Imported Inputs and Within-Firm Labor Organization *

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Abstract

While previous studies show that imported inputs can increase firms' demand for skilled workers, much less is known about how they reshape within-firm occupational structure. This paper fills that gap using French administrative employer-employee, customs and balance-sheet data over the period 2002-2015 and a shift-share instrumental variable strategy. I provide causal evidence that firms respond to a broader range of imported input varieties by increasing the share of senior managers within their workforce. A wider range of foreign inputs makes the production process more complex, raising the demand for skilled managers. Exploring the underlying mechanisms, I show that differentiated imported varieties primarily increase the demand for senior managers, whereas homogeneous varieties complement skilled blue-collar workers. Moreover, capital goods are mainly associated with senior managers, while intermediate inputs are more strongly associated with supervisors, indicating that different imported inputs generate distinct organizational requirements. The increase in senior managers is driven primarily by engineers, particularly when firms import differentiated products, and is reflected in a higher managerial wage-bill share. These findings provide new evidence that globalization reshapes firms' internal organization through occupation-specific adjustments, with important implications for understanding labor-market adjustment to trade.

Keywords: imported inputs, firm organization, occupational structure, skill demand, managers.

JEL classification: F14, F16, J23, J24

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1 Introduction

International trade in intermediate inputs has increased substantially over the past decades, accounting for roughly two-thirds of world trade (Johnson and Noguera, 2012). The increasing fragmentation of production across countries has made imported intermediate inputs a central component of firms' production strategies. A large body of evidence shows that access to foreign inputs improves firm performance by increasing productivity (Amiti and Konings, 2007), expanding product scope (Goldberg et al., 2010), shaping export decisions (Bas and Berthou, 2012), facilitating technology adoption (Bas and Berthou, 2017), and influencing firms' employment and production adjustments (Kaus and Zimmermann, 2024). Beyond these performance effects, imported inputs also reshape labor demand by increasing the relative demand for skilled workers compared with unskilled workers (Biscourp and Kramarz, 2007; Crinò, 2012; Ge et al., 2019). However, existing studies primarily distinguish between broad skill groups and, therefore, provide little evidence on how imported inputs reorganize firms' internal occupational structure.

Recent work in the task-based labor literature highlights that changes in production processes, most prominently driven by technological change, but more generally by global sourcing, affect labor demand not only through changes in skill intensity but also through the reallocation of tasks across workers performing distinct roles (Acemoglu and Autor, 2011; Acemoglu et al., 2025). Consequently, analyses based solely on skilled and unskilled labor may mask important adjustments in firms' occupational composition, particularly when occupations differ in their roles in management, coordination, and production.

Understanding these organizational adjustments is important for both firms and policymakers. As production becomes increasingly international, firms must coordinate a larger network of foreign suppliers, integrate more diverse inputs into production, monitor quality, and manage more complex contractual relationships. These organizational changes may alter labor demand not only by increasing firms' overall skill intensity, but also by changing the relative importance of occupations performing different functions within the firm. Identifying which occupations expand or contract is therefore essential for understanding who benefits from globalization and for designing labor-market policies that facilitate workers' adjustment to international trade.

Sourcing inputs from abroad can affect a firm's workforce through multiple channels. First, it can affect all types of workers proportionally through a scale effect by expanding firms' export scope (Kasahara and Lapham, 2013; Bas and Strauss-Kahn, 2014). This effect can arise directly through an increase in firm productivity (Kasahara and Rodrigue, 2008), or indirectly through cheaper input prices and the technology embodied in the imported inputs. Imported inputs may also affect firm scale through the introduction of new domestic products. Colantone and Crinò (2014) shows that sourcing inputs from abroad increases the set of available intermediates and provides access to better varieties of inputs, both mechanisms lead to the introduction of new domestic products.

Second, it can have an occupation-specific effect. Foreign sourcing involves a fixed cost (Antràs and Helpman, 2004; Kasahara and Lapham, 2013) that increases the complexity of the production process. From the perspective of the knowledge-based hierarchy model, as in Caliendo and Rossi-Hansberg (2012), knowledge is a costly input that is unevenly distributed across organizational layers: managers handle exceptional and complex problems, while production workers specialize in routine problems. In this context, importing inputs may raise the demand for managerial occupations responsible for supplier search, contract design, quality monitoring, and coordination. At the same time, consistent with the skill-biased technological change hypothesis (Acemoglu, 2003), imported inputs may substitute for low-skilled production workers and increase relative demand for more skilled workers.

This paper aims to answer the following question: what is the impact of imported inputs on the occupational structure of firms, taking into account firm size ? Building on the idea that foreign inputs increase firms' skill intensity, the paper identifies which occupational shares are affected, to what extent, and which types of imported input varieties drive these changes. Answering these questions contributes to a better understanding of how globalization affects jobs within firms, beyond broad changes in skill demand.

To answer that question, I use administrative data on French firms from 2002 to 2015. I combine customs data and employer-employee data. The final dataset provides information on the occupations of workers and the imports of firms which are needed for the empirical strategy. I rely on the variation in the number of within-firm imported varieties of inputs to study the changes in the share for workers in each occupation out of the total number of workers within importing firms. Using this share allows me to take into account the scale effect. I control for several time-varying firm characteristics such as age, value added and assets. In addition, I introduce firm and year fixed effects to account for firm characteristics that do not vary over time and macroeconomic shocks affecting all firms at the same time, respectively.

The empirical specification can suffer from an endogeneity concern due to omitted variable bias and reverse causality. While using shares of workers in each occupation over total workers can take into account shocks affecting all occupations, some productivity or technology shocks can have occupation-specific effects, which might bias OLS estimates. In addition, firms that are more skill-intensive can be associated with more engagement in international trade activities such as sourcing imports from abroad. To help reduce endogeneity concerns, I instrument imported inputs with a shift share instrument constructed as a firm-level weighted average of world export supply using the BACI database (CEPII). Following Hummels et al. (2014) and Carluccio et al. (2019), the instrument is built as the product of the logarithm of exports of an HS6 product by a country from which a french firm is sourcing in a year and a time-invariant weight calculated as the share of each product sourced from a country in the total imports of the firm on average over the period 2002-2015, aggregated at the firm-year level. The idea is to purge the endogenous variable from the french demand shocks and rely instead on the exogenous world supply shocks.

The main finding is that firms respond to a broader range of imported input varieties by increasing the share of senior managers within their workforce. A one standard deviation increase in imported input varieties increases the share of senior managers by 0.22 percentage points, corresponding to approximately 2% of the average managerial share. This result is robust to a wide range of alternative specifications, including a restricted sample of non-exporting importers, sector-year and department-year fixed effects, controls for firms' purchases of raw materials and supplies, alternative measures of import exposure, the use of the Broad Economic Categories (BEC) classification to identify intermediate inputs, and alternative constructions of the instrumental variable. By contrast, the evidence for other occupations is considerably weaker. Imported input varieties are associated with a decline in the share of unskilled blue-collar workers, although this result proves more sensitive across robustness exercises, while no systematic effects are found for supervisors, white-collar workers or skilled blue-collar workers.

A heterogeneity analysis by firm size shows that firms above and below the threshold of 50 employees reorganize their workforce at different occupational levels. Larger firms become more management-intensive, increasing the shares of senior managers and supervisors at the expense of white-collar and skilled blue-collar workers. Smaller firms adjust mainly along production occupations: the share of skilled blue-collar workers increases while that of unskilled blue-collar workers declines.

To better understand the mechanisms underlying these adjustments, I first investigate the role of the characteristics of imported inputs. Differentiated imported varieties increase the demand for senior managers, whereas homogeneous varieties primarily complement skilled blue-collar workers, suggesting that more complex inputs require greater managerial capabilities to coordinate and integrate them into production. I further distinguish imported varieties according to their economic use using the BEC classification. While imports of capital goods are primarily associated with an increase in the share of senior managers, imports of intermediate inputs are more strongly associated with supervisors. This pattern suggests that capital goods require higher-level strategic and organizational decisions related to technology adoption and integration, whereas intermediate inputs generate coordination tasks that are closer to day-to-day production activities.

Decomposing managerial occupations further shows that the increase in senior managers is driven primarily by engineers, with the effect being particularly pronounced for differentiated imported inputs. Finally, newly imported input varieties are associated with higher demand for engineers, suggesting that integrating new foreign inputs requires additional technical and managerial capabilities.

In addition, I examine the distributional implications of these organizational changes. The increase in managerial employment is mirrored by a higher wage-bill share accruing to senior managers, whereas the wage-bill share of unskilled blue-collar workers declines. Although imported input varieties are associated with higher average wages for most occupations, no significant increase is found for senior managers, suggesting that their larger wage-bill share can reflect an

expansion in managerial employment rather than higher managerial pay.

This article is related to two strands of literature. The first focuses on the impact of trade on within-firm labor organization. A seminal contribution to this body of literature is the idea that firms are organized as knowledge-based hierarchies (Caliendo and Rossi-Hansberg, 2012; Garicano, 2000; Caliendo et al., 2015). Several papers provide empirical support for this model. Friedrich (2022) analyzes the impact of firm-level shocks on foreign demand and transportation costs on the hierarchy of Danish firms and within-firm wage inequality. He finds that trade shocks affect the scale of the firm, therefore firms increase their number of layers which in turn increase the wage inequality within the firm.

Brambilla et al. (2024) show a different channel through which exports increase the complexity of firm organization: the production of higher-quality varieties to export to rich destinations. Guillou and Treibich (2019) examine the relationship between export scope and firm labor structure using French firm-level data. They find that both export entry and export diversification are associated with an increase in the complexity of firm organization measured as the probability of adding a managerial layer. Barba Navaretti et al. (2024) provide evidence that an increase in technical barriers to trade for a firm's destination-product is associated with a higher share of managers, based on French firm-level data.

