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Does shareholder diversification
enhance firm investment resilience?
Evidence from the euro area

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Abstract

This paper develops novel firm-level measures of shareholder geographical concentration and examines how elevated home bias in equity holdings affects investment resilience in the euro area. We combine security-level holdings data from the ECB's Securities Holdings Statistics (SHS-S) with firm-level financial-statement data from Compustat, and document that equity ownership remains strongly concentrated domestically, with limited cross-border diversification within the monetary union. Using a difference-in-differences design around the COVID-19 shock, combined with a propensity score matching approach, we then analyse whether equity home bias shapes firms' responses to macroeconomic disruptions. Against an average 16% decline in exports among the firms in the sectors most affected by the pandemic, those with more concentrated, home-biased shareholder bases reduced investment by 20% more than their more diversified peers after the shock. The effect operates mainly through weaker equity resilience, with equity declining by 13%, while sales and bank financing remain comparable. Our findings highlight the benefits of deeper cross-border equity integration for corporate resilience.

Keywords: cross-border equity integration, shareholder geographical concentration, firm resilience, macroeconomic shocks, COVID-19 shock, difference-in-differences.

JEL classification: F36, G32, G15, D22, E44.

Non-technical summary

This paper examines whether the geographic composition of firms' shareholder bases affects their resilience to major economic shocks. It focuses on equity home bias, namely the tendency for equity ownership to remain disproportionately concentrated in domestic investors rather than diversified across countries.

To study this question, the paper develops new firm-level measures of shareholder geography by combining detailed securities holdings data from the European Central Bank (ECB) with financial statement data for euro-area listed firms over the period 2015–2023. These measures capture both the extent of domestic ownership and the overall geographical concentration of firms' shareholder bases.

First, we document new descriptive evidence on the shareholder structure of euro-area firms, using our unique dataset. The analysis shows that equity ownership in the euro area remains strongly concentrated in domestic investors, which account for 57% of equity holdings on average, while only 9% is held by investors from other euro area countries, and the remainder from the rest of the world. This implies that cross-border diversification within the monetary union remains limited. Moreover, these shares are stable over time, suggesting that financial integration is not progressing.

Second, we investigate whether firm ownership structures shaped their responses to the COVID-19 shock. Our results indicate that firms with more concentrated and home-biased shareholder bases reduced investment more strongly after a severe shock than otherwise comparable firms with more geographically diversified ownership. Amongst firms worst hit by the COVID-19 crisis, who saw a decrease in exports of 16% on average, firms whose shareholder base was relatively less concentrated in their home country reduced their investment by 20% less after the crisis struck.

This investment resilience stemmed from what we call equity resilience: firms with more home-biased ownership experienced larger declines in market valuations, made less use of equity financing, and saw their book value of equity fall by 13% relative to more diversified firms. Conversely, differences in sales and leverage were comparatively limited, pointing to the equity channel as the main mechanism, although we cannot fully exclude that geographically diversified shareholders are also associated with broader access to external finance.

Taken together, our findings point to a close relationship between shareholder geographical

diversification and firms' ability to sustain investment in the face of large external disruptions. As diversification within the euro area remains very limited, the benefits stem mainly from diversification beyond the euro area, leaving the within-euro-area margin largely untapped. These findings speak directly to the debate on how to advance the Capital Markets Union (CMU) in Europe. They suggest that the gains from deeper capital market integration may arise not only through expanding market-based finance, but also through stronger cross-border risk-sharing embedded in more diversified shareholder bases. From this perspective, ownership diversification is not merely a by-product of integration, but a channel through which integrated capital markets can support firm resilience during periods of severe stress. More broadly, the results suggest that progress towards a deeper CMU could enhance the shock-absorption capacity of euro-area firms by strengthening the resilience of their equity financing.

I Introduction

The policy debate within the EU—emphasised in policy reports such as [Draghi \(2024\)](#), [Letta \(2024\)](#), and [ECB \(2024\)](#)—stresses the importance of deepening capital markets to diversify firms’ funding beyond banks, increase private risk sharing, and strengthen resilience. Central to this agenda is fostering cross-border equity investment. Yet equity home bias—the tendency of investors to overweight domestic assets—remains pervasive, also within the euro area ([Coeurdacier and Rey, 2013](#); [Beck et al., 2024](#)). At the firm level, this translates into shareholder bases concentrated among domestic investors, which can weaken risk sharing, constrain access to external equity, and amplify real adjustment to macroeconomic shocks. While research on stock market liberalisations links foreign investor entry to improved growth and firm performance ([Bekaert et al., 2005, 2011](#); [Mitton, 2006](#)), evidence on how the geography of a firm’s shareholder base affects real outcomes remains limited—particularly in times of crisis, when international diversification may be most valuable but also most fragile.

This paper fills the gap, by proposing novel firm-level measures of the geographical concentration of shareholders for euro-area firms, based on granular security-level holdings data, and by providing new evidence on how this concentration affects firm resilience during a crisis.

To construct our equity concentration measures, we exploit the ECB’s Securities Holdings Statistics at the sector level (SHS-S), which reports holdings of individual securities by investor country and sector across the euro area. This allows us to map the geographical composition of each firm’s shareholder base at the country level within the euro area, with holdings from outside the euro area observed as a single residual block. We merge these holdings data with firm-level financial statements from Compustat Global, yielding a panel of over 15,000 firm-year observations across the 19 euro area countries from 2015 to 2023.

We document that ownership of euro-area firms remains highly concentrated among domestic investors, with only a small share held by other euro area investors and a more substantial share by investors outside the euro area.

From this data, we then construct two complementary measures of geographical shareholder concentration. Our baseline measure, firm-level home bias, captures the over-representation of domestic investors relative to an integrated benchmark. We complement this with a more general measure based on the Herfindahl–Hirschman Index (HHI), which captures overall geographical concentration across all investor origins. Both measures indicate that ownership

is strongly concentrated in the home country on average, but with substantial cross-sectional heterogeneity. In particular, higher concentration is associated with smaller firm size, as well as weaker investment and innovation activity. Both measures are remarkably stable over time, suggesting that shareholder geography is a persistent firm characteristic.

Our firm-level analysis provides novel insights along several dimensions, especially compared to country-level analyses. First, the existing literature characterises the portfolios of *investors* and shows that aggregate home bias raises the aggregate cost of equity (Stulz, 1999; Lau et al., 2010). Our firm-level measures characterise the shareholder base of *issuers*. Two firms in the same country face the same country-level home bias but can have very different investor bases; as we show below, country and industry explain only a limited share of the variation in firm-level home bias, and a country-level index would miss most of the variation we exploit. Second, because our data covers all investor sectors, including households and non-financial corporations, we can distinguish a firm with a single foreign block-holder from a firm with a broad international base—a distinction that a foreign-ownership dummy or a measure based on institutional holdings alone cannot make, and which turns out to matter empirically. Third, and most importantly, firm-level data allow us to trace the margins through which diversification operates: we observe, for the same firms, market valuation, share issuance, paid-in capital, book equity, sales, bank debt, cash, and the reallocation of the shareholder base during the crisis. This is what allows us to say not only that diversified firms fare better, but through which channel and under which conditions.

To identify the effects of shareholder concentration, we exploit the COVID-19 pandemic as a large, unexpected macroeconomic shock. Our hypothesis is that firms with more geographically diversified shareholders are better positioned to weather such a shock: a broader investor base reduces the cost of equity through better risk-sharing and existing visibility to international investors facilitates access to equity financing (Errunza and Losq, 1985; Merton, 1987; Stulz, 1999). At the same time, investors may retrench to domestic assets during crises, which could reduce the diversification advantage.

We proxy exposure to the crisis by the fall in exports at the industry-country level in the spirit of Aghion et al. (2021). Our difference-in-differences strategy compares investment and equity outcomes of firms with high versus low home bias in highly exposed industries after the onset of the crisis, similarly to Adolfsen et al. (2026). We combine this with propensity score matching to balance observable firm characteristics across groups in the pre-crisis period.

The results are economically meaningful and persistent. Among firms in highly exposed industries, those with high home bias reduce investment by 20% more than their matched counterparts, with the gap emerging in 2020 and deepening through 2022. Consistent with this effect operating mainly through the equity channel, these firms also experience larger declines in market valuations and make less use of equity financing. Overall, the book value of equity relative to firm size declines by 13% for high-home-bias firms relative to their counterparts. Despite some rebalancing toward more proximate investors, the shareholder base of low-home-bias firms remains substantially more international throughout the crisis, suggesting that the diversification advantage persists.

To test our conclusion, we assess a range of competing explanations and perform several robustness checks, all of which are consistent with the baseline results. The findings are not driven by stronger sales resilience through a higher international revenue share, nor by better access to alternative funding sources: post-shock changes in bank debt are small, statistically insignificant and short-lived, and our results are robust to controlling for pre-COVID-19 cash holdings. The results also survive controls for investment-fund holdings and majority ownership, indicating that they do not simply reflect other dimensions of the investor structure. Additional robustness tests include inverse probability weighting, a triple-difference specification that incorporates less exposed firms, and the use of our broader HHI-based measure. In all cases, the main conclusions remain unchanged.

Our findings highlight substantial unrealised potential for deeper cross-border equity integration within the euro area. Greater diversification of equity holdings could enhance private risk sharing and strengthen firm-level resilience to macroeconomic shocks.

The paper proceeds as follows. Section II presents the related literature. Section III describes the data sources and sample construction. Section IV describes the shareholder structure of euro-area firms. Section V introduces our firm-level measures of home bias and shareholder geographical diversification. Section VI outlines the empirical strategy. Section VII presents baseline results. Section VIII explores alternative mechanisms. Section IX reports methodological robustness checks. Section X concludes.

II Literature review

This paper contributes and relates to several strands of the literature.

First, it speaks to the literature on equity home bias, originating with the seminal contribution of [French and Poterba \(1991\)](#) and comprehensively surveyed by [Coeurdacier and Rey \(2013\)](#) and [Ardalan \(2019\)](#). While much of this literature documents the prevalence, persistence, and causes of home bias in equity portfolios, more recent work has sought to refine its measurement using granular data. In particular, our paper relates to recent contributions that exploit detailed security-level information from the SHS-S to construct novel measures of cross-border equity holdings, including [Lambert et al. \(2024\)](#) and [Beck et al. \(2024\)](#). Rather than examining the geographical allocation of investors' portfolios, we measure the geographical concentration in firms' shareholder base and document its empirical relevance for firms' decisions.

Second, we contribute to the literature studying the real effects of international capital market integration at the aggregate level and the channels through which they materialise. As outlined by [Stulz \(1999\)](#), international integration of equity markets reduces the cost of equity through several channels, including improved risk sharing between domestic and international investors. In line with this, [Lau et al. \(2010\)](#) show that higher home bias is associated with a higher cost of equity at the country level. Further, evidence from stock market liberalisations suggests that openness to international investors significantly impacts the cost of equity, as well as aggregate investment, growth, and productivity ([Henry, 2000](#); [Bekaert et al., 2005, 2011](#); [Chari and Henry, 2008](#)). Within the European context, [Hoffmann et al. \(2020\)](#) and [Duarte and Pires \(2025\)](#) show that further integration of euro area capital markets is associated with stronger growth and improved monetary policy transmission, respectively. We extend this literature from the country level to the firm level, exploiting granular holdings data to study how ownership geography shapes real outcomes during a crisis.

Third, the strand of the literature closest to our work examines the effects of foreign equity ownership on firm outcomes. [Mitton \(2006\)](#) studies the firm-level effects of stock market liberalisations in emerging markets, showing that firms with greater openness to international investors experience stronger increases in valuation and performance, including investment and sales growth. [Chan et al. \(2009\)](#) define a firm-level home-bias measure with a similar interpretation to ours, which is, however, based on mutual fund holdings only. They show that higher home bias is associated with lower valuations. Finally, [Kacperczyk et al. \(2021\)](#) study the impact of foreign institutional investors on price efficiency with firm-level international data. They find that a higher share of international institutional owners improves stock price informativeness, reduces the cost of equity, and increases investment at the firm level. Our contribution relative

to this work is twofold. First, we exploit holdings data that encompasses the entire investor base rather than a single investor type, providing a more complete picture of firms' shareholder geography. Second, we study how this geography matters during a major crisis—showing that the diversification advantage translates into equity resilience and sustained investment when firms face a severe macroeconomic shock.

Fourth, we contribute more broadly to the literature studying the relevance of firm heterogeneity in the response to macroeconomic shocks. Much of this literature is concerned with the heterogeneous effects of monetary policy on firm investment (e.g., [Ottonello and Winberry, 2020](#); [Durante et al., 2022](#); [Cloyne et al., 2023](#)). Another strand assesses dimensions of heterogeneity that impact firm resilience during recessions, such as decentralisation ([Aghion et al., 2021](#)), innovation ([Gupta, 2026](#)), and financial conditions of the firm (e.g., [Giroud and Mueller, 2017](#)). Our findings add to this literature by identifying the geographic concentration of equity ownership as an additional and previously unexplored firm-level characteristic shaping investment responses during deep economic contractions.

III Data

Our novel dataset is constructed by matching the European Central Bank's Securities Holdings Statistics at the Sectoral level (SHS-S), enriched with key items from the Centralised Securities Database (CSDB), with firm-level financial statement data. The SHS-S provides granular data on securities holdings across euro area sectors, which we link to issuer-level financial statements. This matching procedure allows us to connect euro area securities holdings to firms' underlying financial positions.

III.A Securities data

The SHS-S and the CSDB are two data collections of the European System of Central Banks (ESCB) organised by the ECB. The securities holdings statistics (SHS) come in two main formats: at economic sector level and at individual banking group level. We employ the sectoral module (SHS - Sectoral or SHS-S), which provides security-by-security positions at the level of investor sector and investor country. Data on SHS-S are merged with key items from the Centralised Securities Database (CSDB). The CSDB covers more than six million outstanding securities and supplies the granular attributes that the SHS-S does not capture on its

own—including issuer details (name, institutional sector, and country of residence), instrument classification (such as the distinction between debt securities and listed shares), and security-level characteristics like maturity, price, and yield. The integration of these two datasets is straightforward thanks to a shared identifier—the International Securities Identification Number (ISIN)—which acts as the common key linking SHS-S holdings to the rich reference layer provided by the CSDB. Throughout the analysis we will refer to SHS-S data as implying the version merged with CSDB.

The SHS-S dataset dictates a few restrictions in our analysis based on its coverage. First, it only includes investors in the euro area, with very few, statistically unreliable data points for other EU countries. Second, it covers listed stocks, which are the focus of our paper, in addition to funds, bonds, and money market paper, but no unlisted equity. Third, while the full quarterly time series starts in 2013-Q4, in our analysis we focus on the period 2015–2023, to ensure full coverage for firms and holders in Lithuania, which is included in the sample from 2015. Fourth, the holdings data is aggregated at sector-country level but one cannot have a full picture of the individual holders, e.g. one can see how much of a firm’s equity is held by the investment fund sector in a given country, but cannot identify the individual funds ([Boermans, 2022](#)).

For our analysis, we focus on listed shares issued by non-financial corporations (NFCs) in the 2015 euro area composition (EA-19). In line with the literature using the same data, we restrict holdings to those reported by euro area investors because non-euro area countries have insufficient coverage in SHS-S ([Boermans, 2022](#)). Holdings by the rest of the world (RoW) are inferred as the difference between total market capitalisation and reported euro area holdings. An important implication is that holdings by non-euro-area investors enter our measures as a single residual block: we observe how much of a firm’s equity is held outside the euro area, but not in which countries. Our measures therefore offer a more detailed picture about the geography of ownership *within* the euro area, while diversification across non-euro-area investors is captured only at the aggregate level. SHS-S contains end-of-quarter data. We compute all SHS-S-based measures at quarterly frequency and take annual averages to match the frequency of the financial statement data.¹

¹We use annual averages rather than year-end data, as some observations at the ISIN-country-sector level are missing in the fourth quarter. Given the persistence of the shareholder structure, this choice does not affect our results in any meaningful way.

III.B Financial statements and additional data

Our analysis uses financial-statement data for euro-area firms from Compustat Global, which contains annual information on publicly listed companies and is thus well aligned with the coverage of SHS-S.² We convert financial-statement data into euros using Compustat’s currency conversion tables and deflate all nominal variables with country-level GDP deflators, taking 2020 as the base year.

Information on NACE industry codes, firms’ year of incorporation, and majority ownership is obtained from the ORBIS database (Bureau van Dijk). Additionally, we obtain data on the geographical distribution of sales and the amount of bank debt from Capital IQ, data on stock returns, trading volumes, and the foreign revenue share from LSEG, and data on analyst coverage from IBES.

III.C Final sample construction

To construct our final dataset, we merge holdings information from SHS-S on each firm’s main common stock with the corresponding financial statement data. We restrict the sample to firms whose country of issuance coincides with their country of headquarters or incorporation.

In line with the literature, we apply the following sample restrictions. First, we drop holdings at the ISIN–country–sector level that amount to less than 1,000 euros. Second, we exclude firms with negative or missing market capitalisation. Third, we drop firms for which total euro area holdings recorded in SHS-S amount to less than 5% of market capitalisation. Fourth, we exclude firms operating in the Agriculture, Utilities, and Financial Services sectors (NACE codes A, D, E, and K).

In a small number of cases (less than 1% of observations), total euro area holdings in SHS-S exceed the firm’s market capitalisation. To allow for small measurement errors, we only drop observations where total holdings exceed 105% of market capitalisation and rescale holdings to 100% for observations in which they lie between 100% and 105%. We also exclude observations with negative firm age, observations with missing total assets, observations with negative common equity, and observations where the sum of total equity and total liabilities deviates more than 10% from total assets.

The resulting dataset comprises 15,558 firm-year observations for firms from 19 euro area countries over the period 2015–2023. Appendix Table A.2 reports summary statistics for the

²For a general discussion of the representativeness of Compustat, see [Anaya Longaric et al. \(2025\)](#).

final sample, while Appendix Tables A.3 and A.4 show the distribution across countries and NACE industries. The median firm has total assets of €194 million, market capitalisation of €131 million, annual sales of €148 million, and annual investments of €6 million.

IV Shareholder structure of euro-area firms

Our dataset enables us to document novel stylised facts about the shareholder structure of euro-area firms. We measure the share of holdings from a given euro area country c in firm i at time t by summing the holdings from all sectors j in this country and relating it to the firm's total market capitalisation:

$$\omega_{i,c,t} = \frac{\sum_j \text{Holdings}_{j,c,i,t}}{\text{Market cap}_{i,t}} \quad (1)$$

Similarly, we measure the share of holdings from a specific investor sector ($\omega_{i,j,t}$) by summing holdings of one sector across all countries. Holdings from outside the euro area are given by the residual market capitalisation after subtracting all euro area holdings at firm level:

$$\omega_{i,ROW,t} = \frac{\text{Market cap}_{i,t} - \sum_{c \in EA} \sum_j \text{Holdings}_{j,c,i,t}}{\text{Market cap}_{i,t}} \quad (2)$$

For holdings from outside the euro area we cannot distinguish different investor sectors.

