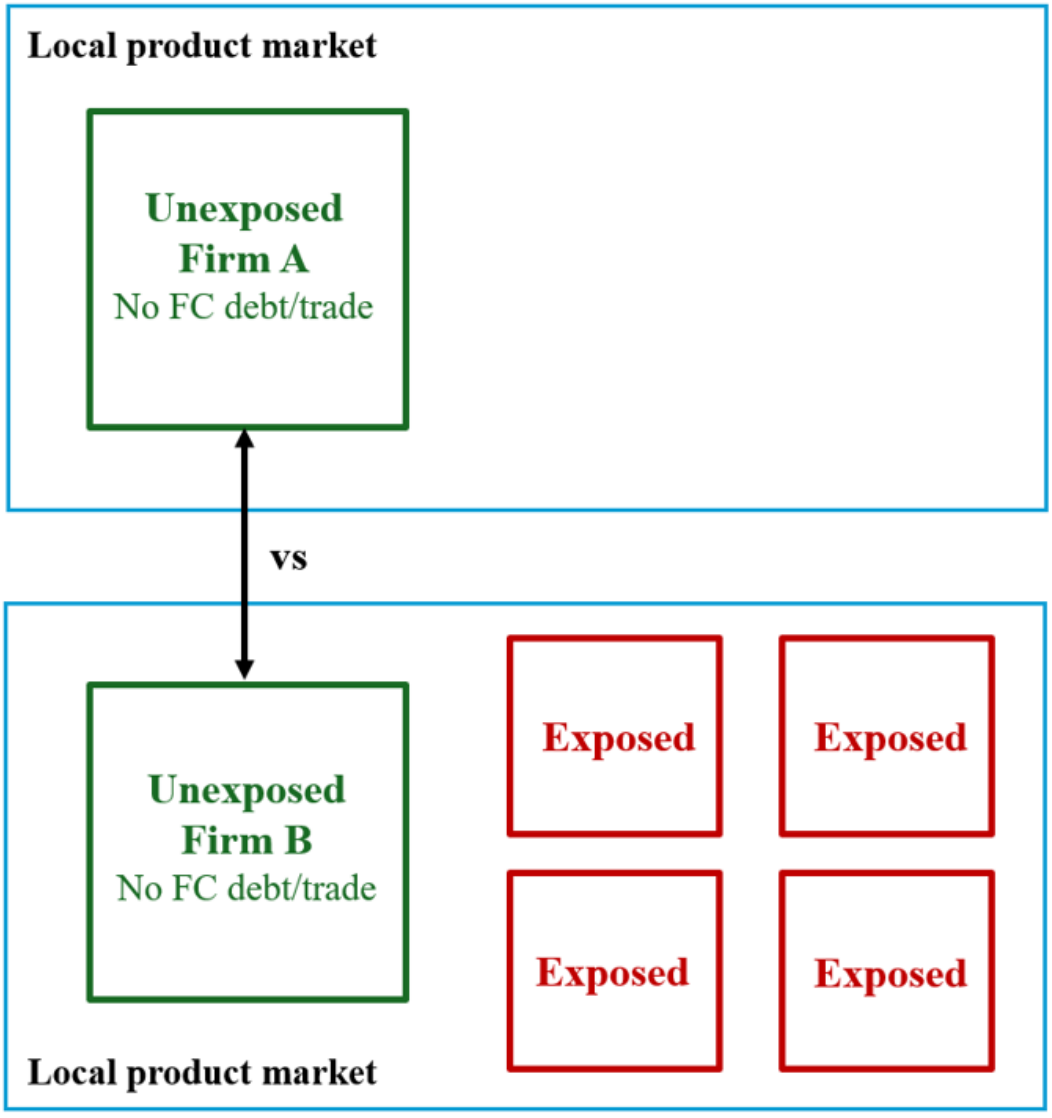


Table 1: Descriptive Statistics for Firm-Specific Variables

This table reports descriptive statistics for a set of firm-specific variables used in the paper. The unit of analysis is an "unexposed" firm with no foreign debt, no foreign assets, and no foreign sales. ΔEX is the log change in the nominal exchange rate, for which $\Delta EX>0$ represents a depreciation of the local currency against the U.S. dollar. *Assets* is total assets in millions of U.S. dollars. *Sales* is firm sales in millions of U.S. dollars. $Ind.FD.Exposure^{Sales\text{-}weighted}$ ($Ind.FD.Exposure^{Assets\text{-}weighted}$) is the indirect foreign debt exposure, defined as a weighted average of its rivals' foreign debt, using rivals' sales (assets) as weights. $Ind.FD.Exposure^{Equal\text{-}weighted}$ is the equal-weighted average of rivals' foreign debt. $Ind.FS.Exposure^{Sales\text{-}weighted}$ ($Ind.FS.Exposure^{Assets\text{-}weighted}$) is the indirect foreign sales exposure, defined as a weighted average of its rivals' foreign sales, using rivals' sales (assets) as weights. $Ind.FS.Exposure^{Equal\text{-}weighted}$ is the equal-weighted average of rivals' foreign sales. *OP* is operating profitability, defined as sales minus the cost of goods sold, minus sales, general, and administrative expenses (excluding research and development expenditures), scaled by total assets, following Ball, Gerakos, Linnainmaa, and Nikolaev (2016). *Leverage* is the ratio of total debt divided by total assets. *PPE* is tangibility, defined as property, plant, and equipment, scaled by total assets. *Cash* is the ratio of cash and short-term investments to total assets. The sample covers 4,987 firms across 46 economies from 2006 to 2022.

Variables	Mean	SD	P5	P25	P50	P75	P95	*N*
ΔEX (%)	-0.22	6.84	-10.27	-4.32	0.48	2.97	7.93	28,523
Assets ($, mil)	5,481	14,955	22	245	991	3,605	25,129	28,523
Sales ($, mil)	1,628	4,097	5	66	294	1,142	7,999	28,523
$Ind.FD.Exposure^{Sales\text{-}weighted}$ (%)	1.32	3.43	0.00	0.00	0.00	0.69	7.75	28,523
$Ind.FD.Exposure^{Assets\text{-}weighted}$ (%)	1.34	3.45	0.00	0.00	0.00	0.69	7.94	28,523
$Ind.FD.Exposure^{Equal\text{-}weighted}$ (%)	1.00	2.98	0.00	0.00	0.00	0.45	5.83	28,523
$Ind.FS.Exposure^{Sales\text{-}weighted}$ (%)	13.56	18.75	0.00	0.00	4.52	21.66	52.44	28,523
$Ind.FS.Exposure^{Asset\text{-}weighted}$ (%)	13.61	18.86	0.00	0.00	4.33	21.59	52.97	28,523
$Ind.FS.Exposure^{Equal\text{-}weighted}$ (%)	10.18	15.75	0.00	0.00	2.86	14.76	43.20	28,523
OP (%)	5.68	17.97	-17.83	2.98	5.47	9.90	29.13	28,523
Leverage (%)	24.69	24.35	0.00	4.72	17.67	38.56	71.27	28,523
PPE (%)	22.72	27.82	0.00	1.38	7.15	39.90	81.69	28,523
Cash (%)	13.83	22.41	0.00	0.02	3.48	16.23	72.96	28,523