Most contributions in this body of research have focused on export shocks.[1] An exception is Guadalupe and Wulf (2010), who study how import competition affects corporate hierarchies in the United States, and Marin et al. (2018), who show that offshoring increases decentralization within multinational firms. This paper complements that literature in two important ways. First, whereas most existing evidence focuses on export-related shocks, I examine how imported input varieties affect firms' internal labor organization. Second, rather than studying vertical layers or the allocation of decision-making authority, I show that imported input varieties reorganize firms' workforce through changes in their occupational composition.

The second strand of literature focuses on the impact of international trade on labor market outcomes. Several articles have found evidence of a reduction in employment and wages as a result of import competition from China (Autor et al., 2013, 2016). More broadly, international competition has been shown to affect the returns to skill and induce labor-market adjustment (Falvey et al., 2018). Moreover, exports have been shown to be associated with an increase in demand for skilled workers (Bernard and Jensen, 1997; Klein et al., 2013; Bas, 2012; Brenčič and Pahor, 2019). Similar evidence on labor outcomes can be found when looking at the effect of importing or offshoring (Biscourp and Kramarz, 2007; Crinò, 2012; Hummels et al., 2014; Carluccio et al., 2019). Despite this evidence, most studies examining imported inputs or offshoring distinguish only between broad skill groups and do not consider heterogeneity across skilled and

[1]Other papers have focused on non-trade related aspects affecting firm organization: Multi-establishment firms and geographic frictions (Gumpert et al., 2022), Foreign direct investments Laffineur (2019), foreign takeovers (Bastos et al., 2018), credit supply shock (Sforza and Acabbi, 2025).

unskilled occupations within firms. While a few papers examine occupations in specific settings, such as import competition (Basco et al., 2025), offshoring by multinational firms (Becker et al., 2013), or services offshoring (Criscuolo and Garicano, 2010), they do not identify how imported input varieties affect the relative demand for detailed occupations within firms.

This paper provides causal evidence that imported input varieties primarily increase the relative importance of senior managers within firms. Rather than documenting only an increase in firms' overall skill intensity, it identifies the occupations driving this adjustment and uncovers the mechanisms through which imported inputs reshape firms' internal labor organization. The findings also have important policy implications. As firms increasingly rely on global sourcing, labor-market adjustment to globalization depends not only on changes in overall employment or skill demand, but also on changes in the occupational composition of firms. The results suggest that access to imported inputs increases demand for managerial and technical capabilities required to coordinate increasingly complex production processes. Policies accompanying trade integration may therefore benefit from complementing broad education policies with occupation-specific training and up-skilling initiatives that facilitate workers' transition towards managerial, engineering and coordination-intensive occupations.

The remainder of the article is organized as follows: section 2 describes the data and presents descriptive statistics and stylized facts, section 3 discusses the empirical strategy and endogeneity concerns, section 4 shows the results on the occupational structure within the firm and the imports of inputs and section 5 concludes.

2 Data and descriptive statistics

2.1 The data

To examine the impact of imported inputs on within-firm workforce composition, I combine three data sources of french administrative firm-level data from 2002 to 2015. First, I draw on the Déclarations annuelles des Données Sociales (DADS) postes, firms' payroll declarations collected by the INSEE (Institut Nationale de la statistique et des Etudes Economiques). All firms are legally required to fill an administrative from with information about their employees. The DADS postes is reported at the level of establishment-worker-occupation and provides detailed data on employment and wages, including gross and net wages, number of hours worked, part-time/full-time status, worker age and occupation.

The key variable of interest for my analysis is the occupation of each employee, based on the French *Professions et Catégories Socioprofessionnelles* (PCS). I group workers into five categories: senior managers (CS3), supervisors (CS4), white-collar workers (CS5), skilled and unskilled blue-collar workers (CS6).[2] I use this information to compute the number of workers in each occupation

[2]A detailed description of the PCS classification is provided in Table A1.

at the firm-year level, which allows me to construct occupational employment shares, my main dependent variable. It also allows me to compute wage-bill shares and average wages for each occupation at the firm–year level, which I use to study the distributional implications of labor reorganization across occupations.

Second, I use the *Fichier Complet Unifié de SUSE - Fichier Approché des Résultats d'ESANE* (FICUS/FARE) dataset which provides firm-level balance sheet information, including the main industry of the firm, sales, value added, date of creation and assets. Combining this dataset with the DADS postes produces an employer-employee dataset.

Finally, I use French Customs data, which records firm-level exports and imports in the manufacturing sector. Trade flows are reported at the 8-digit Combined Nomenclature (CN8) product origin/destination level. This database is quasi-exhaustive. The declaration of trade values is only mandatory for values above 1,000 euros for trade outside the EU and 150,000 euros for trade within the EU. However, many observations have values below these thresholds. I aggregate the variables of interest at the firm-year level which makes the impact of the thresholds less constraining in my case. The main variable of interest is the number of imported varieties of inputs, defined as product-origin combination as in Broda and Weinstein (2006). I also use the total imports of inputs in a robustness check.

All three datasets contain a unique firm identifier, allowing them to be merged into a single firm–year panel. Given that the analysis focuses on the effect of tradable inputs, the sample includes manufacturing firms only.[3] Although the customs data do not distinguish between imported inputs and imported final goods, I assume that imports mainly consistent of inputs for two reasons. First, I focus only on the manufacturing sector, excluding all retailers and wholesalers. Second, to make sure I have production activities in the sample, I only focus on firms with, at least, blue-collar workers (CS6) in their labor organization. To study within-firms occupational structure, I select a subsample of firms with more than five employees. The final dataset includes 37,468 importing firms with non-missing information on occupations.

2.2 Descriptive statistics

This section presents descriptive statistics for the main variables used in the analysis and provides a first glance at the relationship between occupational composition and the number of imported varieties of inputs. Table 1 shows the mean and standard deviation of the key variables for firms in the main sample. It highlights the hierarchical structure of the firm, as in Caliendo et al. (2015), with senior managers and supervisors accounting for a relatively small share of employment but a disproportionate share of the wage bill. In addition, Average wages increase monotonically with occupational rank.

[3]While some firms can also offshore services used as inputs, information on trade in services is not provided by the French customs. In addition, the IV cannot be constructed for French importers of services.

Table 1: Descriptive statistics

	Mean	SD
Share of senior managers	0.110	0.109
Share of senior admin. and com. managers	0.044	0.058
Share of engineers	0.064	0.081
Share of other senior managers	0.002	0.015
Share of supervisors	0.187	0.138
Share of admin. and com. supervisors	0.068	0.094
Share of technicians	0.081	0.101
Share of other supervisors	0.038	0.052
Share of white-collar workers	0.108	0.106
Share of skilled blue-collar workers	0.358	0.221
Share of unskilled blue-collar workers	0.222	0.210
Wage-bill share of senior managers	0.221	0.146
Wage-bill share of supervisors	0.222	0.134
Wage-bill share of white-collar workers	0.096	0.092
Wage-bill share of skilled blue-collar workers	0.319	0.207
Wage-bill share of unskilled blue-collar workers	0.160	0.175
Average wage of senior managers	39,039.363	16,007.148
Average wage of supervisors	23,226.348	8,132.888
Average wage of white-collar workers	16,135.865	6,299.795
Average wage of skilled blue-collar workers	8,580.870	5,302.211
Average wage of unskilled blue-collar workers	4,923.303	3,499.904
Number of imported varieties of inputs	34.634	61.880
Log (Number of imported varieties of inputs)	2.647	1.403
Total imports of inputs	6,101.665	30,617.921
Number of employees	123.355	383.761

Notes: This table is restricted to the sample of importers with more than 5 employees and, at least, blue collar workers (CS6) in their labor organization. Total imports are in thousands of euros. The number of firms is 37,468 and the number of observations is 218,133.