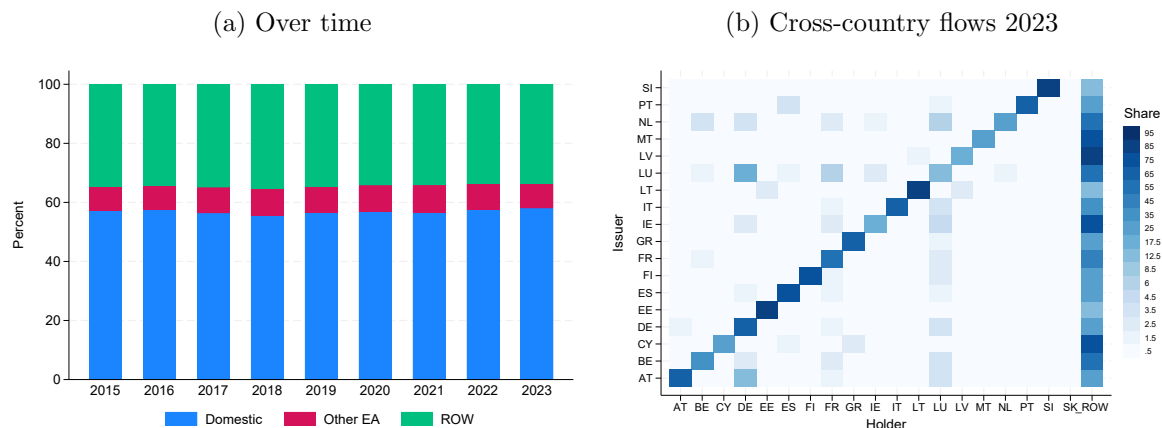
Geographical distribution of shareholders. We begin by documenting the average distribution of shareholders across regions. Panel (a) of Figure 1 shows that, on average, the majority of firms' equity is held by domestic investors (about 57%), with only about 9% held by investors from other euro area countries and the remaining third held by investors outside the euro area (RoW). This pattern is remarkably constant over our sample period.

Panel (b) provides further detail by showing cross-country holdings in 2023. While domestic holdings are elevated in most countries, domestic investors play a smaller role in some, particularly smaller, countries.³ However, firms in those countries are predominantly held by investors outside the euro area rather than by other euro area investors, as within-euro area cross-border investment remains muted across all countries. The limited cross-border holdings that do exist appear to originate mainly from the larger member states, Germany and France, as well as Luxembourg, which hosts a large number of investment funds.

³Appendix Figure A.4 shows the relation between domestic share and country size (measured by GDP).

Overall, the limited cross-border investments within the euro area and the lack of variation over time are the mirror image of the persistent home bias in equity holdings by euro area investors (Beck et al., 2024).

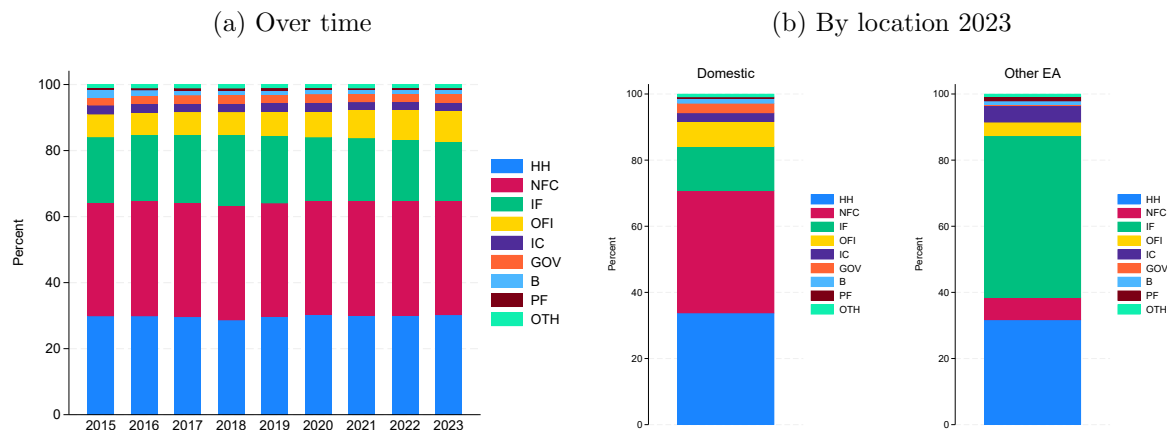
Figure 1: Geographical distribution of shareholders



Notes: This figure shows the cross-sectional average of holding shares by investor region, as defined in Equations (1) and (2). Panel (a): average shares of domestic, other euro area, and rest-of-the-world holdings over time. Panel (b): average share of holdings by holder country and country of the issuing firm in 2023. We exclude issuers from Slovakia because of a limited number of observations. For all other countries we observe at least five issuing firms in 2023.

Sectoral distribution of shareholders. We further document the sectoral composition of holdings from euro area investors. Panel (a) of Figure 2 shows that households, other non-financial corporations (NFCs), and investment funds dominate euro area equity holdings. Panel (b) reveals that NFC holdings are largely domestic, while cross-border exposures within the euro area are primarily intermediated by investment funds, with direct holdings by households also playing a non-negligible role. This is consistent with the important role of euro area investment funds in the cross-border allocation of capital (Lambert et al., 2024).

Figure 2: Sectoral distribution of EA shareholders



Notes: This figure shows the cross-sectional average of holding shares by investor sector for holdings from euro area investors. Panel (a): average shares over time. Panel (b): average share in 2023, split by investor location.

V Measuring geographical shareholder concentration

In this section, we construct and describe two complementary firm-level measures of geographical shareholder concentration: a measure of home bias in ownership, and a measure of geographical concentration across countries based on a normalised Herfindahl–Hirschman Index (HHI). We then document variation in the geographical concentration across firms and over time and relate it to firm characteristics.

V.A A firm-level measure of home bias in ownership

We first examine how concentrated a firm’s ownership is in its home country. To do so, we define a fully integrated benchmark based on each country’s aggregate holdings of euro area NFC equity. Specifically, let $m_{c,t}$ denote country c ’s market share at time t , defined as the total holdings in euro area NFCs by investors resident in country c relative to the total market capitalisation of all euro area NFCs. Appendix Table A.5 reports summary statistics on each country’s market share over time. For example, German investors hold on average 14% of the aggregate market capitalisation of euro area NFCs. In the fully integrated benchmark, German holdings would therefore account for 14% of each firm’s market capitalisation. Importantly, we compute the aggregate market capitalisation based on the full sample of NFCs listed in the euro area, excluding financial firms and equities listed outside the euro area. This takes investors’ preferences for NFC equity relative to other instruments, and for euro area equity relative to the rest of the world, as given.

To quantify the extent to which ownership of firm i is tilted towards its home country beyond what this benchmark would imply, we adapt the standard definition of home bias used in the investor portfolio literature (Coeurdacier and Rey, 2013):

$$\text{HomeBias}_{i,c,t} = 1 - \frac{\omega_{i,-c,t}}{m_{-c,t}}, \quad (3)$$

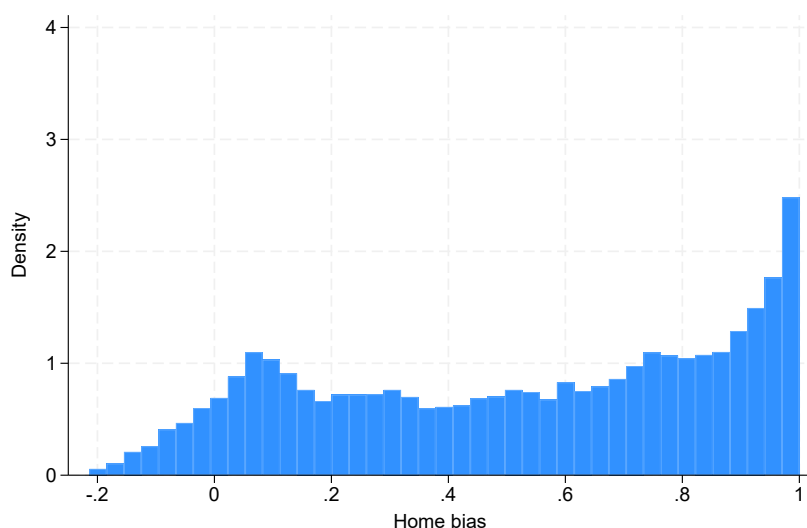
where $\omega_{i,-c,t}$ denotes the share of firm i ’s equity held by all non-resident investors (i.e. investors outside country c), and $m_{-c,t}$ denotes the market share of all countries other than c .

This measure has a straightforward interpretation: it equals one, when there are no foreign holders of the firm’s equity, i.e. ownership is fully concentrated in the home country; it equals zero when the firm’s foreign ownership share exactly matches the aggregate foreign market share $m_{-c,t}$; and it can turn negative when the foreign ownership exceeds the benchmark implied by

$m_{-c,t}$, i.e. domestic investors are underrepresented relative to the home country's market share. Our home-bias measure remains strongly correlated with the unadjusted share of domestic holdings, $\omega_{i,DOM,t}$, with $\rho = 0.99$.

Figure 3 plots the cross-sectional distribution of the home-bias measure across firms. The distribution displays substantial dispersion, reflecting considerable heterogeneity in the degree of domestic versus foreign ownership at the firm level. The low level of cross-border investment within the euro area documented in Section IV implies that a large part of the variation is driven by diversification towards the rest of the world as opposed to within-euro-area diversification. Our findings thus mainly speak to the effect of domestically concentrated ownership versus ownership diversified toward the rest of the world, while cross-border holdings within the euro area remain a largely untapped margin of diversification.

Figure 3: Distribution of firm-level home bias in ownership



Notes: This figure shows the cross-sectional distribution of the home-bias measure defined in equation (3).

V.B Geographical concentration in ownership: an HHI-based measure

While the home-bias measure captures the extent to which ownership is tilted toward the home country, it does not reveal how ownership is distributed across foreign countries. A firm may exhibit low home bias even if its foreign ownership is itself highly concentrated in only one or two markets. To capture the broader geographical concentration of ownership across euro-area countries and the rest of the world, we therefore construct a firm-level Herfindahl–Hirschman Index (HHI).

Let $\omega_{i,c,t}$ denote the share of firm i 's equity held by investors from country c at time t , and let N be the number of country categories considered. We define the normalised HHI for firm i at time t as

$$\text{HHI}_{i,t} = \frac{\sum_{c=1}^N \omega_{i,c,t}^2 - \frac{1}{N}}{1 - \frac{1}{N}}. \quad (4)$$

This normalisation ensures that $\text{HHI}_{i,t} \in [0, 1]$, where a value of 1 indicates that all observable ownership is concentrated in a single country, and a value of 0 indicates that ownership is uniformly distributed across all N country categories.

Figure 4 shows the cross-sectional distribution of the $\text{HHI}_{i,t}$. Panel (a) is based on holdings across all countries (including the RoW as one country category), while Panel (b) restricts attention to within-euro-area concentration and abstracts from the RoW category. The comparison suggests that the domestic-versus-RoW split is an important driver of international shareholder diversification: once RoW holdings are included, the distribution becomes more centred around medium concentration levels of 0.5, consistent with the fact that many firms display a pronounced split between domestic and non-euro-area investors.

The HHI therefore provides a useful complement to the home-bias measure by capturing the broader distribution of shareholders across locations.⁴ However, this measure comes with an important caveat stemming from data limitations: RoW holdings are observed only in aggregate, so we cannot identify how ownership is distributed across the underlying non-euro-area countries. Consequently, the HHI may confound true concentration with limited geographical detail in the data, particularly for firms with large RoW holdings. We therefore view the HHI as informative but less precise than the home-bias measure, which remains our preferred indicator.

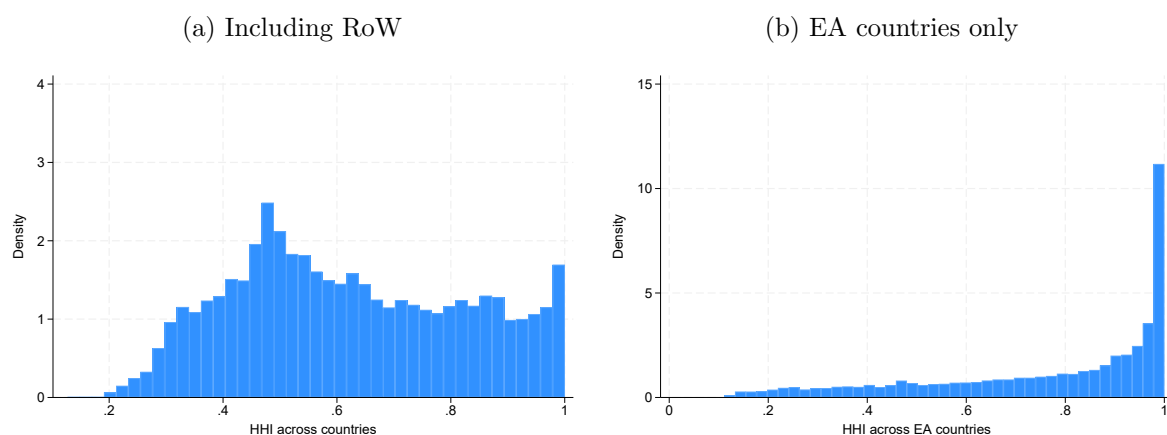
V.C Firm characteristics and geographical ownership concentration

We next explore which firm characteristics account for the observed cross-sectional variation in geographical shareholder concentration. A variance decomposition of the home bias and the HHI measure, presented in Appendix A.1, reveals that the share of the total variation that can be attributed to time-invariant firm-specific factors amounts to 68% and 75%, respectively. This indicates that persistent heterogeneity across firms is the dominant source of variation in shareholder concentration.

To investigate this more systematically, we estimate regressions of our home bias and HHI

⁴Appendix Figure A.5 displays the relation of Home Bias and HHI.

Figure 4: Distribution of firm-level geographical ownership concentration (HHI)



Notes: This figure shows the cross-sectional distribution of the HHI defined in equation (4). Panel (a): concentration across euro area countries and the rest of the world. Panel (b): concentration within the euro area, excluding the rest of the world.

measures on a set of standard firm-level covariates, including size, age, leverage, measures of investment activity, and proxies for innovation, while controlling for country, year, and 2-digit industry fixed effects. The results, summarised in Table 1, indicate that firms with more geographically concentrated ownership tend, on average, to be smaller, older, and more leveraged. Further, higher levels of concentration are associated with less capital and R&D expenditure. This pattern is consistent with the notion that younger, larger, and more dynamic firms are better able to attract a broader and more internationally diversified investor base.

V.D Time-series patterns in ownership concentration

Finally, we examine how geographical ownership concentration evolves over time. Appendix Figure A.3 plots the cross-sectional average of the concentration measures by year. At the aggregate level, average ownership concentration appears remarkably stable over the sample period, suggesting that the overall degree of geographical diversification in shareholders has changed little.

This aggregate stability, however, masks important heterogeneity across firms, which we further describe in Appendix A.2. When we condition on firm characteristics, we find that geographical ownership concentration has declined more strongly among firms with higher sales growth and greater R&D intensity over our sample period. This pattern is consistent with the cross-sectional evidence and suggests that growing and innovating firms are increasingly able to tap into international markets, even as the average degree of concentration remains stable.

Table 1: Determinants of firm-level geographical ownership concentration

	Home Bias		HHI across countries	
	(1)	(2)	(3)	(4)
Log total assets	-0.048*** (0.004)	-0.051*** (0.004)	-0.044*** (0.002)	-0.043*** (0.003)
Firm age	0.001*** (0.000)	0.000* (0.000)	0.001*** (0.000)	0.000** (0.000)
Mark up	0.003 (0.014)	0.009 (0.018)	-0.002 (0.008)	-0.003 (0.011)
Sales growth	-0.005 (0.016)	-0.035 (0.022)	0.010 (0.008)	0.006 (0.011)
Equity ratio	-0.089** (0.036)	-0.025 (0.046)	-0.054** (0.021)	-0.054* (0.030)
Investment ratio	-0.091*** (0.029)	-0.120*** (0.040)	-0.028* (0.016)	-0.001 (0.022)
Log R&D intensity		-0.019*** (0.004)		-0.010*** (0.003)
Constant	0.841*** (0.035)	0.757*** (0.051)	0.869*** (0.021)	0.806*** (0.031)
Observations	10116	5482	10116	5482
Country FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓

Notes: This table reports OLS regression results relating the measures for geographical ownership concentration to firm characteristics, controlling for country, year, and 2-digit NACE industry fixed effects. Columns 1-2: outcome is the home bias as defined in Equation (3). Columns 3-4: outcome is the HHI including the RoW country category as defined in Equation (4). See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

VI Empirical strategy

As our measure of shareholder diversification exhibits very limited variation over time, yet displays strong and persistent differences across firms, it is well suited to identify the effects of shareholder diversification on firm outcomes in the face of a significant macroeconomic disruption.

In this section, we outline our empirical strategy, comprising the shock measure, the estimation approach, and the matching procedure.

VI.A Shock measure

Our sample period encompasses the COVID-19 recession, a severe macroeconomic shock that was exogenous in origin and largely unanticipated in its timing and severity. To capture heterogeneous exposure across firms, we identify industries that were disproportionately affected by the crisis. Following [Aghion et al. \(2021\)](#) and [Gupta \(2026\)](#), we use the decline in exports

at the industry-country level as our selection criterion. We view this as a suitable, data-driven approach for several reasons. First, it reflects both demand- and supply-side forces—including restrictions that impact the demand for specific goods and services, limited remote-work feasibility, and supply-chain disruptions—at the industry-country level, which is the relevant margin of variation in exposure. Second, as an aggregate measure driven by foreign developments, it is unlikely to be driven by idiosyncratic shocks to individual firms. Third, exports are particularly representative of the economic activity of the large, publicly listed firms we have in our sample.

