Labor Share, Foreign Demand and Superstar Exporters

Ludovic Panon*†

November 23, 2020

Abstract

This paper proposes a new determinant of labor share changes. Using micro-data on the universe of French manufacturing exporters over 1995-2007, I show that a measure of export demand growth exogenous to firm-level outcomes drives down the manufacturing labor share through two effects. First, foreign demand shocks allow low-labor share, highly internationalized "superstar" exporters to grow disproportionately more. Second, foreign demand growth decreases the labor share of exporters and this effect is stronger for larger exporters. Both effects explain 12% of the labor share decline over 1995-2000 and led to a 1.2 percentage point drop over 2000-2007. A simple model of endogenous competition with heterogeneous firms rationalizes the findings. A market size increase allows exporters to expand, which decreases their share of fixed labor cost in value-added, and *increases* competition on international markets. Fiercer competition favors superstar exporters, further decreasing their labor share through the fixed cost channel. Overall, these findings provide direct causal evidence of a "winner take most" phenomenon induced by trade globalization.

*Bank of Italy. Email: ludovic.panon@esterni.bancaditalia.it.

†I am indebted to Thomas Chaney for his invaluable advice and support throughout this project. I would also like to thank Philippe Aghion, Zsofia Barany, Antoine Berthou, Johannes Boehm, Jocelyn Boussard, Moshe Buchinsky, Paola Conconi, Nicolò Dalvit, Guy Laroque, Philippe Martin, Thierry Mayer, Marc Melitz, Ariell Reshef for their feedback. I also thank seminar participants at the Bank of Chile, Bank of Italy, Bank of Norway, Banque de France, Catholic University of Portugal, College de France, PSE and Sciences Po for their comments. I am grateful to Sciences Po for funding the project. I gratefully acknowledge support from a public grant overseen by the French National Research Agency (ANR) as part of the Investissements d'avenir program (reference : ANR-10-EQPX-17 Centre d'accès sécurisé aux données CASD). The opinions expressed do not necessarily reflect those of the Bank of Italy.

1 Introduction

The manufacturing value-added labor share has experienced changes in several OECD countries in recent decades.[1] This phenomenon casts doubt on the future of work and its value.[2] The causes of the evolution of the labor share, however, remain uncertain.[3] While international trade has been put forward as an explanation for labor share changes, the only mechanism highlighted in the literature is increased *import* exposure (Elsby et al., 2013). It is likely that the *export* side of trade, which refers to changes in demand conditions on foreign markets,[4] also causes changes in the manufacturing labor share. On the one hand, an increase in foreign demand could increase or decrease the labor share of firms depending on the relative response of labor compensation and value-added. On the other hand, an increase in foreign demand could favor firms with a low labor share, decreasing the aggregate labor share through compositional changes. In a recent paper, Autor et al. (2020) show that the labor share decline is explained by the rise of "superstar firms", which have a low labor share. However, the precise origins behind the reallocation of sales towards large players remain to be uncovered. In this article, I use detailed micro-data on the universe of French exporters over 1995-2007 to highlight a new trade determinant of changes in the manufacturing labor share and show that it generates reallocation forces as hypothesized by Autor et al. (2020).

The contribution of the article is threefold. First, I provide causal empirical evidence that an increase in foreign demand decreases the labor share at home through two effects. Foreign demand growth generates intensive margin reallocations towards low-labor share, more internationalized "superstar" exporters (*between*-exporter effect). Foreign demand growth also drives down exporters' labor share and the effect is *stronger* for superstar exporters (*within-between* exporter effect). Importantly, my framework makes it possible to disentangle the effect of foreign demand shocks from other firm-level changes affecting a firm's growth rate and its labor share, such as automation, outsourcing and offshoring. Second, I provide some back-of-the-envelope calculation to assess the magnitude of both between and within-between exporter effects. This exercise sheds quan-

[1] The value-added labor share or labor share is the ratio of total labor compensation to total value-added. It represents the share of value-added that goes back to workers in the form of wages and social contributions. Its evolution for a sample of OECD countries over 1995-2007 is documented in Figure A1. It shows that the labor share does not systematically decrease in all countries. The French labor share decreases before 2000 and increases after that year. However, it always exhibits variations over time. My paper provides a mechanism that systematically drives down the labor share regardless of the period.

[2] Labor share changes also invalidate the well-known stability of factor shares observed by Kaldor (1957) and has important implications for macroeconomic modeling.

[3] The recent labor share literature is detailed below.

[4] In the paper, I will refer to export demand shocks as foreign demand shocks.

titative light on the effect of export demand on the labor share. Third, I investigate the channels behind the labor share changes and show that the results are consistent with increased competition on international markets. My findings thus point to a previously unexplored dimension of labor share changes and establish a direct causation link with the "winner take most" mechanism of Autor et al. (2020).

Using French balance-sheet and customs data over 1995-2007, I document three facts for the manufacturing sector. The labor share experiences a decline over 1995-2007: it decreases over 1995-2000 and starts increasing over 2000-2007. Second, decomposing the change in the labor share into a within-firm, between-firm and entry-exit margin,[5] I find that the reallocation of output towards low labor share firms drives down the labor share, consistent with recent evidence for the US (Autor et al., 2020; Kehrig and Vincent, 2018).[6] Third, I show that more internationalized exporters have a lower labor share, especially those that sell more internationally. Taken jointly, these facts suggest that a reallocation of value-added towards superstar exporters generated by export demand shocks has the potential to generate changes in the aggregate labor share. Moreover, the use of good-quality micro data for France provides additional external validity to the existence of a reallocation effect towards low-labor share firms.

Empirically, I study whether foreign demand growth impacts the value-added growth rate of firms and their labor share differently depending on their degree of internationalization.[7] To do so, I rely on a shift-share identification strategy. The foreign demand measure uses the fact that firms initially have a different export basket and export different goods to different countries. Changes in imports from the rest of the world *excluding* France affect firms differently, depending on their initial exposure to foreign markets. This firm-level foreign demand measure is exogenous to firm-level decisions that could impact their growth rate or labor share, such as the decision to offshore, outsource or automate. The most important empirical finding is that the effect of foreign demand growth on exporters' value-added growth rate and labor share is heterogeneous. More specifically, I find that top sellers on international markets grow faster whereas less internationalized exporters shrink, following an increase in foreign demand. I also find that exporters experience a decrease in their labor share following an export demand shock,

[5]Firms will refer to exporting firms hereafter. Exporters drive changes in the manufacturing labor share as these are the largest firms in that sector. The within-firm effect refers to a shift in the distribution of firm-level labor shares while the between-firm, or reallocation effect is caused by a reallocation of value-added shares towards low-(or high) labor share firms.

[6]Interestingly, the within component increases over the period, driving up the aggregate labor share.

[7]The labor share can be expressed as a *value-added* weighted average of individual firms' labor share. Studying how foreign demand shapes the labor share entails looking at its impact on the value-added growth rate of firms and their labor share.

and this negative effect is magnified for top exporters. Although labor compensation increases with foreign demand, the labor share goes down because of the disproportionate rise of value-added. These results highlight the existence of intensive margin reallocations towards superstar exporters. The results do not appear to be driven by confounding factors such as automation, offshoring, outsourcing, by the choice of sample or specification, by the definition of superstar exporters, or by the existence of pre-trends.

I examine the quantitative impact of export demand on the manufacturing labor share. Both between and within-between exporter effects generate a 1.4 percentage point labor share decline over 1995-2007. This change is almost entirely driven by the within-between exporter effect. Focusing on 1995-2000, I find that both effects explain 12% of the observed labor share decline. Over 2000-2007, both effects generate a 1.2 percentage point drop, implying that the observed labor share increase would have been stronger had export demand not risen. In exploring the importance of superstar exporters in driving the results, I further find that roughly half of the magnitude of the within-between exporter effect is driven by larger exporters experiencing a stronger labor share decline and by the top 1% of superstar exporters. In other words, intensive margin reallocations towards large players on international markets are key to understanding the role played by export demand growth in shaping the aggregate labor share.

Finally, I rely on a monopolistic competition model with heterogeneous firms and endogenous competition to understand why foreign demand shocks decrease firm-level labor shares and why superstar exporters experience a larger labor share decline. In the model, the price elasticity of demand decreases with consumption, a case long recognized to be the most plausible by Marshall (1890) and Krugman (1979).[8] The labor share of firms is pinned down by their markup and by their share of fixed labor cost in value-added: an increase in market power or a decrease in the share of fixed labor cost in value-added results in declining firm-level labor shares.[9] A foreign demand increase generates two counteracting forces on firms' profits: the positive effect arising from the increase in market size is counterbalanced by a negative effect caused by an increase in competition arising from the entry of new firms on the foreign market. The direct market size effect dominates for larger firms, while the indirect competition effect dominates for smaller firms. Larger firms can therefore expand with respect to smaller firms that squeeze. The

[8]This case is commonly referred to as Marshall's Second Law of Demand (MSLD). MSLD generates a positive relationship between firm size and markups, consistent with recent empirical evidence (De Loecker and Warzynski, 2012; De Loecker et al., 2016). This is because more productive firms produce more, face a lower demand elasticity and are able to charge higher markups.

[9]In the cross-section, this leads to larger firms having a lower labor share, which is consistent with the third stylized fact documented in the paper.

rise in competition on international markets decreases firm-level markups and implies that declining labor shares can only be explained by the fixed cost channel.[10] Superstar exporters experience a stronger labor share decline because they grow relatively more and thus experience a greater decline in their share of fixed labor cost in value-added.

Related Literature. My paper relates to a recent literature that identifies different causes for the labor share decline.[11] Autor et al. (2020) attribute the labor share decline to the rise of low-labor share superstar firms and emphasize the role of market concentration in driving down the labor share in several US sectors. I focus on the role played by trade globalization and export demand in affecting the manufacturing labor share and highlight the role of competition on international markets in reallocating output towards superstar exporters. My paper thus provides direct causal evidence to their superstar firm hypothesis.[12] [13] For these reasons, I view my findings as complementary to theirs. Elsby et al. (2013) find that offshoring the labor-intensive part of production is a good candidate explanation for the labor share decline in the US. My paper differs from theirs in that I instead focus on the role of export demand using micro-data. Furthermore, my empirical framework allows me to disentangle the effect of export demand from that of technology. Finally, in a series of papers, De Loecker et al. (2020) and De Loecker and Eeckhout (2018) show that rising aggregate markups driven by the growth of high-markup firms and an increase in their markup are consistent with the US labor share decline. The negative correlation that I find between the degree of internationalization

[10] The markup channel is also inconsistent with the wage gains arising from foreign demand shocks that I document empirically.

[11] A vast literature has highlighted the labor share decline across several different developed economies. Karabarbounis and Neiman (2013) show that it can be caused by a decrease in the relative price of investment goods and a more intensive use of capital. While appealing, this is theoretically hard to reconcile with micro-evidence that the elasticity of substitution between capital and labor is less than unity (Oberfield and Raval, 2014; Moreau, 2019). Other studies highlight the role of a global productivity slowdown (Grossman et al., 2017), privatization (Azmat et al., 2012), automation (Acemoglu and Restrepo, 2018; Bergholt et al., 2019), labor market deregulation (Blanchard and Giavazzi, 2003), plant restructuring (Böckerman and Maliranta, 2011), openness to trade (Guscina, 2006; Harrison, 2005; Jaumotte and Tytell, 2007), global value chains (Reshef and Santoni, 2019), expenditures on intangible capital (Koh et al., 2016), Information and Communication Technology (Lashkari et al., 2019; Aghion et al., 2019), compositional changes driven by the rise of the housing sector (Gutiérrez and Piton, 2020), market concentration (Barkai, 2020), granular market power (Jarosch et al., 2019), common ownership (Azar and Vives, 2018) and rising firms' labor market power and changing production processes (Mertens, 2020) in driving down the labor share.

[12] My identification strategy also allows me to circumvent the issue of using market concentration measures to proxy for changes in competition (Bresnahan, 1989; Berry et al., 2019; Syverson, 2019).

[13] Covarrubias et al. (2020) argue that markets may have instead become more concentrated due to *decreased* competition and weakened competition policies, especially in the US (Gutiérrez and Philippon, 2018). My findings are consistent with fiercer competition on *international* markets. This does not mean, however, that competition increases on the domestic market.

of firms and their labor share is consistent with larger exporters having higher markups in the cross-section because of Marshall's Second Law of Demand. The disproportionate growth of superstar exporters caused by foreign demand shocks is thus consistent with a rise in manufacturing markups driven by high-markup superstar exporters.

Recent papers have revived the idea that the demand elasticity is not constant across firms and more specifically, that it decreases with consumption, a case deemed "plausible" by Krugman (1979). This has important consequences as an increase in market size generates intensive margin reallocation effects favoring larger firms because of the endogenous response of competition (Zhelobodko et al., 2012; Mrázová and Neary, 2017). I build on these papers for the theoretical framework. My paper is also related to Mayer et al. (2020). Their focus, however, is on how reallocations of export sales across *products* within multi-product firms generate aggregate productivity growth.[14] I am instead interested in how foreign demand shocks generate reallocations across *firms* and highlight the heterogeneous response of firms' growth rate and labor share to foreign demand changes. I further quantify the importance of both effects in generating aggregate labor share changes. My results are also consistent with aggregate productivity gains, as superstar exporters are larger and more productive.

Parenti et al. (2017) argue that "it is time to pay more attention to the demand side". Indeed, recent evidence by Hottman et al. (2016) stress the importance of demand in determining firm size. They find that 80% of firm growth is caused by firm "appeal" which loosely refers to demand (differences in tastes or quality). My paper also highlights the importance of foreign demand growth in generating value-added growth favoring more internationalized firms. Aghion et al. (2018) document the role of foreign demand growth on patenting at the firm level and show that initially more productive firms patent more. My paper differs from theirs is that my focus is on providing an alternative mechanism for the evolution of the labor share through between and within-firm changes. My results, if anything, are short-term effects while innovation is a longer-run phenomenon. Their findings, however, could reinforce my key finding. Foreign demand growth might also contribute to reallocating value-added shares towards superstar exporters through innovation, as larger exporters are more likely to innovate.

The rest of the article is organized as follows. Section 2 describes the data sources and the stylized facts. Section 3 describes the identification strategy and empirical framework. Section 4 presents the results and robustness tests. Section 5 examines the magnitude of the effect while Section 6 investigates the mechanism behind the labor share changes. Section 7 concludes.

[14] These reallocations can be attributed to MSLD.

2 Data and Stylized Facts

2.1 Data Sources and Sample

I use two main sources of micro data: balance-sheet and customs data. Each firm in France is assigned a unique identifier ("SIREN" code), which facilitates keeping track of them over time and matching firm-level datasets.

The balance-sheet data contain the universe of French firms. I keep both large and small firms. This classification is based on a firm's tax regime: the Regime of Normal Real Profits (BRN) applies to large firms while the Simplified Regime for the Self-Employed (RSI) applies to smaller companies. BRN contains firms with annual sales above 763K euros (230K euros for services) whereas smaller firms included in RSI sell at least 76.3K euros (but less than 763K euros) a year and more than 27K euros for services. This dataset has been used in previous studies, for instance in Di Giovanni et al. (2014) and I refer to their paper for more details. Given the focus of the paper, I only keep firms that operate in the manufacturing sector (sector 15 to 37 in NAF Rev. 1). This exhaustive database allows me to build a firm's labor share and all other relevant variables that will be used in the empirical framework. I also rely on customs data. They contain information on a firm's export sales and export quantities of each product defined at the 8-digit level towards each destination country in a given year. I use this additional data source to recover information on the number of products exported by each firm in a given year, the number of foreign countries served, the total amount of expenditures spent on imports and total export sales. More information on the sample selection procedure and on the variables used can be found in Appendix A. My sample of French manufacturing exporters spans the period 1995-2007.[15] Exporters are representative of overall changes in manufacturing. Indeed, exporting firms are the largest firms operating in manufacturing (Bernard et al., 2007), and represent 74% of the sector's total value-added. Moreover, they are the only firms for which foreign demand shocks can be defined. I will therefore use the term "firm" or "exporter" interchangeably, unless explicitly stated.

[15] The period of analysis is shorter than usual in the labor share literature. For example, the sample of Elsby et al. (2013) roughly covers twenty years of (macro) data, while that of Autor et al. (2020) spans thirty years. The reason for focusing on this period of time is data-driven as I do not have access to the customs and balance-sheet data before 1995 and information on the export intensity of firms needed to compute the foreign demand shocks is missing in 2008.

2.2 Stylized Facts

I now document the evolution of the labor share in French manufacturing. I then decompose this change into different margins and document the fact that larger, more internationalized exporters have a lower labor share.

Labor share and trade flows. Given the focus of the paper, the labor share or aggregate labor share refers to the *manufacturing* labor share, not the economy-wide labor share. It is defined as the ratio of total labor compensation (including employers' contributions to social security etc.) to gross value-added. Figure 1 highlights the evolution of the labor share in the French manufacturing sector over 1995-2007 for my sample of exporting firms. The French manufacturing labor share experiences a 0.35 percentage point decline over the period. Interestingly, it decreases up until 2000 and experiences an *increase* over the 2000-2007 period. The pattern is very similar using macro data from EU KLEMS, as displayed in Figure A2.[16] [17] Finally, I note that the drop in the manufacturing labor share is a within-industry phenomenon. As shown in Figure A3 in the Appendix, the decline occurs in all industries within manufacturing and is not due to a reallocation towards low labor share industries.

On the trade side, Figure A4 displays the evolution of export sales. Exports have considerably increased over the period averaging about 4% annually over 1995-2007. This sharp increase in exports is plausibly caused by an increase in foreign demand and I will later use a direct measure of foreign demand to study how foreign demand growth affects the aggregate labor share. Figure A5 shows the exports of goods and services in percentage of GDP. This ratio steadily increases over the period.[18]

Fact 1: *The manufacturing labor share has declined by 0.35 percentage points over 1995-2007. It decreases over 1995-2000 and increases over 2000-2007.*

Decomposition of labor share changes. Denoting labor compensation by wL and value-added by VA, the aggregate labor share LS_t also writes as a weighted average of firms'

[16] The numbers in the macro data are higher as self-employment is accounted for.

[17] 10 out of 12 OECD countries experience a slight or drastic decrease in their manufacturing labor share over the whole 1995-2007 period with the exception of Italy and the UK (Figure A1). Importantly, the labor share exhibits systematic variations over time.

[18] The patterns almost match perfectly when considering merchandise trade only.

labor share, weighted by their share in total value-added

$$\mathrm{LS}_t = \frac{\sum_i wL_{it}}{\mathrm{VA}_t} = \sum_i \omega_{it}\mathrm{LS}_{it} \tag{1}$$

where ω_{it} is firm i's value-added share in total manufacturing value-added at time t.

I decompose the change in the labor share from one year to the next into the contribution of surviving firms, new entrants and exiters.[19] To do so, I use a decomposition method initially developed by Baily et al. (1992) and refined in Foster et al. (2001) (FHK). This decomposition is extremely tractable and will be used to compute the magnitude of the effect of export demand growth on the aggregate labor share. The manufacturing labor share change between any two time periods is given by:

$$\begin{aligned}\Delta \mathrm{LS}_t = &\sum_{i \in \mathrm{S}} \omega_{it-1}\left(\mathrm{LS}_{it} - \mathrm{LS}_{it-1}\right) + \sum_{i \in \mathrm{S}} \left(\omega_{it} - \omega_{it-1}\right)\left(\mathrm{LS}_{it-1} - \mathrm{LS}_{t-1}\right) \\ &+ \sum_{i \in \mathrm{S}} \left(\omega_{it} - \omega_{it-1}\right)\left(\mathrm{LS}_{it} - \mathrm{LS}_{it-1}\right) + \sum_{i \in \mathrm{ENT}} \omega_{it}\left(\mathrm{LS}_{it} - \mathrm{LS}_{t-1}\right) \\ &- \sum_{i \in \mathrm{EXT}} \omega_{it-1}\left(\mathrm{LS}_{it-1} - \mathrm{LS}_{t-1}\right)\end{aligned} \tag{2}$$

where LS_{t-1} is the aggregate labor share in the previous year, also called the reference labor share level. The first term of (2) is the within-firm effect, the second and third terms are the between-firm (reallocation) component while the last two terms are the contribution of entry and exit, respectively.[20] Equation (2) states that the manufacturing labor share can decrease for several reasons. A negative within-firm effect means that surviving firms experience a decrease in their labor share. A negative between-firm effect means that output is reallocated towards low-labor share survivors so that these firms become larger. Crucially, output corresponds to value-added from the definition of the labor share given in (1) so that the value-added growth of low-labor share firms can drive down the labor share. The contribution of entrants and exiters is allowed to be positive or negative. This depends on whether their labor share is higher than the reference labor share level.

I make use of the FHK decomposition to study which margin drives the change in the labor share over the period of interest. To do so, I apply (2) to each year interval, namely 1995-1996, 1996-1997 etc.

[19] The sample only includes exporting firms. Entry and exit do not necessarily capture the entry and the death of a firm but rather, whether it starts or stops exporting from one year to the next.

[20] The third term is the cross effect. The whole reallocation term effect is the sum of the second component and the cross effect.

Figure 2 presents the result of this decomposition and shows the cumulative change in each component over time. The blue line represents the aggregate change while the blue dotted line represents the contribution of the between-firm component. The black full line and the red dashed line represent the contribution of the within-firm component and entry-exit, respectively. The blue dotted line is always negative and keeps decreasing over time. The overall small decrease in the labor share is explained by a reallocation towards low labor share firms, suggesting that the key message of Autor et al. (2020) also holds for French manufacturing over 1995-2007. The contribution of entry and exit is aggregated and is stable over the period. The within firm effect is positive and contributes to *increasing* the manufacturing labor share. This is consistent with Table A1 that shows that firms, on average, experience an increase in their labor share. Interestingly, in the US over 1982-2012, Autor et al. (2020) document that the within-firm component is *negative* and that the reallocation term is larger in magnitude than the within-firm one. In France, however, the within-firm effect is strongly positive and almost cancels out the strong reallocation effect towards low-labor share exporters over the whole 1995-2007 period. The between-firm component is responsible for the labor share decline over 1995-2000, while the within-firm component explains its increase over 2000-2007.[21] The results for each year interval are displayed in Table 1. The qualitative finding of this decomposition is unaltered when considering the Melitz and Polanec (2015) decomposition method as shown in Table A3. The description of that method is relegated to Appendix B.

Fact 2: *The reallocation of value-added shares towards low-labor share firms drives down the labor share. The within-firm component increases the labor share.*

Internationalization and labor share. I now document that low-labor share firms are more internationalized.

Table 2 displays the labor share of firms whose log export sales, export intensity, log number of products exported and log number of destinations served is above the median, in the top 25%, 10% and 1% of each corresponding distribution. The figures in the table show that more internationalized exporters have a lower labor share. For example, firms in the top 1% of the export sales distribution have a labor share that is about 11 percentage points lower than firms in the top 50%. This pattern is true regardless of the

[21] Lashkari et al. (2019) show that the fall in the price of IT can explain roughly 50% of both the increase in the labor share of individual firms and the reallocation effect towards low-labor share firms, which helps to understand the evolution of the French aggregate labor share. Indeed, their model can quantitatively explain the positive within-firm component that explains the rising labor share in French manufacturing post-2000.

internationalization measure used,[22] but is particularly exacerbated for firms in the top of the export sales distribution. I will therefore use this measure as the key measure of internationalization for my baseline results and will show that the results are qualitatively unchanged when considering other internationalization measures. Table A4 tests the difference in mean between the labor share of firms with an internationalization measure above and below a certain threshold and confirms the finding that more internationalized exporters have a lower labor share. In columns 1 to 4 of Table A5, I regress a firm's labor share on the four internationalization measures, controlling for the industry composition and supply and demand shocks occurring at the 2-digit sectoral level. I further control for firm-specific, time-invariant characteristics. This shows that an increase in openness compared to the firm mean leads to a lower labor share. Column 5 shows that the sign on log export sales and export intensity remain the same in the multivariate regression. Column 6 shows that this result survives the inclusion of total firm sales. Finally, I show in Table A6 that defining labor as "labor-plus-capital" (Alvarez and Lucas Jr, 2007; di Giovanni et al., 2018) and computing the labor share as the ratio of value-added to total sales yields very similar results. This alternative measure, which reflects all primary factors of production, also decreases with the degree of internationalization of firms.

These pieces of evidence lead to the same conclusion. There exists a strong negative relationship between a firm's degree of internationalization and its labor share, and this is particularly true for firms at the top of the export sales distribution.

Fact 3: *More internationalized exporters have a lower labor share. This is especially true for exporters at the top of the export sales distribution.*

3 Empirical Framework

This section presents the identification strategy and empirical framework I rely on to study the effect of foreign demand changes on the manufacturing labor share.

3.1 Identification Strategy

World import demand shocks are used as a source of exogenous changes to a firm's foreign demand as in Hummels et al. (2014) and Mayer et al. (2020).[23] This measure is ex-

[22] These four internationalization measures are all positively correlated with each other.

[23] Hummels et al. (2014) use world import demand and world export supply changes as exogenous sources of variation for exports and imports, respectively. I focus on the effect of foreign demand on firms' growth and on their labor share, and instead use this measure in reduced-form. Mayer et al. (2020)

ogenous to other firm-level determinants of a firm's growth rate and labor share, such as outsourcing, automation, offshoring.

The growth rate of each foreign country's imports of each product is weighted by that firm's export share for that specific product and destination country. Averaging across products and countries gives a firm-level measure of changes in demand conditions on foreign markets.[24] As an illustrative example, Figure A6 shows that these foreign demand shocks will capture the expansion of the BRIC countries or the rise of Eastern-Europe following the 2004 European enlargement. In order to build these firm-level demand shocks, I use French customs data and the BACI database (Gaulier and Zignago, 2010). A product is defined at the HS6 level as this is the lowest level of disaggregation in BACI. The customs data allow me to map each firm's exports into this product classification as the NC8 category's six first digits exactly correspond to the HS6 classification. Therefore, the world import demand component comes from BACI while the weights are built using the customs data. Product codes from the customs data and BACI are harmonized over the period using the procedure detailed in Van Beveren et al. (2012). This allows me to have a consistent set of product categories over 1995-2007.