Table 2: Correlations between Firm-Specific Variables

This table shows Pearson (upper triangle) and Spearman (lower triangle) correlations between firm-specific variables. The unit of analysis is an unexposed firm with no foreign debt, no foreign assets, and no foreign sales. *Ind.FD.Exposure* represents indirect foreign debt exposure, defined as a weighted average of its rivals' foreign debt, using rivals' sales as weights. *Ind.FS.Exposure* represents indirect foreign sales exposure, defined as a weighted average of its rivals' foreign sales, using rivals' sales as weights. *Assets* is total assets in millions of U.S. dollars. *Sales* is firm sales in millions of U.S. dollars. *OP* is operating profitability, defined as sales minus the cost of goods sold, minus sales, general, and administrative expenses (excluding research and development expenditures), scaled by total assets, following Ball, Gerakos, Linnainmaa, and Nikolaev (2016). *Leverage* is the ratio of total debt divided by total assets. *PPE* is tangibility, defined as property, plant, and equipment, scaled by total assets. *Cash* is the ratio of cash and short-term investments to total assets. The sample covers 4,987 firms across 46 economies from 2006 to 2022.

	Ind.FD.Exposure	*Ind.FS.Exposure*	*Assets*	*Sales*	*OP*	*Leverage*	*PPE*	*Cash*
Ind.FD.Exposure		0.31	-0.07	-0.03	-0.05	0.01	0.06	0.09
Ind.FS.Exposure	0.46		-0.08	-0.06	-0.13	-0.03	0.01	0.33
Assets	-0.04	-0.23		0.61	0.05	0.04	-0.03	-0.17
Sales	0.01	-0.06	0.74		0.14	0.10	0.15	-0.14
OP	-0.06	-0.06	0.16	0.34		-0.08	0.07	-0.18
Leverage	0.01	-0.07	0.25	0.27	-0.14		0.24	-0.19
PPE	0.04	0.12	-0.12	0.25	0.02	0.18		-0.16
Cash	0.16	0.31	-0.49	-0.13	-0.07	-0.08	0.25	

Table 3: FX Risk and Operating Profitability: Baseline Results

This table shows panel regression results of Equation 3. The dependent variable is operating profitability (OP), defined as sales minus the cost of goods sold, minus sales, general, and administrative expenses (excluding research and development expenditures), scaled by total assets. The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, its indirect foreign debt (foreign revenue) exposure is constructed as a weighted average of competitors' foreign debt (foreign revenue). I use either competitors' sales and assets as weights or equal-weighting. ΔEX is the annual log change in the nominal exchange rate, for which $\Delta EX>0$ represents a local currency depreciation against the U.S. dollar. *Dep_Dum* is a depreciation dummy variable that equals one if the nominal exchange rate increases by over 20% compared to the value of the exchange rate one year earlier, and zero otherwise. Control variables include size, leverage, tangibility (PPE), profitability (OP), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	DEPR = ΔEX			DEPR = *Dep_Dum*		
	Ind. Exposure Weighted by			Ind. Exposure Weighted by		
	Sale	Asset	Equal	Sale	Asset	Equal
	(1)	(2)	(3)	(4)	(5)	(6)
Ind.FD.Exposure × *DEPR*	0.184***	0.177***	0.198***	1.877***	1.939***	1.670***
	(3.00)	(2.87)	(3.44)	(3.53)	(3.47)	(3.18)
Ind.FS.Exposure × *DEPR*	0.051	0.056	0.074	0.470	0.544	0.615
	(0.61)	(0.67)	(0.85)	(0.73)	(0.87)	(0.98)
Ind.FD.Exposure	-0.224	-0.162	-0.155	-0.244	-0.184	-0.162
	(-1.15)	(-0.83)	(-0.81)	(-1.25)	(-0.95)	(-0.86)
Ind.FS.Exposure	-0.104	-0.093	-0.319	-0.108	-0.096	-0.322
	(-0.51)	(-0.47)	(-1.31)	(-0.53)	(-0.48)	(-1.32)
Size	-1.088	-1.091	-1.096	-1.084	-1.087	-1.097
	(-1.42)	(-1.43)	(-1.43)	(-1.42)	(-1.42)	(-1.43)
Leverage	0.332	0.332	0.332	0.330	0.330	0.329
	(0.89)	(0.89)	(0.90)	(0.89)	(0.89)	(0.89)
PPE	0.116	0.119	0.110	0.106	0.107	0.098
	(0.36)	(0.37)	(0.34)	(0.33)	(0.33)	(0.30)
OP	2.113***	2.115***	2.116***	2.115***	2.117***	2.117***
	(4.68)	(4.68)	(4.68)	(4.68)	(4.68)	(4.68)
Cash	-0.494	-0.494	-0.490	-0.495	-0.495	-0.491
	(-1.18)	(-1.18)	(-1.16)	(-1.18)	(-1.18)	(-1.17)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,386	28,386	28,386	28,386	28,386	28,386
Adjusted R^2	0.716	0.716	0.716	0.716	0.716	0.716

Table 4: FX Risk and Operating Profitability: Appreciation Episodes

This table shows panel regression results of Equation 3 in appreciation episodes. The dependent variable is operating profitability (OP), defined as sales minus the cost of goods sold, minus sales, general, and administrative expenses (excluding research and development expenditures), scaled by total assets. The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, its indirect foreign debt (foreign revenue) exposure is constructed as a weighted average of competitors' foreign debt (foreign revenue). I use either competitors' sales and assets as weights or equal-weighting. *Appreciation* is a dummy variable that equals one if the annual log change in the nominal exchange rate (i.e., ΔEX) is in the bottom quintile, and zero otherwise. Control variables include size, leverage, tangibility (PPE), profitability (OP), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *Appreciation* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	Ind. Exposure Weighted by		
	Sale	Asset	Equal
	(1)	(2)	(3)
Ind.FD.Exposure × *Appreciation*	-0.441	-0.440	-0.366
	(-1.48)	(-1.51)	(-1.31)
Ind.FS.Exposure × *Appreciation*	0.065	0.092	0.009
	(0.23)	(0.33)	(0.03)
Ind.FD.Exposure	-0.117	-0.059	-0.056
	(-0.59)	(-0.29)	(-0.29)
Ind.FS.Exposure	-0.115	-0.110	-0.318
	(-0.56)	(-0.54)	(-1.31)
Size	-1.084	-1.086	-1.088
	(-1.42)	(-1.42)	(-1.42)
Leverage	0.332	0.332	0.332
	(0.90)	(0.90)	(0.90)
PPE	0.126	0.127	0.120
	(0.39)	(0.40)	(0.37)
OP	2.113***	2.114***	2.114***
	(4.67)	(4.68)	(4.67)
Cash	-0.493	-0.493	-0.489
	(-1.17)	(-1.17)	(-1.16)
Firm FE	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes
Observations	28,386	28,386	28,386
Adjusted R^2	0.716	0.716	0.716

