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# Reorganizing Global Supply-chains: Who, What, How, and Where

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## ABSTRACT

In an increasingly uncertain environment, firms are differently exposed to shocks and may or may not bear the cost of reorganizing their value chain by reshoring or offshoring. This paper draws on a survey of French firms about the decision to reorganize part of their value chain between January 2018 and December 2020. Reorganizations prove to be infrequent, made by firms employing a higher proportion of skilled workers, in manufacturing rather than in services, with a predominance of multinational firms. Even though high-skill firms are reorganizing more, reorganized business functions are less skill-intensive and more intensive in routine tasks. Activities more intensive in intangible capital are more likely to be reorganized within firm's boundaries. Last, besides reshoring in France, activities are located close to France when offshored. India, combining low-average wage and a large endowment of high-skilled workers, receives a disproportionate share of skill-intensive activities.

Keywords: Supply-chains, Reshoring, Offshoring

JEL classification: F14, F23, L10, L23

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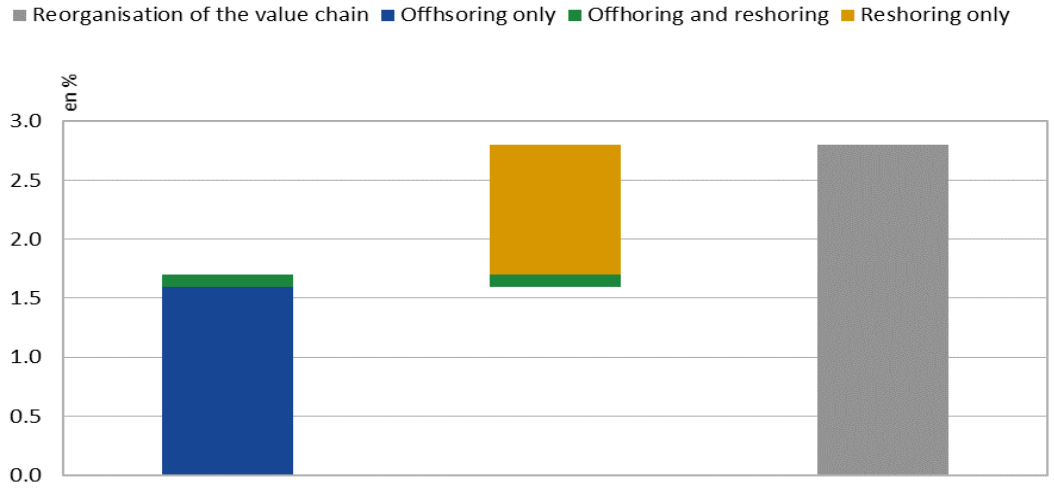
# NON-TECHNICAL SUMMARY

GVCs enable greater specialization and therefore gains in terms of production costs, but they are complex structures that entail greater risks. As such, supply-chain organization results from the trade-off between cost efficiency and cost uncertainty. When economic conditions change, the terms of this trade-off change; and firms may decide to reorganize their supply-chain. Reorganizing the supply-chain can take multiple forms. It may involve separate business functions (What), different countries (Where), take place within the firm's boundaries or outside the firm's boundaries (How). Whether a firm takes one of these decisions or not (Who) depends on how exposed to changes the firm is and how costly it is to reorganize. This paper studies, along these four margins, how firms adapt their international supply-chain. We leverage a survey of French firms (Chaînes d'activité mondiales, CAM) that fulfils these requirements. For each surveyed firm, we observe whether it has offshored or reshored part of its international value chain between January 2018 and December 2020. We also observe which business functions were thus reorganized, and whether this took place within the firm's boundaries (in-house) or not (at arms' length), controlling for destination-level determinants of location. Importantly, surveyed units are so-called "enterprises", a concept that reflects a set of legal units sharing a common centre of decision. We make the following working hypothesis: respondents' initially optimal value chain has been subject to unobserved shocks, possibly due to a more uncertain environment. Firms have then made a decision, or not, to reorganize, and this decision is observable, reported in the survey.

Adjustments are uncommon: less than 3% of firms offshored or reshored during the three years under review, and only a handful of firms did both. These adjustments were made by firms employing a greater proportion of skilled workers, in manufacturing industries rather than services. Multinationals, particularly foreign multinationals, predominate among these firms. Firms report offshoring and reshoring decisions separately for each business function of their value chain and the survey shows that they reorganized only a fraction of their supply-chain: less than one percent of firm-function combinations are reorganized during the period and these are business functions considered to be their core activity. Upon offshoring, we find that the likelihood of offshoring in-house decreases with firm productivity, suggesting that the cost of arm's length relationship is higher than the cost of in-house relationships. Last, the likelihood of reorganizing in-house increases with the fraction of intangible capital in total capital for offshored activities, but not reshored activities. We interpret this result as the sign that intellectual rights are hard to enforce, and harder in foreign countries than in France. We finally find that the likelihood of offshoring in a given destination decreases with distance from France, and that high-skilled and R&D intensive activities are more likely to be offshored in India.

**Figure 1. Percentage of companies having offshored or reshored between January 2018 and December 2020**




Note: The share of companies reorganizing their global value chain is weighted by survey weight calculated based on employee headcounts. Reading: On average, 1.7% of companies have relocated at least one activity between January 2018 and December 2020.
Source: INSEE, survey "Chaînes d'activité mondiales", 2020

# Réorganisation des chaînes d'approvisionnement mondiales : qui, quoi, comment et où

## RÉSUMÉ

Dans un environnement de plus en plus incertain, les entreprises sont différemment exposées aux chocs choisissent d'assumer ou non le coût de la réorganisation de leur chaîne de valeur par relocalisation ou délocalisation. Cet article s'appuie sur une enquête menée auprès d'entreprises françaises sur la décision de réorganiser une partie de leur chaîne de valeur entre janvier 2018 et décembre 2020. Les réorganisations s'avèrent peu fréquentes, réalisées par des entreprises employant une plus grande proportion de travailleurs qualifiés, dans l'industrie manufacturière plutôt que dans les services, avec une prédominance d'entreprises multinationales. Même si les entreprises hautement qualifiées se réorganisent davantage, les fonctions réorganisées sont moins intensives en compétences et plus intensives en tâches routinières. Les activités plus intensives en capital immatériel sont plus susceptibles d'être réorganisées au sein du périmètre de l'entreprise. Enfin, outre la relocalisation en France, les activités délocalisées le sont à proximité de la France. L'Inde, qui combine un salaire moyen peu élevé et une importante dotation en travailleurs hautement qualifiés, reçoit une part disproportionnée des activités à forte intensité de compétences.

Mots-clés : chaines de valeur, relocalisation, délocalisation

# Introduction

More than half of international trade is mediated through global value chains (GVCs) – production processes that span at least two countries (Antràs, 2020). GVCs enable greater specialization and therefore gains in terms of production costs, but they are complex structures that entail greater risks. That makes firms participating in GVCs all the more exposed to supply shocks, as evidenced by several recent events[1] and by the increasing attention supply chains are getting from executives (Ersahin et al., 2024). Shocks to the supply chain may propagate and turn into large economic effects, as shown by a growing body of literature (see, e.g., Barrot and Sauvagnat, 2016; di Giovanni et al., 2018; Carvalho et al., 2021; Lafrogne-Joussier et al., 2023), possibly freezing supply (Elliott et al., 2022). As such, supply-chain organization results from the trade-off between cost efficiency and cost uncertainty (Kopytov et al., 2023). When economic conditions change, the terms of this trade-off change; and firms may decide to reorganize their supply-chain.

Reorganizing the supply-chain can take multiple forms. It may involve separate business functions ("What"), different countries ("Where"), take place within the firm's boundaries or outside the firm's boundaries ("How"). Whether a firm takes one of these decisions or not ("Who") depends on how exposed to changes the firm is and how costly it is to reorganize. This paper studies, along these four margins, how firms adapt their international supply-chain.

It is generally difficult to explore this question exhaustively, as it would require a complete description of the value chain. Firstly, it means considering all the business functions involved in the firm's value chain. This includes both upstream functions (e.g., R&D) and downstream functions (e.g., transportation). Most descriptions of firms' value chains are based on flows of goods, thus missing service activities. Secondly, it also implies observing outsourced activities, not just those carried out within the firm. Thirdly, firms participating in global value chains often group together several administrative units, in which decisions are taken by the head office. Full account of supply chain reorganization requires all firms under the same decision-making center to be considered as a single entity. Furthermore, within these organizational structures, international trade may be conducted through specific (specialized) firms, making it difficult to identify reorganization from firm-level data only. One way of getting around this problem is to ask the decision center directly about reorganization decisions.

In this paper, we leverage a survey of French firms ("Chaînes d'activité mondiales", CAM) that fulfills these requirements. For each surveyed firm, we observe whether it has offshored or reshored part of its international value chain between January 2018 and December 2020. We also observe which business functions were thus reorganized, and whether this took place within the firm's boundaries or not – at arms' length. Importantly, surveyed units are so-called "enterprises", a concept that reflects

[1] For instance, the 2011 Tohoku earthquake, the 2011 floods in Thailand, the Sino-American trade war, or the Covid-19 pandemic.

a set of legal units sharing a common center of decision.[2] The ability to observe the decisions of "enterprises" ( "firms" henceforth) contrasts with usual datasets that either aggregate decisions at the level of groups, encompassing different activities and potentially different value chains – here, the unit of analysis is one value chain – or focus on single legal units, masking potential decisions made at the firm-level – here, we work with all legal units under the same lead legal unit.

