DISCUSSION PAPER SERIES

DP21961

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INTERNATIONAL MACROECONOMICS AND FINANCE AND MACROECONOMICS AND GROWTH

ISSN 0265-8003

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Discussion Paper DP21961
Published 21 September 2026
Submitted 15 September 2026

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HETEROGENEOUS CROSS-BORDER FINANCIAL ALLOCATIONS

Abstract

We construct a unique micro-level dataset covering the near universe of France's cross-border financial positions and document three novel facts about firms' financial internationalization. First, cross-border financial positions are highly concentrated, substantially more so than international trade. Second, financial internationalization differs sharply across firms: firms in the bottom 90 percentiles only raise foreign funds, whereas the largest firms both invest and raise funds abroad. Third, newly internationalized firms enter primarily by raising foreign equity. These facts reveal two distinct margins of financial internationalization: a funding margin, through which the majority of firms internationalize by only raising foreign equity, and an investment margin, reached only by the largest firms. We develop a heterogeneous-firm model in which domestic financial imperfections make foreign equity valuable, rationalizing these two margins. Empirically, financial internationalization associates with a rebalancing of capital structure away from costly domestic bank debt and an expansion in firms' equity and size. At the macro level, firm heterogeneity matters: the cross-border allocations of the majority of firms are substantially more affected by country-specific factors than aggregate estimates suggest, because these positions disproportionately reflect the allocations of the largest firms, whose cross-border activities span worldwide largely independently of country characteristics.

JEL Classification: F36, F23, G15

Keywords: N/A

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Acknowledgements
We thank Mateo Fernandez, Francisco Legaspe and Tiago Paul for outstanding research assistance. We are grateful to Cynthia Balloch, Vasco Carvalho, Daniel Ferreira, Xavier Gabaix, Mireia Gine, Dirk Jenter, Oleg Itskhoki, Dima Mukhin, Daniel Paravisini, Romain Ranci\`ere, Stephen Redding, Raman Uppal and to seminar and conference participants of Richmond Fed, Federal Reserve Board, Paris School of Economics, John Hopkins University-SAIS, Janeway Institute-Cambridge, Chicago Booth International Macro and Finance Conference, SITE-Stanford, Global Capital Allocation, LSE-Finance, LSE-CFM, International Monetary Fund-Research Department, Kiel-CEPR, Annual Congress of the EEA 2025, Universidad de San Andres, Franco-German Fiscal Seminar, for helpful comments. The views expressed here are those of the authors and do not necessarily represent those of the Banque de France. This work was funded by UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee [grant number EP/X020916/1].

1 Introduction

Over the past decades, cross-border financial positions have expanded dramatically, reaching unprecedented levels. Yet we know remarkably little about the microeconomic structure of financial internationalization. A key obstacle is the absence of consolidated microdata on cross-border financial operations. As a result, existing research studies individual components—such as foreign direct investment or securities holdings—or focuses on specific margins of financial internationalization, either investing or funding. In this paper, we construct a novel micro-level dataset covering the near universe of France's cross-border financial operations between 2014 and 2018 and use it to uncover the micro structure underlying international financial allocations.

International financial operations are the financial analogue of international trade: they are cross-border exchanges of financial claims rather than goods and services. These operations span a wide range of cross-border financial activities—such as foreign direct investment, portfolio investment, bank deposit and lending, trade credit, derivatives and official reserves—and involve a diverse set of agents, including corporations, banks, other financial intermediaries and the government.[1] Unlike international trade, however, these operations are not systematically recorded in a single source. Given their confidential and heterogeneous nature, data on cross-border financial activities is produced in a decentralized fashion by different official authorities.[2] As a result, there has been no consolidated micro-level dataset capturing the full range of cross-border financial operations.

We fill this gap by merging 12 administrative datasets to construct the first firm-level dataset of cross-border financial positions. For corporations, financial intermediaries—such as banks, mutual funds, hedge funds, among others—, government and public agencies the dataset identifies the instrument, position type (investing or funding), currency, country of destination/source for direct investment (equity capital, inter-company loans and reinvested earnings), portfolio investment (listed shares and bonds) and other investment (trade credit, loans and cash and deposits) and creates a dataset that aggregates precisely to the national statistics.[3] These data allow us to open the black box of international financial operations at the micro level, much as the trade literature has done for trade flows.

We document three novel facts revealing substantial cross-sectional heterogeneity in firms' financial internationalization. First, cross-border financial positions are highly concentrated and skewed, more

[1] Households typically do not participate directly in cross-border financial operations and engage through financial intermediaries. For example, households account for two percent of cross-border portfolio investment assets.

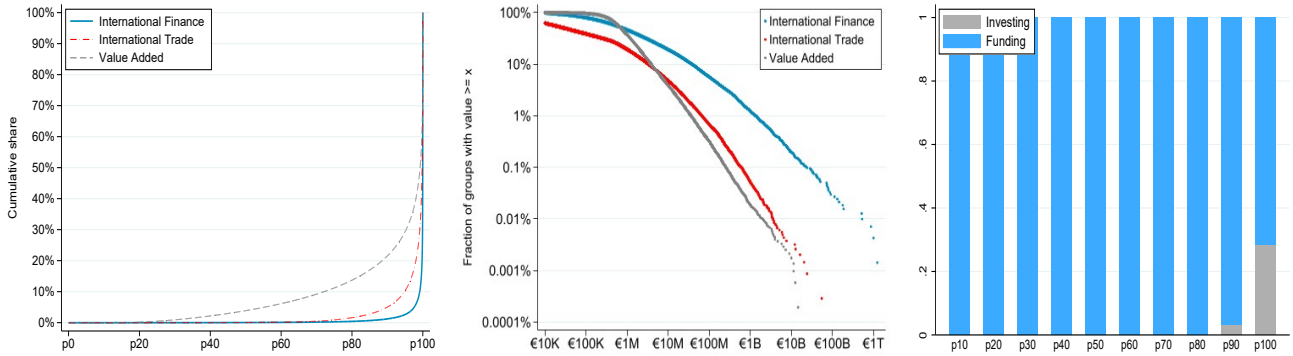
[2] Data on cross-border financial operations are collected by different national agencies, which then compute semi-aggregates to produce official statistics. Official statistics only report at country level a basic description of cross-border financial operations and sectors.

[3] Direct Investment (DI), Portfolio Investment (PI), Other Investment (OI) account for 86% of France's cross-border financial positions, being the remaining 14% derivatives and official reserves. DI, PI and OI are the most important components of a country's International Investment Position (IIP). According to Lane and Milesi-Ferretti (2021), they account for 88% in the U.S., 92% in Germany, 87% in Japan, 77% in the UK between 2005 and 2020.

than international trade. Second, patterns of financial internationalization differ sharply across firms: firms in the bottom 90 percentiles only raise foreign equity from one country, whereas firms in the top 1 percentile both invest and raise funds across countries and financial instruments. Third, newly internationalized firms enter by raising foreign equity and do not engage in international trade. These facts reveal two distinct margins of financial internationalization across the firm productivity distribution: a *funding margin*, through which the bulk of firms become financially internationalized by only raising foreign equity, and an *investment margin*, reached only by the largest firms, which also invest abroad and expand across many countries. We develop a parsimonious heterogeneous-firm framework with domestic financial imperfections that rationalizes these two margins and delivers implications for firms' financing and investment decisions and aggregate cross-border allocations that we validate in data.

France is a highly internationalized economy: its gross international investment position (IIP) increased from 300% to 700% between 2000 and 2023. Yet *Fact 1* shows that only 0.8% of firms in France in 2014 reported having cross-border financial positions. Financially internationalized firms were an order of magnitude larger than the average French firm and accounted for almost 70% of domestic assets.[4] Cross-border financial activity is also highly concentrated among firms operating internationally. The top 1% of these groups accounts for 91% of the gross volume of operations, while the bottom 99% accounts for only 9%, a degree of concentration that exceeds that observed in international trade and value added (left panel of Figure 1). This difference is particularly pronounced in the upper tails, with finance exhibiting a substantially flatter tail. The Pareto exponent for the top 1% is 0.81 for cross-border financial positions, compared with 1.11 for trade and 1.18 for value added (middle panel).[5]

Figure 1: France's Financial Internationalization



Notes: The left panel presents the Lorenz curves for groups' gross cross-border financial positions (investment plus funding), gross international trade (exports plus imports), and value added. The middle panel plots the CCDF. Both axes are in logarithmic scale. The right panel reports the composition of firms' cross-border positions by size, distinguishing investing and funding activities Period 2014-2018.

[4]We consolidate legal entities at the ultimate-owner level to construct economic groups. We discuss the consolidation procedure in detail in Appendix A. Throughout the paper, we use the terms "firms" and "groups" interchangeably.

[5]Table D.1 in Appendix D reports Pareto tail estimates for alternative definitions of the upper tail, ranging from the top 10% to the top 0.5%, as well as estimates based on the Hill estimator, following Gabaix and Ibragimov (2011) and Gabaix (2009). Across specifications, cross-border financial positions consistently exhibit the lowest Pareto exponent.

Fact 2 shows that the financial internationalization pattern differs markedly between the largest and the bottom 90th percentile groups. Firms in the bottom 90 percentile only raise foreign funding, without investing abroad, whereas the largest firms expand into both cross-border funding and investment (right panel of Figure 1). These differences are also reflected in the geographic and currency scope of firms' international positions. Firms in the bottom 90 percentile only raise foreign non-public equity from one country, whereas firms in the top 1 percentile hold positions, on average, in 40 countries and 11 currencies across all financial instruments (see Figure D.1 in Appendix D).

Fact 3 shows that firms enter international finance primarily by raising foreign equity. We establish this fact by focusing on the extensive margin of financial internationalization: firms with no prior cross-border financial positions that undertake a cross-border financial operation for the first time. Entry is dominated by medium-large, non-listed corporations, with an average of 118 employees, that operate predominantly in the service sector (90%) and typically neither engage in international trade (76.6%) nor invest abroad (90.7%).

Taken together, these facts highlight the predominance of a *funding margin* in financial internationalization for the majority of firms (bottom 90 percentile). This funding margin is particularly striking given that France is a capital-abundant economy, located in the 90th percentile of the global capital–labor distribution, for which a benchmark neoclassical framework would predict net capital outflows toward more capital-scarce economies. Instead, the evidence points to access to foreign funding as the main force behind the financial internationalization of the typical firm. The *investment margin*, by contrast, emerges only among the largest firms (top 10 percentile), which also invest abroad and expand their financial operations across many countries.

Motivated by these patterns, we develop a parsimonious heterogeneous-firm framework that rationalizes the cross-sectional heterogeneity in financial internationalization. The model focuses on corporations, which account for the vast majority of financially internationalized firms and new entrants. Firms differ in productivity, which determines the scale of their investment opportunities and hence their external financing needs. Domestic financial imperfections make access to foreign funding valuable to firms with sufficiently large financing needs. We model these imperfections along two dimensions: domestic equity is in limited supply, and bank debt becomes increasingly costly as firms borrow more. Firms can expand their financing by accessing foreign equity, subject to fixed and variable costs. As productivity and financing needs increase, firms first find it optimal to pay the fixed cost of accessing foreign equity and use these additional funds to expand domestic investment. At still higher levels of productivity, diminishing returns to domestic investment make it profitable to pay a second fixed cost and invest abroad. The model thus generates a funding threshold followed by an investment threshold, consistent with the cross-sectional pattern in the data. Hence, a key feature of our model is that firms

sort into both foreign funding and foreign investment based on productivity.

Beyond rationalizing these cross-sectional patterns, the model delivers micro and macro implications that we test in the data. At the micro level, the model predicts that access to foreign equity increases firms' total equity, reduces domestic bank debt and interest payments, and expands investment. At the macro level, the model revisits a central question in the international finance literature: how gravity, currency, and institutional factors shape cross-border financial allocations. With heterogeneous firms, aggregate estimates need not reflect the sensitivity of the typical firm: because international positions are concentrated among the largest firms, which are less sensitive to country characteristics, aggregate coefficients are tilted toward their behavior. The model therefore predicts that aggregate estimates understate the importance of country factors in shaping cross-border allocations for the bulk of firms.

We next test the model's implications. We first show that firms sort into the three regimes predicted by the model. Firms that only access foreign funding are substantially larger and more productive than firms that do not engage in cross-border financial activities, employing three times as many workers and sales. Firms that both raise foreign funds and invest abroad are larger still, with more than seven times the employment and sales of firms that only raise foreign funds. Consistent with foreign equity providing an additional source of funds, domestic bank leverage declines across these firms. Importantly, the probability of exporting is low and does not differ systematically across these firms.

We then focus on the extensive margin, examining changes in firms' real and financial outcomes before and after they become financially internationalized. Because financial internationalization is inherently non-random, we treat firms' decision to internationalize as a revealed preference and ask whether their subsequent outcomes are consistent with the motives predicted by the model. Consistent with the funding channel—and after controlling for initial firm characteristics and five-digit sector fixed effects—firms' total equity raises by 9.1%, bank debt declines by 6.4% and interest expenses by 7.3%, indicating more financing and a rebalancing of their capital structure. Additionally, firms increase investment by 13.9%. The increase in total assets (2%), capital–labor ratio (3%), employment (1.2%) and sales (0.8%) confirm this mechanism. Firms' responses are larger among more productive firms, as implied by the model. We find little support for alternative explanations: financial internationalization is not followed by increases in probability or intensity of trade, the results remain when we exclude foreign acquisitions, and the same financing and investment responses arise with both financial and non-financial foreign investors. These changes provide support for a funding channel of financial internationalization and indicate that foreign equity entry implies an expansion of the firms' financing and investment rather than simply a change in their ownership or financing composition.

We finally examine the macro implications of firm heterogeneity by following a large international finance literature that studies how country factors—such as gravity (distance and GDP), EU member-

ship, currency, and institutional quality—shape aggregate cross-border positions. We estimate analogous relationships at the firm level, regressing firms' country shares on these factors and allowing their sensitivity to vary across the firm productivity distribution. Our micro data reveal substantial heterogeneity beneath aggregate relationships: sensitivity to country characteristics declines sharply with firm productivity. Because cross-border positions are highly concentrated among the largest firms, aggregate allocations disproportionately reflect precisely those firms that are least sensitive to these factors. Consistent with this mechanism, the coefficients estimated from France's aggregate positions closely resemble those of the largest firms and are substantially smaller than those of the average firm. For example, the semi-elasticity to euro denomination is nearly ten times smaller at the aggregate level relative to the average firm (2.2 against 19.9 percentage points). Ranking firms by their gross positions gives sharper results: country factors—other than EU membership—do *not* significantly affect the allocations of the Top 1 percent, whereas EU membership, euro denomination, and destination/source-country GDP strongly shape those of the Bottom 99 percent. We obtain a similar picture when benchmarking firms' geographic allocations against the world allocation: the Top 100 firms allocate across countries much more closely to this benchmark—with a point estimate of close to one—, while the bottom 99% are only about half as closely aligned. Thus, aggregate estimates understate the importance of country characteristics for the bulk of firms because they disproportionately reflect the largest firms, whose allocations are less sensitive to these factors. Heterogeneity in cross-border financial allocations is thus crucial for understanding financial integration and shock propagation across countries.

Related Literature. We contribute to several strands of the literature by providing new insights within each and bridging approaches that have largely developed separately—particularly corporate finance and multinational activity, and granularity and international financial integration—into a single approach.

Our paper relates to the literature on firm heterogeneity in international economics. A large trade literature documents substantial heterogeneity in firms' international activity and, in particular, the concentration of trade among large firms in France (di Giovanni, Levchenko, and Rancière 2011; di Giovanni, Levchenko, and Mejean 2018; Gaubert and Itskhoki 2021; among others). By contrast, much less is known about the heterogeneity underlying international financial operations. Existing work has examined particular components of international financial positions: Bruno and Shin (2015) study cross-border banking flows, while Maggiori, Neiman, and Schreger (2020) use security-level holdings of institutional investors to study international portfolio allocations. Maggiori, Neiman, and Schreger (2024) combine these holdings with bond issuance data to study the currency composition of firms' bonds. By consolidating the microdata underlying international financial statistics, we provide, to our knowledge, the first comprehensive micro evidence on cross-border positions. Our data allow us to uncover the cross-sectional pattern of financial internationalization and develop a heterogeneous-firm

framework that rationalizes firms' financial internationalization. We show that firm heterogeneity is key to understanding how country factors shape aggregate cross-border financial allocations. As such, our findings also relate to the literature on granularity, which shows that fat-tailed firm-size distributions can make idiosyncratic firm-level heterogeneity consequential for aggregate outcomes (Gabaix 2009; Gabaix 2011; di Giovanni, Levchenko, and Mejean 2014; Carvalho and Grassi 2019; Gabaix and Koijen 2024). Our findings extend the evidence on firm-level heterogeneity and granularity to cross-border financial positions, where these features are even more pronounced than in trade and value added.

Second, our paper relates to the literature on foreign direct investment (FDI) and multinational firms (Bernard, Jensen, Redding, and Schott 2009; Ramondo, Rappoport, and Ruhl 2013; Antràs and Yeaple 2014; among others). While this literature has largely viewed FDI through the lens of firms' real activities—such as trade motives or managerial capabilities—we study FDI as a financing decision. Important exceptions include Antràs, Desai, and Foley (2009), who show how financial frictions in destination countries shape FDI, and Manova, Wei, and Zhang (2015), who studies how foreign ownership interacts with financial constraints and export performance. We place financing motives at the center of our analysis, studying domestic firms' decision to receive inward FDI and how access to foreign equity affects their capital structure and investment. Our paper also relates to work on the financial decisions of multinational firms, including currency exposure and hedging (Adams and Verdelhan 2025) and the internal capital markets of affiliates (Desai, Foley, and Hines 2004).

Finally, our paper contributes to the literature studying how gravity, currency, and institutional factors shape cross-border financial allocations. Distance and information frictions (Portes, Rey, and Oh 2001; Portes and Rey 2005), market size (Martin and Rey 2004), currency (Maggiori, Neiman, and Schreger 2020; Colacito, Qian, and Stathopoulos 2025), institutional quality (Reinhart and Rogoff 2004; Alfaro, Kalemli-Ozcan, and Volosovych 2008), and proximity in international banking (Papaioannou 2009) have all been shown to shape international financial positions. Relatedly, Pellegrino, Spolaore, and Wacziarg (2025) quantify how geographic, cultural, linguistic, and policy barriers distort the global allocation of capital across countries. Using microdata, we uncover sharp heterogeneity behind these aggregate relationships and show how firm-level sensitivities shape their aggregate counterparts. In particular, we show that sensitivity to country characteristics declines with firm size and, because cross-border positions are concentrated among the largest firms, aggregate coefficients disproportionately reflect their lower sensitivities. Country characteristics thus matter substantially more for the allocations of the majority of firms than aggregate estimates suggest.

The paper is structured as follows. Section 2 describes the data. Section 3 documents our novel three firm-level facts. Section 4 derives the cross-sectional framework of firms' cross-border financial allocations. Section 5 tests the theoretical implications in the data. The last section concludes.

2 Data

Our dataset provides detailed information on the cross-border financial positions of the public sector and private financial and non-financial agents, vis-à-vis all countries worldwide between 2014 and 2018. Our sample covers a relatively stable period, away from both major financial disruptions—such as the European sovereign debt crisis and the COVID-19 pandemic—and the unusually high capital flows of the previous to the Global Financial Crisis, providing a useful setting for studying the structural forces underlying cross-border financial allocations. For each position involving a French resident and a foreign one, the data record the agent, instrument, currency, country of destination or source and the type of stock (i.e., whether the position is classified as an investing or a funding). A full description of the data can be found in Appendix A.

We construct our dataset by collecting, harmonizing, and merging 12 micro-level datasets used to produce France's IIP, compiled by the Banque de France and complemented with data from the French National Statistical Institute (INSEE). Given the diversity of cross-border financial operations and the agents involved, official statistics are collected by specialized units using distinct methods, with no single unit having access to the full set of microdata. A key step in constructing the dataset is therefore harmonizing the 12 micro-datasets into a common format consistent with the international accounts, ensuring that the resulting micro-level positions aggregate precisely to the IIP statistics. Table A.2 in Appendix A presents France's International Investment Position (IIP) over the period under analysis. We focus on Direct Investment (DI), Portfolio Investment (PI), Other Investment (OI), which account for 86% of France's gross IIP.