Table 5: FX Risk and Operating Profitability: Country Development

This table shows panel regression results in which the dependent variable is operating profitability (*OP*). The unit of analysis is unexposed firms with no direct foreign currency exposure. I divide unexposed firms into two groups based on a country's development level. "AE" denotes the 20 advanced economies. "EME" denotes the 26 emerging market economies. For each unexposed firm, its indirect foreign debt (foreign revenue) exposure is constructed as a weighted average of competitors' foreign debt (foreign revenue). I use competitors' sales as weights. ΔEX is the annual log change in the nominal exchange rate, for which $\Delta EX>0$ represents a local currency depreciation against the U.S. dollar. *Dep_Dum* is a depreciation dummy variable that equals one if the nominal exchange rate increases by over 20% compared to the value of the exchange rate one year earlier, and zero otherwise. Control variables include size, leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* are absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	DEPR = ΔEX		DEPR = *Dep_Dum*	
	AE	EME	AE	EME
	(1)	(2)	(3)	(4)
Ind.FD.Exposure × *DEPR*	0.127	0.194**	1.563*	1.666***
	(1.10)	(2.58)	(1.71)	(2.71)
Ind.FS.Exposure × *DEPR*	0.029	-0.002	0.145	-0.201
	(0.26)	(-0.02)	(0.09)	(-0.31)
Ind.FD.Exposure	-0.350	0.114	-0.356	0.077
	(-1.33)	(0.44)	(-1.34)	(0.30)
Ind.FS.Exposure	-0.092	-0.020	-0.095	0.042
	(-0.42)	(-0.06)	(-0.44)	(0.12)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes
Observations	25,402	2,833	25,402	2,833
Adjusted R^2	0.718	0.756	0.718	0.757

Table 6: FX Risk and Operating Profitability: Sector Tradability

This table shows panel regression results in which the dependent variable is operating profitability (OP). The unit of analysis is unexposed firms with no direct foreign currency exposure. I divide unexposed firms into non-tradable (e.g., construction, transportation, communication, utilities, services) and tradable (e.g., agriculture, mining, manufacturing) sectors, following Alfaro, Asis, Chari, and Panizza (2019). For each unexposed firm, its indirect foreign debt (foreign revenue) exposure is constructed as a weighted average of competitors' foreign debt (foreign revenue). I use competitors' sales as weights. ΔEX is the annual log change in the nominal exchange rate, for which $\Delta EX>0$ represents a local currency depreciation against the U.S. dollar. *Dep_Dum* is a depreciation dummy variable that equals one if the nominal exchange rate increases by over 20% compared to the value of the exchange rate one year earlier and zero otherwise. Control variables include size, leverage, tangibility (PPE), profitability (OP), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	DEPR = ΔEX		DEPR = *Dep_Dum*	
	Yes	No	Yes	No
	(1)	(2)	(3)	(4)
Ind.FD.Exposure × *DEPR*	0.073	0.108**	3.499	0.884***
	(0.30)	(2.05)	(1.62)	(2.84)
Ind.FS.Exposure × *DEPR*	0.098	0.057	-0.136	0.775*
	(0.37)	(0.73)	(-0.05)	(1.66)
Ind.FD.Exposure	-0.310	-0.203	-0.346	-0.208
	(-0.54)	(-1.27)	(-0.60)	(-1.30)
Ind.FS.Exposure	0.036	-0.200	0.038	-0.208
	(0.07)	(-1.15)	(0.08)	(-1.19)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes
Observations	6,396	21,866	6,396	21,866
Adjusted R^2	0.555	0.800	0.555	0.800

Table 7: Operating Profitability Decomposition

This table shows panel regressions in which the dependent variables are three primary components of operating profitability. *Gross PMGN* is gross profit margin, defined as the difference between sales and cost of goods sold scaled by total assets. *SG&A* is selling, general, and administrative expenses scaled by total assets. *R&D* is research and development expenditures scaled by total assets. The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, its indirect foreign debt (foreign revenue) exposure is constructed as a weighted average of competitors' foreign debt (foreign revenue). I use competitors' sales as weights. *DEPR* is the depreciation dummy *Dep_Dum*. Control variables include size, leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	Gross PMGN	SG&A	R&D
	(1)	(2)	(3)
Ind.FD.Exposure × *DEPR*	1.305**	-0.907**	-0.001
	(2.34)	(-1.97)	(-0.01)
Ind.FS.Exposure × *DEPR*	0.425	0.759	0.177
	(0.71)	(1.29)	(1.48)
Ind.FD.Exposure	-0.113	0.134	-0.009
	(-0.46)	(0.59)	(-0.11)
Ind.FS.Exposure	-0.289	-0.356	-0.109
	(-0.74)	(-1.41)	(-0.84)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes
Observations	28,386	28,386	28,386
Adjusted R^2	0.817	0.853	0.829

Table 8: Financial Vulnerability and Horizontal Risk Mitigation

This table shows panel regression results in which the dependent variable is operating profitability (*OP*). The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, I build two versions of indirect foreign currency exposure. I first sort each unexposed firm's rivals into two buckets based on two financial vulnerability measures (*Leverage* and *EFD*, respectively), from low to high within each country for each year, and then compute indirect foreign debt exposure (*Ind.FD.Exposure*) and indirect foreign sales exposure (*Ind.FS.Exposure*) for each bucket using competitors' sales as weights. *Leverage* is total debt to total assets. *EFD* is external financing dependence, calculated according to Rajan and Zingales (1998) for U.S. public firms and assigned to firms in the sample. *DEPR* is ΔEX. Control variables include size, leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	Leverage		EFD	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Ind.FD.Exposure × *DEPR*	0.143**	0.053	0.141**	0.063
	(2.29)	(0.77)	(2.00)	(1.05)
Ind.FS.Exposure × *DEPR*	0.075	0.079	-0.027	0.046
	(0.72)	(0.83)	(-0.23)	(0.47)
Ind.FD.Exposure	-0.279	-0.049	-0.271*	-0.065
	(-1.49)	(-0.38)	(-1.91)	(-0.57)
Ind.FS.Exposure	-0.244	0.086	0.088	-0.114
	(-1.45)	(0.50)	(0.56)	(-0.65)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes
Observations	28,386	28,386	28386	28,386
Adjusted R^2	0.716	0.715	0.715	0.715