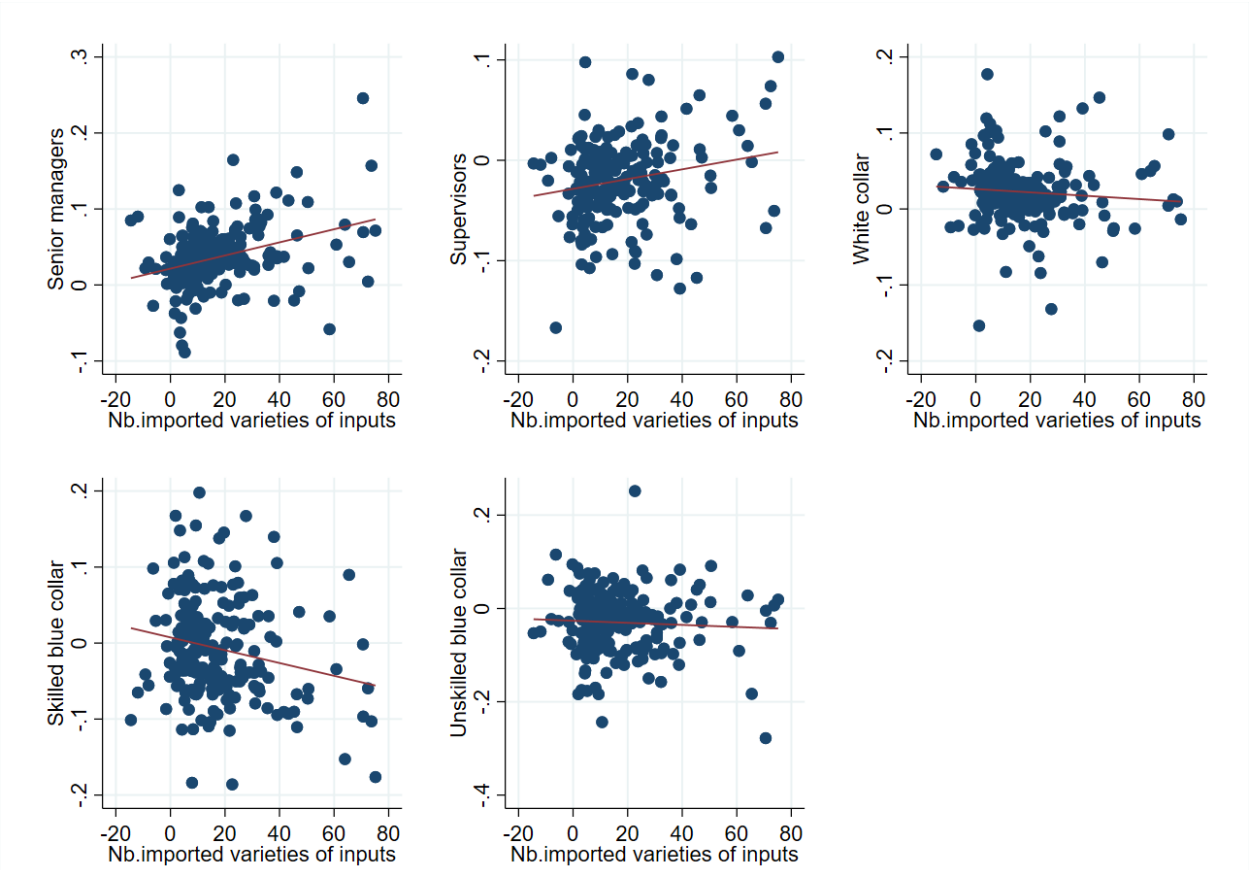
Table A2 in the appendix reports mean values of the key variables by firm size, distinguishing importers above and below the 50 employee threshold. Larger importing firms tend to have a higher share of managerial occupations overall. However, the difference in senior administrative and commercial managers is modest across size groups, while larger firms employ a substantially higher share of engineers. A similar pattern emerges at the supervisor level: smaller firms are relatively more intensive in administrative and commercial supervisors, whereas larger firms employ more technicians. This suggests that larger importers are more intensive in technically-oriented occupations that are closer to the production process at both managerial levels. Smaller importers allocate a larger share of their workforce to white-collar and unskilled blue-collar workers compared to larger importers, while the pattern reverses for skilled blue-collar workers, where larger firms are more intensive. Finally, larger importers pay higher average wages across all occupations and source a substantially larger number and value of imported input varieties.

To examine how workforce composition and import behavior evolve over time, Table A3 compares the average share of each occupation and sub-occupation in 2002 and 2015. Among import-

ing firms, the shares of supervisors and blue-collar workers decline, whereas the shares of senior managers and white-collar workers increase. Notably, the rise in senior managers is driven by both administrative and commercial managers and engineers, with the largest increase observed among engineers. Although the overall share of supervisors decreases, mainly due to a decline in administrative and commercial supervisors, the share of technicians increases over the period. In parallel, both the total number of imported input varieties and the total volume of imported inputs rise substantially.

To further explore these patterns, Figure 1 plots, at the 4-digit NACE sector level, the change between 2002 and 2015 in the average number of imported input varieties across firms (horizontal axis) against the change in average occupational shares (vertical axis). It presents the five main occupations used in the baseline estimations: senior managers, supervisors, white-collar workers, skilled and unskilled blue-collar workers. It shows a strong positive correlation between the expansion of imported varieties and the shares of senior managers and, to a lesser extent, supervisors. In contrast, there is a clear negative correlation for skilled blue-collar workers, while correlations for white-collar and unskilled blue-collar workers are only weakly negative.

Figure 1: The number of imported varieties of inputs and the change in workforce composition (2002-2015)

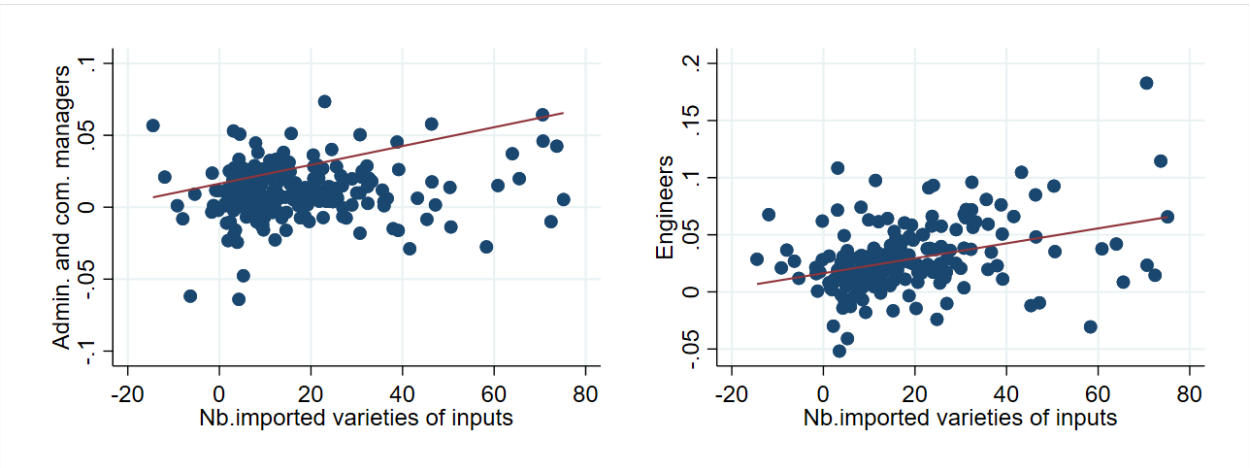


Notes: On the horizontal axis, the change in the average number of imported varieties of inputs between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. On the vertical axis, the change in the average share of workers in a given occupation (1 digit) out of total number of employees between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. *Source:* Author's calculations using DADS and French customs data.

I further examine the share of workers in each senior managers sub-occupation relative to total employment. Figure 2 shows a positive correlation for both, administrative and commercial managers and engineers. Figure A1 in the appendix shows the same correlations for the supervisors sub-occupations. It reveals weak correlations for administrative and commercial supervisors and for other supervisors, but a positive correlation for technicians.

Taken together, these descriptive patterns indicate that firms increasing the number of imported input varieties become more skill-intensive. This reorganization occurs through rising shares of managers, especially senior managers, matched by a decline in other occupations due to the increase in the complexity of the production process, which requires managerial skills. In addition, this increase in managers is driven by senior administrative and commercial managers, engineers and technicians, highlighting the need for both coordination and technical managerial skills.

Figure 2: The number of imported varieties of inputs and the change in workforce composition (2002-2015): senior managers



Notes: On the horizontal axis, the change in the average number of imported varieties of inputs between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. On the vertical axis, the change in the average share of workers in a given sub-occupation of senior managers (2 digits) out of total number of employees between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. The sub-occupation "Other senior managers" is excluded from the analysis as it accounts for a negligible share of total employment on average (0.2%), as reported in Table 1. *Source:* Author's calculations using DADS and French customs data.

3 Identification strategy

3.1 Baseline specification

This section presents the identification strategy used to estimate the impact of imported inputs on within-firm occupational structure. The empirical approach exploits within-firm variation in the number of imported input varieties to assess how foreign sourcing affects the demand for workers across occupations. I adopt the following equation:

$$Share_{it} = \beta_1 X_{it-1} + V'_{it-1}\Omega + \gamma_i + \delta_t + \epsilon_{it} \quad (1)$$

where $Share_{it}$ denotes the share of workers employed in a given occupation, following the PCS classification described in section 2, at the 1 digit level over the total number of workers in firm i in year t. X_{it-1} denotes the logarithm of the number of imported varieties of inputs of firm i in year $t-1$. In other specifications, I use the logarithm of the value of imported inputs for firm i in year $t-1$ to capture the intensive margin and the logarithm of the number of new imported varieties of inputs to take into account the dynamic imports portfolio of the firm. Sourcing new varieties from abroad can add another dimension of complexity to the international production process through the need to identify new suppliers and integrate new inputs into the existing production process.

V'_{it-1} is a vector of control variables to take into account firm characteristics that vary overtime including the logarithm of age, the logarithm of the change in value added and the logarithm of assets for firm i in year $t-1$. To control for other factors that might be correlated with foreign inputs, all specifications include firm fixed effects (γ_i) to control for unobserved firm characteristics that do not vary over time and year fixed effects (δ_t) to control for macroeconomic shocks that could affect all firms at the same time. In some specifications, I add 2-digit sector-year fixed effects along with the firm fixed effects in order to control for unobservable sector-specific shocks over time. I also add department-year fixed effects to capture local labor market shocks that could vary over time. Errors are clustered at the firm level.

3.2 Endogeneity concerns

The baseline specification may suffer from an endogeneity bias. First, an omitted variable bias may arise since French imports of inputs are likely correlated with other factors such as productivity or technology (Amiti and Konings, 2007; Bas and Berthou, 2017) which can directly affect within-firm labor organization, biasing OLS estimates. While using occupational shares (rather than employment levels) helps mitigate concerns about shocks that affect all occupations proportionally, it does not fully eliminate the problem. If productivity or technology shocks have differential effects across occupations, they could still bias the estimated relationship between imported inputs and firms' occupational structure.