With this unique set of data, and since we have cross-sectional evidence – reorganizations over 2018-2020 – we make the following working hypothesis: respondents' initially optimal value chain has been subject to unobserved shocks, possibly due to a more uncertain environment. Firms have then made a decision, or not, to reorganize, and this decision is observable, reported in the survey. This paper is about understanding "Who" decided to reorganize, and if so, "What" business functions, "How", that is within its boundaries or not, and "Where" the firm offshored the business function, if it offshored.

The first survey question we exploit is whether a decision to reorganize their global value chain network has been made over the period 2018-2020, or not. Such a decision may concern either the offshoring or the relocation in France of part or all of a business function. Offshoring and reshoring are strictly defined as the movement of activities with a reduction or increase in activity in France. The survey therefore excludes any reorganization within France or within the rest of the world, as well as pure firm's growth in foreign markets through horizontal foreign direct investment. We complement the survey with a range of administrative data on firms to describe "Who" reorganizes its value chain. We use annual balance sheet data (*FARE*), matched employer-employee data (*DADS*), customs data, and the business register (*Répertoire Sirene*). A limitation here is that administrative data usually record data for legal units, and not firms. Special care is thus devoted to aggregating legal unit-level data up to firm-level data.

According to the survey, adjustments are uncommon: less than 3% of firms offshored or reshored during the three years under review, and only a handful of firms did both. In the sample we use for regressions, 142 firms offshored and 105 reshored. These adjustments were made by firms employing a greater proportion of skilled workers, in manufacturing industries rather than services. Multinationals, particularly foreign multinationals, predominate among these firms. This last result for multinationals is robust to the introduction of industry fixed effects, suggesting that within industries, reorganization was more prevalent among firms either more exposed to foreign shocks or with more resources and opportunities to reshape their value chain. Besides, the firm's skill intensity, as well as its multinational reach, have a greater impact on offshoring than on reshoring. This first set of results suggests mechanisms by which multinational firms are more exposed to uncertainty

[2] According to the European regulation of 1993, an "enterprise" is "*the smallest combination of legal units that is an organizational unit producing goods or services, which benefits from a certain degree of autonomy in decision-making, especially for the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise may be a sole legal unit but can also be part of an enterprise group.*" France adopted the definition of enterprises for structural firms statistics in 2008.

through their value chain, are more willing to adapt, and have greater skill or financial resources to do so.

Second, firms report offshoring and reshoring decisions separately for each business function of their value chain. In the survey, a business function is a large category of activities; there are eight such categories, reflecting every part of the production process, ranging from upstream functions such as R&D to end-of-pipe functions such as marketing or transportation.

Firms reorganized only a fraction of their supply-chain: less than one percent of firm-function combinations are reorganized during the period. When firms reorganize, they tend to reorganize business functions that they consider to be their core activity. Besides, even though high-skill firms reorganized more, reorganized business functions have lower skill intensity. Consistent with Acemoglu and Autor (2011), we find that routine activities are more mobile.

Third, we observe whether the reorganized business functions end up within the firm or outside the boundaries of the firm, the "How". However, there is no information about whether the function was carried out previously within the firm or not: we will not be able to talk, strictly speaking, about the internalization of parts of the production process; we rather observe whether these parts are vertically integrated or not. Upon offshoring, we find that the likelihood of offshoring in-house decreases with firm productivity, suggesting that the cost of arm's length relationship is higher than the cost of in-house relationships. Activities tend to be less reorganized in-house if they are capital-intensive. Last, the likelihood of reorganizing in-house increases with the fraction of intangible capital in total capital for offshored activities, but not reshored activities. We interpret this result as the sign that intellectual rights are hard to enforce, as in Ethier (1986); Markusen (1995), and harder in foreign countries than in France.

Finally, for each offshored business function, firms also report the region where the activity was relocated.[3] Regions are large parts of the world, that may aggregate multiple countries ("South America") or single countries (India or China). We find that the likelihood of offshoring in a given destination decreases with distance from France, and that high-skilled and R&D intensive activities are more likely to be offshored in India.

Although these are important results, we are aware of the intrinsic limitation of the data used. The first issue is indeed self-selection in terms of participation in global value chains. It is well documented that not all firms export, or import, and this applies even more so to firms that have developed global networks of business relationships. Global sourcing, which involves fixed cost, is more attractive to larger firms (Antràs et al., 2017). Consequently, the scarcity of reorganization in our data set is no surprise. The firms that are adjusting are already those that have self-selected to participate in global networks of business relationships. Another determining factor of this scarcity is the lock-in effect of contractual relations established in value chains characterised by a bilateral

[3]Unfortunately, we do not observe the region from which reshored activities originate.

hold-up problem: sunk-costs investments are devoted to customized inputs, either within the firm's boundaries or from subcontractors, while switching from one source to another is problematic in terms of contractual security when moving from an in-house to subcontractors, or even from one foreign subsidiary to another in countries with different rule of law (Chor and Ma, 2021).

**Related literature.** This paper speaks to three related literatures. We first contribute to the growing literature on the reorganization of global supply chains. While existing work either focuses on specific industries (Galdin, 2023; Castro-Vincenzi, 2024), on multinationals (di Stefano et al., 2022), or on manufacturers (Boehm et al., 2019), we study firms operating in all sectors, with any type of activity carried-out along the supply chain. In particular, to the best of our knowledge, we are among the first to study both reshoring and offshoring decisions, which appear to be of equal importance.

Furthermore, we contribute to the literature that seeks to understand the determinants of international firms' boundaries. A first strand of literature uses intra-firm trade data and finds support for the predictions of Antràs (2003), be that on US firms (Antràs and Helpman, 2008; Nunn and Trefler, 2013), or, closer to us, on French firms (Carluccio and Fally, 2012; Defever and Toubal, 2013; Corcos et al., 2013). In particular, intra-firm trade prevails in capital and skill-intensive industries and more productive firms. However, data limitations on international trade force these studies to focus on parent-affiliate relationships in which physical goods are traded. We contribute by considering a broader perspective encompassing a wider set of activities, from goods to services, and activities conducted both within and outside the firm. We also describe business functions with the mix of production inputs they need. This measure is consistent with Antràs (2003) in which the factor content of business functions, and not of the reorganizing firm, is a key driver of integration. A second strand of literature seeking to understand the drivers of firms' global boundaries relies on data on foreign manufacturing activity, using various proprietary sources (Del Prete and Rungi (2017) use Bureau van Dijk' Orbis and Zephyr, Alfaro et al. (2019) use Dun & Bradstreet's Worldbase). One of the key advantages of the survey we use is that it covers not only manufacturing activities but all types of functions along the value chain.

Finally, we are following the footsteps of Bernard et al. (2020); Berlingieri et al. (2021); Kaus and Zimmermann (2022) who used different vintages of the same survey in other countries, as a laboratory of firm decisions regarding offshoring.[4] We depart from this set of papers in two ways: we study determinants of reorganizations rather than consequences[5], and we consider not only offshoring

[4]Bernard et al. (2020) used a 2005 vintage on Danish firms, Berlingieri et al. (2021) a 2012 vintage on French firms, and Kaus and Zimmermann (2022) a 2017 vintage of German firms.

[5]Bernard et al. (2020) show that following offshoring, firms specialize their domestic production units in high-quality goods, rather than shutting them down altogether, increasing high-skill workers' employment and innovation activities within the parent firm. On the contrary, Kaus and Zimmermann (2022) find that domestic employment and production at parent firms decline following offshoring. Berlingieri et al. (2021) shows how service offshoring in a given region emerges when firms want to settle as an exporter in this region.

but also reshoring decisions.

The remainder of the paper is organized as follows. We describe the survey and additional data we use in Section 1, before presenting the determinants of "Who" reorganizes, "What" is reorganized, "How" it is reorganized, and "Where", in Sections 2, 3, 4, and 5.

# 1 Data

In this section, we describe the GVC survey and the questions we draw from it, as well as additional firm-level data sources. We also describe how we construct the factor content of business functions and the data on offshoring regions characteristics.

## 1.1 The GVC survey

The source of data on firm-level offshoring and reshoring is the survey *Enquête sur les chaînes d'activité mondiales* (*Global Value Chains Survey*) conducted by the French National Institute of Statistics and Economic Studies (INSEE) in 2021. The survey derives from an EU-wide initiative, and several other EU countries conduct similar surveys.[6] Its main objective is to document the extent of domestic and international outsourcing (offshoring) by firms operating in France. It asks questions about motivations and obstacles, as well as the consequences of offshoring. The main specificity of the French version of the 2021 survey is the inclusion of questions on the relocation of activities to France.

The survey covers all firms operating in France with more than 50 employees, except agricultural activities (industries B to N in the NACE/CITI classification). The survey is exhaustive among firms with more than 250 employees, and stratified among firms with fewer than 250 employees, according to employment, export sales, sector of activity and multinational status. Some 11,000 firms were included in the survey, and 7,042 answered. The responses relate to reorganizations for which the decision was made during the years 2018, 2019 and 2020.[7]

What makes this survey unique is the definition of the "firm" used. Surveyed units are "enterprises", a concept developed by Eurostat as "the smallest combination of legal units that constitutes an organizational unit for the production of goods and services, with a certain degree of decision-making autonomy, particularly for the allocation of its operating resources." In general, enterprises consist of a single legal unit (LU); but some "enterprises" consist of two or more legal units, in which

[6] Four vintages of the survey exist (2007, 2001, 2018 and 2021), on different samples of firms, each time conducted by several EU members. The survey will become part of official EU statistics from 2024 onwards, and will be conducted every 3 years by each Member State.

