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The Multinational Capital Advantage

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Abstract

This study shows that internal capital markets confer a significant resilience advantage to multinational enterprises (MNEs) during banking crises. First, we document that MNEs experience half the debt contraction of domestic firms during these events. Second, subsidiaries affected by a crisis increase their reliance on intra-group borrowing, offsetting declines in external debt. Third, this ‘multinational capital advantage’ translates into higher post-crisis growth in employment and investment. While this improves the resilience of the host economy to banking crises, the multinational capital advantage may also contribute to the rising market shares of MNEs and increasing firm concentration observed in recent decades.

JEL classification: F21, F23, G15

Keywords: Multinational Enterprises, Internal Capital Markets, Banking Crises

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1 Introduction

Multinational enterprises (MNEs) are capturing increasing market shares. They account for a third of worldwide output and close to a fourth of worldwide employment (OECD, 2018). This development resonates with the steady increase in corporate concentration experienced both by the US (Kwon et al., 2024) and elsewhere (Bighelli et al., 2021). In this paper, we causally identify an important advantage held by multinational firms that can help in understanding these phenomena. We show that intra-group insurance using internal lending cushions multinational affiliates from the detrimental effects of banking crises. The disruptive nature and ubiquity of these events render this advantage important enough to help explain recent MNE success.

Using bank crisis episodes identified in Baron et al. (2021), we compare the debt holdings of similar domestic and multinational firms. We find that MNE subsidiaries retain greater access to debt when external funding conditions tighten. During banking crises, MNEs experience only about 50% of the decline in debt observed for otherwise comparable domestic firms. Specifically, the decline in debt is 4 to nearly 15 percentage points smaller for MNE affiliates over the one to six year period following a crisis. In terms of leverage, the gap reaches 5 percentage points after six years. Second, using detailed within group data from German MNEs, we are able to directly document internal debt flows in response to banking crises. We find that crisis-affected MNE affiliates increase their borrowing from the rest of their group by more than 15% compared to a control group of affiliates in non-affected MNEs. Simultaneously, external debt declines by roughly 6%. Lending from the headquarter increases particularly strongly, while own lending from the affected affiliate to the rest of the group declines. In our third set of results, we show that these differential capital developments are associated with divergent growth paths in subsequent years. MNE subsidiaries outperform their domestic competitors by roughly 20 percentage points in both employment and fixed asset investment by the sixth year after the crisis. This ‘multinational growth advantage’ is hence long lived and can help explain their increasing market shares over time.

Our paper combines a comprehensive global dataset covering millions of firms with a granular administrative dataset on German MNEs that provides detailed information on intra-group financial positions. This integration allows us to document broad patterns in the global sample while conducting a more detailed analysis of underlying mechanisms using administrative data.

We implement two complementary identification strategies based on event-study designs that exploit within-firm variation over time. The first approach analyzes MNE affiliates and domestic firms separately, comparing firms exposed to banking crises with those that are not. This design yields causal estimates of the effect of banking crises on borrowing behavior under a standard parallel trends assumption between affected and unaffected firms. The second approach compares MNE affiliates to observably similar domestic firms that are not part of an international corporate

network, allowing us to quantify the relative advantage of MNEs during and after crises. Rather than assuming random assignment into MNE status, we implement a dynamic triple-difference design with MNE-specific time trends. Identification relies on the assumption that, absent a crisis, differences between MNEs and domestic firms in crisis countries would have evolved similarly to those in non-crisis countries. To address systematic differences between MNEs and domestic firms, we include a rich set of controls and allow for flexible time trends by firm size and age, so that identification is based on within-country, within-industry comparisons among firms of similar size and age. As a result, differential responses to crises across industry, firm size, or firm age do not drive our results.

For the analysis of aggregate borrowing and growth patterns, we use the Orbis dataset, which provides financial and ownership information for firms worldwide. To investigate internal capital markets within MNEs and the mechanisms underlying the differences we document, we use the MiDi dataset. This administrative dataset covers the universe of German foreign affiliates, subject to a modest reporting threshold: a balance sheet of at least EUR 3 million and a minimum ownership share of 10 percent by the German parent company. Complete information on the international subsidiary structure allows us to ensure that neither other affiliates within treated MNEs nor firms in the control group are exposed to crises elsewhere in their network.

Our findings have several implications for governments and policymakers. First, the ability of MNEs to cushion themselves against banking shocks translates into increased resilience to domestic banking crises in the host economies. Since MNEs make up a large and growing part of many economies, their access to internal capital markets significantly dampens the overall effects of these disruptive shocks. This is the mirror image of results in the literature that highlight how MNEs transmit shocks across borders and make host economies vulnerable to foreign downturns. This resilience may have contributed to the notable long-term rise in corporate concentration highlighted by policy makers as a potential concern. Since banking shocks occur surprisingly frequently and affect MNEs and domestic firms very differently, these events have likely facilitated the expansion of MNEs' market shares at the expense of less financially resilient domestic competitors. Policy makers should acknowledge this trade-off when considering policies aimed at attracting foreign investment. Second, the role of internal capital markets in shielding MNE affiliates from the adverse effects of banking crises can inform policies that constrain intra-group financing. Policies such as thin capitalization rules, which limit the tax deductibility of interest on internal debt to curb profit shifting, may unintentionally weaken this stabilizing function by increasing the cost of internal borrowing. Third, our results provide insight into the types of firms and workers most vulnerable to banking crises, thereby informing the design of policy interventions aimed at mitigating the real economy impacts of financial shocks. Emergency liquidity facilities could be targeted at domestic firms who do not have a multinational capital advantage and are therefore more likely to have to

lay off workers during a crisis.

The paper makes several contributions to the literature. First, we document and quantify a substantive advantage enjoyed by MNEs during banking crises - an advantage that plausibly underlies their expanding market shares and the growing concentration of firms. In future work it would be important to quantify the extent to which the advantage has contributed to these developments. Second, our results further our understanding of the use of internal capital markets within MNEs. We document an important function of this market in the face of crises and highlight how recent policies aimed at curbing tax avoidance could hinder this global self-insurance function.

Our paper proceeds as follows. In section 2, we detail our contribution to the large and growing literature on banking crises and multinational enterprises. Section 3 introduces our main data sources: Orbis and MiDi before section 4 introduces the bank crisis data and our identification strategy. We discuss our results on the multinational capital advantage, the internal debt channel, and the multinational growth advantage in section 5. In section 6 we elaborate how policy makers need to weigh our identified crisis stabilization function of MNE subsidiaries against the increasing market centralization that follows their multinational capital advantage.

2 Related literature

This paper contributes to at least four closely related strands of literature. Firstly, we add to the emerging body of literature examining how MNEs are affected by business cycle shocks and transmit them across countries (Cravino and Levchenko, 2017; Di Giovanni et al., 2018; Basco et al., 2024; Bena et al., 2022; Boehm et al., 2019; Biermann and Huber, 2024). These studies demonstrate that ownership linkages are important in the propagation of shocks internationally, particularly in the presence of trade, but also in the absence of trade connections. The study most closely related to ours is Biermann and Huber (2024), who investigate the effects of a credit shock to the parent company's bank in Germany on its international subsidiaries via the internal capital market. Their findings indicate that capital flows tend to be directed towards affected parent firms and away from subsidiaries abroad, resulting in reduced subsidiary sales. We contribute to this literature with a different perspective, focusing on the resilience advantage that the corporate group confers on its members when those are impacted by crises. Specifically, we focus on the insurance motive and examine how MNE groups contribute to stabilizing economies experiencing a crisis, rather than concentrating on the propagation effects imposed by MNEs on directly unaffected economies. We further complement the evidence provided by Biermann and Huber (2024) by showing that crisis-affected MNE affiliates reduce their lending to other group members. Consequently, it is not only parent level shocks but also affiliate level disruptions that propagate across borders.

Secondly, the paper contributes to the sizeable literature on how banking shocks affect firms’ access to credit and, ultimately, their real economic outcomes. Prior studies, such as Chodorow-Reich (2014) and Cingano et al. (2016) demonstrate that borrowers maintaining pre-existing relationships with financially weaker banks prior to the 2008-09 financial crisis experienced greater credit contractions during the crisis. Exploiting this exogenous variation in credit availability, these studies document substantial effects of credit supply shocks on real firm outcomes such as investment and employment, with the strongest impacts observed among younger and smaller firms. Similarly, Khwaja and Mian (2008) show that banks transmit liquidity shocks to borrowers by comparing the borrowing behaviour of the same firm across banks differentially affected by an external liquidity shock in Pakistan. Building on this methodology, subsequent research has used within-firm variation in credit across banks to estimate the effect of bank shocks on firm credit and ultimately on real outcomes - consistently finding significant effects on employment, output and investment (Bentolila et al., 2018; Alfaro et al., 2021; Iyer et al., 2014).¹ This paper identifies a novel dimension of heterogeneity in firms’ exposure to banking shocks – namely, the distinction between firms with and without an international firm network. This heterogeneity does not simply capture differences between large versus small or old versus young firms already highlighted in the literature, as we flexibly control for both size and age. Rather, our findings suggest that the previously observed resilience of larger firms to credit supply shocks could be explained in part by their greater likelihood of belonging to multinational enterprise groups, which can mitigate financial constraints through access to internal capital markets.

Thirdly, we contribute to a literature that examines how different types of firms are affected by and cope with macroeconomic shocks, such as banking crises. Prior research compares the performance of multinational affiliates and domestic firms during the 2007-2008 global financial crisis (Alfaro and Chen, 2012; Alvarez et al., 2017; Santioni et al., 2020). These papers generally yield mixed findings depending on the included controls and the specific time periods considered. Desai et al. (2008) investigate the relative performance of local firms and multinational affiliates in the aftermath of significant currency depreciation in emerging markets. Such depreciation can influence both the financial health of firms and their competitiveness by altering the relative prices of domestic and foreign products. Their findings suggest that multinational affiliates tend to outperform local firms following these exchange rate shocks, likely due to less binding financial constraints. In a related

¹Several other influential studies have examined the effects of credit supply shocks on firms’ real outcomes. Amiti and Weinstein (2011) analyze the impact on exports, while Berton et al. (2018) investigate heterogeneous effects on employment. Costello (2020) explores spillover effects from suppliers affected by credit supply shocks to their customer firms, and Cai and Szeidl (2024) examine spillovers to competitors of affected firms. Similarly, Huber (2018) documents geographic spillover effects. Greenstone et al. (2020) study the impact of credit supply shocks on small businesses during the 2008–2009 financial crisis. Contrary to the prevailing narrative in this literature, they find effects that are statistically insignificant and economically close to zero.

contribution Kalemlı-Ozcan et al. (2016) compare foreign owned and domestic exporters in the aftermath of a combined currency and banking crisis. They find that foreign exporters invest more. Manova et al. (2015) does not directly investigate responses to macroeconomic shocks but shows that MNE affiliates have better export performance than domestic firms in financially vulnerable sectors, consistent with affiliates being less liquidity constrained. The present paper contributes by providing a comprehensive picture of the relative performance of firms with and without firm networks using a large set of well-documented bank crisis episodes rather than a single event like the global financial crisis. This is especially important given the mixed findings of previous studies. In addition, we are able to identify an important underlying mechanism explaining these differences in an international context - and directly document a tangible advantage of being an MNE affiliate.

Finally, the paper also contributes to the literature on the role of internal capital markets within corporate groups. Prior research, particularly in the context of emerging markets, has emphasized how these internal capital markets function both to prevent default of financially distressed group members as well as to reallocate resources to members with the most promising investment opportunities (Gopalan et al., 2007; Jia et al., 2013; Almeida et al., 2015). Notably, these studies are confined to single-country settings and hence domestic group networks, thereby operating within one uniform legal and institutional framework. A number of considerations caution against generalizing these findings to an international setting and to firms operating across national boundaries. Among these are complex international tax provisions that restrict the cross-border use of internal capital markets, informational frictions, and the distinct role of international diversification when a shock, such as a banking crisis, disproportionately affects a single economy.