Our DI data include equity capital, reinvested earnings and inter-company loans.[6] Our PI data come from the French chapter of the Security Holdings Statistics (SHS) database, collected at the security level for all euro zone countries and put together by the European Central Bank. For PI funding (liabilities), we observe the individual identifiers of issuers, which allows us to reconstruct the portfolio issuance of all French residents held by non-residents and match it exactly with national account statistics. For PI investing (assets), security-level data are available for all holdings, but agent-level attribution is available only for banks. For the remaining agents (corporations, households, and other non-bank financial institutions), PI investing data can only be traced to the institutional sector level. Using the SHS at the sector level, we checked the shares of portfolio assets directly held by corporations, households and other non-bank financial institutions. The shares directly held by corporations and households are less than 3%, and the bulk of the portfolio asset data not covered by our micro dataset

[6] Following the national statistic convention as defined by the BOP and IIP Manual (BPM6), a DI relationship is established when foreign ownership of French assets, or French ownership of foreign ones surpasses a 10% threshold.

arises from investment funds and insurance companies.[7] Therefore, our results provide a lower bound for the gross positions of granular agents, especially those of financial groups. Importantly, this does not affect the segmentation patterns presented below, but the absence of micro-level data of security assets for investment funds and insurance companies overestimates the share of funding of granular financial groups. Our OI data include the cross-border positions on loans and deposits, repurchasing agreements (repo), other accounts payable/receivable, trade credit, and other financial debt between non-affiliated firms. In the subsequent analysis, we restrict the sample to private groups, excluding the French government and national agencies, which are only included in Table 3 for comparative purposes. We define a group as a collection of legal entities that have common ownership.

We also leverage balance sheet and income statement data from the FIBEN (Fichier Bancaire des Entreprises, collected by the Banque de France) to gather information on real and financial variables of corporations.

Summary statistics. Compared with official statistics our micro data accounts for 77% of the aggregate gross position (i.e., sum of investment and funding), 62% of investment & 90% of funding of DI, PI and OI for the period 2014-2018 (Figure D.2 in Appendix D). The lower investment share reflects limitations in attributing portfolio investment assets to non-bank resident agents, as discussed above.

Table 1: Summary Statistics

	Panel A. Number of Groups					
	2014	2015	2016	2017	2018	2014-18
Number of groups	35,178	34,663	39,122	39,142	41,961	38,013
	Panel B. Summary Statistics					
	Mean	1pp	25pp	Median	75pp	99pp
Gross Position	201.6	0.0	0.1	0.8	5.2	1,310.0
Corporations	84.7	0.0	0.1	0.7	4.7	867.4
Financial groups	2,263.0	0.0	0.3	3.3	48.1	11,539.0
Investing	206.9	0.0	0.1	0.6	4.4	1391.0
Funding	128.2	0.0	0.1	0.7	4.7	952.7

Note: Panel B: in millions of euros. Year 2014.

As shown in Panel A of Table 1, we identify an average of 38,013 private groups reporting cross-border financial operations between 2014 and 2018. Panel B reports summary statistics on the firm-level distribution of France's Gross IIP (GIIP), which is highly skewed toward large groups. In 2014, the

[7] Foreign holdings of corporations and household through asset managers are more difficult to trace because of the absence of administrative data and confidentiality reasons, and it is out of the scope of the paper. For a deep analysis on these flows see Coppola, Maggiori, Neiman, and Schreger (2021). PI assets of investment funds and insurance companies account for 28% and 36% of total PI assets, respectively.

gross position of the 99th-percentile group amounted for 1.31 billion of euros, which was 1,680 times larger than that of the median group and 252 times larger than that of the 75th-percentile group. This concentration is present in both corporations and financial groups, and investing and funding activities.

3 Three New Micro-Level Facts About Cross-Border Financial Allocations

This section presents our three main facts. Section 3.1 documents the first fact: international financial activity is highly selective and, conditional on participation, highly concentrated. Section 3.2 presents the second fact: a segmented pattern of international financial integration across firms. Section 3.3 documents the third fact: newly internationalized firms internationalize primarily to raise foreign funds. Section 3.4 discusses the implications of these facts for the cross-sectional patterns of international financial integration and motivates the model developed in Section 4.

3.1 Fact 1: The Select Few: 1% of Firms Engage in International Finance

The bulk of cross-border financial operations are channeled through a small group of large agents. Among the 3.2 million firms in France in 2014, only 0.8% reported any international financial activity (Panel A of Table 2), from which 95% are corporations and the remaining 5% financial groups. This degree of selection is even stronger than the well-documented skewness in international trade: 5.4% of firms trade internationally in France.

Focusing on corporations, those engaged in international financial operations are an order of magnitude larger than both the average firm in France and the average firm involved in international trade. Panel B shows that they hold nine times more domestic assets than the average French firm and nearly four times more than firms engaged in international trade, while employing over four times as many workers as the typical firm and twice as many as firms in trade. Despite being less than 1% of firms in France, they account for 68% of the domestic assets and 36% of employment reported by FIBEN. A similar pattern holds for banks: while two-thirds of banks in France report cross-border financial operations, they account for 84% of all domestic loans.

The Top 1% of the Top 1%: Granularity Within Firms Engaging in Cross-Border Finance

In turn, the vast majority of international financial operations are conducted by a small number of large agents. Column 2 of Table 3 shows that the top 100 groups account for 51% of France's gross

Table 2: Firms Engaging in International Financial Operations

	Panel A: Share of Firms			
	France	Int'l Trade	Int'l Financial Operations	
	(1)	(2)	(3)	(4)
Share of firms	100%	5.42%	0.79%	
	Panel B: Relative Size			
	All Corporations in France	Corporations in Int'l Trade	Int'l Financial Operations	
			Corporations	Banks
Value of domestic assets (mean)	20,649	51,661	183,256	
Employment (mean)	40	96	187	
Share on domestic assets	1.00	0.60	0.68	
Share on employment	1.00	0.60	0.36	
Share of banks w/int'l financial operations				0.67
Share on domestic loans				0.84

Note: year 2014. Value of assets are in thousands of Euros. Source: data on domestic assets and employment comes from FIBEN. Firms in France in 2014: 3.2 millions.

cross-border positions as reported in official statistics.[8] Expanding the sample to the top 1 percentile increases this share to 58%. Together with the French government and national agencies, they account for 70% of France's cross-border financial positions. Beyond the top decile, the incremental contribution is negligible: firms in the bottom 90th percentile add less than 1% to cross-border positions. This pattern holds for both investing and funding activities (columns 3 and 4).

Financial flows are more skewed than trade flows: the top 100 groups account for 89% of gross financial flows compared with 33% for trade, while the top 1st percentile accounts for 93% of financial flows versus 71% for trade (columns 5 and 6).[9] This concentration is also evident when removing financial groups, as corporations belonging to the top 100 groups account for 80% of all corporate financial flows, and those in the top 1st percentile account for 89%. Table D.2 in Appendix D presents a similar pattern when comparing the number of countries in international finance and trade.

Corporations constitute the overwhelming majority of groups and of gross cross-border financial positions across the distribution, except for the top 100 groups—where financial groups dominate in

[8] These categories are mutually exclusive based on firms' gross positions: (i) the top 100 groups (corresponding to the top 0.26 percentile of the firm-level cross-border distribution), (ii) the top 1 percentile (above the 99th percentile), (iii) the top 5 percentile (95th-98th percentiles), (iv) the top 10 percentile (90th-94th percentiles), (v) the top 50 percentile (50th-89th percentiles), and (vi) the bottom 50 percentile (1st-49th percentiles). Given that agents engaging in cross-border activities differ widely in nature (corporations, banks, mutual funds, etc.), there is no single measure of size that can be used to rank them. In this section, we rank agents by their gross cross-border financial positions and show in the next sections that this ranking is strongly correlated with their size (productivity).

[9] To make this comparison, we compute financial flows as year-to-year changes in stocks and estimate each group's share within our dataset, which—for comparability—we compute over our sample rather than official statistics.

Table 3: Granular Cross-Border Financial Operations

Group rank	Definition	Panel A: All Groups					
		Number of Groups	Cumulative Share on National Accounts			Comparison w/Int'l Trade Cumulative Share	
			Gross	Investing	Funding	Finance	Trade
		(1)	(2)	(3)	(4)	(5)	(6)
Top 100 groups	Above percentile 99.74	100	0.51	0.50	0.51	0.89	0.33
Top 1 percentile	Above percentile 99	285	0.58	0.56	0.60	0.93	0.71
Top 5 percentile	Percentiles 95 to 98	1,565	0.63	0.61	0.66	0.98	0.90
Top 10 percentile	Percentiles 90 to 94	1,953	0.64	0.61	0.67	0.99	0.95
Top 50 percentile	Percentiles 50 to 89	15,654	0.65	0.62	0.68	1.00	1.00
Bottom 50 percentile	Percentiles 1 to 49	19,561	0.65	0.62	0.68	1.00	1.00
Including French Government and Agencies			0.77	0.62	0.90		
		Panel B: Corporations					
		Share on		Mean		Share on Aggregate	
		# of groups	Value	Employees	Assets	Employees	Assets
Top 100 groups	Above percentile 99.74	0.65	0.31	10,064	35,397	0.06	0.31
Top 1 percentile	Above percentile 99	0.72	0.73	2,801	5,109	0.11	0.42
Top 5 percentile	Percentiles 95 to 98	0.85	0.79	710	924	0.18	0.54
Top 10 percentile	Percentiles 90 to 94	0.91	0.89	405	290	0.23	0.59
Top 50 percentile	Percentiles 50 to 89	0.95	0.92	111	52	0.33	0.66
Bottom 50 percentile	Percentiles 1 to 49	0.97	0.82	40	13	0.36	0.67

Note: Panel A: column 1 presents the number of groups. Columns 2 to 4 report the share of the (absolute value) positions on official statistics. Column 5 and 6 document the share of gross international flows and gross trade (in sample). *Panel B:* Columns 1 and 2 report the share of corporations in the number of groups and gross value by category. Columns 3 and 4 present averages values of employment and assets (millions of euros) within each category for corporations. Columns 5 and 6 report shares on the aggregate. Average 2014-18.

value (69% versus 31% for corporations), as shown in Panel B. This pattern is especially pronounced below the 95th percentile, where corporations account for more than 90% of groups and over 80% of gross value. There are substantial size disparities across firms: corporations in the top 100 groups are vastly larger, employing on average 10,064 workers compared with 40 in the bottom 50th percentile, and holding roughly 2,700 times more assets (columns 3 and 4). Despite being much smaller and accounting for only a small fraction of cross-border financial operations, corporations in the bottom 99th percentile remain economically meaningful in the domestic economy, accounting for 25% of employment and assets (columns 5 and 6).

The granularity in firms' financial internationalization has meaningful implications for France's financial integration. A counterfactual exercise shows that, if all internationalizing firms had the same external position than the median firm engaging in international financial operations (p50), France's gross IIP would decline from 347% over GDP to 1% (Table D.3 in Appendix D).[10]

[10]Its cross-country allocation would also change substantially: only 15% of positions would be with non-EU countries, and only 8% would be denominated in non-euro currencies. These results are computed using our firm-level data and France's GDP. Figure D.3 in Appendix D reports France's net IIP based on national accounts data.

Lastly, it is worth noting that granularity is not driven by state-owned firms or asset management firms. Tables D.4 and D.5 in Appendix D show that the Top 100 groups still account for half of gross positions, and the top 1 percentile for 57% when excluding state-owned firms and the top 50 French asset managers (sufficient given the sector's high concentration).

3.2 Fact 2: Firm Heterogeneity in Cross-Border Financial Allocations

We next examine how the nature of financial internationalization varies across firms. We characterize firms' cross-border positions along three dimensions: the share accounted for by foreign funding, their geographic and currency scope, and their composition across financial instruments.

Investment and funding activities. There is a sharp contrast in foreign investment and funding patterns across firms. As shown in column 1 of Table 4, the typical corporations and financial groups in the bottom 90 percentiles engage exclusively in foreign funding—resulting in an average funding share of 100% of their gross positions. By contrast, the largest firms engage in both cross-border investment and funding activities. Among the top 100 groups, funding accounts for 59% of gross cross-border positions for corporations (Panel A) and 51% for financial groups (Panel B). These shares rise to 62% and 68%, respectively, for corporations and financial groups in the remainder of the top 1%.

Geography. The segmented pattern is also salient in the geographic and currency scope of firms' cross-border activities. Both corporations and financial groups in the bottom 90 percentiles typically hold positions in only one country, generally within the EU, and in one currency, the euro (columns 2-4). By contrast, corporations in the top 100 groups report positions across 86 countries and 16 currencies, while those in the remainder of the top 1% (excluding the top 100) operate across 25 countries and 4 currencies. A similar pattern emerges among financial groups: those in the top 100 report positions across 72 countries and 11 currencies, while those in the remainder of the top 1% hold positions across 42 countries and 6 currencies.

Instruments. The internationalization of the largest and typical firms also differs in the financial instruments used in their cross-border operations.[11] As shown in Panel A, the typical corporation in the bottom 90 percentiles relies almost exclusively on equity—which accounts for 100% of cross-border positions among firms in the bottom 50 percentiles and 93% among those in the 50th–89th percentiles—and, in particular, non-public equity (columns 5 and 6). In contrast, the largest corporations employ a

[11] We distinguish five types of financial instruments: (i) non-public equity, including non-listed shares, reinvested earnings, and inter-company loans; (ii) public equity; (iii) bonds; (iv) bank loans, comprising cross-border loans and other accounts payable/receivable involving a financial institution as counterpart; and (v) trade credit between corporations.

broader set of financial instruments. Among those in the top 100 groups, the share of non-public equity falls to 39%, while public equity accounts for 31% of their cross-border positions, foreign bonds for 25%, trade credit for 4%, and cross-border bank credit for 1%.

This segmented pattern is also evident among financial groups (Panel B). Financial groups in the bottom 90 percentiles tilt their foreign positions toward equity, which accounts for more than two-thirds of their cross-border positions, while bonds represent a smaller share that declines with firm size. By contrast, the largest financial groups rely predominantly on cross-border bonds (64%), followed by bank loans (27%), with only small shares accounted for by public equity (7%) and non-public equity (2%).

Table 4: Segmented Financial Integration

	Investing & Funding	**Geography**			**Instruments**					
	Share of	**Number of**			**Share of**					
	Funding	**Countries**	**Currencies**	**Non-EU Countries**	**Equity**			**Bond**	**Bank Loan**	**Trade Credit**
					Total	**Non-Public Equity**	**Public Equity**			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Corporations										
Top 100 groups	0.59	86	16	61	0.70	0.39	0.31	0.25	0.01	0.04
Top p1	0.62	25	4	13	0.76	0.59	0.17	0.14	0.02	0.08
Top p5	0.68	5	2	2	0.77	0.72	0.05	0.03	0.06	0.14
Top p10	0.75	3	1	1	0.65	0.61	0.04	0.01	0.04	0.30
Top p50	1.00	1	1	1	0.93	0.91	0.02	0.00	0.02	0.05
Bottom p50	1.00	1	1	0	1.00	0.99	0.01	0.00	0.00	0.00
Panel B: Financial Groups										
Top 100 groups	0.51	72	11	51	0.09	0.02	0.07	0.64	0.27	0.00
Top p1	0.68	42	6	29	0.28	0.10	0.18	0.21	0.51	0.00
Top p5	0.86	21	2	11	0.40	0.15	0.25	0.22	0.38	0.00
Top p10	1.00	7	1	2	0.61	0.22	0.39	0.17	0.22	0.00
Top p50	1.00	2	1	0	0.87	0.33	0.54	0.05	0.08	0.00
Bottom p50	1.00	1	1	0	0.95	0.41	0.54	0.01	0.04	0.00

Note: Column 1 reports the share of funding (liabilities) on groups' gross positions. Columns 2 to 4 document the number of countries, currencies and non-EU countries, respectively, in which groups hold positions. Columns 5 to 10 show the value share of instrument in groups' gross positions. Average 2014–18.

The segmented internationalization patterns that we document are not driven either by state-owned firms and asset managers, as our results remain robust when removing them (Tables D.7 and D.8 in Appendix D). Analyzing internationalization by type of national account category—direct investment, portfolio investment and other investment—also offers a similar segmentation pattern: firms in the bottom 90th percentile typically have positions in only one category, most often direct investment,

whereas the largest groups have typically positions in the three categories (Table D.9 in Appendix D). Our results are not driven by the residency of our data. We follow Coppola, Maggiori, Neiman, and Schreger (2021) and restate positions in financial centers with ultimate parent's nationality using their restatement matrix.[12] Table D.10 in Appendix D confirms the segmentation between largest groups and the rest after this restatement. Lastly, Figure D.4 in Appendix D plots the fraction of firms by the number of countries and currencies in which they hold cross-border positions. The figure shows that 76% of corporations hold positions in only one country and 88% in only one currency, while 53% of financial groups hold positions in only one country and 84% in only one currency.

3.3 Fact 3: Equity-Funded Internationalization

We turn now to study the extensive margin of international financial integration. As shown in Table 5, from the 14,388 firms that began engaging in international financial operations between 2015 and 2018 (3,597 firms per year, about 10% of groups operating internationally), 92% were corporations. These firms are typically medium-sized firms (118 employees) that do not engage in international trade (77% do not export or import), operate in the service sector (90%) and entered in the bottom 90th percentile of the distribution of cross-border financial operations (94% of them).

Consistent with our earlier finding that the typical corporation internationalizes financially by only raising foreign funds, almost all newly internationalized firms enter through the funding side: 91% exclusively raise foreign funds, 7% both raise foreign funds and invest abroad, and only 2.5% undertake foreign investment without raising foreign funds. Nearly all firms that start engaging in cross-border financial activities rely on a single instrument (98%), which tends to be non-public equity (93%). Financial internationalization through trade credit (2.3%), bonds (1.1%) or bank loans (3.3%) is rare.

The geographic distribution of their positions further reveals that their counterparts are mainly located in high income countries (and in 69.1% of cases in the EU). Figure D.6 in Appendix D presents a heat-map with the number of entrants per country and shows that the most partners are USA, Germany, Spain, UK and Italy.

In sum, newly financially internationalized firms are typically corporations that do not engage in international trade and whose financial internationalization is equity-funded, primarily through non-public equity, mostly from other high-income countries.

[12] Since the restatement matrix is only available for securities assets of the European Monetary System (EMU), we need to make several assumptions in its application. In particular, we assume that (i) positions reported in direct investment and other investment have the same relocation than securities, (ii) liabilities have the same relocation than assets, (iii) France has the same allocation than the EMU, and (iv) all firms share the same relocation patterns.

Table 5: Profile New Cross-Border Financial Activities

(1)		(2)	
By institutional sector		**By type of stock**	
Share of corporations	92.4	Share w/only funding (liabilities)	90.7
Share of non-public corporations	99.5	Share w/only investment (assets)	2.5
Share of financial groups	7.6	Share w/ both funding and investment	6.8
By rank		**By instrument**	
Top 100 groups (Top p0.26)	0.0	Share of groups w/only one instrument	98.4
Top 1 percentile (p99–p99.74)	0.1	Only equity capital	92.8
Top 5 percentile (p95–p98)	2.1	Only non-listed equity capital	99.4
Top 10 percentile (p90–p94)	4.1	Only trade credit	2.3
Top 50 percentile (p50–p89)	33.3	Only bonds	1.1
Bottom 50 percentile (p1–p49)	60.8	Only bank loans	3.3
By trade status		**By geography**	
No international trade	76.6	EU	69.1
By sector		**Size of corporations**	
Agriculture	1.3	Employment	118
Manufacturing	8.4	Sales (millions €)	26.9
Services	90.3	Fixed assets (millions €)	8.0

Note: Values expressed in %. Period: 2015–18.

3.4 Implications for Cross-Border Financial Allocations

Our facts reveal three salient features of cross-border financial allocations. First, financial internationalization is carried out by a small number of corporations and financial groups and, conditional on participation, cross-border financial activity is in turn highly concentrated. Second, the pattern of financial internationalization differs sharply across firms. While the median firm internationalizes by raising non-public equity from a single foreign country, firms in the top 1% engage in both cross-border investment and funding across multiple countries and through multiple financial instruments. Third, the extensive margin mirrors the pattern of the median firm: newly internationalized firms internationalize financially by raising foreign non-public equity.

While the first two facts characterize both corporations and financial groups, the third pertains predominantly to corporations. In what follows, we focus our analysis on corporations, which more broadly account for the vast majority of financially internationalized firms and, with the exception of the top 100 groups, for the majority of cross-border positions within each size group.

Having documented these patterns, we next ask what economic forces can account for the observed form of financial internationalization. The evidence helps distinguish among three broad explanations for the financial internationalization of the typical corporation: supporting international trade, undertaking

foreign investment, and accessing foreign sources of funding. International trade does not appear to be the predominant explanation, as the bulk of corporations engaging in cross-border financial activities do not export or import and operate in the service sector. Among corporations in the bottom half of the size distribution, 70% do not trade, as neither do 54% of those between the 50th and 89th percentiles (Table D.11 in Appendix D). Similarly, newly internationalized firms rarely engage in international trade. Foreign investment provides a natural alternative explanation. France is a capital-abundant economy, lying in the 90th percentile of the world capital–labor distribution (Figure D.5 in Appendix D), and a benchmark neoclassical framework would thus predict capital to flow from France to less capital-abundant economies. Yet the typical firm and entrants exhibit the opposite pattern: they participate almost exclusively as a recipient of foreign funding rather than as an investor abroad. The evidence thus points to access to foreign funding as the predominant form of financial internationalization for the typical corporation.

Motivated by these patterns, Section 4 develops a theoretical framework that rationalizes the cross-sectional structure of financial integration. Our framework also delivers additional implications for firms' capital structure and real activity, as well as for aggregate cross-border allocations. We examine these predictions in Section 5.