Second, there is a risk of reverse causality as the labor organization of the firm can affect its imports of inputs. Firms with a higher share of high-skill occupations, such as managers or technical specialists, may be more capable of navigating global supply chains or integrating foreign inputs, making them more likely to import. Bloom et al. (2021) show that better managed firms are more likely to import more inputs of higher quality and from more advanced countries. To mitigate the impact of the omitted variable and reverse causality biases, I include firm-year level controls such as value added and size and different sets of fixed effects. In addition, I use lagged values of the explanatory variables by one year.

To further address endogeneity, I complement the specification in Eq. 1 with an IV strategy. I rely on a shift-share type of instrument using exogenous world export supply shocks, as in Autor et al. (2013). This type of instrument has been extensively employed in the international trade empirical literature.[4] Following Hummels et al. (2014), I instrument the number of imported varieties of inputs with firm-level weighted average of foreign export supply. It is calculated as follows:

[4]Examples of studies where the shift-share instruments have been used include Autor et al. (2013); Hummels et al. (2014); Berman et al. (2015); Acemoglu et al. (2016); Carluccio et al. (2019); Bas et al. (2021); Barba Navaretti et al. (2024).

$$IV_{it} = \sum_{j,p} \gamma_{ijp} \cdot \log(\text{Exports}_{jpt}^{\text{no FRA}}), \quad \text{where } \gamma_{ijp} = \frac{\sum_t \text{Imports.inp}_{ijpt}}{\sum_t \text{Imports.inp}_{it}} \tag{2}$$

$Exports_{jpt}^{noFRA}$ denotes foreign exports (excluding exports to France) for each HS6 product p exported by country j from which a french firm is sourcing in year t.[5] γ_{ijp} is a time-invariant weight calculated as the share of each product p and source country j in the total imports of firm i on average over the period 2002-2015. Following Carluccio et al. (2019), I use the logarithm of the foreign export supply, which is equivalent to using growth rates of export supply since I use time-invariant weights in the IV construction and firm fixed effects in my main empirical specification.[6]

The intuition behind the IV is to rely on exogenous world supply shocks to reduce the concerns of the endogenous french demand shocks. When country j increases its exports of product p to the rest of the world (excluding France), it is most likely driven by supply shocks (from France's point of view) such as productivity, competitiveness, and reduction in trade barriers. Consequently, a french firm i will increase its imports of product p from origin country j. The exclusion restriction can be satisfied in the sense that world export supply shocks are exogenous to french firms production decisions. In other words, the weighted average of world export supply can affect french firms' labor composition only through their imports.

In other specifications, I distinguish between homogeneous and differentiated imported products using the classification proposed by Rauch (1999). For each category, I construct separate shift-share instruments, analogous to Eq. 2, based on the weighted sum of world export supply: one for homogeneous products and another for differentiated products.

Shift-share instruments have received considerable attention in the econometrics literature, particularly following the two seminal contributions of Borusyak et al. (2022) and Goldsmith-Pinkham et al. (2020). These papers offer complementary perspectives on the conditions under which shift-share instruments yield valid causal estimates. Borusyak et al. (2022) establish that the validity of shift-share instruments rests primarily on the exogeneity of the shocks, even when the shares are endogenous. Under this view, identification requires that the world export supply shocks be orthogonal to firm-level unobservables correlated with labor composition, that is, aggregate supply conditions in origin countries should not be driven by French firms' input demand. The construction of the instrument in this paper aligns closely with this framework.

First, world exports to France are excluded when constructing the supply shocks, ensuring that domestic demand conditions do not contaminate the instrument. Second, following Borusyak et al. (2025), I implement a balance test by regressing lagged occupational shares on the instrument conditional on the same controls as in the baseline specification. Since the choice of clustering

[5]The source of the imports data at the HS6 level is the BACI database (CEPII).

[6]Borusyak et al. (2025) show in the online appendix of their paper that multiplying shares with log of shifts constitutes a shift-share type IV.

level is consequential for this test, clustering at the firm level allows for within-firm correlation but does not account for correlation across firms importing the same product from the same country, which could lead to underestimated standard errors. I report results clustering both at the firm level and at the country-product level.[7] Results are presented in Table A4, with Panel A corresponding to firm-level clustering and Panel B to country-product-level clustering. Based on Panel B, the correlations between lagged occupational shares and the instrument are either statistically insignificant or only marginally significant with small coefficient magnitudes, alleviating concerns about the endogeneity of the shifts. Third, as a further check, I re-estimate the baseline specification excluding each of the three dominant trading partners, the United States, China, and the European Union, separately from the construction of the instrument, to verify that the results are not driven by supply shocks originating from a single dominant source country, as detailed in Section 4.

Goldsmith-Pinkham et al. (2020) offer an alternative perspective, grounding identification in the exogeneity of the shares rather than the shocks. Under their decomposition, the shift-share estimator can be expressed as a weighted combination of just-identified IV estimates for each individual share, where the weights, known as Rotemberg weights, reflect the contribution of each share to the overall identifying variation. Concerns arise when Rotemberg weights are concentrated in a small number of product-country pairs, as this would imply that identification rests on a narrow set of potentially endogenous exposure shares. While identification in this paper is primarily defended through the exogeneity of the shocks, I take two steps to mitigate residual concerns about share endogeneity.

First, I document the relative stability of firms' import portfolios over time, following Carluccio et al. (2015, 2019). If sourcing portfolios are stable, average weights are less likely to be substantially affected by endogenous reallocation in response to shocks. Table A5 in the appendix shows that, on average, a firm's top imported variety (country-product pair) accounts for 56% of its total imports, and its top two varieties account for 68%. Moreover, among the 37,468 importers in the sample, the top imported variety changes on average 3.3 times over the sample period, while the top two varieties change approximately 6 times. Similar patterns hold for top origin countries and top imported products, suggesting that firms' sourcing portfolios are indeed relatively stable. Second, as an additional robustness check detailed in Section 4, I exclude each firm's top one and top three imported varieties from the construction of the instrument, ensuring that the estimates are not driven by concentration in a small number of dominant sourcing relationships.

[7] While clustering at the country-product level accounts for correlation within country-product pairs, it may not fully capture residual dependence across firms with overlapping exposure structures arising from simultaneous exposure to multiple country-product combinations.

4 Results

This section first presents the baseline results and a range of robustness checks. It then explores heterogeneity by firm size before examining the mechanisms underlying the main findings, focusing on product characteristics, managerial sub-occupations, and newly imported input varieties. Finally, it investigates the implications of imported input sourcing for firms' wage structure.

4.1 Baseline results

This subsection presents the baseline estimates of Eq. 1, examining the impact of imported input varieties on firms' occupational structure. The dependent variable is the share of workers in each occupation relative to total firm employment. I estimate separate regressions for senior managers, supervisors, white-collar workers, skilled blue-collar workers and unskilled blue-collar workers using both OLS and 2SLS. All specifications include the full set of firm-level controls together with firm and year fixed effects.

Table 2 reveals a clear pattern of organizational adjustment. The main finding is that firms increase the share of senior managers as they expand the range of imported input varieties, while no statistically significant effects are found for supervisors, white-collar workers or skilled blue-collar workers. The estimated effect is remarkably stable across OLS and 2SLS specifications, with no statistically significant difference between the two estimates. The IV estimates imply that a one standard deviation increase in imported input varieties raises the share of senior managers by 0.22 percentage points, corresponding to approximately 2% of the average managerial share (11%). For comparison, this effect is equivalent to around 6% of the average increase in senior managerial intensity observed over the sample period, during which the average share of senior managers increased from 8.8% in 2002 to 12.6% in 2015. Although modest in absolute magnitude, this effect is economically meaningful given that firms' occupational structures tend to evolve gradually over time.

The baseline estimates also point to a decline in the share of unskilled blue-collar workers. While the OLS coefficient is negative but statistically insignificant, the IV estimate is negative and significant, implying that a one standard deviation increase in imported input varieties reduces the share of unskilled blue-collar workers by 0.47 percentage points, corresponding to approximately 2.1% of its sample mean (22%). The larger IV estimate is consistent with attenuation bias in the OLS specification arising from endogeneity, including reverse causality and omitted technological upgrading that simultaneously affect firms' import decisions and labor demand.[8] The strength of the instrument is confirmed by the Kleibergen-Paap Wald F-statistic reported in the table notes. As shown in the robustness section, however, the negative effect on unskilled blue-collar workers

[8]For example, if firms adopting new production technologies simultaneously increase their use of imported intermediate inputs while reducing demand for unskilled occupations, the OLS estimator incorrectly attributes part of the effect of technological upgrading to imported inputs, biasing the estimated coefficient toward zero.

proves more sensitive to alternative specifications than the effect on senior managers and should therefore be interpreted with greater caution.

Overall, the baseline results indicate that firms respond to a broader range of imported inputs by becoming more manager-intensive. As firms source a wider range of intermediate inputs, coordinating production, managing supplier relationships, ensuring product quality, and integrating foreign inputs into production become increasingly complex, increasing the relative importance of senior managers within the firm. This finding is consistent with the broader literature documenting that international sourcing raises the demand for skilled labor (Hummels et al. 2014; Carluccio et al. 2019) and complements recent evidence highlighting the growing importance of managers in firms engaged in international activities (Chakraborty and Raveh 2018; Bloom et al. 2021; Mion and Opromolla 2014).