More formally, let us denote by X_{ljpt} the value of exports of a particular product p from country l to country j at time t. The total value of imports of product p by country j in t is defined as

$$M_{jpt} = \sum_{l \in L \setminus \{\text{France}\}} X_{ljpt}$$

where M_{jpt} is destination country j's total imports of product p from the rest of the world excluding France.

The firm-level foreign demand shock for an exporter i in year t is given by:[25]

$$\tilde{\Delta}\text{Shock}_{it} = w_{it_0} \sum_{j,p} \frac{X_{ijpt_0}}{X_{it_0}} \frac{M_{jpt} - M_{jpt-1}}{\frac{1}{2}(M_{jpt} + M_{jpt-1})} \tag{3}$$

study how foreign demand shocks lead to reallocations of export sales across products within French multi-product firms and affect aggregate productivity in manufacturing.

[24]The intuition of the measure is the following. Imagine a French firm i exporting a single product, "wine: sparkling" (code 220410 in the 1996 HS6 classification), to a single destination country, Brazil, in 1997. Demand changes for that firm in that market are measured by Brazil's change in total imports of sparkling wine from the rest of the world *excluding* France in between 1997 and 1998. The fact that the value of total imports (excluding France) of Brazil varies will affect that firm's demand and the degree of competition it faces in that market.

[25]The growth rate of imports is expressed in this manner so that it is well defined even if countries stop importing a particular product in a given year. If imports switch from zero to a positive value, this growth rate equals the value 2 while the growth rate will equal -2 if imports go from a positive number to zero. One could also use the alternative specification: $\Delta\text{Shock}_{it} = w_{it_0} \sum_{j,p} \frac{X_{ijpt_0}}{X_{it_0}} \ln \frac{M_{jpt}}{M_{jpt-1}}$. The results are robust to using this functional form and are available upon request.

Changes in j's imports of p (the second component of the sum) are weighted by the relative importance of firm i's exports of that product in the initial year, $\frac{X_{ijpt_0}}{X_{it_0}}$. This measure is then scaled by the initial export intensity $w_{it_0} := X^*_{it_0}/S^*_{it_0}$ of that firm using the production data, where $X^*_{it_0}$ and $S^*_{it_0}$ represent a firm's initial total export sales and total sales, respectively. This weighting scheme ensures that the foreign demand shocks capture the expansion in foreign markets relative to the French domestic market.

The exogeneity of $\tilde{\Delta}\text{Shock}_{it}$ hinges on two conditions. First, it must be the case that the growth rate of M_{jpt} does not reflect any supply-side shocks arising in France, which would lead to a rise of French exports to foreign countries and would boost their imports. The fact that aggregate imports of country j have been purged from the French exports rules out this channel. The only source of time series variation I exploit comes from this purged growth rate of imports.[26] The second important condition is that the firm-level weights are exogenous. A recent literature aims to identify the conditions under which a shift-share measure such as the one described in (3) is exogenous. Goldsmith-Pinkham et al. (2018) show that the exogeneity of the shift-share hinges on the exogeneity of the weights. The idea is that a firm's initial composition of export sales across products and destinations could have a direct effect on its growth rate or on the evolution of its labor share. In order for the shock not to reflect self-selection of French firms into exporting to booming markets (or conversely, exporting less or not exporting at all to markets experiencing a bust in demand), the weights are defined in the initial year the firm appears in the customs data. Second, I show that the results are robust to including firm fixed effects in the first-differences specifications. These firm trends plausibly absorb the variation in the growth rate of value-added or labor share caused by the initial export structure of the firms. Third, I show that *future* demand shocks do not predict contemporaneous outcomes, which provides reassuring evidence that the measure is not picking up pre-trends affecting the dependent variables of interest.

Although it is unlikely given the structure of the firm's foreign demand shock detailed above, I will also provide robustness checks to control for the possibility that other time-varying and firm-specific determinants of a firm's growth rate and its labor share might be correlated with changes in that firm's foreign demand. First, changes in a foreign country's demand might be associated with changes in wages or quality improvements. These changes might incentivize firms to offshore more, thereby affecting their growth

[26]Another potential confounding factor is that of French firms that have a large market share in the foreign markets they serve. Their market power abroad might impact foreign firms serving these markets and could affect aggregate imports from the rest of the world excluding France. To address this concern, I have experienced by dropping all the firms that have a market share higher than 10% for a given product p in a given destination country j at time t. The results are robust to this test and are available upon request.

rate and their labor share. I will control for this possibility by including total firm-level imports to control for offshoring.[27] Second, foreign demand changes could be correlated with technological improvements occurring at the firm-level. I will control for the growth rate of capital intensity of firms to control for the fact that firms might automate part of their activity in response to changes in foreign demand, which could affect their growth rate and labor share. I will therefore add a vector of controls $\mathbf{X}_{it}$, which includes the firm's growth rate of imports, growth rate of capital intensity and firm-specific fixed effects. These additional results along with alternative robustness checks are provided in Section 4.3.

3.2 Empirical Specifications

To study how foreign demand shocks affect the manufacturing labor share, I make use of the fact that the labor share can be rewritten as a *value-added* weighted average of individual firms' labor shares from equation (1). I am therefore going to study how foreign demand affects the *value-added* growth rate of firms and their labor share. The analysis is restricted to firms that survive over at least two periods of time.

Figure 2 shows that the reallocation of value-added shares towards low-labor share firms drives down the labor share, while Table 2 shows that low-labor share firms are highly internationalized, superstar exporters. To determine whether foreign demand changes can contribute to this between-firm effect, I test whether these changes benefit disproportionately more to superstar exporters. To do so, I estimate the following specification (between-exporter specification):

$$\begin{aligned}\Delta \ln \mathrm{VA}_{it} = {} & \alpha^{\mathrm{Rank}} \tilde{\Delta}\mathrm{Shock}_{it} + \beta^{\mathrm{Rank}} \tilde{\Delta}\mathrm{Shock}_{it} \times \mathrm{Superstar}_{it_0} \\ & + \gamma^{\mathrm{Rank}} \mathrm{Superstar}_{it_0} + \Delta\delta_{kt} + \xi_a w_{it_0} \times \psi_t + \Delta\varepsilon_{it}\end{aligned} \tag{4}$$

The dependent variable is the growth rate of value-added between $t-1$ and t. The important term is the second one that interacts a firm's foreign demand shock with its degree of internationalization, $\mathrm{Superstar}_{it_0}$, which is defined in the first year in which that firm appears in the sample to avoid endogeneity issues. $\mathrm{Superstar}_{it_0}$ is measured by a firm's (log) export sales.[28] $\Delta\delta_{kt}$ are 2-digit industry by year fixed effects and absorb changes in

[27] Biscourp and Kramarz (2007), Mion and Zhu (2013), Hummels et al. (2014) distinguish between broad and narrow offshoring by using firm-level imports that correspond or not to the main activity of the firm as indicated in the balance sheet data. Because I am not interested in separating the effect of broad versus narrow offshoring, I include *total* firm-level imports.

[28] Results using alternative and time varying (lagged) measures are detailed below and yield very similar results.

business cycles conditions or competition shocks occurring at the industry level. Finally, by construction, the firm-level weights used to create the foreign demand shocks do not add up to unity. I therefore control for a firm's initial export intensity interacted with year dummies, as suggested by Borusyak et al. (2018). The specification is expressed in first-differences so that all unobserved drivers of a firm's value-added that are time invariant and that might be correlated with that firm's foreign demand (high-quality firm, good management practices etc.) are wiped out.

The impact of foreign demand changes on firm growth is $\partial \Delta \ln \mathrm{VA}_{it} / \partial \tilde{\Delta}\mathrm{Shock}_{it} = \alpha^{\mathrm{Rank}} + \beta^{\mathrm{Rank}} \times \mathrm{Superstar}_{it_0}$. Absent the interaction term, one can expect $\alpha^{\mathrm{Rank}} > 0$ as an increase in foreign demand should increase a firm's value-added. The main test is whether $\beta^{\mathrm{Rank}} > 0$. If this coefficient is positive, superstar exporters grow relatively more when hit by foreign demand shocks. Note that this elasticity varies across firms, depending on the rank of the firm in the export sales distribution.

Given equation (1), I also study how an increase in foreign demand at the firm level impacts the labor share of exporters and how the effect might vary depending on their degree of internationalization ("within-between" exporter specification). The dependent variable is the labor share change in percentage points:

$$\begin{aligned} \Delta \mathrm{LS}_{it} = {} & \zeta^{\mathrm{Rank}} \tilde{\Delta}\mathrm{Shock}_{it} + \chi^{\mathrm{Rank}} \tilde{\Delta}\mathrm{Shock}_{it} \times \mathrm{Superstar}_{it_0} \\ & + \rho^{\mathrm{Rank}} \mathrm{Superstar}_{it_0} + \Delta \delta_{kt} + \xi_b w_{it_0} \times \psi_t + \Delta v_{it} \end{aligned} \tag{5}$$

The effect of foreign demand growth on the firms' labor share is allowed to vary across firms, depending on their degree of internationalization, as in the between-exporter specification described in equation (4). Given that the labor share is the ratio of total labor compensation to value-added, an increase in foreign demand can increase or decrease this ratio, depending on which effect is strongest. On the one hand, we can expect a rise in foreign demand to increase labor compensation through an increase in the number of workers or in wages. To meet the increase in foreign demand, firms might need to hire more workers. Similarly, an increase in foreign demand might lead firms to raise wages in order to incentivize workers to meet the increase in demand. On the other hand, given that the firm might also sell more and experience an increase in its value-added as argued above, its labor share could go down if this effect dominates the increase in labor compensation. It is therefore not clear how foreign demand can impact a firm's labor share and what the effect might be for larger exporters.

The relationship between foreign demand shocks and the growth rate of firms and their labor share is illustrated as a bin-scatter plot in Figure 3 and Figure 4, respectively.

These Figures show that larger exporters grow faster and experience a stronger labor share decline. All the results reported in the next section will corroborate these descriptive pieces of evidence.

4 The Impact of Foreign Demand on Firm Growth and Labor Shares

This section presents the empirical results of the paper. The main results are introduced in the first two subsections while the last subsection introduces the robustness tests considered.

4.1 Foreign Demand Growth and Reallocation

How does a foreign demand increase affect the value-added growth rate of heterogeneous exporters? Figure 5 highlights the first main empirical result. The estimated coefficients are reported in the first column of Table 3.[29] A clear picture emerges: foreign demand growth allows larger exporters to grow faster. More specifically, highly internationalized exporters grow following an increase in foreign demand while firms in the bottom 1% to 10% of the initial export sales distribution squeeze, although the effect is not significant at conventional levels. Figure 5 points to the existence of intensive margin reallocations favoring more internationalized exporters. Indeed, the elasticity of value-added growth to foreign demand growth displayed in the Figure means that firms that are in the top 1% of the initial export sales distribution experience a 1.5% increase in their value-added following a 10% increase in their foreign demand. This elasticity becomes negative for firms in the bottom 1% of the export sales distribution. Changes in value-added are driven by changes in total sales as shown in Figure 6.[30] Foreign demand shocks therefore have a heterogeneous effect on value-added growth and favor superstar exporters with a low-labor share.

This result complements the findings of Autor et al. (2020) who show that the growth of superstar firms explains the decline of the labor share across sectors in the US and in several other OECD countries. Their work does not explore specific causes behind the rise of superstar firms, which can include globalization, mergers and acquisitions, technological advances. Figure 5 shows that changes in demand conditions on foreign markets can rationalize part of the rise of superstar exporters, at least in the manufacturing sector.

[29] Table A2 reports the percentiles of the export sales distribution defined in year t_0.

[30] The negative effect for firms at the bottom of the export sales distribution is significant at the 10% level.

4.2 Foreign Demand Growth and Labor Shares

What is the effect of foreign demand shocks on firm-level labor shares? The results from estimating equation (5) are displayed in column 2 of Table 3. The elasticity of labor share changes to foreign demand growth is displayed in Figure 7. It shows that exporters that are not highly internationalized experience an increase in their labor share following an increase in foreign demand. More internationalized exporters, on the other hand, experience a drop in their labor share while the labor share of top exporters exhibit an even larger decrease.

Empirically, the fact that the labor share of superstar exporters decreases relatively more is consistent with the reallocation effect depicted in Figure 5. Top exporters grow disproportionately more, pushing down their labor share. Conversely, firms in the bottom 1% of the export sales distribution experience an increase in their labor share, driven by the fact that their value-added is going down. To explore the possibility that the effect depicted in Figure 7 is not driven by a decrease in labor compensation, I estimate equation 4 where the dependent variable is the growth rate of labor compensation. The estimates are shown in the third column of Table 3 and plotted in Figure 8. Larger exporters experience an increase in their labor compensation. While the effect is positive and significant for all exporters with export sales above the sample median, it is not disproportionately stronger for superstar exporters at the top of the export sales distribution.

Although changes in demand conditions abroad generate an increase in labor compensation, they shrink the share of the pie going back to workers. This within-between exporter effect points to the importance of the reallocation effect displayed in the previous subsection in driving changes in the labor share of exporters.

4.3 Robustness Tests

I show that both the intensive margin reallocations of value-added towards superstar exporters and the stronger decrease in the labor share they experience are not driven by the choice of sample, variables or specification.

Additional controls and firm-specific trends. Table 4 confirms the findings of Table 3 when adding additional controls and controlling for firm trends. Columns 1 and 5 display the baseline results on the same sample for comparison purposes. In columns 2 and 6, I address the concern that offshoring may confound the effect of foreign demand by including the growth rate of each firm's total imports. The point estimates on the interaction terms remain statistically significant at the 1% level. In columns 3 and 7, I include the growth rate of capital intensity, which controls for the fact that foreign demand shocks may also incentivize firms to automate part of the production process. The main effect on the interaction term is largely stable. Finally, in columns 4 and 8, I control for firm-specific trends by adding firm fixed-effects. The point estimates on the interaction term survive this tough test and remain significant. If anything, the point estimates are larger.

Future demand shocks. Figure A7 further tests whether the initial export composition of firms can be responsible for the growth of value-added and changes in the firms' labor share. If pre-trends were responsible for these changes, we should expect future demand shocks to have a statistically significant impact on contemporaneous outcomes. Reassuringly, none of the point estimates are statistically significant. This confirms that firm-specific trends are unlikely to drive the results.

Alternative internationalization measures. Table A7 uses two alternative internationalization measures, namely the number of products exported by a firm and the number of destination countries served. The interaction term is positive (negative) and significant in the first (last) two columns. The finding that superstar exporters grow relatively faster than less internationalized firms and experience a stronger decrease in their labor share is robust to using alternative internationalization measures.

Exclusion of key industries. The different industries within manufacturing experienced a different growth rate of exports over the period as shown in Figure A8. Firms' value-added and labor share can evolve differently within different industries and be driven by industry-specific trends. I further exclude the industries whose growth rate of exports was particularly high to test whether the results are driven by these industries. More specifically, I exclude the chemical, rubber, plastics and fuel, and transport equipment industries from my sample. Table A8 shows that the results survive this restriction and are not driven by a few key industries.

Alternative firm size measures. Fact 3 shows that more internationalized exporters have a lower labor share. I test whether the results hold when considering other "superstar" firm characteristics instead of these internationalization measures. I instead use capital intensity and labor productivity as alternative measures of heterogeneity. The results are displayed in Figure A9 and Figure A10, respectively. The elasticities displayed in all four panels leave the key results reported in Figure 5 and Figure 7 unchanged, though the coefficients are slightly smaller in magnitude and slightly less precisely estimated.

Alternative lag structure. Internationalized exporters are defined in the first year in which they appear in the sample to avoid simultaneity issues. This choice, however, prevents firms from becoming large players on international markets. I assess the robustness of the main results to lagging the internationalization measures, in order to allow exporters to move along the export sales distribution. This test is reported in Table A9. The results are robust to lagging the superstar variable once (columns 1 and 2) or twice (columns 3 and 4).

Sample of survivors. Table 3 contains firms that survive over at least two time periods. Table A10 tests whether the subsample of exporters surviving the entire 1995-2007 period yields similar results. The estimated coefficients of interest (β^{Rank} and χ^{Rank}) have the same sign as the baseline estimates that contain entrants and exiters and are statistically significant. This test shows that entrants and exiters over the period do not seem to drive the results.

Outsourcing. An alternative mechanism that could explain the reallocation of value-added shares towards large exporters and the decline in their labor share is outsourcing. Over the last decades, several industries such as the automobile industry have transferred part of their activity to business partners to focus on their core activity. Two observable consequences of outsourcing could be a sudden increase in investment as the firm narrows its activity to its core competency and large changes in employment. I therefore remove firm-year observations for which the growth rate of total investments and the growth rate of employment is lower than the bottom or higher than the top 10% percent of each growth rate distribution within each 2-digit industry. This allows me to keep a sample of firms that have arguably not experienced any restructuring which would affect their value-added growth rate or their labor share. The point estimates reported in Table A11 are qualitatively very similar to those reported in Table 3 and are estimated precisely.

Industry Fixed Effects and Superstar within Industry. I test the robustness of the results to using an alternative set of industry fixed effects and to changing the way superstar exporters are defined. In the second and fifth column of Table A12, I include 4-digit industry by year fixed effects, instead of the 2-digit sector by year fixed effects that are reported in the first and fourth column for comparison purposes. The point estimate on the interaction term decreases slightly but remains highly significant. In the third and last column, I instead consider a dummy variable that takes the value one if a firm's export sales is higher than its 4-digit industry median (at times t_0). The results are qualitatively unchanged and remain significant.

Excluding firms reporting affiliates abroad. One might worry that the presence of multinational companies (MNC) might undermine the quality of the foreign demand shocks as foreign subsidiaries may drive the increase in foreign imports. An attempt to alleviate this concern consists of using the French "Liaisons Financieres" (LIFI) survey. This non-exhaustive survey contains information on the nationality and ownership status of firms that are headquartered in France. It also contains some information on the nationality of firms that are owned by French headquartered firms. In Table A13, I exclude firm-year observations (columns 1 to 2) or firms (columns 3 to 4) for which a foreign affiliate is reported in LIFI. The results are extremely robust to the exclusion of these observations.

5 Magnitude

How large is the impact of a surge in foreign demand on the manufacturing labor share? I make use of the Foster et al. (2001) decomposition method and the point estimates obtained in Section 4.1 and 4.2 to get a sense of the magnitude of the effects. Although the following results are partial equilibrium in nature, they provide interesting evidence on the magnitude of the effect of foreign demand growth in generating changes in the manufacturing labor share.

From equation (2), the reallocation margin is given by:

$$\Delta \mathrm{LS}_t^{\mathrm{Between}} := \sum_{i\in \mathrm{S}} \left(\omega_{it} - \omega_{it-1}\right)\left(\mathrm{LS}_{it-1} - \mathrm{LS}_{t-1}\right) + \sum_{i\in \mathrm{S}} \left(\omega_{it} - \omega_{it-1}\right)\left(\mathrm{LS}_{it} - \mathrm{LS}_{it-1}\right)$$

while the within-firm effect is given by:

$$\Delta \mathrm{LS}_t^{\mathrm{Within}} := \sum_{i\in \mathrm{S}} \omega_{it-1}\left(\mathrm{LS}_{it} - \mathrm{LS}_{it-1}\right)$$

Using the point estimates obtained, I can compute the percentage point change in the labor share caused by the reallocation effect and arising from foreign demand changes, labeled $\Delta \hat{\mathrm{LS}}_t^{\mathrm{Between}}$:

$$\begin{aligned}\Delta \hat{\mathrm{LS}}_t^{\mathrm{Between}} &= \sum_{i\in \mathrm{S}} \left(\hat{\omega}_{it}^{\mathrm{Between}} - \omega_{it-1}\right)\left(\mathrm{LS}_{it-1} - \mathrm{LS}_{t-1}\right) \\ &+ \sum_{i\in \mathrm{S}} \left(\hat{\omega}_{it}^{\mathrm{Between}} - \omega_{it-1}\right)\left(\hat{\zeta}^{\mathrm{Rank}}\tilde{\Delta}\mathrm{Shock}_{it} + \hat{\chi}^{\mathrm{Rank}}\tilde{\Delta}\mathrm{Shock}_{it} \times \mathrm{Superstar}_{it_0}\right)\end{aligned} \tag{6}$$

The predicted values for the value-added weights are given by:

$$\hat{\omega}_{it}^{\text{Between}} = \frac{\text{VA}_{it-1}\left(1 + \hat{\alpha}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} + \hat{\beta}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}\right)}{\sum_i \text{VA}_{it-1}\left(1 + \hat{\alpha}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} + \hat{\beta}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}\right)} \tag{7}$$

Value-added is lagged in the previous equation. If there were no effect, $\hat{\alpha}^{\text{Rank}} = \hat{\beta}^{\text{Rank}} = 0$ so that $\hat{\omega}_{it}^{\text{Between}} = \omega_{it-1}$ which would imply that the predicted between-firm component would be nil ($\Delta\hat{\text{LS}}_t^{\text{Between}} = 0$).

The percentage point change arising from changes in firms' labor share and caused by foreign demand changes can be obtained using the estimated coefficients from equation (5). This gives the predicted within-between term $\Delta\hat{\text{LS}}_t^{\text{Within}}$:

$$\Delta\hat{\text{LS}}_t^{\text{Within}} = \sum_{i \in \text{S}} \omega_{it-1}\left(\hat{\zeta}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} + \hat{\chi}^{\text{Rank}}\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}\right) \tag{8}$$

I use the OLS coefficients provided in the first two columns of Table 3 to compute the predicted between-firm margin $\Delta\hat{\text{LS}}_t^{\text{Between}}$ and the predicted within-between firm margin $\Delta\hat{\text{LS}}_t^{\text{Within}}$.

The main quantitative results are displayed in Table 5. For comparison purposes, the first three columns report the observed labor share change, reallocation and within components shown in Table 1. Columns 4 and 5 display the predicted between and within-between effects. In column 4, foreign demand growth generates a 0.04 percentage point decline in the labor share through reallocation towards low-labor share exporters over 1995-2007. The within-between firm effect is much stronger and generates a 1.4 percentage point decline in the labor share. Both between-firm and within-between firm effects arising from foreign demand growth therefore generate a 1.4 percentage point decline in the manufacturing labor share over the whole period. Given the evolution of the labor share depicted in Figure 1, the last two rows focus on the two sub-periods 1995-2000 and 2000-2007. Over 1995-2000, foreign demand growth explains about 12% of the overall decline in the French manufacturing labor share.[31] The within-between effect represents two-thirds of this number. When the aggregate labor share increased over 2000-2007, foreign demand led to a 1.2 percentage point decline,[32] driven by the within-between effect.

These results are arguably a *lower* bound for the overall effect of international trade on the labor share. Aghion et al. (2018) provide causal empirical evidence that foreign

[31] This figure is obtained by computing $(-0.077 - 0.154)/-1.899 = 12.16\%$.

[32] This figure is obtained by computing $0.035 - 1.217 = -1.182$.

demand shocks induce firms to patent more. The authors find that the effect is stronger for more productive exporters. This increase in innovation could further reallocate output towards larger exporters. A more globalized economy also means a country more open to imports from the rest of the world. Bloom et al. (2016) show that the rise of Chinese exports to European countries over the period 1996-2007 spurred innovation. This channel, which goes through the import side of trade, can also lead to intensive margin reallocations towards larger firms.

I further investigate the role of firm heterogeneity in driving the within-between effect. In Table 6, I shut down the heterogeneity parameters β^{Rank} and χ^{Rank}.[33] The first two columns report the baseline estimated effects from Table 5. Columns 3 and 4 display the estimated between and within effects without accounting for the heterogeneous impact of foreign demand. The last column shows the contribution of firm-heterogeneity in driving the baseline within-between effect. The message from this table is that the heterogeneous impact of foreign demand matters substantially. Column 3 shows that foreign demand leads to a small labor share increase through the between-firm effect. This result is not surprising given that the reallocation effect is about the interaction term between a firm's foreign demand and its degree of internationalization. Column 4 shows that the pure effect of foreign demand shocks on the firms' labor share is negative. More importantly, column 5 indicates that allowing the effect of foreign demand to be heterogeneous across exporters leads to a within-between exporter effect to be more than twice as important. Understanding the role played by foreign demand growth in generating changes in the labor share boils down to understanding the reason why exporting firms experience a labor share decline and why the reallocation effect that takes place favors larger exporters, driving down their labor share by a larger amount. This is examined in the next section.

Finally, to examine the sensitivity of the results to the exclusion of superstar exporters, I first trim the top 1% of the export sales distribution and estimate baseline specifications (4) and (5). The first two columns of Table 7 report the baseline numbers provided in the last two columns of Table 5. I then use the point estimates reported in columns 1-2 of Table A14 and compute the new predicted between and within-between effects. Columns 3 and 4 show the new between and within-between effects, while the last column computes the contribution of superstar exporters to the within-between effect. The contribution of these superstar exporters to the within-between effect is quantitatively important. This effect is halved without these special exporters. Moreover, not accounting for top sellers on

[33] The baseline specifications are estimated by imposing that foreign demand shocks do not impact the firms' growth rate and labor shares differentially. The point estimates are shown in columns 3-4 of Table A14.

international markets leads to foreign demand growth explaining only 3% of the 1995-2000 labor share decline versus 12% as reported before. Over 2000-2007, the effect is also roughly halved. These results stress the key role of superstar exporters.