A body of work exists that studies internal capital markets within multinational groups in a global setting.² While this strand of literature has focused extensively on tax incentives, it has also explored broader institutional factors affecting intra-group capital allocation. Desai et al. (2004) empirically analyse the effect of tax incentives and legal and capital market characteristics on the level and composition of debt within affiliates of US multinationals. They find evidence of substitution between internal and external debt in response to the institutional characteristics of different countries. In a related contribution, Egger et al. (2014) develop a theoretical model of the multinational enterprise and provide both theoretical and empirical evidence indicating that corporate tax rates, as well as local institutional quality and financial development influence within-firm borrowing and lending.³ The present paper adds to this literature by identifying another important use of

²In this paper we focus on non-financial firms, however, our findings are related to a literature on internal capital markets within global banks. This literature documents that multinational banking groups actively reallocate liquidity across affiliates in response to various shocks, thereby stabilizing lending in some locations (De Haas and Van Lelyveld, 2010; Schnabl, 2012; Cetorelli and Goldberg, 2012b,a; Campello, 2002)

³More generally our results relate to a large corporate finance literature on the importance of internal capital markets for resource allocation within firms. Foundational work includes Stein (1997), Gertner et al. (1994), Shin and Stulz (1998) and Rajan et al. (2000). Examples of papers looking at internal capital markets and taxes include

internal capital markets within multinational enterprises - namely their role in providing intra-group insurance in the face of large banking crises. While some studies have noted a type of intra-group insurance motive in domestic contexts, we highlight and causally identify this mechanism in an international context in response to severe, economy-wide disruptions.⁴

3 Data

Our analysis mainly exploits two unique datasets that we describe in more detail below.

3.1 Orbis

We use the historical Orbis database to get financial and ownership information on a large global sample of multinational affiliates and fully domestic corporations. The Orbis database, owned and maintained by Moody's, is a large global dataset containing panel data on the financial reports of firms across many different countries. To identify whether corporations are fully domestic or members of a multinational group, we use the ownership links in the Orbis ownership database from the year 2018. This ownership data contains more than 300 million ownership links between firms in the Orbis database, and we define a fully domestic standalone corporation as one that does not have any links to foreign countries or other domestic corporations. We consider both upward links, hence whether the corporation has any foreign shareholders, and downward links, hence whether the corporation owns any subsidiaries. We classify firms with foreign links as MNE affiliates and firms with no links to other firms in this database as domestic standalones. We report more details on the specifics of this distinction in Appendix A.

The Orbis financial data set is a large unbalanced panel with substantial variation in the number of observations per firm, as well as the recorded set of variables for each firm. This depends, among other things, on the reporting requirements within each country. To rule out large compositional changes over time our baseline sample requires at least 6 observations per firm, as well as non-missing and positive debt, turnover, sales and total assets variables. We further restrict the

Buettner et al. (2009, 2012); Schindler and Schjelderup (2016); Goldbach et al. (2021). Papers looking at institutional features and political risk include Kesternich and Schnitzer (2010) and Gyimah et al. (2022). Imbierowicz et al. (2025) investigate the role of internal capital markets during Brexit.

⁴A related literature focuses on diversified conglomerates and resource allocation. Matvos and Seru (2014) build a structural model and use Compustat data on US conglomerates to estimate the importance of within-firm-across-industry resource allocation during external capital market distress. Kuppuswamy and Villalonga (2016) look at the value of corporate diversification within large US conglomerates during the global financial crisis of 2007/08. Using Compustat data they show that the value of multi-segment firms relative to focused firms changes as a result of the crisis and that this likely was related to debt availability. Anjos et al. (2018) consider the importance of a dedicated financial division within large conglomerates for the workings of internal capital markets.

analysis to countries for which we have information on banking crisis episodes from Baron et al. (2021). The baseline sample has 11.6 million observations across 28 countries of incorporation and 19 industries. This consists of 2.2 million MNE affiliate observations and 9.4 million domestic standalone observations. The sample starts in 1983 and ends in 2019.⁵ Given the nature of how this data is collected, the sample has differential coverage across countries and industries. Figures B.1, B.2 and B.3 in Appendix C show how the sample is distributed across countries of incorporation, countries of ownership (for the MNE affiliate sample), and industries respectively. We show these distributions for the sample of MNE affiliates and standalone domestic firms separately. While some countries and industries clearly account for a lot more observations than others, we still have a large number of observations across many countries and industries. Countries in southern Europe are important countries of incorporation in our sample, as are some countries in northern Europe. Many of the multinational affiliate corporations in the sample are also owned by parent firms located in southern Europe, but the United States, Germany, Great Britain, and Japan are also important ownership countries in the sample. *Manufacturing* and *Wholesale* are very important industries in both the sample of multinational affiliates and in the sample of fully domestic standalone firms.

3.2 MiDi

To study capital movements within multinational groups, we turn to administrative data from the German central bank. The Microdatabase Direct Investment (MiDi) collects detailed data on German foreign direct investment positions at the foreign affiliate level. The database includes financial and ownership information on almost the entire web of foreign affiliates owned by German parent companies subject to a modest reporting threshold of three million Euros balance sheet total. The data includes comprehensive ownership information which allows us to identify all foreign subsidiaries and their ownership relationships within multinational groups. The data includes general firm characteristics, such as industry, as well as detailed historical financial data in the period from 1999 to 2018. Importantly, we can observe internal lending and borrowing between the foreign affiliate and both the German parent, the immediate owner, and the collective group of entities that make up the rest of the multinational structure. This allows us to study the internal capital market of the multinational enterprise in reaction to bank crises. We describe the sample in more detail in the dedicated MiDi results section below and report details on the sample in Appendix B.⁶

⁵We have very few observations in the 1980'ies. The sample becomes substantial in the 1990'ies with more than 100.000 observations per year from 1996 to 2019.

⁶We access the data at the Bundesbank data center and all results provided in this paper that use MiDi data have undergone output control by Bundesbank employees.

4 Variation and Empirical Strategy

4.1 Bank Crisis Definition

Our measure of bank distress is constructed in Baron et al. (2021) using a combination of historical bank equity returns, bank failures, and narrative information about banking panics. We will refer to this list of episodes as the BVX crisis list throughout the paper.⁷ The list of crisis events covers 46 countries up to the year 2016. The paper views a banking crisis as an episode where the banking sector’s ability to intermediate funds is markedly impaired. Fundamentally, a BVX crisis is defined as a country event with either a banking panic or a bank equity crash in combination with widespread bank failures (or both). The authors define a bank equity crash as a bank equity decline of more than 30% over the course of a single year. A banking panic is defined as an event where we observe considerable and sudden withdrawals of funding by the creditors of a considerable section of the banking system. Widespread bank failures are defined as the failure of a top five domestic bank or the failure of five or more smaller banks above the normal rate of bank failures.

The paper demonstrates that these episodes of bank distress are associated with severe, sharp, and very persistent domestic bank credit contractions. For instance, after six years, a bank equity decline of over 45% predicts a 12 percentage point decline in the credit-to-GDP ratio within a country.⁸ Investigating the timing of macroeconomic developments the paper further demonstrates that bank equity crashes tend to substantially precede banking panics, credit spread increases as well as declines in non-financial equity. This suggests that these episodes indeed originate from bank distress which then later propagates to the rest of the economy through the bank lending channel. Our goal in this paper is to investigate how such economy-wide bank distress and credit contraction impacts domestic and multinational firms differentially and shapes the corporate landscape.

4.2 Empirical specification

Our baseline approach is an event study regression investigating within-firm responses to bank distress events. We use two different event study specifications: One designed for within firm-type comparisons, i.e. affected versus unaffected MNE affiliates, and another designed for across firm-type comparisons, i.e. MNE affiliates versus domestic standalone firms. To obtain average magnitudes of the responses measured in the event studies, we use staggered difference-in-difference versions of the event study specifications as detailed below.

⁷When a firm is present in the dataset across multiple crisis events we use as default the most recent crisis where our sample is largest. We show robustness to changing this choice in the results section below.

⁸The average bank equity decline within the full list of BVX crises is 46.2%. In this paper we only use the most recent of these episodes due to the timeframe of our datasets.

4.2.1 Within firm type event study

When assessing the impact of bank distress on either multinational affiliates or domestic standalones separately, we use the following specification

$$\log(y_{it}) = \alpha_i + \sum_{j=\underline{j}}^{\bar{j}} \beta^j \mathbb{1}_{[t=j]} + \theta_{s \times t} + \phi_{G \times t} + X_{it} + \varepsilon_{it} \quad (1)$$

where $\log(y_{it})$ is the logarithm of the relevant outcome for firm i in year t and X_{it} are firm-level controls which in the baseline specifications always include $\log(\text{turnover})$ as well as $\log(\text{sales})$ if this is available in the dataset in question. The indicator variable $\mathbb{1}_{[t=j]}$ is equal to one whenever we observe the firm in period j relative to the crisis. α_i are firm fixed effects, $\phi_{G \times t}$ are country income group by year fixed effects and $\theta_{s \times t}$ represent industry-by-time fixed effects. $\underline{j}$ and $\bar{j}$ represent the start and end points of our effects window. We bin the start and end points, meaning that all time periods before and after these periods are collected in the $\mathbb{1}_{[t=\underline{j}]}$ and $\mathbb{1}_{[t=\bar{j}]}$ indicator variables (Schmidheiny and Siegloch, 2023). In the following result section, we will use $\underline{j} = -5$ and $\bar{j} = 7$. In essence, this is a parsimonious specification that compares the evolution of debt levels (or other outcomes) within firm type across countries and shows raw data patterns of how a banking crisis fundamentally impacts a firm. Since this means that we are comparing within firm dynamics across different countries we control for country income group by time fixed effects ($\phi_{G \times t}$). This accounts for the fact that the dynamic path of subsidiaries in high income economies might be different to those in low income environments. We use the classification of countries by the World Bank.⁹

4.2.2 Across firm types event study

When comparing across firm types we need to account for the fact that on average MNE affiliates and domestic standalone firms are different in other dimensions than their network structure. To isolate the importance of network structure, ideally, we would like to compare two firms that are identical except for one being part of an MNE group while the other is not. It is well known that multinational affiliates on average are larger than domestic standalone firms (see Bilicka, 2019) and so if larger firms respond differently to banking shocks compared to smaller firms, this might confound our empirical strategy.¹⁰ Similarly, the presence of multinational firms is different across industries and countries. In our baseline results, we deal with these concerns by flexibly controlling for differential time trends across countries, industries, firm-age and firm-size. To further mitigate the concern that results could be driven by a differential impact of the shock on firm operations

⁹To satisfy output control, the Bundesbank data center required us to lump together lower middle income and upper middle income countries into one group.

¹⁰Cingano et al. (2016), Chodorow-Reich (2014) and Iyer et al. (2014) exactly highlight that smaller and younger firms appear to be affected more by banking shocks compared to larger firms.

and cash-flows, and hence the demand for credit, we also directly control for firm turnover and firm sales in our baseline regressions.

Our baseline regression hence reads as follows,

$$\log(y_{it}) = \alpha_i + \sum_{j=\underline{j}}^{\bar{j}} \beta^j \mathbb{1}_{[t=j]} \times \mathbf{MNE} + \phi_{\mathbf{MNE} \times t} + \theta_{s \times t} + \gamma_{c \times a \times t} + \lambda_{c \times inc \times t} + X_{it} + \varepsilon_{it} \quad (2)$$

where $\mathbf{MNE}$ is an indicator variable for being part of a multinational group and hence β^j now measures the difference between affiliates of multinational groups and domestic firms at time j relative to the period before the event. $\phi_{\mathbf{MNE} \times t}$ are MNE-by-year fixed effects and hence measures any potential differential time trend between MNEs and domestics in non-crisis times. $\gamma_{c \times a \times t}$ and $\lambda_{c \times inc \times t}$ represent country-by-age decile and country-by-size decile time trends respectively. $\theta_{s \times t}$ represent industry-by-time fixed effects.¹¹ All other terms are as defined in equation 1. Conceptually, this regression investigates the differential development of an outcome around a crisis event among MNE affiliates and domestic standalones conditional on firm size, firm age, industry, and country. We are careful to flexibly control for size and age differences by including within country size- and age-decile time trends. This means that we always compare similar size and age firms and we for instance allow large firms to have different time trends within two different countries.