Table 2: Imported varieties of inputs and within-firm labor organization

	(1)	(2)	(3)	(4)	(5)
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
OLS					
Log(nb. imported varieties of inputs)$_{it-1}$	0.125***	0.068	−0.048	−0.027	−0.088
	(0.033)	(0.049)	(0.038)	(0.082)	(0.079)
Observations	177,074	177,074	177,074	177,074	177,074
IV					
Log(nb. imported varieties of inputs)$_{it-1}$	0.156***	0.082	−0.049	0.173	−0.337**
	(0.056)	(0.082)	(0.063)	(0.138)	(0.134)
Observations	176,373	176,373	176,373	176,373	176,373

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specification:* First-stage coeff. = 0.098***; KP F-stat. = 19,100.1. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.2 Robustness checks

Alternative specifications. Since exports may also affect firms' occupational structure (Caliendo et al. 2015; Friedrich 2022; Brambilla et al. 2024), I first examine whether the baseline results are driven by firms' export activity. Jointly estimating the effects of imported inputs and exports is not feasible because the corresponding shift-share instruments are highly correlated, leading to multicollinearity in the first stage and weakening identification. I therefore re-estimate the baseline specification on the subsample of importing firms that do not export. The results, reported

in Panel A of Table 3, remain qualitatively unchanged, suggesting that the baseline findings are not driven by export activity. Panel B additionally reports OLS estimates controlling for firms' total exports. The positive and significant effect on the share of senior managers remains virtually unchanged, whereas the coefficient on unskilled blue-collar workers becomes statistically insignificant.

Table 3: Robustness checks (controlling for exports)

	(1)	(2)	(3)	(4)	(5)
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A: Non-exporting importers only (IV)					
Log(nb. imported varieties of inputs)$_{it-1}$	0.242**	−0.115	0.001	0.646*	−0.772**
	(0.120)	(0.192)	(0.154)	(0.349)	(0.340)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	28,383	28,383	28,383	28,383	28,383
Panel B: Controlling for exports (OLS)					
Log(nb. imported varieties of inputs)$_{it-1}$	0.101***	0.063	-0.058	-0.087	0.001
	(0.039)	(0.057)	(0.043)	(0.091)	(0.088)
Log(exports)$_{it-1}$	0.025	0.018	-0.022	-0.090*	0.083*
	(0.020)	(0.028)	(0.021)	(0.049)	(0.046)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	138,829	138,829	138,829	138,829	138,829

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. Log(exports)$_{it-1}$ is the logarithm of the total export value of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses. *Panel A:* First-stage coeff. = 0.098***; KP F-stat. = 4,015.8.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Next, I consider three alternative specifications of the baseline model. First, I include sector-year fixed effects to account for time-varying shocks common to firms operating in the same sector. Second, I add department-year fixed effects to control for local labor market conditions that may evolve over time and affect firms' occupational composition. Third, I augment the baseline specification with firm-level purchases of raw materials and other supplies, the closest available proxy for intermediate input expenditures, to ensure that the estimated effects do not simply reflect a broader outsourcing margin.[9] Panels A-C of Table A6 show that the positive effect on senior managers remains stable across all specifications.

[9] A limitation of this variable is that it does not distinguish between domestic and imported purchases.

Alternative measures of import exposure. To assess whether the results depend on the measure of import exposure, Table A7 reports estimates using three alternative variables: the logarithm of the total value of imported inputs (Panel A), the logarithm of the number of imported products (Panel B), and the logarithm of the number of origin countries (Panel C). The main finding remains qualitatively unchanged across all measures. Interestingly, the estimated coefficients are systematically larger when import exposure is measured by the number of origin countries, suggesting that geographic diversification of sourcing generates greater organizational complexity than simply expanding the range of imported products. Coordinating a broader international supplier network requires greater coordination of suppliers, contract management, and adaptation to heterogeneous institutional and logistical environments, thereby increasing the relative demand for senior managers.

Input classification and type. A potential concern is that the baseline measure captures imports that are not strictly intermediate inputs. To address this issue, the baseline sample is already restricted to manufacturing firms employing production workers (CS6), thereby excluding wholesalers and retailers, as discussed in Section 2. As an additional robustness check, I reclassify imported varieties using the Broad Economic Categories (BEC) nomenclature following Colantone and Crinò (2014): parts and accessories (BEC 42), capital goods excluding transport equipment (BEC 41), processed industrial supplies (BEC 22), industrial transport equipment (BEC 521), parts and accessories of transport equipment (BEC 53), processed fuels and lubricants (BEC 32), and processed food and beverages for industry (BEC 121). The results, reported in Table A8, confirm that the positive effect on the share of senior managers remains robust under this stricter classification. By contrast, although the coefficient on unskilled blue-collar workers remains negative, it is no longer statistically significant, indicating that evidence for this margin is more sensitive to the definition of imported inputs.

Instrument validity. I implement two additional robustness checks to further assess the validity of the shift-share instrument. First, to strengthen the exogeneity of the shift component, I reconstruct the instrument by excluding each of the three largest trading partners, the United States, China, and the European Union, from world export supply, ensuring that the results are not driven by shocks originating from a single dominant source. Second, to mitigate concerns related to endogenous exposure shares, I reconstruct the instrument after excluding each firm's top one and top three imported varieties, on average, from the share component. The corresponding results are reported in Tables A9 and A10, respectively. Across all alternative constructions, the positive effect on the share of senior managers remains qualitatively robust. Although some coefficients lose statistical significance, particularly for unskilled blue-collar workers, the overall conclusions remain unchanged.

4.3 Heterogeneous size effects

This section examines whether the effect of imported input varieties differs according to firms' initial size. French labor regulations introduce an important institutional threshold at 50 employees. While firms with at least 11 employees are required to establish a social and economic committee, its responsibilities expand considerably once the workforce reaches 50 employees. Beyond this threshold, the committee must be consulted on a broad range of strategic and organizational decisions, including labor organization, professional training, production techniques, and firms' economic and financial developments.[10] These additional consultation requirements increase the administrative costs associated with workforce reorganization.

To investigate whether these institutional differences shape firms' responses to imported input varieties, I interact the number of imported input varieties with an indicator equal to one for firms employing at least 50 workers in the first year they appear in the sample. The results are reported in Table 4. The estimates reveal substantial heterogeneity across firm size. Larger firms become more manager-intensive following an increase in imported input varieties: the shares of senior managers and supervisors increase, while the shares of white-collar and skilled blue-collar workers decline. In contrast, smaller firms adjust primarily across production occupations, increasing the share of skilled blue-collar workers at the expense of unskilled blue-collar workers, with little evidence of changes in managerial occupations.

Overall, these results indicate that both groups of firms reorganize their workforce in response to increases in imported input varieties, but along different margins. Larger firms appear able to absorb the additional administrative costs associated with organizational changes and adjust their managerial structure accordingly. Smaller firms, operating under less stringent administrative requirements, reorganize primarily across production occupations.

4.4 Mechanisms

This section investigates the mechanisms through which imported input varieties affect firms' occupational structure. Specifically, I examine whether the effects differ according to the characteristics of imported inputs, the type of managerial occupations involved, and whether firms are sourcing entirely new imported input varieties.

To distinguish between more and less complex imported inputs, I classify products using the Rauch (1999) classification. Following the existing literature, products traded on organized exchanges or with reference prices are classified as homogeneous, while all remaining products are classified as differentiated.[11] Results are reported in Table 5.[12]

[10] More information on the role of the social and economic committee is available at `https://travail-emploi.gouv.fr/les-attributions-du-cse`.

[11] I use the correspondence tables between the HS classification and the SITC Rev.2 available at `https://unstats.un.org/unsd/classifications/Econ`.

[12] Table A11 in the appendix reports estimates when differentiated and homogeneous imported varieties are

Table 4: Heterogeneity by size

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)$_{it-1}$	0.079	−0.108	0.050	0.429**	−0.413**
	(0.076)	(0.109)	(0.087)	(0.174)	(0.170)
Log(nb. imported varieties of inputs)$_{it-1}\times$ size$_{it0} \geq 50$	0.215**	0.534***	−0.277**	−0.717***	0.215
	(0.104)	(0.150)	(0.111)	(0.267)	(0.260)
Observations	176,373	176,373	176,373	176,373	176,373

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. size$_{it0} \geq 50$ is a dummy variable equal to one if the number of employees of firm i in the initial year $t0$ is greater than or equal to 50 employees. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specification:* First-stage coeff. (main effect) = 0.101***; first-stage coeff. (interaction) = 0.098***; KP F-stat. = 5,819.0. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The estimates reveal a clear distinction across product types. Differentiated imported varieties increase the share of senior managers, whereas homogeneous varieties primarily increase the share of skilled blue-collar workers. A plausible explanation is that differentiated inputs are more technologically sophisticated and relationship-specific, requiring greater coordination with foreign suppliers and closer integration into firms' production processes. These tasks increase the demand for managerial capabilities. Homogeneous inputs, by contrast, are more standardized and therefore complement production-oriented skills rather than managerial occupations. These findings are consistent with the literature documenting stronger complementarities between complex imported inputs and skilled labor (Bas and Paunov 2021; Fieler et al. 2018).

To further distinguish the characteristics of imported inputs, I decompose imported varieties into capital goods and intermediate inputs using the BEC classification. Results are reported in Table 6. The decomposition reveals meaningful heterogeneity across managerial occupations. Imports of capital goods are primarily associated with senior managers, whereas imports of intermediate inputs are more strongly associated with supervisors. This pattern is consistent with the view that capital goods require higher-level organizational and strategic decisions related to technology adoption and integration, while intermediate inputs generate coordination tasks closer to day-to-day production.

To better understand which managerial sub-occupations drive the baseline results, I decompose senior managers and supervisors into their constituent occupations. Senior managers are divided into senior administrative and commercial managers and engineers, while supervisors are

included in separate regressions.