[7] The set of firms being exhaustive above 250 employees and only sample below may bias our results towards large firms. We replicate all our main regressions with weighted regressions and find that weighting has no effect on our conclusions. See Appendix Tables S.3-S.6.

case the French statistical office (Insee) groups the legal units into an "Entreprise Profilée" (EP).[8] In the survey, two-thirds of the respondents are EP. In the following, we will indifferently call "firms" the surveyed units, be they a single LU or a group of LU (EP).

This particular feature of the survey has an immediate advantage. EPs must report on decisions relating to their perimeter in France, i.e., decisions concerning all the legal units within their perimeter. The essence of the EP is that it aggregates decision-making; if we were to survey legal units without taking into account the fact that another legal unit is making the decision, we'd miss part of the story. This also has a disadvantage, given that most administrative data is recorded at the legal unit level: additional work is required to aggregate data from legal units to the EP. As we believe we are the first to do so, we briefly present the procedure in Section 1.3 and defer the full discussion to Appendix Section B.1.

## 1.2 Variables of interest

We use three sets of questions from the survey.[9] The first is about the decision to offshore or reshore a given business function. The question is asked for 8 different business functions: manufacturing, transportation and logistics, wholesale and call centers, ITC services, administrative and financial services, engineering and conception, R&D, and others.[10] We use the answers to this question to investigate "What" is reorganized, and aggregate them into firm-level binary variables to investigate "Who" reorganizes. To qualify as offshoring, a reorganization must involve the transfer of a job from France to a foreign country and a reduction of economic activity in France, be that within the firm's French boundaries or at subcontractors' facilities in France; and vice versa for reshoring. In particular, foreign direct investment in production facilities is not included in the answers, ensuring we are observing actual reorganizations of the value chain, not firm's growth in foreign markets. This definition also precludes any displacement of activity between two entities within France (affiliates or subcontractors) or between two entities outside of France. In short, we observe international reorganizations of the value chain when business functions cross the (French) border.

To investigate "How" firms reorganize, we use a second question asking, upon reorganization, whether the firm reorganized the business function within its boundaries or not. This applies to both offshoring and reshoring decisions.

Finally, firms must declare the destination of each *offshored* activity, among 11 regions that we aggregate in 10 regions: EU14, excluding France and the UK; EU13, which are new EU member

[8] This definition of a firm is often considered to be close to the firm's "economic" reality. In particular, it may differ from the definition of a group, which is defined by the financial links between legal units. For example, groups may house different activities, and therefore different EPs. A good example of this distinction is the Airbus group, which has three activities in France: commercial aircrafts, helicopters, and defense & space, which are three distinct EPs.

[9] The full set of questions is available at this link: https://www.insee.fr/en/metadonnees/source/operation/s2038/processus-statistique.

[10] We remove answers to an additional "construction" category.

states[11]; the United Kingdom; other European countries; China; India; other Asian countries; USA or Canada; Maghreb; and Rest of the world. We use this question to understand the determinants of "Where" firms offshore.

## 1.3 Additional data sources

To avoid any endogeneity concern, all dataset are relative to the year just before the period covered by the survey, 2017.

**Firm-level data.** We complement the survey with three firm-level datasets. First, we collect value-added $VA$ and the stock of physical capital $K$ from *FARE*, which is constructed from legal units' tax forms by Insee, and covers the population of firms producing in France, except for financial firms.[12] We augment the data with information about employment and the workforce using matched employer-employee data (*DADS*). We use this database to retrieve total employment $L$ and the share of hours worked by high-skilled workers $Share_{HS}$. We finally add the multinational status of the firm using the French firm directory *Sirus*.

Linking *FARE* and *DADS* with survey firms requires care as they are collected at the level of legal units. Most firms in France are single legal units, but the largest are a set of legal units. Because the survey collects information at the level of firms and not of legal units, we must aggregate *FARE* and *DADS* data from legal units to firms. This has mainly two implications: first, it constrains the set of variables to additive variables (value-added, employment, but not sales). Second, it makes the matching with administrative data difficult. This is because we use data on legal units relative to 2017 about firms surveyed in 2021, and the firm identifier used to retrieve the set of legal units within the firm in 2017 changed between 2017 and 2021. Firm identifiers change as delineating the set of legal units that belong to a given firm is a statistical procedure that is constantly evolving. In Appendix B, we detail the methodology we use to back out the identifiers from 2017 starting from the 2021 firm. We retrieve half of non-matched firms, leaving 5% of observations – around 300 firms – out of the sample.

The final dataset consists of the 5,797 firms for which we were able to retrieve the set of legal units in 2017, to match with FARE, DADS, and whose value-added and employment are strictly positive.

**Business functions-level data.** We use what we call the factor content of business functions: a set of variables reflecting the relative use of different production factors. We compute factor contents by first identifying business functions with a set of industries. The correspondence between business functions and industries can be found in Table S.2. We then build the factor content of business

[11] Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, and Slovenia, and Slovakia.

[12] Details on the specific variables used can be found in Appendix A.

functions by collecting the amount of factors of production for all firms operating in the corresponding industries. The factors of production are retrieved from firm-level balance sheet data (*FARE*) and matched employer-employee data (*DADS*). We measure material inputs intensity $\frac{M}{W}$ as the ratio of total material inputs expenditures to the wage bill. We also measure the intensity of intangible capital as the ratio between the stock of intangible capital and total capital $\frac{K_{inc}}{K}$. We build measures of headquarter or skill content using two alternative measures: the ratio between the wage bill of high-skilled or R&D workers to the total wage bill $\frac{HS}{W}$ and $\frac{RD}{W}$, and the share of hours worked by high-skilled or R&D workers $Share_{HS/R\&D}$. The name of variables used are described in Appendix A. Last, in line with Acemoglu and Autor (2011), we compute a measure of routineness capturing the importance of routine cognitive and manual tasks for the business function. We use routines measures at the occupation level from O*NET dataset and the correspondence between O*NET occupations and the French occupation classification (PCS) from Le Barbanchon and Rizzotti (2020). We then compute the routine measure at the level of our 8 business functions as the average of the routine measure of occupations in the business function, weighted by the number of hours worked in the occupations.

**Destinations-level data.** Destinations in the survey are regions of the world. We build region-level characteristics as the weighted average of country-level characteristics in 2017, weighted by nominal GDP in dollars of 2017. We collect distance from France and GDP per capita from CEPII's BACI.

## 1.4 Sample description

**The sparsity of boundaries' changes.** The first line of Table 1 displays the number of offshoring and reshoring firms in our sample. It appears that these decisions are rare; they represent only 2.5% (142) and 1.9% (105) of firms, respectively. Very few firms (10) declare having both offshored and reshored.[13] Firms may offshore or reshore up to 8 business functions, or activities; however, most offshore or reshore only one activity. We indeed observe 231 offshored business functions, that is 1.6 per offshoring firm, and 129 reshored business functions (1.2 per reshoring firm). Reorganization decisions take place primarily within the firm (81% of cases), reshoring activities being slightly more integrated (86%) than offshored activities (78%).

**Firms.** Firms in the final sample are large, with 917 employees and 61 millions euros of value added on average. More than a third of firms (34.7%) are manufacturing firms. 37.5% are multinational

[13]Because the survey is biased towards large firms, this figure is not representative of all firms above 50 employees in France. Still, if we reproduce the main statistics weighted by survey weights, 1.8 % of firms offshored and 1.3% reshored. Moreover, our sample is a subset of the survey, so we reproduce the figures on the full survey and the numbers do not change much. See Appendix Table S.1.

firms (22.7% are French multinationals) and 44.7% are firms operating in France only but comprised of multiple legal units (EP).

**Factor content of business functions.** The factor content of business functions, displayed in Table 3, varies greatly from one business function to another. High-skilled workers account for around 71% of the workforce in IT services, while only 22% in manufacturing activities, and around 20% in business services. The most intangible-capital intensive activities are business services and IT services, with around half of the capital stock being intangible.

**Offshoring destinations.** Offshoring destinations are mostly European countries, in particular historical EU countries (Table 4). India and Maghreb countries account each for slightly less than a tenth of recorded offshorings, while only 4% (17) business functions have been offshored to China.

# 2 Who reorganizes?

## 2.1 Conceptual framework

We begin the empirical investigation of reorganizations with laying out the conceptual framework we use to understand who we should expect to reorganize.

We conceptualize the setting as follows: starting from an initially optimal value chain, firms are faced with an (unobserved) exogenous shock that alters business conditions. New business conditions may make the previous organization of supply-chains sub-optimal and firms may reconsider their network of business relationships. The survey provides a list of firms that decided, or not, to relocate one or more business functions – a decision we refer to as *reorganization*. Under this framework, we isolate two main reasons why only some firms would reorganize. First, firms are unequally exposed to changes in their business conditions. Second, conditional on changes, firms may or may not find it profitable to reorganize. We begin by outlining the mechanisms related to the second reason before addressing the first one.

**Choosing to reorganize.** When deciding to reorganize the location of their production processes, firms trade-off paying the large sunk cost of this reorganization today, and the expected present value of increased profits, generally due to lower marginal costs or a lower variance of their returns. As a result, larger or more productive firms are more likely to reorganize their production, for the same reasons that they are more inclined to engage in foreign sourcing (Antràs et al., 2017). Besides, large firms gather several activities. If each activity has a given probability of being reorganized, it is more likely to observe at least one reorganization in large companies.