This event-study specification gives us the ability to evaluate the common trends assumption underlying our empirical results. Importantly, the common trends assumption underlying this design is less strict than requiring MNE affiliates and domestic firms to evolve in parallel absent any banking crisis. Instead, our assumption requires that these two types of firm would have the same relative trend in countries that experience a crisis as they do in countries that are not hit by a crisis in that time period. In other words, we assume that debt levels of MNE affiliates and domestic firms of similar size, industry and age potentially evolve differentially over time but that this dynamic is the same within crisis and non-crisis countries.¹² A special case that fulfills this assumption is of course the case where MNE affiliates and domestic standalones evolve in parallel absent any crisis conditional on size, age, country and industry. In robustness tests we show that even this stricter assumption seems to hold in the data.

¹¹Size deciles are constructed using fixed tangible assets to avoid conditioning on a variable directly affected by debt-levels such as total assets. For firms experiencing a crisis, we measure the size of a firm as the mean level of tangible fixed assets within the pre-event years from -5 to -3. For treated firms pre-event years -5 to -3 represent on average the 2nd, 3rd and 4th observation in the panel for each firm in the dataset. For firms that do not experience a crisis we therefore use their 2nd-4th observation in the panel to calculate their size. Using this size measure we construct deciles across all firms in the sample. Age deciles are constructed using the distance between the year before the crisis and the year of incorporation of treated firms. For firms that do not experience a crisis we use the year of their sixth observation in the panel (as this is the mean observation number of time -1 for the treated group).

¹²This relaxation of the common trends assumption is achieved by including the term $\phi_{\mathbf{MNE} \times t}$ which controls for a general differential time-trend among MNE affiliates relative to domestic firms.

To be able to measure average effect sizes, we further use a staggered difference-in-difference version of our event study equation (2) above. For the across firm type comparisons, the equation is given below, the difference-in-difference version of the within firm type event study works analogously.

$$\begin{aligned} \log(y_{it}) = & \alpha_i + \beta_1 \mathbf{MNE} \times \text{Post}_{Short} + \beta_2 \mathbf{MNE} \times \text{Post}_{Medium} + \beta_3 \mathbf{MNE} \times \text{Post}_{Other} \\ & + \beta_4 \mathbf{MNE} \times \text{Pre}_{Other} + \phi \mathbf{MNE} \times t + \theta_{s \times t} + \gamma_{c \times a \times t} + \lambda_{c \times inc \times t} + X_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

In this diff-in-diff specification Post_{Short} is an indicator variable equal to 1 for $j \in [0; 3]$, Post_{Medium} is an indicator variable equal to 1 for $j \in [4; 6]$, Post_{Other} is an indicator variable equal to 1 for $j > 6$ and finally Pre_{Other} is an indicator variable equal to 1 for $j < -4$. The parameters of interest in this specification are hence β_1 and β_2 . β_1 measures the average short-term differential crisis effect between multinational affiliates and domestic standalones using the year of the crisis and the three following years. The parameter β_2 measures the average medium term effect between four and six years after the crisis. Since we are looking at a very long time period during which countries can experience multiple crisis episodes, we further include the terms $\mathbf{MNE} \times \text{Pre}_{Other}$ and $\mathbf{MNE} \times \text{Post}_{Other}$. This ensures that the reference period here is $j \in [-4; -1]$ and hence the short-term and medium-term effects are measured relative to this pre-period and not time-periods very far into the past or future where other crisis episodes could be taking place. In all specifications, we cluster standard errors at the firm level to account for potential non-independence of the error term within firm over time.

5 Results

Using the event-study design described in detail above, we investigate whether the ability of multinational affiliates to obtain financing during banking crises differs from that of purely domestic firms. Subsequently, we examine the underlying sources of this difference in ability, as well as how these differences in finance flexibility translate into differences in the impact of crisis on firm performance and future growth.

5.1 The effect of bank crisis on firm debt

We first investigate how domestic bank distress affects the overall availability of credit for firms in the economy. Baron et al. (2021) show that these episodes are associated with a lower credit-to-GDP ratio within a country, and hence we would expect that part of this effect is driven by lower availability of credit for the corporate sector. Hence, if these bank distress events severely impact firms, we would expect their overall debt-levels to go down as they struggle to raise credit. For this analysis, we use the Orbis global dataset presented above to get a large global sample covering many banking crises.¹³ Table 1 shows summary statistics for the Orbis sample of MNE affiliates and domestic standalones separately. As is evident from this table, there are considerable size differences between these two groups of companies. We pay particular attention to this fact in our empirical specification when comparing these two groups, as highlighted in the methodology section above. Note that while there are large average size differences, both types of firm are well-represented in all size deciles allowing comparisons within deciles.¹⁴

Table 1: **Orbis Descriptives**

Variable	MNE affiliates				Domestic standalones			
	(1) mean	(2) median	(3) st.dev.	(4) Obs	(5) mean	(6) median	(7) st.dev.	(8) Obs
Turnover	62,800	5,353	697,000	2,220,349	967	311	6,136	9,389,280
Total Assets	68,600	5,012	915,000	2,220,349	796	268	4,836	9,389,280
Sales	60,600	5,109	673,000	2,220,349	947	301	5,974	9,389,280
Debt	42,100	2,950	641,000	2,220,349	517	165	3,359	9,389,280
Fixed tangible assets	16,500	374	386,000	2,181,266	226	30	2,154	9,125,343
Employees	171	28	1540	1,630,672	8	4	65	6,268,163

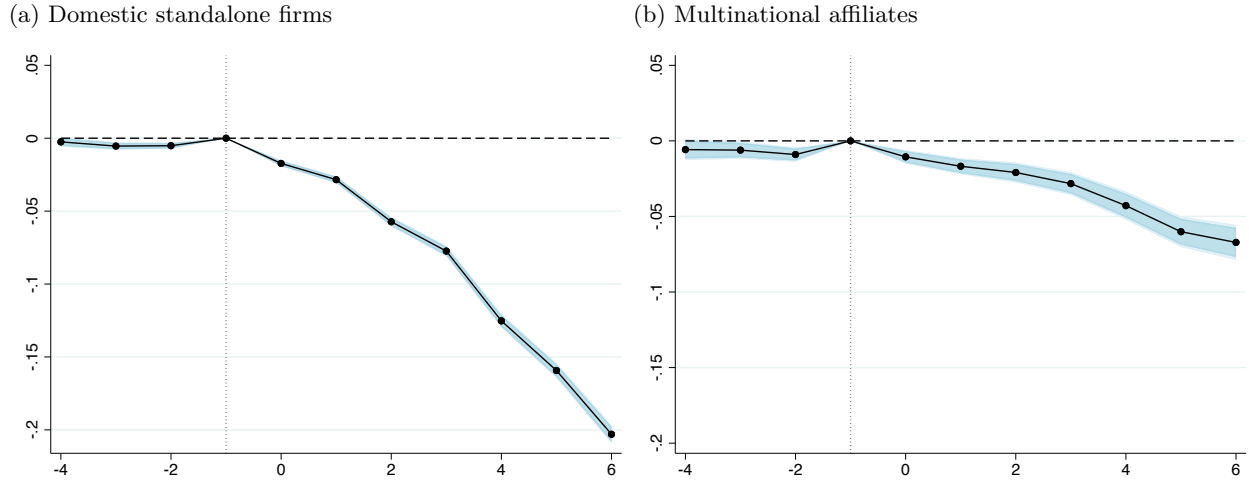
Notes: This table shows summary statistics for the sample of MNE affiliates (columns 1-4) and domestic standalones (columns 5-8) in Orbis. All numbers are in thousands EUR (except the number of employees and observations).

¹³In a later section, we confirm these results using the MiDi dataset on affiliates of German MNEs.

¹⁴The largest size decile (using fixed tangible assets as a proxy for size) has 35% domestic firms and 65% multinational affiliates. The smallest decile has 14% multinational affiliates and 86% domestic firms.

Using this sample of firms, Figure 1 first shows the overall effect of our bank distress events on firm debt. Panel (a) shows results only for the sample of fully domestic standalone firms, while panel (b) shows results for the sample of multinational affiliates. For both types of firms, we see an immediate and substantial decline in the level of firm debt relative to the global trend captured by firms within economies unaffected by bank distress. These regressions control for firm turnover as well as firm sales, and hence this effect on debt is above and beyond any impact explained by a general slowdown of firm activity. Comparing panels (a) and (b), we observe the first suggestive evidence that bank crises impact domestic standalone firms considerably more than multinational affiliates. Three years after the year of the bank crisis, total firm debt has decreased by about 3 percent for multinational affiliates, but by more than twice as much for domestic standalone firms relative to the global trend.

Figure 1: **Bank crisis and firm debt**

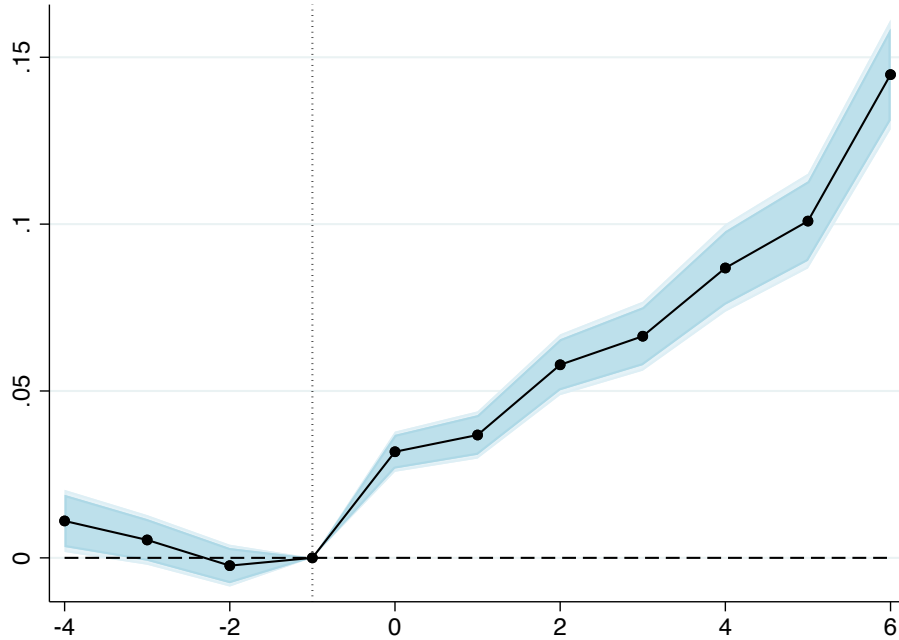


Notes: Panel (a) includes only domestic standalone firms. The outcome is $\log(\text{debt})$ and controls include $\log(\text{turnover})$, $\log(\text{sales})$, year-by-country income group fixed effects, year-by-industry fixed effects and firm-fixed effects. Event is the most recent crisis event for each firm with at least 6 observations in the event window. Panel (b) shows the same specification, but only using multinational affiliate observations. The regression in panel (a) uses 9.39 million observations. The regression in panel (b) uses 2.2 million observations. Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level.

5.2 The multinational capital advantage

We now turn to measuring differences in the ability of domestic firms and MNE affiliates to raise financing in times of domestic bank distress and tight credit markets. If multinational affiliates are able to obtain more credit due to their international network, we would expect to observe an increase in the debt of multinational affiliates relative to otherwise similar domestic firms commencing at the onset of the crisis. Figure 2 plots the estimated β^j coefficients from equation 2 along with the 90% and 95% confidence intervals. This illustrates the differential development of debt levels within MNE affiliates relative to similar domestic standalone firms around a crisis event.