4 A Cross-Sectional Framework of Firms' Cross-Border Financial Allocations

We develop a parsimonious framework to rationalize the cross-sectional heterogeneity in financial internationalization across corporations documented above. This static framework relies on standard ingredients from the corporate and international finance literatures to characterize firms' financing and investment decisions and generates the two margins. The first—the *funding margin*—is the decision to access foreign equity funding, which characterizes nearly all internationally active firms.[13] The second—the *investment margin*—is the decision to expand from foreign funding into cross-border investment, a margin reached only by the largest firms. We introduce each margin in turn.

We begin with the funding margin. The key question is why some firms find it valuable to access foreign sources of equity while others rely exclusively on domestic financing. In the model, this decision depends on firms' financing needs. Firms differ in productivity, which determines the scale of their investment opportunities and, consequently, their demand for funds. Under the Modigliani and Miller (1958) paradigm, however, the source of financing is irrelevant for firms' real decisions: raising foreign rather than domestic equity merely changes the identity of the firm's shareholders and has no effect on

[13] We focus on equity funding following the empirical evidence presented in the previous section, as cross-border bank debt, trade credit, and bonds account for a negligible share of the positions of the bottom 90th percentile and entrants.

its real operations or capital structure. The model thus requires departures from this benchmark. In the presence of local financial imperfections, foreign equity becomes valuable to the firm.

There are two main distinct and complementary roles for foreign equity to add value. The first role refers to the availability of funds. If domestic equity is in limited supply, foreign investors expand the pool of capital available to the firm. Consistent with this view, Fratto, Gatti, Kivernyk, Sinnott, and van der Wielen (2024) show that European firms face increasing constraints in accessing domestic financing when they transition from the startup to the growth stage, leading them to seek funding abroad. Similarly, Direction Générale du Trésor (2021) reports a shortage of domestic capital to finance the expansion of young and growing firms in France and Europe. The second role refers to the choice across different financial instruments, particularly bank debt, given the traditional bank-based nature of the French financial system. Under credit market imperfections, access to foreign equity can also affect the firm's optimal financing mix. Foreign equity may reduce reliance on costly domestic debt, allowing firms to rebalance their capital structure while simultaneously financing additional investment. Our model combines these two channels. For less productive firms, domestic sources of finance are initially sufficient. As productivity increases, firms' financing needs eventually exceed domestic financing capacity and thus firms access foreign equity. They use the additional equity funds to expand domestic investment while optimally rebalancing their capital structure.

The most productive firms face a second margin. Once diminishing returns reduce the profitability of additional domestic investment, firms expand from foreign funding into cross-border investment.[14]

We set up the model in Section 4.1 and characterize firms' financing and investment decisions in Section 4.2. We characterize the resulting cross-sectional pattern of international financial operations in Section 4.3. We then present the funding channel of financial internationalization and derive its micro-level implications for firms' capital structure and investment in Section 4.4. Finally, we derive the macro-level implications of firm heterogeneity in Section 4.5.

4.1 Environment

The economy is populated by a continuum of heterogeneous firms. Firms differ in productivity, denoted by z, which is distributed according to a Pareto distribution, $P(z) = 1 - \left(\frac{z_0}{z}\right)^{\theta}$, where $z \geq z_0$ and $\theta > 0$. More productive firms have more profitable investment opportunities. We consider a static, partial-equilibrium environment in which prices and market size are taken as given, abstracting from general-equilibrium effects.

[14]The decision to establish a foreign affiliate and its location has been extensively studied in the FDI literature. See for example Helpman, Melitz, and Yeaple (2004); Bernard, Jensen, Redding, and Schott (2009), Antràs and Yeaple (2014); Fillat and Garetto (2015); Ramondo, Rodriguez-Clare, and Tintelnot (2015), among others. We model the foreign investment decision parsimoniously, as our objective is to characterize the cross-sectional pattern of firms' financial internationalization.

The firm first raises external funds and then chooses its optimal level of investment, conditional on the available financing. Investment exhibits decreasing returns to scale and can be undertaken either domestically or abroad, with foreign investment requiring the payment of a fixed cost.

Financing. There are two financial-market imperfections in the model. First, domestic non-public equity is in short supply. In particular, we let each firm start with an existing domestic ownership network—including founders, family owners, incumbent shareholders, etc. Before the external financing stage, this domestic ownership network commits a fixed amount of domestic equity, $\bar{E}_D$. We let $\bar{E}_D$ reflect the depth of the domestic equity market and be small enough such that firms need to resort to other sources of financing. For simplicity, we also assume that firms do not hold cash. These assumptions are consistent with the evidence presented in Lé and Vinas (2024), who document that equity and cash holdings finance less than 5% and 8% of non-public French firms' investment. Most of their investment is financed with bank debt.[15]

Second, there is asymmetric information between the firm and external investors. In the spirit of Myers and Majluf (1984), firms possess private information about the quality of their investment project, while external financiers do not perfectly observe this quality. There are two types of financiers: domestic bank debt and foreign non-public equity that differ on their ability to acquire information. For expositional simplicity, we focus here on non-public equity. Section 4.5 introduces public equity and examines its implications.

- *Domestic bank debt.* Banks acquire information through ongoing screening and risk assessment. We capture the associated intermediation costs through a convex lending function, reflecting that larger loans require more intensive due diligence, including audits, verification, and stress testing.[16] Let $\phi > 0$ parameterize the degree of convexity. Specifically, for each unit of debt D, the bank requires a return $r(D)$ above the risk-free rate r_f. The debt service is $C_D(D) = (1 + r(D))D = (1 + r_f)D + \frac{\phi}{2}D^2$.

- *Foreign equity.* Unlike domestic equity, foreign equity is unconstrained, but firms must incur a fixed cost to establish a relationship with international investors, $\kappa_F > 0$, which captures the costs of matching with foreign investors. Conditional on paying the fixed cost, foreign investors require a return equal to

[15] Unfortunately, our data does not report domestic equity issuance, which prevents us from comparing the domestic versus foreign equity margins. Given the empirical evidence in Lé and Vinas (2024), Fratto, Gatti, Kivernyk, Sinnott, and van der Wielen (2024) and Direction Générale du Trésor (2021), and that firms employ foreign equity funding, we can however conjecture that domestic equity market might be limited.

[16] An increasing marginal cost of debt is a common feature of models with financial frictions in the corporate finance, international macro and firm heterogeneity literatures. These can arise, for example, from costly monitoring and verification or from endogenous default risk (Townsend 1979; Gale and Hellwig 1985; Arellano 2008; Salomao and Varela 2021). We capture this feature parsimoniously through a quadratic debt-service schedule, as in Hardy, Saffie, and Simonovska (2026).

the risk-free rate plus a premium, $r_f + \tau_F$, which compensates for the costs of active monitoring arising from information asymmetries.[17]

Investing. Firms can allocate investment I between domestic and foreign projects. Let I_D denote domestic investment and I_F foreign investment, such that $I = I_D + I_F$. Investment in location $j \in \{D, F\}$ generates return $R_j(I_j)$ where $R_j'(I_j) > 0$ and $R_j''(I_j) < 0$, capturing diminishing marginal returns in each location.[18] Undertaking foreign investment additionally requires paying a fixed cost $\kappa_I > 0$. The net return from investment is: $R_I(I) = R_D(I_D) + R_F(I_F) - \kappa_I$.

4.2 Firms' Optimal Financing and Investment Decisions

We begin by describing the financing decision through which the firm chooses its optimal financing regime. If the firm does not access foreign equity, it solves[19]

$$\begin{aligned} V^{\text{D only}} = \max_{I>0, D\geq 0} \; & R_I(I) - (1+r_f)D - \frac{\phi}{2}D^2. \\ \text{s.t.} \quad & I = \bar{E}_D + D. \end{aligned} \tag{1}$$

The first-order condition for domestic debt: $1 + r_f + \phi D^{\text{D only}} = \frac{\partial R_I(I^{\text{D only}})}{\partial I}$, implies that the firm equates the marginal cost of additional domestic bank borrowing to the marginal return of investment.

If the firm accesses foreign equity, it solves

$$\begin{aligned} V^{\text{D\&F}} = \max_{I>0, D\geq 0, E_F>0} \; & R_I(I) - (1+r_f)D - \frac{\phi}{2}D^2 - \kappa_F - (1+r_f+\tau_F)E_F. \\ \text{s.t.} \quad & I = \bar{E}_D + D + E_F, \end{aligned} \tag{2}$$

The first-order conditions for D and E_F give the optimal domestic debt and foreign equity

$$D^{\text{D\&F}} = \frac{\tau_F}{\phi} \qquad \text{and} \qquad E_F^{\text{D\&F}} = I_D^{\text{D\&F}} - \bar{E}_D - \frac{\tau_F}{\phi}. \tag{3}$$

Equation (3) shows that the optimal domestic bank debt is pinned down by the value at which the

[17] Fixed and variable costs of external equity issuance are standard in corporate finance models with financial frictions. We capture these frictions through a fixed cost of accessing foreign equity and a proportional cost of funds, as in Hennessy and Whited (2007); Hennessy, Levy, and Whited (2007); Bolton, Chen, and Wang (2013). The fixed component generates selection into foreign equity financing, while the proportional component increases with the amount of equity raised. The latter also ensures an interior financing choice between debt and equity.

[18] Our decreasing-returns specification provides a parsimonious way of generating positive selection into foreign investment. While the underlying mechanism differs, the resulting productivity sorting is consistent with heterogeneous-firm models of multinational production, in which the more productive firms select into FDI; see, for example, Helpman, Melitz, and Yeaple (2004) and Yeaple (2009).

[19] We implicitly assume that all values are evaluated at the end of the period. Equivalently, if values were discounted to the present using a common risk-free rate r_f for debt and equity, all the model results would remain unchanged.

marginal cost of bank debt equals the marginal cost of foreign equity. Foreign equity finances the gap between investment needs and the funds available from domestic equity and optimal bank debt. The firm accesses foreign funding whenever the value in the financially internationalized regime is higher than the value on the domestic bank debt only regime: $V^{D\&F} \geq V^{\text{D only}}$. We define the *funding threshold* z_F by: $V^{D\&F}(z_F) = V^{\text{D only}}(z_F)$. Then, foreign equity is given by

$$E_F^*(z) = \begin{cases} 0, & \text{if } z < z_F \quad \text{(domestic financing only)}, \\ > 0, & \text{if } z \geq z_F \quad \text{(domestic and foreign financing)}. \end{cases} \tag{4}$$

The firm undertakes foreign investment whenever, conditional on optimal financing, the value of investment both locally and cross-border V_{I_F} is higher than the value of remaining a local investor only V_{I_D}, that is, $V_{I_F} \geq V_{I_D}$. Since both local and foreign investment return functions are strictly concave, we can define an *investment threshold* z_I—given by $V_{I_F}(z_I) = V_{I_D}(z_I)$—such that firms with productivity below z_I invest exclusively in the domestic market, whereas firms with productivity above z_I also undertake foreign investment:

$$I_F^*(z) = \begin{cases} 0, & z < z_I \quad \text{(domestic investment only)}, \\ > 0, & z \geq z_I \quad \text{(domestic and foreign investment)}. \end{cases} \tag{5}$$

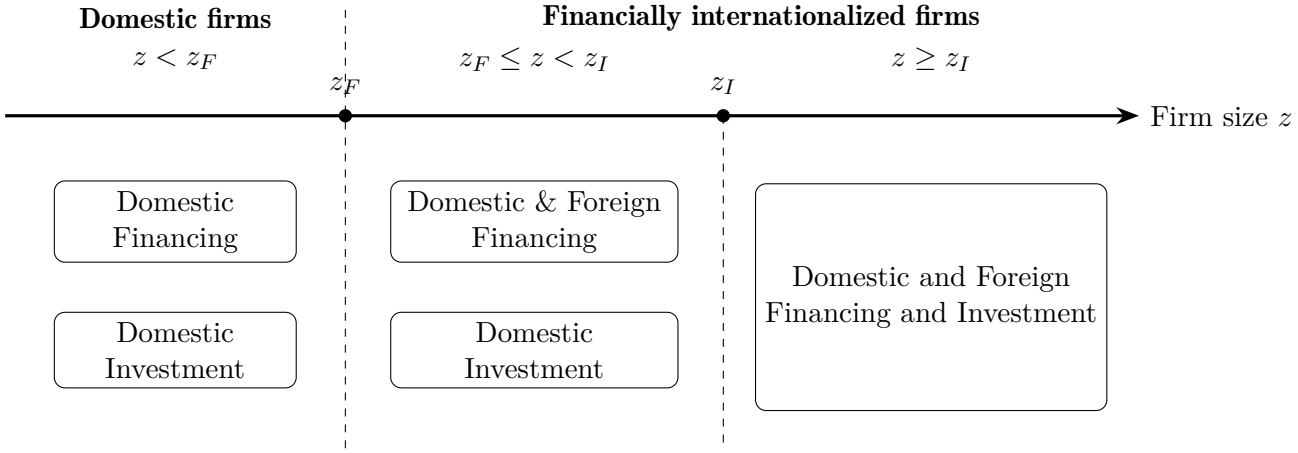
To replicate the cross-sectional pattern documented above—namely, firms access foreign funding before undertaking foreign investment along the firm productivity distribution—we assume that, at the productivity threshold for foreign financing z_F, the gains from allocating domestic and foreign investment are still insufficient to cover the fixed cost of establishing foreign operations: $V_{I_D}(z_F) > V_{I_F}(z_F)$. Then, $z_I > z_F$ and less productive firms using foreign financing initially invest the additional funds entirely in domestic projects. Only sufficiently productive firms, with larger investment opportunities, eventually find it profitable to incur the fixed cost of establishing foreign operations.

4.3 The Cross-Sectional Pattern of International Financial Integration

The financing and investment decisions generate two productivity thresholds—funding and investment—that organize firms' international financial integration. We illustrate these thresholds in Figure 2.

For firms with productivity below the funding threshold, $z < z_F$, domestic bank debt and domestic equity provide sufficient financing to exploit all profitable investment opportunities. For these firms, the fixed cost of accessing foreign equity exceeds its benefits, and they therefore remain domestically financed and invest exclusively at home. For firms with productivity above the funding threshold and below the investment threshold—$z_F \leq z < z_I$—foreign equity becomes valuable because it allows the

Figure 2: Cross-section of firms' financial internationalization.



Notes: This figure illustrates the cross-sectional pattern of firms' financial internationalization across the firm productivity distribution.

firm to expand domestic investment while reducing its reliance on costly domestic bank debt. These firms become financially internationalized, but they remain domestic investors. For firms with productivity above, $z \geq z_I$, investment opportunities are large enough so that they find it optimal to pay the fixed cost of establishing foreign operations. These firms both raise foreign funding and undertake foreign investment. Proposition 1 summarizes this cross-sectional pattern (see Appendix B for its proof).

Proposition 1. *[The Cross-Section of Financial Internationalization] There exist two productivity thresholds z_F and z_I, with $z_F < z_I$, such that firms with productivity below z_F remain domestically financed, firms with productivity between z_F and z_I access foreign funding but invest only domestically, and firms with productivity above z_I both access foreign funding and undertake foreign investment:*

$$\begin{cases} z < z_F: & E_F^*(z) = 0, \quad I_F^*(z) = 0, \\ z_F \leq z < z_I: & E_F^*(z) > 0, \quad I_F^*(z) = 0, \\ z \geq z_I: & E_F^*(z) > 0, \quad I_F^*(z) > 0. \end{cases} \tag{6}$$

4.4 The Funding Channel of Financial Internationalization

To assess the main force underlying the model—namely, that firms internationalize financially to expand their access to financing—we focus on the extensive margin of financial internationalization and study changes in firms' financing, capital structure, and investment after entry into cross-border finance. We ask whether these changes are consistent with the mechanism that, in the model, makes financial

internationalization valuable to firms. We characterize firms' financing and investment decisions in the following proposition, which we then test in the data. Appendix B presents the proofs.

Proposition 2. *[The Funding Channel] When a firm becomes financially internationalized by accessing foreign equity, its financial and investment decisions change as follows:*

1. *Equity expansion. Total equity increases:*

$$\Delta E(z) \equiv E^{D\&F}(z) - E^{D\ only}(z) = E_F^{D\&F}(z) > 0. \tag{7}$$

2. *Debt reduction. The firm rebalances its capital structure away from domestic bank debt:*

$$\Delta D(z) \equiv D^{D\&F} - D^{D\ only}(z) < 0. \tag{8}$$

3. *Interest-payment reduction. Interest payments on domestic bank debt decline:*

$$\Delta IP(z) \equiv IP(D^{D\&F}) - IP(D^{D\ only}(z)) < 0 \tag{9}$$

4. *Investment expansion. Investment increases:*

$$\Delta I_D(z) \equiv I_D^{D\&F}(z) - I_D^{D\ only}(z) > 0. \tag{10}$$

It is useful to contrast these implications with the Modigliani–Miller benchmark. Under frictionless capital markets, none of the adjustments described in Proposition 2 would necessarily follow from accessing foreign equity. Foreign equity could simply substitute for domestic equity, leaving total equity unchanged; the firm's capital structure and interest payments would be unaffected; and financing choices would not alter investment decisions. These implications arise in our model because domestic financial market imperfections make access to foreign equity valuable: it expands the funds available to the firm and allows it to substitute away from costly domestic bank debt, thereby affecting both its capital structure and investment decisions.

4.5 From Micro to Macro: Financial Allocations Across Countries

In this section, we extend the model to assess its aggregate implications for aggregate cross-border financial allocations. Motivated by our finding that the largest firms engage in both funding and

investment across multiple foreign destinations and guided by the empirical evidence, we enrich both sides of firms' cross-border activities. On the funding side, firms can access public equity and, thereby, raise funds from investors dispersed across countries. On the investment side, they can undertake foreign non-public equity investment across multiple destinations.[20] This extended framework allows us to study how firm heterogeneity interacts with heterogeneity across countries to shape aggregate cross-border financial allocations.

Public-Equity Funding. Becoming publicly listed provides an additional source of funding that, alongside foreign non-listed equity, enables firms to reduce their reliance on costly domestic bank debt. To raise public equity E_L, the firm incurs a fixed listing cost κ_L; in exchange, it gains access to a broad pool of domestic and foreign public-equity investors. Public equity carries a required return τ_L. We let $\kappa_L > \kappa_F$, reflecting the additional fixed costs associated with accessing public equity markets, including listing, underwriting, regulatory, disclosure, and compliance costs. This assumption is consistent with our empirical evidence of Section 3 that firms access foreign non-public equity substantially earlier in the size distribution, while public equity is concentrated among the largest firms, and with the literature documenting substantial fixed costs of going public and strong economies of scale in public equity issuance (Ritter 1987; Lee, Lochhead, Ritter, and Zhao 1996). At the same time, we assume that the required return on listed equity is lower than that on foreign non-public equity, $\tau_L < \tau_F$. This captures the greater liquidity and broader investor participation associated with public equity markets and is consistent with the literature showing that illiquidity commands a return premium (Amihud and Mendelson 1986; Acharya and Pedersen 2005), and that the greater liquidity and investor participation associated with public ownership can lower firms' cost of capital (Boot, Gopalan, and Thakor 2008).

The firm chooses the financing regime that delivers the highest value among three alternatives: relying exclusively on domestic financing and bank debt, $V^{\text{D only}}(z)$; additionally raising foreign non-public equity, $V^F(z)$; or becoming publicly listed, $V^L(z)$, where the value of being public is[21]

$$V^L(z) = \max_{I,D,E_L} \left\{ R_I(I) - (1+r_f)D - \frac{\phi}{2}D^2 - \kappa_L - (1+r_f+\tau_L)E_L \right\} \\ \text{subject to} \qquad I = \bar{E}_D + D + E_L, \qquad D \geq 0, \qquad E_L > 0. \tag{11}$$

[20] These modeling choices are guided by the data. Equity accounts for the bulk of cross-border positions across firms (Table 4). Table D.12 in Appendix D further shows that non-public equity funding originates from essentially one country throughout the distribution, whereas the number of countries associated with public equity funding rises sharply with firm size, reaching 53 among the Top 100 firms. On the investment side, foreign non-public equity exhibits a cross-country gradient, with the Top 100 firms investing across four countries on average. We therefore model multi-country funding through public equity and multi-country investment through non-public equity. Firm-level geographic information on listed-equity investment is unavailable.

[21] Conditional on issuing public equity, the first-order condition for debt implies $D^L = \frac{\tau_L}{\phi}$. As $\tau_L < \tau_F$, $D^L < D^F$.

Firms with small external financing needs remain domestic. As productivity and financing needs increase, firms either raise foreign non-public equity or become publicly listed. They face a fixed-cost–marginal-cost trade-off. The value of the marginal-cost advantage of listed equity, $\tau_F - \tau_L$, increases with z, while the additional fixed cost $\kappa_L - \kappa_F$ remains constant. Hence, firms with moderate external financing needs do not find it worthwhile to incur the large listing cost and instead raise foreign private equity. As the scale of profitable investment opportunities increases, the lower marginal cost of listed equity becomes increasingly valuable and the firm becomes public. Hence, there exists a productivity threshold z_L satisfying $V^L(z_L) = V^F(z_L)$, above which the value of being public is higher than the value of raising private foreign equity $V^L(z) > V^F(z)$, and the firm becomes public. For a sufficiently large κ_L, the threshold to become listed is higher than the productivity threshold to raise foreign equity: $z_L > z_F$, as we find in data.