Firms may also face heterogeneous fixed costs of reorganization, particularly for offshoring decisions. Offshoring requires a certain knowledge of the offshoring region: contacts among businesses, knowledge of the legal environment for drawing up contracts, etc. Firms that already trade with foreign countries or have subsidiaries in foreign countries may thus be particularly equipped to engage in offshoring. This is particularly true for multinational firms. In addition, reorganization, be that reshoring or offshoring requires the performance of managerial tasks (supervision, team leadership) and highly skilled tasks (market analysis, legal analysis, etc.).[14]

**Exposure to changes in business conditions.** Firms are unequally exposed to changing business conditions depending on their activity: demand or supply shocks vary from one industry to another, and so the primary determinant of exposure to business conditions is the industry to which a firm belongs. For example, a firm producing capital goods will be more sensitive to the business cycle than a firm producing processed food. Second, firms are differently exposed to changes in economic conditions abroad, as opposed to France, induced by the firm-level intensity of participation in international trade. Finally, exposure differs between firms considering reshoring an activity, and those about to offshore an activity previously carried out domestically within the firm, or by a domestic subcontractor. While all surveyed firms have an activity of production of goods or services in France and so may decide to offshore one activity, only firms with foreign suppliers can reshore activities: to control for this, we use two survey questions, indicating respectively whether the firm sources raw materials and services from abroad.

## 2.2 Specification

We begin by analyzing the differences between firms that reorganize and those that do not. We use variables describing firms before the reorganizations under study (see Section 1) and estimate the

[14]Besides, the period we analyze (2018-2020) is marked by increasing uncertainty, making it difficult to predict future earnings, which has an impact on the cost-benefit analysis of reorganization. This has ambiguous implications for predicting which firms are likely to reorganize. First, firms differ in their ability to assess risks and the associated consequences on business conditions. There is extensive literature on how managers inform themselves about business conditions. At the very least, we expect large firms to be able to devote more resources to assessing the risk of their supply chains, but the effect on the likelihood of reorganizing is ambiguous. Second, managerial risk aversion differs from one firm to another, depending on the composition of the board of directors, managerial incentives, and the structure of the market in which the firm evolves (Raith, 2003; Lewellen, 2006). Risk-aversion will place more importance on the variance of expected profits in the event of reorganization than on the reduction in marginal costs resulting from reorganization. We can't measure managerial risk aversion in the data, and we take no position on how it will affect our estimate – we have no strong prior about which firms are more risk-averse than others.

following model at the firm level:

$$\begin{aligned} D_f = \beta_1 \times \log \frac{VA}{L} + \beta_2 \times \log \frac{K}{L} + \beta_3 \times Share_{HS} \\ + \beta_4 \times \text{FMNE} + \beta_5 \times \text{DMNE} + \\ + \beta_6 \times Imports_{Goods} + \beta_7 \times Imports_{Services} \\ + \delta_s + \epsilon_f \end{aligned} \tag{1}$$

where $D_f$ is a binary variable equal to one if firm $f$ reorganized its value chain (offshored, reshored, or at least one of them). $\log \frac{VA}{L}$ is value-added per worker, our proxy for firm-level productivity. $\log \frac{K}{L}$ is capital intensity, the stock of capital within the firm (in euros) per worker. $Share_{HS}$ is the share of hours worked by high-skilled workers. We investigate the advantage of multinational firms to reorganize with FMNE and DMNE, which are mutually exclusive binary variables equal to one if the firm is a foreign or a French multinational firm. Firms for which FMNE = DMNE = 0 are operating in France only. We include trade participation controls with $Imports_{Goods}, Imports_{Services}$, binary variables equal to one if the firm imports goods or services. Finally, we control for any industry-specific common determinants, including supply and demand factors, with a set of one-digit industry fixed-effects $\delta_s$. We estimate the regression using a logit model, and report average marginal effects.

## 2.3 Results

We present the results in Table 5. In all specifications, reorganizing firms are not more productive than those that do not. This is true for both offshoring and reshoring decisions (Columns (1) and (2)), and even conditional on industry fixed-effects (Columns (4)-(5)). Moreover, within industries, reorganizing firms are less capital-intensive and employ a larger share of high-skilled workers. This last finding is consistent with the view that reorganizing the value chain involves an additional managerial load for firms. This interpretation is further supported by the fact that a large share of high-skilled workers appears to matter more for offshoring decisions than for reshoring decisions, as costs of offshored activities are known to increase with distance, including for French firms (Chen and Moore, 2010; Mayer et al., 2010).[15]

MNEs predominate among reorganizing firms, especially foreign MNEs. This might seem unsurprising for reshoring decisions, but remember that in the survey, non-MNEs can also reshore part of the value chain that was previously performed at arm's length. That MNEs are reorganizing more is not a productivity effect, as the effect of firm productivity is not significant, with or without controlling for MNE status. This finding suggests two interpretations. One, MNEs may reorganize more because they are more exposed to changing business conditions. However, MNEs reorganize

[15] One might be worried that share of high-skilled workers is positively correlated with value-added per worker at the firm-level and that we might pick up a productivity effect here. However, when removing the share of high-skilled workers, value-added per worker is not significant, suggesting that we really are estimating of high-skilled effect.

more even when we control for being exposed to foreign supply shocks (Column (5)). We thus prefer a second interpretation, in which it is simply easier for MNEs to reorganize their value chain. This is supported by the fact that the increase in likelihood of reshoring for MNEs is half the increase in likelihood of offshoring. Offshoring requires specific knowledge of the destination country that MNEs are likelier to have.

Last, Figure 1 displays the estimated industry fixed-effects from Column (4) of Table 5. Manufacturing firms are more likely to reorganize, and, to a lesser extent, firms in sales and wholesale industries. Engineering, R&D and business services firms are the less likely to reshore.

# 3 What is reorganized?

## 3.1 Conceptual framework and insights from previous literature

We now turn to understanding what business functions are reorganized. Each reorganizing firm reorganizes at least one business function of its value chain. Following the conceptual framework laid out previously, firms decide to reorganize when the expected variable profits from doing so exceeds its sunk cost. Because the largest activities of a firm are the activities that can lead to the largest changes in profits, we expect firms to reorganize primarily their core business function.

Activities differ in the intensity of different factors in the production process. Previous literature has emphasized the role of lower costs of production abroad in explaining offshoring patterns. In particular, tasks intensive in low-skilled labor have been historically more offshored (Carluccio et al., 2019).

Last, business functions differ in the fixed cost of their reorganization. Acemoglu and Autor (2011) suggest that some occupations are more mobile ("tradable") than others: those intensive in routine tasks. Routine tasks indeed do not require complex communication within the firm, hence are easier to be performed somewhere else than at the headquarters (Oldenski, 2012). We do not work with occupations nor tasks, but with large activities that encompass many different tasks. Still, we can expect activities more intensive in routine tasks to be more easily offshored, because the fixed cost of doing so decreases with routineness. Conversely, activities that are going to be relocated in France are activities that were previously carried out outside of France. Hence, we expect relocated activities to also be routine-intensive – maybe less than offshored activities, as reshored activities may exactly be those for which the cost from communicating and coordinating has become too large to be sustained abroad.

## 3.2 Specification

We narrow the analysis to reorganizing firms and describe what characterizes the business functions they reorganized. To do so, we select reorganizing firms and transform the data to include not one observation per firm but one observation per firm-business function pair, and run regressions of the following form:

$$D_{f,b} = \delta_{f,b} \times Core_{f,b} + \gamma_b \times X_b + \beta_f \times X_f + \epsilon_{f,b} \quad (2)$$

where $D_{f,b}$ is a binary variable equal to one if firm $f$ reorganized business function $b$; $Core_{f,b}$ is a binary variable equal to one if business function $b$ is the core business function of firm $f$. $X_b$ is a set of variables describing the factor content of the business function, here, the share of hours worked by high-skilled or R&D workers, and the measure of routineness. $X_f$ are the firm-level controls of Equation 1, including industry fixed effects. We estimate (2) with a logit model and report average marginal effects. As the dataset consists of 8 observations per firm[16], we cluster standard errors at the firm-level.

## 3.3 Results

We present the results in Table 6. Unreported firm-level controls have similar effects as in Table 5. It appears that the more intensive in routine tasks, the more likely an activity is to be reorganized (Columns (3) and (7)). This is especially true for offshoring, in line with Autor et al. (2003); Acemoglu and Autor (2011) who predict that routine tasks are more easily managed and controlled remotely. Overall, our results suggest that offshored activities are skill-intensive but also intensive in routine tasks, while reshored activities are low-skilled and intensive in routine tasks. Routine tasks are indeed not the same as low-skill tasks – for instance, gardening is low-skill but non routinizable. The activity-level correlation between the share of high-skilled workers and our measure of routineness is nonetheless negative at -.31. This negative correlation calls for controlling for both measures: when we do not control for routineness, it flips the sign on skill intensity for offshored activities (Column (1)), that would be low skill-intensive. The fact that routine-intensive activities are more reorganized is however robust to the inclusion of skill-intensity (Columns (2) and (6)). Previous studies find that high productivity or multinational firms were offshoring low-skill activities (Becker et al., 2013; Carluccio et al., 2019). Our results cannot be directly compared to theirs, as they are related to early years of offshoring for German and French firms (around year 2000), while we cover recent years, in which determinants of offshoring may have changed. Still, that fact that low skill-intensive activities are reshored may indicate a relocation of previously offshored activities.

Last, Columns (4)-(8) suggest that, consistent with core activities generating the largest share of

[16]Without any further information, we implicitly assume here that each firm uses each of these eight activities at some point in its value chain.

profits within firms, firms adjust more their core business function.[17] Our interpretation is that the core business is strategically more important to the firm, hence it is in the top priorities for the firm when needing to adjust. This coefficient could also pick up the fact that firms may not have control on much more than on their core business; still, it is unlikely that this is driving our results, as 56% of reorganized functions are not core business functions.