Figure 2: **The multinational capital advantage during crisis**



Notes: The figure shows parameter estimates for event time dummies interacted with the MNE dummy variable. The outcome variable is $\log(\text{debt})$ and the regression further includes $\log(\text{turnover})$, $\log(\text{sales})$, year fixed effects interacted with the MNE dummy variable, country-by-size decile-by-year fixed effects, country-by-age decile-by-year fixed effects, industry-by-year fixed effects, firm fixed effects. Size deciles are constructed using average fixed tangible assets from time -5 to -3 before the event. For non-treated firms we choose the observation-numbers consistent with this. I.e. if time -5 to -3 in the treatment group on average are observation number 4-6 in the panel, then we take observation number 4-6 in the non-treated group to create the deciles. We measure age at time -1 as the difference between the year in question and the year of incorporation. For non-treated firms we use the same procedure as with size and choose the equivalent observation number in the panel for each firm. Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level.

Pre-trends are stable prior to the event, supporting the validity of our empirical design. In particular, restricting comparisons to firms within narrowly defined cells - by country, industry, size, and age - ensures that we compare firms with similar underlying dynamics. Consistent with this, domestic firms and MNE affiliates within these cells exhibit similar borrowing behavior in the absence of crises. Starting exactly at the time of the banking crisis we observe a clear divergence. This difference continues to grow in the six years following the onset of the crisis, consistent with the evidence in Baron et al. (2021) that the credit effects of a banking crisis often lasts for many years. Two years after the onset of the crisis the difference has reached more than 5 percentage points and after six years the cumulative difference is close to 15 percentage points. This means that after two years the debt levels of MNE affiliates have dropped by 5 percentage points less than the debt levels of similar domestic standalones relative to the period before the crisis. The measured effects are highly statistically significant already in the year of the crisis, and the cumulative impact over the course of just a few years is economically sizable. Note that this effect is conditional on any impact of the crisis on activity or sales of the firm. In section 5.2.2, we discuss in detail how this rules out most demand-driven explanations and instead point to differential access to credit as the primary mechanism.

Given the inclusion of separate time trends for large versus small firms and for old versus younger firms, the difference in access to credit shown in Figure 2 is not driven by firm size or age, nor by associated differences in creditworthiness. Likely, it reflects the importance of being internationally connected through ownership links to other economies that can provide credit as we test directly in section 5.3 below. In other words, the importance of being a multinational firm. This, of course, does not rule out the possibility that features such as size and stable cash flows matter for credit (Chodorow-Reich et al., 2022). Such features clearly matter for banks' willingness to lend, and to the extent that MNE affiliates are larger than domestic firms, this could also contribute to the raw difference in debt levels between these firms during and outside crisis episodes. However, Figure 2 shows that being internationally connected matters in its own right and gives an economically significant advantage during times of crisis.

Table 2 shows the average short- and medium-term effects using Equation 3. In the baseline specification in column (1), using all fixed effects, the average short- and medium-term effects are 5.6 and 12.3 percentage points, respectively, significant at the one percent level.¹⁵ Table 2 columns (2)-(4) show that these results are not dependent on the exact fixed effects structure of the model. In column (2) we remove MNE time trends and hence rely on the standard common

¹⁵The short- and medium-term effects remain significant at conventional significance levels with other choices of clustering. With a conservative level of clustering at the country-by-industry level, standard errors are 0.0162 and 0.0328 for the short- and medium-term parameters, respectively. Hence, even with conservative clustering they remain significant at the 1% level.

trends assumption that the debt patterns of otherwise similar MNE affiliates and domestic firms would have evolved in parallel absent any crisis. In column (3) we remove within-country age- and size-decile time trends and instead include separate country-, age- and size time trends. In column (4) we remove age- and size-decile time trends completely. In all these cases, we get results very similar to the baseline case. In column (5) we change the crisis definition and only use crisis episodes that are not preceded by other crisis events in the years immediately before. In particular, we require that there be at least 3 years between two crisis events for the latter event to be classified as a separate crisis. This, for instance, means that a 2010 crisis is not classified as a separate crisis event if there is also a crisis in 2008. The results are almost identical using this alternative crisis definition. Finally, in column (6) we change the definition of size used in the calculation of size deciles. Instead of creating size deciles using tangible fixed assets, we instead use employment. The measured effects are very similar to the baseline results.

Table 2: **The multinational capital advantage, Diff-in-Diff estimates**

Outcome: log(debt)	Baseline	Alternative fixed effects			Alt. crisis def	Alt. size def
	(1)	(2)	(3)	(4)	(5)	(6)
MNE×Post _{Short}	0.0561*** (0.0037)	0.0506*** (0.0026)	0.0366*** (0.0032)	0.0364*** (0.0032)	0.0613*** (0.0038)	0.0400*** (0.0039)
MNE×Post _{Medium}	0.1233*** (0.0066)	0.1246*** (0.0044)	0.0994*** (0.0058)	0.0951*** (0.0058)	0.1129*** (0.0069)	0.0969*** (0.0070)
log(turnover)	0.4384*** (0.0019)	0.4384*** (0.0019)	0.4420*** (0.0019)	0.4508*** (0.0019)	0.4401*** (0.0019)	0.4400*** (0.0019)
log(sales)	0.0176*** (0.0016)	0.0176*** (0.0016)	0.0182*** (0.0016)	0.0201*** (0.0016)	0.0180*** (0.0016)	0.0180*** (0.0016)
Firm FE	✓	✓	✓	✓	✓	✓
Industry × year FE	✓	✓	✓	✓	✓	✓
MNE × year FE	✓		✓	✓	✓	✓
Country × year FE			✓	✓		
Size Decile × year FE			✓			
Age Decile × year FE			✓			
Country × Size Decile × year FE	✓	✓			✓	✓
Country × Age Decile × year FE	✓	✓			✓	✓
Obs	11.608.809	11.608.809	11.609.555	11.609.568	11.487.098	11.608.785
Adj R ²	0.91	0.91	0.91	0.91	0.91	0.91

Notes: *Post_{Short}* is an indicator variable equal to 1 if $j = 0, 1, 2, 3$ i.e. in the year of the crisis and the following three years. This measures the short-term impact of the crisis. *Post_{Medium}* is an indicator variable equal to 1 if $j = 4, 5, 6$ i.e. between four and six years after the crisis. We refer to this as the medium-term impact of the crisis. Each regression further includes an indicator variable equal to 1 for time periods after year 6 as well as an indicator variable equal to 1 for time periods before $j = -4$. Effectively the DiD coefficients here compare to the time period from $j = -4$ to $j = -1$, i.e. the four years preceding the crisis represent the pre-period. Size deciles here are defined using fixed tangible assets in column (1)-(3) and (5) and number of employees in column (6). *p<0.1; **p<0.05; ***p<0.01 are based on heteroskedasticity and autocorrelation robust standard errors clustered at the firm level.

In Appendix D, Table 5 we investigate the robustness of our results to excluding countries, in-

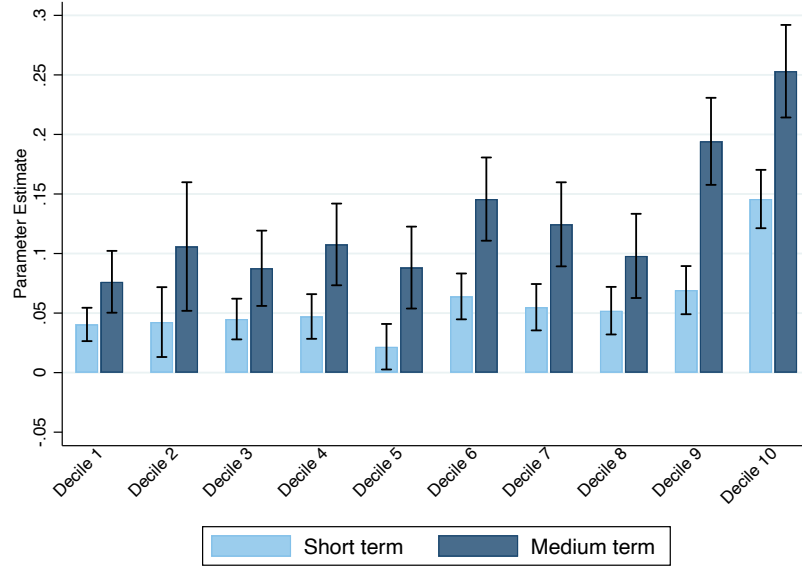
dustries, crisis-years and ownership countries that are important in our sample. We first exclude the two countries that host the largest number of firms in our sample (Italy and France) and the two industries that account for the largest number of observations (Wholesale and Manufacturing). We then exclude all firms with a crisis event in 2008, 2010 or 2011 to show that our results are not driven by the Global Financial Crisis and Euro debt crisis alone. Finally, we exclude all MNE affiliates owned by a Global Ultimate Owner in either Italy or France, since these are the two most common ownership countries in our sample as well. Across all these reduced samples, we find a significant and economically sizable multinational capital advantage during crisis. When excluding the Global Financial Crisis and the Euro debt crisis, the magnitude of our medium-term effect drops by about 50% potentially highlighting the magnitude and severity of these crisis episodes and the exceptional importance of credit flexibility during these times. We also see a drop in the magnitude of our effects when removing Italy and France from the sample, potentially reflecting that the severity of crisis episodes can be quite different across countries in the sample.

5.2.1 Heterogeneity and further robustness

In Figure 3 we show heterogeneity of the crisis effect across size of the multinational group. We use a proxy for group size calculated as the number of other affiliates within the dataset that have the same global ultimate owner as the firm in question. We compute this measure by year and then average across all years to get average group size across the sample period for each multinational affiliate firm. Figure 3 shows the short- and medium-term parameter estimates for each decile of this group size measure. Each regression includes only the MNE affiliates within that specific decile of group size but includes all domestic standalone firms. We use our baseline specification from Table 2, column 1.

The figure shows a significant and economically sizeable short- and medium-term effect across all MNE-group sizes. This finding points to the importance of being a member of a multinational group for finance flexibility during crisis even when that group is not particularly large. The figure further shows signs of some interesting heterogeneity in the absolute size of the effect across group sizes with a tendency for a larger effect as the group size grows. Both the short- and medium-term effects are more than twice as large in the highest decile compared to the lowest decile of group size. This result could indicate that being a larger group with presence across more countries and environments gives you increased flexibility in providing finance to directly affected affiliates during crisis times.

Figure 3: **The multinational capital advantage: Group size heterogeneity**



Notes: The figure shows the parameter estimates for the interaction terms $MNE \times Post_{Short}$ and $MNE \times Post_{Medium}$ in the baseline specification from Table 2, column (1) across group-size deciles. Group-size is constructed for MNE subsidiaries as the number of subsidiaries with the same global ultimate owner in a given year in the dataset. For each subsidiary we then average across all the years they appear in the sample to get an average group-size measure. We then construct deciles based on this average group-size measure. I.e. "Decile 1" corresponds to a regression including all domestic standalone firms, but only MNE firms in the lowest decile of group size - i.e. members of very small MNE groups. The mean group size in this decile is 2. "Decile 10" analogously includes all domestic standalone firms, but only MNE affiliates from the largest MNE groups in the dataset. The mean group size in this decile is close to 500.

Appendix figure B.4 shows short- and medium-term parameter estimates across the ten largest industries in our sample. Again, we use our baseline specification now splitting the sample by industry.¹⁶ First, we observe that our baseline estimates are not driven by a single or a few industries only. In all of the ten largest industries, we have a significant and sizable effect either in the short term, the medium term or both. Collectively, these heterogeneity results highlight that the capital advantage does not seem to be unique to only a specific type of multinational group or type of industry. In contrast, it appears to be an ubiquitous phenomenon associated more generally with being a member of a multi-firm group.