Table 9: Industry Competition and Horizontal Risk Mitigation

This table shows panel regression results in which the dependent variable is operating profitability (*OP*). The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, I build two versions of indirect foreign currency exposure. I first sort each unexposed firm's rivals into two buckets based on two industry competition measures (*HHI* and *Entry Barrier*, respectively), from low to high within each country for each year, and then compute indirect foreign debt exposure (*Ind.FD.Exposure*) and indirect foreign sales exposure (*Ind.FS.Exposure*) for each bucket using competitors' sales as weights. *HHI* is the Herfindahl–Hirschman index, defined as the sum of the squared market shares of firms competing in each Fama–French 48 industry. I measure entry barriers as average fixed assets weighed by sales of an industry, following Li (2010). *DEPR* is ΔEX. Control variables include size, leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	HHI		Entry Barrier	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Ind.FD.Exposure × *DEPR*	0.125**	0.018	0.060	0.146***
	(2.14)	(0.30)	(0.98)	(2.70)
Ind.FS.Exposure × *DEPR*	-0.041	0.148	0.035	0.033
	(-0.50)	(1.53)	(0.34)	(0.35)
Ind.FD.Exposure	-0.065	-0.145	0.021	-0.277
	(-0.39)	(-1.21)	(0.13)	(-1.41)
Ind.FS.Exposure	-0.065	0.041	0.086	0.084
	(-0.39)	(0.26)	(0.45)	(0.49)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes
Observations	28,386	28,386	28,386	28,386
Adjusted R^2	0.716	0.716	0.715	0.716

Table 10: Inventory Level and Horizontal Risk Mitigation

This table shows panel regression results in which the dependent variable is operating profitability (*OP*). The unit of analysis is unexposed firms with no direct foreign currency exposure. For each unexposed firm, I build two versions of indirect foreign currency exposure. I first sort each unexposed firm's rivals into two buckets based on two inventory measures, from low to high within each country for each year, and then compute indirect foreign debt exposure (*Ind.FD.Exposure*) and indirect foreign sales exposure (*Ind.FS.Exposure*) for each bucket using competitors' sales as weights. I measure inventories as the amount of inventory at both firm and industry levels. *DEPR* is ΔEX. Control variables include size, leverage, tangibility (*PPE*), profitability (*OP*), and cash ratio. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. Firm-, sector-year, and country-year fixed effects are included in each specification. *DEPR* is absorbed by country-year fixed effects. Standard errors are clustered at the firm level, and t-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

	Firm Inventory		Industry Inventory	
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Ind.FD.Exposure × *DEPR*	0.210***	-0.048	0.189***	0.020
	(3.18)	(-1.00)	(2.96)	(0.46)
Ind.FS.Exposure × *DEPR*	-0.037	-0.014	-0.070	0.099
	(-0.41)	(-0.16)	(-0.78)	(1.48)
Ind.FD.Exposure	-0.181	0.015	-0.139	-0.031
	(-1.01)	(0.13)	(-0.80)	(-0.26)
Ind.FS.Exposure	-0.012	-0.157	-0.066	-0.072
	(-0.06)	(-1.14)	(-0.34)	(-0.54)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Country × *Year FE*	Yes	Yes	Yes	Yes
Industry × *Year FE*	Yes	Yes	Yes	Yes
Observations	28,386	28,386	28,386	28,386
Adjusted R^2	0.716	0.715	0.716	0.715

Internet Appendix for

"Their Pain Is Your Gain: Market Competition and Foreign Currency Exposure"

Yancheng Qiu

This appendix contains the following sections:

1. Section A provides further details on the cleaning and processing procedures for the FactSet datasets used in the paper.
2. Section B provides further details on the identification and characteristics of unexposed firms and their associated horizontal rivals. I also provide additional data summary statistics and empirical results.

A FactSet Databases

This section describes various FactSet databases and the data cleaning and processing procedures I employ in this paper. My goal is to form annual panel data with firm-level fundamental information, including foreign sales and foreign debt exposures, as well as construct a competitor relationship network over time. I use a unique FactSet-generated identifier, FACTSET_ENTITY_ID, to link all databases.

A.1 Sales Data

The FactSet Geographic Revenue Exposure (GeoRev) dataset is constructed by a combination of primary sources and algorithms. In particular, FactSet maps each firm's revenue to geographic regions using the firm's direct disclosures in regulatory filings and annual reports. In addition to sourcing from geographic segments' tables, Factset analysts incorporate information from footnotes, ancillary tables, and in-text disclosures to capture the most granular and precise geographic revenue information whenever available. FactSet also relies on a proprietary algorithm to estimate the revenue shares of regions that are not explicitly disclosed.

Specifically, I use two data files of the GeoRev dataset: "gr_report" (i.e., a table that contains basic information on the periods for which a company reported geographic revenue data) and "gr_item" (i.e., a table that contains individual line items of revenue exposures at the country level for all records). I use REPORT_ID in the "gr_report" table to join the "gr_item" table to return country-level revenue exposures.

Next, I use two FactSet metadata files, "ent_entity_structure" and "sym_entity," to find the ultimate parent firms and their domicile countries. I delete observations with the lowest certainty in the estimate (i.e., Certainty Class equals "E") or those with missing domicile countries. I also exclude unspecified countries with the following ISO country codes: "XP," "XR," "XS," "XT," "XW," "XY," and "XZ." For duplicates for a firm-period date pair, I keep the one with the latest REPORT_ID and highest certainty rank when available.

I sum up all the estimated percentages of revenue (i.e., EST_PCT) outside the domicile country as the foreign sales exposure. I treat the missing values as zero and delete observations if the aggregated foreign sales exposure is larger than 100%.

A.2 Debt Structure Data

The FactSet Debt Capital Structure (DCS) dataset begins in 2006 and contains debt structure information of nearly 40,000 reporting entities collected from financial statements, credit agreements, and indentures worldwide. It provides a breakdown of all debt instruments that reconcile to debt values appearing in each firm's balance sheet, including all short-term debt, revolving credit

facilities, term loans, and bonds, to the detail available in firm filings and credit agreements. For example, short-term debt represents a company's total debt maturing within 12 months of the reporting period, and term loans represent long-term and short-term loans combined.

I use the "dcs_details" data file, which contains details on individual debt instruments included in the DCS dataset (e.g., debt type, coupon, principal outstanding, issuance currency, maturity). To capture firms' offshore debt issuance activities, I back out each reporting entity's ultimate parent firm and its domicile countries and local currencies by using the same FactSet mapping files as before (e.g., "ent_entity_structure" and "sym_entity").