Specifically, a firm’s exposure to the economic shock induced by COVID-19 is proxied by the decline in exports at the industry-country level between 2019 and 2020, in deviation from its pre-pandemic growth trend. Formally, the export shock is defined as follows:

$$\text{Export Shock}_{j,c,2020} = - \left[(\text{Log Exports}_{j,c,2020} - \text{Log Exports}_{j,c,2019}) - \hat{g}_{j,c,2011:2019} \right] \quad (5)$$

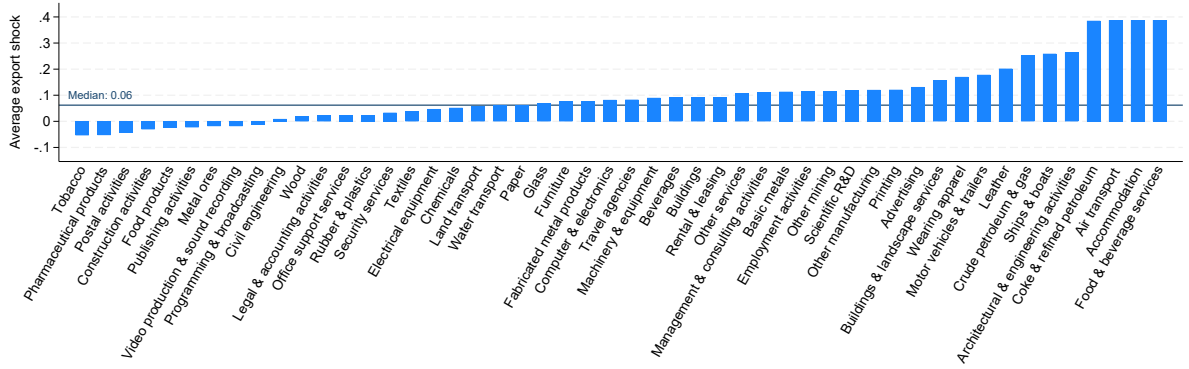
where j denotes the two-digit NACE industry, c denotes the country, and $\hat{g}_{j,c,2011:2019}$ is the average yearly growth rate in exports from 2011 to 2019. We use data from the OECD on exports in goods and services mapped to NACE two-digit industries, available for the mining, manufacturing, construction, and services sectors.⁵

We use the export shock to split the sample into firms strongly exposed to the crisis, defined as those operating in industries with an above-median export shock, and firms weakly exposed. Figure 5 shows the average size of the shock across industries. Consistent with the development of the pandemic, industries such as *Accommodation*, *Air transport*, and *Motor vehicles* saw the largest contractions, while sectors such as *Tobacco* and *Pharmaceuticals* were the least affected, even registering a moderate increase in exports. The median shock, at which we split the sample, is a 6% decline in exports. The average decline in exports in the group of firms facing a large shock amounts to 16%. Appendix Figure A.6 shows the frequency with which each industry is part of the large export shock group.

Figure 6 further validates our shock measure by relating it to firm-level sales growth in 2020. Panel (a) shows that a larger industry-level shock is associated with a stronger decline in sales at the firm level. Panel (b) validates this also for our sample split: firms in the large export shock group experienced a 10 percentage point stronger drop in sales in 2020 compared to firms facing a small shock.

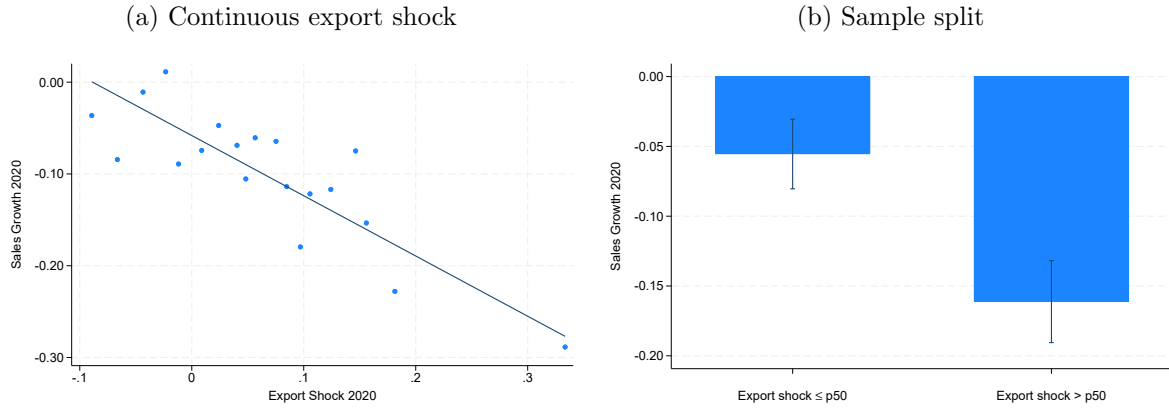
⁵For some sectors, exports, especially service exports, are recorded at a broader level. In that case we assume that exports are equally distributed across all 2-digit industries within a category.

Figure 5: Average export shock by industry



Notes: This figure displays the industry-level export shock as defined in Equation (5) averaged across countries. For illustrative purposes, we winsorize the shock measure at the 5% level. The solid line shows the median export shock.

Figure 6: Export shock and firm-level sales growth in 2020



Notes: This figure relates the industry-level export shock to firm-level sales growth in 2020 (log difference in sales). Panel (a): binned scatter plot of sales growth and the continuous export shock measure as defined in Equation (5). For illustrative purposes, we winsorize the shock measure at the 5% level. Panel (b): average sales growth in the high and low export shock groups, defined by splitting the sample at the median shock. Bars represent 95% confidence bands.

VI.B Estimation approach

To determine the causal relationship between shareholder diversification and firm resilience, our identification strategy relies on a dynamic difference-in-differences specification:

$$Y_{i,s,c,t} = \sum_{k=2016, k \neq 2019}^{2023} \beta_{k,s} \cdot \text{High HomeBias}_{i,s} \cdot \mathbb{1}[t = k] + \alpha_i + \alpha_{c,post,s} + \delta_{t,s} + \gamma_s X_{i,c,t} + \varepsilon_{i,s,c,t} \quad (6)$$

where $Y_{i,s,c,t}$ represents the outcome variables for firm i in shock group s , country c , and year t , including log investment, log market capitalisation, log paid-in capital, log number of

outstanding shares, and log equity, each scaled by the average sales over the past three years.⁶ The variable $\text{High HomeBias}_{i,s}$ is an indicator that equals one for firms with high shareholder concentration relative to firms in the same export shock group, defined as those with average home bias above the group-specific median during the pre-treatment period (2016–2019), and zero otherwise. The term $\mathbb{1}[t = k]$ denotes a time indicator for year k . We include firm fixed effects, α_i , to control for time-invariant firm characteristics, and year fixed effects, $\delta_{t,s}$, to account for common trends within each shock group. Moreover, we include country-post 2019 fixed effects $\alpha_{c,post,s}$ to account for differences in COVID-19 policy responses across countries. The vector $X_{i,c,t}$ contains further controls, including country-level GDP growth and the long-term interest rate.⁷ In specifications where we do not scale the outcome by firm size, we further control for log sales. Finally, $\varepsilon_{i,s,c,t}$ represents the error term, which we cluster at the firm level to account for serial correlation.

The model is estimated separately for firms in the large and small export shock groups, with the baseline focusing on the large shock group. The coefficients $\beta_{k,s}$ capture the differential effect of high geographical shareholder concentration in year k and within export shock group s . We estimate the dynamic effects over the period 2016 to 2023 and restrict the sample to firms observed for at least four years.

VI.C Matching procedure

As discussed in Section V.C, the diversification of shareholders is not random but strongly associated with firm characteristics like size, age, and leverage. As these characteristics also shape firms' responses to shocks, simple comparisons across firms may be confounded. To address this concern, we implement a propensity matching procedure following [Rosenbaum and Rubin \(1983\)](#), on the basis of pre-COVID-19 firm characteristics.

Specifically, we use propensity score matching to improve comparability between firms with high and low home bias. Propensity scores are estimated separately for firms in the large and small export shock group, using firm characteristics averaged over the 2016–2019 period.⁸

⁶We use average sales as our measure of firm size to ensure that our results are not driven by the adoption of IFRS 16, which changed the accounting treatment of lease contracts from 2019 onward and mechanically affected the evolution of total assets, liabilities, and the capital stock.

⁷Because there is no long-term interest rate for Estonia, we exclude Estonia from our main estimation.

⁸Before taking the average, we extract year fixed effects to account for the fact that not all firms are observed over the whole pre-period.

The propensity score is defined as:

$$\Pr(\text{High HomeBias}_i = 1 \mid \bar{X}_{i,2016:2019}) \quad (7)$$

where $\bar{X}_{i,2016:2019}$ denotes a vector of pre-treatment firm characteristics, including firm size (log total assets), age, equity ratio, investment ratio, sales growth, and markup. These variables capture key dimensions of firm heterogeneity that may be correlated with both shareholder concentration and firm resilience.

We match each firm in the high-home-bias group to the five nearest firms with low home bias based on the estimated propensity score, using a nearest-neighbour matching algorithm with replacement, and limiting the estimation to cases on the common support.⁹ Conditional on observing all variables, the matching exercise results in the exclusion of 13 out of 441 firms in our baseline sample, i.e. firms facing a large export shock.

The effectiveness of the matching procedure is evaluated by examining the balance of firm characteristics before and after matching. Panel (a) of Appendix Table A.6 reports the overall balance statistics, showing no significant bias after matching. Table 2 provides further detail, confirming that the treatment and control groups are well balanced across key dimensions, including size, age, leverage, investment, and growth metrics. Moreover, differences across relevant variables we do not include in the matching exercise, such as cash holdings, liquidity of the stock and market capitalisation also dissipate. Tables A.7 and A.8 show the distribution of high- and low-home-bias firms across industries and countries in the matched sample. Importantly, the groups are balanced across broad industries (NACE sections). At the same time, some differences across countries remain, which we address in a robustness check.

Overall, the matching procedure provides confidence that firms in the treatment and control groups exhibit similar observable characteristics during the pre-pandemic period, thereby reducing the risk of confounding bias and strengthening the causal interpretation of our estimates.

Given that observable fundamentals are balanced across groups, this raises the question of what is behind the remaining differences in shareholder structure. We argue that the answer lies, at least in part, in the firms' visibility to international investors. When firms are more

⁹As shown in Figure A.7 in the Appendix, the propensity score distributions indicate that most observations satisfy the common support condition. Further, the resulting matching weights are unrelated to the continuous home bias values in the control group. While matching on five neighbours results in the best balance across characteristics, alternative specifications of the matching procedure, using less neighbours, provide comparable results.

Table 2: Balance of firm characteristics

	Mean		Difference
	High home bias	Low home bias	
<i>Panel (a): Unmatched</i>			
Log total assets	5.19	5.95	-0.76***
Year of incorporation	1972	1977	-4.70
Equity to assets	0.44	0.47	-0.03*
Investment ratio	0.20	0.23	-0.03**
Mark up	1.62	1.52	0.10**
Δ Log sales	0.03	0.06	-0.03
Cash to assets	0.15	0.18	-0.03
Log Amihud illiquidity measure	-1.53	-2.95	1.42***
Log market capitalisation	18.55	19.56	-1.01***
<i>Panel (b): Matched</i>			
Log total assets	5.50	5.35	0.15
Year of incorporation	1971	1972	-1.30
Equity to assets	0.43	0.44	-0.01
Investment ratio	0.21	0.21	0.00
Mark up	1.62	1.60	0.02
Δ Log sales	0.03	0.03	0.00
Cash to assets	0.15	0.17	-0.02
Log Amihud illiquidity measure	-1.80	-2.00	0.20
Log market capitalisation	18.87	18.86	0.01

Notes: This table reports the balance of firm characteristics across the low- and high-home-bias groups in the baseline sample of firms facing a large export shock. Columns show group averages and their difference. Panel (a): raw averages. Panel (b): after applying the matching weights from the PSM procedure described in the text. All variables are firm-level averages over 2016–2019 after removing time fixed effects. The table includes all variables used in the matching as well as three additional characteristics. See Appendix A.5 for variable definitions. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

visible, international investors face lower information frictions, making them more willing to hold the stock and resulting in a more geographically diversified shareholder base. We examine two proxies that plausibly capture such visibility: index membership and analyst coverage. Table 3 shows that members of the STOXX Europe 600 (as of 2019) are significantly less likely to belong to the high-home-bias group (Column 1). Similarly, firms covered by more than five analysts providing earnings forecasts in the pre-COVID-19 period are also significantly less likely to have a high home bias (Column 2). Crucially, these differences in visibility cannot be attributed to differences in market capitalisation, liquidity, or growth, as these characteristics are balanced by construction in the matched sample. The residual variation in ownership structure thus appears to partly reflect differences in international visibility that are unrelated to the observable fundamentals of the firm.

Table 3: High home bias and visibility in matched sample

	High home bias	
	(1)	(2)
STOXX 600 member	-0.17** (0.08)	
Covered by 1-5 analysts		-0.10 (0.07)
Covered by >5 analysts		-0.15** (0.07)
Constant	0.51*** (0.03)	0.58*** (0.06)
Observations	430	427
R^2	0.009	0.013

Notes: This table reports regression results from a linear probability model, relating the high-home-bias indicator to proxies for visibility to international investors. The sample is restricted to firms in the large export shock group and we apply matching weights. Column 1: *STOXX 600 member* is one if a firm was part of the STOXX Europe 600 index in 2019, and zero otherwise. Column 2: *Covered by X analysts* indicates how many analysts, on average, provided earnings forecasts for the firm over the pre-COVID-19 period. The base category is zero analysts. Robust standard errors in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

VII Estimation results

We now turn to the results. For our baseline results, we estimate Equation 6 within the matched sample of firms with high COVID-19 exposure, as defined in Section VI.A, applying the matching weights derived in the previous section.

VII.A Investment dynamics

We start with our main outcome of interest: firms' investment activity, which most directly captures the potential real economic consequences of shareholder concentration during the crisis. Panel (a) of Figure 7 displays the estimated evolution of log investment for high relative to low-home-bias firms. We find no evidence of differential pre-trends, lending support to our identification strategy. From 2020 onwards, high-home-bias firms display a persistent and statistically significant decline in investment relative to low-home-bias firms, with the effect reaching 29% at its trough in 2022. Appendix Figure A.9 confirms the result using alternative outcomes, namely log investment scaled by sales and the investment-to-capital ratio, though pre-trends for the latter are affected by the adoption of IFRS 16.

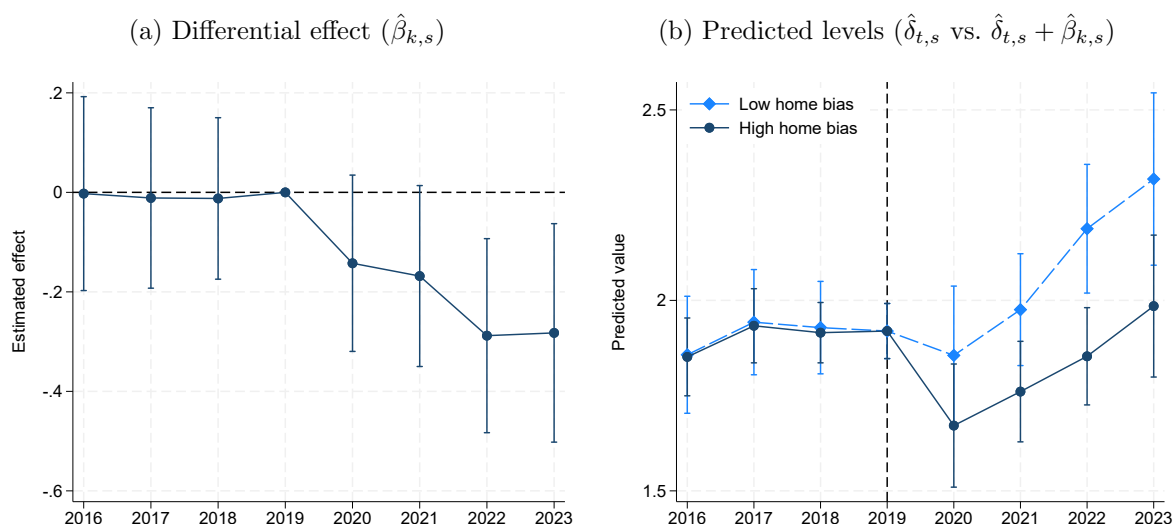
To gain a deeper understanding of the underlying dynamics, we show the predicted levels of log investment for both groups in Panel (b).¹⁰ The results indicate that investment falls for

¹⁰To predict the levels, we estimate Equation (6) without country-post 2019 fixed effects, as otherwise, the levels would not be identified. Omitting these fixed effects has no visible impact on the estimated dynamics.

both groups during the crisis and then recovers, but the contraction is smaller and the recovery significantly stronger for low-home-bias firms, resulting in the persistent gap between high- and low-home-bias firms' investment activities.

The gap continues to widen through 2022, when the acute phase of the pandemic had largely passed in most euro area countries. Two further shocks in 2022 plausibly contributed to this pattern and cannot be separated from the COVID-19 shock with our design. First, the energy price surge following Russia's invasion of Ukraine weighed disproportionately on manufacturing, which is over-represented in the large export shock group (Figure 5); part of the 2022 widening may therefore reflect differential exposure to this second shock rather than a lagged pandemic effect. Second, monetary tightening from mid-2022 onwards raised the cost of debt financing, which is likely to have been more binding for firms with weaker access to equity markets. Our year fixed effects absorb these shocks only to the extent that they hit high- and low-home-bias firms symmetrically. Reassuringly, the estimates are essentially unchanged when we interact year fixed effects with 2-digit industry dummies (Section IX.D), which absorbs industry-specific paths of the energy shock. More generally, both shocks share the feature that firms with resilient equity financing should be better placed to absorb them, so their contribution is consistent with, but not proof of, the equity channel we emphasise. We therefore read the 2022 estimates as reflecting a sequence of adverse shocks rather than the pandemic alone.