6 Inspecting the Mechanism

I now discuss plausible channels behind the empirical findings of Section 4. To do so, I first examine the channels behind the response of labor shares before turning to the differentiated impact of foreign demand on labor shares. The full model and proofs are detailed in Appendix C. The model focuses on *intensive* margin reallocations towards large firms.[34]

6.1 Labor Share Changes: Fixed Costs or Markups?

Why do labor shares decrease when exporters experience an increase in foreign demand? A firm's production function is given by $q_i = \varphi l_i$ where l_i is variable labor, φ is its productivity and is firm-specific. Total labor of firm i is given by $L_i = l_i + f$ where f is the fixed labor cost of production.

The condition for profit maximization such that marginal revenue is equal to marginal cost entails that the price p_i of a good is equal to that firm's markup μ_i times its marginal cost of production:

$$p_i = \mu_i \frac{w}{\varphi}$$

Multiplying both sides of the previous equation by q_i and using the fact that $l_i = L_i - f$, one obtains:

$$\frac{wL_i}{p_i q_i} = \frac{1}{\mu_i} + \frac{wf}{p_i q_i} \tag{9}$$

Firms that charge higher markups or have a lower share of fixed labor cost in value-added have a lower labor share.[35] In a monopolistic competition framework with constant elasticity of substitution (CES) preferences, markups would be constant across firms and pinned down by the elasticity of substitution across goods σ.[36] In the present model,

[34]Focusing on the impact of market toughness on the *exit* of less productive firms via changes in the productivity cutoff yields similar theoretical predictions on markups and reallocations towards larger firms (Autor et al., 2020). Because the empirical analysis is about changes at the intensive margin, the framework presented here highlights the endogenous response of competition via the free entry condition.

[35]The denominator of (9) corresponds to sales or value-added. Both are equal to each other as I abstract from materials.

[36]Firm markups would be given by $\mu_i = \frac{\sigma}{\sigma-1}$ for all i.

a firm's demand elasticity varies with its size, generating heterogeneous markups. The main assumption, which is discussed in the Appendix, is that Marshall's Second Law of Demand holds:

Assumption 1. *(Marshall's Second Law of Demand) The inverse demand elasticity* $\sigma_p(x_i) := -\frac{\partial p(x_i)/\partial x_i}{p(x_i)/x_i}$ *increases in* x_i*:* $\frac{\partial \sigma_p(x_i)}{\partial x_i} > 0$.

This assumption is equivalent to saying that the demand elasticity decreases with consumption x_i. It implies that a profit-maximizing firm's marginal revenue decreases in x_i, as shown in Appendix C. The fact that marginal revenues decrease with consumption generates a positive relationship between a firm's productivity level and its size. Assumption 1 is sufficient to generate a positive relationship between firm size and markups as found in the literature (De Loecker and Warzynski, 2012; Autor et al., 2020). Proposition 1 follows:

Proposition 1. *A market size increase decreases firm-level markups and decreases the share of fixed labor cost in value-added.*

Proof. See Appendix C. □

In the model, an increase in demand, i.e. an increase in market size, impacts both components of (9). First, the market size increase generates entry of new firms and thus an increase in competition on the foreign market, leading to a higher price elasticity of demand and to lower markups charged on the foreign market. Everything else being equal, firm-level markups will decrease, leading to an increase in firm-level labor shares. Second, the increase in market size allows all firms to grow. Everything else equal, this increases the denominator of wf/p_iq_i and thus decreases the labor share of exporters. This is the only channel that can rationalize the empirical finding documented previously and shown in column 4 of Table A14.

The French micro-data allow me to further investigate the channel through which foreign demand affects the labor share of firms by investigating the response of the number of workers, wages and output. To meet the increase in foreign demand, firms might need to hire more workers. Similarly, an increase in foreign demand might lead firms to raise wages in order to incentivize workers to meet the increase in demand.[37] Figure 9a suggests that individuals working in larger exporting firms experience small wage gains.[38]

[37] Garin et al. (2018) study the causal effect of changes in demand conditions abroad on wages in Portugal before and after the Great Recession of 2008 and find positive significant effects.

[38] The effect on wages likely masks a lot of heterogeneity across skill types. Foreign demand growth might favor more skilled workers, for instance. This issue is left for future research.

Figure 9b shows that exporters do not hire more workers following an increase in foreign demand.[39] As labor supply is arguably inelastic in the short-run, the increase in labor demand brought about by foreign demand growth leads to higher wages, thereby driving up total labor compensation (Figure 8). Moreover, the finding that the number of workers does not react and that superstar exporters grow disproportionately more suggests that their labor productivity is going to increase. If the labor share decline within firms was predominantly driven by an increase in markups, there is no strong reason to believe this would be associated with wage gains. Finally, I investigate the response of output to foreign demand shocks. Figure 10 shows that the elasticity of output growth to foreign demand growth closely corresponds to that of value-added growth reported in Figure 5, so that the results are driven by an increase in output, consistent with the theory.

These results corroborate the existence of a market size effect that allows firms to expand on international markets. This decreases their labor share by decreasing their share of fixed labor cost in value-added, consistent with the result shown in the last two columns of Table A14.

6.2 Market Size and Competition

Why do superstar exporters experience a larger labor share decline following a foreign demand shock as shown in Figure 7?

The overall effect of market size L on a firm's profits Π is given by:

$$\frac{d\Pi}{dL}\frac{L}{\Pi} = \frac{\partial\Pi}{\partial L}\frac{L}{\Pi} + \frac{\partial\Pi}{\partial\lambda}\frac{\lambda}{\Pi} \times \frac{d\lambda}{dL}\frac{L}{\lambda} \tag{10}$$

The elasticity of profits to a change in demand can be decomposed into two effects: a direct market size effect, which is the first component on the right hand side of the equation, and a competition effect, where λ is the competition shifter. The first component tends to rise firms' profits as highlighted in the previous subsection. The second one decreases profits as competition becomes fiercer via the entry of new firms.[40] In general, the overall effect is indeterminate but with additively separable preferences, the solution turns out

[39] Higher hours worked could also be a way for firms to meet the increase in demand on the output market. Unfortunately, the data do not allow me to test this hypothesis.

[40] The fact that an increase in λ leads to lower profits follows from differentiating per consumer operating profits with respect to λ and using the envelope theorem. Competition always increases with demand L as shown in the Appendix.

to be tractable. As shown in the Appendix, the previous equation boils down to:

$$\frac{d\Pi}{dL}\frac{L}{\Pi} = 1 - \frac{[\sigma_p(\varphi,\lambda)]^{-1}}{\int_{\varphi^*}^{\infty} \frac{\pi^c(\varphi,\lambda)}{\pi^c(\lambda)}[\sigma_p(\varphi,\lambda)]^{-1} dG(\varphi)} \tag{11}$$

The market size effect equals unity. The competition effect is the ratio of a firm's demand elasticity to a weighted average of demand elasticities faced by all surviving firms. These demand elasticities are weighted by the share of each firm's profit in total profits. The denominator is thus an average demand elasticity. Firms with a lower than average demand elasticity will grow as $[\sigma_p(\varphi,\lambda)]^{-1} / \int_{\varphi^*}^{\infty} \frac{\pi^c(\varphi,\lambda)}{\pi^c(\lambda)}[\sigma_p(\varphi,\lambda)]^{-1} dG(\varphi) < 1$. Proposition 2 follows:

Proposition 2. *A market size increase reallocates profits towards larger firms and decreases their labor share relatively more through the fixed cost channel.*

Proof. See Appendix C. □

The intuition of the result is as follows. Under Assumption 1, more productive firms face a lower demand elasticity. The market size effect dominates the competition effect for larger firms as they face a lower than average demand elasticity and are not highly penalized by the concomitant increase in competition. Firms with a higher than average demand elasticity, namely less productive firms, will experience a decrease in profits as the competition effect dominates. A market size increase thus triggers intensive margin reallocations towards larger firms.[41] [42] As Mrázová and Neary (2017) put it, an increase in demand generates a "Matthew Effect".[43] These results are not new. The new feature that the model puts forward is that intensive margin reallocations towards larger exporters have implications for firm-level labor shares via the fixed cost channel.

[41] Syverson (2004a,b) shows that greater substitutability, which means more competition, reallocates output from low-productive firms to high-productive firms and reduces productivity dispersion. This is consistent with the fact that concentration can increase in a more competitive environment.

[42] Markups vary across firms because of MSLD. An increase in demand reallocates output towards more productive firms that are larger. Since larger firms charge higher markups, aggregate markups rise through this reallocation effect, consistent with De Loecker et al. (2020); De Loecker and Eeckhout (2018) and Bauer and Boussard (2019).

[43] The Matthew Effect originally refers to a sentence appearing in the Gospel According to St. Matthew: "For unto every one that hath shall be given, and he shail have abundance: but from him that hath not shall be taken away even that which he hath". Merton (1968) refers to this biblical statement to describe situations in which, everything else equal, more famous researchers get more attention for their work, compared to less famous ones. More famous researchers therefore become more famous.

7 Conclusion

This paper studies and quantifies the impact of export demand on the labor share. To do so, I use firm-level data on the universe of French exporters operating in the manufacturing sector.

Foreign demand growth allows low-labor share firms, superstar exporters, to grow disproportionately more. Importantly, this reallocation effect towards superstar exporters generates a stronger decrease in their labor share. These effects appear to be extremely robust. Foreign demand accounts for 12% of the labor share decline over 1995-2000 and generates a 1.2 percentage point labor share decline over 2000-2007, suggesting that the increase observed over the second period could have been substantially higher.

My findings uncover a previously unexplored dimension of labor share changes and show that the impact of international trade on the labor share goes beyond changes in import exposure. The results provided in the paper are arguably a lower bound for the effect of international trade more broadly construed on the manufacturing labor share. First, this article has focused exclusively on the role played by export demand. Second, the analysis is partial equilibrium and does not capture the impact of export demand and import competition on innovation (Aghion et al., 2018; Bloom et al., 2016). Innovating is also a means to grow and gain market shares, which would likely strengthen the importance of reallocations towards superstar exporters.

Overall, this paper adds causal evidence from an international trade perspective to the "winner take most" phenomenon highlighted by Autor et al. (2020). Indeed, the labor share changes arising from foreign demand shocks are consistent with *fiercer* competition on international markets, which generates intensive margin reallocations towards superstar exporters. The paper thus suggests that the consequences of globalization are not so malign. First, the labor share changes are consistent with a decrease in the share of fixed labor cost in value-added rather than rising firm-level markups. Second, superstar exporters are also more productive so that their rise is a source of aggregate productivity growth.

References

ACEMOGLU, D. AND P. RESTREPO (2018): "The race between man and machine: Implications of technology for growth, factor shares, and employment," *American Economic Review*, 108, 1488–1542.

ADAROV, A., R. STEHRER, ET AL. (2019): *Tangible and Intangible Assets in the Growth Performance of the EU, Japan and the US*, Vienna Institute for International Economic Studies.

AGHION, P., A. BERGEAUD, T. BOPPART, P. J. KLENOW, AND H. LI (2019): "A theory of falling growth and rising rents," Federal Reserve Bank of San Francisco.

AGHION, P., A. BERGEAUD, M. LEQUIEN, AND M. J. MELITZ (2018): "The impact of exports on innovation: Theory and evidence," Tech. rep., National Bureau of Economic Research.

ALVAREZ, F. AND R. E. LUCAS JR (2007): "General equilibrium analysis of the Eaton–Kortum model of international trade," *Journal of monetary Economics*, 54, 1726–1768.

ATKESON, A. AND A. BURSTEIN (2008): "Pricing-to-market, trade costs, and international relative prices," *The American Economic Review*, 98, 1998–2031.

AUTOR, D., D. DORN, L. F. KATZ, C. PATTERSON, AND J. VAN REENEN (2020): "The fall of the labor share and the rise of superstar firms," *The Quarterly Journal of Economics*, 135, 645–709.

AZAR, J. AND X. VIVES (2018): "Oligopoly, macroeconomic performance, and competition policy," .

AZMAT, G., A. MANNING, AND J. V. REENEN (2012): "Privatization and the decline of labour's share: international evidence from network industries," *Economica*, 79, 470–492.

BAILY, M. N., C. HULTEN, D. CAMPBELL, T. BRESNAHAN, AND R. E. CAVES (1992): "Productivity dynamics in manufacturing plants," *Brookings papers on economic activity. Microeconomics*, 1992, 187–267.

BARKAI, S. (2020): "Declining labor and capital shares," *The Journal of Finance*, 75, 2421–2463.

BAUER, A. AND J. BOUSSARD (2019): "Market Power and Labor Share," Working paper or preprint.

BERGHOLT, D., F. FURLANETTO, AND N. FACCIOLI (2019): "The Decline of the Labor Share: New Empirical Evidence.," .

BERNARD, A. B., J. B. JENSEN, S. J. REDDING, AND P. K. SCHOTT (2007): "Firms in international trade," *Journal of Economic perspectives*, 21, 105–130.

Berry, S., M. Gaynor, and F. Scott Morton (2019): "Do Increasing Markups Matter? Lessons from Empirical Industrial Organization," *Journal of Economic Perspectives*, 33, 44–68.

Biscourp, P. and F. Kramarz (2007): "Employment, skill structure and international trade: Firm-level evidence for France," *Journal of International Economics*, 72, 22–51.

Blanchard, O. and F. Giavazzi (2003): "Macroeconomic effects of regulation and deregulation in goods and labor markets," *The Quarterly journal of economics*, 118, 879–907.

Bloom, N., M. Draca, and J. Van Reenen (2016): "Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity," *The Review of Economic Studies*, 83, 87–117.

Böckerman, P. and M. Maliranta (2011): "Globalization, creative destruction, and labour share change: evidence on the determinants and mechanisms from longitudinal plant-level data," *Oxford Economic Papers*, 64, 259–280.

Borusyak, K., P. Hull, and X. Jaravel (2018): "Quasi-experimental shift-share research designs," Tech. rep., National Bureau of Economic Research.

Bresnahan, T. F. (1989): "Empirical studies of industries with market power," *Handbook of industrial organization*, 2, 1011–1057.

Covarrubias, M., G. Gutiérrez, and T. Philippon (2020): "From Good to Bad Concentration? US Industries over the past 30 years," *NBER Macroeconomics Annual*, 34, 1–46.

Dauth, W., S. Findeisen, and J. Suedekum (2014): "The rise of the East and the Far East: German labor markets and trade integration," *Journal of the European Economic Association*, 12, 1643–1675.

De Loecker, J. and J. Eeckhout (2018): "Global Market Power," Working Paper 24768, National Bureau of Economic Research.

De Loecker, J., J. Eeckhout, and G. Unger (2020): "The rise of market power and the macroeconomic implications," *The Quarterly Journal of Economics*, 135, 561–644.

De Loecker, J., P. K. Goldberg, A. K. Khandelwal, and N. Pavcnik (2016): "Prices, markups, and trade reform," *Econometrica*, 84, 445–510.

De Loecker, J. and F. Warzynski (2012): "Markups and firm-level export status," *The American Economic Review*, 102, 2437–2471.

Demidova, S. and A. Rodríguez-Clare (2013): "The simple analytics of the Melitz model in a small economy," *Journal of International Economics*, 90, 266–272.

Di Giovanni, J., A. A. Levchenko, and I. Méjean (2014): "Firms, destinations, and aggregate fluctuations," *Econometrica*, 82, 1303–1340.

di Giovanni, J., A. A. Levchenko, and I. Mejean (2018): "Foreign shocks as granular fluctuations," Tech. rep., Working Paper.

Edmond, C., V. Midrigan, and D. Y. Xu (2015): "Competition, markups, and the gains from international trade," *The American Economic Review*, 105, 3183–3221.

Elsby, M. W., B. Hobijn, and A. Şahin (2013): "The decline of the US labor share," *Brookings Papers on Economic Activity*, 2013, 1–63.

Foster, L., J. C. Haltiwanger, and C. J. Krizan (2001): "Aggregate productivity growth: Lessons from microeconomic evidence," in *New developments in productivity analysis*, University of Chicago Press, 303–372.

Garin, A., F. Silverio, et al. (2018): "How Does Firm Performance Affect Wages? Evidence from Idiosyncratic Export Shocks," Tech. rep., Working Paper.

Gaulier, G. and S. Zignago (2010): "BACI: International Trade Database at the Product-Level. The 1994-2007 Version," Working Papers 2010-23, CEPII.

Goldsmith-Pinkham, P., I. Sorkin, and H. Swift (2018): "Bartik instruments: What, when, why, and how," Tech. rep., National Bureau of Economic Research.

Grossman, G. M., E. Helpman, E. Oberfield, and T. Sampson (2017): "The productivity slowdown and the declining labor share: A neoclassical exploration," Tech. rep., National Bureau of Economic Research.

Guscina, A. (2006): *Effects of globalization on labor's share in national income*, International Monetary Fund.

Gutiérrez, G. and T. Philippon (2018): "How EU markets became more competitive than US markets: A study of institutional drift," Tech. rep., National Bureau of Economic Research.

GUTIÉRREZ, G. AND S. PITON (2020): "Revisiting the global decline of the (non-housing) labor share," *American Economic Review: Insights*, 2, 321–38.

HARRISON, A. (2005): "Has globalization eroded labors share? Some cross-country evidence," .

HOTTMAN, C. J., S. J. REDDING, AND D. E. WEINSTEIN (2016): "Quantifying the sources of firm heterogeneity," *The Quarterly Journal of Economics*, 131, 1291–1364.

HUMMELS, D., R. JØRGENSEN, J. MUNCH, AND C. XIANG (2014): "The wage effects of offshoring: Evidence from Danish matched worker-firm data," *American Economic Review*, 104, 1597–1629.

JAROSCH, G., J. S. NIMCZIK, AND I. SORKIN (2019): "Granular Search, Market Structure, and Wages," Tech. rep., National Bureau of Economic Research.

JAUMOTTE, M. F. AND I. TYTELL (2007): *How has the globalization of labor affected the labor income share in advanced countries?*, 7-298, International Monetary Fund.

KALDOR, N. (1957): "A model of economic growth," *The economic journal*, 67, 591–624.

KARABARBOUNIS, L. AND B. NEIMAN (2013): "The global decline of the labor share," *The Quarterly Journal of Economics*, 129, 61–103.

KEHRIG, M. AND N. VINCENT (2018): "The micro-level anatomy of the labor share decline," Tech. rep., National Bureau of Economic Research.

KOH, D., R. SANTAEULALIA-LLOPIS, AND Y. ZHENG (2016): "Labor share decline and intellectual property products capital," *Available at SSRN 2546974*.

KRUGMAN, P. R. (1979): "Increasing returns, monopolistic competition, and international trade," *Journal of international Economics*, 9, 469–479.

LASHKARI, D., A. BAUER, AND J. BOUSSARD (2019): "Information Technology and Returns to Scale," Boston College Working Papers in Economics 984, Boston College Department of Economics.

MARSHALL, A. (1890): *Principles of economics. Vol. 1*.

MAYER, T., M. J. MELITZ, AND G. I. OTTAVIANO (2020): "Product Mix and Firm Productivity Responses to Trade Competition," *The Review of Economics and Statistics*, 0, 1–59.

MELITZ, M. J. AND S. POLANEC (2015): "Dynamic Olley-Pakes productivity decomposition with entry and exit," *The Rand journal of economics*, 46, 362–375.

MERTENS, M. (2020): "Micro-Mechanisms behind Declining Labor Shares: Rising Market Power and Changing Modes of Production," .

MERTON, R. K. (1968): "The Matthew effect in science: The reward and communication systems of science are considered," *Science*, 159, 56–63.

MION, G. AND L. ZHU (2013): "Import competition from and offshoring to China: A curse or blessing for firms?" *Journal of International Economics*, 89, 202–215.

MOREAU, F. (2019): "Inferring Capital-Labor Substitution from Firm Size Distortions," .

MRÁZOVÁ, M. AND J. P. NEARY (2017): "Not so demanding: Demand structure and firm behavior," *American Economic Review*, 107, 3835–74.

OBERFIELD, E. AND D. RAVAL (2014): "Micro data and macro technology," Tech. rep., National Bureau of Economic Research.

OLLEY, G. S. AND A. PAKES (1996): "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, 64, 1263–97.

PARENTI, M., P. USHCHEV, AND J.-F. THISSE (2017): "Toward a theory of monopolistic competition," *Journal of Economic Theory*, 167, 86–115.

RESHEF, A. AND G. SANTONI (2019): "Are your labor shares set in Beijing," *The view through the lens of global value chains*.

SYVERSON, C. (2004a): "Market structure and productivity: A concrete example," *Journal of Political Economy*, 112, 1181–1222.

——— (2004b): "Product substitutability and productivity dispersion," *Review of Economics and Statistics*, 86, 534–550.

——— (2019): "Macroeconomics and market power: Context, implications, and open questions," *Journal of Economic Perspectives*, 33, 23–43.

VAN BEVEREN, I., A. B. BERNARD, AND H. VANDENBUSSCHE (2012): "Concording EU trade and production data over time," Tech. rep., National Bureau of Economic Research.

Zhelobodko, E., S. Kokovin, M. Parenti, and J.-F. Thisse (2012): "Monopolistic competition: Beyond the constant elasticity of substitution," *Econometrica*, 80, 2765–2784.

Tables

Table 1: FHK Decomposition of Labor Share Changes

	Total Change (1)	Within (2)	Between (3)	Entry-Exit (4)
1995-1996	1.39	1.88	−0.9	0.40
1996-1997	−0.85	−0.62	−0.61	0.38
1997-1998	−0.40	0.12	−0.37	−0.15
1998-1999	−0.65	0.44	−1.04	−0.06
1999-2000	−1.38	−0.26	−0.51	−0.61
2000-2001	1.06	1.63	−0.007	−0.56
2001-2002	0.55	1.45	−1.29	0.39
2002-2003	−0.017	1.08	−0.63	−0.47
2003-2004	−1.50	0.22	−1.20	−0.52
2004-2005	0.56	0.87	−0.66	0.35
2005-2006	0.030	0.29	−0.11	−0.15
2006-2007	0.86	−0.15	0.20	0.81
1995-2007	−0.35	6.95	−7.11	−0.19

Notes: This decomposition is done for the sample of manufacturing exporters using the Foster et al. (2001) decomposition described in the text. Column 1 is the change in the aggregate labor share. Column 2 is the within-firm margin. Column 3 is the sum of the between and the cross effect. Column 4 is the sum of the entry and exit components and refers to entry and exit into exporting.

Table 2: Internationalization and Labor Shares

Variable Internationalization Measure	Labor Share Above Median (1)	 Top 25 % (2)	 Top 10 % (3)	 Top 1 % (4)
ln Export sales	70.2	68.4	65.5	59.1
Export intensity	70.7	69.4	67.3	64.4
ln # Products exported	70.9	70.1	69	66.1
ln # Destinations served	70.4	69.3	68.1	63.9
# Firms	35,548	17,774	7,110	711

Notes: The results are obtained by taking the mean of each variable (labor share, export sales, export intensity, number of products exported and number of countries served) over time for each firm and calculating the labor share of firms that belong to the top 50, 25, 10 and 1% of each distribution.

Table 3: Baseline Results

Dependent variable	$\Delta \ln \text{VA}_{it}$	ΔLabor Share$_{it}$	$\Delta \ln$ Labor Compensation$_{it}$
	(1)	(2)	(3)
$\tilde{\Delta}$Shock$_{it}$	−0.0267	1.8501*	0.0119
	(0.0242)	(1.0321)	(0.0202)
$\tilde{\Delta}$Shock$_{it}$ × Superstar$_{it_0}$	0.0158***	−0.7544***	0.0017
	(0.0035)	(0.1583)	(0.0028)
Superstar$_{it_0}$	−0.0075***	0.0074	−0.0077***
	(0.0002)	(0.0070)	(0.0002)
Two-digit Sector × Year FE	Yes	Yes	Yes
Export Intensity$_{it_0}$ × Year Dummies	Yes	Yes	Yes
# Observations	281,978	281,978	281,978

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, ΔLabor Share$_{it}$ is the change in a firm's labor share, $\Delta \ln$ Labor Compensation$_{it}$ is the change in a firm's labor compensation. $\tilde{\Delta}$Shock$_{it}$ is the change in a firm's export demand. Superstar$_{it_0}$ is the log of the export sales of the firm in the first year in which it appears in the sample.

Table 4: Robustness: Controls and Pre-Trends

Dependent variable	$\Delta \ln \text{VA}_{it}$				$\Delta\text{Labor Share}_{it}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\tilde{\Delta}\text{Shock}_{it}$	−0.0273	−0.0279	−0.0286	−0.0513*	1.8771*	1.8818*	1.8576*	2.5157**
	(0.0243)	(0.0240)	(0.0240)	(0.0269)	(1.0666)	(1.0658)	(1.0631)	(1.2373)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.0164***	0.0158***	0.0161***	0.0184***	−0.7858***	−0.7812***	−0.7706***	−0.8414***
	(0.0036)	(0.0035)	(0.0035)	(0.0039)	(0.1636)	(0.1634)	(0.1629)	(0.1906)
Superstar_{it_0}	−0.0070***	−0.0068***	−0.0070***		0.0156**	0.0139**	0.0099	
	(0.0002)	(0.0002)	(0.0002)		(0.0067)	(0.0067)	(0.0067)	
$\Delta \ln \text{Imports}_{it}$		0.0236***	0.0240***	0.0175***		−0.2006***	−0.1891***	−0.1623***
		(0.0006)	(0.0006)	(0.0006)		(0.0216)	(0.0215)	(0.0227)
Δ Capital Intensity_{it}			−0.0438***	−0.0537***			−1.4883***	−1.2352***
			(0.0027)	(0.0027)			(0.0819)	(0.0907)
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Export Intensity_{it_0} × Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	No	No	No	Yes
# Observations	270,268	270,268	270,268	270,268	270,268	270,268	270,268	270,268

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is the log of the export sales of the firm in the first year in which it appears in the sample. $\Delta \ln \text{Imports}_{it}$ is the change in a firm's total imports from the rest of the world, $\Delta \ln (1+\text{Imports})_{it}$, and controls for offshoring. Δ Capital Intensity_{it} is the change in a firm's capital intensity as measured by the log of its capital-labor ratio. Firm-specific trends are included in columns 4 and 8.