¹⁶Since each regression only includes one single industry, we cannot include industry-by-year fixed effects. All other fixed effects and controls from the baseline specification are included in all regressions.

5.2.2 Demand for credit versus supply of credit

In the preceding section, we document that MNE affiliates exhibit a smaller decline in borrowing than comparable domestic firms during banking crises. A natural question is whether these differential responses reflect differences in credit demand rather than differences in access to credit.

First, if banking crises disproportionately reduce domestic demand, domestic firms may experience larger declines in sales than MNE affiliates, which can more readily substitute toward export markets. Such differences could generate variation in credit demand. However, since our baseline specifications control for sales and turnover, this channel is unlikely to account for the divergence observed in Figure 2. To further probe this mechanism, we scale debt directly by measures of firm activity rather than including them as controls. Appendix C Figure B.5 presents results using the debt-to-assets ratio (panel a) and the debt-to-sales ratio (panel b) as outcome variables. These leverage measures directly normalize borrowing by firm size. We find that six years after the onset of the crisis, the debt-to-assets ratio has declined by almost 5 percentage points less for MNE affiliates than for domestic firms. The debt-to-sales ratio has decreased by about 14 percentage points less. While banking crises may differentially affect assets and sales across groups, these specifications condition on such changes. Accordingly, any demand-based explanation must operate through channels other than changes in firm activity ruling out mechanisms based on differential product demand.

A demand-based interpretation would therefore require that these otherwise comparable firms adjust their desired borrowing differently during crises, even conditional on product demand. While such mechanisms are conceivable, differences in access to credit provide a more plausible explanation. We examine this mechanism directly in the next section.

5.3 Mechanisms: The role of internal capital markets

In the previous section, we demonstrate that multinational enterprises have a distinct advantage during periods of banking crisis compared to similar domestic firms. While firms generally experience a decline in debt, this decline is significantly less pronounced for affiliates of multinational firms. This finding holds after accounting for key observable differences between domestic and multinational firms, as well as for any potential differential effects of the crisis on the scale of operations and sales. Consequently, we argue that this advantage is not attributable to specific characteristics of the MNE affiliate itself but rather to its integration within a global network of firms, in contrast to domestic firms that lack such a network.

Integration within a global network of firms can give rise to a capital advantage through several plausible mechanisms, one of which is access to an internal capital market. This is the channel we

test directly in this section.¹⁷

In situations where external financing becomes scarce, MNEs can mitigate this constraint by providing internal funds to their affiliates. We use detailed data on the internal capital markets of German multinational enterprises (MiDi database) to assess whether this mechanism plays a significant role in generating the observed capital advantage of MNE affiliates. The degree to which this occurs likely depends on the MNE’s capacity to provide such internal resources and hence factors such as the extent to which other parts of the multinational group remain unaffected by the banking crisis and are therefore able to redirect funding. Since ownership information is universal in MiDi, we can ensure that the rest of the group is not affected by a crisis when comparing treated versus non-treated subsidiaries. This ensures that the comparison is not contaminated by crises elsewhere in the MNE network. We also reduce the sample to firms with at least 6 available observations. A downside of the MiDi data is that it only collects information on German firms - the dataset is hence much smaller than the global Orbis data used above.

Table 3: **MiDi Descriptives**

Variable	Treated MNE subsidiaries			Control MNE subsidiaries		
	(1) mean	(2) st.dev.	(3) subsidiaries	(4) mean	(5) st.dev.	(6) subsidiaries
Turnover	43,482	238,830	7,773	25,953	121,986	3,150
Internal Debt	7,852	50,325	6,726	4,628	14,761	2,770
Internal Debt Ratio	0.397	0.353	6,726	0.393	0.356	2,770
External Debt	8,574	36,069	7,546	7,265	22,986	3,112
Lending from HQ	1,744	8,601	3,712	1,409	7,787	1,557
Lending to group	566	11,883	829	282	5,879	203

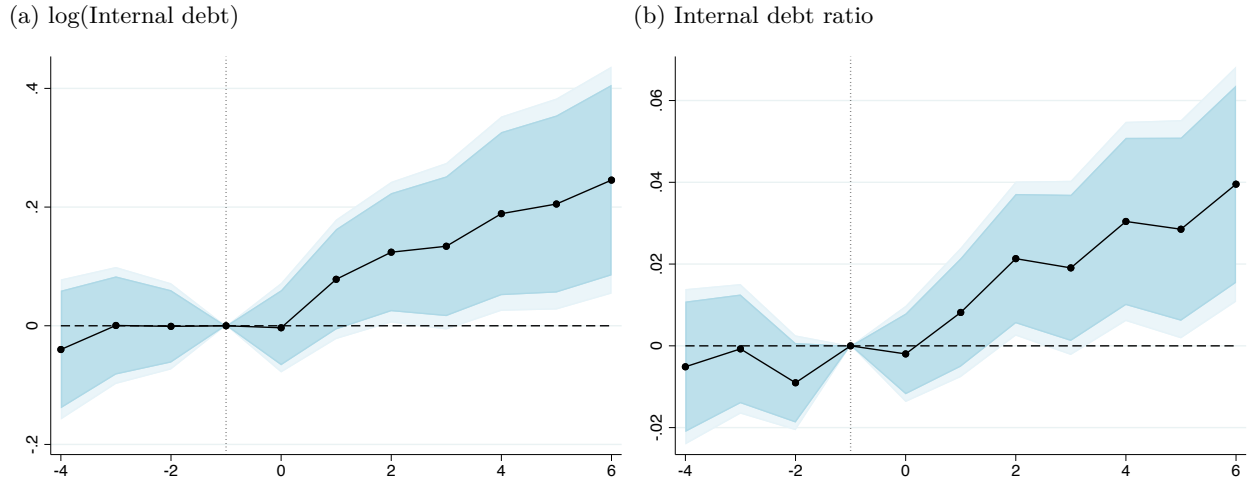
Notes: This table shows the treatment (columns 1–3) and control groups (columns 4–6) of the MiDi dataset we use to test the internal debt channel along three dimension (mean, standard deviation, number of subsidiaries) for one variable per row. Both groups contain German owned subsidiaries downstream from a German reporting party (outward fdi). This is therefore a within firm type sample as it only contains information on multinational firms. All numbers are in thousands EUR (except for the number of subsidiaries and the 0 to 1 internal debt ratio). Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Midi dataset, own calculations.

Table 3 describes our sample for the treatment group exposed to crises (columns 1-3) and the control group (columns 4-6). It first shows summary statistics on the 7,773 German foreign subsidiaries that experience a crisis in the sample period (part of “Treated MNE subsidiaries”), for which turnover information is available, and that are not linked to another subsidiary that also experiences a crisis in the effects window. Most treated subsidiaries report internal as well as external debt with means of 7.8 and 8.5 million EUR respectively. The mean of the internal debt ratio first calculated at the microeconomic level is lower than these two very numbers indicate: less than 40%, indicating a wider right tail in internal as compared to external debt usage. Among the 3,125 subsidiaries in

¹⁷We do not rule out the existence of other, potentially complementary, channels. We discuss these explicitly in the conclusion.

the control group, external debt usage is similar with 7.2 million EUR on average, while internal debt use as well as the internal debt ratio is lower compared to the treatment group. This is due to a larger right tail in the treated population (see also the difference in turnover) which again is due to a different country composition since most large high income economies (with large subsidiaries) experience crises during our sample period. Our country income group by year fixed effects alleviate potential identification concerns - we are only comparing the dynamics of debt of subsidiaries within the same dynamic trend of an income group of countries. This is a ‘within firm type’ comparison of affected MNE subsidiaries to unaffected ones while ensuring that the rest of the MNE network is not hit. The MiDi dataset also provides more detailed information on the components of group internal debt. We see, for example, what each subsidiary is lending from the headquarter (‘Lending from HQ’) and to the rest of the group (‘Lending to group’). However, as the number of subsidiaries in the last two rows of table 3 show, only a limited number of German foreign subsidiaries report these variables.

Figure 4: **The Internal Debt Channel**



Notes: The black dots of panel (a) show the event study coefficients comparing $\log(\text{internal debt})$ of German MNE subsidiaries that experience a crisis to those that do not. Panel (b) shows the development of the ratio of internal to total debt. Controls include $\log(\text{turnover})$, year-by-country income group fixed effects, year-by-industry fixed effects, and firm fixed effects. The event is the most recent crisis event for each firm. Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level. Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Midi dataset, own calculations.

When subsidiaries of MNEs experience banking crises, external debt becomes more expensive or harder to come by. At the same time, MNE subsidiaries have access to group internal lending where either the headquarter or other subsidiaries of the MNE can provide liquidity. Figure 4 tests this channel directly. Using the logarithm of internal debt from the rest of the group as the outcome

variable, a clear crisis effect is visible in panel (a). Controlling for turnover and the fixed effects setup discussed above, there is no discernible difference in internal debt dynamics between affected and non-affected MNEs in the years leading up to a crisis. With the onset of a crisis, we see a continuous increase of internal debt by roughly 20% in the six subsequent years. Most of the effect takes place in the first two years after a crisis occurs. This shows the internal lending channel directly. MNEs use their internal capital markets to compensate when external funding conditions deteriorate.¹⁸ To substantiate this result, panel (b) turns to the relative use of internal debt. Here, we use the internal-to-total debt ratio as the outcome variable. We see that not only the absolute but also the relative use of internal debt increases, namely by 0.04 on a scale of 0 to 1 - a four percentage point increase. Against a baseline mean of roughly 0.4, this is a 10% change.

Table 4: **The Internal Debt Channel, Diff-in-Diff estimates**

Outcome:	log(total debt) (1)	log(external debt) (2)	log(internal debt) (3)	log(lending from hq) (4)	log(lending to group) (5)
Treated $\times$ Post _{Short}	-0.0430*** (0.0188)	-0.0595*** (0.0233)	0.0640 (0.0532)	0.11367** (0.0589)	-0.1273 (0.1144)
Treated $\times$ Post _{Medium}	-0.0207 (0.0353)	-0.0777 (0.0523)	0.1618*** (0.0768)	0.2627*** (0.0807)	-0.3536*** (0.1907)
log(turnover)	0.4417*** (0.0161)	0.5135*** (0.0199)	0.3680*** (0.0260)	0.3542** (0.0459)	0.3112*** (0.0802)
Firm FE	✓	✓	✓	✓	✓
Industry $\times$ year FE	✓	✓	✓	✓	✓
Country Income Group $\times$ year FE	✓	✓	✓	✓	
Obs	62,984	60,633	50,005	23,319	2,835
Adj R ²	0.84	0.79	0.68	0.69	0.84

Notes: Post_{Short} is an indicator variable equal to 1 if $j = 0, 1, 2, 3$ i.e. in the year of the crisis and the following three years. This measures the short-term impact of the crisis. Post_{Medium} is an indicator variable equal to 1 if $j = 4, 5, 6$ i.e. between four and six years after the crisis. We refer to this as the medium-term impact of the crisis. Each regression further includes an indicator variable equal to 1 for time periods after year 6 as well as an indicator variable equal to 1 for time periods before $j = -4$. Effectively the DiD coefficients here compare to the time period from $j = -4$ to $j = -1$, i.e. the four years preceding the crisis represent the pre-period. *p<0.1; **p<0.05; ***p<0.01 are based on heteroskedasticity and autocorrelation robust standard errors clustered at the firm level. Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, Midi dataset, own calculations.

Table 4 quantifies these results using static specifications and examines further outcomes. Column (1) reports the average post-crisis response of total debt, distinguishing between short- and medium term effects. The short term decline of 4.3 log points is similar to what we found using the global Orbis sample (see Figure 1), while the medium term effect remains negative but insignificant at conventional levels. Column (2) turns to external debt, showing a decline of roughly 6% in the

¹⁸Note that standard errors are much larger than in previous specifications because the sample consists of at most 62,984 observations instead of the 11.6 million of the Orbis results.

short term and a large but insignificant decline at longer horizons. Consistent with the event-study evidence, the response of internal debt takes place with a slight delay. Column (3) shows no significant short term effect, but a substantial medium term increase of 17% (16.2 log points).