Table 5: Homogeneous vs. differentiated products

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)H_{it-1}	-0.198^{**}	0.022	-0.041	0.541^{**}	-0.257
	(0.093)	(0.136)	(0.097)	(0.259)	(0.249)
Log(nb. imported varieties of inputs)D_{it-1}	0.434^{***}	0.002	0.123	-0.412	-0.183
	(0.103)	(0.150)	(0.116)	(0.263)	(0.252)
Observations	116,769	116,769	116,769	116,769	116,769

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)H_{it-1} (Log(nb. imported varieties)D_{it-1}) is the logarithm of the total number of imported homogeneous (differentiated) product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specification:* First-stage coeff. (homogeneous varieties) = 0.125^{***}; first-stage coeff. (differentiated varieties) = 0.097^{***}; KP F-stat. = 3,923.6. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 6: Intermediate inputs vs. capital goods

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported interm. varieties)$_{it-1}$	-0.113	0.341^{**}	-0.121	-0.051	-0.041
	(0.119)	(0.174)	(0.116)	(0.292)	(0.275)
Log(nb. imported capital varieties)$_{it-1}$	0.472^{***}	-0.561^{***}	-0.009	0.143	-0.054
	(0.144)	(0.210)	(0.129)	(0.303)	(0.269)
Observations	87,671	87,671	87,671	87,671	87,671

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations classified as inputs according to the BEC classification. Log(nb. imported interm. varieties)$_{it-1}$ is the logarithm of the total number of imported intermediate product-country combinations. Log(nb. imported capital varieties)$_{it-1}$ is the logarithm of the total number of imported capital product-country combinations. All regressors are measured at $t-1$. Control variables include the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses.
IV specifications: First-stage coeff. (interm.) = 0.097^{***}; First-stage coeff. (capital) = 0.112^{***}; KP F-stat. = 2,113.5.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$.

decomposed into administrative and commercial supervisors, technicians, and other supervisors.[13] Results are reported in Table 7.

The increase in the share of senior managers is driven primarily by engineers and senior administrative and commercial managers, with the effect being particularly strong for engineers. By contrast, the response across supervisory sub-occupations is limited to administrative and commercial supervisors, while the remaining supervisory sub-occupations are not significantly affected.

Table 7: Managerial sub-occupations

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior admin. & comm. mgrs	Engineers	Admin. and comm. supervisors	Technicians	Other supervisors
Log(nb. imported varieties of inputs)$_{it-1}$	0.067*	0.088**	0.123**	0.006	−0.046
	(0.038)	(0.044)	(0.057)	(0.057)	(0.036)
Observations	176,373	176,373	176,373	176,373	176,373

Notes: The dependent variable is the share of workers in each sub-occupation out of total employees in firm i in year t. Log(nb. imported varieties of inputs)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specification:* First-stage coeff. = 0.098***; KP F-stat. = 19,100.1. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A12 in the appendix further shows that these effects are driven by differentiated imported varieties. The increase in engineers suggests greater demand for technical expertise to evaluate, adapt and integrate sophisticated imported inputs into firms' production processes, whereas the increase in senior administrative and commercial managers points to greater coordination needs related to supplier selection, contract management and compliance. Together, these findings reinforce the view that more complex imported inputs primarily increase the demand for managerial capabilities.

Finally, I examine whether managerial demand is particularly strong when firms begin sourcing entirely new imported input varieties. Unlike existing imported inputs, new varieties require firms to identify suppliers, evaluate product suitability and integrate unfamiliar technologies into production. I therefore relate the number of newly imported input varieties to firms' occupational structure and managerial sub-occupations.

Tables 8 and A13 show a positive association between newly imported input varieties and the share of senior managers, driven by engineers. These findings reinforce the interpretation that introducing new imported inputs requires technical capabilities to evaluate and integrate

[13]The sub-occupation "Other senior managers" is excluded from the analysis because it accounts for only 0.2% of total employment on average (Table 1).

unfamiliar technologies into firms' production processes. They are also consistent with Colantone et al. (2020), who document that importing new inputs is associated with the hiring of more highly skilled workers.

Table 8: New imported varieties of inputs

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. new imported varieties of inputs)$_{it-1}$	0.108***	−0.029	0.001	−0.056	−0.000
	(0.025)	(0.036)	(0.028)	(0.060)	(0.056)
Observations	153,504	153,504	153,504	153,504	153,504

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. new imported varieties)$_{it-1}$ is the logarithm of the total number of new imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.5 Wage dynamics

To study the distributional implications of internal occupational reorganization and how its gains are transmitted to workers, I examine the relationship between sourcing foreign inputs and within-firm wage dynamics. I study how imported input varieties affect the wage share of each occupation in the firm's total wage bill. Changes in an occupation's wage share may reflect adjustments in employment, documented earlier in Table 2, and/or changes in the average wage of that occupation, which I study in this subsection.

First, Table 9 reports occupational wage shares findings. The results indicate that the wage share of senior managers increases, while that of unskilled blue-collar workers decreases, with no significant effects for other occupations. A one standard deviation increase in imported input varieties leads to a 0.36 percentage point increase in the wage-bill share of senior managers and a 0.46 percentage point decrease in the wage-bill share of unskilled blue-collar workers. These patterns closely mirror the employment-share results and suggest that internal labor reorganization occurs through an increased demand for senior managers at the expense of unskilled blue-collar workers, both in terms of employment and labor costs.

Second, Table 10 presents estimates using the logarithm of the average wage of each occupation as the dependent variable. Imported input varieties are associated with higher average wages for supervisors, white-collar workers, skilled blue-collar workers, and unskilled blue-collar

Table 9: Imported varieties of inputs and share of wage bill

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)$_{it-1}$	0.258***	0.053	−0.031	0.032	−0.330***
	(0.087)	(0.091)	(0.055)	(0.124)	(0.112)
Observations	176,373	176,373	176,373	176,373	176,373

Notes: The dependent variable is the share of wages of workers in each occupation out of total wage bill in firm i in year t. Log(nb. imported varieties of inputs)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each wage-bill share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specification:* First-stage coeff. = 0.098***; KP F-stat. = 19,100.1. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

workers, while no statistically significant effect is found for senior managers. Combined with the previous findings on occupational shares and wage-bill shares, the absence of a wage effect for senior managers provides suggestive evidence that the increase in their wage-bill share primarly reflects an expansion in managerial employment rather than higher average managerial pay. This result is broadly consistent with Caliendo and Rossi-Hansberg (2012) and Caliendo et al. (2015), who show that firms experiencing scale shocks but not expanding their occupational hierarchy by adding an extra layer may increase wages across all layers. Table A14 in the appendix restricts the sample to firms that employ all occupations in all years and shows that the results for average wages by occupation remain similar to those reported in Table 10.

For the remaining occupations, however, the estimated increase in average wages may reflect within-occupation workforce restructuring rather than a genuine wage effect. In particular, firms may alter the composition of their workforce within a given occupation by hiring higher-paid workers or separating from lower-paid ones, thereby mechanically increasing average wages without necessarily affecting the pay of incumbent workers. Another possible interpretation is that, as firms become more management-intensive and reorganize their internal labor structures, they may experience productivity gains that enable them to raise wages across the occupational structure. Importantly, the calculation of average wages does not control for individual worker characteristics, such as education or experience. Consequently, the estimated effects may partly capture changes in the composition of workers within occupations rather than pure wage adjustments. These results should therefore be interpreted with caution.

Table 10: Imported varieties of inputs and average wages

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)$_{it-1}$	0.007	0.014***	0.013***	0.017***	0.013**
	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)
Observations	148,212	161,867	159,263	169,013	154,242

Notes: The dependent variable is the logarithm of the average wage of workers in each occupation in firm i in year t. Log(nb. imported varieties of inputs)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each average occupation wage is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses. *IV specifications:* First-stage coeff. ranges from 0.097*** to 0.098***; KP F-statistics range from 15,123.1 to 18,065.6. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5 Conclusion

This paper examines how imported input varieties reshape within-firm occupational structure. Using French administrative employer-employee, customs and balance-sheet data over the period 2002-2015, together with a shift-share instrumental variable strategy, I provide causal evidence that expanding imported input varieties induces firms to reorganize their workforce by increasing the relative importance of senior managers. A one standard deviation increase in imported input varieties raises the share of senior managers by 0.22 percentage points. These results reflect the heightened demand for skilled senior managers as the production process becomes more complex when firms source a wider range of foreign inputs. The positive effect on senior managers remains robust across a wide range of alternative specifications.

The analysis further shows that organizational adjustments differ across firms and imported inputs. Larger firms respond by strengthening their managerial structure, whereas smaller firms adjust mainly across production occupations. The type of imported input also matters. Differentiated products primarily increase the demand for senior managers, whereas homogeneous products complement skilled blue-collar workers. Moreover, capital goods are mainly associated with an increase in senior managers, while intermediate inputs are more strongly associated with supervisors, suggesting that different imported inputs generate distinct organizational requirements. Decomposing managerial occupations further reveals that the increase in senior managers is driven primarily by engineers, particularly when firms import differentiated products. Finally, newly imported input varieties are associated with greater demand for engineers, highlighting the

importance of technical capabilities in integrating new foreign inputs into production. These organizational adjustments are also reflected in firms' wage structure: the wage-bill share of senior managers increases, while average wages rise across most occupations.