Table 5: Magnitude of the Effects

	Labor Share Change (Data) (1)	Between (Data) (2)	Within (Data) (3)	Between (Predicted) (4)	Within-Between (Predicted) (5)
1995-1996	1.39	−0.90	1.88	−0.028	0.063
1996-1997	−0.85	−0.61	−0.62	0.003	−0.025
1997-1998	−0.40	−0.37	0.12	0.038	−0.093
1998-1999	−0.65	−1.04	0.44	−0.042	−0.012
1999-2000	−1.38	−0.51	−0.26	−0.047	−0.086
2000-2001	1.06	−0.007	1.63	0.013	−0.011
2001-2002	0.55	−1.29	1.45	−0.001	−0.038
2002-2003	−0.017	−0.63	1.08	0.024	−0.264
2003-2004	−1.50	−1.20	0.22	0.016	−0.279
2004-2005	0.56	−0.66	0.87	0.002	−0.168
2005-2006	0.030	−0.11	0.29	−0.001	−0.232
2006-2007	0.86	0.20	−0.15	−0.017	−0.225
1995-2007	−0.35	−7.11	6.95	−0.042	−1.371
1995-2000	−1.899	−3.422	1.557	−0.077	−0.154
2000-2007	1.549	−3.688	5.393	0.035	−1.217

Notes: This table examines the magnitude of the impact of export demand growth on the manufacturing labor share. The first three columns report the first three columns of Table 1. Columns 4 and 5 report the predicted between term and the predicted within-between firm effect described in equation (6) and (8), respectively. Column 4 is the sum of the between and the cross effect described in equation (6). The numbers reported are computed for the sample of manufacturing exporters using the estimated parameters recovered from estimating equations (4) and (5) and reported in columns 1 and 2 of Table 3. The last three rows of the table sum the previous rows over 1995-2007, 1995-2000 and 2000-2007.

Table 6: Shutting Down the Heterogeneity Parameters

	Baseline Between (1)	Baseline Within-Between (2)	Between (3)	Within (4)	Contribution Within (%) (5)
1995-1996	−0.028	0.063	−0.007	0.024	62
1996-1997	0.003	−0.025	0.002	−0.010	60
1997-1998	0.038	−0.093	0.015	−0.039	58
1998-1999	−0.042	−0.012	−0.012	−0.006	50
1999-2000	−0.047	−0.086	−0.014	−0.032	63
2000-2001	0.013	−0.011	0.006	−0.007	36
2001-2002	−0.001	−0.038	0.000	−0.015	61
2002-2003	0.024	−0.264	0.012	−0.122	54
2003-2004	0.016	−0.279	0.010	−0.128	54
2004-2005	0.002	−0.168	0.004	−0.077	54
2005-2006	−0.001	−0.232	0.005	−0.103	56
2006-2007	−0.017	−0.225	−0.001	−0.100	56
1995-2007	−0.042	−1.371	0.019	−0.615	55
1995-2000	−0.077	−0.154	−0.017	−0.032	79
2000-2007	0.035	−1.217	0.036	−0.583	52

Notes: This table examines the magnitude of the impact of export demand growth on the manufacturing labor share without accounting for the heterogeneous effect of export demand across exporters. The first two columns report columns 4 and 5 of Table 5. Columns 3 and 4 report the predicted between term and the predicted within firm effect described in equation (6) and (8), respectively, where the interaction terms and the Superstar$_{it_0}$ variables are dropped. Column 3 is the sum of the between and the cross effect described in equation (6). The numbers are computed for the sample of manufacturing exporters and the estimated parameters are reported in columns 3 and 4 of Table A14. Column 5 shows the importance of firm heterogeneity in explaining the predicted within-between term and is obtained by taking the ratio of the numbers reported in column 4 to those reported in column 2 and subtracting one to isolate the contribution of heterogeneity. The last three rows of the table sum the previous rows over 1995-2007, 1995-2000 and 2000-2007.

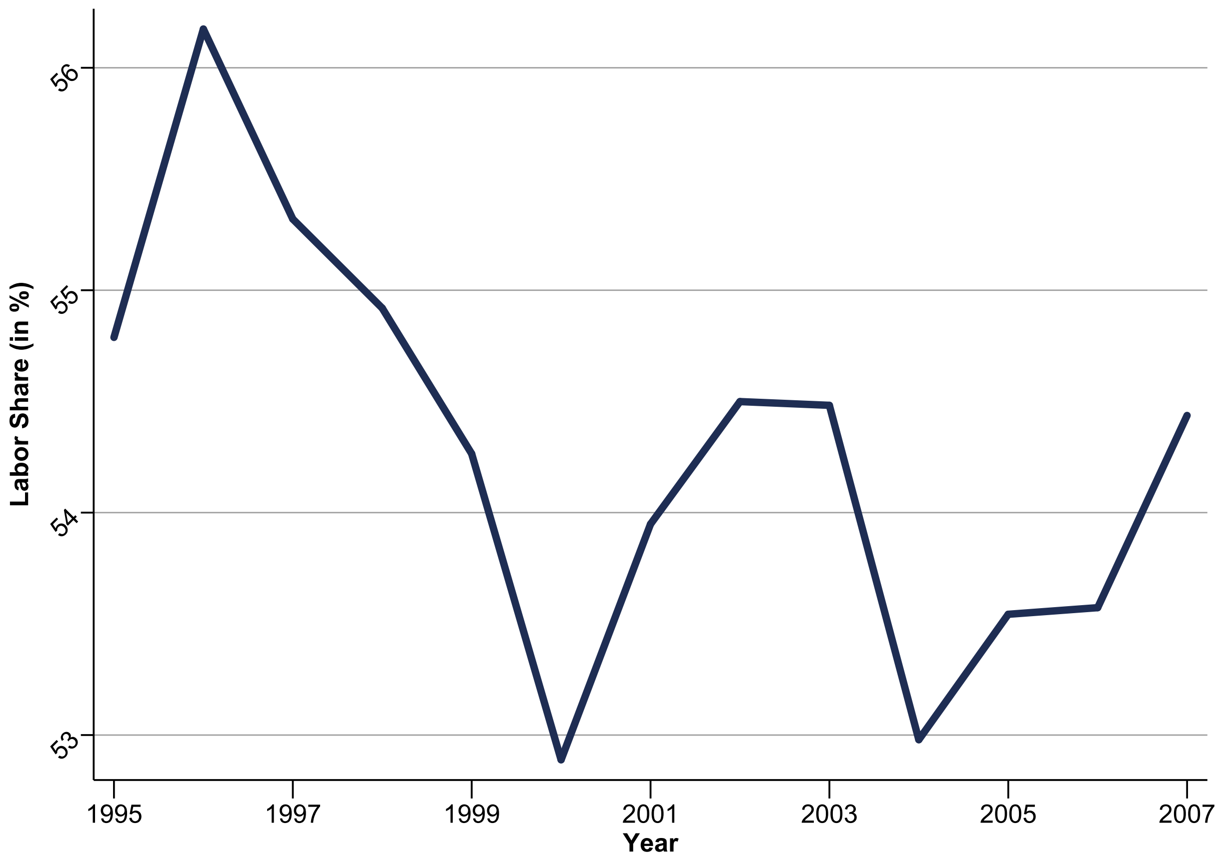
Table 7: No Superstar Exporters

	Baseline Between (1)	Baseline Within-Between (2)	Between (3)	Within-Between (4)	Contribution Within (%) (5)
1995-1996	−0.028	0.063	0.001	0.019	70
1996-1997	0.003	−0.025	0.001	−0.009	64
1997-1998	0.038	−0.093	−0.002	−0.050	46
1998-1999	−0.042	−0.012	−0.003	−0.004	67
1999-2000	−0.047	−0.086	−0.003	−0.011	87
2000-2001	0.013	−0.011	−0.003	−0.009	18
2001-2002	−0.001	−0.038	−0.001	−0.013	66
2002-2003	0.024	−0.264	−0.003	−0.155	41
2003-2004	0.016	−0.279	−0.002	−0.168	40
2004-2005	0.002	−0.168	−0.002	−0.096	43
2005-2006	−0.001	−0.232	0.000	−0.119	49
2006-2007	−0.017	−0.225	−0.011	−0.099	56
1995-2007	−0.042	−1.371	−0.028	−0.714	48
1995-2000	−0.077	−0.154	−0.006	−0.055	64
2000-2007	0.035	−1.217	−0.022	−0.659	46

Notes: This table examines the magnitude of the impact of export demand growth on the manufacturing labor share without accounting for superstar exporters. The first two columns report columns 4 and 5 of Table 5. Columns 3 and 4 report the predicted between term and the predicted within-between firm effect described in equation (6) and (8), respectively. Firms in the top 1% of the initial log export sales distribution have been discarded from the sample. Column 3 is the sum of the between and the cross effect described in equation (6). The numbers are computed for the sample of manufacturing exporters and the estimated parameters are reported in columns 1 and 2 of Table A14. Column 5 shows the importance of superstar exporters in explaining the predicted within-between term and is obtained by taking the ratio of the numbers reported in column 4 to those reported in column 2 and subtracting one to isolate the contribution of superstar exporters. The last three rows of the table sum the previous rows over 1995-2007, 1995-2000 and 2000-2007.

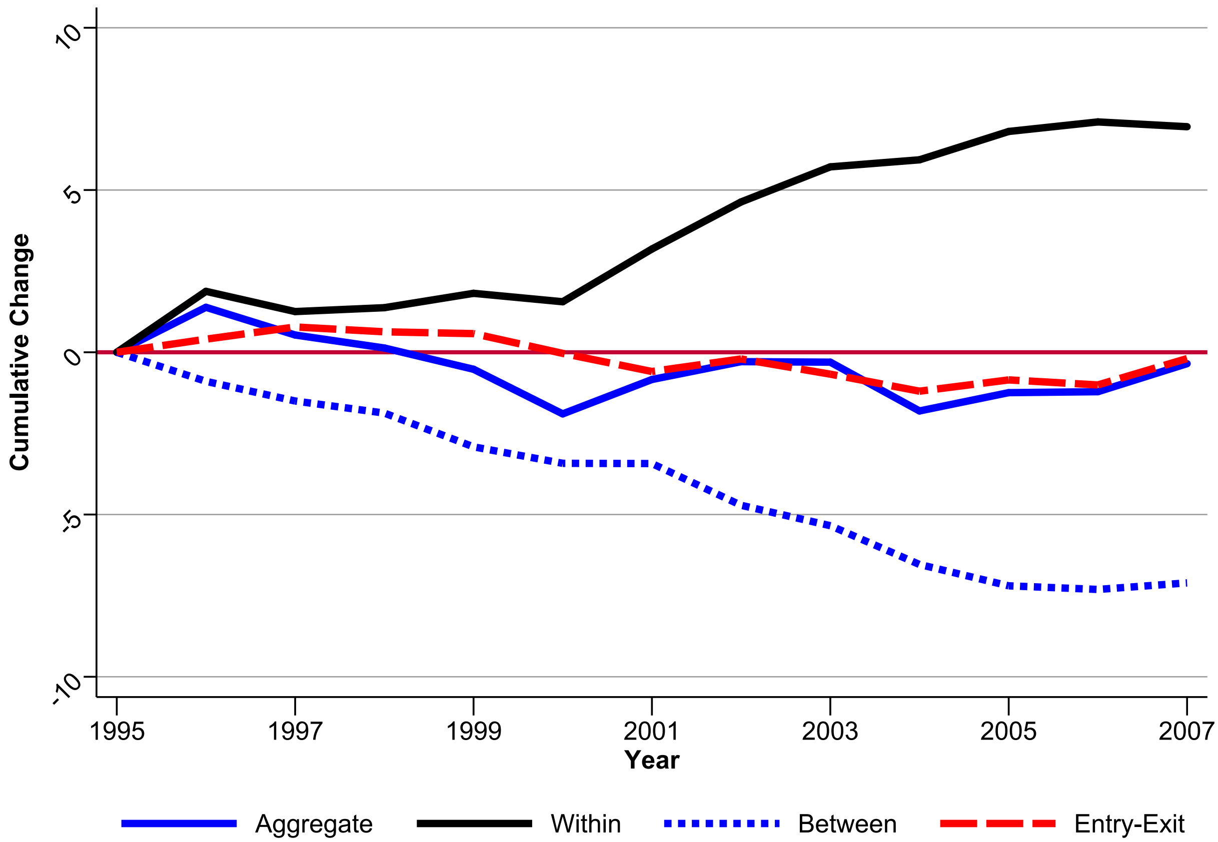
Figures

Figure 1: Manufacturing Labor Share



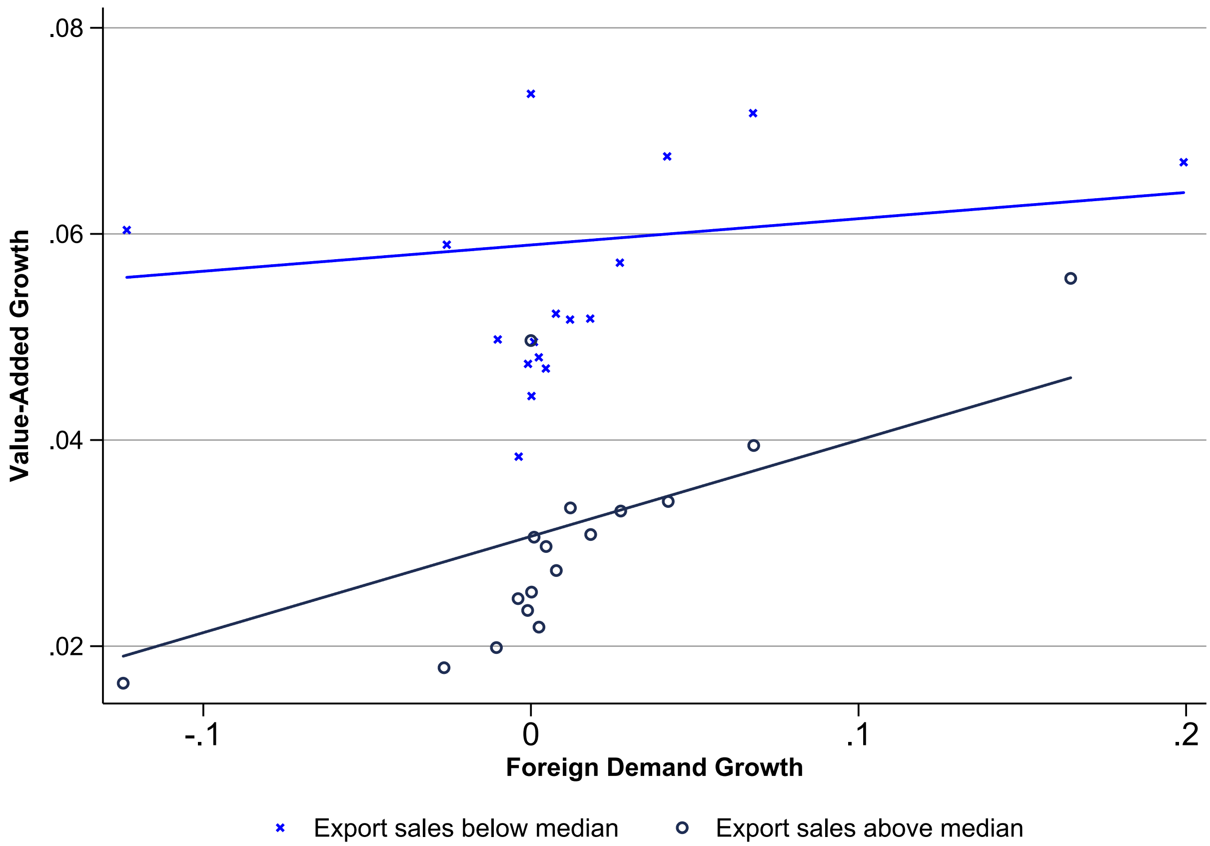
Notes: This figure plots the French aggregate labor share in manufacturing over 1995-2007. The sample consists of exporting firms. The labor share is defined as the ratio of total labor compensation to value-added.

Figure 2: Cumulative Change in Labor Share Components



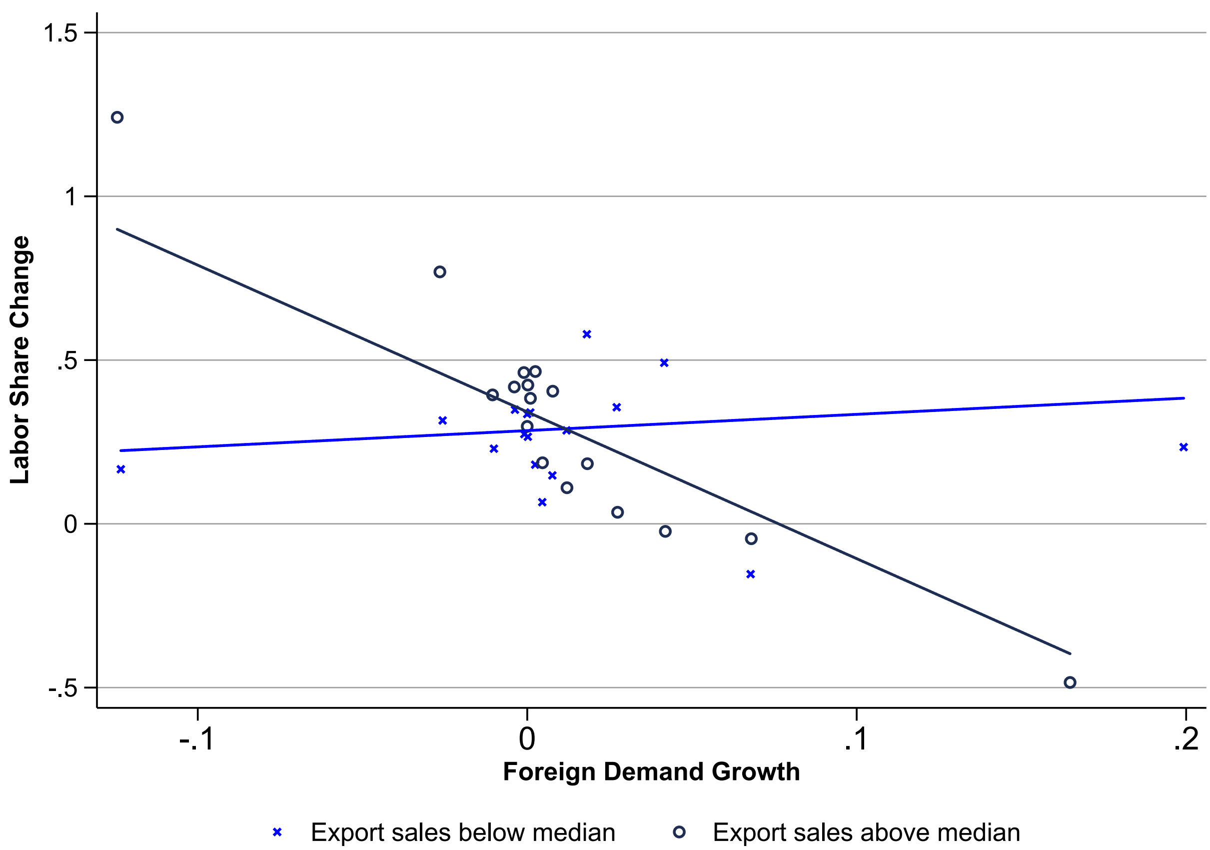
Notes: This figure plots the decomposition of the French aggregate labor share in manufacturing over 1995-2007 using the decomposition method described in equation (2). The sample consists of exporting firms. The blue solid line shows the overall change in the labor share. The black solid line shows the within-firm effect, while the blue dotted line and the red dashed line show the between-firm and entry-exit components, respectively.

Figure 3: Larger exporters grow faster following a foreign demand shock



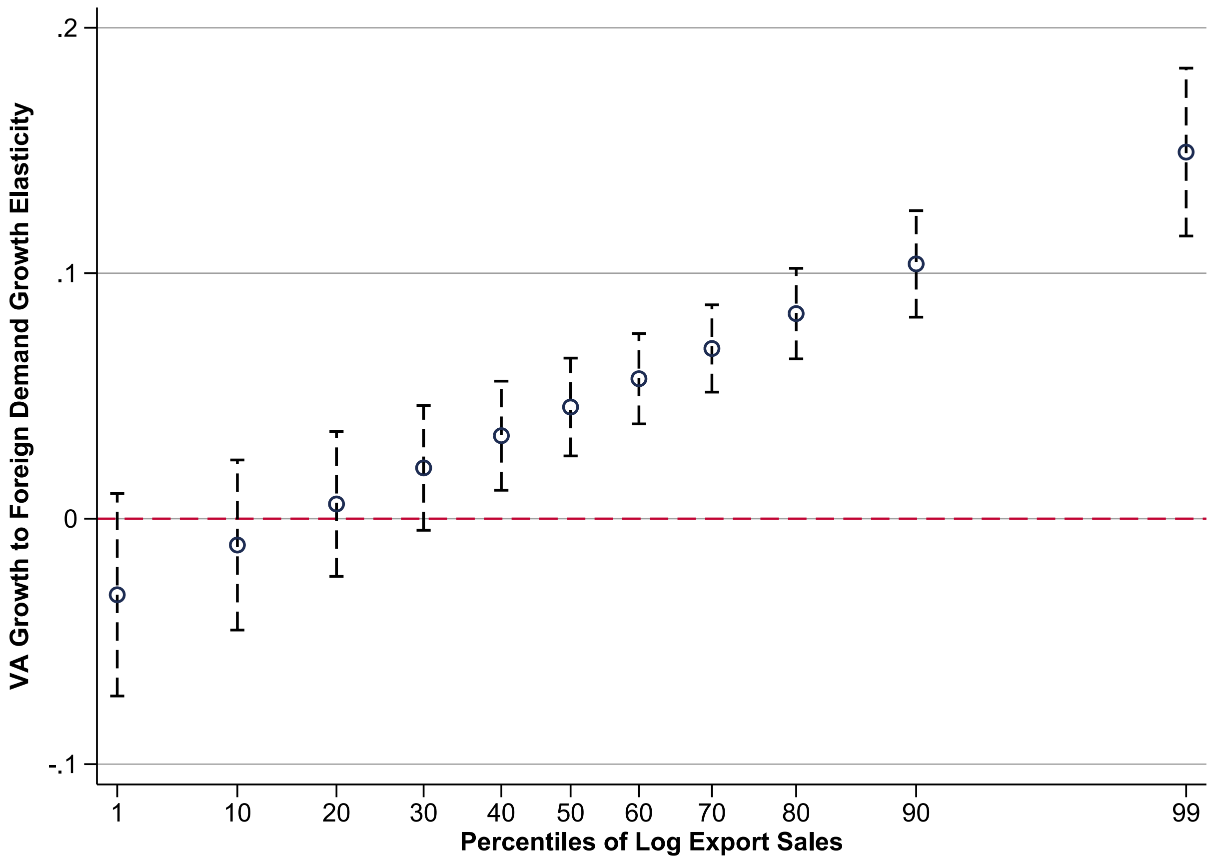
Notes: This bin-scatter plot shows the correlation between foreign demand shocks and value-added growth. Exporters with export sales above the median (both defined in the first year in which firms appear in the sample) are shown by the navy blue circles.

Figure 4: Larger exporters experience a stronger labor share decline following a foreign demand shock



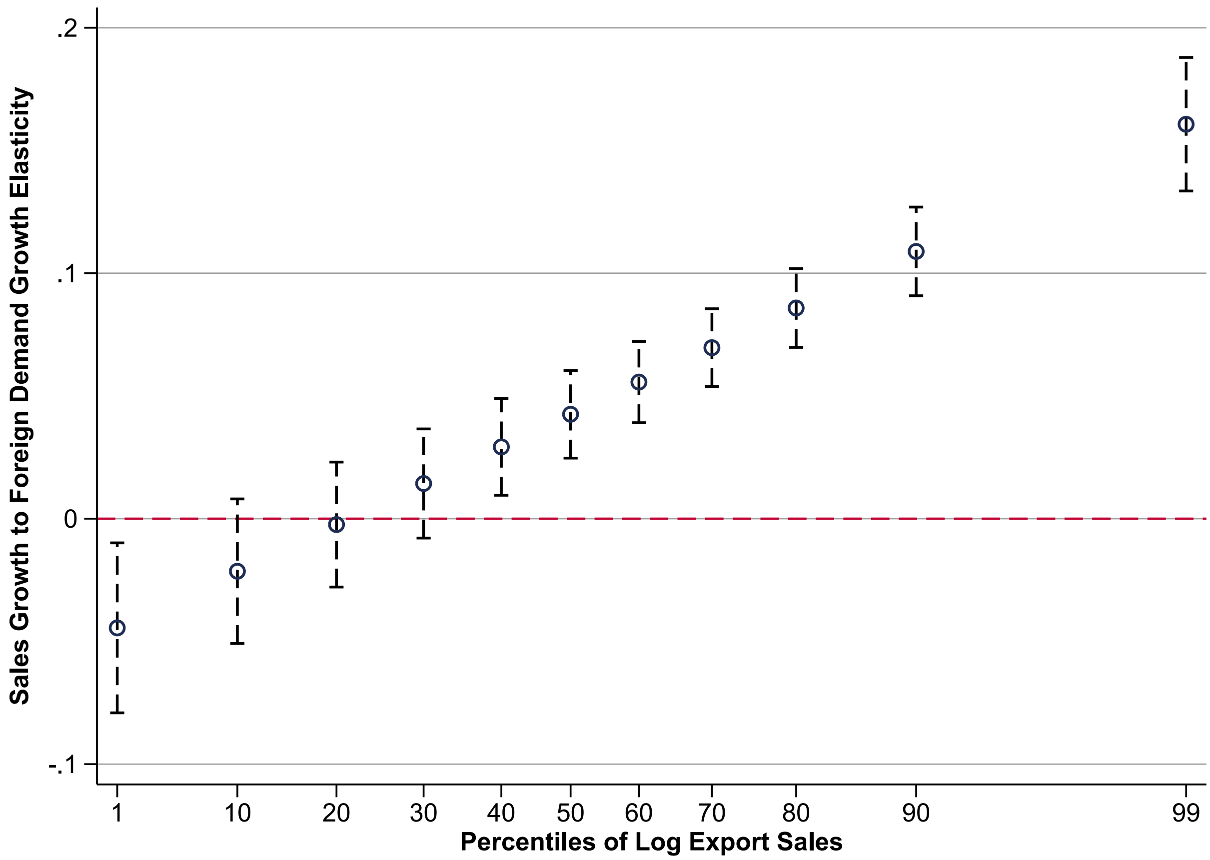
Notes: This bin-scatter plot shows the correlation between foreign demand shocks and labor share changes. Firms with export sales above the median (both defined in the first year in which firms appear in the sample) are described by the navy blue circles.