I identify a foreign currency debt as long as the issuance currency of the debt instrument is different from the home currency of its ultimate parent firm. I further sum up individual debt instruments to broad debt types according to FactSet's debt code and category, for instance, maturity (i.e., short-term debt and long-term debt), debt type (i.e., revolving credit, term loans, and bonds), and currency (i.e., USD-denominated and EUR-denominated).

I exclude "Adjustment"(debt code "BD_AM") and "Capital Leases" (debt code "BD_CL") in the computation of total foreign debt and other broad debt types. Based on the information provided in email correspondence with the FactSet data team, certain adjustments are needed when a company provides outstanding amounts on a summary level, and no breakdown is available. It could be a fair value adjustment, an amortization discount/premium, or a unit amount adjustment. FactSet adds a principal adjustment to reconcile the summary value available in the balance sheet. Besides, FactSet does not always include capital leases as part of the debt, which depends on the company's reporting policies.

A.3 Fundamentals Data

FactSet Fundamentals is a comprehensive global database that contains financial statements and other accounting and financial metrics to analyze firms. In April 2008, FactSet purchased a copy of the Thomson Worldscope Database, which contains historical information for over 43,000 companies dating back to 1980. Thomson continued partial updates to this database until May 2010, when FactSet became the sole contributor. Companies are regularly added to the FactSet Fundamentals universe based on their market capitalization, index constituents, broker coverage, size, and the importance of the market itself. Therefore, the data coverage and quality are at least as good as widely used financial statement databases like Worldscope and Compustat.

The primary firm/security identifier in the Fundamentals dataset is FSYM_ID. I use the following four metadata files provided by FactSet to map FSYM_ID to a unique FactSet-generated identifier assigned to an entity (i.e., FACTSET_ENTITY_ID):

1. Data file "ff_sec_entity_hist"
2. Data file "ff_sec_coverage"

3. Data file "sym_entity"

4. Data file "sym_coverage"

Next, I use FACTSET_ENTITY_ID to merge different FactSet datasets (i.e., GeoRev, DCS, Fundamentals, and Relationships below). To obtain a higher matching ratio with the FactSet DCS dataset and calculate foreign debt ratio, I include all types of reporting frequencies (i.e., annual, semiannual, and quarterly) and regions (i.e., North America and International) of the FactSet Fundamentals dataset. However, I use the annual Fundamentals data and the annual value of foreign debt for the outcome and control variables in the main tests. I corrected some reporting date inconsistencies between DCS and Fundamentals by reassigning the report date to the last month-end date if it is before the fifth calendar date of each month.

To account for meaningful economic activities, I keep only countries with at least ten firms in the sample period and exclude tax havens. Hence, the resultant home countries of ultimate parent firms come from 64 economies (27 AE and 37 EME). Similar to Chaieb, Langlois, and Scaillet (2021), I combine the 27 advanced economies into three regions: (i) North America (Canada and the US), (ii) Developed Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Israel, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom), and (iii) Asia Pacific (Australia, Hong Kong, Japan, New Zealand, Singapore, South Korea, and Taiwan). Moreover, I group the 37 emerging market economies into four regions: (i) Emerging Asia (Bangladesh, China, India, Indonesia, Kazakhstan, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam), (ii) Emerging Europe (Bulgaria, Croatia, Cyprus, Czech Republic, Hungary, Poland, Romania, Russian, and Ukraine), (iii) Latin America (Argentina, Brazil, Chile, Colombia, Mexico, and Peru), (iv) Middle East and Africa (Egypt, Jordan, Kenya, Kuwait, Nigeria, Oman, Qatar, Saudi Arabia, South Africa, Turkey, and United Arab Emirates).

Furthermore, I convert the outstanding debt values from DCS and accounting items from Fundamentals into U.S. dollars to facilitate comparison and ratio computation. To mitigate data error issues, I delete observations if any foreign debt ratio, domestic debt ratio, and total leverage ratio are outside the unit interval. After imposing the filters I describe here, the resultant merged FUNDA-DCS-GeoRev dataset contains 75,652 unique firms across 64 economies from (fiscal) year 2005 to 2022.

A.4 Competition Network Data

The FactSet Supply Chain Relationships database provides arguably the most comprehensive coverage of business relationship interconnections (e.g., suppliers, customers, competitors, strategic partners) among companies globally (e.g., Gofman et al. 2020; Katona et al. 2024). FactSet's analysts monitor relationship data regularly and continually update the database. They collect information from firms' annual reports and a range of other sources, including press releases and

announcements, investor presentations, and firms' websites. FactSet uses a proprietary research methodology to collect and classify relationship types (i.e., 4 main categories and 13 types). For instance, keywords are captured when available to provide meaningful context to the nature of the relationship between companies.

For my analysis, I focus on competitor relationship data (i.e., require REL_TYPE = "COMPETITOR" for the data file "ent_scr_relationships"). It includes competition relationships disclosed by either the firm itself or its rivals (or by both), with the start and end dates for each pair. My sample period is from April 2003, when the database started, to April 2023, when my data license ends. To allow sufficient time for analysts to fully update the competition relationships, I use only relationships that were present up to December 2022.

I clean the data by removing duplicate records and redundant relationships whose start and end dates fall within the time period of a longer relationship between the same pair of firms. I also combine multiple relationships between the same pair of firms over different time periods into one continuous relationship. After identifying competing firms' ultimate parent firms and domicile countries, I only keep competitor pairs in the local product market with the same domicile countries. Finally, I obtained 148,295 competitor pairs covering 53,316 firms across 63 economies over this period. These comprehensive competitor-pairs data allow me to measure firms' individual competition networks in the local product market over time.

A.5 Other Mapping Files

The FactSet Data Management Solutions (DMS) database provides additional mapping files across FactSet's security and entity level identifiers, as well as the link tables between FactSet's permanent identifiers and standard market identifiers, including current and historical CUSIPs, ISINs, SEDOLs, and tickers.

I match firms in FactSet to Compustat based on CUSIP, ISIN, and SEDOL, whenever available, using the following mapping files from the DMS database:

1. Data file "sym_coverage"
2. Data file "sym_cusip"
3. Data file "sym_isin"
4. Data file "sym_sedol"

B Sample Construction

This section outlines detailed steps for identifying unexposed firms and constructing indirect foreign currency exposure. I provide an illustrative example and additional summary statistics on

unexposed firms' competitors.

B.1 Data Processing

I start with the merged FUNDA-DCS-GeoRev dataset and identify 13,840 unexposed firms that ever had zero foreign debt (from the DCS dataset), zero foreign sales (from the GeoRev dataset), and zero foreign assets (from the FUNDA dataset) in at least one fiscal year from 2006 to 2022.