This paper contributes to the growing literature on trade and firms' labor organization by shifting the focus from export-related shocks to imported input varieties. While previous studies have shown that trade affects organizational structure through managerial layers, decentralization or broad changes in skill intensity, this paper demonstrates that imported inputs reshape firms through changes in their occupational composition. It further identifies the specific managerial occupations driving these adjustments and shows that the organizational response depends on the characteristics of the imported inputs.

The findings also carry important policy implications. As production becomes increasingly fragmented across countries, policies accompanying trade integration should account not only for changes in aggregate employment or broad skill demand, but also for changes in firms' occupational needs. The results suggest that imported input sourcing raises demand for managerial, engineering and coordination capabilities required to manage increasingly complex production processes. Policies supporting worker adjustment may therefore be more effective if they complement broad education policies with occupation-specific training and up-skilling programs aimed at developing managerial and technical capabilities, while providing transitional support for workers in occupations adversely affected by these organizational changes.

Finally, the paper opens several avenues for future research. First, this analysis focuses on imported goods, whereas sourcing services from abroad may generate different organizational responses that remain largely unexplored. Second, worker-level analysis would provide richer evidence on the microeconomic mechanisms underlying these adjustments, allowing future research to examine career progression, occupational mobility and wage dynamics following firms' expansion of imported input sourcing.

Appendix

Table A1: The PCS-ESE Classification (2003)

Occupation	**Description**
CS 3	Senior managers:
	Administrative and commercial managers (CS 37)
	Engineers (CS 38)
	Other seniros managers (other CS 3 categories)
CS 4	Supervisors:
	Administrative and commercial supervisors (CS 46)
	Technicians (CS 47)
	Other supervisors (other CS 4 categories)
CS 5	White collar workers:
	Civilian employees and public service agents (CS 52)
	Security workers (CS 53)
	Administrative office workers (CS 54)
	Sales workers (CS 55)
	Personal services workers (CS 56)
CS 6	Blue-collar workers:
	Skilled industrial workers (CS 62)
	Skilled manual workers (CS 63)
	Drivers (CS 64)
	Skilled transport and wholesale (CS 65)
	Unskilled industrial workers (CS 67)
	Unskilled manual workers (CS 68)

Source: INSEE.

Table A2: Descriptive statistics by firm size

	Importers with $\geq$ 50 employees	Importers with $<$ 50 employees
Share of senior managers	0.121	0.101
Share of senior admin. and com. managers	0.045	0.042
Share of engineers	0.074	0.056
Share of other senior managers	0.001	0.002
Share of supervisors	0.194	0.181
Share of admin. and com. supervisors	0.061	0.074
Share of technicians	0.090	0.074
Share of other supervisors	0.043	0.034
Share of white-collar workers	0.086	0.125
Share of skilled blue-collar workers	0.378	0.343
Share of unskilled blue-collar workers	0.214	0.229
Wage-bill share of senior managers	0.214	0.229
Wage-bill share of supervisors	0.214	0.230
Wage-bill share of white-collar workers	0.070	0.119
Wage-bill share of skilled blue-collar workers	0.332	0.309
Wage-bill share of unskilled blue-collar workers	0.153	0.165
Average wage of senior managers	40213.590	37842.752
Average wage of supervisors	24055.302	22496.280
Average wage of white-collar workers	16777.454	15569.133
Average wage of skilled blue-collar workers	11012.561	6699.965
Average wage of unskilled blue-collar workers	6012.441	4080.859
Number of imported varieties of inputs	56.158	16.013
Total imports of inputs	11841.372	1135.931

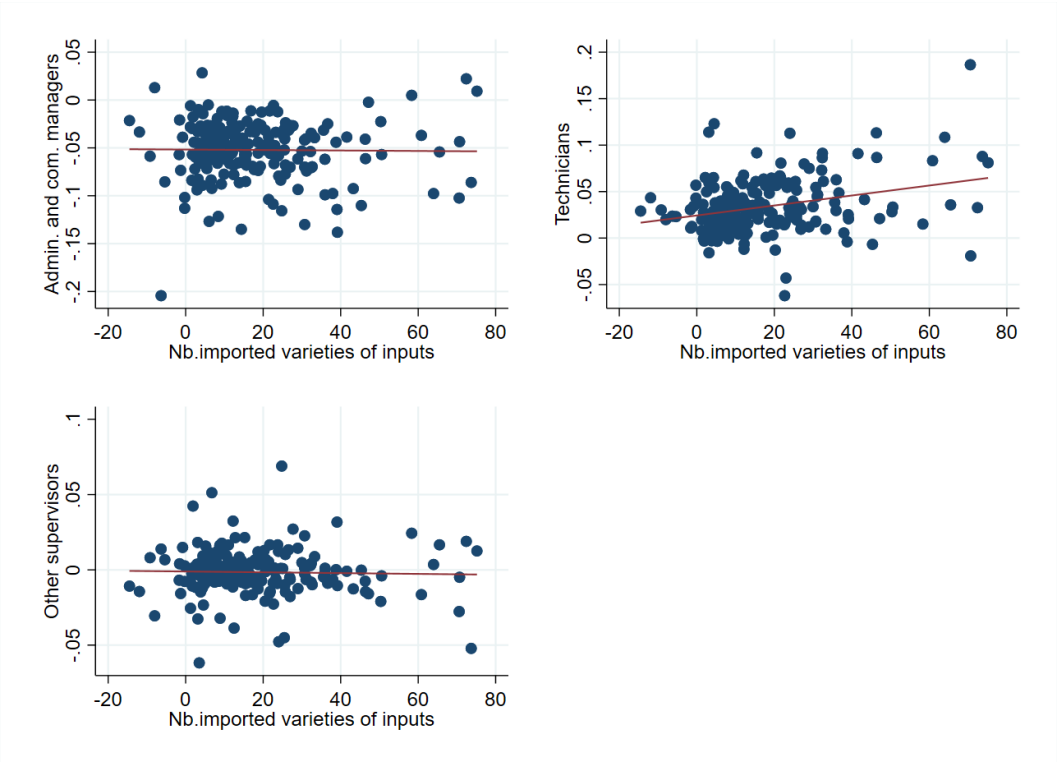
Notes: This table is restricted to the sample of importers with more than five employees and at least blue-collar workers (CS6) in their labor organization. Total imports are measured in thousands of euros. The sample consists of 37,468 firms and 218,133 firm-year observations.

Table A3: Average of main variables in 2002 and 2015

	2002	2015
Share of senior managers	0.088	0.126
Share of senior admin. and com. managers	0.038	0.048
Share of engineers	0.047	0.076
Share of other senior managers	0.003	0.001
Share of supervisors	0.198	0.185
Share of admin. and com. supervisors	0.102	0.048
Share of technicians	0.059	0.100
Share of other supervisors	0.037	0.037
Share of white collar workers	0.098	0.120
Share of blue collar workers	0.600	0.556
Share of skilled blue collar workers	0.357	0.347
Share of unskilled blue collar workers	0.243	0.209
Number of imported varieties of inputs	25.511	38.240
Total imports of inputs	4,251.162	6,064.627

Notes: This table is restricted to the sample of importers with more than 5 employees and, at least, blue collar workers (CS6) in their labor organization. Total imports are in thousands of euros.

Figure A1: The number of imported varieties of inputs and the change in workforce composition (2002-2015): supervisors



Notes: On the horizontal axis, the change in the average number of imported varieties of inputs between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. On the vertical axis, the change in the average share of workers in a given sub-occupation of supervisors (2 digits) out of total number of employees between 2002 and 2015 across firms in each 4 digits sector (NACE) is reported. *Source:* Author's calculations using DADS and French customs data.

Table A4: Balance test

	(1)	(2)	(3)	(4)	(5)
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A: Standard errors clustered at the firm level					
IV_{it}	0.007	0.018	−0.006	−0.004	−0.013
	(0.011)	(0.016)	(0.011)	(0.024)	(0.022)
Observations	6,024,908	6,024,908	6,024,908	6,024,908	6,024,908
Panel B: Standard errors clustered at the country-product level					
IV_{it}	0.007*	0.018**	−0.006	−0.004	−0.013*
	(0.004)	(0.007)	(0.008)	(0.007)	(0.007)
Observations	6,024,908	6,024,908	6,024,908	6,024,908	6,024,908

Notes: The dependent variable is the lagged share of workers in each occupation out of total employees in firm i in year $t-1$. IV_{it} denotes the instrumental variable measure used in the analysis. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupational share is estimated in a separate regression. The sample includes all non-exporting importing firms with more than five employees and at least blue-collar workers within their workforce organization. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Stability over time of firms' portfolio (2002-2015)

	Mean	Median
Share of trade		
Top 1 product	0.629	0.606
Top 2 products	0.747	0.781
Top 1 country	0.704	0.711
Top 2 countries	0.824	0.865
Top 1 product × country pair	0.559	0.513
Top 2 product × country pairs	0.676	0.689
Number of changes		
Top 1 product	2.427	2
Top 2 products	4.537	4
Top 1 country	1.664	1
Top 2 countries	2.770	3
Top 1 product × country pair	3.267	3
Top 2 product × country pairs	6.074	6

Notes: This table presents the average share of the top 1 and top 2 imported products, calculated using customs data for firms over the period 2002-2015 as the ratio of imports of an HS6 product to a firm's total imports. The same calculations are performed for countries and product-country pairs. The table also reports the average number of times a firm changes its top 1 or top 2 imported products over the sample period. The same analysis is conducted for countries and product-country pairs. The sample is restricted to importing firms with more than five employees and at least one blue-collar worker (CS6) in their labor organization. The sample consists of 37,468 firms and 218,133 firm-year observations.