Given the richness of the data, we can further examine the internal debt response by measuring the effect on lending directly from headquarters. Column (4) shows that such lending increases immediately and by almost 30% relative to the control group in the medium term. Finally, we find that the MNE subsidiary substantially reduces its own lending to the group (column 5). These results are consistent with Biermann and Huber (2024) who show that a credit shock to the headquarter is transmitted through the MNE network via lower internal lending from the parent. A similar pattern arises when shocks affect other parts of the network. Affiliates affected by a banking crisis draw on funding from the rest of the network while reducing their own lending to the group. Since few firms report this kind of lending behavior to begin with this last column should be interpreted as indicative.

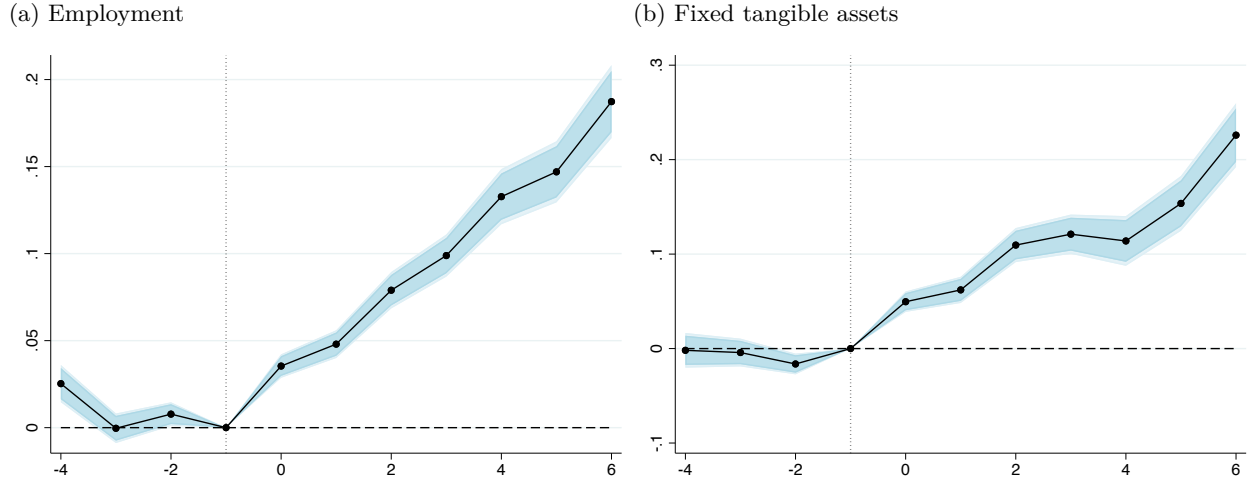
5.4 The multinational growth advantage

In the previous sections, we showed that being a member of a multinational group provides financial flexibility during a banking crisis, and hence grants access to more debt financing. At least part of this additional financing is provided within the multinational group through the internal capital market. We are now interested in understanding the importance of such finance flexibility for growth of the firm throughout the crisis and subsequently. One possibility is, for instance, that the additional financing enables multinational affiliates to lay off fewer workers during the crisis and avoid general disruption from selling assets. This could have both a short term and a longer-term impact on growth of the firm and cushion the harmful impact of banking crises on the corporate sector. Such questions are important to answer because they could help in explaining (a) the increasing firm concentration in many OECD economies (Kwon et al., 2024; Bighelli et al., 2021; Bajgar et al., 2023, 2021) and (b) the increasing market shares captured by MNEs over time (OECD, 2018).

To analyse potential differential growth between multinational affiliates and domestic standalones, we use the same methodology as previously used when examining the evolution of debt around a bank crisis event. We look both at the evolution of employment within these firms as well as fixed tangible assets to get an idea of how jobs and physical capital investments develop around and after the crisis.

Figure 5 shows the differential trajectory of employment and fixed tangible assets of MNE affiliates versus domestic standalones around a banking crisis event. We use our baseline specification, except we do not directly include controls for turnover and sales to avoid absorbing part of the effect we

Figure 5: **The MNE growth advantage during crisis**



Notes: Panel (a) shows parameter estimates for event study dummies interacted with the MNE dummy variable where the outcome variable is $\log(\text{employment})$. The specification is identical to the baseline specification used for the debt results except that we (i) create size deciles using turnover instead of fixed tangible assets or employment and (ii) we do not control for turnover and sales directly in the regression. (i) is to avoid conditioning on the level of the outcome variable before the event. (ii) is to avoid controlling for part of the effect we are trying to measure. Specifically the regression includes year fixed effects interacted with the MNE dummy variable, country-by-size decile-by-year fixed effects, country-by-age decile-by-year fixed effects, industry-by-year fixed effects and firm fixed effects. Panel (b) shows results using $\log(\text{fixed tangible assets})$ as the outcome variable. Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level.

are trying to measure.¹⁹ From this figure it is evident that MNE affiliates display greater growth both in terms of jobs and investments in physical capital following the onset of a crisis compared to similar domestic standalone firms. Three years after the onset of the crisis, the employment and investment levels of MNE affiliates have dropped by 10 percentage points less than the levels of domestic standalones. In Appendix Table 6 we see that the average medium term effect on employment and fixed assets is 15 and 13 percentage points respectively. This result relates to a recent literature investigating the resilience of multinational affiliates compared to domestic firms to large negative shocks such as the global financial crisis (Alfaro and Chen, 2012; Alviarez et al., 2017). Overall, this literature finds somewhat mixed results depending on the period considered, while here we find a very clear increased resilience among MNE affiliates when looking broadly across banking crises.

In Appendix Table 6 columns (2) and (4) and Appendix Figure B.6 we further show that this growth advantage persists even when we explicitly control for sales and turnover in the regression

¹⁹To avoid conditioning on the level of the outcome variable before the event, we create size deciles using turnover instead of fixed tangible assets.

and hence attempt to rule out any differential impact of the crisis going through demand channels. When controlling for turnover and sales, the effect sizes are somewhat smaller, which resonates with the notion that we are now controlling for part of the growth difference directly. Effect sizes are roughly halved, with a medium term effect of 8 and 6 percentage points respectively. The fact that a clear growth advantage persists when we control for demand channels is consistent with the finance flexibility advantage translating into a sizable growth advantage for affiliates of multinational firms. This advantage could raise level playing field concerns for domestic firms and could explain part of the increasing firm concentration as well as the increasing MNE market share observed across many economies. Our results are consistent with emergency liquidity for domestic firms being a useful countermeasure if politicians want to counteract the MNE growth advantage. Such a policy would not undermine the added stability that MNE presence provides in the face of banking crises, only their relative advantages over domestic firms.

6 Conclusion

This paper studies how firms respond to banking crises and the implications for the corporate landscape. Using a comprehensive global dataset, we document an economically sizeable multinational capital advantage during bank crisis episodes. Multinational affiliates experience significantly smaller declines in debt than comparable domestic firms, and this advantage is robust to controlling for dynamic country-, industry-, size-, and age-specific trends, as well as firm activity measured by sales and turnover. We argue that any residual difference between multinational affiliates and domestic firms reflects the impact of a firm’s international network, rather than the result of other underlying firm characteristics.

Unlike domestic firms, MNE affiliates can draw on internal capital markets to offset adverse external funding conditions. To examine this channel directly, we use administrative data on foreign affiliates (MiDi) of German MNEs. These data cover the universe of German foreign subsidiaries above a modest balance sheet threshold (EUR 3 million and at least 10% total ownership) and include detailed information on intra-group and total debt. During banking crises, subsidiaries increase borrowing from the rest of the group by more than 15% relative to a control group, while external debt declines. Headquarters are particularly active in providing emergency liquidity while the subsidiary itself scales down its own lending to the rest of the group.

We next ask whether this capital advantage translates into real outcomes. Returning to the global dataset, we compare the post-crisis performance of MNE subsidiaries and domestic firms. We find a pronounced divergence in growth beginning at the onset of the crisis. Three years after a crisis has occurred, employment at MNE affiliates has declined by 10 percentage points less than at comparable domestic firms. We document a similar pattern for fixed tangible investment.

These results suggest that MNEs are able to capture larger market shares after banking crises by expanding their operations in the affected host economy.

Taken together, our findings indicate that intragroup liquidity plays a central role in offsetting contractions in external finance during banking crises. This mechanism generates a persistent capital advantage for multinational firms and leads to a divergence in real outcomes, with MNEs outperforming domestic firms along multiple margins. These findings point to a dual role of multinational activity. On the one hand, internal capital markets provide a stabilizing source of financing for host economies during episodes of financial distress. On the other hand, these advantages give rise to level playing field concerns and may contribute to the growing market share of multinational firms. These results further advance our understanding of the anatomy of international capital flows – a large part of which reflect lending within multinational enterprises.

While we emphasize internal capital markets as a central mechanism behind the multinational capital advantage, alternative and potentially complementary mechanisms may also be at play. For instance, the advantage may partly reflect passive differences in financing structures, as multinational affiliates may be less reliant on domestic banks prior to a crisis (Jang, 2017) or may have greater access to the bond market (Darmouni and Papoutsis, 2025). As a result, contractions in domestic bank lending could have a smaller impact on these firms. In addition, banks may differentially allocate credit across firms during periods of financial stress. One possibility is that banks take into account the presence of internal capital markets within multinational groups when assessing credit risk, thereby amplifying the direct effects of internal capital markets. Such mechanisms would be an important topic for future research.

Appendix A Creation of the Orbis dataset

Sample restrictions

We drop all observations where we do not observe debt as this is our key variable of interest. We further require positive total assets and a non-missing turnover and sales variable, since we use these variables in our main specifications. We further drop all firms for which we observe growth rates in total assets in excess of 1000 percent (ten-fold increase from one time period to the next observed time period), as we regard this as implausible and likely the result of data errors or mergers. We exclude financial corporations including banks and insurance companies and all corporations with industry classifications "O" (public administration and defense; compulsory social security). For a financial report to be used, we require that the report covers 12 months and that the closing date is the 31 December. This is to ensure that we are comparing financial reports covering the same financial period and length of time. For all firms, we require at least 6 observations, to make sure that effects are not driven by large compositional changes. For firms within countries that experience a bank crisis, we require at least 6 observations within the 10 year observation window around the event (-5 to 4) for the firm to be included. If a firm only has observations outside the event window, we keep the firm in the sample as a control firm if it has more than 6 observations in total. We drop headquarters of multinational groups (firms that are the global ultimate owner of other firms). We only include countries in the analysis if they are covered in the crisis analysis in Baron et al. (2021). This includes countries which they studied but that did not experience a banking crisis.

Variable definitions

The age variable is created using the year of incorporation variable. We measure age at time -1, that is, the period before the bank crisis. For control firms that never experience a bank crisis, we choose their sixth observation in the dataset, since this is the median panel observation number where time equals -1 in the group of firms that experience a crisis (treatment group). We use the same procedure when creating size deciles using an average size measure in the time period -5 to -3 before the crisis. For control firms, we use the 2nd-4th observation in the dataset to create the average size measure.

Definition of multinational affiliate/domestic standalone

To create the final Orbis dataset, we exclude all corporations that do not live up to our fairly strict definition of being either a fully domestic standalone firm or a multinational affiliate firm. To

make this distinction, we use the full Orbis ownership links data from the year 2018. This dataset includes more than 300 million ownership links between companies in the Orbis database for the year 2018. Our classification is therefore based on ownership information in 2018 only and to the extent that firms change status over time this will create noise in our estimation. To be classified as a fully domestic standalone firm, we require that the firm has no recorded foreign or domestic shareholder links to other firms. We allow observed links to individual shareholders, but not links to shareholders of unknown type.