# 4 How? The boundaries of the firm

## 4.1 Conceptual framework

From the survey, we know whether the reorganized task ended up within the firm or outside the firm's boundaries. We follow here Antràs (2003) and Grossman and Hart (1986) in that we view ownership as the residual rights of control over the means of production. In this framework, a firm may require another firm to perform one of the functions of its production process, leading to a relationship between a "headquarter" (the lead firm) and a "supplier", formalized through a contract. Typically, both entities contribute to this relationship; the lead firm provides management, coordination, guidelines, and possibly patents or inputs, while the supplier contributes the workforce. The contract binds a specific input to the relationship, a situation particularly applicable to services and specialized inputs. Building on the insights of Antràs (2003), imperfect contracts and contributions of both sides of the relationship distort incentive structures, leading to an optimal ownership structure in which the party contributing the most to the relationship should take on ownership.

This theory has intuitive implications: firms are more likely to integrate activities close to their core business. In short, we expect manufacturing firms to integrate more manufacturing functions and service firms to integrate more service functions. It has also implications relative to the factor content of business functions. If the lead firm contributes capital, as in Antràs (2003), activities requiring substantial capital investment will be more likely to be integrated.

An other prominent theory of integration (Ethier, 1986; Markusen, 1995) predicts that because intellectual property rights are hard to enforce, activities involving more knowledge capital are more likely to be conducted within the firm. We thus expect activities intensive in intangible capital or in R&D to be more within the firm. Last, Costinot et al. (2011) argues that tasks that are prone to mistakes are more likely to be integrated; because when mistakes are realized, it is quicker to become aware of them and easier – and cheaper – to correct them within the firm rather than at arm's length. In Costinot et al. (2011), tasks prone to mistakes are non-routine tasks: the more routine-intensive, the more likely an activity is to be reorganized within the firm.

[17] The skill-intensity of core business functions of reorganizing firms is slightly lower than that of other functions, increasing the coefficient for the share of high-skilled workers.

## 4.2 Specification

We focus on reorganized business functions and describe what drives reorganizing within the firm rather than at arm's length by running the following regression:

$$I_{f,b} = \delta_{f,b} \times Core_{f,b} + \gamma_b \times X_b + \beta_f \times X_f + \epsilon_{f,b} \tag{3}$$

where $I_{f,b}$ equals one if the business function is within the reorganizing firm. As for the "What" regressions (Equation 2), $X_f$ are the firm-level variables used in Table 5, including industry fixed effects. $X_b$ include the factor content of business functions. Consistent with integration theories, we include the R&D and capital intensity of production (proxies for headquarters intensity), the ratio of the stock of intangible capital to total capital stock (physical and intangible), and the measure of routineness. $Core_{f,b}$ is specific to a firm-business function pair indicating whether the business function coincides with the core business of the firm. We include all firms that reorganized at least one business function and estimate separate regressions for offshored and reshored activities. We estimate a logit model and report average marginal effects.

## 4.3 Results

Results are displayed in Table 7. First, more productive firms tend to offshore less within firm boundaries, as indicated by the negative and significant estimated coefficient on $\log \frac{VA}{L}$ in Colums (1)-(3)-(5). This informs about the relative costs in the "Make or Buy" decision when displacing activities abroad, suggesting that the sourcing from an independent supplier is more expensive than setting up an affiliate abroad. This is consistent with Defever and Toubal (2013), in which for the most productive multinationals the likelihood of trading through an independent supplier is higher.

Second, in all specifications, reorganized activities are more likely to be within the firm when they coincide with the core business function of the firm. As discussed in Section 4.1, this may be a sign of the property-rights approach of Grossman and Hart (1986); Antràs (2003): firms contribute more in relationships over activities close to their own activity.

We then augment the regression with material inputs intensity and capital intensity in Columns (3)-(4). We find that capital-intensive activities are less integrated. In capital-intensive industries, activities may exhibit increasing returns to scale, because of the large investments required by capital. The relative cost of producing in-house compared to the cost of finding an external supplier is thus higher in capital-intensive industries. Hence, the more capital-intensive, the more likely it is that an activity is outsourced outside the firm.

Last, we add the skill-intensity and the ratio of intangible capital to total capital in Columns (5)-(6). Skill-intensity does not appear to explain integration. However, we find that the likelihood of being an integrated activity increases with the proportion of intangible capital in the activity,

especially for offshored activities. This echoes the property-rights approach of the firm, in which headquarter-inputs-intensive activities are more likely to be integrated: among prominent headquarter inputs are patents, so intangible capital. However, this theory would also imply more integration for reshored activities. We thus prefer an interpretation following Ethier (1986); Markusen (1995): intellectual rights are the hardest to enforce, hence activities involving more knowledge capital are more likely to be integrated. If, additionally, intellectual rights are harder to enforce in foreign countries than in France, the likelihood of integration increases with intangible capital for both offshored and reshored activities, but more for offshored activities; which is what we find.

A notable distinction between our setting and the majority of empirical studies on the vertical integration decision (Antràs, 2003; Nunn and Trefler, 2013; Corcos et al., 2013, among others) is our capacity to examine not only activities producing material inputs but also services.[18] We thus report in Figure 2 the effect of the type of reorganized activity on vertical integration status, relative to manufacturing activities, such that the average marginal effect of manufacturing is 0. It appears that except for business services – that are equally likely to be offshored within the firm – all types of activities are less likely than manufacturing activities to be reorganized within the firm, especially reshored activities.

In Appendix Table S.7, we test whether the predictions of Costinot et al. (2011) hold in our setting. We replicate their specifications and find that routine-task-intensive activities are more likely to be reorganized within the firm, and not less likely. However, our results cannot be compared directly to them, as we work at the firm and not the industry-level, and with all types of activities, not only manufactured goods.

# 5 Where?

## 5.1 Conceptual framework

When a firm decides to offshore an activity, it then decides where to locate it. As laid out previously, we conceptualize the determinants of the decision of offshoring as being both cost reduction and variability of the benefits it provides. There is a large literature documenting the fact that transaction costs may increase with distance from the home country. Consequently, we anticipate that any business function will be less frequently offshored to distant countries. The optimal offshoring destination also varies according to the activity's production function. According to a standard comparative advantage approach, high-income regions should receive the bulk of high-skilled activities. However, offshoring firms might be attracted by low-average wage countries with a large endowment of high-skilled workers, such as India. Hence, whether income per capita increases or decreases the

[18] Most previous empirical studies have been limited to using physical trade flows, from customs data, to study the determinants of vertical integration.

probability of offshoring remains an empirical question.[19]

## 5.2 Specification

We focus on offshored business functions and run the following regression:

$$I_{f,b,c} = \text{Interactions} + \alpha \times X_c + \gamma \times X_b + \beta \times X_f + \epsilon_{f,b,c} \tag{4}$$

where $I_{f,b,c}$ equals one if firm $f$ offshored business function $b$ in region $c$, and 0 for all other regions.[20] $X_c$ is a vector of region-level characteristics or region fixed effects. As we cannot directly measure wage rates by destination and skill, we instead proxy wage rates by GDP per capita, capturing economic development at large. As before, $X_f$ are the firm-level variables used in Table 5, including industry fixed effects. $X_b$ are business function fixed effects. Interactions are variables constructed from interacted firm-level, business-function, and region-level variables.

## 5.3 Results

We present results on the "Where" decision in Table 8. There are four different specifications. Column (1) presents results in which we control for firm and activity fixed effects, and include region-specific variables. Distance enters with the expected sign while GDP per capita does not influence the likelihood of offshoring. To understand this finding, we augment the regression with destination fixed effects and display them in Figure 3. The regions most likely to receive offshoring are EU countries, while other countries with high GDP per capita (USA, Canada, UK) are among the least attractive. Similarly, countries with low GDP per capita may be very attractive (India) or not (China). Note that this reflects the average 'attractiveness' for all types of activity. In Column (2), we show that high-skilled activities are, if any, more likely to be offshored in low income regions: the coefficient on the interaction between GDP per capita and the share of high-skilled workers in the business function is negative but not precisely estimated. Skilled workers are typically high-wage workers so when offshored, skill-intensive tasks are conducted in regions offering a combination of low average wage and a large endowment of high-skilled workers. This combination is particularly acute in India: Column (3) shows that skill-intensive activities are more likely to be offshored in this country, explaining the negative effect found in Column (2). The story is similar for RD-intensive tasks, which are more likely to be offshored to low GDP per capita regions (Column (4)), this effect being driven by R&D-intensive activities offshored in India, like IT services and R&D (Column (5)).

[19] When choosing an offshoring destination, firms also consider the uncertainty associated with business in this destination. Some risks are applicable to a whole range of tasks, particularly those related to general business conditions. In the survey, firms were asked about the motivations behind reshoring tasks, and "political instability" emerged as a predominant factor in offshoring decisions.

[20] For a given firm×activity, $I_{f,b,c}$ may be equal to one for several regions $c$. Firms offshore to 1.4 destinations on average.

# 6 Conclusion

The complexity of global value chains exposes firms to risks that may or may not outweigh their cost advantages. When the economic environment changes, tipping the balance in favor of risk, which firms adapt to this new environment, and how do they do so? Which activities do they reorganize, and where are the reorganized activities relocated? To answer these questions, this article has combined various sources of firm-level data with a survey of offshoring and relocation of activities over a three-year period up to December 2020. The approach developed here first contributes to the literature by taking into account the entire value chain, from upstream to downstream, including services, inside or outside the firm's boundaries. It also contributes by taking into account the firm's perimeter, corresponding to all the components belonging to the same economic decision-making center, which differs both from legal units and from the usual approach in terms of groups defined solely by the financial perimeter of companies: this approach is totally novel. Last but not least, it helps to document both reshoring and offshoring decisions.