Table A6: Robustness checks (alternative specifications)

	(1)	(2)	(3)	(4)	(5)
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A: Sector-year FE (IV)					
Log(nb. imported varieties of inputs)$_{it-1}$	0.142**	0.071	−0.037	0.218	−0.370***
	(0.056)	(0.082)	(0.063)	(0.138)	(0.134)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No
Sector-year FE	Yes	Yes	Yes	Yes	Yes
Dept.-year FE	No	No	No	No	No
Observations	176,369	176,369	176,369	176,369	176,369
Panel B: Department-year FE (IV)					
Log(nb. imported varieties of inputs)$_{it-1}$	0.137**	0.047	−0.031	0.189	−0.323**
	(0.056)	(0.082)	(0.063)	(0.138)	(0.134)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	No	No	No	No	No
Sector-year FE	No	No	No	No	No
Dept.-year FE	Yes	Yes	Yes	Yes	Yes
Observations	176,369	176,369	176,369	176,369	176,369
Panel C: Controlling for purchases of raw materials and supplies (IV)					
Log(nb. imported varieties of inputs)$_{it-1}$	0.161***	0.107	−0.031	0.171	−0.396***
	(0.056)	(0.083)	(0.064)	(0.142)	(0.138)
Log(Purchases of raw mat. & supp.)$_{it-1}$	−0.050	−0.223***	−0.104**	0.128	0.317***
	(0.043)	(0.058)	(0.051)	(0.079)	(0.077)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	172,363	172,363	172,363	172,363	172,363

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. Log(Purchases of raw mat. & supp.)$_{it-1}$ is the logarithm of the total purchases of raw materials and supplies of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses. *Panel A:* First-stage coeff. = 0.098***; KP F-stat. = 18,964.1. *Panel B:* First-stage coeff. = 0.098***; KP F-stat. = 19,025.6. *Panel C:* First-stage coeff. = 0.097***; KP F-stat. = 18,264.4.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A7: Robustness checks (alternative measures of import exposure)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A					
Log(tot. imported inputs)$_{it-1}$	0.115***	0.061	−0.036	0.128	−0.248**
	(0.041)	(0.060)	(0.046)	(0.102)	(0.099)
Panel B					
Log(nb. HS6 products)$_{it-1}$	0.181***	0.095	−0.057	0.201	−0.390**
	(0.065)	(0.095)	(0.073)	(0.160)	(0.155)
Panel C					
Log(nb. origin countries)$_{it-1}$	0.269***	0.142	−0.085	0.298	−0.579**
	(0.097)	(0.141)	(0.108)	(0.237)	(0.231)
Observations	176,373	176,373	176,373	176,373	176,373

*Notes:*The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Each panel corresponds to a different measure of import exposure on the right-hand side, measured at $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses.
Panel A: First-stage coeff. = 0.134***; KP F-stat. = 9,941.5.
Panel B: First-stage coeff. = 0.085***; KP F-stat. = 15,004.4.
Panel C: First-stage coeff. = 0.057***; KP F-stat. = 10,813.7.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A8: Robustness checks (BEC classification)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)$_{it-1}$	0.164***	0.045	−0.077	0.118	−0.186
	(0.064)	(0.090)	(0.065)	(0.156)	(0.149)
Observations	168,186	168,186	168,186	168,186	168,186

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations classified as inputs according to the BEC classification. All regressors are measured at $t-1$. Control variables include the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses.
IV specification: First-stage coeff. = 0.095***; KP F-stat. = 13,456.2.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table A9: Robustness checks (excluding major trading partners)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A: excl. US					
Log(nb. imported varieties of inputs)$_{it-1}$	0.138**	0.110	−0.063	0.217	−0.369***
	(0.055)	(0.081)	(0.062)	(0.139)	(0.135)
Observations	171,833	171,833	171,833	171,833	171,833
Panel B: excl. China					
Log(nb. imported varieties of inputs)$_{it-1}$	0.095*	0.093	−0.106*	0.263*	−0.316**
	(0.056)	(0.081)	(0.061)	(0.139)	(0.135)
Observations	172,023	172,023	172,023	172,023	172,023
Panel C: excl. EU					
Log(nb. imported varieties of inputs)$_{it-1}$	0.166***	−0.160*	0.031	−0.224	0.182
	(0.062)	(0.089)	(0.069)	(0.142)	(0.134)
Observations	124,275	124,275	124,275	124,275	124,275

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. Control variables include the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm in parentheses.

Panel A: First-stage coeff. = 0.100***; KP F-stat. = 18,332.3.

Panel B: First-stage coeff. = 0.101***; KP F-stat. = 18,631.7.

Panel C: First-stage coeff. = 0.085***; KP F-stat. = 18,425.2.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A10: Robustness checks (excluding top importing varieties)

	(1)	(2)	(3)	(4)	(5)
	Senior managers	Supervisors	White collar	Skilled blue collar	Unskilled blue collar
Panel A: Excluding the top import market					
Log(nb. imported varieties)$_{it-1}$	0.106*	−0.016	0.034	0.186	−0.298**
	(0.054)	(0.080)	(0.061)	(0.134)	(0.127)
Observations	167,301	167,301	167,301	167,301	167,301
Panel B: Excluding the top three import markets					
Log(nb. imported varieties)$_{it-1}$	0.121**	−0.093	0.049	0.012	−0.102
	(0.054)	(0.079)	(0.061)	(0.131)	(0.125)
Observations	157,343	157,343	157,343	157,343	157,343

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses.
Panel A: First-stage coeff. = 0.093***; KP F-stat. = 21,394.9.
Panel B: First-stage coeff. = 0.092***; KP F-stat. = 22,645.2.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A11: The product complexity channel (separate regressions)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White-collar workers	Skilled blue collar	Unskilled blue collar
Panel A					
Log(nb. imported varieties of inputs)H$_{it-1}$	−0.165*	0.022	−0.031	0.512**	−0.274
	(0.090)	(0.131)	(0.093)	(0.250)	(0.240)
Panel B					
Log(nb. imported varieties of inputs)D$_{it-1}$	0.398***	0.006	0.116	−0.316	−0.228
	(0.097)	(0.140)	(0.108)	(0.243)	(0.233)
Observations	116,768	116,768	116,768	116,768	116,768

Notes: The dependent variable is the share of workers in each occupation out of total employees in firm i in year t. Log(nb. imported varieties of homogeneous inputs)$_{it-1}$ (Log(nb. imported varieties of differentiated inputs)$_{it-1}$) is the logarithm of the total number of imported homogeneous (differentiated) product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses.
IV specifications: First-stage coeff. (homogeneous inputs) = 0.108***; first-stage coeff. (differentiated inputs) = 0.082***; KP F-statistics = 6,537.6 and 6,704.0, respectively.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A12: Managerial sub-occupations and product complexity

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior admin. & comm. mgrs	Engineers	Admin. and comm. supervisors	Technicians	Other middle mgrs
Log(nb. imported varieties of inputs)H_{it-1}	−0.089	−0.103	0.089	−0.128	0.061
	(0.065)	(0.071)	(0.087)	(0.092)	(0.065)
Log(nb. imported varieties of inputs)D_{it-1}	0.166**	0.256***	0.033	0.125	−0.156**
	(0.071)	(0.082)	(0.104)	(0.106)	(0.061)
Observations	116,769	116,769	116,769	116,769	116,769

Notes: The dependent variable is the share of workers in each sub-occupation out of total employees in firm i in year t. Log(nb. imported varieties of homogeneous inputs)$_{it-1}$ (Log(nb. imported varieties of differentiated inputs)$_{it-1}$) is the logarithm of the total number of imported homogeneous (differentiated) product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses.
IV specifications: First-stage coeff. (homogeneous inputs) = 0.125***; first-stage coeff. (differentiated inputs) = 0.097***; KP F-statistics = 3,923.6.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A13: New imported varieties of inputs and sub-occupations

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
	Senior admin. & comm. mgrs	Engineers	Admin. and comm. supervisors	Technicians	Other supervisors
Log(nb. new imported varieties of inputs)$_{it-1}$	0.006	0.106***	−0.011	0.022	−0.040***
	(0.018)	(0.019)	(0.026)	(0.025)	(0.015)
Observations	153,504	153,504	153,504	153,504	153,504

Notes: The dependent variable is the share of workers in each sub-occupation out of total employees in firm i in year t. Log(nb. new imported varieties of inputs)$_{it-1}$ is the logarithm of the total number of new imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and, at least, the blue-collar occupation within their workforce organization. Standard errors clustered by firm are reported in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A14: Imported varieties of inputs and average wage (firms with all occupations)

	(1) IV	(2) IV	(3) IV	(4) IV	(5) IV
	Senior managers	Supervisors	White-collar workers	Skilled blue collar	Unskilled blue collar
Log(nb. imported varieties of inputs)$_{it-1}$	0.025**	0.020*	0.033**	0.044**	0.031
	(0.010)	(0.011)	(0.014)	(0.018)	(0.020)
Observations	12,479	12,479	12,479	12,479	12,479

Notes: The dependent variable is the logarithm of the average wage of workers in each occupation in firm i in year t. Log(nb. imported varieties of inputs)$_{it-1}$ is the logarithm of the total number of imported product-country combinations of firm i in year $t-1$. All specifications include controls for the logarithm of age, the logarithm of assets, and the change in the logarithm of value added of firm i in year $t-1$, as well as firm and year fixed effects. Each occupation share is estimated in a separate regression. The sample includes all importing firms with more than 5 employees and all occupations across all years. Standard errors clustered by firm are reported in parentheses.

IV specification: First-stage coeff. $= 0.087^{***}$; KP F-stat. $= 793.6$.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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