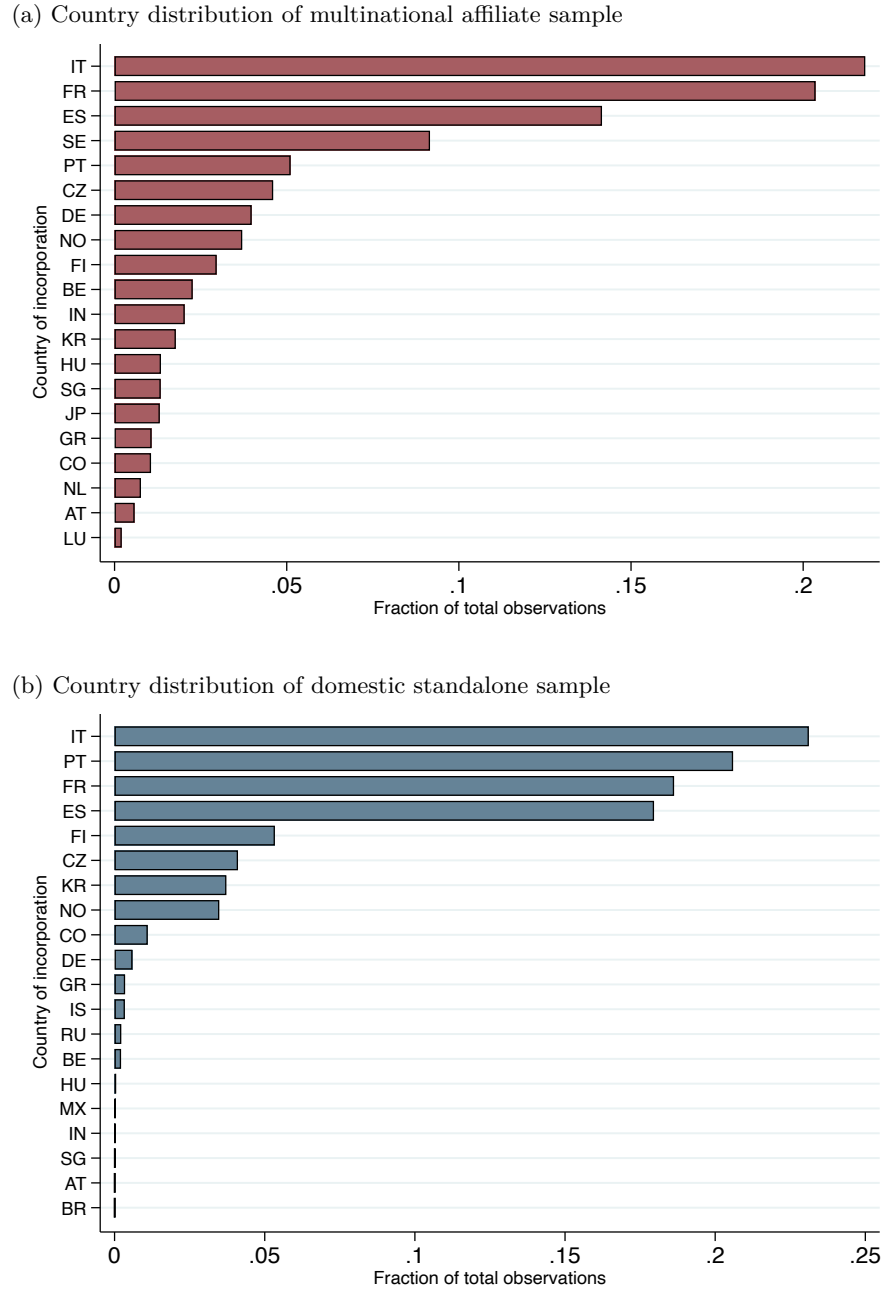
To be classified as a multinational affiliate, we require at least one foreign link. This link can be one of four types: 1. a foreign corporate shareholder, 2. has a shareholder who owns a foreign subsidiary, 3. owns a foreign subsidiary, and 4. owns a subsidiary who has a foreign corporate shareholder. In all cases we require that the ownership percentage is known. For cases 1 and 3 (i.e. direct foreign link) we require majority ownership, for cases 2 and 4 (indirect foreign link) we require that both links are above 25 percent. In cases 1, 2 and 4 we require that the entity type of the shareholder is known and that this type is either *corporation* or *financial corporation*.

Appendix B Creation of the MiDi dataset

We drop all observations for which we do not observe turnover. Note that the MiDi data does not include information on sales, therefore only turnover can be used as a control variable. Firms are included if they report at least 6 observations in the sample period. Ownership information is comprehensive in MiDi above the 10% FDI threshold. We use it to identify groups where one subsidiary is affected by a crisis and the others are not (treatment group) and groups where no subsidiary is affected (control group). This ensures that spillover effects do not contaminate our measured effect sizes.

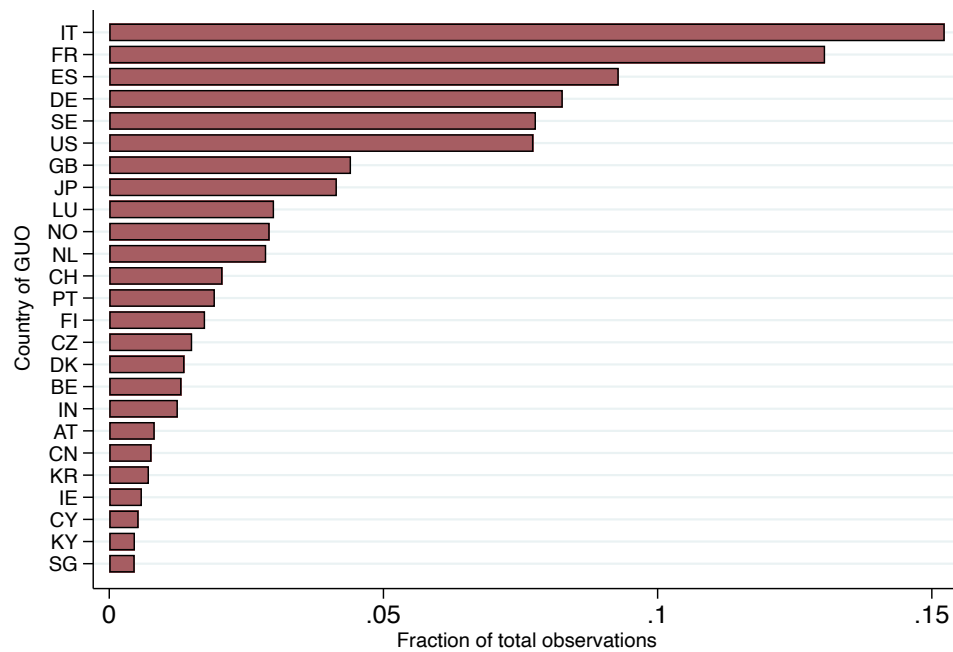
Appendix C Figures

Figure B.1: Country distribution



Notes: The figure lists the top 20 countries of incorporation for the sample of MNE affiliates and domestic standalone firms respectively. For each country we show the fraction of the full sample incorporated in that country. Panel (a) shows this for the full sample of multinational affiliates, while panel (b) shows the top 20 countries for the sample of domestic standalone firms. The full sample of MNE affiliates is 2.220.349 observations while the full sample of domestic standalone firms is 9.389.280. As described in the data-section we require at least 6 observations per firm with non-missing total assets, log(debt), log(turnover) and log(sales).

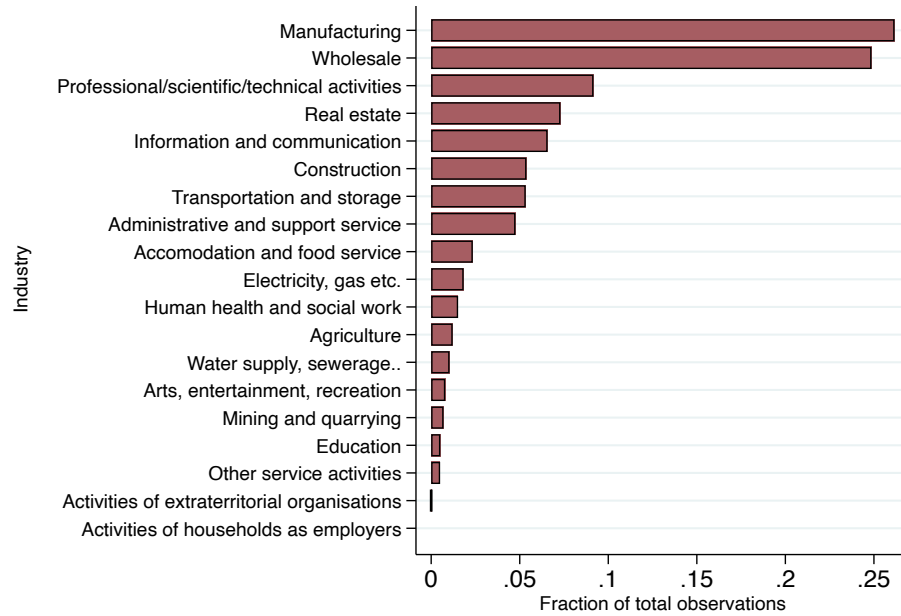
Figure B.2: **Country of ownership (Global Ultimate Owner)**



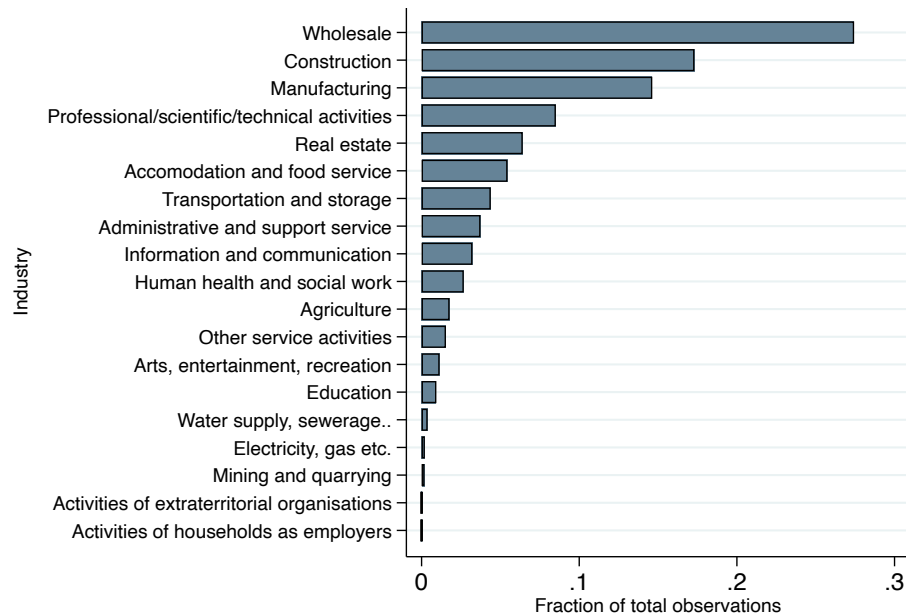
Notes: The figure shows the fraction of the total number of MNE affiliate observations owned through each of the top 25 ownership countries in the sample. The full sample of MNE affiliates is 2.220.349 observations.