Figure 5: Between-Exporter Effect



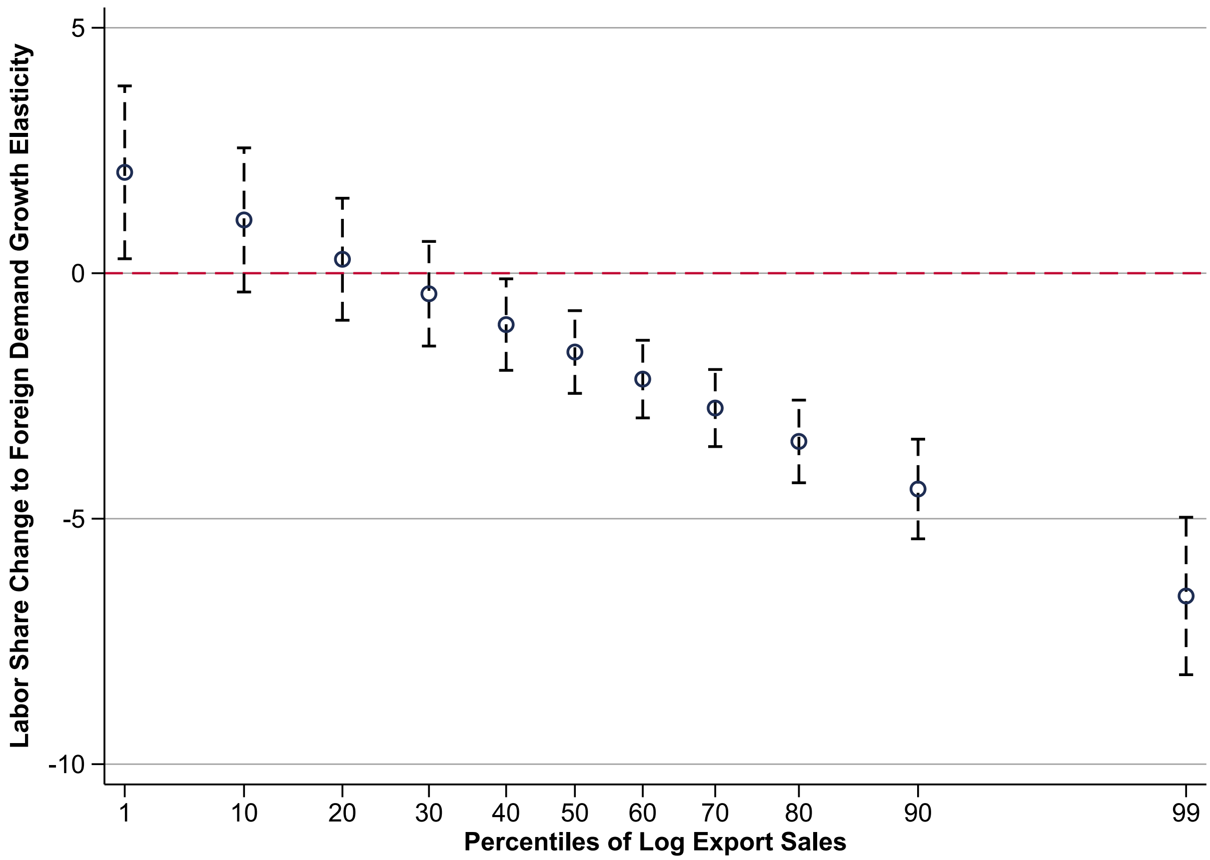
Notes: This Figure reports the elasticity of value-added growth to foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (4). The coefficients used to compute these elasticities are reported in column 1 of Table 3. The percentiles of the initial export sales distribution are reported in Table A2.

Figure 6: Foreign demand shocks and sales growth



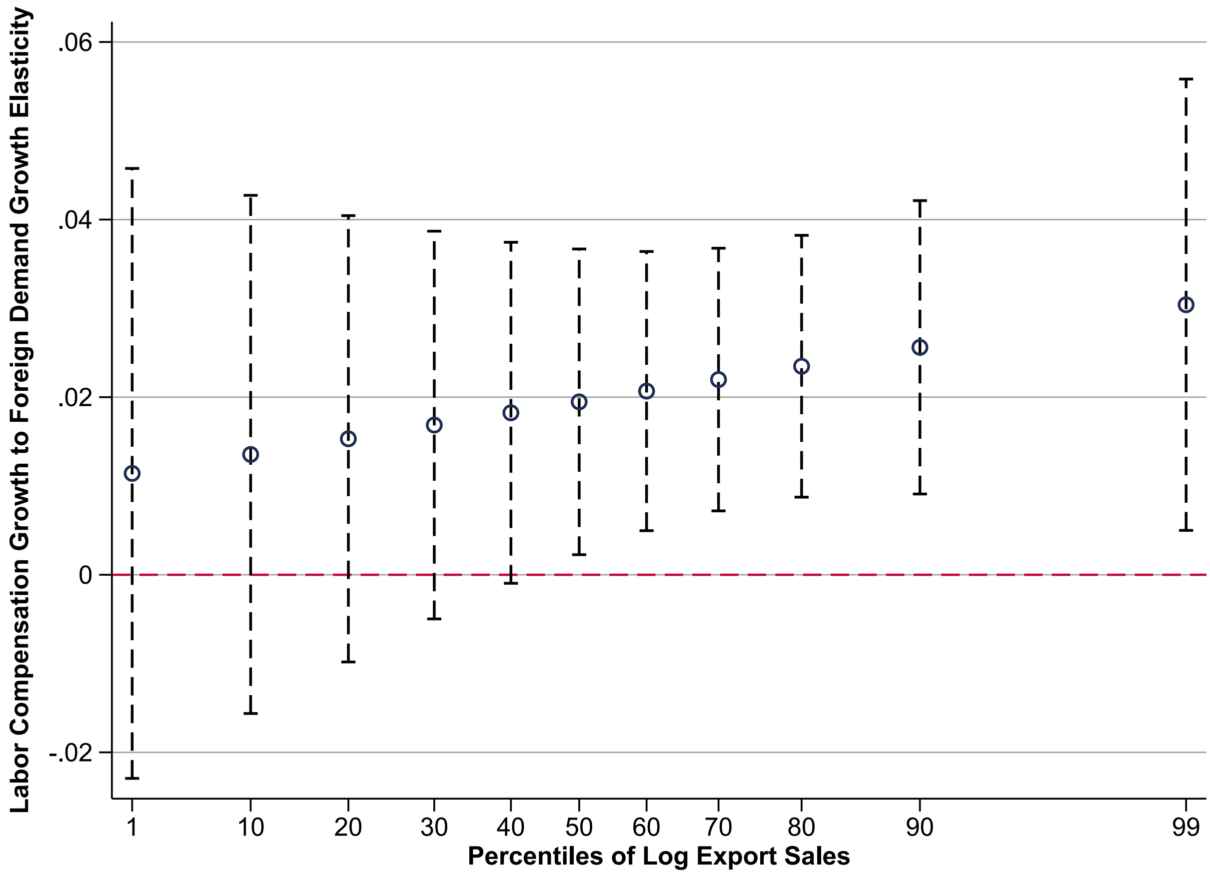
Notes: This Figure reports the elasticity of the change in a firm's total sales to its foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (4) where the dependent variable is the change in a firm's total sales. The percentiles of the initial export sales distribution are reported in Table A2.

Figure 7: Within-Between Exporter Effect



Notes: This Figure reports the elasticity of the change in a firm's labor share to its foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (5). The coefficients used to compute these elasticities are reported in column 2 of Table 3. The percentiles of the initial export sales distribution are reported in Table A2.

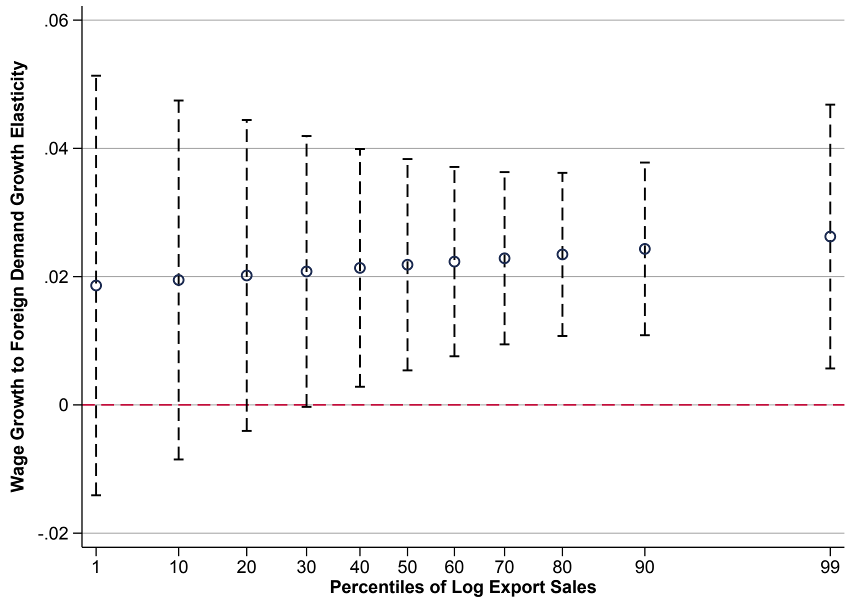
Figure 8: Foreign demand shocks and labor compensation



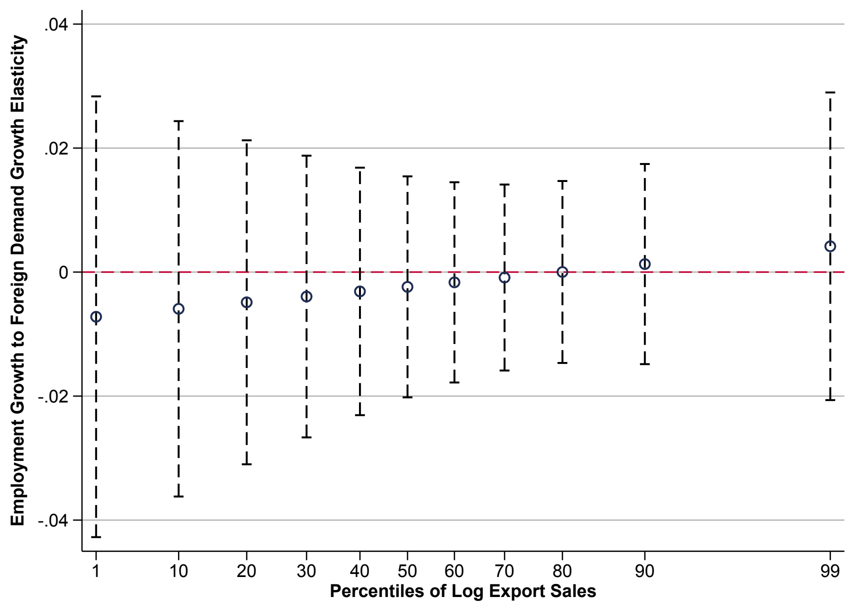
Notes: This Figure reports the elasticity of the change in a firm's labor compensation to its foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (5) where the dependent variable is the change in a firm's total labor compensation. The coefficients used to compute these elasticities are reported in column 3 of Table 3. The percentiles of the initial export sales distribution are reported in Table A2.

Figure 9: Foreign Demand, Wages, and Employment

(a) Wages

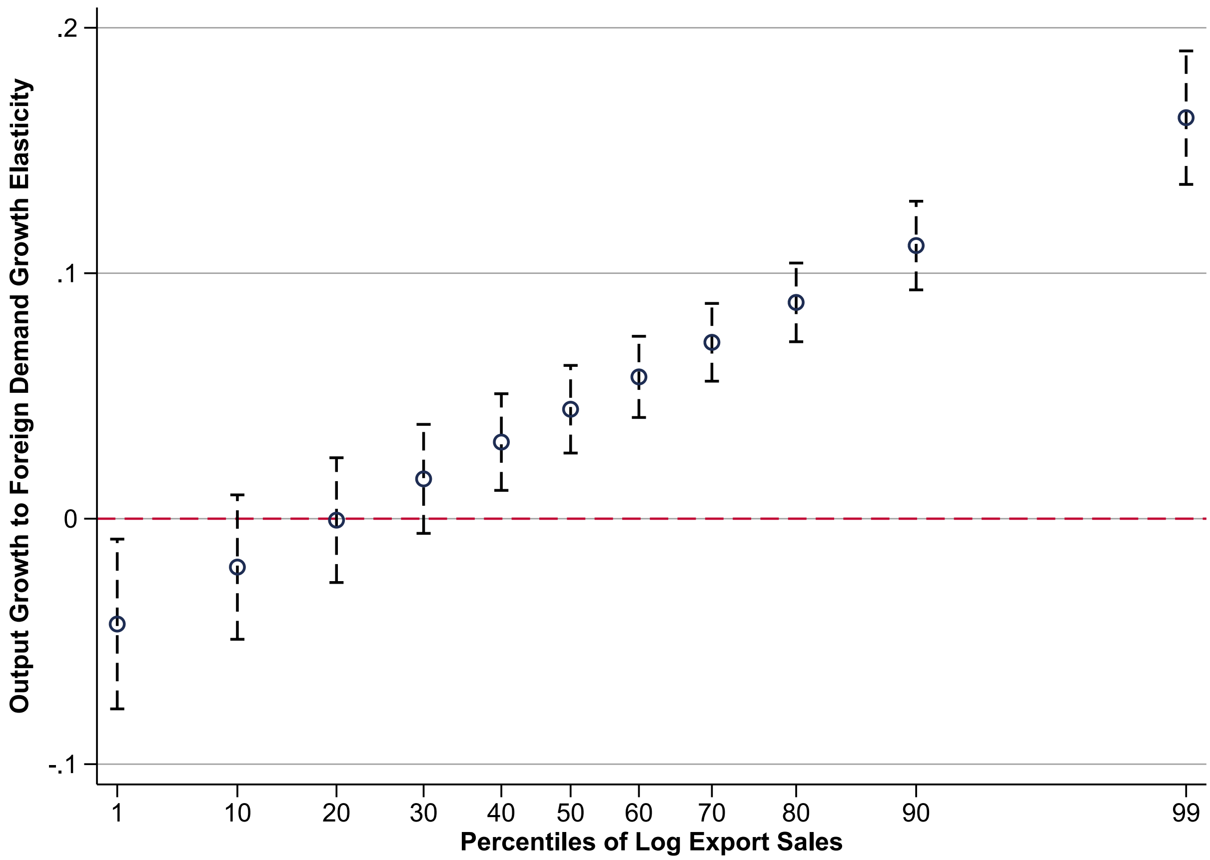


(b) Employment



Notes: This Figure reports the elasticity of the change in a firm's wages and number of workers to its foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (5) but where the dependent variable is the change in average wages for Panel 9a and in the number of employees for Panel 9b. The percentiles of the initial export sales distribution are reported in Table A2.

Figure 10: Foreign demand shocks and output growth



Notes: This Figure reports the elasticity of the change in a firm's output to its foreign demand growth evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equation (4) where the dependent variable is the change in a firm's output. The percentiles of the initial export sales distribution are reported in Table A2.

Appendix

"Labor Share, Foreign Demand and Superstar Exporters"

Ludovic Panon

A Data Appendix

I detail below how I construct my main sample and describe the different variables used in the empirical framework.

A.1 Sample Selection

I only keep observations that report their taxes to the BRN and RSI regime. I drop firm-year observations with missing SIREN or with a SIREN number that only contains zeros or nines. I further keep observations whose first two digits of main activity code is strictly between 15 and 37. That is, I keep manufacturing firms according to NAF Rev. 1. I drop observations with negative, null or missing values for sales, value-added, number of workers. I also get rid of firm-year pairs with negative values for domestic sales, export sales, wages, social contributions. Firm-year observations with a labor share lower than zero or higher than unity are dropped. Finally, I drop values equal to zero for labor compensation and eliminate observations for which the growth rate of sales is lower than the bottom or higher than the top 1% percent of the growth rate distribution within each 2-digit industry. This allows me to remove outliers. I only keep firm-year observations that exported at least once according to the customs data. This sample of exporting firms represents 74% of total value-added of the raw manufacturing sample.

A.2 List of Variables

- **Capital:** The capital measure is measured as the book value of fixed tangible assets. I deflate capital expenditures by sector-level price indices from EUKLEMS. *Source: FICUS and author's calculation*

- **Capital Intensity:** The capital intensity of a firm is the log of the capital-labor ratio of the firm. *Source: Author's calculation*

- **Destination Served:** Total number of destinations (European and Extra-European) served by a firm in a given year. *Source: Customs data and author's calculation*

- **Employment:** Total number of employees working in each firm. *Source: FICUS*

- **Export Intensity:** Export intensity is the ratio of export sales as reported in FICUS to total sales. This is to ensure that the number takes values between 0 and 1. *Source: FICUS*

- **Export Sales:** Export sales reported by the firm in thousands of euros. This variable is available in the fiscal files and is highly correlated (correlation coefficient above 0.9) with total export sales computed from the customs data. Firms are classified as exporters if they sell a positive amount abroad according to the customs. I use export sales from the customs data for the empirical analysis. Figure A4 uses export sales from the balance-sheet data but the pattern is similar when using data from the customs instead. *Source: FICUS and customs data*

- **Imports:** Imports are available from the customs data and are disaggregated at the firm-origin-product-year level. Firm-level imports are obtained by summing a firm's imports across origin countries and product types in a given year. *Source: Author's calculation and customs data*

- **Labor Compensation:** This variable is the sum of two components separately available in the fiscal files: salaries and social benefits that are paid by the employer and that benefit the worker in the form of retirement funds, social security funds etc. *Source: FICUS*

- **Labor Productivity:** Labor productivity is the ratio of real value-added to the number of employees. *Source: FICUS and author's calculation*

- **Labor Share:** I construct the firm-level labor share variable as follows. In accounting, gross value-added is equal to the sum of gross operating surplus, labor compensation (as defined above) and taxes net of subsidies. We therefore do not allocate taxes net of subsidies and build the labor share as the ratio of labor compensation to gross value-added. Observations with values outside the $(0, 1)$ interval are discarded. *Source: FICUS and author's calculation*

- **Labor Share (Equipped):** Equipped labor shares are defined as the ratio of a firm's value-added to its total sales. This definition captures the supply of all primary factors of production (labor and capital). It is defined as $\text{LS}_{it}^{\text{Equipped}} = \frac{\text{VA}_{it}}{\text{Sales}_{it}}$. *Source: Author's calculation*

- **Output:** Output is defined as a firm's total sales divided by the corresponding 2-digit sector price index. *Source: FICUS and author's calculation*

- **NAF Code:** 2-digit sector code according to the NACE Rev. 1 classification. Some sectors are pooled together, depending on the availability of sector-price deflators from EUKLEMS. *Source: FICUS*

- **Products:** Total number of products defined at the 8-digit level (CN8 classification) exported by a firm in a given year. *Source: Customs data and author's calculation*

- **Total Sales:** Total sales (domestic sales plus export sales) reported by the firm in thousands of euros. *Source: FICUS*

- **Value-Added:** This variable is directly available in FICUS and follows the accounting definition according to which it is equal to total sales minus input expenses taking into account changes in inventories. *Source: FICUS*

- **Wages:** Firm-level wages are obtained by dividing labor compensation by the number of employees for each firm-year observation. *Source: FICUS and author's calculation*

B Alternative Decomposition of Labor Share Changes

Defining $\overline{\text{LS}}_t$ and $\overline{\omega}_t$ as the unweighted mean labor share and value-added share, respectively, and $\bar{\Delta} X_{it} = X_{it} - \overline{X}_t$, one can decompose (1) into two components as initially done in Olley and Pakes (1996) for productivity. This yields

$$\text{LS}_t = \overline{\text{LS}}_t + \sum_i \bar{\Delta}\omega_{it} \bar{\Delta}\text{LS}_{it} \tag{12}$$

Subtracting LS_{t-1} from (12), the change in the labor share from one year to the next is therefore given by:

$$\text{LS}_t - \text{LS}_{t-1} = \left(\overline{\text{LS}}_t - \overline{\text{LS}}_{t-1} \right) + \left(\sum_i \bar{\Delta}\omega_{it} \bar{\Delta}\text{LS}_{it} - \sum_i \bar{\Delta}\omega_{it-1} \bar{\Delta}\text{LS}_{it-1} \right) \tag{13}$$

Melitz and Polanec (2015) (MP) further refine this decomposition method in order to account for entry and exit of firms. Writing the change in a variable X between $t-1$ and t by ΔX_t, this decomposition writes:[44]

$$\Delta \text{LS}_t = \Delta \overline{\text{LS}}_t^{\text{S}} + \Delta \left(\sum_i \bar{\Delta}\omega_{it} \bar{\Delta}\text{LS}_{it} \right)^{\text{S}} + \omega_t^{\text{ENT}} \left(\text{LS}_t^{\text{ENT}} - \text{LS}_t^{\text{S}} \right) + \omega_{t-1}^{\text{EXT}} \left(\text{LS}_{t-1}^{\text{S}} - \text{LS}_{t-1}^{\text{EXT}} \right) \tag{14}$$

Between any two years, firms can be survivors (superscript S), new firms or entrants (ENT) or exiters (EXT). ω_t^{ENT} is the overall value-added share of new firms at time t, while $\omega_{t-1}^{\text{EXT}}$ is that of exiters at $t-1$.[45] LS_t^{S}, LS_t^{ENT} and LS_t^{EXT} are each group's aggregate labor share at time t.

The first two terms of (14) are the within and between-firm effects previously mentioned. The third term reflects the contribution of entrants to labor share changes. The entry of firms with a larger labor share than survivors in the same period could increase the aggregate labor share. The effect will be larger, the larger the share of entrants in value-added in the second period. The intuition is similar for the last term of the decomposition accounting for the contribution of exit.

The results of this decomposition are provided in Table A3 for the sample of exporting firms. The within-firm effect given in column 2 is positive over the period. Column 3 shows that reallocations of output towards low-labor share firms drive down the labor share. The between-firm and within-firm components roughly offset each other, as

[44] See Equation (6) in their paper.

[45] Note that $\omega_t^{\text{ENT}} + \omega_t^{\text{S}} = 1$ and that $\omega_{t-1}^{\text{EXT}} + \omega_{t-1}^{\text{S}} = 1$.

was already the case with the FHK decomposition. The contribution of entry and exit is roughly constant over the whole 1995-2007 period.

C Theoretical Appendix

The empirical results highlight the importance of reallocations towards superstar exporters in driving down the manufacturing labor share, through between-firm and within-between firm effects. I now rely on a monopolistic competition model with endogenous competition to rationalize these effects. The two key results of the model is that a market size increase decreases markups and the share of fixed labor cost in value-added, and leads to intensive margin reallocations towards larger firms.

The framework builds on Zhelobodko et al. (2012). The market structure is monopolistic competition and firms are heterogeneous in terms of their productivity. For sake of simplicity and because the focus of the paper is on reallocations across *firms*, firms are assumed to be single-product firms.[46]

C.1 Closed Economy Model

The economy is assumed to be closed. The model in open-economy delivers the same results as the one in closed-economy and is therefore relegated to Appendix C.3. An increase in foreign demand will lead to a reallocation of output towards the most productive exporters with a low labor share.

Consumers side. There are L consumers in the economy who demand x_i units of a differentiated good indexed over the interval $i \in [0, N]$. The wage is the numeraire so that a consumer's income is set equal to one. Preferences are additively separable and each consumer solves:

$$\max_{x_i} \int_0^N u(x_i)di \quad \text{s.t.} \quad \int_0^N p_i x_i di = 1$$

The first-order condition with respect to x_i yields the following inverse demand function:

$$p(x_i; \lambda) = \frac{u'(x_i)}{\lambda} \tag{15}$$

The inverse demand function is positive and downward sloping if and only if $u'(x_i) > 0$ and $u''(x_i) < 0$, which I assume. The marginal utility of income λ is defined from the budget constraint and (15) as:

$$\lambda = \int_0^N u'(x_i)x_i di \tag{16}$$

[46] For a treatment of multi-product firms and evidence of intensive margin reallocations across products leading to aggregate productivity gains in the French context, see Mayer et al. (2020).

From (15), the marginal utility of income acts as a demand shifter. If it increases, the residual demand curve shifts inward so that prices decrease at any given quantity level.

Firms side. Firms produce a distinct differentiated good and there is a set of entrants N_e who can pay a sunk cost of entry expressed in units of labor f_e to produce or not. If they decide to pay that cost, they draw their productivity level φ from a distribution $G(\varphi)$ whose support is given over $[0, \infty]$. When producing, firms have to pay a fixed cost f which gives rise to increasing returns to scale. Each firm i produces a good q_i using labor l_i as a variable input. A firm's production function is $q_i = \varphi l_i$ where φ is its productivity and is firm-specific. The total cost function TC_i of the firm is $\text{TC}_i = \frac{w}{\varphi} q_i + wf$ where f is the fixed cost of production.