Figure 7: Baseline estimation results – Investment

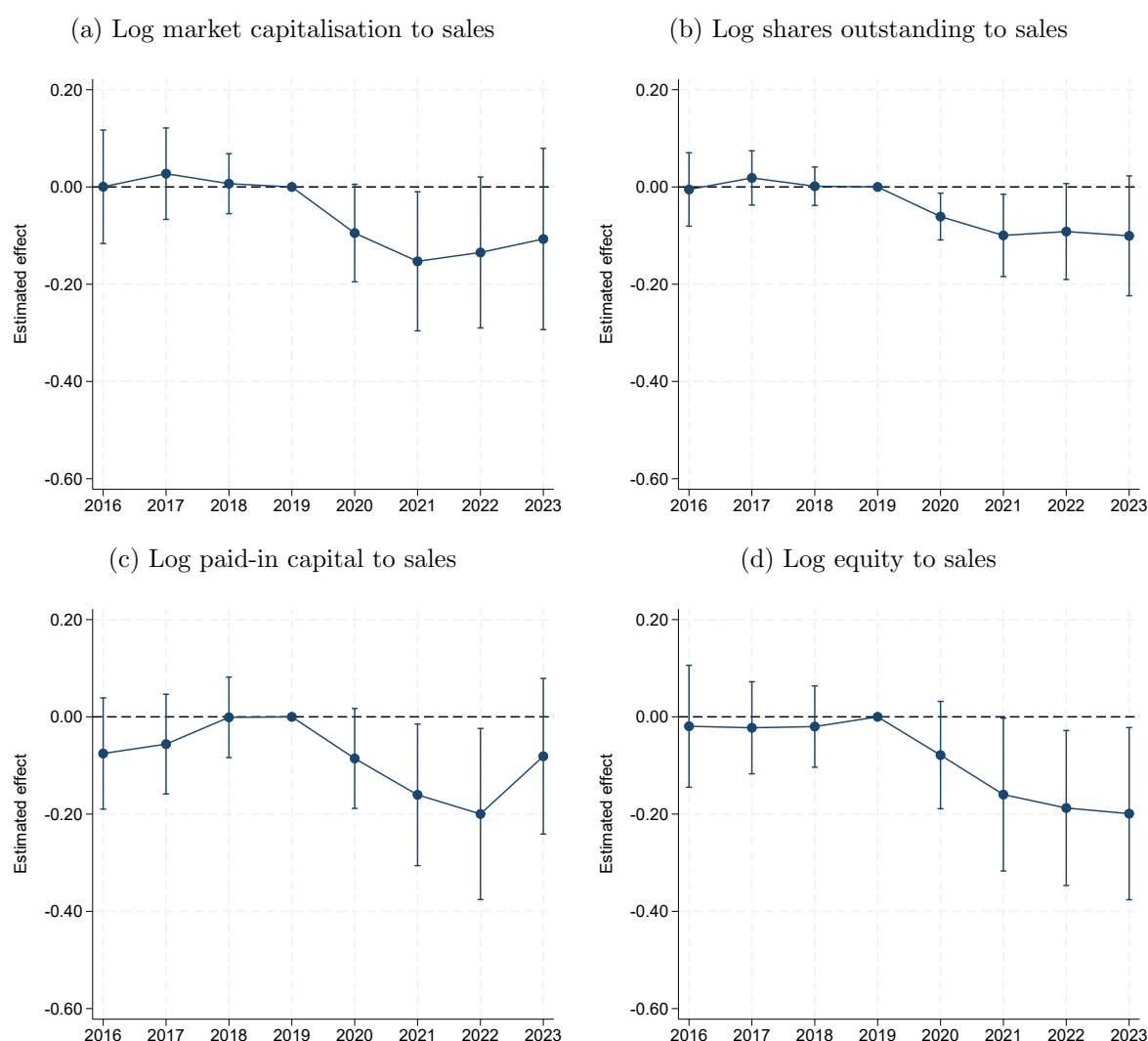


Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, with log investment as the outcome and controlling for log sales. Panel (a): differential effect of high-home-bias. Panel (b): predicted levels for low- and high-home-bias firms, both normalised to the sample-wide average predicted outcome in 2019, estimated without country-post fixed effects. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

VII.B The equity channel

We hypothesise that differences in the shareholder structure lead to different investment dynamics mainly through higher equity resilience, meaning more stable cost of equity and the ability to raise new equity during the crisis. While debt and government guarantees played the dominant role for the immediate liquidity provision during the COVID-19 pandemic, equity markets served as an important recapitalisation channel. In Europe, follow-on offerings reached their highest quarterly volume in over three years in mid-2020 (AFME, 2020), and evidence from US firms suggests that equity issuances supported investment activity through the downturn (Panetsidou and Synapis, 2025).

Figure 8: Baseline estimation results – Equity channel



Notes: This figure shows estimation results from Equation (6) for different equity-related outcomes in the matched sample of firms facing a large export shock. All outcome variables are scaled by average sales over the preceding three years. Panel (a): log market capitalisation. Panel (b): log number of outstanding shares. Panel (c): log paid-in capital. Panel (d): log equity. See Appendix A.5 for variable definitions. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

In Figure 8 we analyse different equity-related outcomes, each scaled by firm size. We first look at the market capitalisation in Panel (a). High-home-bias firms experience a strong relative decline in market valuation, particularly during the first two years of the pandemic. While we cannot cleanly disentangle the underlying channels, this pattern is at least consistent with investors demanding a higher risk premium for firms with a more concentrated shareholder base. A higher risk premium—the return investors require over and above the risk-free rate—translates into a higher cost of equity for the firm and thus raises the return that new projects must earn to be undertaken, which can directly depress investment. It is worth being precise about what this interpretation does and does not require. That high-home-bias firms are perceived as riskier by equity investors in bad states is part of the mechanism rather than an alternative to it: a domestically concentrated shareholder base implies less international risk sharing and hence a higher required return on equity precisely when the shock hits (Stulz, 1999). What the interpretation does require is that the two groups do not differ in *credit* risk in a way unrelated to ownership. The matching already balances leverage, size, age and cash before the shock. Additional robustness checks show that the effect remains unchanged when identified within industry-year cells (Section IX) and that bank debt does not respond differentially (Section VIII), which we would expect if the groups differed in creditworthiness.

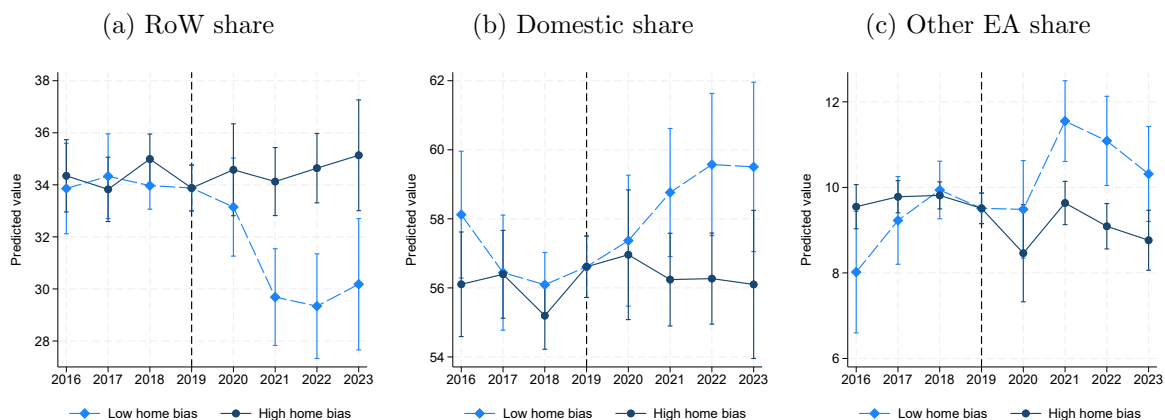
If equity markets are less favourable for high-home-bias firms, this also impacts their ability to use equity financing. We analyse this using two measures: the number of outstanding shares in Panel (b) and the value of paid-in capital in Panel (c). Both measures decline for high-home-bias firms relative to their low-home-bias counterparts. The predicted levels for the number of outstanding shares, shown in Panel (b) of Appendix Figure A.10, reveal an increase for low-home-bias firms but no change for high-home-bias firms, consistent with low-home-bias firms actively raising new equity during the crisis while high-home-bias firms do not. Overall, Panel (d) shows a persistent relative decline in the book value of common equity. Importantly, the difference in common equity is not driven by differences in retained earnings as shown in Appendix Figure A.11.

Finally, our arguments for higher equity access for low-home-bias firms rest on continued access to international investor demand during the crisis. However, if foreign investors retrench to domestic assets during crises, this access could weaken even for firms entering the crisis with a diversified shareholder base. We therefore investigate how equity holdings were reallocated following the shock by using the shares held by domestic, other euro area, and rest-of-world

investors ($\omega_{i,c,t}$) as outcomes in Equation (6).

Figure 9 shows that the geographical shareholder structure of high-home-bias firms remained largely stable. They retain their high exposure to domestic holders and do not tap into international markets during the crisis. In contrast, low-home-bias firms experience a modest rebalancing in their shareholder composition alongside their increase in market value. Panel (a) shows a small reduction in the share of RoW holdings, declining by roughly 5 percentage points from an average share of 53%. This decline is partly offset by an increase in domestic holdings, shown in Panel (b), but also by a disproportionate rise in holdings from other euro-area countries, increasing by about 2 percentage points from an average share of 13% as shown in Panel (c). Overall, while there is some evidence of rebalancing toward more proximate investors, the shareholder base of low-home-bias firms remains substantially more international than that of their high-home-bias counterparts throughout the crisis.

Figure 9: Predicted change in shareholder composition



Notes: This figure shows predicted levels of holding shares for low- and high-home-bias firms, estimated from Equation (6) in the matched sample of firms facing a large export shock with holding shares by investor location as the outcomes. Panel (a): share of rest-of-world holdings. Panel (b): share of domestic holdings. Panel (c): share of other euro area holdings. We control for log sales and exclude country-post fixed effects. Levels are normalised to the sample-wide average predicted outcome in 2019. Bars represent 90% confidence intervals based on standard errors clustered at the firm level.

VII.C Average effects in the large and small export shock groups

Taken together, the dynamic effects support the view that weaker equity resilience contributes to the larger and more persistent investment decline observed for high-home-bias firms. Table 4 quantifies the average effects by collapsing the period-specific estimates into a single pre-versus-post comparison. The estimates are economically meaningful within the large export shock group. Against an average 16% shock, investment by high-home-bias firms falls by 20% relative to comparable firms with low home bias.

We also find consistently negative effects on equity-related outcomes for high-home-bias firms. The number of outstanding shares relative to sales declines by 9% and the book value of equity relative to sales by 13%. The effects on market capitalisation and paid-in capital are shorter-lived, resulting in statistically insignificant average effects.

Table 4: Baseline estimation – Average effect within large export shock sample

	(1)	(2)	(3)	(4)	(5)
	Log investment	Log market cap/sales	Log shares/sales	Log paid-in capital/sales	Log equity/sales
Post 2019 _t × High HomeBias _i	-0.20** (0.09)	-0.13 (0.08)	-0.09* (0.05)	-0.10 (0.07)	-0.13* (0.08)
Log sales _{i,t}	0.37 (0.33)				
Constant	-0.00 (1.77)	-0.14*** (0.03)	11.29*** (0.02)	-1.86*** (0.02)	-0.67*** (0.03)
Observations	2992	3021	3021	2999	3015
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓	✓
Macro control	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We repeat our analysis also for the low-export shock group.¹¹ Appendix Table A.9 shows no significant differences across high- and low-home-bias firms among firms only weakly affected by the crisis. This suggests that the resilience channel operates in more severe downturns. Further, it lends additional credibility to our analysis: if high-home-bias firms were subject to other shocks over 2020–2023 unrelated to their COVID-19 exposure, or differed from low-home-bias firms in unobserved ways that became binding after 2019 irrespective of the pandemic, we would expect a differential response also in the small export shock group. The absence of such a response speaks against these alternative explanations, although it cannot exclude unobserved differences that interact with COVID-19 exposure, which we address through the saturated specifications in Section IX.D.

VIII Competing channels

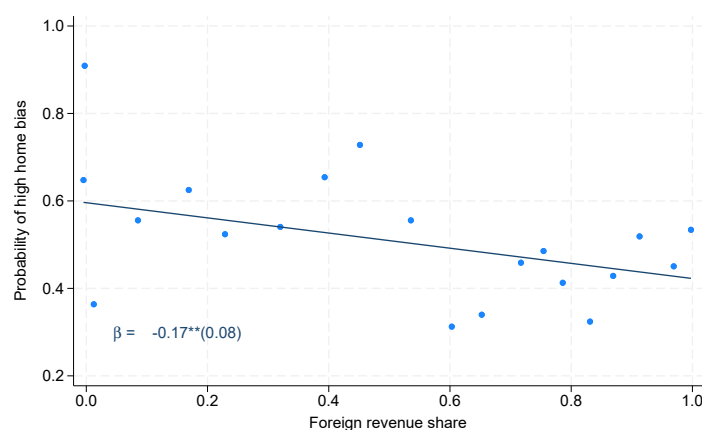
Our hypothesis is that shareholder diversification across countries enhances equity resilience and thereby supports firm investment in the aftermath of severe adverse shocks. While our baseline results are consistent with this view, we now address alternative channels that could explain the weaker resilience of high-home-bias firms.

¹¹Balance statistics for the corresponding matching procedure are shown in Panel (b) of Appendix Table A.6.

VIII.A The role of foreign sales

A first competing channel concerns international sales. Even after matching, home bias in ownership remains strongly correlated with the share of international revenue, as shown in Figure 10. This pattern may reflect the greater visibility of internationally active firms to foreign investors, which in turn fosters more geographical diversification in the shareholder base. However, international sales exposure also provides an alternative explanation for our findings: if such firms are more resilient on the sales side during the shock, their stronger investment performance may partly reflect greater sales resilience rather than equity resilience. We test this in two ways.

Figure 10: Foreign revenue share and probability of being a high-home-bias firm



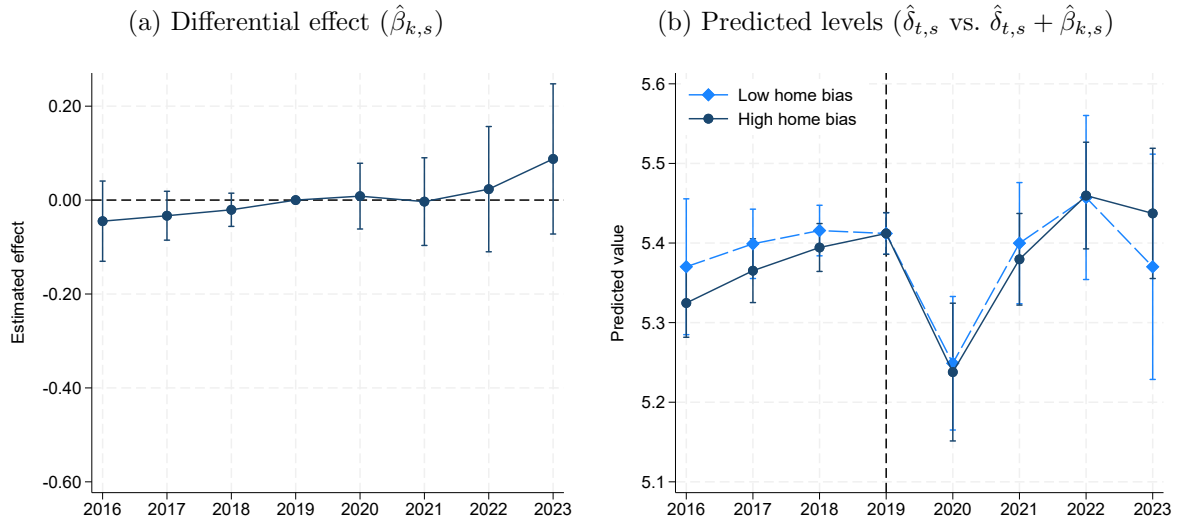
Notes: This figure shows a binned scatter plot for the matched sample of firms facing a large export shock, relating the High HomeBias indicator to the average share of foreign revenues over 2016–2019. The solid line shows a linear fit with the corresponding slope estimate β and robust standard error in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

First, we assess whether differential sales resilience can account for our findings. If high-home-bias firms had experienced a larger decline in sales than low-home-bias firms, the stronger investment performance of the latter could simply reflect better operating resilience. However, Figure 11 shows that, within the large-shock group, there is no statistically significant difference in sales across the two groups following the shock.¹² This finding provides evidence against the sales-resilience channel as the main explanation for our results.

Second, we augment our baseline specification to account directly for the potentially confounding role of firms' international sales exposure. Specifically, we control for interactions between the year dummies and an indicator for a high foreign revenue share in the pre-COVID-19 period, defined analogously to the high-home-bias indicator. Our investment result remains

¹²Appendix Figure A.12 further confirms that sales growth does not differ between groups.

Figure 11: Baseline estimation results – Log sales



Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, with log sales as the outcome. Panel (a): differential effect of high home bias. Panel (b): predicted levels for low- and high-home-bias firms, both normalised to the sample-wide average predicted outcome in 2019, estimated without country-post fixed effects. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

fully robust to this specification: the estimated effects retain the same sign, magnitude, and statistical significance as in the baseline (Panel (a) of Appendix Figure A.13). For the equity-related outcomes, the pattern of results is likewise unchanged, although statistical significance is somewhat weaker (Panels (b)–(e)). This is unsurprising given the strong correlation between foreign revenue share and home bias in ownership. Nevertheless, the overall stability of the estimates lends further support to our preferred interpretation.

VIII.B The role of alternative funding sources

Our baseline results point to the equity channel as the key mechanism linking shareholder diversification to investment resilience. However, the pecking order theory suggests that firms prefer internal funds and debt over equity financing, turning to equity only as a last resort (Myers, 1984). If firms with more diversified shareholders also had better access to these preferred funding sources, the equity channel may be secondary. We therefore address the role of these alternative funding sources for our results.

First, we consider cash holdings. Firms entering the crisis with larger cash buffers could sustain investment without external financing and experienced more stable stock prices (Fahlenbrach et al., 2021), potentially accounting for both our investment and valuation results. It is thus important to rule out that our results are driven by differences in the cash positions with which firms entered the crisis. As shown in Section VI.C, pre-COVID-19 cash-to-assets ratios do

not differ significantly across groups in our matched sample. In Table 5, we additionally control for above-median cash holdings prior to COVID-19. The results remain virtually unchanged, suggesting that the availability of internal funds is not a primary driver of our findings.