Figure B.3: **Industry distribution**

(a) Industry distribution of multinational affiliate sample

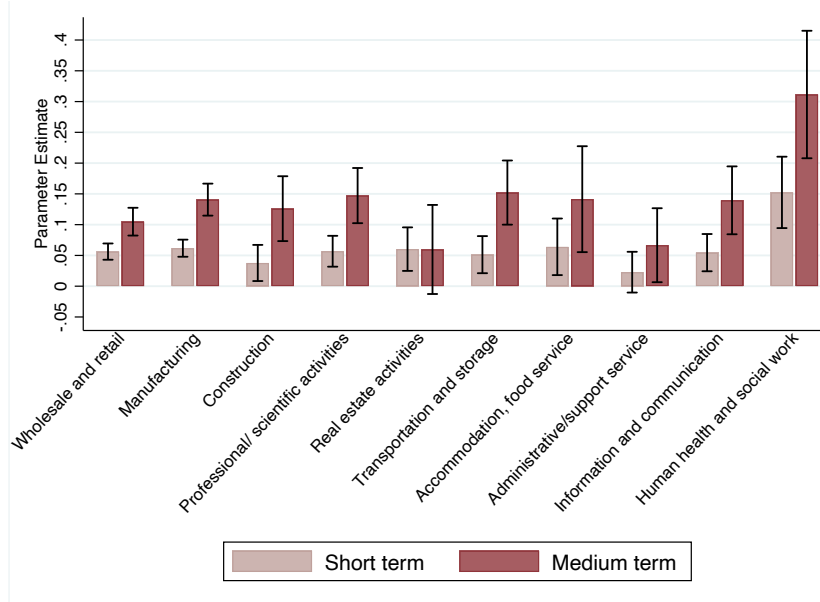


(b) Industry distribution of domestic standalone sample



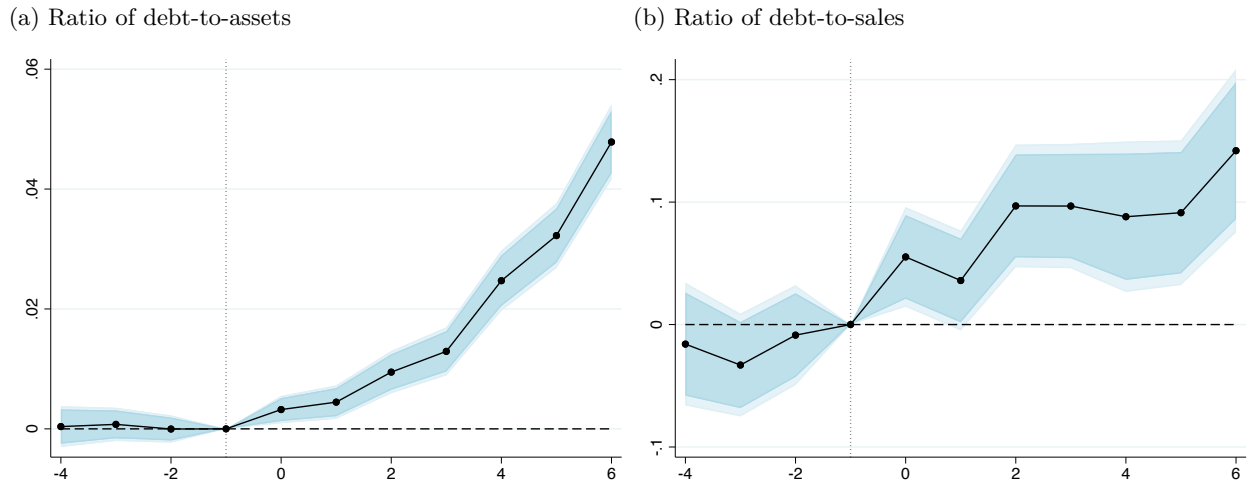
Notes: The figure shows the fraction of observations attributable to each of the 19 industries in the sample for MNE affiliates and domestic standalone firms respectively. Panel (a) shows the distribution for the full sample of multinational affiliates, while panel (b) shows the industry distribution for the sample of domestic standalone firms. The full sample of MNE affiliates is 2.220.349 observations while the full sample of domestic standalone firms is 9.389.280 observations.

Figure B.4: **The multinational capital advantage: Industry heterogeneity**



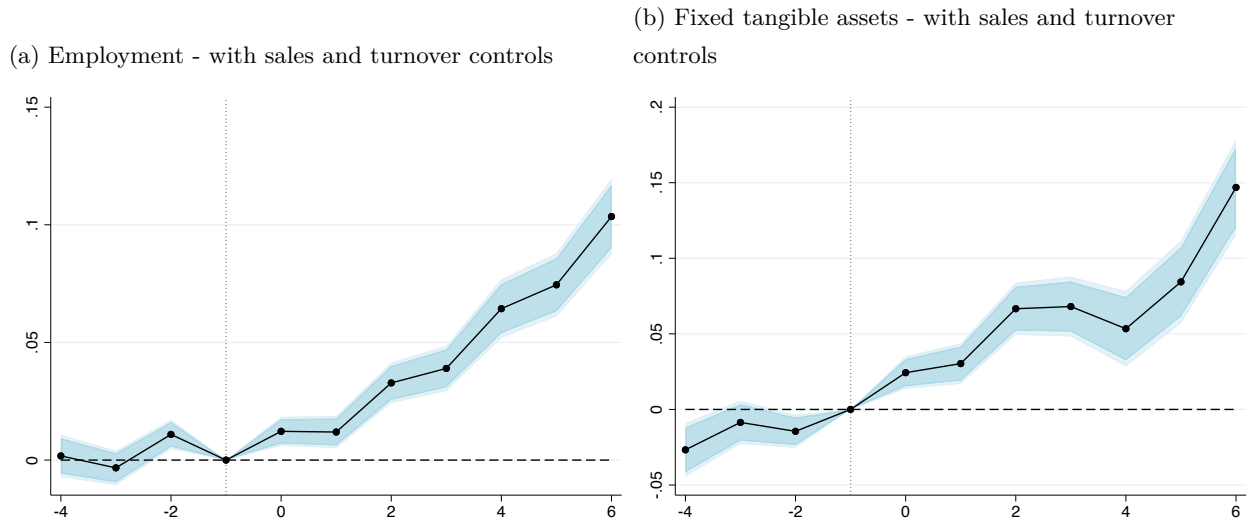
Notes: The figure shows the parameter estimates for the interaction terms $MNE \times Post_{Short}$ and $MNE \times Post_{Medium}$ in the baseline specification from Table 2, column (1) across industries. Since we split the sample by industry we do not include industry-by-year fixed effects. The figure includes the 10 largest industries in the dataset (i.e. the industries for which we have the largest number of observations overall).

Figure B.5: The MNE capital advantage during crisis - leverage



Notes: Panel (a) shows parameter estimates for event study dummies interacted with the MNE dummy variable where the outcome variable is the ratio of total debt to total assets of the firm. The specification is identical to the baseline specification, except it does not include direct controls for sales and turnover (as the outcome is scaled by assets/sales). Specifically the regression includes year fixed effects interacted with the MNE dummy variable, country-by-size decile-by-year fixed effects, country-by-age decile-by year fixed effects, industry-by-year fixed effects and firm fixed effects. Panel (b) shows results using the ratio of total debt to sales as the outcome variable. For each outcome variable we drop observations above the 99th percentile of the distribution (as ratios are notoriously sensitive to outliers). Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level.

Figure B.6: **The MNE growth advantage during crisis**



Notes: Panel (a) shows parameter estimates for event study dummies interacted with the MNE dummy variable where the outcome variable is $\log(\text{employment})$. The specification is identical to the baseline specification used for the debt results except that we create size deciles using turnover instead of fixed tangible assets or employment. This is to avoid conditioning on the level of the outcome variable before the event which can create problems within event studies. Specifically the regression includes $\log(\text{turnover})$, $\log(\text{sales})$, year fixed effects interacted with the MNE dummy variable, country-by-size decile-by-year fixed effects, country-by-age decile-by year fixed effects, industry-by-year fixed effects and firm fixed effects. Panel (b) shows results using $\log(\text{fixed tangible assets})$ as the outcome variable. Dark shaded area indicates 90% confidence intervals while the lighter shaded area represents 95% confidence intervals. Standard errors are clustered at the firm level.

Appendix D Tables

Table 5: **The multinational capital advantage, Diff-in-Diff estimates (Robustness)**

Outcome: log(debt)	Excl. IT & FR	Excl. Wholesale & Manufacturing	Excl. GFC and Euro debt crisis	Excl. GUO from IT or FR
	(1)	(2)	(3)	(4)
MNE $\times$ Post _{Short}	0.0194*** (0.0063)	0.0502*** (0.0054)	0.0387*** (0.0066)	0.0490*** (0.0043)
MNE $\times$ Post _{Medium}	0.0665*** (0.0096)	0.1255*** (0.0099)	0.0607*** (0.0157)	0.1219*** (0.0075)
log(turnover)	0.4117*** (0.0031)	0.4201*** (0.0021)	0.4085*** (0.0022)	0.4333*** (0.0019)
log(sales)	0.0286*** (0.0028)	0.0163*** (0.0017)	0.0325*** (0.0019)	0.0177*** (0.0017)
Firm FE	✓	✓	✓	✓
Industry $\times$ year FE	✓	✓	✓	✓
MNE $\times$ year FE	✓	✓	✓	✓
Country $\times$ Size Decile $\times$ year FE	✓	✓	✓	✓
Country $\times$ Age Decile $\times$ year FE	✓	✓	✓	✓
Obs	6.752.521	6.525.483	6.182.058	11.070.347
Adj R ²	0.91	0.90	0.91	0.91

Notes: $Post_{Short}$ is an indicator variable equal to 1 if $j = 0, 1, 2, 3$ i.e. in the year of the crisis and the following three years. This measures the short-term impact of the crisis. $Post_{Medium}$ is an indicator variable equal to 1 if $j = 4, 5, 6$ i.e. between four and six years after the crisis. We refer to this as the medium-term impact of the crisis. Each regression further includes an indicator variable equal to 1 for time periods after year 6 as well as an indicator variable equal to 1 for time periods before $j = -4$. Effectively the DiD coefficients here compare to the time period from $j = -4$ to $j = -1$, i.e. the four years preceding the crisis represent the pre-period. In column (1) we exclude all firms located in either Italy or Russia, in column (2) we exclude all firms whose industry is classified as either *Wholesale and retail trade* or *Manufacturing*, in column (3) we exclude all firms whose crisis event falls in year 2008, 2010 or 2011 and finally in column (4) we exclude all MNE affiliates with a parent company in either Italy or France. *p<0.1; **p<0.05; ***p<0.01 are based on heteroskedasticity and autocorrelation robust standard errors clustered at the firm level.

Table 6: The multinational growth advantage, Diff-in-Diff estimates

	(1)	(2)	(3)	(4)
Outcome:	log(employment)	log(employment)	log(fixed assets)	log(fixed assets)
MNE $\times$ Post _{Short}	0.0467*** (0.0045)	0.0221*** (0.0035)	0.0486*** (0.0076)	0.0283*** (0.0072)
MNE $\times$ Post _{Medium}	0.1501*** (0.0085)	0.0814*** (0.0064)	0.1267*** (0.0140)	0.0629*** (0.0131)
log(turnover)		0.3195*** (0.0021)		0.3730*** (0.0027)
log(sales)		0.0740*** (0.0019)		0.0293*** (0.0024)
Firm FE	✓	✓	✓	✓
Industry $\times$ year FE	✓	✓	✓	✓
MNE $\times$ year FE	✓	✓	✓	✓
Country $\times$ Size Decile $\times$ year FE	✓	✓	✓	✓
Country $\times$ Age Decile $\times$ year FE	✓	✓	✓	✓
Obs	7.600.722	7.600.722	10.603.109	10.603.109
Adj R ²	0.91	0.93	0.83	0.84

Notes: Post_{Short} is an indicator variable equal to 1 if $j = 0, 1, 2, 3$ i.e. in the year of the crisis and the following three years. This measures the short-term impact of the crisis. Post_{Medium} is an indicator variable equal to 1 if $j = 4, 5, 6$ i.e. between four and six years after the crisis. We refer to this as the medium-term impact of the crisis. Each regression further includes an indicator variable equal to 1 for time periods after year 6 as well as an indicator variable equal to 1 for time periods before $j = -4$. Effectively the DiD coefficients here compare to the time period from $j = -4$ to $j = -1$, i.e. the four years preceding the crisis represent the pre-period. Size deciles here are defined using turnover. *p<0.1; **p<0.05; ***p<0.01 are based on heteroskedasticity and autocorrelation robust standard errors clustered at the firm level.

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