Foreign investors may face costs of holding a French firm's equity due to information acquisition, monitoring, limited familiarity, and other country-specific factors. We summarize these costs by $a_c(z) \geq 0$, where c captures investor-country characteristics, and assume $a_c'(z) < 0$, reflecting that larger firms generate more public information and are easier for foreign investors to evaluate. The investor holds the firm's listed shares whenever this return is at least as large as implied cost, $a_c(z) \leq \tau_L$.[22] This defines a country-specific productivity threshold z_c^L, implicitly determined by $a_c(z_c^L) = \tau_L$, such that investors from country c hold the firm's listed equity whenever $z \geq z_c^L$.

Two distinct patterns emerge across firms. First, firms sort across financing regimes according to the scale of their financing needs: less productive firms rely exclusively on domestic financing, intermediate firms access foreign non-public equity, and only the largest firms incur the fixed cost of becoming publicly listed. Second, conditional on listing, larger firms attract investors from a broader set of foreign countries. Since $a_c'(z) < 0$, the set of countries for which $z \geq z_c^L$ expands with firm productivity.

Investing. A firm can pay a fixed cost κ_c to invest in country c and obtain a return $R_F(\theta_c(z)I_c)$, where $\theta_c(z)$ captures country-specific characteristics—such as information asymmetries, institutional quality, market size, etc—that affect the productivity of investment in that country. We let larger firms be less sensitive to these characteristics, as larger firms can better adapt their operations to local conditions.[23] Conditional on its financing decision, the firm solves

[22] These investor-side costs are borne by investors and therefore do not affect the return paid by the firm. Rather, they reduce the net attractiveness of holding the firm's listed shares. An investor in country c obtains a net return of $1 + r_f + \tau_L - a_c(z) \geq 0$.

[23] Empirical evidence shows that country-specific factors become less important with firm productivity, and larger and more internationally connected firms are better able to overcome country-level barriers. In international finance, see for example Desai, Foley, and Hines (2006), Auguste, Dominguez, Kamil, and Tesar (2006), Alfaro, Chari, and Kanczuk (2017) and Varela (2018). In international trade, see for example Holmes and Stevens (2014) and Chaney (2018).

$$\begin{aligned} \max_{I_D,\{I_c\}_{c\in\mathcal{C}}} \quad & \left\{ R_D(I_D,z) + \sum_{c\in\mathcal{C}} \left[R_F(\theta_c(z)I_c) - \kappa_c \, \mathbf{1}\{I_c > 0\} \right] \right\} \\ \text{subject to} \quad & I_D + \sum_{c\in\mathcal{C}} I_c = X(z). \end{aligned} \tag{12}$$

Firms allocate foreign investment until the marginal return is equal to domestic investment $\frac{\partial R_D(I_D)}{\partial I_D} = \theta_c(z)R_F'(\theta_c(z)I_c)$. As investment continues to expand, diminishing returns in both the domestic market and the existing foreign destinations make it optimal to enter additional foreign countries. Then, for any pair of active foreign destinations: $\theta_c(z)R_F'(\theta_c(z)I_c) = \theta_j(z)R_F'(\theta_j(z)I_j)$. There exists a sequence of productivity thresholds, $z_I < z_2^I < z_3^I < \cdots$, such that firms progressively expand the geographic scope of their foreign investment.

Geographic scope of gross positions across firms. For each firm, define its gross position with country c as $G_c(z) \equiv F_c(z) + I_c(z)$, where F_c and I_c denote funding from and investment in country c and $G'(z) > 0$. The share of foreign country c in firm's gross position is

$$s_c(z) \equiv \frac{F_c(z) + I_c(z)}{\sum_{j\in\mathcal{C}}[F_j(z) + I_j(z)]}.$$

The model generates a transition from highly concentrated international positions among less productive firms toward increasingly geographically dispersed positions among more productive firms. In particular,

$$s_c(z) = \begin{cases} \mathbf{1}\{c = c^F\}, & z_F \le z < z_I, \\ \dfrac{E_F(z)\mathbf{1}\{c = c^F\} + I_c(z)}{E_F(z) + \sum_{j\in\mathcal{C}_I(z)} I_j(z)}, & z_I \le z < z_L, \\ \dfrac{E_c^L(z) + I_c(z)}{\sum_{j\in\mathcal{C}_L(z)} E_j^L(z) + \sum_{j\in\mathcal{C}_I(z)} I_j(z)}, & z \ge z_L, \end{cases} \tag{13}$$

where c^F denotes the country of the firm's foreign private-equity investor, $\mathcal{C}_I(z) = \{c : I_c(z) > 0\}$ is the set of foreign countries in which the firm holds investment and funding positions, and $\mathcal{C}_L(z) = \{c : E_c^L(z) > 0\}$ is the set of foreign countries whose investors hold the firm's listed equity. The model therefore implies a productivity-dependent structure for firms' country shares. Firms just above the foreign-funding threshold concentrate their international position in a single funding country. As productivity rises above z_I, foreign investment introduces additional countries into the firm's gross position. Above z_L, public listing further expands the geographic scope of funding, so that both the

funding and investment components of gross positions are spread across multiple countries.

Country-specific factors affect firms heterogeneously. Let $\mathbf{q}$ be a vector country-specific characteristics such that the funding and investment costs are: $a_c(z) \equiv a(z, \mathbf{q})$, and $\theta_c(z) \equiv \theta(z, \mathbf{q})$. We then define the sensitivity of the firm's share of country c to the country-specific characteristic as

$$\beta_c(z) \equiv \frac{\partial s_c(z; \mathbf{q})}{\partial q_c},$$

with $s_c(z; \mathbf{q}) = \frac{F_c(z;\mathbf{q})+I_c(z;\mathbf{q})}{\sum_{j\in\mathcal{C}}[F_j(z;\mathbf{q})+I_j(z;\mathbf{q})]}$. Conditional on a positive country position, the absolute sensitivity of the country's share of the firm's gross international position to country-specific characteristics declines with productivity:

$$\frac{\partial}{\partial z} |\beta_c(z)| < 0.$$

Thus, country-specific characteristics should have a larger influence on the geographic allocation of international positions among smaller firms and a progressively smaller influence among larger firms.

Proposition 3. *[Firm heterogeneity and aggregate sensitivity] Let $\mathcal{C}(z)$ denote the set of countries in which a firm with productivity z holds a positive international position, and define $A_c(z) \equiv \mathbf{1}\{c \in \mathcal{C}(z)\}$. For firms active in country c, define the unweighted average firm-level sensitivity as $\bar{\beta}_c \equiv \mathbb{E}_P[\beta_c(z) \mid A_c(z) = 1]$. Define the corresponding aggregate sensitivity as $\beta_c^F \equiv \frac{\mathbb{E}_P[G(z)\beta_c(z)|A_c(z)=1]}{\mathbb{E}_P[G(z)|A_c(z)=1]}$. Then*

$$|\beta_c^F| < |\bar{\beta}_c|. \tag{14}$$

Hence, because aggregate positions place greater weight on larger firms, which are less sensitive to country-specific factors, aggregate estimates understate the average sensitivity of firms' cross-border financial allocations to these factors.

The fat tail of the productivity distribution can amplify this aggregation effect. When the upper tail concentrates a disproportionate share of aggregate gross positions among highly productive firms, the aggregate coefficient places greater weight on firms that are least sensitive to country-specific factors. Thus, the degree of concentration in the firm productivity distribution determines the extent to which aggregate sensitivity is attenuated relative to the unweighted average across firms.

5 Theoretical Implications and Empirical Evidence

This section evaluates the model's predictions using our micro data. Section 5.1 examines whether the cross-sectional hierarchy characterized in Proposition 1—a theoretical counterpart to Fact 2—is present in data. Section 5.2 assesses Proposition 2 , which derive the capital structure and investment implications of the equity-funded internationalization documented in Fact 3. We additionally provide further evidence on this mechanism and rule out alternative interpretations of financial internationalization, including foreign equity entry driven by trade linkages or foreign acquisitions. Finally, Section 5.3 evaluates Proposition 3 and assesses a macro implication of Fact 1.

5.1 Cross-Sectional Pattern of Financial Internationalization

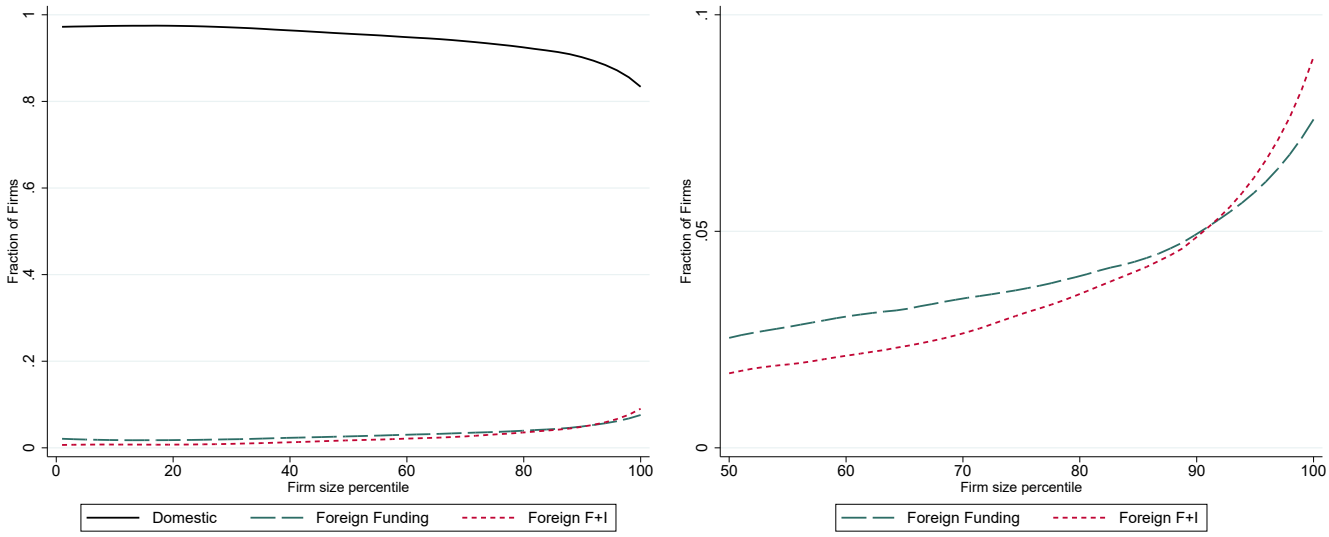
Proposition 1 provides a theoretical counterpart to the segmented pattern of financial internationalization documented in Fact 2. In particular, the model predicts that firms sort across international financial activities according to their size: less productive firms remain financially domestic, intermediate-productivity firms access foreign funding, and only the most productive firms both raise foreign funds and invest abroad. We assess this prediction by first reporting the internationalization pattern along the firm productivity distribution and then comparing the characteristics of firms across these groups.[24]

Figure 3 reports the share of firms that remain purely domestic (solid black line), internationalize only through foreign funding (dashed blue line), and internationalize through both foreign funding and foreign investment (dotted red line) across the firm productivity distribution. In line with Proposition 1, at the bottom of the firm productivity distribution, international financial integration is virtually absent: among firms in the 25th percentile, 97% remain purely domestic, 1% raise foreign funds without investing abroad, and essentially none engage in both foreign funding and foreign investment (left plot). As firm productivity increases, access to foreign funding rises gradually, while cross-border investment remains rare. Even at the 75th percentile, 93% of firms remain domestic, 4% exclusively access foreign funding, and 2% engage in both foreign funding and foreign investment. Only among the very largest firms foreign investment becomes more common. The right plot zooms in the largest firms and shows that, only above the 90th percentile, the share of firms that both raise foreign funds and invest abroad exceeds the share that only access foreign funding. At the 99th percentile, 12% of firms engage in both cross-border funding and foreign investment, compared with only 9% that exclusively raise foreign

[24] For expositional simplicity, we exclude corporations that internationalize through foreign investment exclusively, as they constitute only 1% of corporations of newly internationalized firms.

funds, while the remaining 79% continue to operate purely domestically.[25]

Figure 3: Financial Internationalization by Firm Productivity Distribution in France (Corporations)



Notes: The figure reports the share of corporations across the firm productivity distribution that remain financially domestic, raise foreign funding without investing abroad, or both raise foreign funding and invest abroad. Firm productivity is measured by labor productivity (value added per worker) and firms are ranked into percentiles of its distribution. The left panel reports all three categories across the full firm productivity distribution, while the right panel focuses on financially internationalized firms in the upper half of the distribution. Period: 2014–2018.

Table 6 reports main characteristics of these three groups of firms and provides additional supportive evidence of the sorting pattern of financial internationalization. Compared to firms that remain domestic (column 1), firms that only raise foreign funds (column 2) are more productive and larger. They employ three times more workers (106 vs 33), have four times higher sales and total assets, and have greater labor productivity. In line with the model, these firms rely less on domestic bank debt (i.e., lower bank debt over assets) and have higher investment. The difference in mean of these variables is statistically significant at one percent, as shown by the p-values reported in brackets. Column 3 extends the comparison to firms that also engage in cross-border investment. These firms are more productive and an order of magnitude larger: they have on average seven times more employment (797), more than ten times annual sales and investment, and more than twenty times total assets than firms that only raise foreign funds. As expected, they rely less on domestic bank credit.

Supporting the view that trade linkages are not the main underlying cause of financial internationalization, the export and import probabilities across groups are small. Furthermore, neither firms that

[25] These patterns are estimated using the balance-sheet data, which cover only firms with annual sales exceeding €750,000 (292,625 firms out of more than 3.2 million firms in France in 2014). The evidence therefore already pertains to a sample that is substantially tilted toward larger firms, implying that the prevalence of purely domestic firms is likely even higher in the full population of French firms.

only raise foreign funds nor those that additionally invest abroad have a higher probability of exporting than firms that invest and fund themselves locally.

Table 6: Characteristics Financially Internationalized Corporations

	Domestic	**Foreign Funding**	**Foreign Funding and Investment**
	(1)	(2)	(3)
Labor Prod (log)	4.16	4.37	4.58
p-values		[0.000]***	[0.000]***
Employment	33	106	797
p-values		[0.000]***	[0.000]***
Total Assets	8,883	39,975	991,239
p-values		[0.000]***	[0.000]***
Sales	6,992	26,484	339,661
p-values		[0.000]***	[0.000]***
Bank Leverage	0.16	0.11	0.08
p-values		[0.000]***	[0.000]***
Investment	786	2,588	33,488
p-values		[0.000]***	[0.000]***
Export dummy	0.03	0.03	0.03
p-values		[0.413]	[0.508]
Import dummy	0.03	0.04	0.03
p-values		[0.000]***	[0.002]***

Notes: Column 1 reports the characteristics of corporations with no cross-border financial activity. Column 2 reports corporations that raise foreign funds but do not invest abroad. Column 3 reports corporations that both raise foreign funds and invest abroad. The p-values reported in Column 2 correspond to tests of differences relative to purely domestic corporations, while those in Column 3 correspond to tests of differences relative to corporations that raise foreign funds only. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Sales, investment and total assets are expressed in thousands of euros. Bank leverage is defined as bank debt divided by gross assets. Year 2014.

5.2 Firm's Financial Internationalization

Fact 3 shows that firms become financially internationalized primarily by raising foreign non-public equity. Proposition 2 characterizes the implications of this mode of internationalization and predicts that, upon financial internationalization, firms increase their equity, reduce domestic bank debt and interest payments, and expand investment. We assess these implications by comparing newly internationalized corporations with firms that remain financially domestic in the years before and after internationalization.

Financial internationalization is inherently the result of firms' own decisions rather than a random event. Accordingly, our objective is not to identify the causal effect of financial internationalization. Rather, we treat this decision as a revealed preference and ask whether firms that choose to internation-

alize and their subsequent evolution are consistent with the mechanism proposed by the model. With this end, we estimate

$$\Delta Y_{i,t} \quad = \quad \gamma_0 I_{i,t} + \sum_{s=1}^{4} \gamma_s X_{i,t0} + \mu_m + \varepsilon_{i,t}, \tag{15}$$

where $I_{i,t}$ is an internationalization dummy if the firm became financially internationalized in t. $\Delta Y_{i,t} = (\ln(Y_{i,t+1}) - \ln(Y_{i,t-1}))/2$ denotes the annualized change in the dependent variable between the year before and after the financial internationalization. $X_{i,t0}$ is a set of controls capturing firm characteristics that may affect differential growth across firms. These include log productivity, leverage (debt-to-asset ratio) and export and import shares, all measured prior to the internationalization—in 2014—to mitigate concerns of reverse causality. Because equation (15) is estimated in first differences, time-invariant industry characteristics are differenced out. To account for heterogeneous growth rate across sectors, we include five-digit sector fixed effects, μ_m. These fixed effects allow us to compare firms within narrowly defined industries.

The model implies that firms internationalize financially to access a larger pool of funds, so that foreign equity provides additional financing rather than merely replacing domestic ownership with foreign ownership. Consistent with this prediction, Panel A of Table 7 shows that, relative to firms that remain purely domestically financed, newly internationalized firms increase their equity by 9.1% around the year of internationalization.

Foreign equity also affects firms' optimal financing mix by allowing them to rebalance away from costly bank debt. Column 2 shows that newly internationalized firms reduce bank debt by 6.4%. Consistent with this rebalancing, interest expenses relative to earnings before interest and taxes decline by 7.3%. This rebalancing is also reflected in firms' leverage. Table 8 shows that bank leverage—defined as bank debt relative to assets—falls by 8% following financial internationalization. By contrast, other forms of credit, including commercial loans and other financial debt, remain unchanged, indicating that the decline in bank debt is not offset by substitution toward other forms of borrowing.

These results connect financial internationalization to a central question in corporate finance: how access to different sources of external finance shapes firms' capital structure. They show that access to foreign equity is associated with a substantial rebalancing of firms' financing, expanding equity while reducing reliance on bank debt and lowering the interest burden.

Turning to the analysis of real activities, newly internationalized firms increase investment by 13.9% (column 4). This increase provides further evidence that foreign equity represents more than a change in ownership: it is associated with an expansion in firms' financing capacity and investment.

Panel B provides additional evidence on the funding channel. Comparing columns 1 and 2 of Panel

Table 7: Performance after Financial Internationalization

	Panel A: Lemmas			
	1: Δ Equity	**2: Δ Bank Debt**	**3: Δ Interest Expenses /EBIT**	**4: Δ Investment**
	(1)	(2)	(3)	(4)
$I_{i,t}$	0.091***	-0.064**	-0.073**	0.139**
	(0.013)	(0.026)	(0.035)	(0.060)
R^2	0.024	0.015	0.017	0.034
	Panel B: Further Evidence			
	Δ Total Assets	**Δ Capital-Labor Ratio**	**Δ Employment**	**Δ Sales**
$I_{i,t}$	0.020***	0.030***	0.012***	0.008**
	(0.004)	(0.010)	(0.004)	(0.004)
R^2	0.035	0.034	0.049	0.043
Firm-level controls	Yes	Yes	Yes	Yes
5-digit sector FE	Yes	Yes	Yes	Yes
N	226,270	226,270	226,270	226,270

Notes: *, **, *** significant at 10, 5, and 1 percent. Dependent variable: $\Delta Y_{i,t} = ln(Y_{i,t+1}) - ln(Y_{i,t-1})/2$. Firm-level controls include labor productivity, import and export shares and leverage in the initial year (2014). Interest expense is interest payments over earning before interest and taxes (EBIT).

A, the increase in equity exceeds the decline in bank debt, suggesting that foreign equity does not simply substitute for bank financing but expands firms' balance sheets. Consistent with this interpretation, Panel B shows that total assets increase by 2%, a magnitude similar to the difference between the increase in equity and the decline in bank debt. Hence, the additional net financing is reflected on the asset side of firms' balance sheets. The capital–labor ratio also increases by 3%, consistent with firms expanding capital investment as financing conditions improve. Finally, employment and sales increase by 1.2% and 0.8%, respectively.

Taken together, these results show that access to foreign equity is associated with an expansion of firms' financing as well as a different capital structure and an expansion of firms' real activity.

Table 8: Changes in Capital Structure

	(1) **Δ Bank Debt-to-Assets**	(2) **Δ Commercial Loans-to-Assets**	(3) **Δ Other Financial Debt-to-Assets**
$I_{i,t}$	-0.085***	-0.003	0.016
	(0.025)	(0.006)	(0.035)
R^2	0.014	0.014	0.006
Firm-level controls	Yes	Yes	Yes
5-digit sector FE	Yes	Yes	Yes
N	226,270	226,270	226,270

Notes: *, **, *** significant at 10, 5, and 1 percent. Dependent variable: $\Delta Y_{i,t} = ln(Y_{i,t+1}) - ln(Y_{i,t-1})/2$. Firm-level controls include labor productivity, import and export shares and leverage in the initial year (2014).