The condition for profit maximization such that marginal revenue is equal to marginal cost entails that the price p_i of a good is equal to that firm's markup μ_i times its marginal cost of production:

$$p_i = \mu_i \frac{w}{\varphi}$$

Multiplying both sides of the previous equation by q_i and using the fact that $l_i = L_i - f$, one obtains equation (9) in the text.

From the goods market equilibrium condition, total quantity produced is $q_i = x_i L$. Firms choose the x_i that maximizes their per-consumer operating profits π^c:[47]

$$\pi^c(\varphi, \lambda) := \max_{x_i} \left\{ \left(\frac{u'(x_i)}{\lambda} - \frac{1}{\varphi} \right) x_i \right\} \tag{17}$$

This gives rise to the optimal quantity demanded by individual consumers:

$$x(\varphi, \lambda) := \arg\max_{x_i} \left\{ \left(\frac{u'(x_i)}{\lambda} - \frac{1}{\varphi} \right) x_i \right\} \tag{18}$$

Revenue sales per-consumer are defined as:

$$r(\varphi, \lambda) = p\big(x(\varphi, \lambda), \lambda\big) x(\varphi, \lambda) \tag{19}$$

while total net profits are given by:

$$\Pi(\varphi, \lambda) = \pi^c(\varphi, \lambda) L - f \tag{20}$$

[47] I make use of the inverse demand function given in (15).

Total profits are continuous and from the envelope condition, profits increase in φ so that there exists a unique cutoff productivity level φ^* that solves:

$$\Pi(\varphi^*, \lambda) = 0 \iff \pi^c(\varphi^*, \lambda)L = f \tag{21}$$

Firms that are less productive than the cutoff productivity level ($\varphi < \varphi^*$) will not find it profitable to produce and will exit.

Free entry is assumed to hold and this condition writes:

$$\int_{\varphi^*}^{\infty} \Big[\pi^c(\varphi, \lambda)L - f\Big] dG(\varphi) = f_e \tag{22}$$

Marshall's Second Law of Demand. The two key results of the model hinge on an assumption relating a firm's demand elasticity to its size, assumption commonly referred to as Marshall's Second Law of Demand (MSLD) and stated in the text. MSLD means that the demand elasticity decreases with x_i. Krugman (1979) derives a model of international trade with increasing returns to scale in which he studies the effect of an expansion of the world economy on welfare. His model with no firm heterogeneity predicts that trade leads to pro-competitive effects (lower markups). This is because the demand elasticity is not constant. More specifically, "these results depend [...] on the assumption that the elasticity of demand falls with c(onsumption). This assumption, which might alternatively be stated as an assumption that the elasticity of demand rises when the price of a good is increased, seems plausible. In any case, it seems to be necessary if this model is to yield reasonable results, and I make the assumption without apology" (Krugman, 1979). De Loecker and Warzynski (2012) show that exporting firms that are larger than domestic firms charge higher markups. De Loecker et al. (2016) shows that markups and quantities are positively correlated with one another. Their method of estimating markups does not make any assumption on the market structure in which firms operate and is therefore consistent with larger firms facing a lower demand elasticity in a monopolistic competition context. Mayer et al. (2020) show that the patterns of product-mix reallocations they find in French manufacturing are consistent with larger firms facing a lower demand elasticity.[48]

[48] This positive relationship between firm size and markups can also be obtained when the market structure is oligopolistic. In the Atkeson and Burstein (2008) and Edmond et al. (2015) framework, more productive firms charge higher markups because they produce more and have lower prices which translates into a higher market share for these firms. In their model, under the assumption that the elasticity of substitution within sectors is higher than that across sectors, more productive firms charge higher markups. This is because firms with a high market share mostly compete with firms in other sectors. As the competition is low in their own sector, they face a low demand elasticity close to the elasticity of substitution across sectors.

C.2 Firm-Level Results

MSLD leads to the following claim:

Claim 1. *Marshall's Second Law of Demand implies that marginal revenues decrease with x_i.*

Proof. The first-order condition of the firm's optimization problem given in (17) gives:

$$\frac{\partial p(x_i)}{\partial x_i} x_i + p(x_i) = \frac{1}{\varphi} \tag{23}$$

Defining the inverse demand elasticity as $\sigma_p(x_i) := -\frac{\partial p(x_i)/\partial x_i}{p(x_i)/x_i}$, equation (23) rewrites:

$$p(x_i)\Big(1 - \sigma_p(x_i)\Big) = \frac{1}{\varphi}$$

This condition states the well-known condition that profit-maximizing firms produce up to the point where their marginal revenue $\mathrm{MR}(x_i)$ is equal to their marginal cost MC. Given the support of $G(\varphi)$, the marginal cost is always non-negative which entails that a firm's marginal revenue must be non-negative. This condition is met if the inverse demand elasticity is such that $\sigma_p(x_i) \leq 1$. A second important condition for profit maximization is that the second-order condition on (17) is met. This condition reads:

$$\frac{\partial p(x_i)}{\partial x_i}\Big(1 - \sigma_p(x_i)\Big) - p(x_i)\frac{\partial \sigma_p(x_i)}{\partial x_i} < 0 \tag{24}$$

This condition is equivalent to saying that a firm's marginal revenue decreases in x_i. Using the definition of the inverse demand elasticity and rearranging (24), this yields:

$$-p(x_i)\left(\big(1 - \sigma_p(x_i)\big) + \frac{\partial \sigma_p(x_i)}{\partial x_i}\frac{x_i}{\sigma_p(x_i)}\right) < 0 \tag{25}$$

Given Assumption 1 that the inverse demand elasticity increases in x_i, or conversely, that the demand elasticity decreases in x_i and that $\sigma_p(x_i) \leq 1$, this yields a downward sloping marginal revenue curve:

$$\frac{\partial \mathrm{MR}(x_i)}{\partial x_i} < 0 \tag{26}$$

Therefore, MSLD implies that marginal revenues decrease with x_i. Alternatively, defining the convexity of the demand function as $\rho := -\frac{\partial^2 p(x_i)/\partial x_i^2}{\partial p(x_i)/\partial x_i} x_i$ and rearranging the second-

This result holds regardless of whether firms compete à la Cournot or à la Bertrand.

order condition yields $\rho < 2$. This condition will be used to prove that markups decrease when the market size increases.

CES preferences are very often used in international trade. Their inverse demand function is given by:[49]

$$p(x_i) = \kappa^{\frac{1}{\sigma}} x_i^{-\frac{1}{\sigma}}$$

Deriving $\sigma_p(x_i)$ given the CES inverse demand function leads to $\sigma_p(x_i) = \frac{1}{\sigma}$. This trivially entails that $\frac{\partial \sigma_p(x_i)}{\partial x_i} = 0$ so that MSLD does not hold for this class of functions. As shown in the next subsection, this implies that CES preferences are not consistent with a positive relationship between firm size and markups. More details on functions consistent with MSLD can be found in Mrázová and Neary (2017). □

Claim 2. *More productive firms charge higher markups and have a lower share of fixed labor cost in value-added.*

Proof. Using the first-order condition (23) and the definition of the inverse demand elasticity, the inverse demand function writes:

$$p(x_i) = \frac{1}{1 - \sigma_p(x_i)} \frac{1}{\varphi}$$

Equation (26) implies that for any two firms 1 and 2 such that $\varphi_2 < \varphi_1$:

$$\frac{\mathrm{MR}(x_1)}{\mathrm{MR}(x_2)} = \frac{\varphi_2}{\varphi_1} < 1$$

which implies that $x_1 > x_2$. Therefore, more efficient firms produce more. Since $p(x_i) = \frac{u'(x_i)}{\lambda}$ is decreasing in x_i, more productive firms also sell at lower prices.

A firm's markup is defined as $\mu(x_i) := \frac{1}{1-\sigma_p(x_i)}$. This implies that:

$$\mathrm{sgn}\left\{\frac{\partial \mu(x_i)}{\partial x_i}\right\} = \mathrm{sgn}\left\{\frac{\partial \sigma_p(x_i)}{\partial x_i}\right\} > 0 \tag{27}$$

Given that more productive firms also produce more,[50] these firms face a lower demand elasticity which allows them to charge higher markups. It follows from equation (9) that

[49]This equation is obtained by maximizing the utility function $U = \left(\int_0^1 c_i^{\frac{\sigma-1}{\sigma}} di\right)^{\frac{\sigma}{\sigma-1}}$ subject to the budget constraint $\int_0^1 p_i c_i di = 1$ with $\kappa := \frac{1}{\int_0^1 p_i^{1-\sigma} di} = \frac{1}{P^{1-\sigma}}$ where P is the price index.

[50]Figure A11 shows that more productive firms are larger. Indeed, there exists a strong positive relationship between (labor) productivity and firm size, as measured by total sales.

larger firms have a lower labor share.

□

Proposition 1. (Reminded) *A market size increase decreases firm-level markups and decreases the share of fixed labor cost in value-added.*

Proof. I start by showing that markups decrease with an increase in market size. Totally differentiating the first-order condition (23) and using the fact that $x = x(\varphi, \lambda)$ at the optimum yields:

$$2\frac{\partial p}{\partial x}dx + \frac{\partial p}{\partial \lambda}d\lambda + x\frac{\partial^2 p}{\partial x^2}dx + x\frac{\partial^2 p}{\partial x \partial \lambda}d\lambda = 0 \tag{28}$$

Taking partial derivatives of the inverse demand function $p(x;\lambda) = \lambda^{-1}u'(x)$ to compute the relevant terms and rearranging yields:

$$\frac{dx}{dL}\frac{L}{x} = \frac{\sigma_p(\varphi,\lambda)^{-1} - 1}{\rho - 2}\frac{d\lambda}{dL}\frac{L}{\lambda} \tag{29}$$

I now proceed to evaluating how competition λ changes with market size. First, total operating profits are given by:

$$\Pi(\varphi,\lambda,L) := \max_{q_i}\left\{\Big(\frac{u'(\frac{q_i}{L})}{\lambda} - \frac{1}{\varphi}\Big)q_i\right\} \tag{30}$$

Applying the envelope theorem and differentiating profits with respect to λ:

$$\frac{\partial \Pi}{\partial \lambda}\frac{\lambda}{\Pi} = -\frac{u'(x)q}{\lambda^2}\frac{\lambda}{\Pi} = -p\frac{q}{\Pi} = -\frac{pq}{[p - \frac{1}{\varphi}]q} = -\frac{p}{[p - \frac{1}{\varphi}]}$$

Making use of (23):

$$\frac{\partial \Pi}{\partial \lambda}\frac{\lambda}{\Pi} = -\frac{1}{\sigma_p(\varphi,\lambda)} < 0 \tag{31}$$

by the definition of the inverse demand elasticity and the fact that $x = x(\varphi,\lambda)$ at the optimum.

Finally, deriving $\frac{d\lambda}{dL}\frac{L}{\lambda}$ entails making use of the free-entry condition. Let us denote the value of a firm by $V(\lambda, L)$. The expected value of a firm must equal the sunk cost from the free entry condition:

$$V(\lambda, L) := \int_{\varphi^*}^{\infty}\Big[\pi^c(\varphi,\lambda)L - f\Big]dG(\varphi) = f_e$$

Totally differentiating this equation and solving for $\frac{d\lambda}{dL}$ yields:

$$\frac{d\lambda}{dL} = -\frac{\partial V(\lambda, L)/\partial L}{\partial V(\lambda, L)/\partial \lambda} \tag{32}$$

Applying Leibniz's rule to the free-entry condition and using the cut-off condition in (21) I obtain:

$$\frac{\partial V(\lambda, L)}{\partial L} = \int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi) - \left[\pi^c(\varphi^*, \lambda)L - f\right] \frac{d\varphi^*}{dL} = \int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)$$

Applying Leibniz's rule to the denominator of (32) and (21):

$$\frac{\partial V(\lambda, L)}{\partial \lambda} = \int_{\varphi^*}^{\infty} L \frac{\partial \pi^c(\varphi, \lambda)}{\partial \lambda} dG(\varphi) - \left[\pi^c(\varphi^*, \lambda)L - f\right] \frac{d\varphi^*}{d\lambda} = \int_{\varphi^*}^{\infty} L \frac{\partial \pi^c(\varphi, \lambda)}{\partial \lambda} dG(\varphi)$$

Substituting the previous two equations in (32):

$$\frac{d\lambda}{dL} = -\frac{\int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)}{\int_{\varphi^*}^{\infty} L \frac{\partial \pi^c(\varphi, \lambda)}{\partial \lambda} dG(\varphi)}$$

Rewriting this equation to obtain an elasticity:

$$\frac{d\lambda}{dL}\frac{L}{\lambda} = -\frac{\int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)}{\int_{\varphi^*}^{\infty} \lambda \frac{\partial \pi^c(\varphi, \lambda)}{\partial \lambda} dG(\varphi)} = -\frac{\int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)}{\int_{\varphi^*}^{\infty} \frac{\partial \pi^c(\varphi, \lambda)}{\partial \lambda} \frac{\lambda}{\pi^c(\varphi, \lambda)} \pi^c(\varphi, \lambda) dG(\varphi)}$$

Using (31) and substituting finally yields:

$$\frac{d\lambda}{dL}\frac{L}{\lambda} = \frac{\int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)}{\int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) \frac{1}{\sigma_p(\varphi, \lambda)} dG(\varphi)} \tag{33}$$

Defining $\pi^c(\lambda) := \int_{\varphi^*}^{\infty} \pi^c(\varphi, \lambda) dG(\varphi)$ and using this expressing into equation (29):

$$\frac{dx}{dL}\frac{L}{x} = -\frac{\sigma_p(\varphi, \lambda)^{-1} - 1}{2 - \rho} \frac{1}{\int_{\varphi^*}^{\infty} \frac{\pi^c(\varphi, \lambda)}{\pi^c(\lambda)} \sigma_p(\varphi, \lambda)^{-1} dG(\varphi)} \tag{34}$$

where $[\sigma_p(\varphi, \lambda)]^{-1}$ is the demand elasticity and the denominator of the second ratio on the right-hand side is a profit-weighted average demand elasticity. Given that competition increases with market size and that the first and second-order conditions for profit maximization are met, this entails that the quantity consumed of each variety falls. This implies that the demand elasticity increases via MSLD and thus that markups decrease. This increases the labor share of firms everything else equal via equation (9).

To show that the share of fixed labor cost in value-added decreases with market size, we must show that output rises and prices decrease less than the output rise for the average firm.[51] Output is given by $q = xL$. Totally differentiating the quantity produced and using equation (34) I obtain:

$$\frac{dq}{dL}\frac{L}{q} = 1 - \frac{\sigma_p(\varphi,\lambda)^{-1} - 1}{2-\rho} \frac{1}{\int_{\varphi^*}^{\infty} \frac{\pi^c(\varphi,\lambda)}{\pi^c(\lambda)} \sigma_p(\varphi,\lambda)^{-1} dG(\varphi)} \tag{35}$$

From the inverse demand function, we obtain the change in prices by totally differentiating the equation:

$$\frac{dp}{dL}\frac{L}{p} = \frac{\partial p}{\partial x}\frac{x}{p} \times \frac{dx}{dL}\frac{L}{x} + \frac{\partial p}{\partial \lambda}\frac{\lambda}{p} \times \frac{d\lambda}{dL}\frac{L}{\lambda}$$

Using the terms derived above, I obtain:

$$\frac{dp}{dL}\frac{L}{p} = \frac{\sigma_p(\varphi,\lambda)^{-1} - 1}{\sigma_p(\varphi,\lambda)^{-1}(2-\rho)} - \frac{1}{\int_{\varphi^*}^{\infty} \frac{\pi^c(\varphi,\lambda)}{\pi^c(\lambda)} \sigma_p(\varphi,\lambda)^{-1} dG(\varphi)} \tag{36}$$

The previous equation and equation (35) entail that the value-added pq of the average firm rises with market size This decreases the share of fixed labor cost in value-added in equation (9).

□

Proposition 2. (Reminded) *A market size increase reallocates profits towards larger firms and decreases their labor share relatively more through the fixed cost channel.*

Proof. Differentiating total operating profits with respect to L we get (10) in the text. Differentiating (30) with respect to L and applying the envelope theorem yields:

$$\frac{\partial \Pi}{\partial L}\frac{L}{\Pi} = -\frac{u''}{\lambda}\frac{q^2}{L^2}\frac{L}{\Pi} = -p'\frac{q^2}{L}\frac{1}{[p(x,\lambda) - \frac{1}{\varphi}]q}$$

Using the first-order condition (23) we get:

$$\frac{\partial \Pi}{\partial L}\frac{L}{\Pi} = 1 \tag{37}$$

[51] The average firm is such that its demand elasticity is equal to the profit-weighted average demand elasticity defined above.

Combining (37), (31) and (33) in (10) gives:

$$\frac{d\Pi}{dL}\frac{L}{\Pi} = 1 - \frac{1}{\sigma_p(\varphi,\lambda)} \frac{\int_{\varphi^*}^{\infty} \pi^c(\varphi,\lambda)dG(\varphi)}{\int_{\varphi^*}^{\infty} \pi^c(\varphi,\lambda)\frac{1}{\sigma_p(\varphi,\lambda)}dG(\varphi)} \tag{38}$$

Using $\pi^c(\lambda) := \int_{\varphi^*}^{\infty} \pi^c(\varphi,\lambda)dG(\varphi)$, (38) writes as (11) in the text.

Profits rise with market size for firms that face a lower than average demand elasticity. Given MSLD, firms that are more productive than average experience an increase in their profits following an increase in market size.

It is important to note that when preferences are CES, the inverse demand elasticity is constant and given by $\sigma_p(x_i) = \frac{1}{\sigma}$ with σ the elasticity of substitution across varieties. Both effects turn out to be equal to one and cancel each other out:

$$\sigma_p(x_i) = \frac{1}{\sigma} \Longrightarrow \frac{d\Pi}{dL}\frac{L}{\Pi} = 0$$

Intensive margin reallocations are incompatible with CES preferences when the market structure is monopolistic. □

C.3 Open-Economy Framework

This section sketches the open economy framework.[52] There are two countries that populate the world economy. The domestic economy D trades with a foreign economy denoted F. This foreign economy is characterized by a market size level L_F and a competition level λ_F. Preferences are the same on both markets which implies that per-consumer profits, quantity levels and revenues depend on both the competition level and the firm's productivity level, as in the closed economy case. As in Demidova and Rodríguez-Clare (2013), I assume that country F is a small economy so that changes in market size abroad do not impact the number of domestic entrants, the competition level λ_D nor the domestic productivity cutoff in D.

Exporting is costly. There is a fixed cost of serving the foreign market for domestic firms. This fixed cost of exporting writes f_F and is paid in units of domestic labor. Exporters also incur an additional iceberg trade cost so that exporting one unit of a good requires sending $\tau > 1$ units. This leads to the following total export profits for any

[52] The exposition of the open-economy framework is explained in more detail in Mayer et al. (2020).

domestic firm:[53]

$$\Pi_X^D(\varphi, \lambda_F) = \pi^c\big(\frac{\varphi}{\tau}, \lambda_F\big)L_F - f_F$$

As before, total export profits $\Pi_X^D(\varphi, \lambda_F)$ are an increasing function of its first argument, so that firms below a certain export productivity threshold φ_X^* might decide not to export. This is given by the following condition:

$$\Pi\big(\varphi_X^*, \lambda_F\big) = 0 \Longleftrightarrow \pi^c\big(\frac{\varphi_X^*}{\tau}, \lambda\big)L_F = f_F$$

The condition for producing on the domestic market for domestic firms is still given by (21).

Firms in F draw their productivity level from a distribution $G_F(\varphi)$ and a there is pool of entrants N_e^F. Firms in F will self-select into producing domestically and exporting to D if they are productive enough with the relevant cutoff productivity levels given by the usual zero-profit conditions.

What matters for the purpose of the analysis is that an increase in L_F generates intensive margin reallocation effects towards larger exporters from country D. A change in market size abroad leads to an increase in the level of competition λ_F because profit opportunities are higher. Some firms enter because of the free-entry condition, which increases the degree of competition in F.[54] Because larger domestic exporters face a lower demand elasticity, the market size effect still dominates for these firms, leading to higher export sales and allowing them to grow relative to smaller exporters. This decreases their labor share relatively more via a larger decrease in their share of fixed labor cost in value-added.

[53]Because the iceberg trade cost enters the marginal cost of production, an increase in τ will decrease the first argument of the per-consumer profit function and therefore lead to lower profits.

[54]Free-entry is inherently a long-run process. The increase in competition would also occur in the short-run, otherwise the consumers' budget constraint would be violated.

D Appendix Tables

Table A1: Summary Statistics Main Sample

	Mean (1)	Standard Deviation (2)	Median (3)
Labor share (%)	70.3	17.4	73
ln Export sales	5.1	2.8	5.1
ln Value-added	7	1.6	7
ln Labor compensation	6.6	1.6	6.6
Export-intensity (%)	18.9	24.1	8.2
# Products exported	9	18	3
# Destinations served	9	13.4	3
Δ Labor share	0.28	11.3	0.02
Δ ln Export sales	0.07	1.1	0.05
$\tilde{\Delta}$ Shock	0.009	0.06	0.0004
Δ ln Value-added	0.04	0.3	0.03
Δ ln Labor compensation	0.05	0.3	0.03
Δ Export-intensity	0.5	11.9	0
Δ ln # Products exported	0.02	0.6	0
Δ ln # Destinations served	0.03	0.5	0
# Firms		71,095	
# Observations		355,746	
# Survivors (1995-2007)		5,634	

Notes: The sample consists of exporting firms. The period considered is 1995-2007. Export sales, labor compensation and value-added are in thousands of euros. Labor share is the ratio of labor compensation to value-added and takes values between 0 and 100.

Table A2: Percentiles of Initial Export Sales Distribution

	P1	P10	P20	P30	P40	P50	P60	P70	P80	P90	P99
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ln Export sales$_{t_0}$	-0.27	1.01	2.07	3	3.84	4.58	5.31	6.09	6.99	8.28	11.17

Notes: The sample consists of exporting firms. The period considered is 1995-2007. Export sales are in thousands of euros. The initial year is defined as the first year in which exporters appear in the sample.

Table A3: MP Decomposition of Labor Share Changes

	Total Change (1)	Within (2)	Between (3)	Entry-Exit (4)
1995-1996	1.39	1.19	−0.12	0.32
1996-1997	−0.85	−0.32	−1.02	0.48
1997-1998	−0.4	−0.17	−0.12	−0.11
1998-1999	−0.65	0.33	−1	0.01
1999-2000	−1.38	−0.41	−0.42	−0.55
2000-2001	1.06	0.83	0.99	−0.76
2001-2002	0.55	1.17	−0.96	0.35
2002-2003	−0.02	1.3	−0.75	−0.56
2003-2004	−1.5	−0.21	−0.8	−0.49
2004-2005	0.56	0.74	−0.51	0.33
2005-2006	0.03	−0.29	0.54	−0.23
2006-2007	0.86	−0.7	0.76	0.8
1995-2007	−0.35	3.47	−3.42	−0.4

Notes: This decomposition is done for the sample of manufacturing exporters using equation (14). Column 1 is the change in the aggregate labor share. Column 2 is the within-firm margin. Column 3 is the between-firm margin. Column 4 is the sum of the entry and exit components and refers to entry and exit into exporting.

Table A4: Internationalization and Labor Share across Groups

	Above Median	Below Median	Difference
ln Export sales	70.2	72.6	−2.3***
	(0.08)	(0.09)	(0.12)
Export intensity	70.7	72.1	−1.4***
	(0.08)	(0.09)	(0.12)
ln # Products exported	70.8	71.9	−1.1***
	(0.08)	(0.09)	(0.12)
ln # Destinations served	70.4	72.4	−2.1***
	(0.08)	(0.09)	(0.12)
	Top 25%	Bottom 75%	Difference
ln Export sales	68.4	72.4	−4***
	(0.12)	(0.07)	(0.14)
Export intensity	69.4	72.1	−2.7***
	(0.12)	(0.07)	(0.14)
ln # Products exported	70	71.9	−1.8***
	(0.12)	(0.07)	(0.14)
ln # Destinations served	69.3	72.1	−2.8***
	(0.12)	(0.07)	(0.14)
	Top 10%	Bottom 90%	Difference
ln Export sales	65.5	72.1	−6.6***
	(0.2)	(0.06)	(0.2)
Export intensity	67.3	71.9	−4.6***
	(0.21)	(0.06)	(0.2)
ln # Products exported	69	71.7	−2.6***
	(0.18)	(0.07)	(0.2)
ln # Destinations served	68.1	71.8	−3.7***
	(0.18)	(0.07)	(0.2)
	Top 1%	Bottom 99%	Difference
ln Export sales	59	71.5	−12.5***
	(0.67)	(0.06)	(0.62)
Export intensity	64.4	71.5	−7.1***
	(0.79)	(0.06)	(0.62)
ln # Products exported	66.1	71.5	−5.3***
	(0.6)	(0.06)	(0.61)
ln # Destinations served	63.9	71.5	−7.6***
	(0.6)	(0.06)	(0.61)

Notes: This table shows that firms above each given threshold have a lower labor share than firms below it. It displays the mean labor share of firms with a labor share above and below several thresholds. The last column tests the difference in these two means.

Table A5: Internationalization and Labor Shares: Regression Analysis

Dependent variable	Labor Share					
	(1)	(2)	(3)	(4)	(5)	(6)
ln Export sales	−0.6***				−0.71***	−0.2***
	(0.03)				(0.03)	(0.03)
Export intensity		−3.7***			−2.4***	−1.89***
		(0.3)			(0.28)	(0.27)
ln # Products exported			−0.3***		0.26***	0.52***
			(0.05)		(0.06)	(0.06)
ln # Destinations served				−0.36***	0.47***	1.1***
				(0.06)	(0.07)	(0.07)
ln Total sales						−8.8***
						(0.14)
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
# Observations	337,073	337,073	336,952	336,952	336,952	336,952

Notes: Standard errors clustered at the firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for firm-specific trends through the inclusion of firm fixed effects..