Despite the mobilization of a large number of firm-level data sets, limitations to this exercise remain, due to the intrinsic logic of the survey. Reorganization events that do not cross the French border are not observed. Notwithstanding these limitations, results obtained are in line with the findings of incomplete contract theory: large firms, i.e. the most productive ones, are better able to pay the high sunk costs generated by the reorganization of their value chain. Their previous experience on foreign markets reduces this cost, while increasing their exposure to global shocks. Core activities will be the first to be reorganized, and more likely to be internalized, while those intensive in routine tasks are less costly to relocate. Intangible-asset-intensive value-added segments will also tend to be reorganized within firms boundaries.

Alongside these results, already documented in the literature but in a less unified framework, this article has brought new findings that pave the way for future research. The first concerns services which, with the exception of business services, are more easily outsourced when they are reorganized.

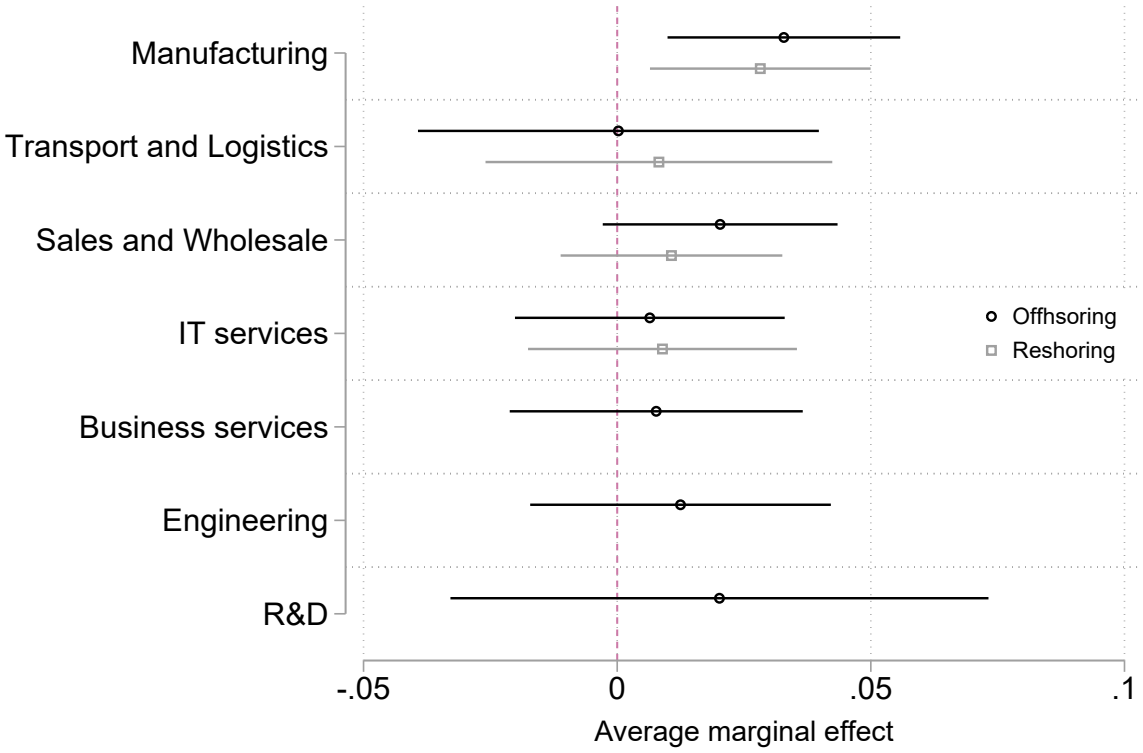
The second concerns the location chosen for skill-intensive and R&D-intensive activities upon offshoring. While conventional reasoning in terms of comparative advantage would favor offshoring to high-income countries, the high degree of skill and wage heterogeneity in low-income countries enables firms to locate there activities for which these countries would be *a priori* disadvantaged. The case of India in IT services and R&D is perfectly illustrated by our work.

The third result concerns the choice of offshoring countries in a more uncertain context, which favors nearby destinations, supposed to reduce information costs and risks, i.e. Europe. In addition, China is among the least attractive offshoring destinations in our sample.

A final result concerns reshoring. In our sample, the frequency of reshoring appears to be comparable to that of offshoring, albeit at a lower level. The determinants of offshoring and reshoring are essentially the same.

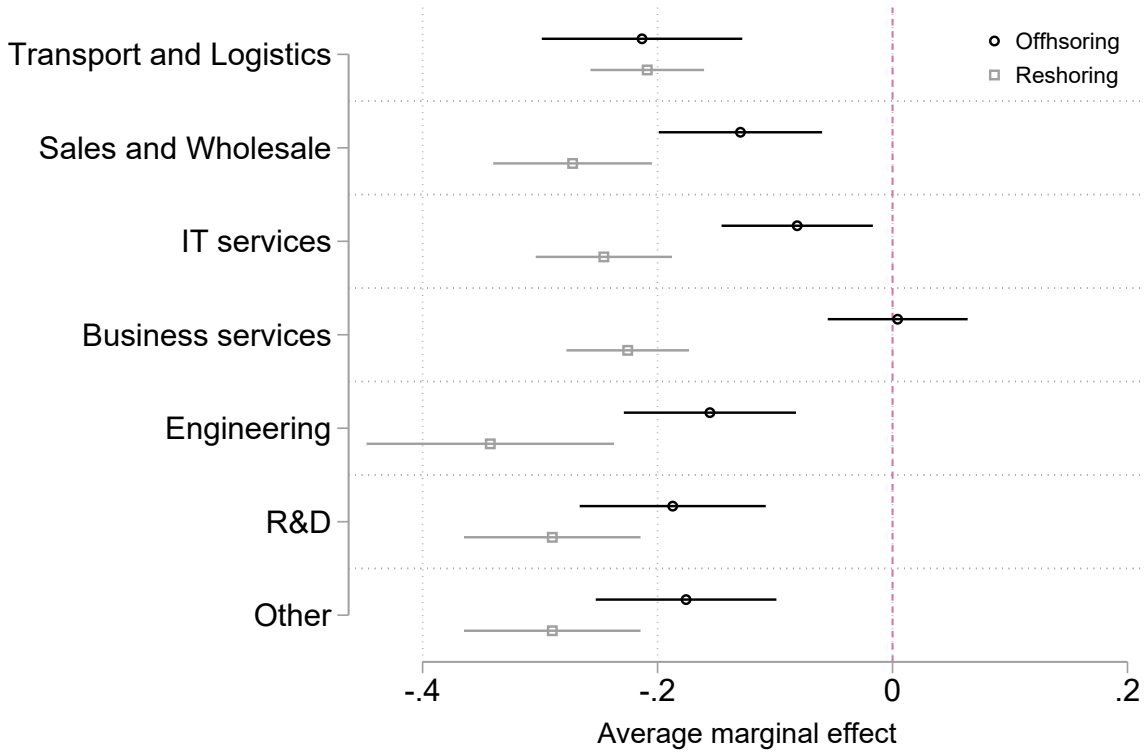
# Figures

Figure 1: Effect of core business on firms' propensity to offshore and reshore



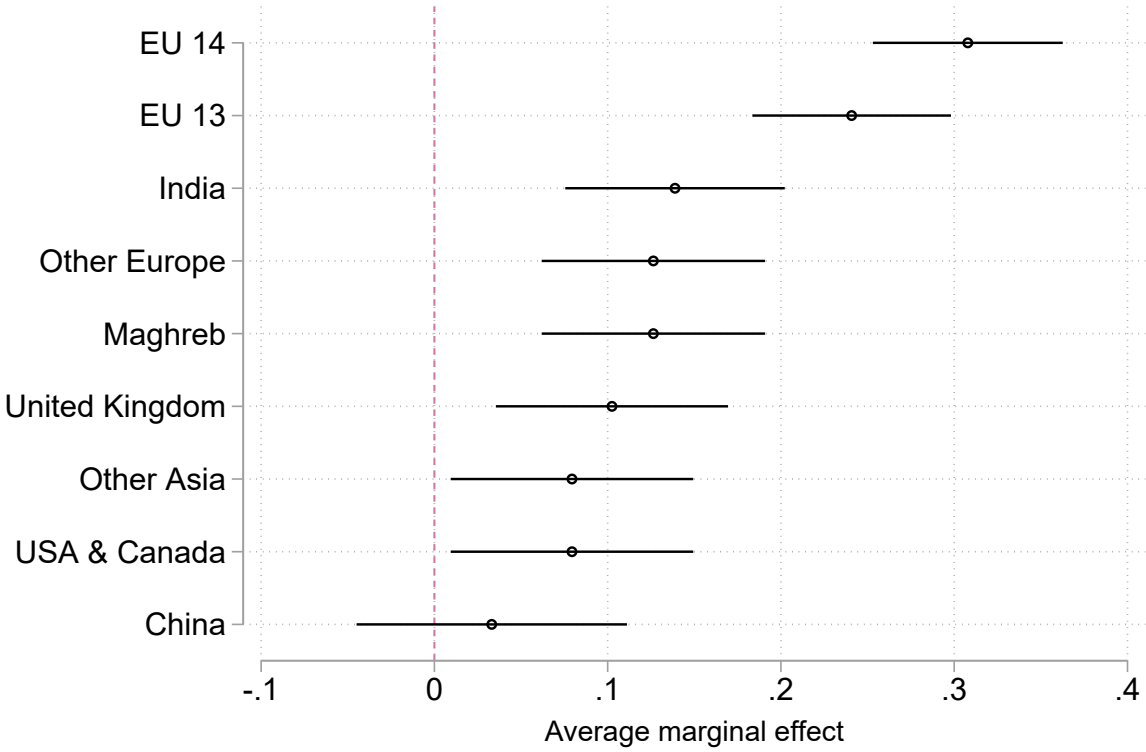

*Notes*: This figure reports the estimated average marginal effects of the core business function of the firm on the probability to offshore or reshore, from the specification of in Column (5) of Table 5. The reference category is "other activities". Confidence intervals at 95%.