To further assess the model's mechanism, we examine heterogeneity across firms. The theoretical framework states that more productive firms have greater investment opportunities and, consequently, larger financing needs. Upon financial internationalization, these firms should therefore experience larger increases in equity, stronger rebalancing away from domestic bank debt, larger reductions in interest expenses, and greater investment growth. To test this prediction, we classify newly internationalized firms as high- or low-productivity relative to the median productivity of firms within their five-digit sector in the initial year (2014) and interact this indicator with the internationalization dummy. Table 9 presents the results. Consistent with the model, the responses to financial internationalization are substantially larger among high-productivity firms. Equity increases by 13.2%, while bank debt and interest expenses decline by 10.1% and 8.3%, respectively. Investment also increases by 17.5%. Less productive firms exhibit changes in the same direction, but, as predicted by the model, the magnitudes are smaller and some estimates are only marginally significant or lose statistical significance.

Table 9: Heterogeneous Effect Across Firms

	1: Δ Equity	**2: Δ Bank Debt**	**3: Δ Interest Expenses /EBIT**	**4: Δ Investment**
	(1)	(2)	(3)	(4)
$I_{i,t} \times$ High Productivity$_{i,0}$	0.132***	-0.101***	-0.083*	0.175**
	(0.018)	(0.034)	(0.044)	(0.083)
$I_{i,t} \times$ Low Productivity$_{i,0}$	0.045**	-0.065*	-0.045	0.093
	(0.019)	(0.036)	(0.047)	(0.088)
R^2	0.023	0.014	0.016	0.033
Firm-level controls	Yes	Yes	Yes	Yes
5-digit sector FE	Yes	Yes	Yes	Yes
N	226,270	226,270	226,270	226,270

Notes: *, **, *** significant at 10, 5, and 1 percent. Dependent variable: $\Delta Y_{i,t} = ln(Y_{i,t+1}) - ln(Y_{i,t-1})/2$. Firm-level controls include labor productivity, import and export shares and leverage in the initial year (2014). Interest expense is interest payments over earning before interest and taxes (EBIT).

Alternative channels. We now assess three alternative channels that may lead firms to internationalize financially. The first channel is that firms access international financial markets to support their international trade activities. The evidence documented above provides limited support for this channel. Table 4 shows that trade credit accounts for only a small fraction of the cross-border positions of firms in the bottom 90% of the distribution, while Table 5 shows that newly internationalized firms rarely use trade credit. Moreover, these firms typically exhibit little or no international trade activity.

We examine this channel more directly by asking whether firms increase their trade participation or trade intensity upon financial internationalization. Panel A in Table 10 provides little evidence of such a response. Newly internationalized firms are not more likely to become exporters, while their probability of importing increases by only 1.3%, with the estimate statistically significant only at the 10% level.

Among firms already engaged in international trade, neither export nor import shares increase following financial internationalization. International trade is thus unlikely to be the primary driver of financial internationalization for the vast majority of firms.

Table 10: Alternative Channels

	Panel A: International Trade			
	Export Dummy	**Import Dummy**	**Δ Export Share**	**Δ Import Share**
	(1)	(2)	(3)	(4)
$I_{i,t}$	-0.008	0.013*	0.011	0.007
	(0.007)	(0.007)	(0.017)	(0.018)
R^2	0.025	0.020	0.007	0.008
N	226,270	226,270	226,270	226,270
	Panel B: Exclude Foreign Acquisitions			
	1: Δ Equity	**2: Δ Bank Debt /EBIT**	**3: Δ Interest Expenses**	**4: Δ Investment**
$I_{i,t}$	0.080***	-0.056*	-0.084*	0.307***
	(0.016)	(0.031)	(0.051)	(0.075)
Exclude Foreign Acquisitions	Yes	Yes	Yes	Yes
R^2	0.024	0.014	0.011	0.034
N	226,056	226,056	226,056	226,056
	Panel C: Sector of Investor			
	1: Δ Equity	**2: Δ Bank Debt /EBIT**	**3: Δ Interest Expenses**	**4: Δ Investment**
$I_{i,t} \times$ Financial Investor$_{i,0}$	0.093***	-0.056	-0.121*	0.287**
	(0.026)	(0.052)	(0.071)	(0.122)
$I_{i,t} \times$ Non-Financial Investor$_{i,0}$	0.055***	-0.172***	-0.115**	0.256***
	(0.021)	(0.041)	(0.056)	(0.097)
R^2	0.024	0.015	0.017	0.034
N	226,048	226,048	226,048	226,048
Firm-level controls	Yes	Yes	Yes	Yes
5-digit sector FE	Yes	Yes	Yes	Yes

Notes: *, **, *** significant at 10, 5, and 1 percent. Dependent variable: $\Delta Y_{i,t} = ln(Y_{i,t+1}) - ln(Y_{i,t-1})/2$. Firm-level controls include labor productivity, import and export shares and leverage in the initial year (2014). Interest expense is interest payments over earning before interest and taxes (EBIT). Panel B removes foreign acquisitions, defined as firms that had 50% or more foreign shares after the internationalization.

A second alternative channel is that foreign equity positions reflect foreign acquisitions rather than firms' attempts to expand their financing. Under this interpretation, financial internationalization is driven by foreign investors acquiring domestic firms, rather than by recipient firms seeking additional sources of funding. We assess this possibility by distinguishing firms that retain domestic control from those that cede control to foreign investors. Table D.13 in Appendix D shows that firms retaining domestic control—defined as those for which domestic investors continue to hold at least 50% of equity—constitute the economically most important group among newly internationalized firms. They account for 63% of foreign equity positions, 72% of sales, and 61% of employment among newly internationalized

firms. They are also more productive and larger than firms that cede control, with employment of 108 versus 35 workers, sales of 26 versus 9 million euros, and assets of 67 versus 29 million euros.

To isolate financial internationalization from foreign acquisitions, we re-estimate our baseline specifications restricting the sample to firms that retain domestic control. Panel B of Table 10 shows that firms retaining domestic control increase equity by 8%, reduce bank debt and interest expenses by 5.6% and 8.4%, respectively, and increase investment by 30.7%. Therefore, Proposition 2 continues to hold.

A final exercise examines whether the model's mechanism depends on the type of foreign investor. The identity of the investor is informative because financial and real-sector investors may provide foreign equity for different reasons. Financial investors are naturally associated with the provision of capital and financial restructuring, whereas real-sector investors may also acquire equity for strategic motives, such as gaining access to markets, technologies, or supply-chain relationships. Importantly, however, the mechanism operates through the recipient firm rather than the foreign investor. It therefore predicts that, regardless of the investor's sector, foreign equity expands the firm's sources of funding, allowing it to rebalance its capital structure and increase investment.

For a subset of newly internationalized firms, the data identify whether the foreign investor operates in the financial or real sector.[26] We re-estimate equation (15), interacting the internationalization dummy with the sector of the foreign investor. Panel C of Table 10 shows that the model's predictions hold for both types of investors. Firms increase equity following internationalization regardless of the investor's sector, although the increase is larger for firms receiving equity from financial investors. Firms with real-sector investors exhibit a larger decline in bank debt, while the increase in investment is similar across the two groups. Thus, firms' responses are present for both types of investors.

5.3 Firm Heterogeneity and Aggregate Financial Allocations

We now ask whether firm heterogeneity changes how we interpret the aggregate determinants of cross-border financial allocations. A large international finance literature estimates how country characteristics shape bilateral financial positions using aggregate data. Yet, when firms differ both in the size of their international positions and in their sensitivity to country characteristics, aggregate estimates need not be representative of the firms underlying these positions. Our microdata allow us to uncover this heterogeneity and assess how it shapes the relationship between country characteristics and aggregate cross-border allocations.

Proposition 3 formalizes how this heterogeneity affects aggregation. It combines two features: international positions are highly concentrated among the largest firms, and firms' sensitivity to country

[26] Table D.14 in Appendix D shows that this subset accounts for 69% of entrant observations but only 33% of total entrant investment value, with 68% of identified counterparties operating in the real sector.

characteristics declines with productivity. Together, they imply that aggregate estimates place greater weight on the lower sensitivities of the largest firms and therefore understate the importance of country-specific factors for the cross-border allocations of the typical firm. To evaluate this, we first examine how the sensitivity of firms' country shares to country-specific factors varies across firms. We then estimate the aggregate elasticity to each factor and show that the resulting estimates are tilted toward those of the largest firms. Finally, we estimate the elasticities for the typical firm and show that its international allocations are more sensitive to country-specific factors than aggregate allocations.

We follow the international finance literature in selecting the country characteristics that have been shown to shape cross-border financial allocations. This literature parallels the well-known gravity framework in international trade, which relates bilateral trade flows to bilateral trade costs and country-size characteristics, and shows that analogous factors systematically shape the allocation of cross-border financial positions.

In particular, Portes, Rey, and Oh (2001) and Portes and Rey (2005) show that distance reduces international portfolio equity flows by creating information asymmetries across countries. Martin and Rey (2004) shows that market size acts as a gravity force in international asset trade, with larger economies attracting disproportionately more capital. Lane and Milesi-Ferretti (2008) and Alfaro, Kalemli-Ozcan, and Volosovych (2008) highlight the role of institutional quality in shaping cross-border capital allocations. A related literature emphasizes the role of European integration: Coeurdacier, De Santis, and Aviat (2009) and Head and Mayer (2021) document a positive effect of EU membership on cross-border mergers and acquisitions, while Lane and Milesi-Ferretti (2007) and Coeurdacier and Martin (2009) show that the introduction of the euro increased cross-border holdings of euro-area assets. Maggiori, Neiman, and Schreger (2020) and Maggiori, Neiman, and Schreger (2024) document investors' preference for securities denominated in their home currency. Head and Ries (2008) derive an estimate a gravity model for bilateral FDI positions; and Pellegrino, Spolaore, and Wacziarg (2025) quantify how geographic, cultural, linguistic, and policy barriers distort the capital allocation across countries. We therefore examine five country-specific factors: distance, GDP, institutional quality, EU membership, and whether the position is denominated in euros.[27] We also include common language, legal origin, and colonial history, which the trade literature has identified as affecting bilateral flows (Rose 2000; Frankel and Rose 2002; Disdier and Head 2008; Head and Mayer 2014a). Following the literature, we

[27] We construct the institutional quality index following Alfaro, Kalemli-Ozcan, and Volosovych (2008), using annual country-level data from the Political Risk section of the International Country Risk Guide (ICRG), published by the PRS Group. The index is based on the sum of eleven political risk indicators—government stability, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality—and is rescaled to range from 0 to 10 for each country-year observation. Higher values indicate better institutional quality (lower risk).

estimate gravity-type regressions at the firm and aggregate levels.[28]

Empirical Analysis. Following the literature, we regress, at the aggregate level, the share of France's gross financial positions allocated to country c in year t, $s_{F,c,t}$, on a vector of country-level characteristics:

$$s_{F,c,t} = \beta_0^F + \beta^F \, Z_{c,t} + \varepsilon_{F,c,t}, \tag{16}$$

where $Z_{c,t}$ includes EU membership, euro, distance, GDP, institutional quality, common language, common colonial history and common legal system. We standardize distance, GDP and institutional quality to be able to compare the size of the estimated coefficients and cluster the standard errors at the country level.

The main objects of interest are the β^F coefficients. A coefficient $\beta^F = 0$ implies that France's cross-border financial allocations do not systematically vary according to countries' characteristics. The economic interpretation of this benchmark differs across financial instruments. For portfolio securities, this provides a natural benchmark under frictionless international asset markets: in the international CAPM (Solnik 1974; Adler and Dumas 1983), portfolio allocations are determined by risk and expected returns rather than by geography or institutional barriers. For foreign direct investment and other investment, the interpretation is closer to the trade literature on gravity. These country characteristics may affect bilateral allocations by capturing information, monitoring, contracting, institutional, or other costs of establishing and maintaining cross-border financial relationships. A non-zero β^F, with its sign depending on the characteristic considered, therefore indicates that these country-specific factors systematically shape the allocation of cross-border positions.

To assess the relevance of these factors for the average firm, we regress the share of each group i's gross position with country c in year t, $s_{i,c,t}$, on these factors:

$$s_{i,c,t} = \bar{\beta}_0 + \bar{\beta} \, Z_{c,t \, \forall i,c,t} + \bar{\varepsilon}_{i,c,t}, \tag{17}$$

where $s_{i,c,t}$ is constructed by consolidating the firm's investment and funding positions across instruments for each country and year.

To assess heterogeneity across firms, we rank firms by productivity and interact the country-specific

[28] A standard gravity equation takes the multiplicative form $X_{in} = GS_iM_n\phi_{in}$, where S_i and M_n capture origin and destination size and $\phi_{in} = \tau_{in}^{-\theta}$ captures bilateral accessibility as a function of bilateral costs τ_{in} (Head and Mayer 2014b). In logs, this yields an additive specification in country-size and bilateral-cost variables.

factors with indicators for different groups of the productivity distribution. We estimate

$$\begin{aligned} s_{i,c,t} &= \beta_1 \left(Z_{c,t\,\forall i,c,t} \times 1_{[top100,t]}\right) + \beta_2 (Z_{c,t\,\forall i,c,t} \times 1_{[p1,t]}) + \beta_3 (Z_{c,t\,\forall i,c,t} \times 1_{[p5,t]}) \\ &+ \beta_4 (Z_{c,t\,\forall i,c,t} \times 1_{[p10,t]}) + \beta_5 (Z_{c,t\,\forall i,c,t} \times 1_{[p90,t]}) + \sum_{g \in G} \gamma_g 1_{i \in g} + \varepsilon_{i,c,t}, \end{aligned} \tag{18}$$

where $1_{[top100,t]}$, $1_{[p1,t]}$, $1_{[p5,t]}$, $1_{[p10,t]}$ and $1_{[p90,t]}$ are group-rank dummies for Top 100 groups, top 1 percentile (p99 to p99.74), top 5 percentile (p95 to p98), top 10 percentile (p90 to p94) and bottom 90 percentile (p1 to p89), and g indexes the five mutually exclusive productivity-rank groups.[29] As in the model, there is a clear ordering across these coefficients. Since the sensitivity of firms' international allocations to country-specific factors declines with productivity, the absolute magnitude of the estimated coefficients should be larger for less productive firms and progressively smaller for more productive firms.

Results. Panel A in Table 11 reports the estimates from equation (16).[30] France's aggregate allocations exhibit the standard gravity, currency, and institutional patterns: EU membership, euro denomination, distance, GDP, and institutional quality are all significantly associated with the geographic distribution of aggregate positions. The estimated coefficient on EU membership implies that the share allocated to an EU country is, on average, 2 percentage points higher than that allocated to a non-EU country. Given that France's average allocation to a non-EU country is 0.3 percentage points, this corresponds to an allocation almost seven times larger in EU countries. Similarly, the share allocated to a euro-area country is 2.2 percentage points higher than that allocated to a non-euro-area country, almost seven times the average allocation to the latter. Economic size also matters: a one-standard-deviation increase in a country's GDP associates with a higher France's allocation by 1.7 percentage points. Institutional quality and distance exhibit smaller effects, with one-standard-deviation increases associated with changes in France's allocation of 0.8 and -0.5 percentage points, respectively. Common language, common legal system, and colonial history are not significantly associated with aggregate allocations.

Although meaningful in economic terms, the aggregate coefficients substantially understate the sensitivity of the average firm. Panel B reports the estimates from equation (17) and shows that the coefficients for the average firm are several times larger than their aggregate counterparts. In particular, the semi-elasticities to EU membership and euro denomination are 17.3 and 19.9 percentage

[29] As noted above, bottom-90th-percentile groups typically hold positions in only one country. We therefore aggregate them into a single category, as there is no meaningful cross-country variation to exploit.

[30] Productivity ranks are constructed only for firms observed in FIBEN, for which productivity can be measured. Accordingly, the aggregate estimates reported in Table 11 are also computed on the FIBEN sample, ensuring comparability between the firm-level and aggregate coefficients. Below, we present an additional exercise using the full sample and ranking firms by their gross cross-border positions.

Table 11: Univariate Regressions

	Independent variable:							
	EU	**EUR**	**Distance**	**GDP**	**Institutional Quality**	**Common Language**	**Common colonial History**	**Common Legal System**
	Panel A. Aggregate Analysis. Dep. Var.: $s_{F,c,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
var	0.020***	0.022**	-0.005**	0.017***	0.008***	0.004	0.002	0.003
	(0.007)	(0.009)	(0.002)	(0.004)	(0.002)	(0.006)	(0.008)	(0.004)
R^2	0.106	0.091	0.043	0.272	0.151	0.004	0.001	0.004
N	537	537	537	537	537	537	537	537
	Panel B. Firm-Level Analysis: Average Effect. Dep. Var.: $s_{i,c,,t}$							
var	0.173***	0.199***	-0.088***	0.121***	0.095***	0.132**	-0.040	0.097
	(0.052)	(0.043)	(0.021)	(0.011)	(0.015)	(0.066)	(0.068)	(0.059)
R^2	0.050	0.031	0.054	0.094	0.080	0.021	0.001	0.015
N	315,129	315,129	315,129	315,129	315,129	315,129	315,129	315,129
	Panel C. Firm-Level Analysis: Heterogeneous Effect. Dep. Var.: $s_{i,c,t}$							
Top 100 groups × var	0.104***	0.054*	-0.044***	0.083***	0.057***	0.084	-0.002	0.023
	(0.038)	(0.030)	(0.015)	(0.014)	(0.014)	(0.058)	(0.062)	(0.044)
Top p1 × var	0.162***	0.116***	-0.072***	0.104***	0.073***	0.132*	-0.047	0.081
	(0.045)	(0.041)	(0.019)	(0.019)	(0.017)	(0.070)	(0.043)	(0.053)
Top p5 × var	0.143***	0.155***	-0.069***	0.108***	0.074***	0.134**	-0.015	0.071
	(0.045)	(0.039)	(0.019)	(0.013)	(0.014)	(0.065)	(0.063)	(0.050)
Top p10 × var	0.145***	0.164***	-0.068***	0.119***	0.086***	0.103	-0.008	0.049
	(0.049)	(0.032)	(0.021)	(0.011)	(0.013)	(0.064)	(0.080)	(0.057)
Bottom p90 × var	0.175***	0.203***	-0.091***	0.121***	0.097***	0.134**	-0.044	0.102*
	(0.053)	(0.044)	(0.021)	(0.012)	(0.015)	(0.066)	(0.067)	(0.060)
Group rank dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.316	0.302	0.319	0.347	0.338	0.296	0.282	0.292
N	315,129	315,129	315,129	315,129	315,129	315,129	315,129	315,129

Notes: *, **, *** significant at 10, 5, and 1 percent. Firms are ranked by productivity. Standard errors clustered at the country level. Panels A and B include a constant term.

points for the average firm, compared with only 2.0 and 2.2 percentage points at the aggregate level. A similar pattern emerges for the remaining factors. The sensitivity to a one-standard-deviation increase in distance is -8.8 percentage points for the average firm, compared with -0.5 percentage points in the aggregate; for GDP, the corresponding coefficients are 12.1 and 1.7 percentage points; and for institutional quality, 9.5 and 0.8 percentage points. Thus, the country-specific factors that affect France's aggregate allocations are substantially more important for the allocations of the average firm.

Panel C shows that this difference emerges as a result of large firm heterogeneity. Consistent with the model's assumption, sensitivity to country-specific factors declines with productivity. For example, the coefficient on euro denomination declines from 20.3 percentage points for firms in the bottom 90 percentiles to 5.4 percentage points for the Top 100 firms. The corresponding coefficients decline from 17.5 to 10.4 percentage points for EU membership, from -9.1 to -4.4 percentage points for distance, and from 9.7 to 5.7 percentage points for institutional quality. GDP exhibits a similar gradient.

Taken together, Panels B and C provide the two elements underlying Proposition 1: the average firm is substantially more sensitive to country-specific factors than aggregate estimates suggest, and this sensitivity declines as firms become more productive. As aggregate positions place disproportionately greater weight on the largest firms, aggregate coefficients are tilted toward their lower sensitivities and are therefore attenuated relative to the unweighted average across firms.

-*Gross-position ranking.* As an additional exercise, we repeat the analysis using the full sample of firms and rank firms directly by the size of their gross cross-border financial positions. Table D.16 in Appendix D shows an even more pronounced gradient in sensitivity across firms. The EU coefficient declines from 15.2 percentage points for firms in the bottom 90 percentiles to 2.1 percentage points for the Top 100 firms. Similarly, the coefficients on distance, GDP, and institutional quality decline in absolute value from -10.6, 11.4, and 11.7 percentage points to -0.7, 2.1, and 1.1 percentage points, respectively. The euro coefficient declines from 26.1 percentage points for firms in the bottom 90 percentiles to a coefficient statistically indistinguishable from zero for the Top 100.

Because firms are ranked by gross international positions—the same positions that determine their weight in the aggregate—this exercise directly illustrates the weighting mechanism underlying Proposition 3. The firms receiving the greatest weight in aggregate cross-border positions are precisely those whose allocations are least sensitive to country-specific factors. Consistent with this mechanism, the aggregate coefficients closely resemble those of the Top 100 firms. For EU membership, distance, GDP, and institutional quality, the aggregate estimates, which are by construction size-weighted, are 2.1, -0.6, 1.8, and 0.8 percentage points, compared with 2.1, -0.7, 2.1, and 1.1 for the Top 100 firms.