To have a glimpse of the distribution of different types of firms, Figure A1 plots the shares of unexposed firms, foreign debt borrowers, and exporters over time in the data. Roughly half of the firms have no reported foreign borrowing or foreign revenues, and the ratio has been stable in recent decades (Panel A). Although around 10% of firms borrow in foreign currency with a natural hedge from exporting revenues (Panel D), around 3% - 4% of firms tend to borrow foreign debt without foreign revenue, exposing them to currency risk.

Next, I link the firm-year panel of unexposed firms to the competition network data from the FactSet Supply Chain Relationships database. I require the ultimate parent firms of connected competitors to be in the same country as the unexposed firms. Moreover, the connected competitors must be in the merged FUNDA-DCS-GeoRev dataset to have non-missing observations on foreign debt, foreign sales, and other firm-level covariates. To avoid look-ahead bias, I use competitors' accounting and financial information from the last period if their fiscal period end is later than that of unexposed firms.

After imposing the filters that I describe here, I obtain 195,526 firm-year observations with each unexposed firm associated with local competitors. This sample includes 4,987 unexposed firms from 46 economies competing with 8,820 distinct horizontal rivals in the local product market through 49,584 competitor pairs from 2006 to 2022. I use this panel to further aggregate competitors' foreign exposure and thus compute unexposed firms' indirect foreign currency exposure across different weighting schemes as specified in Section 2.3.

B.2 An Illustrative Example

Table A3 uses a case of Footstar, Inc. to illustrate an example of competitor pairs in the local product market as well as the construction of indirect foreign currency exposure for unexposed firms. Footstar was a shoe retailer and had no reported foreign assets, foreign debt, or foreign sales in 2008. In the meantime, Footstar had eight rivals (with available accounting and financial information from the merged FactSet FUNDA-DCS-GeoRev dataset) in the product market based on the FactSet Relationships database: Kohl's, Shoe Carnival, Walmart, Caleres, Target, Sears Holdings, Designer Brands, and Payless Holdings.

To avoid the look-ahead bias, I obtain competitors' assets, sales, foreign debt (i.e., FD), and foreign sales (i.e., FS) using accounting information and financial ratios for the fiscal year of 2007.

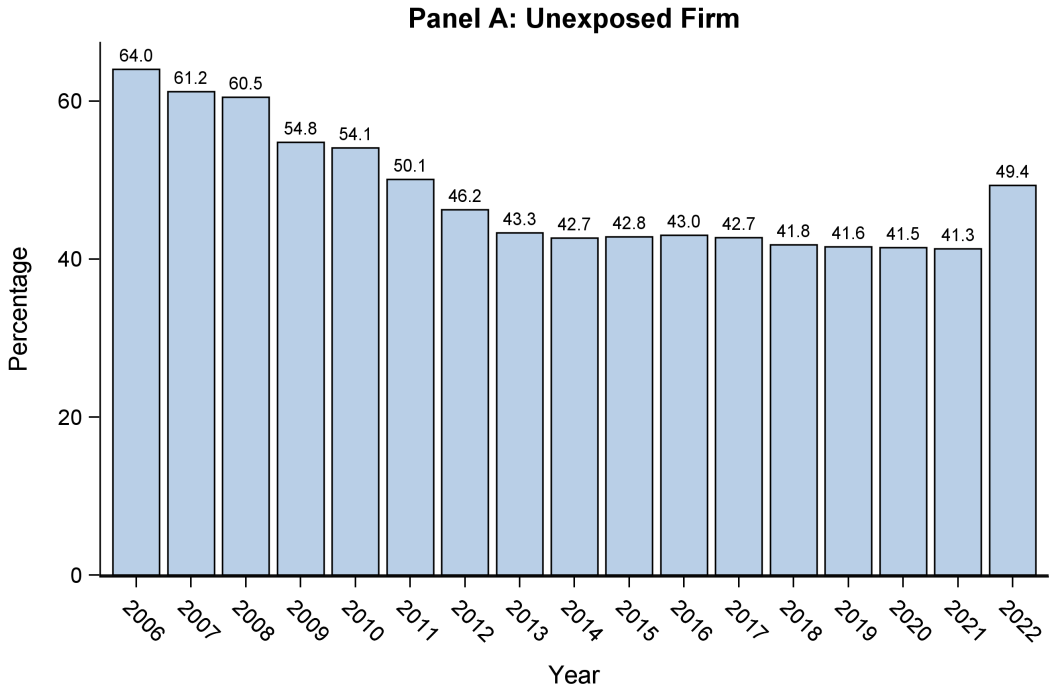
Panel B presents Footstar's sales-weighted, assets-weighted, and equal-weighted indirect foreign debt exposure and indirect foreign sales exposure, respectively, using the numbers from Panel A.

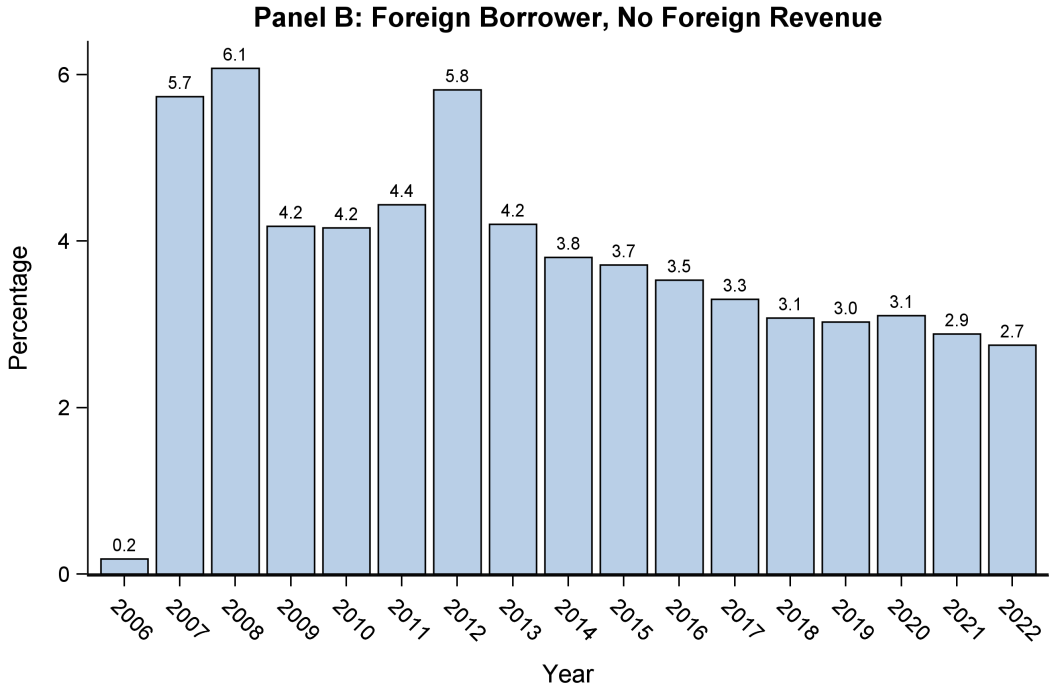
B.3 Summary Statistics on Competitors

Table A4 reports the descriptive statistics of unexposed firms' linked competitors. An average competitor has total assets of $20,254 million and sales of $5,325 million, more than three times the average size of unexposed firms. As shown in Footstar's case, not all rivals are exporters or foreign debt borrowers. The mean of associated competitors' foreign debt ratio and foreign sales ratio is 1.05% and 11.69%, respectively, with a large fraction of firms exhibiting zero foreign currency exposure. A typical rival has a leverage ratio of 26.32%, an operating profitability of 7.12%, a tangibility ratio of 22.87%, and a cash flow ratio of 14.30%, which are all comparable to those of unexposed firms.