Table 5: Average effect estimation – Controlling for cash-to-assets

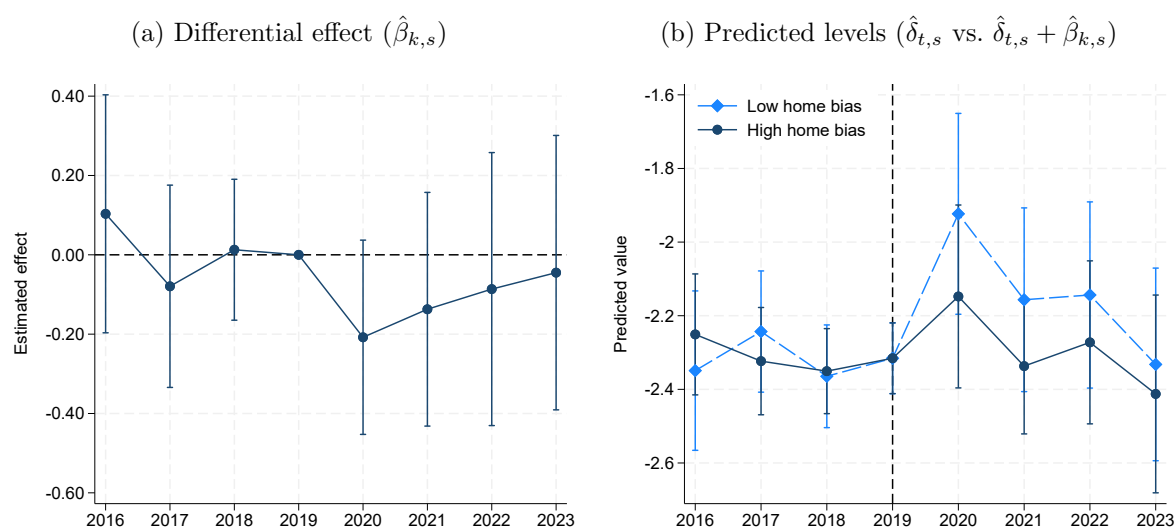
	(1) Log investment	(2) Log market cap/sales	(3) Log shares/sales	(4) Log paid-in capital/sales	(5) Log equity/sales
Post 2019 _t × High HomeBias _i	-0.19** (0.08)	-0.13 (0.08)	-0.09* (0.05)	-0.10 (0.07)	-0.13* (0.08)
Log sales _{i,t}	0.37 (0.32)				
Post 2019 _t × High cash to assets _i	0.20** (0.09)	0.10 (0.08)	-0.01 (0.05)	0.13 (0.08)	0.07 (0.08)
Constant	-0.05 (1.73)	-0.17*** (0.03)	11.29*** (0.02)	-1.89*** (0.03)	-0.69*** (0.03)
Observations	2992	3021	3021	2999	3015
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator and controlling for pre-shock cash buffers. *High cash-to-assets* is an indicator for above-median cash-to-assets averaged over 2016–2019. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Second, we test whether differential access to debt financing can account for our findings. For this, we re-estimate our baseline specification using bank debt scaled by sales as the dependent variable.¹³ Figure 12 shows that low-home-bias firms increase bank debt somewhat more in 2020, though the difference is not statistically significant and closes in subsequent years—inconsistent with the persistent investment gap, which deepens well beyond 2020. Rather than reflecting differential access to bank lending, for which there is no clear mechanism linked to shareholder geography, this pattern likely reflects greater financing needs from higher investment activity. Moreover, equity resilience may itself relax borrowing constraints by supporting collateral values, consistent with Broner et al. (2026), who show that positive equity demand shocks increase not only equity issuance but also debt financing through this channel. Taken together with the timing of the investment and equity responses, this pattern suggests that bank credit served as the immediate shock-absorption margin for both groups of firms in 2020, whereas equity was the margin on which the subsequent recovery of investment diverged.

¹³We look at bank debt as total liabilities are strongly impacted by the adoption of IFRS 16, and bank financing is the dominant source of external debt for European firms.

Figure 12: Baseline estimation results – Log bank debt to sales



Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, with log bank debt scaled by average sales in the preceding three years as the outcome. Panel (a): differential effect of high home bias. Panel (b): predicted levels for low- and high-home-bias firms, both normalised to the overall sample average in 2019, estimated without country-post fixed effects. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

VIII.C The role of alternative dimensions of shareholder structure

Geographical diversification is correlated with other dimensions of ownership that could independently explain our findings. We consider two. First, since investment funds intermediate most cross-border holdings within the euro area (Section IV), our results could reflect the benefits of institutional ownership rather than geography. Controlling for an above-median pre-COVID-19 share of euro area investment fund holdings leaves the results largely unchanged, with only the investment effect becoming somewhat weaker (Appendix Table A.13). Second, geographical concentration may proxy for ownership concentration more generally. Using ORBIS data, we control for the presence of a single majority owner, distinguishing domestic from foreign block-holders.¹⁴ The main results are robust (Appendix Table A.14). Notably, a foreign majority owner—in contrast to a geographically diversified shareholder base—has a negative effect on equity outcomes during the crisis, suggesting that concentrated foreign ownership operates through a different channel than geographical diversification, and that a coarse foreign-ownership indicator would conflate the two.

¹⁴The results are similar when controlling for the presence of an owner with at least 25% of voting shares.

IX Methodological robustness

Whereas the previous section examined and ruled out a range of competing economic channels, the present section focuses on methodological robustness. Specifically, we assess whether our findings remain robust to alternative sample constructions and estimation strategies.

IX.A Inverse Probability Weighting

Our baseline estimation relies on propensity score matching. As an alternative approach, we also implement inverse probability weighting (IPW), which re-weights observations on the basis of their estimated propensity scores. The weights are constructed based on the propensity score estimated as described in Section VI.C, here denoted *pscore*. We assign each observation a weight equal to the inverse of the probability of receiving its actual treatment status. Specifically, high-home-bias firms receive a weight of $\frac{1}{pscore}$, and low-home-bias firms receive a weight of $\frac{1}{1-pscore}$, i.e. the inverse of the probability of having a high home bias. As for the propensity score matching, we keep only observations on the common support to avoid extreme weights.

Because the propensity score is bounded between 0 and 1, this procedure up-weights firms whose treatment status was more uncertain and down-weights firms that were almost certain to receive (or not receive) the treatment. This re-weighting creates a pseudo-population in which treatment assignment is independent of observed covariates, thereby approximating a randomised experiment. Reassuringly, Appendix Figure A.14 shows that the results remain robust under this alternative methodology, indicating that our findings are not driven by the particular matching procedure used in the baseline specification.

IX.B Triple-difference estimation

Because our baseline results are obtained from separate estimations by shock group, we next verify that the findings continue to hold when the full sample is analysed jointly. To do so, we estimate a triple-difference specification that allows us to compare the post-2019 differential effect of shareholder concentration across firms with different exposure to the 2020 export shock:

$$\begin{aligned}
Y_{i,j,c,t} = & \beta_1 (\text{High HomeBias}_i \times \text{Post 2019}_t) + \beta_2 (\text{Post 2019}_t \times \text{Large Export Shock 2020}_{j,c}) \\
& + \beta_3 (\text{High HomeBias}_i \times \text{Post 2019}_t \times \text{Large Export Shock 2020}_{j,c}) \\
& + \alpha_i + \alpha_{c,\text{post}} + \delta_t + \gamma X_{i,c,t} + \varepsilon_{i,j,c,t}
\end{aligned} \tag{8}$$

Here, $Y_{i,j,c,t}$ denotes the outcome of interest. *High HomeBias_i* is an indicator equal to one for firms with high home bias, defined on the basis of average concentration over the 2016–2019 period being above the sample median. *Post 2019_t* is an indicator for the post-shock period, and *Large Export Shock 2020_{j,c}* indicates an above median export shock at the country-industry level as defined in Section VI.A. The vector $X_{i,c,t}$ includes GDP growth, the long-term interest rate, and firm size measured by log sales. Firm fixed effects, α_i , absorb time-invariant heterogeneity across firms, $\alpha_{c,\text{post}}$ capture country-post 2019 differences in pandemic related policies, while year fixed effects, δ_t , capture common aggregate time effects.

The coefficient of primary interest is β_3 , which measures the additional post-2019 differential effect of high shareholder concentration for firms operating in industries with a stronger export shock. By contrast, β_1 captures the post-2019 differential effect of high concentration among unexposed firms. This specification therefore provides a unified test of whether the weaker investment performance of high-home-bias firms is concentrated among firms more strongly exposed to the COVID-19 recession.

The estimates reported in Columns 2 and 4 of Table 6 confirm the baseline findings. High-home-bias firms that are more exposed to the 2020 shock experience a significantly weaker investment response and a relative decline in equity in the post-2019 period. Among firms with small export shock, there are no differences in investment or equity outcomes between high- and low-home-bias firms. Consequently, estimating the difference between high- and low-home-bias firms in the full sample without distinguishing by COVID-19 exposure yields statistically insignificant estimates, as shown in Columns 1 and 3. Overall, the full-sample results align closely with the separate estimations by shock group.

IX.C Measuring concentration with the HHI

Our baseline analysis is based on the home-bias measure, which we consider the most reliable indicator in light of the data limitations in SHS-S. At the same time, the HHI captures a

Table 6: Triple-difference estimation – Investment and equity

	Log investment		Log equity/sales	
	(1)	(2)	(3)	(4)
Post 2019 _{<i>t</i>} × High HomeBias _{<i>i</i>}	-0.08 (0.07)	0.04 (0.10)	-0.02 (0.06)	0.09 (0.08)
Post 2019 _{<i>t</i>} × Large export shock 2020 _{<i>i</i>}		0.15 (0.11)		0.19* (0.10)
Post 2019 _{<i>t</i>} × Large export shock 2020 _{<i>i</i>} × High HomeBias _{<i>i</i>}		-0.23* (0.13)		-0.20* (0.11)
Log sales	0.41*** (0.13)	0.41*** (0.13)		
Constant	-0.28 (0.69)	-0.32 (0.68)	-0.65*** (0.02)	-0.69*** (0.03)
Observations	5893	5893	5970	5970
Firm FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓

Notes: This table reports estimation results from versions of Equation (8) estimated in the full matched sample. Columns 1 and 3 include only the interaction between *Post* 2019 and *High HomeBias*. Columns 2 and 4 estimate the full specification of Equation (8). In columns 3–4, the outcome is scaled by average sales over the preceding three years. Standard errors clustered at the firm level are in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

broader notion of geographical diversification in ownership. We therefore repeat our analysis replacing the high-home-bias indicator with an analogous indicator based on the HHI across all countries.¹⁵ The results remain consistent with the baseline: the effects on investment and market capitalisation remain statistically significant (Panels (a)–(b) of Appendix Figure A.15). For some equity-related outcomes, statistical significance weakens somewhat, while patterns remain comparable to our baseline (Panels (c)–(e) of Appendix Figure A.15). However, this reflects poorer common support in the propensity score distribution between high- and low-HHI firms, causing the matching weights to concentrate on observations near the median and compressing the effective differences between groups (Appendix Figure A.8). Taken together, these findings provide further validation of our conclusions.

IX.D Industry-specific shocks

Our baseline compares firms within the same export shock group, but the pandemic—and the energy shock of 2022—affected industries within this group differently over time. We therefore saturate the baseline with year fixed effects interacted with 2-digit NACE industry dummies, so that the home-bias effect is identified within industry-year cells. Appendix Table A.12 shows that the estimates are essentially unchanged: the investment effect is -0.19 (s.e. 0.09) against

¹⁵The balance statistics for the corresponding matching procedure are shown in Appendix Table A.10.

–0.20 in the baseline, and the effects on shares outstanding and book equity remain statistically significant.

IX.E Country composition

Appendix Table A.8 showed that in some smaller countries there is no variation in the high-home-bias indicator—in Cyprus, Ireland, Lithuania, Luxembourg, Latvia, the Netherlands, Slovakia, and Slovenia, all firms fall into either the high- or the low-home-bias group. While our country-post fixed effects absorb country-level differences in firms’ crisis responses, they may not do so perfectly for these smaller countries. We therefore re-estimate our baseline excluding these countries. Appendix Table A.11 shows that the results are unchanged, confirming that our findings are not driven by cross-country comparisons.

X Conclusion

This paper documents that the ownership of euro-area firms remains strongly concentrated in the home country, with only limited diversification within the euro area itself. This pattern suggests that cross-border equity integration remains incomplete, despite the high degree of economic and financial interdependence within the monetary union.

We show that this ownership structure has important implications for firm resilience in times of severe macroeconomic stress. Among firms that were highly exposed to the COVID-19 recession, those with more domestically concentrated shareholders experienced a significantly weaker adjustment margin: they reduced investment by around 20% more than comparable firms with less concentrated ownership, suffered larger declines in market valuation and weaker subsequent recoveries, and made less use of equity financing. These findings are consistent with the view that a more geographically diversified shareholder base strengthens equity resilience and helps firms sustain investment when adverse shocks hit. We interpret equity resilience as the main channel behind the investment gap, since sales, bank debt, and cash holdings do not differ across groups. At the same time, shareholder geography is a highly persistent firm characteristic, and the residual differences between matched firms may partly reflect unobserved dimensions of firm quality that also support resilience. Our estimates should therefore be read as an upper bound on the pure equity-diversification effect.

Taken together, the results point to substantial unrealised gains from greater cross-border

equity holdings within the euro area. So far, diversification has mainly been towards the rest of the world, leaving considerable untapped potential for diversification within the euro area. While we cannot establish that euro-area diversification alone would replicate the full effect we document, deeper equity market integration could strengthen private risk sharing and improve firms' access to equity financing during major downturns, supporting corporate investment and the resilience of the euro area economy as a whole.

One qualification applies. Our evidence identifies the equity margin as the one on which firms with diversified and concentrated shareholder bases differ, but it cannot exclude that internationally diversified shareholders are correlated with broader access to external finance, including bank relationships, which we observe only through firms' balance sheets. Should part of the effect reflect diversified external finance more generally, this would reinforce rather than weaken the case for cross-border capital market integration.

Our analysis also points to several directions for future research. A first priority is better measurement of foreign ownership concentration, especially beyond the euro area, where current data provide only limited geographical detail. A second is to investigate the relationship between equity diversification and the diversification of bank relationships. Loan-level data such as AnaCredit would make it possible to observe the number and location of a firm's lenders alongside the geography of its shareholder base, and thereby to assess whether the resilience benefits we document are specific to equity or reflect diversified external finance more broadly.

It would also be useful to assess whether the patterns documented here generalise beyond the COVID-19 recession to other types of macroeconomic shocks. More broadly, our results point to the need for further work on the macroeconomic implications of equity market integration within the euro area. Understanding how cross-border ownership shapes private risk sharing, capital allocation, and the transmission of shocks remains an important agenda for future research.

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A Appendix

A.1 Variance decomposition

We examine what drives variation in the geographical concentration of shareholders by decomposing both the home-bias measure and the HHI into four components: a fixed country component, a fixed industry component at the NACE 2-digit level, a fixed firm component, and a residual time-varying component. The exercise follows the sequential variance decomposition in [Altavilla et al. \(2024\)](#).

First, we regress our concentration measure on fixed country effects

$$Home\ Bias_{i,j,c,t} = \alpha_c + \varepsilon_{i,j,c,t},$$

and attribute the resulting explanatory power to the fixed country component, such that

$$\omega_c = R^2.$$

Second, we regress the remaining variation on industry fixed effects,

$$\varepsilon_{i,j,c,t} = \alpha_j + v_{i,j,c,t},$$

so that the industry contribution is given by

$$\omega_j = R^2 \times (1 - \omega_c).$$

Third, we decompose the residual further using firm fixed effects,

$$v_{i,j,c,t} = \alpha_i + \mu_{i,j,c,t},$$

which yields the firm-level contribution

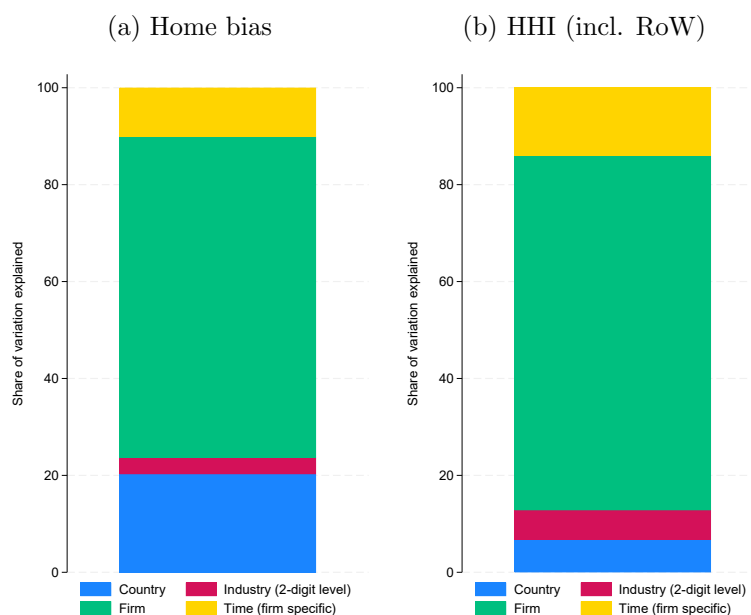
$$\omega_i = R^2 \times (1 - \omega_c - \omega_j).$$

The remaining unexplained share is interpreted as the residual time-varying component:

$$\omega_{i,j,c,t} = 1 - \omega_c - \omega_j - \omega_i.$$

This procedure allows us to assess whether shareholder concentration is primarily shaped by country- and sector-level factors, or whether it mainly reflects persistent firm-specific characteristics. The results, reported in Figure A.1, show that both Home Bias (Panel (a)) and the HHI (Panel (b)) are explained predominantly by fixed firm characteristics. By contrast, country and industry effects account for a more limited share of the variation, while the residual time-varying component is comparatively small. This confirms that the geographical concentration of shareholders reflects persistent firm-level features rather than common country or sectoral conditions.

Figure A.1: Variance decomposition of ownership concentration



Notes: This figure shows the variance decomposition into country (ω_c), industry (ω_j), firm (ω_i), and residual time-varying components. Panel (a): the dependent variable is the home bias. Panel (b): the dependent variable is the HHI including the rest-of-world category.

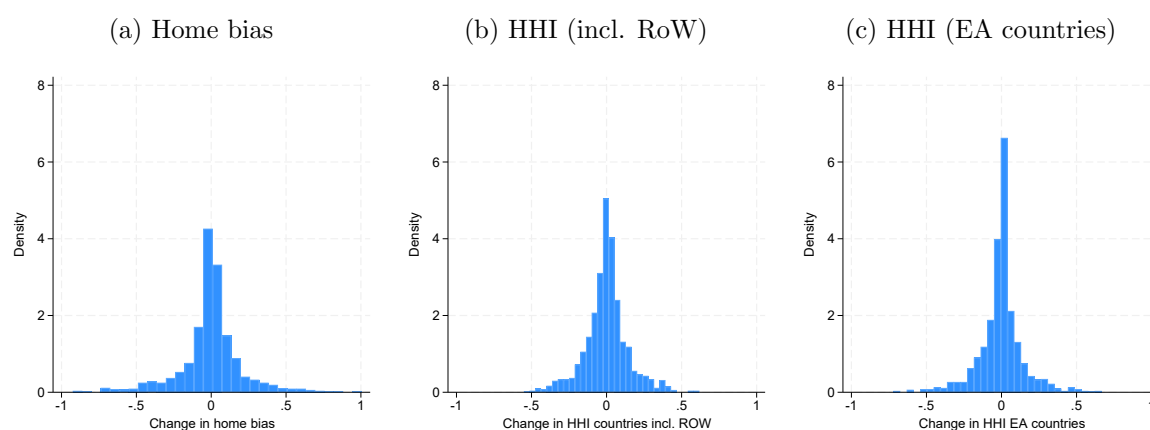
A.2 Long-run change of concentration at the firm level

To complement the variance decomposition and the evidence on the aggregate time-variation, we also analyse long-run changes in shareholder concentration at the firm level. Specifically, we compute the change in concentration between the beginning of our sample period (average over 2015–2017) and the end of our sample period (average over 2021–2023) at the firm level.