-*Multivariate regressions.* Table 12 shows that these patterns remain robust when we estimate the country factors jointly and across alternative specifications. Country characteristics matter substantially more for firms in the bottom 99 percentiles, with EU membership, euro denomination, and GDP emerging as the main factors shaping their cross-border allocations (column 1). This pattern is virtually unchanged when we control for investment and funding fixed effects (column 2) and year fixed effects (column 3). Column 4 introduces country-by-year fixed effects, following the trade literature, which shows that these control for general equilibrium effects on factor prices. These fixed effects absorb aggregate country-level variation, requiring the Top 1 groups to serve as the reference group, and the greater sensitivity of the bottom 99 percentiles remains robust.

Finally, column 5 ranks firms by gross cross-border positions rather than productivity, allowing us to include the full population of corporations and directly linking firm heterogeneity to the weights entering aggregate positions. The size gradient becomes particularly stark: among the Top 1 percent, only EU membership significantly affects country allocations, while euro denomination, distance, GDP,

and institutional quality have no significant effect. By contrast, EU membership, euro denomination, and GDP remain economically and statistically important for the bottom 99 percent. Thus, the firms that account for the bulk of aggregate positions are precisely those whose allocations are least affected by country-specific factors. Aggregate coefficients therefore provide a good description of the firms that dominate international positions, but substantially understate the role of country characteristics in shaping the allocations of the majority of firms.

Table 12: Multivariate Regressions

	Productivity Rank				**IIP Rank**
	(1)	(2)	(3)	(4)	(5)
Top p1 × EU	0.034***	0.033***	0.034***		0.027***
	(0.007)	(0.007)	(0.007)		(0.009)
Bottom p99 × EU	0.034***	0.033***	0.034***	-0.002	0.049***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.013)
Top p1 × EUR	-0.000	-0.005	-0.005		-0.002
	(0.005)	(0.005)	(0.005)		(0.002)
Bottom p99 ×EUR	0.053***	0.051***	0.051***	0.054***	0.095***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.011)
Top p1 × Distance	0.002	0.002	0.002		0.005
	(0.004)	(0.004)	(0.004)		(0.004)
Bottom p99 × Distance	-0.004	-0.003	-0.003	-0.006**	-0.006
	(0.004)	(0.004)	(0.004)	(0.003)	(0.007)
Top p1 × GDP	0.015***	0.014***	0.015***		-0.002
	(0.005)	(0.005)	(0.005)		(0.005)
Bottom p99 × GDP	0.029***	0.028***	0.029***	0.016***	0.053***
	(0.006)	(0.006)	(0.007)	(0.004)	(0.009)
Top p1 × Inst. Quality	-0.005	-0.005	-0.006		-0.000
	(0.005)	(0.005)	(0.005)		(0.005)
Bottom p99 × Inst. Quality	-0.000	-0.000	-0.001	0.003	0.001
	(0.006)	(0.006)	(0.006)	(0.005)	(0.008)
Common colonial history	Yes	Yes	Yes	Yes	Yes
Common legal system	Yes	Yes	Yes	Yes	Yes
Common language	Yes	Yes	Yes	Yes	Yes
Group rank dummy	Yes	Yes	Yes	Yes	Yes
Investment/Funding FE	No	Yes	Yes	No	No
Year FE	No	No	Yes	No	No
Country × Year FE	No	No	No	Yes	No
R^2	0.042	0.042	0.043	0.061	0.147
N	822,171	822,171	822,171	822,171	1,310,022

Notes: *, **, *** significant at 10, 5, and 1 percent. Standard errors clustered at the country level.

Comparison with world allocation. The preceding results show that the sensitivity of cross-border allocations to country-specific factors declines sharply with firm size. In Appendix C, we provide complementary evidence by asking whether the allocations of the largest firms are also closer to the world allocation. We find that the Top 100 corporations allocate their cross-border positions across countries in a manner closely aligned with this benchmark, with a point estimate of 1.008. This alignment declines

monotonically along the size distribution, reaching 0.425 for corporations in the bottom 95th percentile. The same pattern holds for both funding and investment activities. These results complement the evidence underlying Proposition 3 and suggests a possible interpretation of the world allocation itself. To the extent that cross-border financial positions are concentrated among large firms, the world allocation will disproportionately reflect the behavior of granular, largely internationalized firms. The close correspondence between the allocations of France's largest firms and the world benchmark may therefore partly reflect that the world allocation itself is shaped disproportionately by these firms. While we cannot assess this mechanism directly, it reinforces the broader implication of Proposition 3: aggregate allocations need not be representative of the international financial behavior of the average firm.

6 Conclusion

This paper opens the black box of international financial operations by constructing a unique micro-level dataset covering the near universe of France's cross-border financial positions. We document three novel facts. First, cross-border financial activity is highly selected and concentrated, even more so than international trade. Second, financial internationalization differs sharply across firms: the bulk of firms only raise foreign funds, whereas the largest firms also invest abroad. Third, newly internationalized firms enter primarily by raising foreign equity. Together, these facts reveal two distinct margins of financial internationalization: a *funding margin*, through which the bulk of firms access foreign equity, and an *investment margin*, reached only by the largest firms.

We develop a cross-sectional framework of firms' cross-border financial allocations in which domestic financial imperfections make foreign equity valuable. The model rationalizes these two margins and links financial internationalization to firms' financing and real decisions. We show empirically that, after financial internationalization, firms expand total equity, rebalance away from costly bank debt, and increase investment, with stronger responses among more productive firms. This evidence supports the funding channel of financial internationalization.

Firm heterogeneity changes how we interpret aggregate international financial allocations. Country characteristics known to shape cross-border positions matter differently across firms. Their importance declines sharply with firm size, while aggregate positions are concentrated among the largest firms. Aggregate estimates thus understate the importance of country characteristics for the majority of firms, reflecting the behavior of a small number of granular firms.

More broadly, understanding international financial integration requires looking beneath national aggregates: the firms that determine aggregate cross-border positions are not the typical firms participating in international finance.

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Appendix A Data Description

In this appendix, we describe in detail the steps to produce our dataset. We construct our dataset by collecting, harmonizing and merging 12 different micro-level datasets which are collected for the purpose of constructing France's official balance-of-payments (BoP) and International Investment position (IIP) statistics. These data are compiled by the Banque de France, the institution legally responsible for producing external sector statistics according to the guidelines of Balance of Payments and International Investment Position Manual (BPM6), also in collaboration with other national agencies such as the French National Institute (INSEE), the French Treasury and the French Customs Office.

Direct investment (DI) data covers transactions and positions between direct investors and direct investment enterprises, where a direct investor owns 10 percent or more of the ordinary shares or voting power of the direct investment enterprise. It also includes transactions between mutually "invested enterprises", that is, when both enterprises are owned by a common parent company (even if there is no direct ownership link between them). Direct investment transactions include equity capital, reinvested earnings, and debt relationships (inter-company lending). We observe stocks of each of the three concepts for each parent $\times$ affiliate pair, including information on the country and currency of the transaction. The data contains a unique firm French identifier SIREN for the firm residing in France, the names of the domestic and foreign firms, as well as the country of residence and name of the headquarters. It is of annual frequency.

The data are directly collected by Banque de France. Transactions that exceed 15 million euros are to be reported directly by law requirement. For outward positions, smaller operations are collected by an annual survey of entreprises. The equity capital positions of inward DI are based primarily on the identification of non-residents' holdings of more than 10% of the equity capital in any resident enterprise. For non-financial firms, the main source is the Banque de France's FIBEN survey, complemented with the ESANE annual business statistics dataset from INSEE. For banks, data comes from the French Macro-Prudential authority (ACPR), and for insurers, it is collected by the Banque de France's Monetary and Financial Statistics Directorate. Most of Equity Capital is valuated at book values, except in cases where the investee is a listed in a stock exchange, in which case market values are used (official statistics are published at *mixed value*, including market values only when available). In practice, the vast majority of DI positions involve unlisted firms (over 99.8%)

Portfolio investment (PI) data covers transactions in negotiable securities between French residents and non-residents, including purchases of new issues, trading and redemptions but excluding temporary transactions with no change in ownership, such as repurchase agreements (repo), which are recorded

under "other investments" because they are akin to short-term loans among banks.

The PI dataset is a security-by-security dataset. Each security is identified by a unique International Securities Identification Number (ISIN), and in a few cases by a CUSIP number (Committee on Uniform Securities Identification Procedures). For each security and date, we observe the country and sector of issuance and the country and sector where it is held (when the same security is held in different countries and/or by agents in different sectors, we observe stocks and flows for each country/sector pair at each date). Importantly, the data also contains the LEI number of the security's issuer.

For resident banks, we can observe all of their security holdings at the individual level. The main source of data for securities' holdings is a monthly collection of statistics on individual securities reported at the monthly level by French custodians, labeled PROTIDE. Custodians report their own portfolio investment positions in each security, along with those of their resident and non-resident customers. The custodian data are complemented with three other sources: 1) data on investment funds and collected by the Banque de France, 2) data on security issuance by residents also collected by Banque de France, and 3) direct reporting to the Banque de France and the ACPR by monetary and financial institutions and investment firms (which also serve to compute the Other Investments item, as mentioned below). PROTIDE is used to populate the French portion of the Security Holdings Database (SHSDB), which gathers data on security holdings for euro area economies and it is compiled by the European Central Bank using inputs from all national central banks. However, an important advantage of our data over SHS is that we can observe individual holdings by banks, whereas SHSDB reports holdings at the institutional sector level.

Table A.1: Portfolio Assets by Institutional Sector (2014)

Sector	Percentage (%)
Deposit-taking corporations except central banks	24.80
Government	2.19
Households and non-profit organisations	2.05
Insurance corporations	36.21
Money market funds (MMF)	4.91
Non-MMF Investment funds	23.93
Non-financial corporations	1.91
Other financial intermediaries, except insurance corporations and pension funds	2.93
Other (inc pension funds)	1.07

Other Investments (OI) data include data for banks, investment firms, and non-financial firms. For all resident banks and investment firms we observe the value of assets and liabilities with non-residents, broken-down by balance-of-payments' concept, and including information on the partner country and currency of the transaction. These concepts are loans and deposits, including repurchasing

agreements (repo), and also "Other accounts payable/receivable". The data also includes information on the institutional sector of the counterpart and on the duration of the claims, discriminating between short-term (< one year) and long-term (> one year). These data are collected directly from the Banque de France and it is comprehensive.

For firms non-financial firms, we rely on information from two surveys conducted by the Banque de France. The ECO survey provides information on the value of the stock of trade credit between non-affiliated firms at a quarterly level, with information on the country of the foreign end of the transaction as well as the currency in which the debt is denominated. The EFI survey provides information on the value of the stock of all financial debt (other than trade credit) between non-affiliated firms at a quarterly level, also with information on the country of the foreign end of the transaction and currency. These data include deposits in foreign countries by French residents.

Table A.2: France's International Investment Position

	2014	2015	2016	2017	2018
1. Direct Investment	**489.4**	**533.5**	**559.7**	**517.9**	**564.4**
1.1. French Direct Investment Abroad	**1,066.0**	**1,164.9**	**1,218.9**	**1,201.0**	**1,271.5**
1.1.1. Equity Capital	1,012.7	1,079.8	1,111.9	1,097.2	1,208.8
1.1.2. Inter-company Lending	380.6	419.4	445.7	439.9	410.6
1.2. Foreign Direct Investment in France	**576.6**	**631.4**	**659.2**	**683.2**	**707.2**
1.2.1. Equity Capital	528.8	576.1	604.0	625.3	646.1
1.2.2. Intercompany Lending	375.2	389.5	393.9	393.9	409.0
2. Portfolio Investment	**-785.3**	**-743.7**	**-736.5**	**-763.9**	**-796.9**
2.1. Foreign Securities	**2,267.4**	**2,341.8**	**2,392.8**	**2,410.4**	**2,330.0**
2.1.1. Equity Securities and Investment Fund	634.8	687.1	715.1	795.7	686.8
2.1.2. Long-Term Debt Securities	1,435.4	1,472.4	1,496.0	1,419.2	1,435.6
2.1.3. Short-Term Debt Securities	197.2	182.3	181.7	195.5	207.6
2.2. Domestic Securities	**3,052.7**	**3,085.3**	**3,129.3**	**3,174.3**	**3,126.6**
2.2.1. Equity Securities and Investment Fund	743.1	783.9	823.3	914.1	804.1
2.2.2. Long-Term Debt Securities	2,067.4	2,082.8	2,087.5	2,037.4	2,073.8
2.2.3. Short-Term Debt Securities	242.2	218.7	218.5	222.7	248.7
3. Financial Derivatives	**-59.6**	**-35.2**	**-46.5**	**-69.2**	**-72.5**
4. Other Investment	**-98.3**	**-165.7**	**-206.6**	**-267.3**	**-296.2**
4.1. Banque de France	**-171.5**	**-163.5**	**-161.3**	**-168.2**	**-185.6**
4.2. General Government	**44.7**	**49.3**	**50.1**	**46.4**	**42.5**
4.3. Monetary Financial Institutions	**44.2**	**-56.8**	**-82.8**	**-98.6**	**-122.7**
4.3.1. Currency and Deposits	-353.6	-471.1	-552.7	-592.2	-898.8
4.3.2. Loans and Others	397.7	414.5	470.0	493.6	776.2
4.4. Other Sectors	**-15.6**	**5.3**	**-12.7**	**-46.9**	**-30.4**
4.4.1. Currency and Deposits	250.6	324.6	337.2	352.6	135.3
4.4.2. Loans and Others	-265.0	-317.3	-347.8	-390.2	-156.5
5. Reserve Assets	**118.2**	**126.9**	**139.2**	**130.4**	**145.6**
6. International Investment Position	**-335.7**	**-284.2**	**-290.6**	**-452.1**	**-455.4**

Notes: in billions of Euros. Source: National Accounts.

Construction of agent-level data and sectors. All of our datasets contain individual identifiers. Firms (including non-financial firms, as well as banks) are identified by the unique 9-digit SIREN number. Banks have also a 5-digit unique identifier called CIB. Securities are identified by their unique ISIN number. The PI data reports the Legal Entity Identifier (LEI) of the security issuer, which in turn can be mapped into the SIREN and CIB. To this end, we employ concordance tables created by the "Recherche dans le registre des agents financiers" (Regafi) to link SIREN, CIB and LEI, and thus being

able to merge each legal entity's positions reported in each dataset. This procedure allow us to create the consolidated positions for each legal entities on all its positions in direct investment, securities and other investment.

Identifying large agents implies going beyond legal-entity firms and constructing groups, as multinational corporations/banks/financial agents are typically composed by many legal entities.[31] To create an accurate measure of the dynamics of large agents, we leverage from different datasets provided by the Banque de France and create groups by identifying their "ultimate owners". All our datasets contain individual identifiers at the firm-level (always for resident firms and in some cases also for non-resident firms) or at the security level (in the case of PI). We use those identifiers in order to delineate the perimeter of economic groups in our data. We aggregate firms by creating groups based on the ultimate ownership criterion. We use a set of additional data that track ownership links between individual units in our data. The LiFi dataset, constructed by INSEE with input from other sources (including the Banque de France) provides us information about equity participation and the name of the parent company (be it resident in France or abroad), and in which resident firms are identified by the Siren number. To identify banking groups we use data from the Registry of Financial Agents REGAFI (*Registre des agents financiers*) collected by the French Macroprudential Authority (ACPR). Based on the bank identifier CIB (*Code InterBancaire*), the REGAFI register provides the name of the economic group to which each bank belongs. Bloomberg's Ultimate Owner Data is used to identify groups based on the LEI number.

We proceed in several steps. We first stack all the datasets and first use the LiFi and REGAFI datasets to identify units that belong to the same group. Second, we use a concordance between LEI and SIREN, obtained from the LEI official website, to assign security-level PI observations to the groups created in the previous step. Third, we use the Bloomberg ultimate owner data that provides the ultimate owners for firms worldwide, where firms are identified by their LEI number. Fourth, we gather online data on the names of affiliates of the biggest French firms (those in the CAC40) and use those names to match firms into groups. In the end, 16% of our groups are firms for which we still did not manage to identify the group to which they belong to. These can be stand alone firms or actually belong to larger groups and, hence, our estimate are a lower bound on the number of groups. For expositional simplicity, we count them as a "group" composed then by only one firm.

Our datasets contain information about the institutional sector of the individual legal entity, defined as in the European System of Accounts (ESA 2010). This classification includes five broad categories:

[31] The distinction between legal entities and corporations is particular relevant in portfolio and other investment, as financial firms belonging to the same financial corporation might issue securities separately. For example, typically bank have a CIB identifier for their commercial activities while creating separate legal entities to issue and hold securities. Accounting for the overall position of the bank implies consolidating these different securities issuance.

Non-financial corporations (S11), Financial sector (S12), General government (S13), Households (S14) and Non-profit institutions serving households (S15). These are disaggregated further. For example, Financial sector includes Monetary Financial institutions (the Central Bank, commercial banks, money-market funds) and Non-Monetary Financial institutions (Investment funds, Insurance corporations, Pension funds, Other financial intermediaries, Captive financial institutions and Financial auxiliaries). Our groups contain potentially a larger number of legal entities operating in different institutional sectors. In order to classify groups into broad institutional sectors, we use the value of the assets and liabilities of the entities. We define a group as a *corporation* if the majority of its assets (liabilities) are registered in real sector activities. Otherwise, we classify it as *financial groups*. Financial groups then include banks, pension funds, insurance companies, and all other legal entities whose assets (liabilities) are not invested in real sector activities.

We restrict the sample to private groups, excluding the French government and national agencies (e.g., Agence Française de Développement). These entities are included solely in Table 3 for comparative purposes.

Other datasets. We use administrative balance sheet and income statement data from the FIBEN (Fichier Bancaire des Entreprises) database. The data are collected by the Banque de France through its networks of branches throughout France, for the purpose of awarding credit ratings to firms in the real sector. The data provide information on firms' sales, assets, employment and sectors for firms with annual sales higher than €750,000, across all sectors of the economy. The dataset contains around 290,000 firms per year, which account for 85% of total sales in the French economy.

Appendix B The Cross-Sectional Pattern of International Financial Integration

This appendix presents the proofs of the proposition and lemmas of the paper.