Figure A1: Share of Unexposed Firms, Foreign Debt Borrowers, and Exporters

The figure plots the share of unexposed firms, foreign debt borrowers, and exporters in the merged FactSet FUNDA-DCS-GeoRev dataset from 2006 to 2022. The detailed procedure to clean and merge the FactSet databases can be found in Section A of the Internet Appendix. I consider three groups of foreign exposed firms: (1) foreign debt borrowers with no foreign sales (i.e., Panel B); (2) exporters with no foreign debt (i.e., Panel C); and (3) foreign debt borrowers and exporters at the same time (i.e., Panel D).






Panel C: Exporter, No Foreign Debt
Percentage
Year
0
10
20
30
40
11.4
9.6
9.0
18.6
19.2
23.9
26.8
35.0
36.7
36.9
37.0
37.9
39.4
39.7
39.6
40.5
36.3
2006
2007
2008
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2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

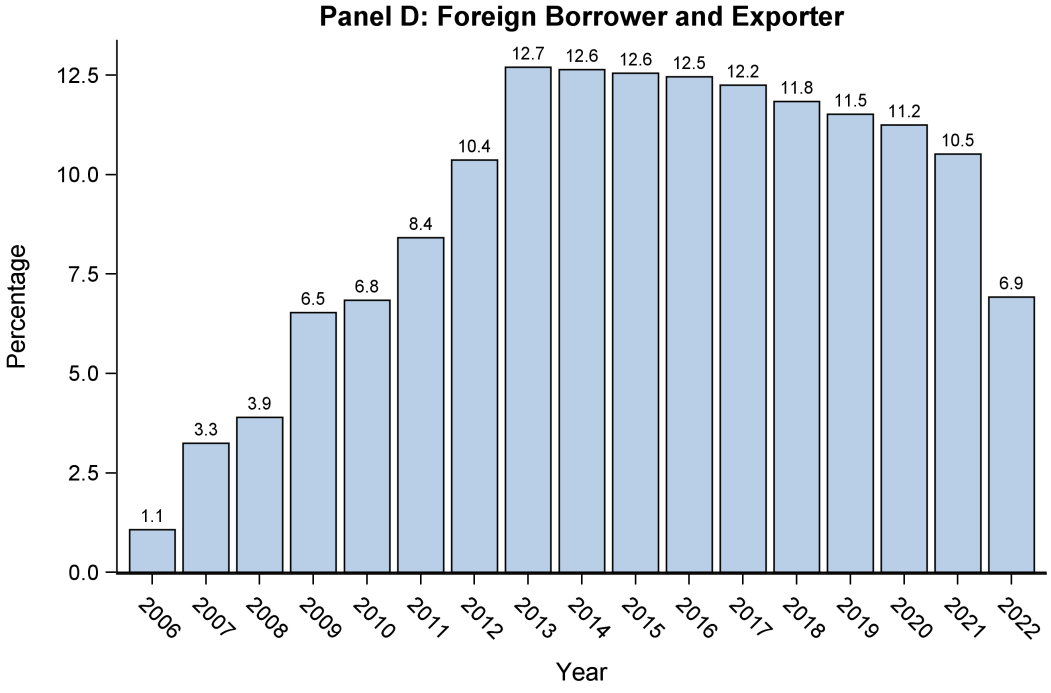
Panel D: Foreign Borrower and Exporter
Percentage
Year
0.0
2.5
5.0
7.5
10.0
12.5
1.1
3.3
3.9
6.5
6.8
8.4
10.4
12.7
12.6
12.6
12.5
12.2
11.8
11.5
11.2
10.5
6.9
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022

Table A1: Country List

This table reports the list of 46 economies, their advanced economy (AE) indicators according to the IMF (20 advanced economies and 26 emerging economies), and their geographic area, following Chaieb, Langlois, and Scaillet (2021), and by three-digit ISO country codes.

Obs	Country Names	AE Indicator	Geo Area	ISO Code
1	Australia	1	Asia Pacific	AUS
2	Hong Kong	1	Asia Pacific	HKG
3	Japan	1	Asia Pacific	JPN
4	New Zealand	1	Asia Pacific	NZL
5	Singapore	1	Asia Pacific	SGP
6	South Korea	1	Asia Pacific	KOR
7	Taiwan	1	Asia Pacific	TWN
8	Finland	1	Developed Europe	FIN
9	France	1	Developed Europe	FRA
10	Germany	1	Developed Europe	DEU
11	Israel	1	Developed Europe	ISR
12	Italy	1	Developed Europe	ITA
13	Netherlands	1	Developed Europe	NLD
14	Norway	1	Developed Europe	NOR
15	Spain	1	Developed Europe	ESP
16	Sweden	1	Developed Europe	SWE
17	Switzerland	1	Developed Europe	CHE
18	United Kingdom	1	Developed Europe	GBR
19	Canada	1	North America	CAN
20	United States	1	North America	USA
21	China	0	Emerging Asia	CHN
22	India	0	Emerging Asia	IND
23	Indonesia	0	Emerging Asia	IDN
24	Kazakhstan	0	Emerging Asia	KAZ
25	Malaysia	0	Emerging Asia	MYS
26	Pakistan	0	Emerging Asia	PAK
27	Philippines	0	Emerging Asia	PHL
28	Thailand	0	Emerging Asia	THA
29	Vietnam	0	Emerging Asia	VNM
30	Poland	0	Emerging Europe	POL
31	Romania	0	Emerging Europe	ROU
32	Russia	0	Emerging Europe	RUS
33	Ukraine	0	Emerging Europe	UKR
34	Argentina	0	Latin America	ARG
35	Brazil	0	Latin America	BRA
36	Chile	0	Latin America	CHL
37	Colombia	0	Latin America	COL
38	Mexico	0	Latin America	MEX
39	Peru	0	Latin America	PER
40	Egypt	0	Mid. E and Africa	EGY
41	Kenya	0	Mid. E and Africa	KEN
42	Nigeria	0	Mid. E and Africa	NGA
43	Oman	0	Mid. E and Africa	OMN
44	South Africa	0	Mid. E and Africa	ZAF
45	Turkey	0	Mid. E and Africa	TUR
46	UAE	0	Mid. E and Africa	ARE