Figure 2: Effect of the type of reorganized activity on vertical integration status, relative to manufacturing activities




*Notes*: This figure reports the estimated average marginal effects of the type of activity on the probability of being offshored or reshored within firm's boundaries, conditional on being offshored or reshored (respectively), relative to manufacturing activities. We include firm controls of Column (5) of Table 5.

Figure 3: Propensity to offshore in a destination




*Notes*: This figure reports the estimated average marginal effects of the destination on the probability of offshoring there, conditional on offshoring, from Column (2) of Table 8. We include firm controls of Column 5 of Table 5. The reference category is "Rest of the world". EU14 is Austria, Belgium, Denmark, Finland, Italy, Ireland, Germany, Greece, Luxembourg, Netherlands, Portugal, Spain, Sweden. EU13 is Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, and Slovenia, and Slovakia.

# Tables

Table 1: Number of reorganizing firms, of reorganized business functions, and of integrated reorganized business functions

| | Offshoring | Reshoring | Total |
|---|---|---|---|
| # Firms | 142 | 105 | 5,797 |
| *which account for # business functions* | 1,136 | 840 | 44,776 |
| # Business functions | 231 | 129 | 44,776 |
| # Within-firm | 170 | 113 | 44,776 |
| # Arm's-length | 47 | 19 | 44,776 |

*Notes:* This table displays the number of reorganizing firms, reorganized business functions, and the number of reorganized business functions within the firm and at arm's length, for both offshoring and reshoring decisions. 10 firms have both offshored and reshored. We do not have information on integration for 19 offshored activities. 10 activities are offshored both within and outside the firm, 3 activities are reshored both within and outside the firm.

Table 2: Sample description: Quantitative variables at the firm-level

| Variable | Avg. | Med. | Std. Dev. |
|---|---|---|---|
| L | 916.7 | 167 | 5,933 |
| VA | 60.75 | 9.869 | 400.7 |
| K | 166.8 | 8.556 | 2,339 |
| $\frac{K}{L}$ | 395 | 50.89 | 7,551 |
| $\frac{VA}{L}$ | 198.6 | 53.94 | 4,282 |
| % HS | 23.94 | 15.43 | 23.6 |
| % RD | 3.7 | 0 | 11.08 |

*Notes:* This table displays summary statistics of quantitative variables in our sample. L is the number of workers. Value added (VA) and capital stock (K) are expressed in millions of euros. Value added and capital stock per worker are expressed in thousands of euros per worker.

Table 3: Sample description: Quantitative variables at the business function-level

| Business function | % HS | % RD | $\frac{M}{W}$ | $\frac{K}{W}$ | $\frac{K_{inc}}{K}$ |
|---|---|---|---|---|---|
| Manufacturing | 22.1 | 4.69 | 5.28 | 6.11 | 0.116 |
| Transport and Logistics | 13.6 | 0.149 | 2.68 | 4.12 | 0.0514 |
| Sales and Wholesale | 19.1 | 0.741 | 1.66 | 2.32 | 0.349 |
| IT services | 70.6 | 24.7 | 1.67 | 5.23 | 0.414 |
| Business services | 19.9 | 1.97 | 0.578 | 0.373 | 0.592 |
| Engineering | 52.3 | 19.1 | 1.45 | 1.16 | 0.277 |
| R&D | 59.8 | 31.1 | 1.75 | 2.41 | 0.291 |
| Other | 19.9 | 1.53 | 1.86 | 4.34 | 0.251 |

*Notes:* This table displays summary statistics of factor contents of business functions. % HS and % RD are the share of hours worked by high-skilled and R&D workers, respectively. $K_{corp}$ and $K_{inc}$ are the stock of physical and intangible capital, respectively. $M$ is the amount of materials purchases. $RD$ is the wage bill of R&D workers. $W$ is the total wage bill.

Table 4: Sample description: Number of offshored functions and geography variables by destination

| Destination | Nb. of offshored functions | (Log.) Distance | (Log.) GDP per cap. |
|---|---|---|---|
| EU 14 | 124 | 6.9 | 10.4 |
| EU 13 | 79 | 7.24 | 9.27 |
| India | 34 | 8.81 | 7.29 |
| Maghreb | 31 | 7.34 | 8.1 |
| Other Europe | 30 | 7.45 | 9.38 |
| UK | 24 | 5.84 | 10.4 |
| USA & Canada | 24 | 8.68 | 10.7 |
| Other Asia | 21 | 9.13 | 10.2 |
| China | 17 | 9.14 | 8.92 |
| Rest of the World | 10 | 8.84 | 8.48 |
| Total | 394 | | |

*Notes:* This table displays the number of offshored business functions by offshoring destinations and the quantitative variables we use in the empirical exercises. Distance and GDP per capita are constructed as the weighted average of the corresponding country-level variables in 2017, weighted by country's nominal GDP. Distance, GDP and GDP per capita from CEPII-BACI. EU14 is Austria, Belgium, Denmark, Finland, Italy, Ireland, Germany, Greece, Luxembourg, Netherlands, Portugal, Spain, Sweden. EU13 is Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, and Slovenia, and Slovakia.

Table 5: Who reorganizes its value chain?

| | Dep. Var = 1 if $f$ reorganizes | | | | |
|---|---|---|---|---|---|
| | Offshoring | Reshoring | Reorganization | | |
| | (1) | (2) | (3) | (4) | (5) |
| (Log) Value added per worker$_f$ | 0.000 | 0.001 | -0.000 | -0.000 | -0.001 |
| | (0.004) | (0.004) | (0.005) | (0.006) | (0.006) |
| (Log) Capital per worker$_f$ | -0.001 | -0.003** | -0.004 | -0.005** | -0.007*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Share of HS workers$_f$ | 0.050*** | 0.016* | 0.063*** | 0.072*** | 0.056*** |
| | (0.010) | (0.009) | (0.013) | (0.015) | (0.015) |
| Manufacturing firm$_f$ | 0.020*** | 0.025*** | 0.041*** | | |
| | (0.005) | (0.005) | (0.007) | | |
| FMNE$_f$ | 0.039*** | 0.019*** | 0.055*** | 0.054*** | 0.046*** |
| | (0.006) | (0.005) | (0.007) | (0.007) | (0.007) |
| DMNE$_f$ | 0.025*** | 0.013*** | 0.035*** | 0.036*** | 0.032*** |
| | (0.006) | (0.005) | (0.007) | (0.007) | (0.007) |
| Foreign goods purch.$_f$ | | | | | 0.019** |
| | | | | | (0.008) |
| Foreign services purch.$_f$ | | | | | 0.023*** |
| | | | | | (0.006) |
| Average (%) | 2.54 | 1.88 | 4.23 | 4.23 | 4.23 |
| Industry fixed effects | | | | ✓ | ✓ |
| Observations | 5,597 | 5,597 | 5,597 | 5,597 | 5,597 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 1. Covariates are relative to year 2017. We include one observation per firm. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table 6: What is reorganized?

| | Dep. Var = 1 if $b$ is reorganized by $f$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Offshoring | | | | Reshoring | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Share of HS workers$_f$ | 0.013*** | 0.013*** | 0.013*** | 0.013*** | 0.002 | 0.002 | 0.002 | 0.002 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.002) | (0.002) | (0.002) | (0.002) |
| Share of HS workers$_b$ | -0.003* | | 0.006*** | 0.008*** | -0.009*** | | -0.006*** | -0.002 |
| | (0.002) | | (0.002) | (0.003) | (0.002) | | (0.002) | (0.002) |
| Routineness$_b$ | | 0.013*** | 0.017*** | 0.018*** | | 0.009*** | 0.006*** | 0.008*** |
| | | (0.002) | (0.003) | (0.003) | | (0.001) | (0.001) | (0.002) |
| Core business function$_{fb}$ | | | | 0.006*** | | | | 0.007*** |
| | | | | (0.001) | | | | (0.001) |
| Average (%) | .516 | .516 | .516 | .516 | .288 | .288 | .288 | .288 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 44,776 | 44,776 | 44,776 | 44,776 | 40,592 | 40,592 | 40,592 | 40,592 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 2. Covariates are relative to year 2017. We include one observation per firm × business function. Standard errors clustered at the firm-level. In Columns (5) to (8), because of the industry fixed-effects, we discard the industries in which no reshoring is observed: R&D, engineering, and business services. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table 7: How are business functions reorganized: within or outside the firm?

| | Dep. Var = 1 if $b$ is reorganized within $f$ | | | | | |
|---|---|---|---|---|---|---|
| | Offshoring | Reshoring | Offshoring | Reshoring | Offshoring | Reshoring |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| (Log) Value added per worker$_f$ | -0.096*** | 0.015 | -0.097*** | 0.010 | -0.095*** | 0.010 |
| | (0.030) | (0.025) | (0.029) | (0.022) | (0.029) | (0.022) |
| Core business function$_{fb}$ | 0.202*** | 0.261*** | 0.233*** | 0.188*** | 0.185*** | 0.176*** |
| | (0.021) | (0.014) | (0.023) | (0.016) | (0.025) | (0.019) |
| Log $\frac{M}{W}_b$ | | | -0.013 | 0.180*** | 0.162*** | 0.203*** |
| | | | (0.035) | (0.030) | (0.057) | (0.039) |
| Log $\frac{K}{W}_b$ | | | -0.042* | -0.088*** | -0.057** | -0.082*** |
| | | | (0.022) | (0.026) | (0.024) | (0.026) |
| Share of HS workers$_b$ | | | | | -0.019 | -0.031 |
| | | | | | (0.055) | (0.058) |
| $(\frac{K_{inc}}{K})_b$ | | | | | 0.623*** | 0.153 |
| | | | | | (0.165) | (0.138) |
| Average (%) | 8.58 | 5.9 | 8.58 | 5.9 | 8.58 | 5.9 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,096 | 840 | 1,096 | 840 | 1,096 | 840 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 3. Covariates are relative to year 2017. We include one observation per firm × business function. Columns (1)-(3)-(5) are restricted to firms with at least one offshored activity, and (2)-(4)-(6) to firms with at least one reshored activity. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table 8: Where are business functions offshored?