Proposition 1. *[The Cross-Section of Financial Internationalization] There exist two productivity thresholds z_F and z_I, with $z_F < z_I$, such that firms with productivity below z_F remain domestically financed, firms with productivity between z_F and z_I access foreign funding but invest only domestically, and firms with productivity above z_I both access foreign funding and undertake foreign investment:*

$$\begin{cases} z < z_F: & E_F^*(z) = 0, \qquad I_F^*(z) = 0, \\ z_F \leq z < z_I: & E_F^*(z) > 0, \qquad I_F^*(z) = 0, \\ z \geq z_I: & E_F^*(z) > 0, \qquad I_F^*(z) > 0. \end{cases} \tag{B.1}$$

Proof. The firm accesses foreign funding whenever the value of the domestic and foreign financing regime exceeds the value of the domestic-debt only regime: $V^{D\&F}(z) \geq V^{D \text{ only}}(z)$. Define the foreign-funding threshold z_F by $V^{D\&F}(z_F) = V^{D \text{ only}}(z_F)$. Since more productive firms have more profitable investment opportunities, the value of relaxing the financing margin is increasing in productivity. The fixed cost of foreign funding, κ_F, is independent of firm productivity. Hence,

$$\begin{cases} z < z_F: & V^{D\&F}(z) < V^{\text{D only}}(z), \qquad \text{and} \qquad E_F^*(z) = 0, \\ z \geq z_F: & V^{D\&F}(z) \geq V^{\text{D only}}(z) \qquad \text{and} \qquad E_F^*(z) > 0. \end{cases} \tag{B.2}$$

The firm undertakes foreign investment whenever the value of domestic and foreign investment exceeds the value of remaining a domestic investor: $V_{I_F}(z) \geq V_{I_D}(z)$. Defining the foreign-investment threshold z_I by $V_{I_D}(z_I) = V_{I_F}(z_I)$ and keeping the assumption that, at the foreign-funding threshold z_F, the gains from foreign investment are not yet large enough to cover the fixed cost of establishing foreign operations—$V_{I_D}(z_F) > V_{I_F}(z_F)$— then $z_F < z_I$. Therefore, firms with productivity $z \in [z_F, z_I)$

$$\begin{cases} z_F \leq z < z_I: & V^{D\&F}(z) \geq V^{\text{D only}}(z), \\ & V_{I_F}(z) < V_{I_D}(z), \\ & E_F^*(z) > 0, \qquad I_F^*(z) = 0. \end{cases} \tag{B.3}$$

For firms with productivity higher than $z \geq z_I$,

$$\begin{cases} z \geq z_I : & V^{D\&F}(z) \geq V^{\text{D only}}(z), \\ & V_{I_F}(z) \geq V_{I_D}(z), \\ & E_F^*(z) > 0, \qquad I_F^*(z) > 0. \end{cases} \tag{B.4}$$

Therefore, firms first access foreign funding and only at a higher productivity threshold undertake foreign investment. □

Proposition 2. *[The Funding Channel] When a firm becomes financially internationalized by accessing foreign equity, its financial and investment decisions change as follows:*

1. *Equity expansion. Total equity increases:*

$$\Delta E(z) \equiv E^{D\&F}(z) - E^{D\ only}(z) = E_F^{D\&F}(z) > 0. \tag{B.5}$$

Proof. For non-financially internationalized firms, the firm's equity financing is provided entirely by its existing domestic ownership network. Since domestic equity is predetermined at $\bar{E}_D$, total equity is $E^{D\text{ only}}(z) = \bar{E}_D$. Firms that become financially internationalized retain its domestic equity commitment and raises additional foreign equity. Total equity is therefore $E^{D\&F}(z) = \bar{E}_D + E_F^{D\&F}(z)$. From the firm's optimal financing choice,

$$E_F^{D\&F}(z) = I_D^{D\&F}(z) - \bar{E}_D - D^{D\&F}.$$

Using $D^{D\&F} = \frac{\tau_F}{\phi}$, foreign equity is $E_F^{D\&F}(z) = I_D^{D\&F}(z) - \bar{E}_D - \frac{\tau_F}{\phi}$. For firms that become financially internationalized, $E_F^{D\&F}(z) > 0$. Consequently,

$$E^{D\&F}(z) - E^{D\text{ only}}(z) = \left[\bar{E}_D + E_F^{D\&F}(z)\right] - \bar{E}_D = E_F^{D\&F}(z) > 0.$$

Thus, financial internationalization increases the firm's total equity. □

2. *Debt reduction. The firm rebalances its capital structure away from domestic bank debt:*

$$\Delta D(z) \equiv D^{D\&F} - D^{D\ only}(z) < 0. \tag{B.6}$$

Proof. In the domestic-only regime, the marginal cost of domestic bank debt is $MC_D(D^{\text{D only}}(z)) = 1 + r_f + \phi D^{\text{D only}}(z)$. After foreign equity entry, the firm chooses domestic bank debt and foreign equity jointly. At an interior solution with $E_F > 0$, the marginal cost of domestic bank

debt must equal the marginal cost of foreign equity: $MC_D(D^{D\&F}) = MC_F$. Foreign equity entry is valuable only if it relaxes financing at the margin. Hence, in the domestic-only regime, the marginal unit that is financed with foreign equity after entry would otherwise have been financed with domestic bank debt at a higher marginal cost: $MC_D(D^{\text{D only}}(z)) > MC_F$. Thus, $1 + r_f + \phi D^{\text{D only}}(z) > 1 + r_f + \tau_F$, which implies $D^{\text{D only}}(z) > \frac{\tau_F}{\phi} = D^{D\&F}$. Therefore, $\Delta D(z) = D^{D\&F} - D^{\text{D only}}(z) < 0$. Foreign equity entry reduces domestic bank debt. □

3. Interest-payment reduction. Interest payments on domestic bank debt decline:

$$\Delta IP(z) \equiv IP(D^{D\&F}) - IP(D^{D\ only}(z)) < 0 \tag{B.7}$$

$$\Delta IP(z) \equiv IP(D^{D\&F}) - IP(D^{D\ only}(z)) < 0$$

Proof. Interest payments on domestic bank debt are $IP(D) = r_f D + \frac{\phi}{2} D^2$. Since $\frac{\partial IP(D)}{\partial D} = r_f + \phi D > 0$, interest payments are strictly increasing in domestic bank debt. From the capital-structure rebalancing result $D^{D\&F} < D^{\text{D only}}(z)$, it follows that $IP(D^{D\&F}) < IP(D^{\text{D only}}(z))$ and $\Delta IP(z) < 0$. □

4. Investment expansion. Investment increases:

$$\Delta I_D(z) \equiv I_D^{D\&F}(z) - I_D^{D\ only}(z) > 0. \tag{B.8}$$

Proof. The first-order condition for domestic debt of financially internationalized firms implies that the marginal return of domestic investment is equal to $R'_D\Big(I_D^{D\&F}(z)\Big) = 1 + r_f + \phi D^{D\&F}$. For non-internationalized firms, the marginal return of investment at the optimum is $R'_D\Big(I_D^{\text{D only}}(z)\Big) = 1 + r_f + \phi D^{\text{D only}}(z)$. As $D^{D\&F} < D^{\text{D only}}(z)$, then $R'_D\Big(I_D^{D\&F}(z)\Big) < R'_D\Big(I_D^{\text{D only}}(z)\Big)$. Since R_D is strictly concave, $R''_D(I_D) < 0$, its marginal return is strictly decreasing in investment. Thus, $I_D^{D\&F}(z) > I_D^{\text{D only}}(z)$. Therefore, financial internationalization increases domestic investment: $\Delta I_D(z) > 0$. □

Proposition 3. *[Firm heterogeneity and aggregate sensitivity] Let $\mathcal{C}(z)$ denote the set of countries in which a firm with productivity z holds a positive international position, and define $A_c(z) \equiv \mathbf{1}\{c \in \mathcal{C}(z)\}$. For firms active in country c, define the unweighted average firm-level sensitivity as $\bar{\beta}_c \equiv \mathbb{E}_P[\beta_c(z) \mid A_c(z) = 1]$. Define the corresponding aggregate sensitivity as $\beta_c^F \equiv \frac{\mathbb{E}_P[G(z)\beta_c(z)|A_c(z)=1]}{\mathbb{E}_P[G(z)|A_c(z)=1]}$. Then*

$$|\beta_c^F| < |\bar{\beta}_c|. \tag{B.9}$$

Hence, because aggregate positions place greater weight on larger firms, which are less sensitive to country-specific factors, aggregate estimates understate the average sensitivity of firms' cross-border financial allocations to these factors.

Proof. Fix a country c and consider firms such that $A_c(z) = 1$. Since $\beta_c(z)$ has the same sign across these firms, we can write $|\bar{\beta}_c| = \mathbb{E}_P\left[|\beta_c(z)| \,|\, A_c(z) = 1\right]$. Similarly, the absolute value of the aggregate sensitivity is $|\beta_c^F| = \frac{\mathbb{E}_P[G(z)|\beta_c(z)| \,|\, A_c(z)=1]}{\mathbb{E}_P[G(z) \,|\, A_c(z)=1]}$. Using the covariance decomposition,

$$\mathbb{E}_P\left[G(z)|\beta_c(z)| \,|\, A_c(z) = 1\right] = \mathbb{E}_P\left[G(z) \,|\, A_c(z) = 1\right] \mathbb{E}_P\left[|\beta_c(z)| \,|\, A_c(z) = 1\right] + \mathrm{Cov}_P\left(G(z), |\beta_c(z)| \,|\, A_c(z) = 1\right).$$

Because gross international positions increase with productivity, $G'(z) > 0$, while the absolute sensitivity to country-specific factors decreases with productivity, $\frac{\partial|\beta_c(z)|}{\partial z} < 0$, the two functions are oppositely ordered in z. Hence, $\mathrm{Cov}_P\left(G(z), |\beta_c(z)| \,|\, A_c(z) = 1\right) < 0$, provided that both vary nontrivially across firms active in country c. Dividing by $\mathbb{E}_P[G(z) \mid A_c(z) = 1] > 0$ therefore gives

$$|\beta_c^F| < \mathbb{E}_P\left[|\beta_c(z)| \,|\, A_c(z) = 1\right] = |\bar{\beta}_c|.$$

Thus, aggregate cross-border positions place greater weight on larger firms, which are less sensitive to country-specific factors, so that the aggregate sensitivity is smaller in absolute value than the unweighted average firm-level sensitivity. □

Appendix C Comparison with World Allocation

The analysis in Section 5 shows that firms differ substantially in the sensitivity of their cross-border allocations to country-specific factors, with this sensitivity declining with firm size. In this appendix, we provide complementary evidence by benchmarking firms' cross-country allocations against the world allocation. Throughout the appendix, we restrict attention to corporations. The world allocation provides a natural reference for the geographic distribution of global cross-border financial positions and allows us to assess whether firms at different points of the size distribution differ in how closely their allocations resemble this aggregate benchmark. We show that the allocations of the largest corporations are substantially closer to the world distribution, while smaller corporations exhibit much larger deviations from it.

We define $s^j_{i,c,t}$ as the share of group i's positions of type j held in country c at time t, where $j \in \{\text{gross}, \text{investment}, \text{funding}\}$, and $m^j_{c,t}$ as country c's corresponding share in world cross-border positions:

$$s^j_{i,c,t} = \frac{x^j_{i,c,t}}{\sum_{c'} x^j_{i,c',t}}, \qquad m^j_{c,t} = \frac{\bar{x}^j_{c,t}}{\sum_{c'} \bar{x}^j_{c',t}}.$$

To examine heterogeneity across the firm-size distribution, we distinguish between allocations to EU and non-EU countries ("Rest of the World," ROW) and interact the corresponding indicators with dummies identifying firms in: (i) the Top 100 groups, $\mathbf{1}_{[top100,t]}$; (ii) the top 1st percentile excluding the Top 100, $\mathbf{1}_{[p1,t]}$; (iii) the 95th–98th percentiles, $\mathbf{1}_{[p5,t]}$; and (iv) the bottom 95th percentile, $\mathbf{1}_{[bottom95,t]}$. For each type of position j, we estimate

$$\begin{aligned} s^j_{i,c,t} = &\Big[\beta^{ROW}_{top100}(\mathbf{1}_{[top100,t]} \times \mathbf{1}_{c\in ROW}) + \beta^{ROW}_{p1}(\mathbf{1}_{[p1,t]} \times \mathbf{1}_{c\in ROW}) \\ &\quad + \beta^{ROW}_{p5}(\mathbf{1}_{[p5,t]} \times \mathbf{1}_{c\in ROW}) + \beta^{ROW}_{bottom95}(\mathbf{1}_{[bottom95,t]} \times \mathbf{1}_{c\in ROW})\Big] m^j_{c,t} \\ &+ \Big[\beta^{EU}_{top100}(\mathbf{1}_{[top100,t]} \times \mathbf{1}_{c\in EU}) + \beta^{EU}_{p1}(\mathbf{1}_{[p1,t]} \times \mathbf{1}_{c\in EU}) \\ &\quad + \beta^{EU}_{p5}(\mathbf{1}_{[p5,t]} \times \mathbf{1}_{c\in EU}) + \beta^{EU}_{bottom95}(\mathbf{1}_{[bottom95,t]} \times \mathbf{1}_{c\in EU})\Big] m^j_{c,t} + \mu^j_i + \varepsilon^j_{i,c,t}. \end{aligned}$$

The coefficients measure how closely the cross-country allocation of each firm-size group tracks the corresponding world allocation. A coefficient of one implies that, within the corresponding region, firms allocate across countries proportionally to the world allocation. A coefficient below one indicates a lower allocation relative to the world benchmark, while a coefficient above one indicates a higher allocation.

Gross positions. Column 1 of Table C.1 reports the results for gross positions. The allocation of the largest corporations to non-EU countries closely tracks the world benchmark. The estimated coefficient

for corporations in the Top 100 groups is 1.008, statistically and economically close to one. The coefficient declines monotonically along the size distribution, to 0.856 for corporations in the remainder of the top 1st percentile, 0.480 for those between the 95th and 98th percentiles, and 0.425 for corporations in the bottom 95th percentile. Thus, while the largest corporations allocate across non-EU countries approximately in proportion to the world allocation, smaller corporations are substantially more concentrated away from these destinations.

This pattern complements the evidence in Section 5. The same large firms whose allocations are least sensitive to country-specific factors are also those whose geographic allocations most closely resemble the world benchmark. Conversely, smaller firms, whose allocations respond much more strongly to gravity, currency, and institutional factors, deviate substantially more from the global allocation.

Within the EU, differences across firm-size groups are considerably smaller. All four groups allocate more to EU countries than implied by the world allocation, with coefficients ranging from 1.437 for the Top 100 groups to 1.276 for corporations in the bottom 95th percentile. This common tilt toward EU countries is consistent with the particularly high degree of financial and economic integration between France and other EU members.

Investment and funding. Columns 2 and 3 of Table C.1 distinguish between investment and funding positions. The same pattern emerges on both sides of firms' international balance sheets. For non-EU countries, the coefficients decline monotonically along the firm-size distribution, from 0.914 to 0.368 for investment and from 1.107 to 0.498 for funding. Thus, the greater similarity between the allocations of the largest corporations and the world benchmark is not driven exclusively by either their foreign investment or their foreign funding activities.

Taken together, these results reinforce the substantial heterogeneity in international financial integration documented throughout the paper. The largest corporations allocate their cross-border positions across non-EU countries in a manner that closely resembles the world distribution, whereas the allocations of smaller corporations remain substantially more regionally concentrated. This evidence is consistent with the results in Section 5: firms whose allocations are least sensitive to country-specific factors are also those whose geographic allocations most closely resemble the aggregate global allocation.

Table C.1: Heterogeneous International Allocation across Corporations

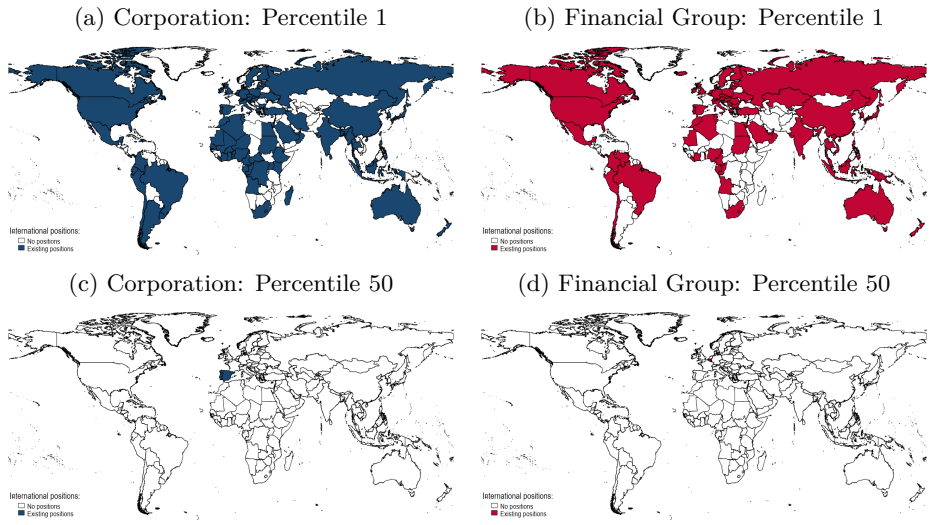
	$s^j_{i,c,t}$: **Group value share in country c at t**		
	Gross Positions	**Assets**	**Liabilities**
	(1)	(2)	(3)
Share Top 100 groups in ROW	1.008***	0.914***	1.107***
	(0.020)	(0.020)	(0.020)
Share Top p1 in ROW	0.856***	0.769***	0.956***
	(0.021)	(0.019)	(0.024)
Share Top p5 in ROW	0.480***	0.420***	0.555***
	(0.023)	(0.019)	(0.029)
Share Bottom 95 in ROW	0.425***	0.368***	0.498***
	(0.032)	(0.028)	(0.037)
Share Top 100 groups in EU	1.437***	1.397***	1.472***
	(0.038)	(0.043)	(0.032)
Share Top p1 in EU	1.421***	1.389***	1.447***
	(0.064)	(0.071)	(0.058)
Share Top p5 in EU	1.290***	1.254***	1.321***
	(0.047)	(0.052)	(0.041)
Share Bottom 95 in EU	1.276***	1.227***	1.320***
	(0.041)	(0.044)	(0.037)
Firm FE	Yes	Yes	Yes
R^2	0.840	0.840	0.841
N	532,381	532,381	532,381

Notes: The sample includes corporations only. *, **, *** significant at 10, 5, and 1 percent. Std. errors are clustered at year level.

Appendix D Additional Figures and Tables

Additional Figures

Figure D.1: France's Financial Internationalization



Notes: The figure shows the geographical distribution of cross-border positions, distinguishing patterns across categories (corporations and financial groups) and sizes (median and top 1st percentile). Panels a and b report the top 1st percentile of each category, while panels c and d report the median corporation and financial group. Period 2014-2018.