Table A6: Internationalization and Equipped Labor Shares

Variable Internationalization Measure	Above Median (1)	Equipped Labor Share Top 25 % (2)	Top 10 % (3)	Top 1 % (4)
ln Export sales	35	32.6	30.7	27.3
Export intensity	36.8	35.8	35.2	35.6
ln # Products exported	35.1	32.5	30.5	29
ln # Destinations served	34.7	33.6	33.1	32.6
# Firms	35,531	17,766	7,107	711

Notes: The equipped labor share is defined as the ratio of value-added to total sales and captures all primary factors of production. The results are obtained by taking the mean of each variable (equipped labor share, export sales, export intensity, number of products exported and number of countries served) over time for each firm and calculating the equipped labor share of firms that belong to the top 50, 25, 10 and 1% of each distribution.

Table A7: Robustness: Alternative Internationalization Measures

Dependent variable	$\Delta \ln \text{VA}_{it}$		$\Delta\text{Labor Share}_{it}$	
Internationalization Measure (Superstar_{it_0})	ln # Products Exported	ln # Destinations Served	ln # Products Exported	ln # Destinations Served
	(1)	(2)	(3)	(4)
$\tilde{\Delta}\text{Shock}_{it}$	0.028*	0.008	−1.269*	−0.406
	(0.017)	(0.016)	(0.736)	(0.686)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.031***	0.046***	−1.127***	−1.738***
	(0.0086)	(0.008)	(0.398)	(0.362)
Superstar_{it_0}	−0.014***	−0.015***	−0.026*	−0.040***
	(0.0005)	(0.0005)	(0.015)	(0.014)
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes
$\text{Export Intensity}_{it_0}$ × Year Dummies	Yes	Yes	Yes	Yes
# Observations	281,889	281,889	281,889	281,889

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies.. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share.. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is a measure of the degree of internationalization of the firm. Columns 1 and 3 use the log of the total number of products exported by the firm and columns 2 and 4 use the log of the total number of destinations served by the firm as the main measure of internationalization. All these measures are defined in the first year in which the firm appears in the sample.

Table A8: Robustness: Dropping Key Industries

Dependent variable	$\Delta \ln \text{VA}_{it}$	ΔLabor Share$_{it}$	$\Delta \ln$ Labor Compensation$_{it}$
	(1)	(2)	(3)
$\tilde{\Delta}\text{Shock}_{it}$	−0.038	2.89***	0.020
	(0.027)	(1.06)	(0.022)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.019***	−1.02***	0.0003
	(0.004)	(0.155)	(0.003)
Superstar_{it_0}	−0.007***	0.001	−0.007***
	(0.0003)	(0.008)	(0.0003)
Two-digit Sector × Year FE	Yes	Yes	Yes
Export Intensity$_{it_0}$ × Year Dummies	Yes	Yes	Yes
# Observations	235,947	235,947	235,947

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. Naf Rev. 1 industries 23-25 and 34-35 are dropped from the sample. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, ΔLabor Share$_{it}$ is the change in a firm's labor share, $\Delta \ln$ Labor Compensation$_{it}$ is the change in a firm's labor compensation.. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is the log of the export sales of the firm in the first year in which it appears in the sample.

Table A9: Robustness: Alternative Lag Structure

Dependent variable	$\Delta \ln \text{VA}_{it}$ (1)	$\Delta \ln \text{Labor Share}_{it}$ (2)	$\Delta \ln \text{VA}_{it}$ (3)	$\Delta \ln \text{Labor Share}_{it}$ (4)
$\tilde{\Delta}\text{Shock}_{it}$	−0.07**	2.44**	−0.05	2.6**
	(0.027)	(1.11)	(0.03)	(1.32)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it-1}$	0.02***	−0.82***		
	(0.004)	(0.17)		
Superstar_{it-1}	−0.007***	0.05***		
	(0.0002)	(0.007)		
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it-2}$			0.02***	−0.85***
			(0.004)	(0.19)
Superstar_{it-2}			−0.005***	0.05***
			(0.0002)	(0.008)
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes
Export Intensity_{it_0} × Year Dummies	Yes	Yes	Yes	Yes
# Observations	281,992	281,992	230,000	230,000

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar is the log of the export sales of the firm. This measure is lagged one year in columns 1 and 2 and lagged two years in columns 3 and 4.

Table A10: Robustness: Sample of Survivors

Dependent variable	$\Delta \ln \text{VA}_{it}$	$\Delta\text{Labor Share}_{it}$	$\Delta \ln \text{Labor Compensation}_{it}$
	(1)	(2)	(3)
$\tilde{\Delta}\text{Shock}_{it}$	−0.011	0.053	−0.006
	(0.058)	(2.46)	(0.038)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.02***	−0.76**	0.006
	(0.007)	(0.31)	(0.005)
Superstar_{it_0}	−0.003***	0.024**	−0.003***
	(0.0004)	(0.01)	(0.0003)
Two-digit Sector × Year FE	Yes	Yes	Yes
Export Intensity_{it_0} × Year Dummies	Yes	Yes	Yes
# Observations	67,119	67,119	67,119

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 on the sample of surviving exporters over the whole period using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share, $\Delta \ln \text{Labor Compensation}_{it}$ is the change in a firm's labor compensation. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is the log of the export sales of the firm in the first year in which it appears in the sample.

Table A11: Robustness: Trim Top and Bottom 10% of Employment and Investment Distribution

Dependent variable	$\Delta \ln \text{VA}_{it}$	ΔLabor Share$_{it}$	$\Delta \ln$ Labor Compensation$_{it}$
	(1)	(2)	(3)
$\tilde{\Delta}\text{Shock}_{it}$	−0.007	0.94	0.01
	(0.027)	(1.27)	(0.018)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.013***	−0.61***	0.003
	(0.004)	(0.20)	(0.002)
Superstar_{it_0}	−0.004***	0.02**	−0.004***
	(0.0002)	(0.009)	(0.0002)
Two-digit Sector × Year FE	Yes	Yes	Yes
Export Intensity$_{it_0}$ × Year Dummies	Yes	Yes	Yes
# Observations	189,938	189,938	189,938

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. Firm-year observations in the top and bottom 10% of both the employment and investment distributions have been discarded in order to keep a sample of firms that do not experience drastic changes due to outsourcing. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, ΔLabor Share$_{it}$ is the change in a firm's labor share, $\Delta \ln$ Labor Compensation$_{it}$ is the change in a firm's labor compensation. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is the log of the export sales of the firm in the first year in which it appears in the sample.

Table A12: Robustness: Superstars within Industries

Dependent variable	$\Delta \ln \text{VA}_{it}$			$\Delta \text{Labor Share}_{it}$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\tilde{\Delta}\text{Shock}_{it}$	−0.025	−0.019	0.041**	1.844*	1.507	−0.587
	(0.024)	(0.024)	(0.018)	(1.032)	(1.018)	(0.736)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it_0}$	0.015***	0.012***		−0.75***	−0.609***	
	(0.004)	(0.003)		(0.158)	(0.154)	
$\tilde{\Delta}\text{Shock}_{it} \times \mathbb{1}_{\text{Superstar}_{it_0}}$			0.046**			−3.371***
			(0.022)			(0.912)
Superstar_{it_0}	−0.007***	−0.007***		0.007	0.005	
	(0.0002)	(0.0002)		(0.007)	(0.007)	
$\mathbb{1}_{\text{Superstar}_{it_0}}$			−0.026***			−0.019
			(0.001)			(0.032)
Two-digit Sector × Year FE	Yes	No	Yes	Yes	No	Yes
Four-digit Industry × Year FE	No	Yes	No	No	Yes	No
Export Intensity_{it_0} × Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
# Observations	281,914	281,914	281,978	281,914	281,914	281,978

Notes: Standard errors clustered at the firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns except columns 2 and 5 include 2-digit industry by year fixed effects. Columns 2 and 5 include 4-digit industry by year fixed effects. All columns control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar_{it_0} is the log of the export sales of the firm in the first year in which it appears in the sample. $\mathbb{1}_{\text{Superstar}_{it_0}}$ is a dummy variable that takes the value one if a firm's export sales defined at time t_0 is higher than its 4-digit industry median at time t_0.

Table A13: Robustness: Excluding Firms Reporting Affiliates

Dependent variable	$\Delta \ln \text{VA}_{it}$ (1)	$\Delta \ln \text{Labor Share}_{it}$ (2)	$\Delta \ln \text{VA}_{it}$ (3)	$\Delta \ln \text{Labor Share}_{it}$ (4)
$\tilde{\Delta}\text{Shock}_{it}$	−0.025	1.807*	−0.030	2.060**
	(0.024)	(1.028)	(0.023)	(0.983)
$\tilde{\Delta}\text{Shock}_{it} \times \text{Superstar}_{it0}$	0.015***	−0.7513***	0.016***	−0.800***
	(0.0035)	(0.158)	(0.003)	(0.147)
Superstar_{it0}	−0.008***	0.007	−0.007***	0.007
	(0.0002)	(0.007)	(0.0002)	(0.007)
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes
Export Intensity_{it_0} × Year Dummies	Yes	Yes	Yes	Yes
Exclude firm-year observations	Yes	Yes	No	No
Exclude firm observations	No	No	Yes	Yes
# Observations	279,274	279,274	278,728	278,728

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, $\Delta\text{Labor Share}_{it}$ is the change in a firm's labor share. $\tilde{\Delta}\text{Shock}_{it}$ is the change in a firm's foreign demand. Superstar is the log of the export sales of the firm in the first year in which it appears in the sample. Columns 1-2 exclude firm-year observations for which a foreign affiliate is reported in the LIFI database. Columns 3-4 exclude firms that report having at least one foreign affiliate in any year.

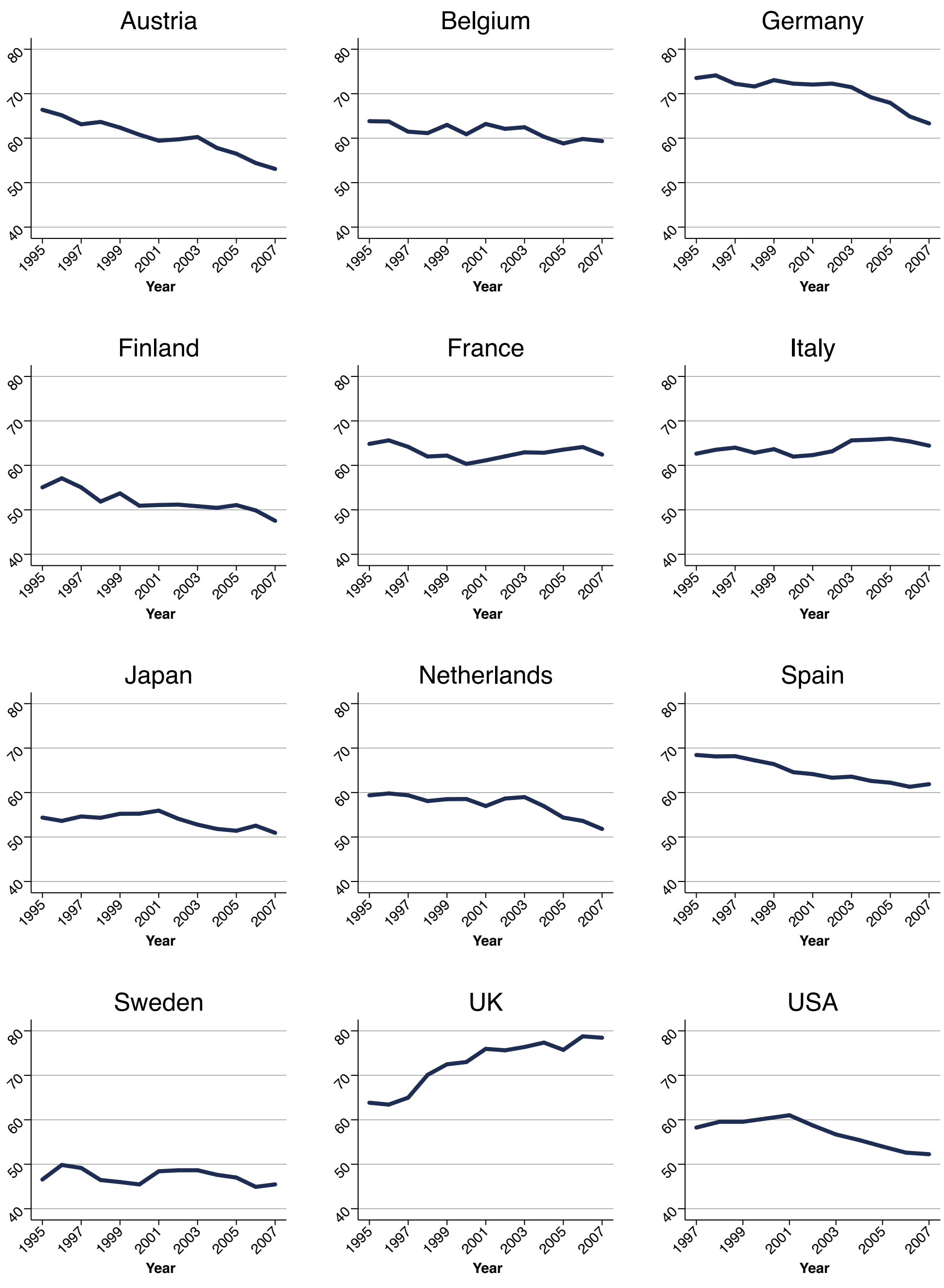
Table A14: Sensitivity Analysis

Sensitivity Test	No Superstar Exporters		No Heterogeneous Effect	
Dependent variable	$\Delta \ln \text{VA}_{it}$ (1)	ΔLabor Share$_{it}$ (2)	$\Delta \ln \text{VA}_{it}$ (3)	ΔLabor Share$_{it}$ (4)
$\tilde{\Delta}$Shock$_{it}$	−0.025	2.5748***	0.0711***	−2.8841***
	(0.025)	(0.99)	(0.01)	(0.4766)
$\tilde{\Delta}$Shock$_{it}$ × Superstar$_{it_0}$	0.0152***	−0.8786***		
	(0.0037)	(0.1557)		
Superstar$_{it_0}$	−0.0075***	0.0048		
	(0.0002)	(0.0072)		
Two-digit Sector × Year FE	Yes	Yes	Yes	Yes
Export Intensity$_{it_0}$ × Year Dummies	Yes	Yes	Yes	Yes
# Observations	277,098	277,098	281,978	281,978

Notes: Standard errors clustered at the firm level. *** p<0.01, ** p<0.05, * p<0.1. The coefficients from the regression models are estimated over 1995-2007 using OLS. All columns include industry by year fixed effects and control for export intensity (defined at t_0) interacted with year dummies. $\Delta \ln \text{VA}_{it}$ is the change in a firm's value-added, ΔLabor Share$_{it}$ is the change in a firm's labor share. $\tilde{\Delta}$Shock$_{it}$ is the change in a firm's foreign demand. Superstar$_{it_0}$ is the log of the export sales of the firm in the first year in which it appears in the sample. Firms in the top 1% of the initial log export sales distribution have been discarded from the sample in columns 1 and 2. In columns 3 and 4, the interaction terms and the Superstar$_{it_0}$ variables are dropped when estimating equations (4) and (5).

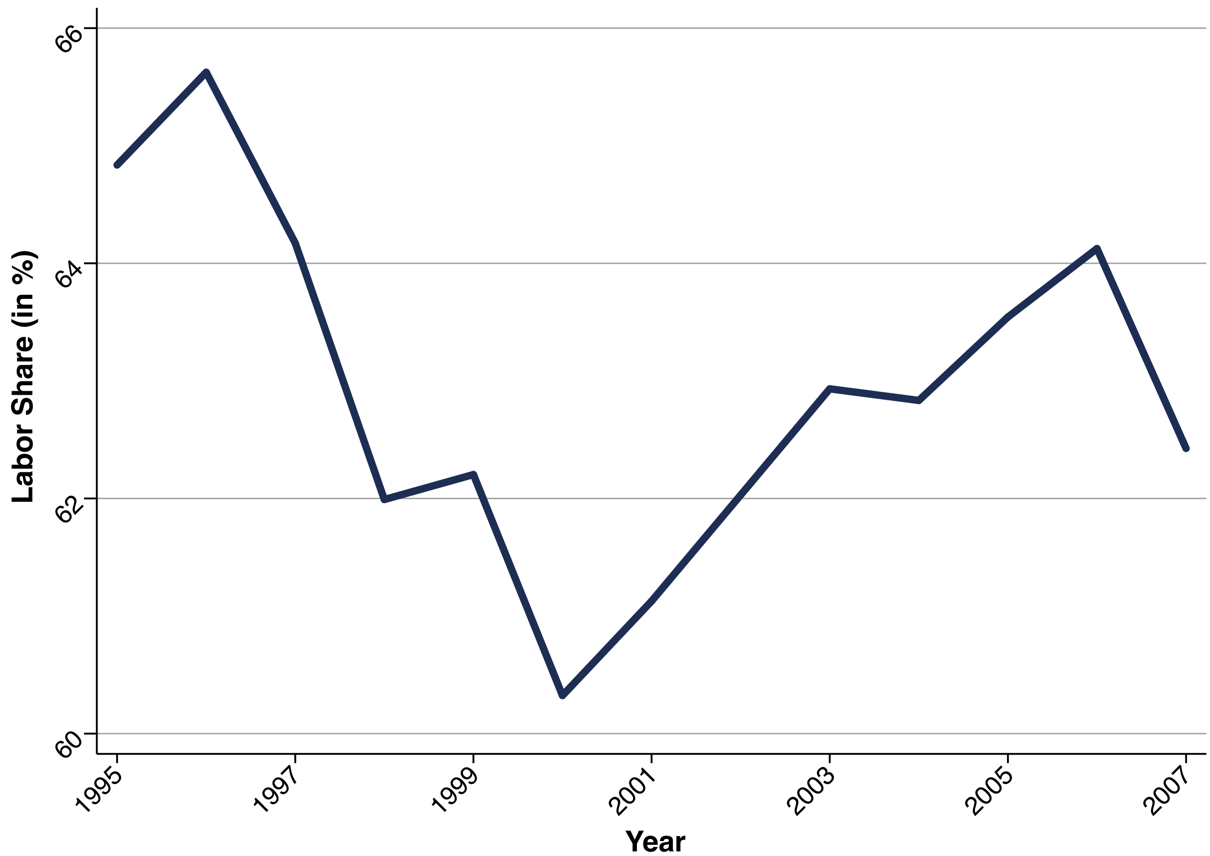
E Appendix Figures

Figure A1: Manufacturing Labor Share by Country (1995-2007)



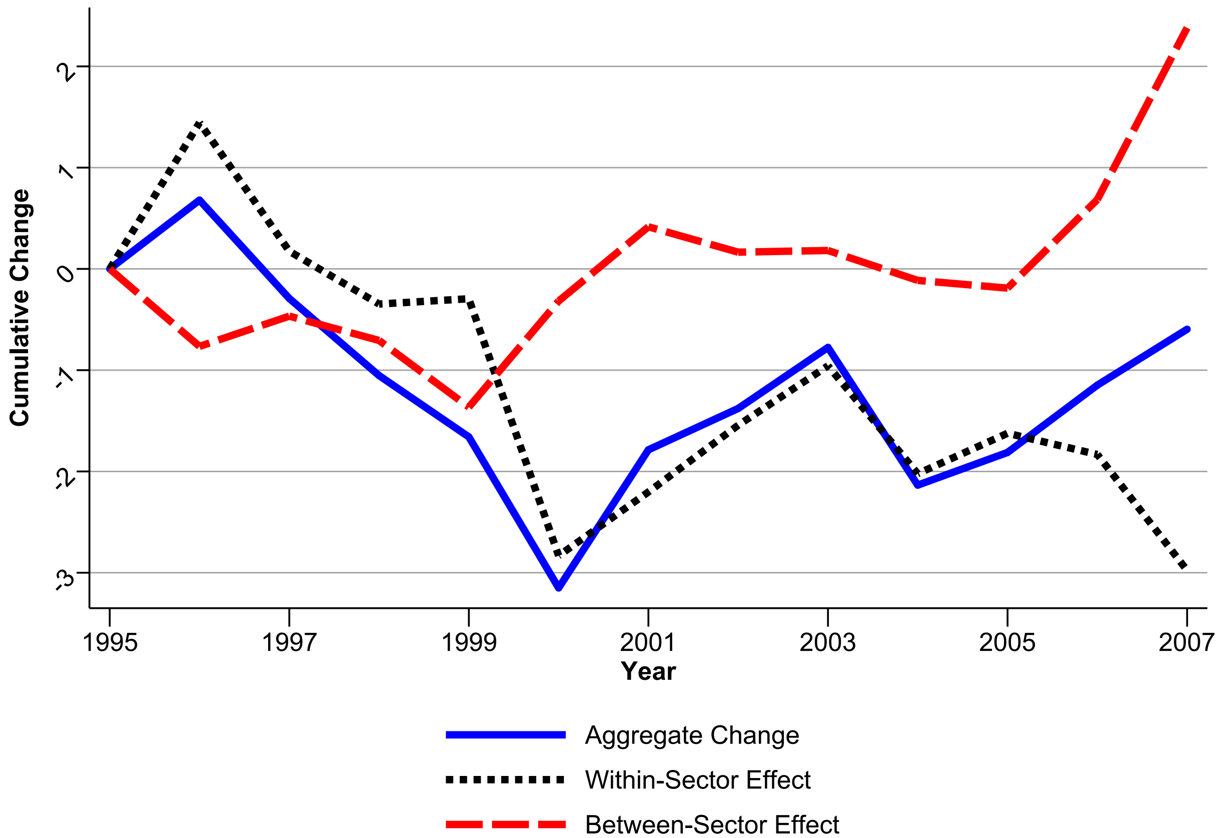
Notes: This figure plots the aggregate labor share in manufacturing over 1995-2007 for different OECD countries. The labor share is defined as the ratio of total labor compensation to value-added. The data come from EU KLEMS Revision 2019 (Adarov et al., 2019).

Figure A2: Manufacturing Labor Share (Macro Data)



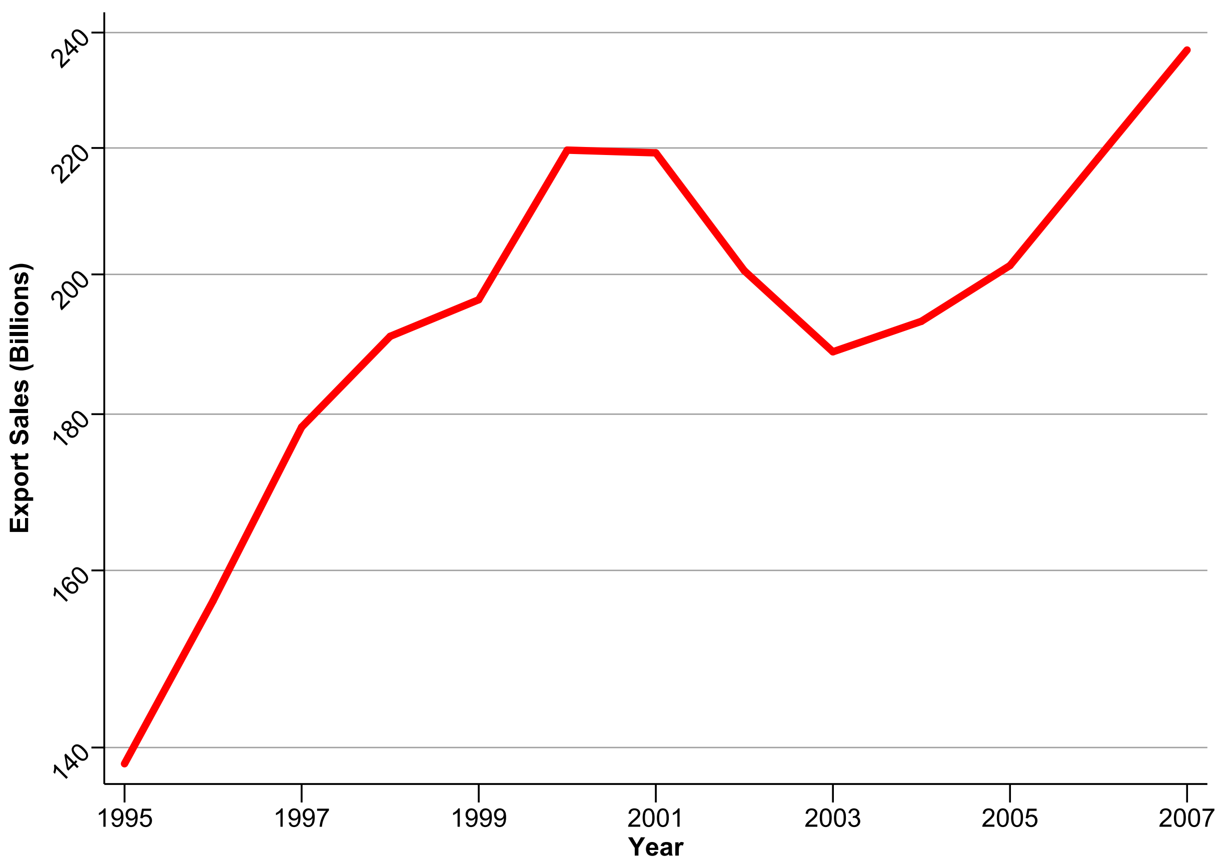
Notes: This figure plots the French aggregate labor share in manufacturing over 1995-2007. The labor share is defined as the ratio of total labor compensation to value-added. The data come from EU KLEMS Revision 2019 (Adarov et al., 2019).