Figure A.2 reports the cross-sectional distribution of these long-run changes for the home-bias measure, the overall HHI, and the euro-area-only HHI. The distributions indicate that, while ownership concentration does evolve over time for some firms, much of the variation remains persistent. This is consistent with the variance decomposition and reinforces the view that geographical concentration in ownership is largely a stable firm-level characteristic rather than a highly transitory outcome.

To understand which firms experienced a shift in their shareholder base, we regress the long-run change in concentration on several firm characteristics, averaged over our sample period. Table A.1 shows that firms with higher R&D intensity saw a stronger decline in both home bias and the HHI across euro area countries, while the decline in the HHI across all countries is most pronounced for firms with higher sales growth.

Figure A.2: Long-run change in ownership concentration at the firm level



Notes: This figure shows the cross-sectional distributions of the long-run changes in concentration, defined as the difference between the average over 2021–2023 and the average over 2015–2017. Panel (a): home bias. Panel (b): HHI including the rest-of-world category. Panel (c): HHI excluding the rest-of-world category.

Table A.1: Long-run change in concentration and firm characteristics

	Δ Home bias		Δ HHI countries		Δ HHI EA countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Log total assets	0.00 (0.00)	0.01* (0.00)	0.00* (0.00)	0.00** (0.00)	0.01*** (0.00)	0.01** (0.00)
Sales growth	-0.03 (0.06)	-0.05 (0.08)	-0.15*** (0.04)	-0.17*** (0.05)	-0.06 (0.04)	-0.09 (0.06)
Equity ratio	-0.01 (0.03)	-0.02 (0.05)	0.01 (0.02)	-0.01 (0.03)	-0.04* (0.02)	-0.05* (0.03)
Log R&D intensity		-0.01** (0.00)		0.00 (0.00)		-0.01* (0.00)
Constant	-0.01 (0.02)	-0.07* (0.04)	-0.02 (0.02)	-0.00 (0.02)	-0.02 (0.02)	-0.04* (0.03)
Observations	1301	768	1301	768	1301	768
R^2	0.044	0.063	0.071	0.060	0.072	0.087
Country FE	✓	✓	✓	✓	✓	✓

Notes: This table reports OLS regressions of long-run changes in concentration on firm characteristics averaged over the sample period. Long-run changes are defined as the difference between the average over 2021–2023 and the average over 2015–2017. Columns 1–2: home bias. Columns 3–4: HHI including the rest-of-world category. Columns 5–6: HHI excluding the rest-of-world category. See Appendix A.5 for variable definitions. Robust standard errors in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A.3 Tables

Table A.2: Summary statistics

	Mean	Std. Dev.	P10	Median	P90	N
Total assets (EUR m)	3631.67	15478.79	12.71	193.68	6079.29	15558
Market capitalisation (EUR m)	2506.63	11383.93	8.74	131.11	4060.22	15551
Employees (k)	9.01	32.42	0.03	0.67	16.94	14424
Investment (EUR m)	146.98	713.14	0.20	5.80	230.46	13126
Sales (EUR m)	2449.94	9377.49	5.24	147.71	4502.94	14177
Age since incorporation	40.70	34.35	10.00	29.00	94.00	15559
Equity ratio	0.44	0.21	0.18	0.43	0.74	15519
Investment ratio	0.22	0.18	0.05	0.16	0.47	11816
Share domestic	56.94	31.18	11.07	61.88	95.94	15557
Share other EA	8.71	12.61	0.05	4.21	21.42	15557
Share RoW	34.36	28.19	2.23	27.25	77.56	15557
Home Bias	0.53	0.34	0.04	0.58	0.96	15557
HHI (incl. RoW)	0.62	0.20	0.36	0.60	0.92	15557
HHI (EA countries)	0.77	0.24	0.38	0.87	1.00	15557

Notes: This table reports pooled summary statistics for the full sample. Holding shares are defined in Equations (1) and (2). Home Bias is defined in Equation (3) and HHI in Equation (4). See Appendix A.5 for the remaining variable definitions.

Table A.3: Sample distribution across countries

	N	Share (in %)
AT	428	2.75
BE	649	4.17
CY	117	0.75
DE	3711	23.84
EE	141	0.91
ES	971	6.24
FI	1098	7.05
FR	4183	26.88
GR	907	5.83
IE	282	1.81
IT	1706	10.96
LT	145	0.93
LU	53	0.34
LV	99	0.64
MT	97	0.62
NL	587	3.77
PT	248	1.59
SI	124	0.80
SK	18	0.12

Notes: This table shows the distribution of observations in the full sample across countries.

Table A.4: Sample distribution across industries

	N	Share (in %)
Mining & quarrying	268	1.72
Manufacturing	7186	46.17
Construction	482	3.10
Wholesale & retail trade; repair of motor vehicles and motorcycles	1427	9.17
Transporting & storage	562	3.61
Accommodation & food service activities	229	1.47
Information & communication	2442	15.69
Real estate activities	963	6.19
Professional, scientific & technical activities	882	5.67
Administrative & support service activities	374	2.40
Public administration & defence; compulsory social security	50	0.32
Education	31	0.20
Human health & social work activities	273	1.75
Arts, entertainment & recreation	227	1.46
Other services activities	168	1.08

Notes: This table shows the distribution of observations in the full sample across NACE sections.

Table A.5: Market share by country

	Market share (in %)			
	Mean	Std. Dev.	Min	Max
AT	1.0848	0.0951	0.9378	1.3574
BE	1.1738	0.1441	0.9028	1.3838
CY	0.0257	0.0099	0.0105	0.0473
DE	13.4571	0.7028	12.2370	15.4856
EE	0.0362	0.0095	0.0237	0.0572
ES	4.3769	0.4991	3.5504	5.1874
FI	1.7192	0.1733	1.3904	2.0661
FR	16.4855	0.9487	14.9211	18.1867
GR	0.1875	0.0442	0.1283	0.2899
IE	1.9780	0.2995	1.4049	2.7120
IT	2.4350	0.3627	1.5588	3.1700
LT	0.0408	0.0096	0.0003	0.0550
LU	6.0423	0.3792	5.1856	6.7245
LV	0.0038	0.0015	0.0023	0.0088
MT	0.0167	0.0068	0.0064	0.0309
NL	1.7399	0.3956	1.2622	2.3792
PT	0.2049	0.0195	0.1655	0.2462
SI	0.0721	0.0135	0.0580	0.1248
SK	0.0050	0.0011	0.0032	0.0073
RoW	48.9147	1.3049	46.5013	51.0530

Notes: This table reports summary statistics on the annual market shares of each country.

Table A.6: PSM balance statistics – High vs. low Home Bias

Sample	Ps R^2	LR χ^2	$p > \chi^2$	Mean Bias	Med Bias	B	R	%Var
<i>Panel (a): Large export shock sample (baseline)</i>								
Unmatched	0.071	43.62	0.000	18.9	17.0	64.3*	0.85	50
Matched	0.003	1.84	0.934	4.5	4.5	12.8	0.82	17
<i>Panel (b): Small export shock sample</i>								
Unmatched	0.128	77.93	0.000	20.6	11.3	88.2*	0.72	67
Matched	0.003	1.75	0.941	4.8	4.5	13.2	1.28	17

Notes: This table reports balance statistics for the PSM matching procedure matching high- and low-home-bias firms. B is the average of the absolute standardised biases, R is the variance ratio. * denotes a significant discrepancy, arising if $B > 25\%$, R outside $[0.5; 2]$. Panel (a): sample of firms facing a large export shock. Panel (b): sample of firms facing a small export shock.

Table A.7: Sectoral distribution after matching

	Shares (in %)		
	High home bias	Low home bias	Difference
Mining & quarrying	1.34	0.54	0.80
Manufacturing	76.79	74.46	2.33
Construction	3.13	1.70	1.43
Transportation & storage	2.68	1.96	0.72
Accommodation & food services	3.57	4.73	-1.16
Information & communication	0.45	1.07	-0.62
Professional, scientific & technical activities	8.93	13.21	-4.28
Administrative & support activities	3.13	2.32	0.81

Notes: This table reports the distribution across NACE sections for the low- and high-home-bias groups in the matched sample of firms facing a large export shock. Columns show the share of firms in each NACE section by group and their difference. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: Country distribution after matching

	Shares (in %)		
	High home bias	Low home bias	Difference
AT	3.57	3.48	0.09
BE	1.34	3.75	-2.41
CY	0.00	0.71	-0.71
DE	32.59	21.96	-10.63**
ES	8.04	3.75	-4.29*
FI	7.59	1.16	-6.43***
FR	27.23	45.45	-18.22***
GR	2.68	2.95	-0.27
IE	0.00	1.43	-1.43*
IT	10.71	6.88	3.83
LT	2.68	0.00	2.68**
LU	0.00	0.09	-0.09
LV	0.00	1.79	-1.79**
NL	0.00	5.63	-5.63***
PT	2.68	0.45	2.23*
SI	0.89	0.00	0.89
SK	0.00	0.54	-0.54

Notes: This table reports the distribution across countries for the low- and high-home-bias groups in the matched sample of firms facing a large export shock. Columns show the share of firms in each country by group and their difference. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: Average effect estimation – Small export shock sample

	(1)	(2)	(3)	(4)	(5)
	Log investment	Log market cap/sales	Log shares/sales	Log paid-in capital/sales	Log equity/sales
Post 2019 _t × High HomeBias _i	0.04 (0.09)	-0.04 (0.08)	-0.10 (0.09)	0.01 (0.07)	-0.04 (0.08)
Log sales _{i,t}	0.44*** (0.09)				
Constant	-0.48 (0.47)	0.16*** (0.03)	-2.08*** (0.03)	-1.79*** (0.03)	-0.59*** (0.03)
Observations	2900	2957	2898	2924	2954
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a small export shock, replacing the single-year indicators with a Post-2019 indicator. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.10: PSM balance statistics – High vs. low HHI

Sample	Ps R^2	LR χ^2	$p > \chi^2$	Mean Bias	Med Bias	B	R	%Var
Unmatched	0.048	29.84	0.000	9.0	5.2	52.4*	0.72	50
Matched	0.004	2.61	0.856	4.6	5.0	15.2	1.06	33

Notes: This table reports balance statistics for the PSM matching procedure matching high- and low-HHI firms within the sample of firms facing a large export shock. B is the average of the absolute standardized biases, R is the variance ratio. * denotes a significant discrepancy, arising if $B > 25\%$, R outside $[0.5; 2]$.

Table A.11: Average effect estimation – Excluding small countries

	(1)	(2)	(3)	(4)	(5)
	Log investment	Log market cap/sales	Log shares/sales	Log paid-in capital/sales	Log equity/sales
Post 2019 _t × High HomeBias _i	-0.20** (0.09)	-0.13 (0.08)	-0.09* (0.05)	-0.10 (0.07)	-0.13* (0.08)
Log sales _{i,t}	0.35 (0.33)				
Constant	0.13 (1.78)	-0.13*** (0.03)	11.27*** (0.02)	-1.87*** (0.02)	-0.67*** (0.03)
Observations	2776	2805	2805	2783	2799
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator and excluding firms from countries without within-country variation in the high-home-bias indicator (Cyprus, Ireland, Lithuania, Luxembourg, Latvia, the Netherlands, Slovakia, and Slovenia). In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Average effect estimation – Industry $\times$ year fixed effects

	Log investment	Log market cap/sales	Log shares/sales	Log paid-in capital/sales	Log equity/sales
Post 2019 _t $\times$ High HomeBias _i	-0.19** (0.09)	-0.13 (0.08)	-0.11** (0.05)	-0.09 (0.08)	-0.16** (0.08)
Log sales _{i,t}	0.38 (0.27)				
Constant	-0.02 (1.50)	-0.17*** (0.03)	11.26*** (0.02)	-1.89*** (0.02)	-0.68*** (0.03)
Observations	2963	2992	2992	2970	2986
Firm FE	✓	✓	✓	✓	✓
Year $\times$ industry FE	✓	✓	✓	✓	✓
Country $\times$ post 2019 FE	✓	✓	✓	✓	✓
Macro control	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator and including year fixed effects at the 2-digit NACE industry level. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Average effect estimation – Controlling for EA investment fund holdings

	(1) Log investment	(2) Log market cap/sales	(3) Log shares/sales	(4) Log paid-in capital/sales	(5) Log equity/sales
Post 2019 _t $\times$ High HomeBias _i	-0.15* (0.09)	-0.14* (0.08)	-0.11** (0.05)	-0.11 (0.08)	-0.13* (0.07)
Log sales _{i,t}	0.37 (0.32)				
Post 2019 _t $\times$ High IF share _i	0.14 (0.10)	-0.04 (0.08)	-0.07 (0.05)	-0.02 (0.10)	-0.00 (0.08)
Constant	-0.04 (1.74)	-0.13*** (0.04)	11.31*** (0.02)	-1.85*** (0.04)	-0.67*** (0.03)
Observations	2992	3021	3021	2999	3015
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country $\times$ post 2019 FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓

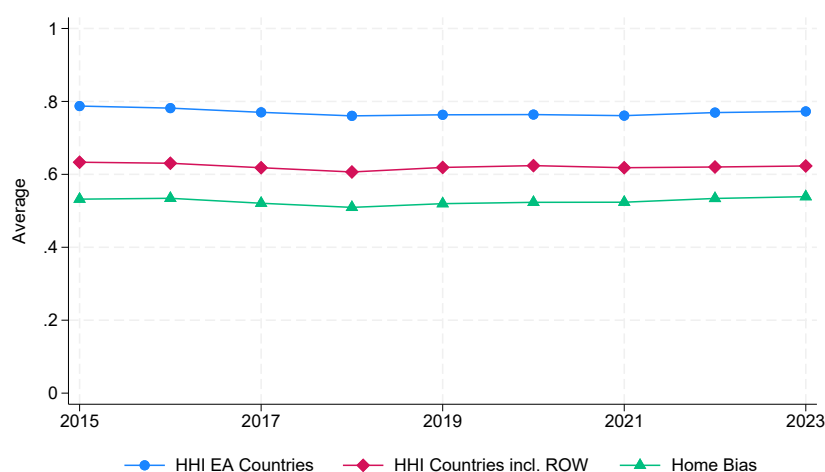
Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator and controlling for pre-shock investment fund holdings. *High IF share* is an indicator for an above-median share of investment fund holdings out of total euro area investor holdings, averaged over 2016–2019. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.14: Average effect estimation – Controlling for majority ownership

	(1)	(2)	(3)	(4)	(5)
	Log investment	Log market cap/sales	Log shares/sales	Log paid-in capital/sales	Log equity/sales
Post 2019 _t × High HomeBias _i	-0.21** (0.10)	-0.12 (0.09)	-0.09* (0.06)	-0.10 (0.08)	-0.12 (0.08)
Log sales _{i,t}	0.38 (0.32)				
Post 2019 _t × Majority owned _i	0.06 (0.12)	-0.02 (0.13)	0.05 (0.08)	-0.02 (0.11)	0.01 (0.12)
Post 2019 _t × Majority owned _i × Int. owner _i	-0.10 (0.14)	-0.03 (0.12)	-0.05 (0.08)	0.04 (0.10)	-0.18* (0.10)
Constant	-0.06 (1.74)	-0.15*** (0.04)	11.29*** (0.02)	-1.86*** (0.03)	-0.67*** (0.03)
Observations	2937	2966	2966	2944	2960
Firm FE	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓
Country × post 2019 FE	✓	✓	✓	✓	✓
Macro controls	✓	✓	✓	✓	✓

Notes: This table reports estimation results from a version of Equation (6) in the matched sample of firms facing a large export shock, replacing the single-year indicators with a Post-2019 indicator and controlling for pre-shock majority ownership. *Majority owned* is an indicator for the presence of a single shareholder holding at least 50% over 2016–2019. *Int. owner* is an indicator for this majority owner being located in a foreign country. In columns 2–5, outcomes are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Standard errors clustered at the firm level in parentheses. Level of significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

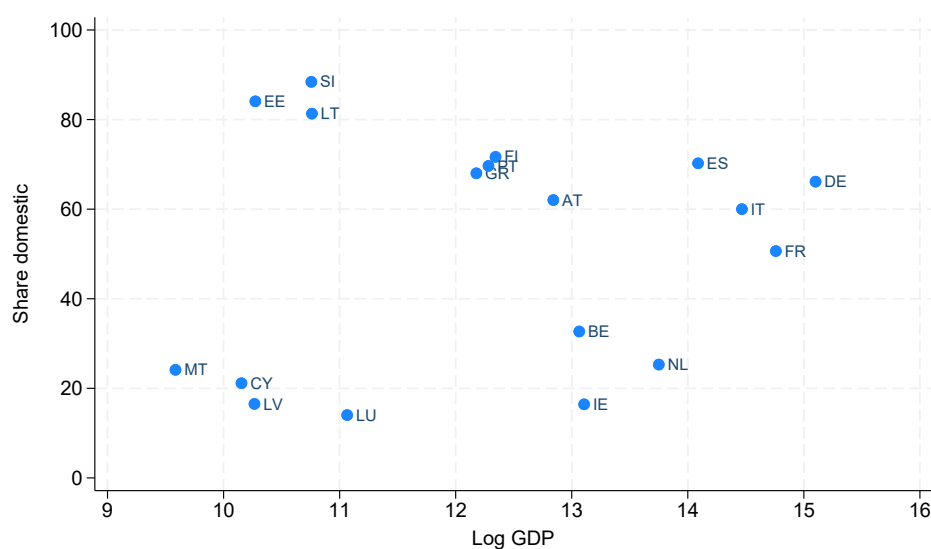
Figure A.3: Average geographical ownership concentration over time



Notes: The figure shows the cross-sectional average of the firm-level HHI excluding the RoW category (blue), the HHI including the RoW category (red), and the home bias (green), by year.