Figure D.2: Data: Comparison with National Accounts, 2014-2018

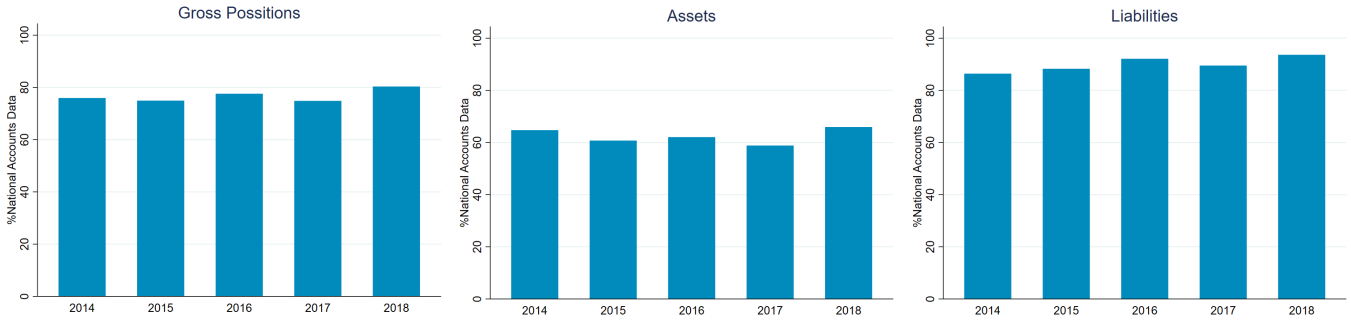


Figure D.3: France's Net International Investment Position

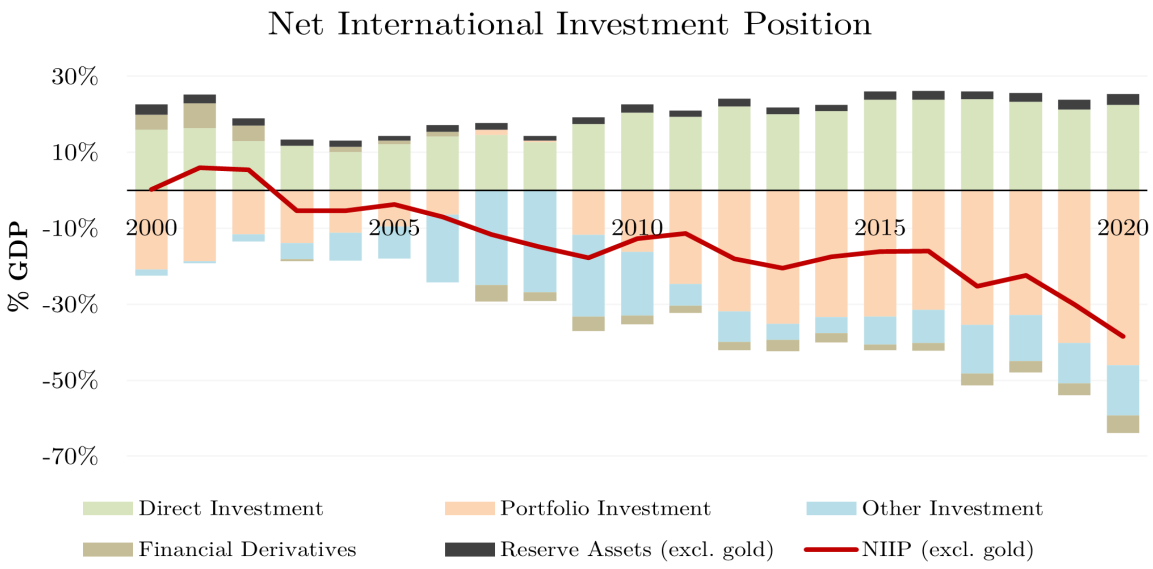


Figure D.4: Granularity by Sector

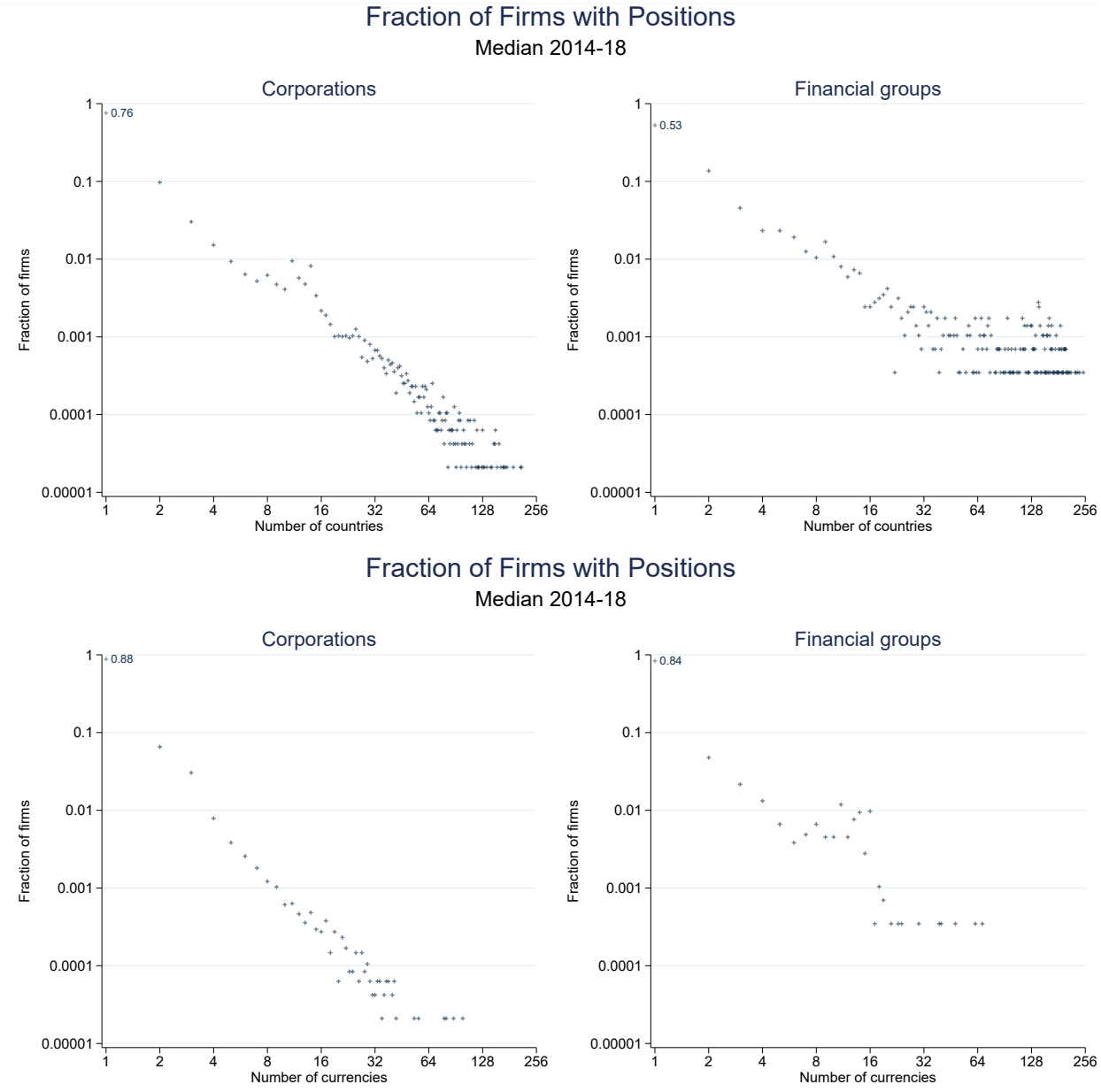


Figure D.5: Capital-labor ratios across countries: deviation from mean values

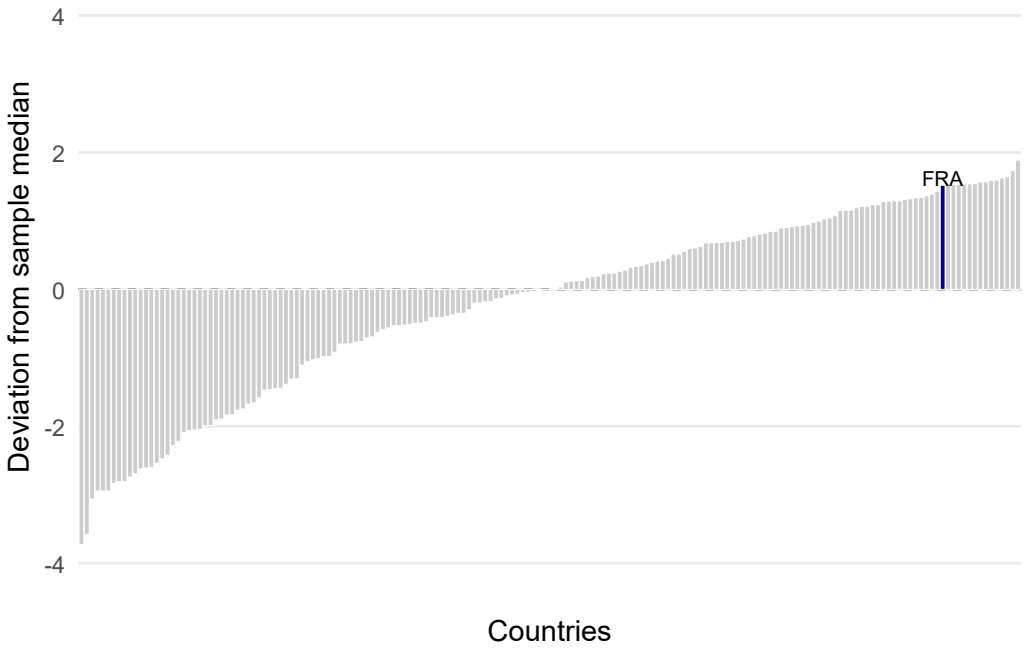
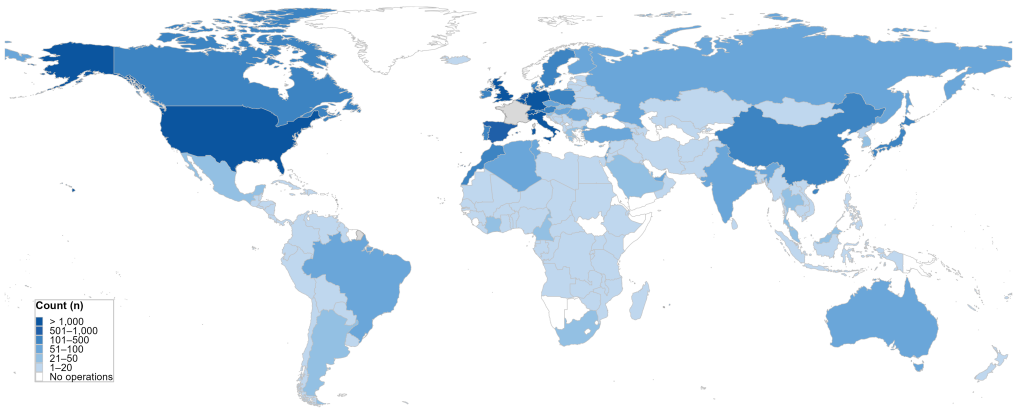


Figure D.6: Newly Internationalized Firms: counterpart countries



Additional Tables

Table D.1: Pareto Tail Exponents

	Top 10%	Top 5%	Top 1%	Top 0.5%
Panel A: Gabaix–Ibragimov estimates				
International Finance	0.686	0.740	0.812	0.821
	(0.016)	(0.025)	(0.061)	(0.087)
International Trade	0.840	0.928	1.111	1.197
	(0.009)	(0.014)	(0.038)	(0.058)
Value Added	1.067	1.110	1.178	1.193
	(0.009)	(0.014)	(0.033)	(0.047)
Panel B: Hill estimates				
International Finance	0.629	0.672	0.801	0.825
International Trade	0.738	0.831	1.011	1.145
Value Added	1.019	1.051	1.161	1.162

Notes: This table reports estimates of the Pareto exponent ζ for the upper tails of the distributions of cross-border financial positions, international trade, and value added. Panel A reports estimates from log-rank regressions using the rank-1/2 correction. Gabaix and Ibragimov (2011) corrected standard errors are reported in parentheses. Panel B reports Hill estimates of the Pareto exponent. Columns successively restrict the estimation sample to the top 10%, 5%, 1%, and 0.5% of each distribution.

Table D.2: Segmentation: Comparison with International Trade

	Number of Countries	
	Finance	**Trade**
	(1)	(2)
Top 100 groups	80	60
Top 1 percentile (p99-p99.74)	30	37
Top 5 percentile (p95 to p98)	8	21
Top 10 percentile (p90 to p94)	4	13
Top 50 percentile (p50 to p89)	1	4
Bottom 50 percentile (p1 to p49)	1	1

Note: columns 1 and 2 report the number of countries. Gross values are asset plus liabilities for financial operations, and exports plus imports for trade flows. Average 2014-18.

Table D.3: Counterfactual Exercises

	Gross position/GDP	**Gross allocation in non-EU countries**	**Gross allocation in non-EUR currencies**
	(1)	(2)	(3)
Current	347	37	35
Counterfactual	1	15	8

Note: In %. Average 2014–2018.

Table D.4: Granularity: Removing State-Owned Firms

Firm size	**Definition**	**Share on National**			**Incremental share**		
		Gross	Investing	Funding	Gross	Investing	Funding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top 100 firms (top percentile 0.26)	Above percentile 99.74	0.51	0.50	0.51			
Top 1 percentile	Above percentile 99	0.58	0.56	0.59	0.07	0.06	0.08
Top 5 percentile	Percentiles 95 to 98	0.62	0.60	0.65	0.05	0.04	0.05
Top 10 percentile	Percentiles 90 to 94	0.63	0.60	0.66	0.01	0.01	0.01
Top 50 percentile	Percentiles 50 to 89	0.64	0.61	0.67	0.01	0.01	0.01
Bottom 50 percentile	Percentiles 1 to 49	0.64	0.61	0.67	0.00	0.00	0.00

Note: fraction of total (absolute value) positions on National Accounts. This table removes the state-owned firms. Average 2014-18

Table D.5: Granularity: Removing Asset Management Firms

Group rank	**Definition**	**Share on National**			**Incremental share**		
		Gross	Investing	Funding	Gross	Investing	Funding
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Top 100 groups	Above percentile 99.74	0.50	0.50	0.51			
Top 1 percentile	Above percentile 99	0.57	0.56	0.59	0.07	0.06	0.08
Top 5 percentile	Percentiles 95 to 98	0.62	0.60	0.64	0.05	0.04	0.05
Top 10 percentile	Percentiles 90 to 94	0.63	0.60	0.65	0.01	0.01	0.01
Top 50 percentile	Percentiles 50 to 89	0.64	0.61	0.66	0.01	0.01	0.01
Bottom 50 percentile	Percentiles 1 to 49	0.64	0.61	0.66	0.00	0.00	0.00

Note: fraction of total (absolute value) positions on National Accounts. This table removes the top 50 asset management firms listed in Table D.6. Average 2014-18

Table D.6: Top 50 Asset Management Firms in France

Asset management firms (top 50)			
AG2R La Mondiale AM	Degroof Petercam AM	The French Woman	OFI Invest AM
Allianz Global Investors	DWS	Meeschaert AM	Ossiam
ABN AMRO Investment Sol.	Ecofi	Mirova	Ostrum AM
Axiom AI	Edmond de Rothschild AM	Money	Palatine AM
Amundi	Eiffel Investment Group	Montpensier Finance	Pictet AM
AXA Investment Managers	Eres Management	Morgan Stanley IM	Rivage Investment
BNY Mellon IM	Federal Finance Mgmt	Muzinich	Robeco
BFT IM	Groupama AM	Natixis IM	Scor Investment
BNP Paribas AM	Invesco	Neuberger Berman	Schelcher Prince Mgmt
Candriam	JP Morgan AM	Oddo BHF AM	Schroders
CPR AM	La Banque Postale AM	OFI Invest AM	Sienna Management
Credit Mutuel AM	Lazard Brothers Mgmt	Ossiam	Swiss Life AM France
Comgest	Lombard Odier IM	Ostrum AM	Tikehau Capital

Table D.7: Segmentation: Remove State-Owned Firms

	# of countries	# of currencies	# of non-EU countries
	(1)	(2)	(3)
Top 100 (≈ top p0.26)	81	13	58
Top percentile 1 (p99-p99.74)	31	5	17
Top percentile 5 (p95-p98)	9	2	3
Top percentile 10 (p90-p94)	4	1	1
Top percentile 50 (p50-p89)	1	1	0
Bottom percentile 50 (p1-p49)	1	1	0

Note: gross (absolute value) positions. Mean values within each rank percentile. Ranks are mutually exclusive. Average 2014-18.

Table D.8: Segmentation: Remove Asset Management Firms

	# of countries	# of currencies	# of non-EU countries
	(1)	(2)	(3)
Top 100 (≈ top p0.26)	80	13	57
Top percentile 1 (p99-p99.74)	31	4	17
Top percentile 5 (p95-p98)	9	2	3
Top percentile 10 (p90-p94)	4	1	1
Top percentile 50 (p50-p89)	1	1	0
Bottom percentile 50 (p1-p49)	1	1	0

Note: gross (absolute value) positions. Mean values within each rank percentile. Ranks are mutually exclusive. Average 2014-18.

Table D.9: Segmentation by Category in National Account Data

	Some combination of DI, PI and OI	**Either DI, PI or OI**	**Either DI, PI, OI**		
			% of column 2		
			Only DI	Only PI	Only OI
	(1)	(2)	(3)	(4)	(5)
Top 100 groups (Top percentile 0.26)	0.96	0.04	0.00	1.00	0.00
Top percentile 1 (p99-p99.74)	0.73	0.27	0.07	0.59	0.33
Top percentile 5 (p95-p98)	0.61	0.39	0.10	0.13	0.77
Top percentile 10 (p90-p94)	0.56	0.44	0.16	0.07	0.77
Top percentile 50 (p50-p89)	0.24	0.76	0.62	0.07	0.32
Bottom percentile 50 (p1-p49)	0.01	0.99	0.93	0.04	0.03

Note: Values are averages from 2014-18.

Table D.10: Segmentation: Nationality Basis

	All firms		**Corporations**		**Financial groups**	
	# of countries	# of countries outside EU	# of countries	# of countries outside EU	# of countries	# of countries outside EU
	(1)	(2)	(3)	(4)	(5)	(6)
Top 100 groups (Top percentile 0.26)	93	68	95	69	90	65
Top percentile 1 (p99-p99.74)	50	34	32	18	69	49
Top percentile 5 (p95-p98)	8	2	5	2	65	44
Top percentile 10 (p90-p94)	4	1	3	1	63	42
Top percentile 50 (p50-p89)	1	0	1	0	61	41
Bottom percentile 50 (p1-p49)	1	0	1	0	1	1

Note: Values are averages from 2014-18.

Table D.11: Corporations Not-Engaged in International Trade

	Corporations without Int'l trade
	(1)
Top 100 groups (≈ top p0.26)	0.60
Top percentile 1 (p99–p99.74)	0.74
Top percentile 5 (p95–p98)	0.64
Top percentile 10 (p90–p94)	0.49
Top percentile 50 (p50–p89)	0.54
Bottom percentile 50 (p1–p49)	0.70

Note: This table shows the share of corporations participating in international financial operations and without engaging in international trade. Average 2014–18.

Table D.12: Multiple countries

	Number of countries			
	Investing		Funding	
	Non-Public Equity	Public Equity	Non-Public Equity	Public Equity
Top 100 groups	4	NA	1	53
Top 1 percentile	1	NA	1	12
Top 5 percentile	1	NA	1	2
Top 10 percentile	0	NA	1	1
Top 50 percentile	0	NA	1	0
Bottom 50 percentile	0	NA	1	0

Note: Average number across group rank. Period 2014-2018.

Table D.13: Newly Internationalized Corporations: Foreign vs Domestic Control

	Foreign Control	**Domestic Control**	**Log differences in means. P-values**
	(1)	(2)	(3)
Share on foreign positions of newly internationalized firms	0.37	0.63	
Share on employment of newly internationalized firms	0.39	0.61	
Share on sales of newly internationalized firms	0.28	0.72	
Labor productivity (log)	4.40	4.47	0.094*
Employment	35	108	0.036**
Total assets	28,696	66,806	0.000***
Sales	9,434	26,514	0.000***
Share of exporters	0.02	0.02	0.953
Share of importers	0.02	0.03	0.023**

Notes: *, **, *** significant at 10, 5, and 1 percent. Sales and total assets are expressed in thousands of euros. We define foreign control as a foreign ownership share of 50% or more, and domestic control otherwise. Column 3 reports the p-values of the log difference of the means. Year 2014.

Table D.14: Performance after Financial Internationalisation: Sector of Investor

	in %
Investment Value of Entrants w/Identified Foreign Counterparties (% of Entrant Investment Value)	0.33
Entrants with Identified Foreign Counterparties (% of Total Entrants)	0.69
Entrants with Real-Sector Foreign Counterparties (%)	0.68
Entrants with Financial-Sector Foreign Counterparties (%)	0.32

Notes: Years 2015-2018. In %.

Table D.15: Performance after Financial Internationalisation: Vertical vs Horizontal FDI

	Panel A. Assets and Firm Size		
	Δ Total Assets	**Δ Capital-Labor**	**Δ Employment**
	(1)	(2)	(3)
$I_{i,t} \times$ Vertical $\text{FDI}_{j,t}$	0.036***	0.027**	0.035***
	(0.006)	(0.013)	(0.008)
$I_{i,t} \times$ Horizontal $\text{FDI}_{j,t}$	0.038***	0.026	0.010
	(0.012)	(0.026)	(0.016)
R^2	0.019	0.032	0.012
	Panel B. Sales and Trade		
	Δ Sales	**Export Dummy**	**Import Dummy**
$I_{i,t} \times$ Vertical $\text{FDI}_{j,t}$	0.018***	0.007	0.023**
	(0.005)	(0.010)	(0.009)
$I_{i,t} \times$ Horizontal $\text{FDI}_{j,t}$	0.012	-0.028	0.006
	(0.010)	(0.019)	(0.018)
R^2	0.013	0.007	0.007
	Panel C. Equity and Debt		
	Δ Equity	**Δ Bank Debt**	**Δ Interest Coverage**
$I_{i,t} \times$ Vertical $\text{FDI}_{j,t}$	0.094***	-0.111***	-0.099**
	(0.016)	(0.035)	(0.048)
$I_{i,t} \times$ Horizontal $\text{FDI}_{j,t}$	-0.049	-0.009	-0.144
	(0.032)	(0.069)	(0.095)
R^2	0.020	0.004	0.010
Firm-level controls	Yes	Yes	Yes
1-digit sector FE	Yes	Yes	Yes
N	229,267	229,267	229,267

Notes: d, *, **, *** significant at 15, 10, 5, and 1 percent. Dependent variable: $\Delta Y_{i,t} = ln(Y_{i,t+1}) - ln(Y_{i,t-1})/2$. Firm-level controls include TFP, gross assets, import and export share and leverage in the initial year (2014). Interest coverage is interest over earning before interest and taxes. Columns 2 and 3 of Panel B do not include the control for log import share and log export shares, as these firms are by definition non-importers and non-exporters. Vertical and horizontal FDI are defined as the 2-digit industries.

Table D.16: Biases in Allocations: Univariate Regressions- Robustness

	Independent variable:							
	EU	**EUR**	**Distance**	**GDP**	**Institutional Quality**	**Common Language**	**Common colonial History**	**Common Legal System**
	Panel A. Aggregate Analysis. Dep. Var.: $s_{F,c,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
var	0.021***	0.023**	-0.006**	0.018***	0.008***	0.005	0.001	0.004
	(0.008)	(0.009)	(0.002)	(0.005)	(0.002)	(0.006)	(0.008)	(0.004)
R^2	0.123	0.108	0.052	0.284	0.158	0.005	0.000	0.006
N	671	671	671	671	671	671	671	671
	Panel B. Firm-Level Analysis: Average Effect. Dep. Var.: $s_{i,c,t}$							
var	0.210***	0.241***	-0.115***	0.146***	0.122***	0.174**	-0.061***	0.120*
	(0.060)	(0.050)	(0.026)	(0.011)	(0.018)	(0.075)	(0.076)	(0.070)
R^2	0.063	0.038	0.070	0.116	0.097	0.033	0.002	0.020
N	642418	642418	642418	642418	642418	642418	642418	642418
	Panel C. Firm-Level Analysis: Heterogeneous Effect. Dep. Var.: $s_{i,c,t}$							
Top 100 × var	0.021**	-0.005	-0.007**	0.021***	0.011***	0.008	0.005	0.004
	(0.009)	(0.006)	(0.003)	(0.005)	(0.003)	(0.010)	(0.015)	(0.007)
Top p1 × var	0.036***	0.002	-0.013**	0.032***	0.019***	0.019	0.002	0.011
	(0.014)	(0.009)	(0.005)	(0.007)	(0.005)	(0.020)	(0.023)	(0.013)
Top p5 × var	0.069***	0.026	-0.028***	0.056***	0.035***	0.040	-0.015	0.030
	(0.022)	(0.018)	(0.009)	(0.011)	(0.008)	(0.036)	(0.027)	(0.022)
Top p10 × var	0.085***	0.027	-0.038***	0.068***	0.047***	0.054	-0.028	0.040
	(0.026)	(0.022)	(0.012)	(0.013)	(0.011)	(0.044)	(0.033)	(0.030)
Bottom p90 × var	0.152**	0.261***	-0.106***	0.114***	0.117***	0.169***	-0.041	0.096
	(0.059)	(0.051)	(0.029)	(0.012)	(0.018)	(0.057)	(0.053)	(0.063)
Group rank dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.528	0.528	0.532	0.544	0.540	0.528	0.516	0.520
N	642,418	642,418	642,418	642,418	642,418	642,418	642,418	642,418

Notes: *, **, *** significant at 10, 5, and 1 percent. Firms are ranked by gross positions. Standard errors clustered at the country level. Panels A and B include a constant term.