Figure A3: Within/Between-Sector Decomposition of Manufacturing Changes in the Labor Share



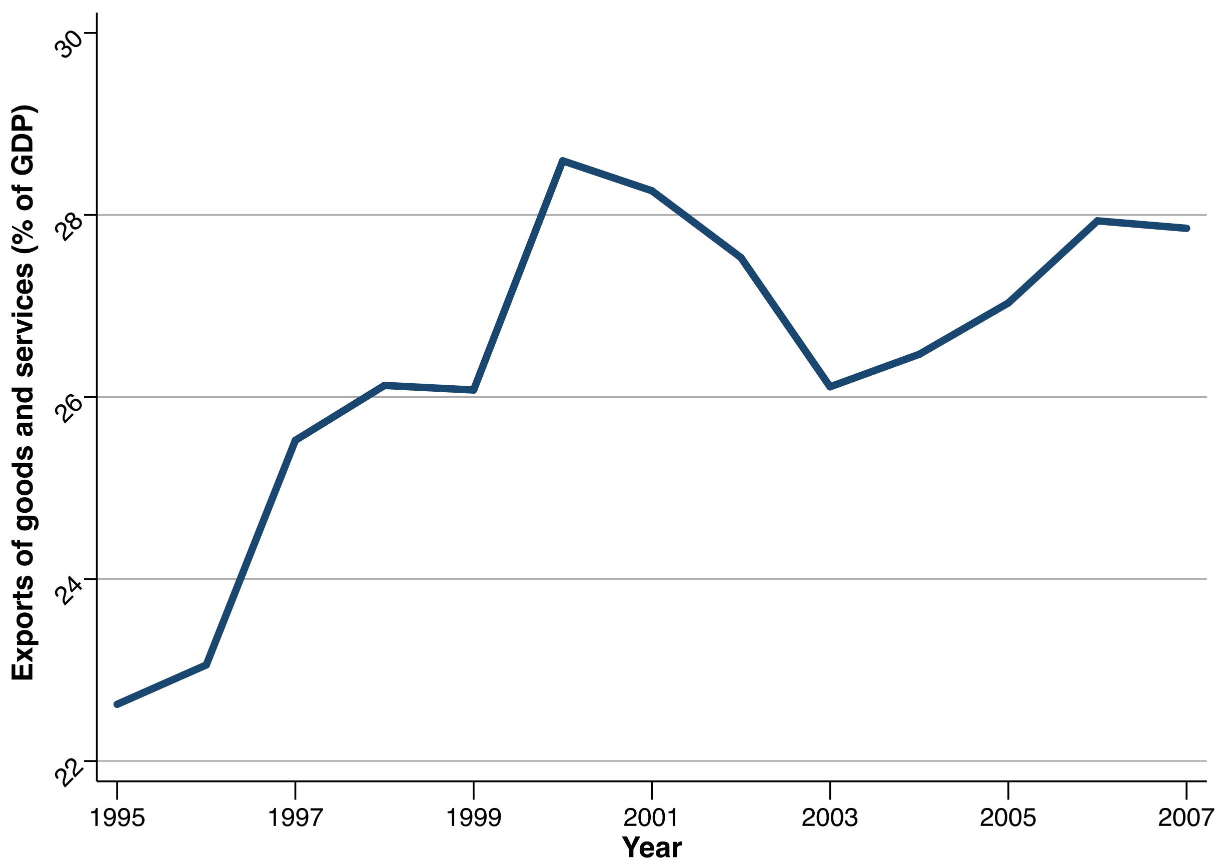
Notes: This figure plots the decomposition of the French aggregate labor share in manufacturing over 1995-2007 using the decomposition method described in equation (2). The sample consists of all firms, namely exporters and non-exporters. The blue solid line shows the overall change in the labor share. The black dotted line shows the within-sector effect, while the red dashed line shows the between-sector component. The data source is FICUS.

Figure A4: Evolution of Exports



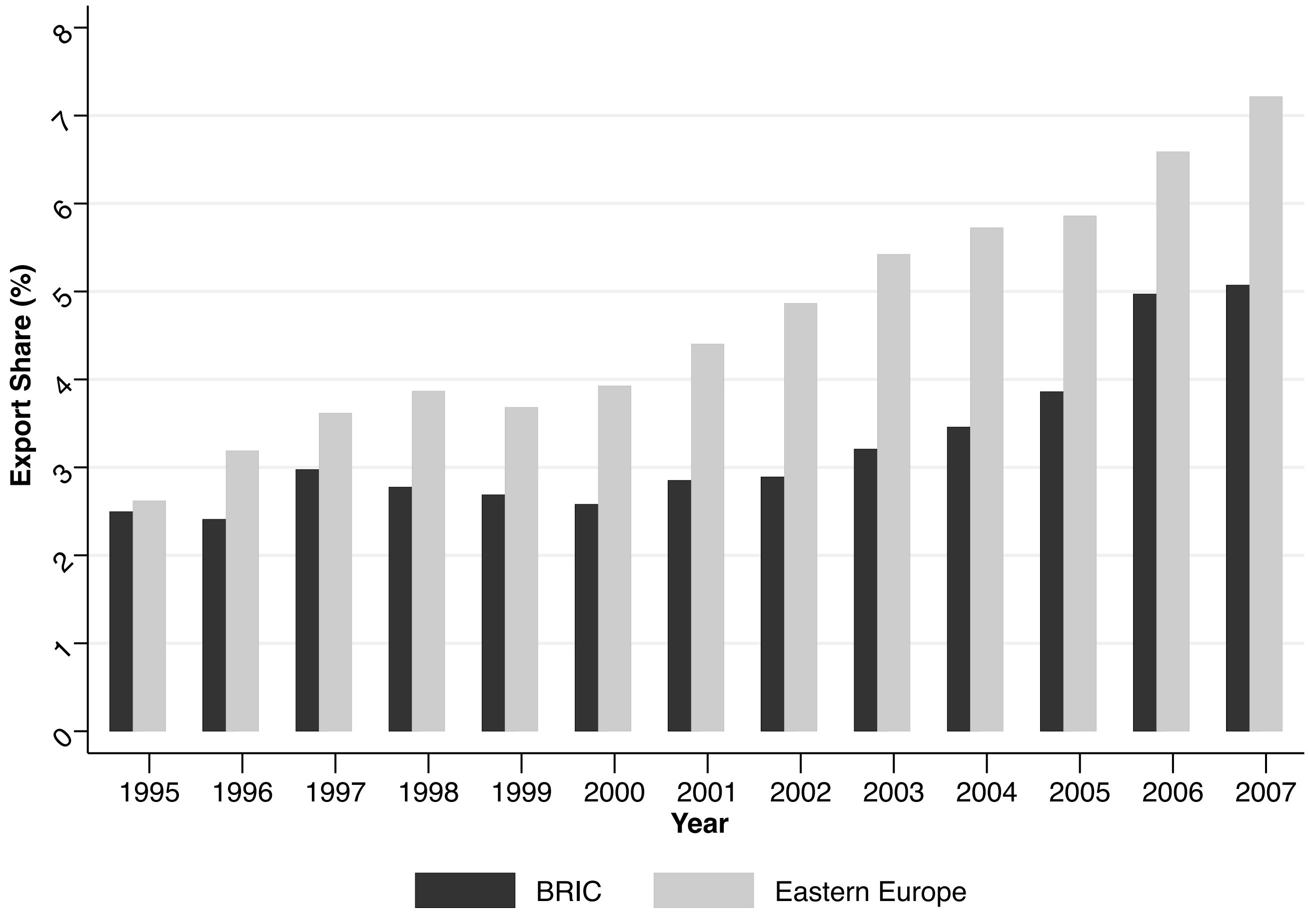
Notes: This figure plots the evolution of exports of manufacturing goods over 1995-2007. The data source is FICUS.

Figure A5: French Exports to GDP Ratio



Notes: This figure plots the evolution of exports of goods and services in percentage of GDP over 1995-2007. The data come from the World Bank national accounts data.

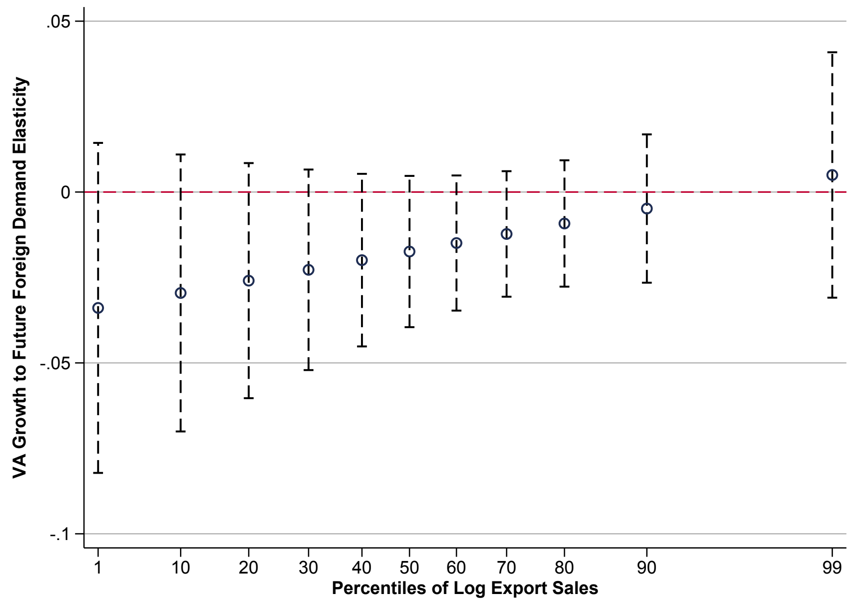
Figure A6: Export Share of BRIC and Eastern European Countries in Total French Exports



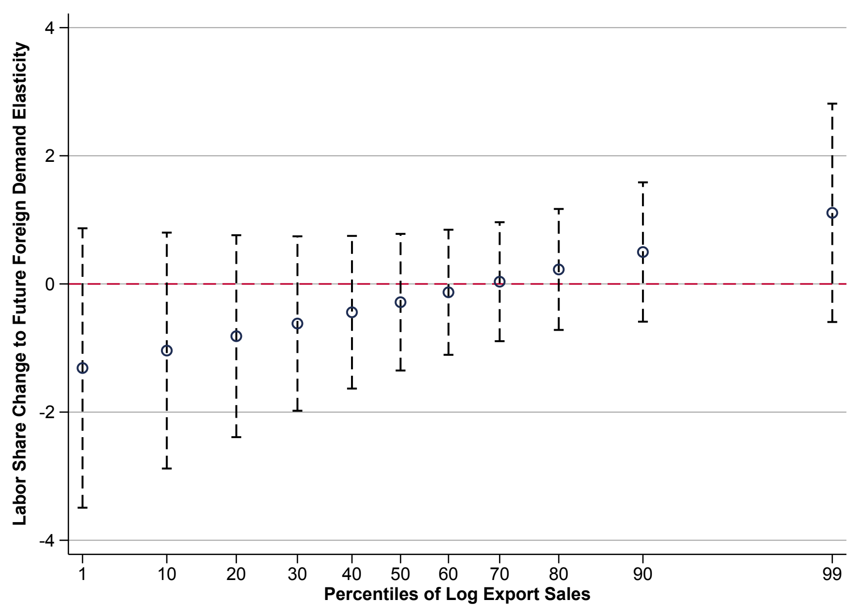
Notes: The data source is BACI. BRIC stands for Brazil, Russia, China, India. Eastern European countries are defined as in Dauth et al. (2014) and include: Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia, Russia, Belarus, Estonia, Latvia, Lithuania, Moldova, Ukraine, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

Figure A7: No pre-trends

(a) Between-Exporter Effect

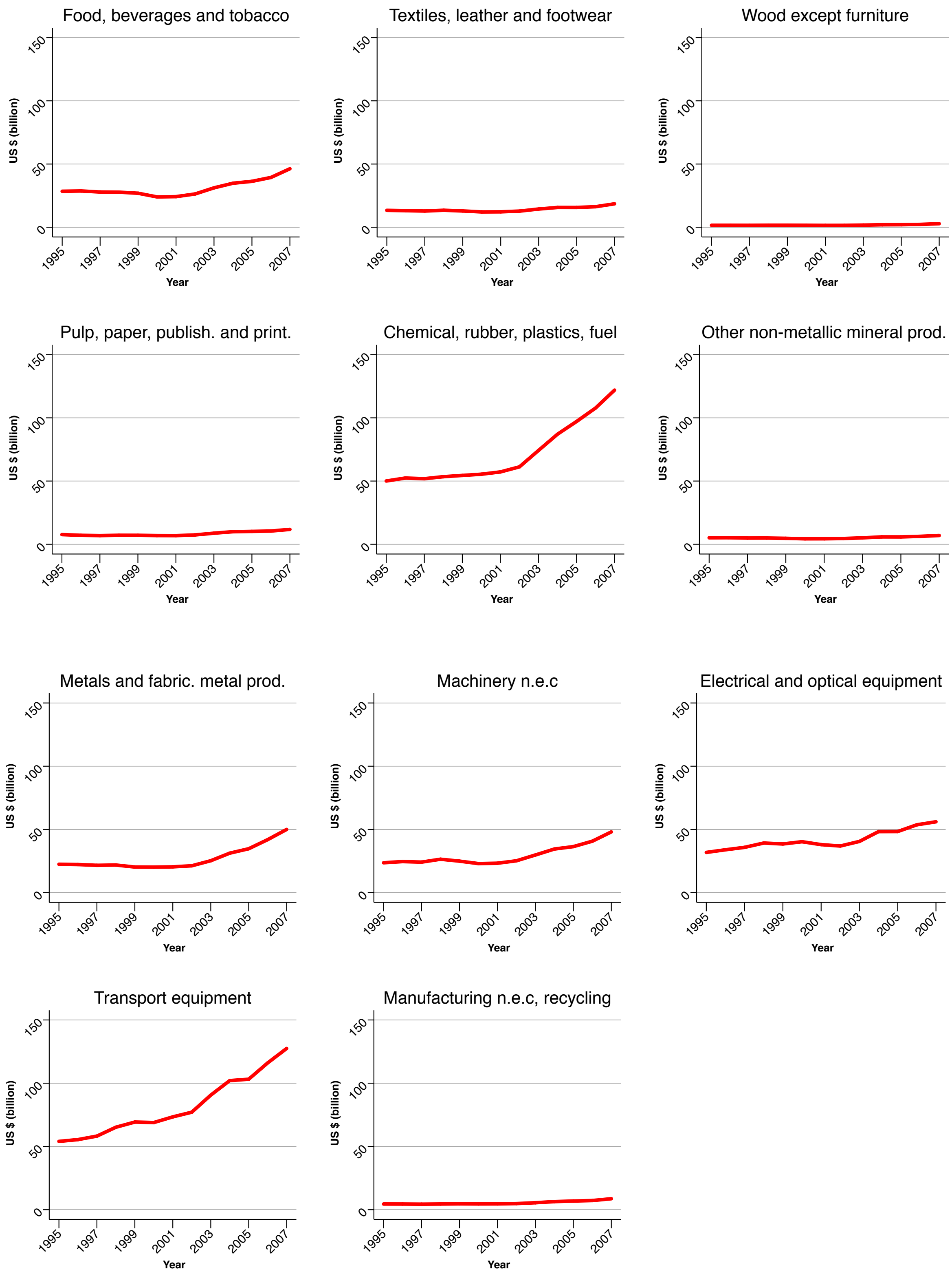


(b) Within-Between Exporter Effect



Notes: This Figure reports the elasticity of the change in a firm's value-added growth and labor share change to its future foreign demand shock evaluated at different percentiles of the (log) export sales distribution (at time t_0). It is obtained by estimating equations (4) and (5).

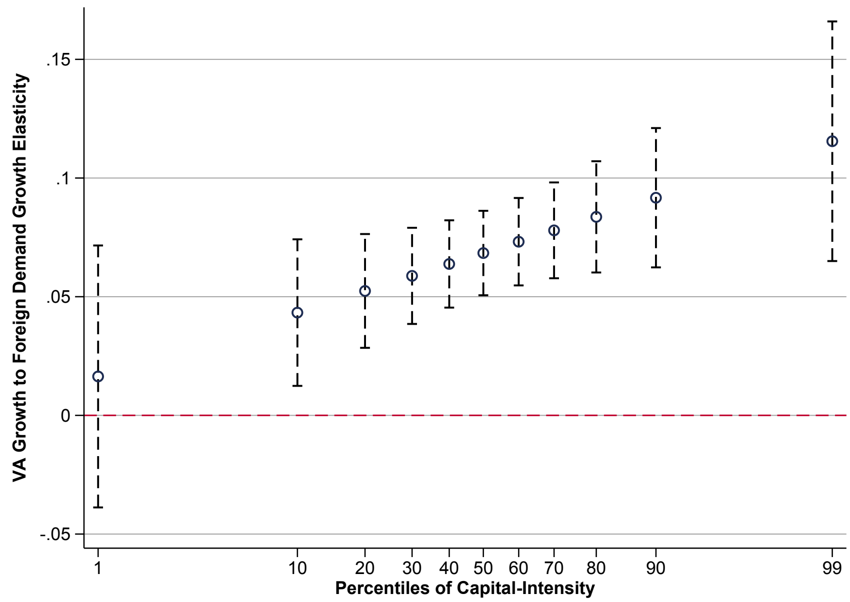
Figure A8: French Exports to the Rest of the World by Industry



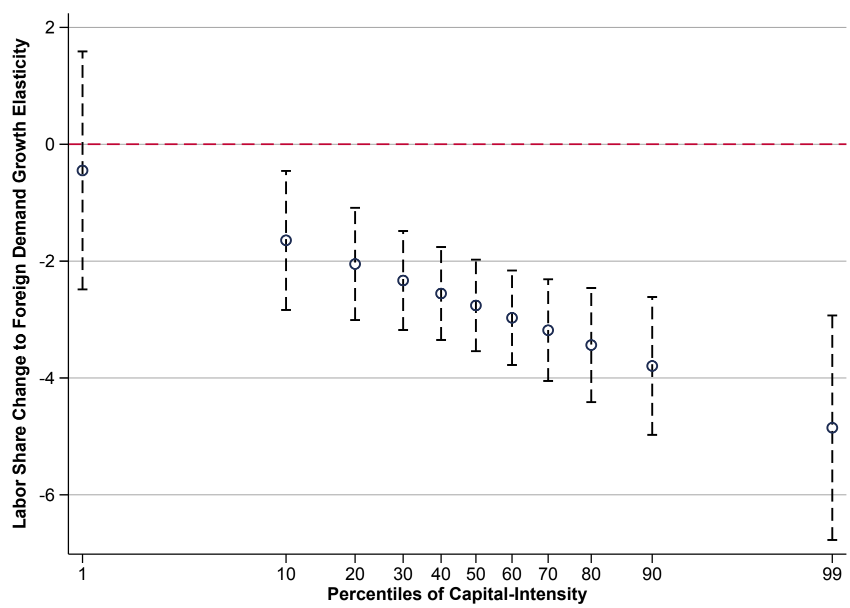
Notes: This figure plots the evolution of exports of manufacturing goods of each industry over 1995-2007. The data come from BACI.

Figure A9: Foreign Demand, Value-Added, and Labor Share (Heterogeneity Measure: Capital Intensity)

(a) Between-Exporter Effect



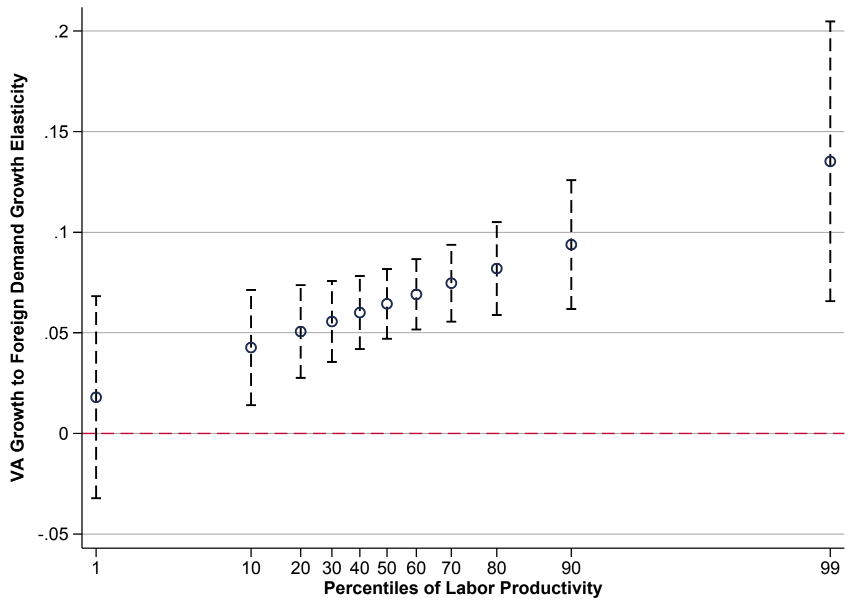
(b) Within-Between Exporter Effect



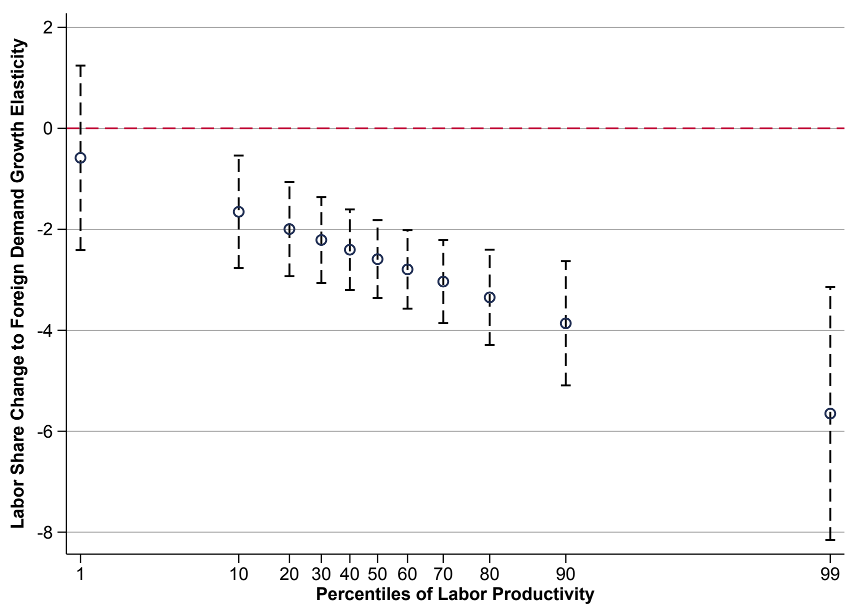
Notes: This Figure reports the elasticity of the change in a firm's value-added growth and labor share change to its foreign demand growth evaluated at different percentiles of the capital intensity distribution (at time t_0). It is obtained by estimating equations (4) and (5).

Figure A10: Foreign Demand, Value-Added, and Labor Share (Heterogeneity Measure: Labor Productivty)

(a) Between-Exporter Effect

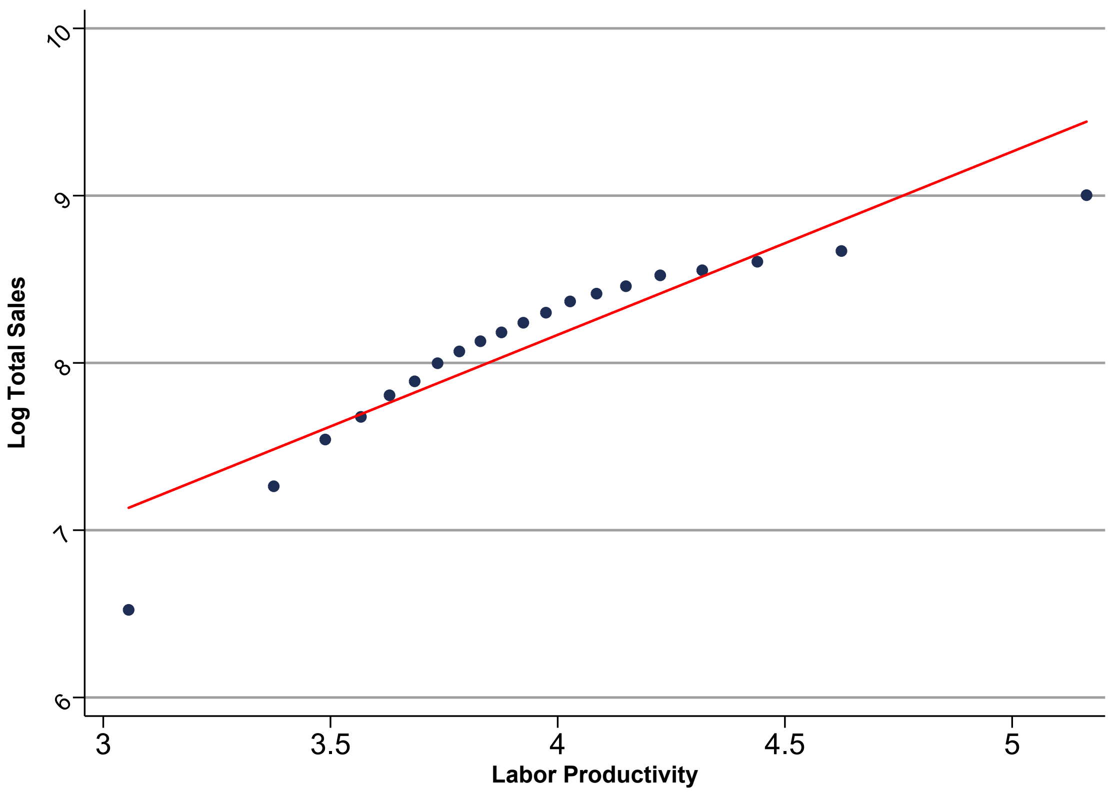


(b) Within-Between Exporter Effect



Notes: This Figure reports the elasticity of the change in a firm's value-added growth and labor share change to its foreign demand growth evaluated at different percentiles of the labor productivity distribution (at time t_0). It is obtained by estimating equations (4) and (5).

Figure A11: Labor Productivity and Firm Size



Notes: This figure is a bin-scatter plot of the relationship between labor productivity on the x-axis and total sales on the y-axis defined at the firm level.