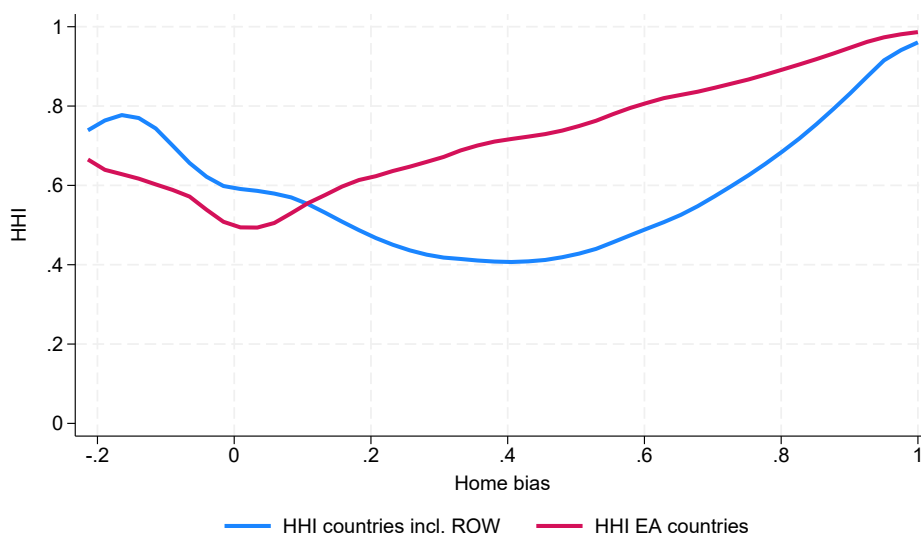
A.4 Figures

Figure A.4: Domestic share and country size (log GDP)



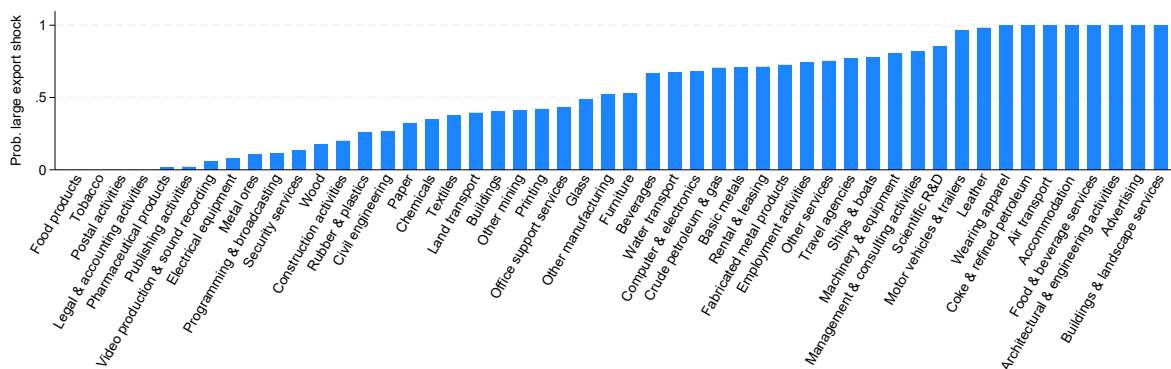
Notes: This figure shows a scatter plot relating the average share of domestic holdings to country-level log real GDP in 2023. We exclude issuers from Slovakia because of a limited number of observations. For all other countries we observe at least five issuing firms in 2023.

Figure A.5: Home Bias and HHI



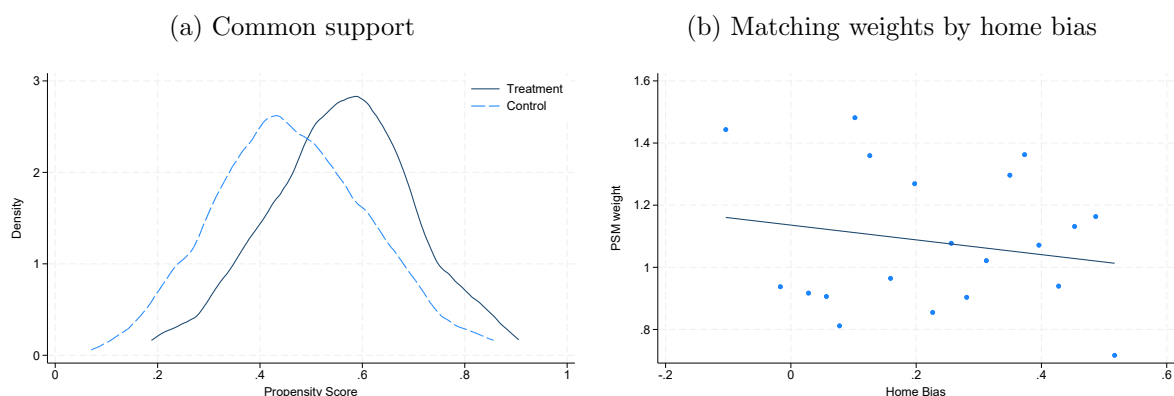
Notes: This figure shows the HHI as a function of Home Bias. Blue line: HHI including the rest-of-world category. Red line: HHI excluding the rest-of-world category.

Figure A.6: Probability of belonging to the large export shock group across industries



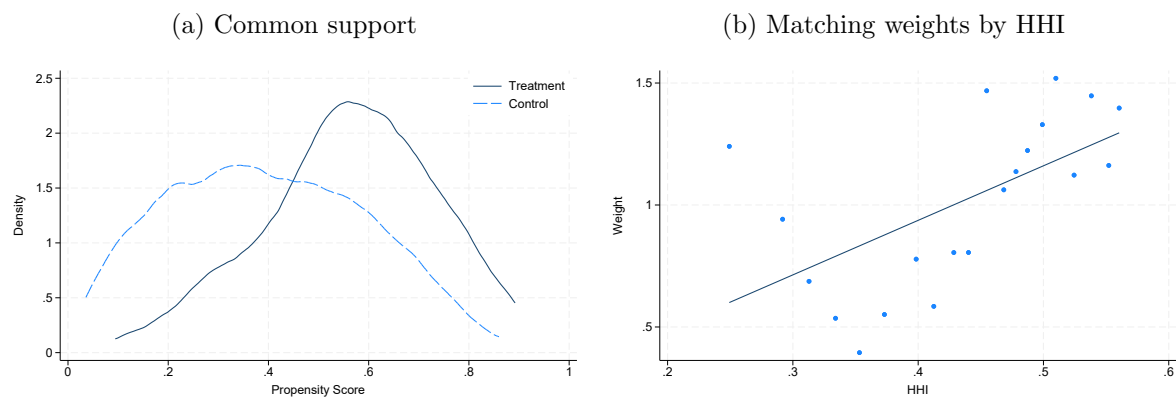
Notes: This figure displays the share of observations in the large export shock group by 2-digit NACE industry.

Figure A.7: Matching diagnostics– Home Bias



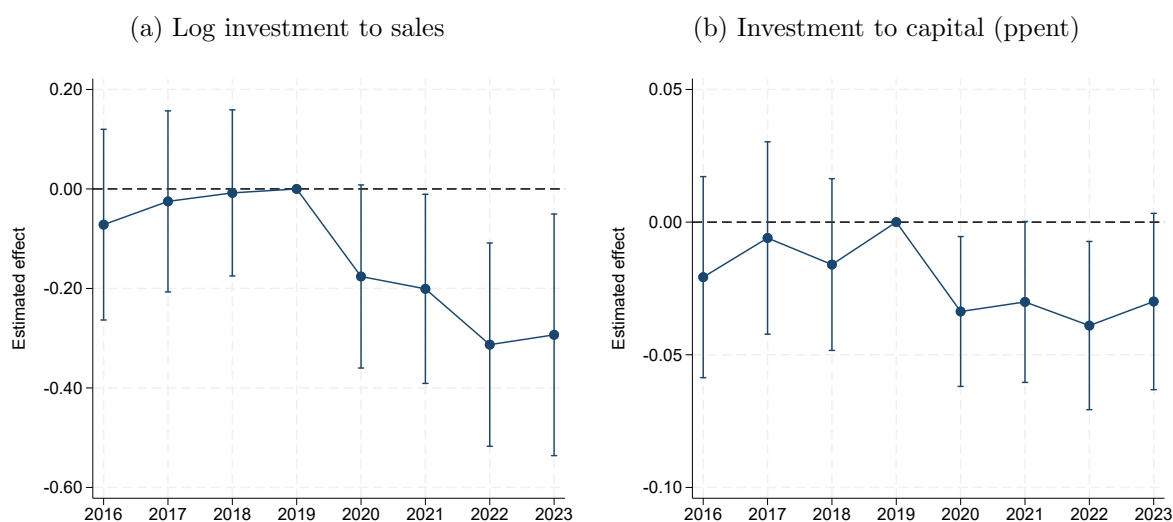
Notes: This figure displays diagnostics for the PSM matching procedure applied to high- and low-home-bias firms within the sample of firms facing a large export shock. Panel (a): distributions of the estimated propensity score for the treatment and control groups, where treatment is defined as high home bias. Panel (b): binned scatter plot of matching weights against the continuous home-bias measure for control group firms.

Figure A.8: Matching diagnostics – HHI



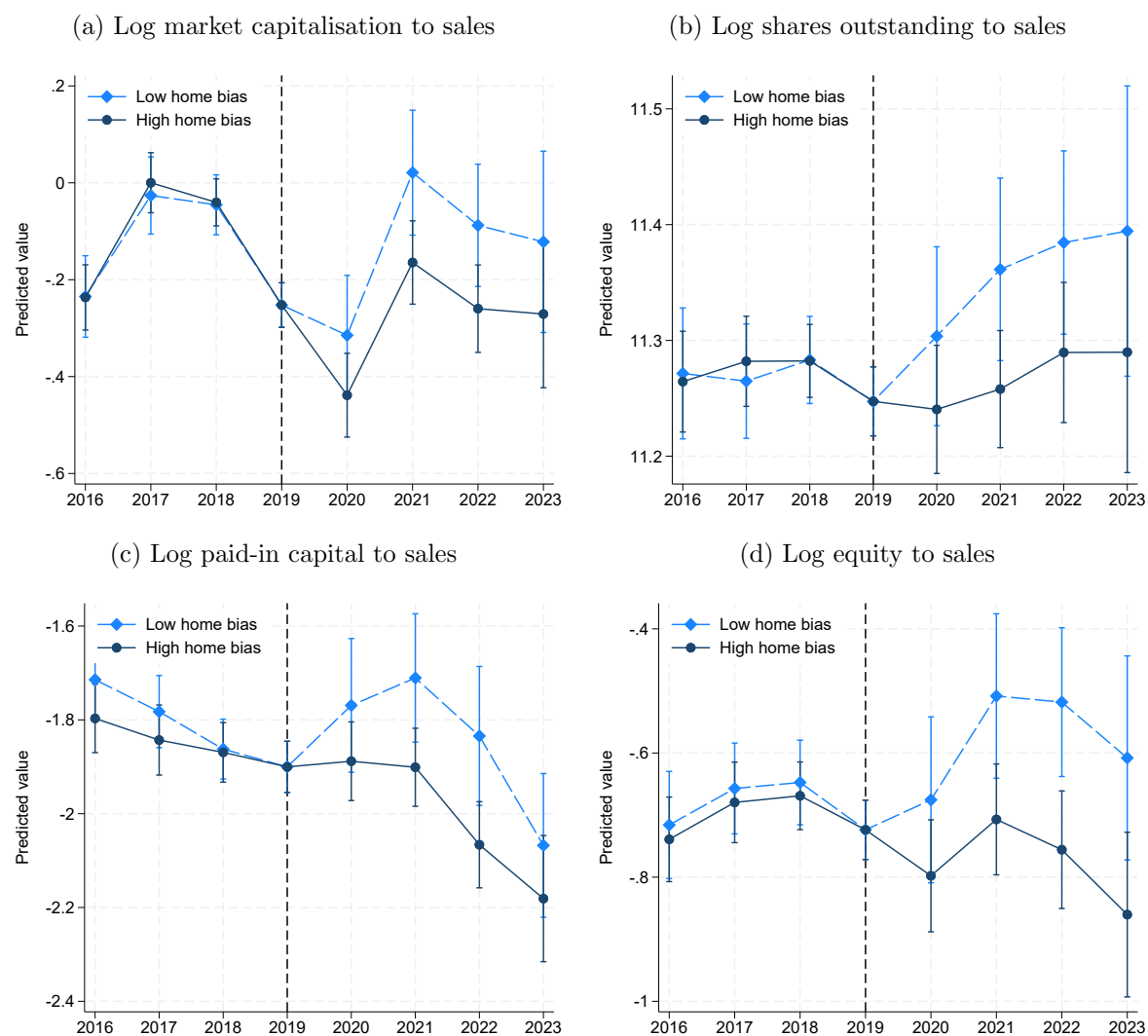
Notes: This figure displays diagnostics for the PSM matching procedure applied to high- and low-HHI firms within the sample of firms facing a large export shock. Panel (a): distributions of the estimated propensity score for the treatment and control groups, where treatment is defined as high HHI. Panel (b): binned scatter plot of matching weights against the continuous HHI measure for control group firms.

Figure A.9: Baseline estimation results – Alternative investment outcomes



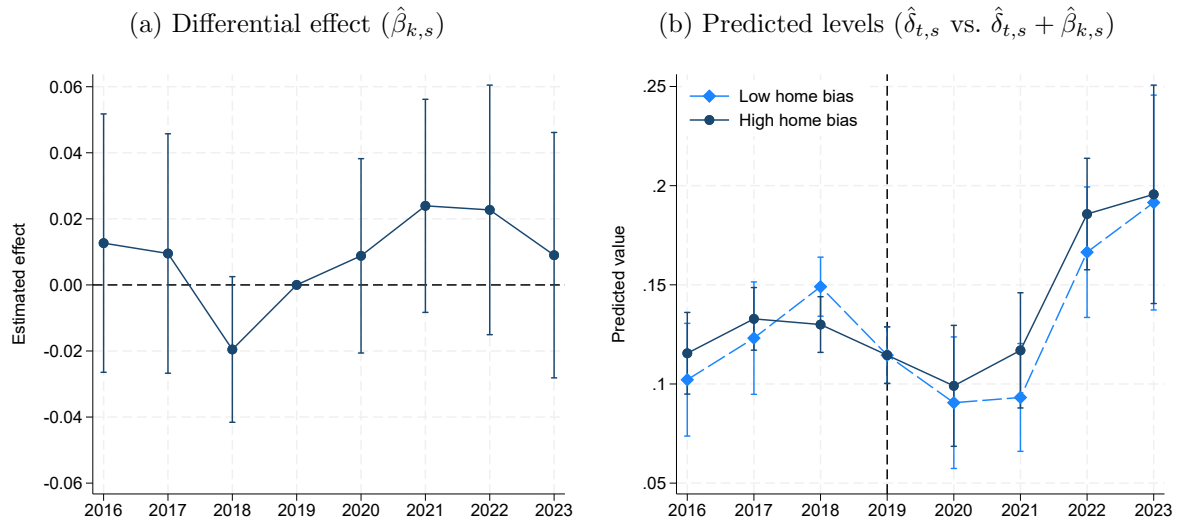
Notes: This figure shows estimation results from Equation (6) for alternative investment outcomes in the matched sample of firms facing a large export shock. Panel (a): log investment scaled by average sales over the preceding three years. Panel (b): investment scaled by capital (net property, plant, and equipment). Bars represent 90% confidence bands based on standard errors clustered at the firm level.

Figure A.10: Predicted levels – Equity channel



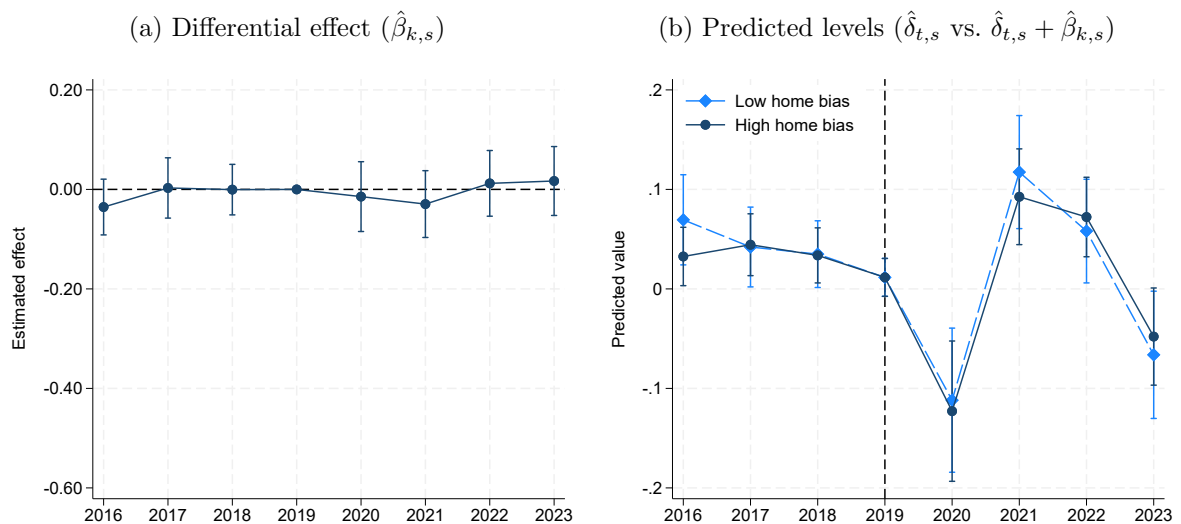
Notes: This figure shows predicted levels for different equity-related outcomes, estimated from Equation (6) in the matched sample of firms facing a large export shock excluding country-post fixed effects. All outcome variables are scaled by average sales over the preceding three years. Panel (a): log market capitalisation. Panel (b): log number of outstanding shares. Panel (c): log paid-in capital. Panel (d): log equity. Levels are normalised to the sample-wide average predicted outcome in 2019. Bars represent 90% confidence intervals based on standard errors clustered at the firm level.