Table A2: Placebo Test: Stock Price Responses to Currency Depreciation

This table shows panel regressions in which the dependent variable is local currency stock returns (*Ret*). ΔEX is the log change in the nominal exchange rate, and $\mathbb{1}[\Delta EX>0]$ is a dummy variable that takes the value of one if the local exchange rate is depreciated against the U.S. dollar, and zero otherwise. *Beta* is the firm-level market beta, estimated using a 36-month rolling window. *Size* is the log of book assets. *BE/ME* is book-to-market ratio. *ROA* is return on assets. *CAPX* is capital expenditure divided by total assets. All continuous independent variables are lagged one period, winsorized at 1% and 99%, and standardized to have zero means and unit standard deviations. I restrict my analysis to unexposed firms with no direct foreign currency exposure. Using data from Ilzetzki, Reinhart, and Rogoff (2019), I also drop observations at the country-month level for countries whose currencies are pegged. In Columns (2)-(3) and (5)-(6), I further classify firms into non-tradable (e.g., construction, transportation, communication, utilities, services) and tradable (e.g., agriculture, mining, manufacturing) sectors, following Alfaro, Asis, Chari, and Panizza (2019). Firm-, country-, month-, and sector-month fixed effects are included in each regression. Standard errors are double clustered at country and month levels, and *t*-statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The sample period is from 2006 to 2022.

LHV = Ret	(1) All	(2) Non-tradable	(3) Tradable	(4) All	(5) Non-tradable	(6) Tradable
ΔEX	0.061	0.005	0.301			
	(0.52)	(0.05)	(1.43)			
$\mathbb{1}[\Delta EX>0]$				0.027	-0.014	0.215
				(0.12)	(-0.07)	(0.51)
Beta	0.313***	0.412***	0.105	0.313***	0.412***	0.106
	(2.84)	(3.42)	(0.80)	(2.84)	(3.42)	(0.81)
Size	-2.396***	-2.210***	-3.038***	-2.392***	-2.209***	-3.029***
	(-8.06)	(-6.83)	(-6.44)	(-8.06)	(-6.84)	(-6.44)
BE/ME	1.205***	1.107***	1.444***	1.205***	1.107***	1.445***
	(10.64)	(8.38)	(9.38)	(10.63)	(8.37)	(9.38)
ROA	-0.443***	-0.632***	-0.306***	-0.444***	-0.632***	-0.307***
	(-5.59)	(-5.67)	(-3.21)	(-5.60)	(-5.68)	(-3.22)
CAPX	-0.103*	-0.090	-0.091	-0.103*	-0.090	-0.091
	(-1.76)	(-1.47)	(-0.93)	(-1.76)	(-1.47)	(-0.94)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Ctry FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	327,393	255,742	71,573	327,393	255,742	71,573
Adjusted R^2	0.211	0.204	0.198	0.211	0.204	0.198

Table A3: Example of Indirect Foreign Currency Exposure Computation

This table uses Footstar, Inc.'s (FactSet ID = "0016G1-E") case to show how indirect foreign currency exposure is computed. Footstar was a shoe retailer and had no foreign debt, foreign assets, or foreign sales reported in 2008, according to the merged FactSet FUNDA-DCS-GeoRev dataset. Footstar had eight rivals (with available accounting and financial information in fiscal year 2007) in the local product market based on the competition network data from FactSet. Panel A shows company names, FacSet ID, sales, assets, foreign debt ratio (i.e., FD), and foreign sales (i.e., FS) of Footstar's horizontal rivals. Among its set of rivals, Walmart borrowed 3.42% of total assets in foreign currency, and 24.2% of its revenues came from abroad; Sears had a foreign debt ratio of 1.14%. Panel B exhibits Footstar's sales-weighted, assets-weighted, and equal-weighted indirect foreign debt and foreign sales exposure using the information provided in Panel A.

Pane A: Footstar's Competitors

Company Name	FactSet ID	Fiscal Year	Sales (mil)	Assets (mil)	FD (%)	FS (%)
Kohl's	000NX1-E	2007	16,474	10,560	0.00	0.00
Shoe Carnival	000WFD-E	2007	659	296	0.00	0.00
Walmart	000YMS-E	2007	183,650	166,238	3.42	24.20
Caleres	002JWW-E	2007	2,360	1,100	0.00	0.00
Target	002RXT-E	2007	63,367	44,560	0.00	0.00
Sears Holdings	006N1R-E	2007	50,703	27,397	1.14	0.00
Designer Brands	00707W-E	2007	1,406	694	0.00	0.00
Payless Holdings	06WDS9-E	2007	3,035	2,415	0.00	0.00

Panel B: Footstar's Indirect Foreign Exposure

	Sales-WTD (%)		Assets-WTD (%)		Equal-WTD (%)	
Indirect Exposure	FD	FS	FD	FS	FD	FS
0016G1-E	2.13	13.82	2.37	15.89	0.57	3.03

Table A4: Summary Statistics for Horizontal Rivals

This table reports descriptive statistics for unexposed firms' horizontal rivals. *Assets* is total assets in millions of U.S. dollars. *Sales* is firm sales in millions of U.S. dollars. *Leverage* is the ratio of total debt divided by total assets. *Foreign Debt* is debt issued in foreign currency scaled by total assets. *Foreign Sales* is the share of sales outside the home country. *OP* is operating profitability, defined as sales minus the cost of goods sold, minus sales, general, and administrative expenses (excluding research and development expenditures), scaled by total assets, following Ball, Gerakos, Linnainmaa, and Nikolaev (2016). *PPE* is tangibility, defined as property, plant, and equipment, scaled by total assets. *Cash* is the ratio of cash and short-term investments to total assets. The sample covers 8,820 linked rivals of unexposed firms across 46 economies from 2006 to 2022.

Variables	Mean	SD	P5	P25	P50	P75	P95	*N*
Assets ($, mil)	20,254	119,171	44	383	1,583	6,758	60,404	52,371
Sales ($, mil)	5,325	16,866	11	123	627	2,930	23,851	52,371
Leverage (%)	26.32	23.01	0.00	6.86	22.03	40.15	70.54	52,371
Foreign Debt (%)	1.05	3.71	0.00	0.00	0.00	0.00	8.39	52,371
Foreign Sales (%)	11.69	21.80	0.00	0.00	0.00	13.80	65.16	52,371
OP (%)	7.12	13.67	-13.42	3.22	5.92	11.24	28.61	52,371
PPE (%)	22.87	26.04	0.06	1.87	11.00	37.89	78.60	52,371
Cash (%)	14.30	20.84	0.00	0.71	5.75	17.72	66.86	52,371