Figure A.11: Baseline estimation – Retained earnings to sales



Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, with retained earnings scaled by average sales over the preceding three years as the outcome. Panel (a): differential effect of high home bias. Panel (b): predicted levels for low- and high-home-bias firms, both normalised to the sample-wide average predicted outcome in 2019, estimated without country-post fixed effects. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

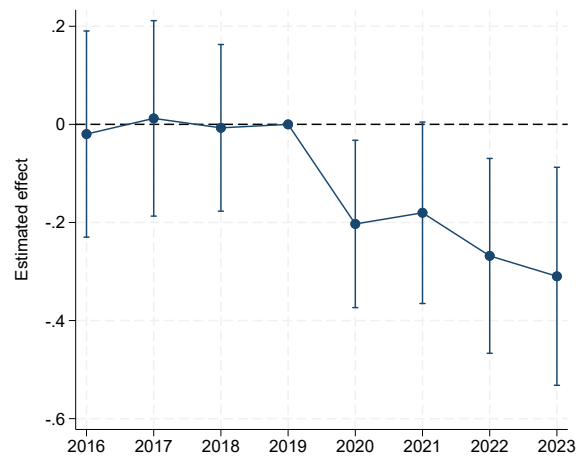
Figure A.12: Baseline estimation results – Δ Log sales



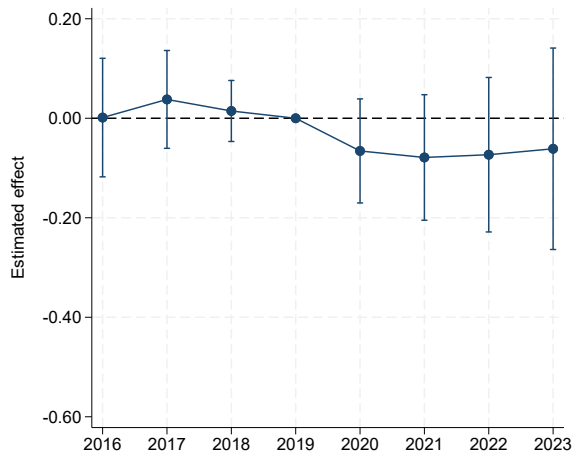
Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, with the log change in sales as the outcome. Panel (a): differential effect of high home bias. Panel (b): predicted levels for low- and high-home-bias firms, both normalised to the sample-wide average predicted outcome in 2019, estimated without country-post fixed effects. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

Figure A.13: Estimation results – Controlling for the share of foreign revenues

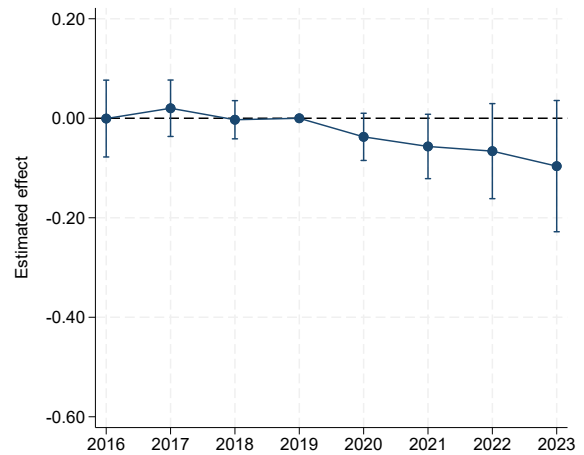
(a) Log investment



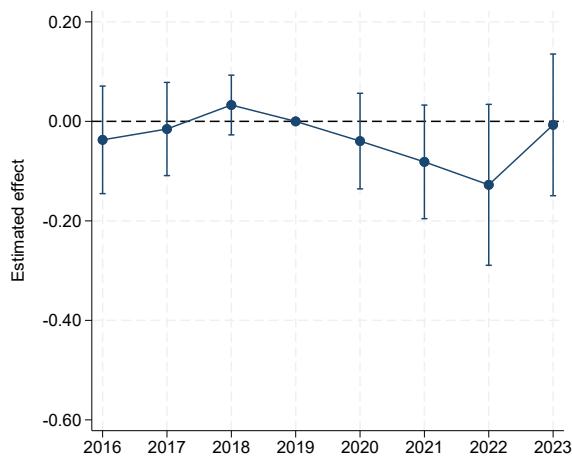
(b) Log market capitalisation to sales



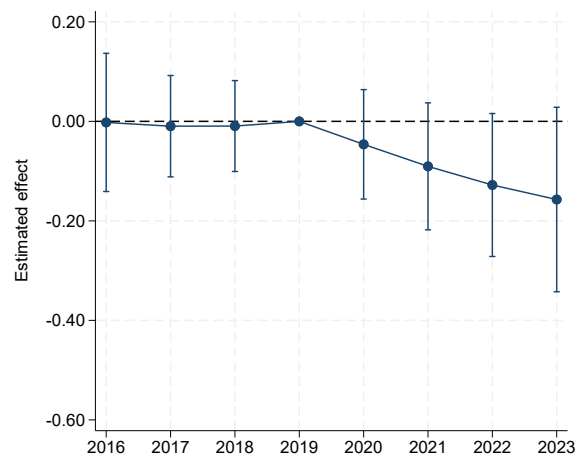
(c) Log shares outstanding to sales



(d) Log paid-in capital to sales



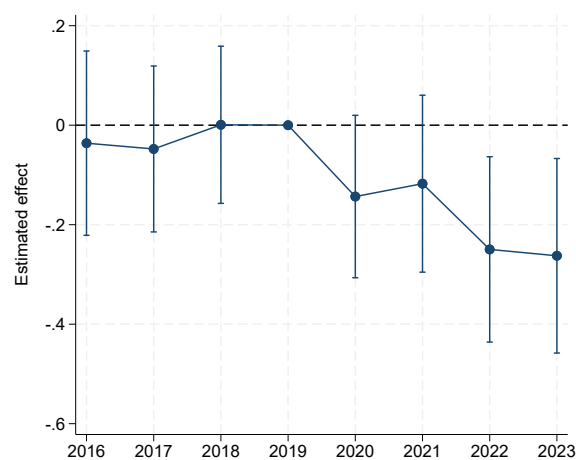
(e) Log equity to sales



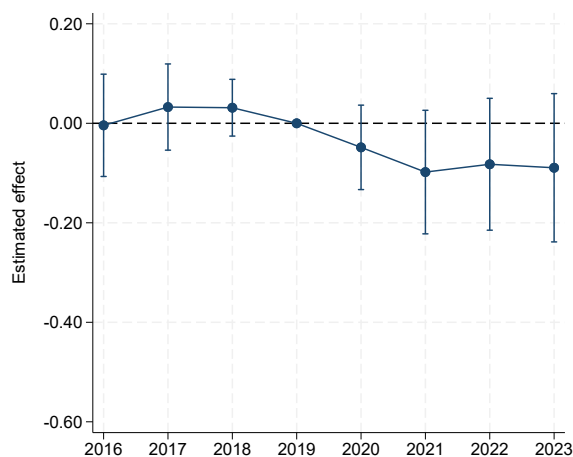
Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, additionally controlling for an above-median share of foreign revenues over 2016–2019 interacted with year dummies. Panel (a): log investment. Panel (b): log market capitalisation. Panel (c): log number of outstanding shares. Panel (d): log paid-in capital. Panel (e): log common equity. Outcomes in Panels (b)–(e) are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

Figure A.14: Robustness – Inverse probability weighting

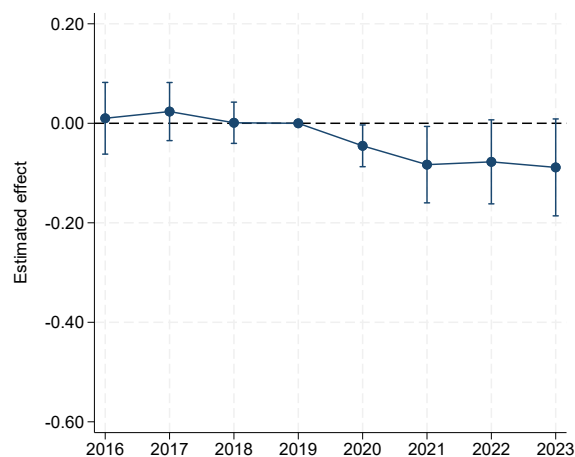
(a) Log investment



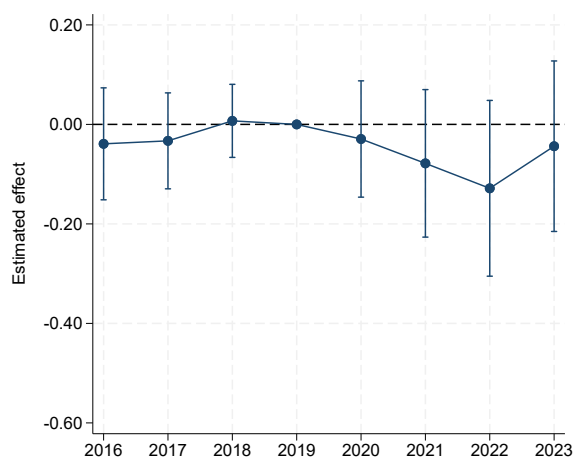
(b) Log market capitalisation to sales



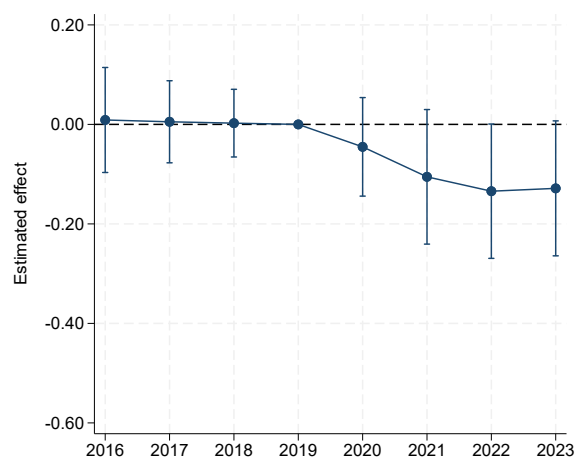
(c) Log shares outstanding to sales



(d) Log paid-in capital to sales



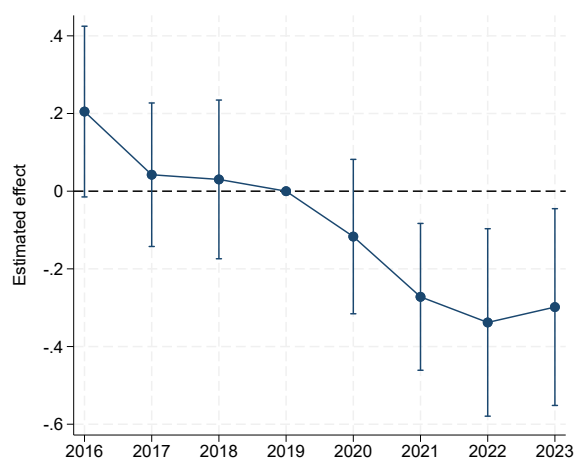
(e) Log equity to sales



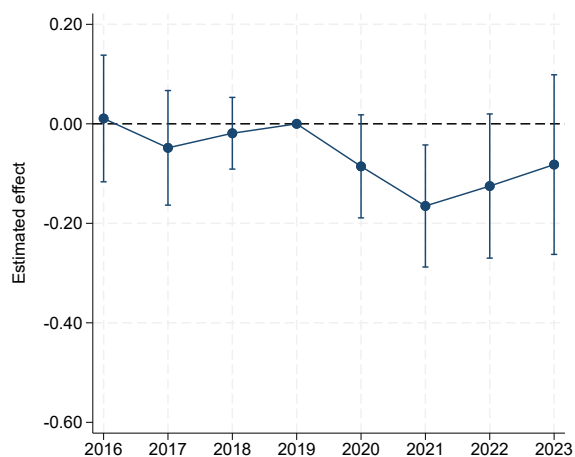
Notes: This figure shows estimation results from Equation (6) in the sample of firms facing a large export shock, using inverse probability weighting instead of PSM. Panel (a): log investment. Panel (b): log market capitalisation. Panel (c): log number of outstanding shares. Panel (d): log paid-in capital. Panel (e): log common equity. Outcomes in Panels (b)–(e) are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

Figure A.15: Robustness – HHI instead of Home Bias

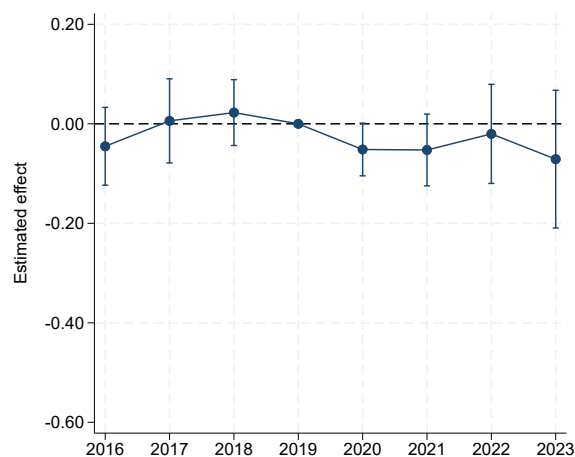
(a) Log investment



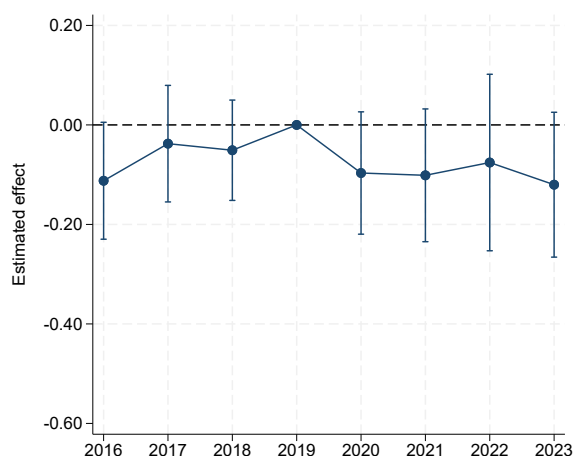
(b) Log market capitalisation to sales



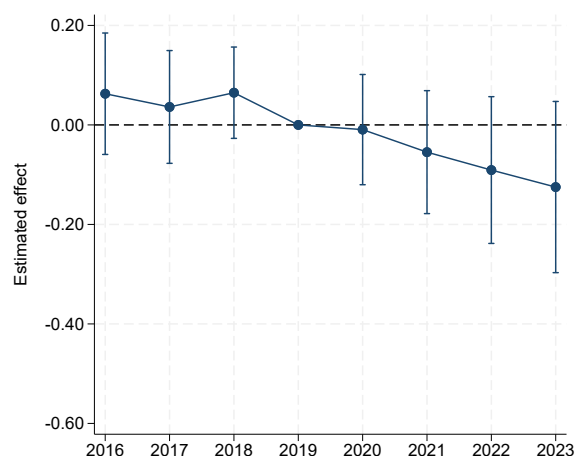
(c) Log shares outstanding to sales



(d) Log paid-in capital to sales



(e) Log equity to sales



Notes: This figure shows estimation results from Equation (6) in the matched sample of firms facing a large export shock, replacing the high-home-bias indicator with a high-HHI indicator. Panel (a): log investment. Panel (b): log market capitalisation. Panel (c): log number of outstanding shares. Panel (d): log paid-in capital. Panel (e): log common equity. Outcomes in Panels (b)–(e) are scaled by average sales over the preceding three years. See Appendix A.5 for variable definitions. Bars represent 90% confidence bands based on standard errors clustered at the firm level.

A.5 Variable definitions

Compustat:

- *Log total assets* is the natural logarithm of the Compustat item AT expressed in 2020 euros.
- *Equity ratio* is common equity (CEQ) over total assets (AT).
- *Investment ratio* is investment (CAPX) over net property, plant, and equipment (PPENT) trimmed at p5 and p95.
- *Sales growth* is the log difference in sales (SALE) from $t - 1$ to t . Sales are expressed in 2020 euros.
- *Mark up* (μ) is estimated following [De Loecker and Warzynski \(2012\)](#) as $\mu = \theta^v \times \frac{SALE}{COGS}$. θ^v is the output elasticity of the variable input, proxied by the cost share of goods sold: $\theta^v = \frac{COGS}{COGS + \text{Capital costs}}$. All nominal values are expressed in 2020 euros. Capital costs are computed as the user cost of capital times the deflated gross capital stock (PPEGT), where the user cost equals the ECB's policy rate minus inflation plus a depreciation rate of 12%. The resulting variable is trimmed at p5 and p95.
- *Log R&D intensity* is the natural logarithm of R&D expenditure (XRD) over sales (SALE) trimmed at p1 and p99.
- *Cash to assets* is Cash (CHE) over total assets (AT).
- *Log investment* is the natural logarithm of investment (CAPX) expressed in 2020 euros.
- *Log sales* is the natural logarithm of sales (SALE) expressed in 2020 euros.
- *Log equity to sales* is the natural logarithm of equity (CEQ) over average sales (SALE) in $t - 3$ to $t - 1$. All variables are expressed in 2020 euros.
- *Log paid-in capital to sales* is the natural logarithm of paid-in capital (given by CAPS + CSTK) over average sales (SALE) in $t - 3$ to $t - 1$, trimmed at p1 and p99. All variables are expressed in 2020 euros.
- *Retained earnings to sales* is given by retained earnings (RE) over average sales (SALE) in $t - 3$ to $t - 1$, trimmed at p5 and p95 and further winsorised at a value of -1 . All variables are expressed in 2020 euros.

Other sources:

- *Log market capitalisation* is the natural logarithm of the market capitalisation taken from CSDB and expressed in 2020 euros. We take the annual average of quarter-end values.
- *Log market capitalisation to sales* is the natural logarithm of total market capitalisation (from CSDB) over average sales (from Compustat) in $t - 3$ to $t - 1$. All variables are deflated to 2020 euros.
- *Log number of outstanding shares to sales* is the natural logarithm of the number of outstanding shares (from CSDB) over average sales (from Compustat) in $t - 3$ to $t - 1$ expressed in 2020 euros. The number of outstanding shares is given by market capitalisation over share price. We take the annual average of quarter-end values.
- *Age* is years since the date of incorporation from ORBIS.
- *Majority owner* indicates that a firm has one owner that holds at least 50% of voting shares given by subsidiaryindependenceindicator C or D in ORBIS. We define this to be an international owner if the location of the global ultimate owner differs from the firm's location.
- *Log bank debt to sales* is the natural logarithm of bank debt (TotBankDbt from Capital IQ) over average sales (from Compustat) in $t - 3$ to $t - 1$. All variables are deflated to 2020 euros.
- *Foreign revenue share* is foreign sales over total sales from LSEG trimmed at p5 and p95. Missings are additionally filled with foreign sales over total sales from Capital IQ.
- *Log Amihud illiquidity measure* is the natural logarithm of the illiquidity measured following [Amihud \(2002\)](#) as the annual average of the ratio of daily absolute stock returns to daily trading volume in euros: $ILLIQ_{i,t} = \frac{1}{D_{i,t}} \sum_{d=1}^{D_{i,t}} \frac{|r_{i,d}|}{V_{i,d}}$, where $r_{i,d}$ is the daily return, $V_{i,d}$ is the daily trading volume in euros for firm i on day d , and $D_{i,t}$ is the number of trading days in year t . Daily return and volume data are obtained from LSEG.
- *Analyst coverage* is the annual average of the number of analysts providing earnings forecasts for a firm obtained from IBES via LSEG.

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