| | Dep. Var = 1 if $b$ is offshored in $d$ | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Log Average distance$_d$ | -0.048*** | | | | |
| | (0.007) | | | | |
| Log GDP/Capita$_d$ | 0.008 | | | | |
| | (0.008) | | | | |
| Share of HS workers$_b$ × Log GDP/Capita$_d$ | | -0.031 | 0.056 | | |
| | | (0.031) | (0.045) | | |
| Share of HS workers$_b$ × India$_d$ | | | 0.414*** | | |
| | | | (0.150) | | |
| Share of RD workers$_b$ × Log GDP/Capita$_d$ | | | | -0.021 | 0.145* |
| | | | | (0.060) | (0.087) |
| Share of RD workers$_b$ × India$_d$ | | | | | 0.794*** |
| | | | | | (0.292) |
| Average (%) | 14.2 | 14.2 | 14.2 | 14.2 | 14.2 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Business function fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Destination fixed effects | | ✓ | ✓ | ✓ | ✓ |
| Observations | 2,250 | 2,250 | 2,250 | 2,250 | 2,250 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 4. Covariates are relative to year 2017. We include one observation per firm × business function × destination. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

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# Appendix

## A Data

**Balance-sheet data *FARE*.** We use the value-added at factor costs (`r004`), the stock of physical capital ("Immobilisations corporelles", `immo_corp`), the stock of intangible capital ("Immobilisations incorporelles", `immo_inc`), and spending on material inputs (`achats_mp`), in 2017.

**Matched employer-employee data.** We use the *BTS Postes* in 2017, which provides the number of hours worked, compensation, and occupational code by job for the near universe of establishments in France. We then aggregate to the firm-level (either legal unit or EP). We use the number of employees in full-time equivalent `EQTP` and the share of hours worked by high-skilled workers $\frac{\texttt{NBHEUR}_{HS}}{\texttt{NBHEUR}}$. For the factor content of business functions, we additionally use the total gross wage bill `S_BRUT`, the wage bill of R&D workers $\texttt{S\_BRUT}_{RD}$ and the share of hours worked by R&D workers $\frac{\texttt{NBHEUR}_{RD}}{\texttt{NBHEUR}}$. High-skilled workers are the workers whose occupation code (PCS-ESE 2017) begins with 2 (C-level occupations) or 3 (Executives and higher intellectual professions). R&D workers are the workers whose occupation code is 383A, 384A, 385A, 386B, 386C, or 388A.

**Routineness.** As in Le Barbanchon and Rizzotti (2020), we build a measure of the routineness of occupations by adding different measures: *4.C.3.b.7 Importance of repeating the same tasks*, *4.C.3.b.4 Importance of being exact or accurate*, *4.C.3.b.8 Structured v. Unstructured work*, *4.C.3.d.3 Pace determined by speed of equipment*, *4.A.3.a.3 Controlling machines and processes*, *4.C.2.d.1.i Spend time making repetitive motions*. Each measure is standardized to have mean zero and standard deviation equal to one, and the final measure is the sum of the 6 measures. Our measure of routineness at the business function level is the average measure, weighted by the number of hours worked. We retrieve the number of hours worked by occupation in each business function from *BTS Postes*.

## B Matching appendix

In this section, we describe the steps needed to recover the list of legal units of each surveyed firm. Most of the administrative data that we use (*FARE* and *DADS*) is recorded at the legal unit level. The merging procedure of the survey with this data is thus straightforward for firms constituted of a single legal unit, as they are identified in those datasets and in the survey with a unique administrative identifier. The case of EP ("Entreprises Profilées"), firms constituted of two or more legal units, requires additional steps.

### B.1 Matching administrative data with the survey: the case of EP

We first recover the list of legal units that constitute the EP, then we merge them with the legal unit level data, before aggregating at the EP-level. We describe here the first step.

**The *Contour des Entreprises Profilées*.** The *Contour des Entreprises Profilées* is the official database that delineates the set of legal units of each EP, called the *contour*. The *contour* is the boundary of the firm in France and is defined by the French National Institute of Statistics and Economic Studies (INSEE). The *contour* is determined with the help of the firms themselves for the

largest firms, otherwise, by an algorithm. The *Contour des Entreprises Profilées* is updated annually. The surveyed firms are identified with their identifier and their French boundaries as they are 2020.

**Recovering the *contour* of EP.** To alleviate any endogeneity concern, we use the firms' boundaries that are defined before the changes in the firm's boundaries that we are interested in, that is we use the contour of firms as it was in 2017. We are able to retrieve the 2017 version of the *contour* for 87% of the surveyed EP. The remaining 13% are firms that either existed as EP in 2017 but whose identifier changed between 2017 and 2020, or firms that did not exist as EP in 2017. Changing identifiers pertain to the nature of EP. An EP represents an organizational unit in a given year, comprised of a set of legal units. When this set of legal units does not change or barely changes from year N to year N+1, the EP is considered as being the same in both years. However, upon major organizational changes such as mergers or acquisitions, the EP does not exist anymore. A new EP, or several new EP, are then created. This particularity explains partly why some surveyed units in 2021 are not found in 2017, even if they are large firms. Importantly, these units are those that are subject to large reorganizations, and discarding them might bias our sample to firms that reorganize only marginally. Besides, the scope of the profiling process – the process of statistically identifying legal units as being part of the same EP – increases each year. Mechanically, part of the EP in 2020 do not correspond to EP in 2017, but to sole legal units.

**Procedure to improve the matching rate.** To date, there is no official history of identifiers for a given enterprise. We thus develop an algorithm to build such a history of identifiers. The idea is to follow over time the legal unit that takes the decision for the whole EP. Hence, we would like to know which unit is responsible for taking decisions within the EP, and follow this unit over time; unfortunately, the identity of this unit is not recorded in the data. We can proxy for which legal unit is the most important in the EP in two ways. We could follow the most important unit in a EP over time as its largest unit – the unit with the largest employment. Alternatively, the information of which legal unit is responsible for taking decisions is available for *groups*: we know which unit is the head of the group.[21] Our procedure to retrieve the EP of 2017 of an EP of 2020 combines both approaches.
The first approach is as follows:

1. We retrieve the employment of each legal unit (SIREN) of the $EP_{2020}$ and identify the unit with the largest employment share.

2. We find the enterprise associated with this legal unit in 2017. We are able to retrieve 538 of them: 426 are $EP_{2017}$, 112 are single legal units.[22]

The second approach is as follows:

1. We retrieve the group $Group_{2020}$ to which the EP $EP_{2020}$ belongs in 2020. From 787 EP, we retrieve a group for 751 of them. However, 80 EP belong to several groups, in part because of joint ventures, so we cannot assign them a unique head of group. Similarly, 9 EP belong to groups that encase other EP and the head of the group is not only for the EP. This leaves us with 662 $EP_{2020} - Group_{2020}$ pairs.

[21] Groups are groups in the usual sense: a set of legal units with financial linkages.

[22] Alternatively, one could find the $EP_{2017}$ closest to the $EP_{2020}$ in terms of the largest number of legal units in common, or the largest employment in common. We also implemented this procedure and it delivers close results to the simple approach presented here.

2. We retrieve the legal unit $Head_{2020}$ that is the head of the $Group_{2020}$ associated with the $EP_{2020}$.

3. We retrieve the $Group_{2017}$ to which $Head_{2020}$ belonged in 2017. In this step, we lose several observations, as only 471 of the 662 $Head_{2020}$ exist in 2017. Among those 471, we apply the same rule as in 2020 to ensure a unique correspondence between a group and an EP. We end up with 323 $EP_{2017} - Group_{2017}$ pairs that are directly related to a $EP_{2020}$ through a legal unit $Head_{2020}$.

We them combine the two procedures as follows: we first apply the method following the largest unit, and then the second one to non-matched $EP_{2020}$. This helps recovering 71% of the 787 missing EPs, that is 562 firms, 538 of which from the first method. 442 are EP and 120 are single legal units.

**Profile of EP.** Our final dataset is comprised of 4,503 EP. On average, EP are made up of around 9 legal units, but it hides a wide variety of profiles: 10% of EP encase more than 16 legal units, while 50% of them have 2 to 4 legal units.

## B.2 Matching with *FARE* and *DADS*

As both *FARE* and *DADS* are data at the legal unit level, we match on legal units within each EP. The average coverage rate is of 97%, mainly because financial units are outside of the scope of *FARE*; marginally, some UL did not exist in 2017. The units left unmatched are mainly financial legal units, as they are absent from the *FARE* data in the first place. We then add up balance sheet data from legal units to the firm level.

This step precludes the use of variables that are not additive in nature. Sales are one example of a non-additive variable: sales of one legal unit can be towards another legal unit of the same EP. A naive sum of sales of both legal units would overstate the total sales of the resulting EP. On the other hand, value-added and full-time equivalent employment are additive variables.

# C Additional Tables

Table S.1: Share of reorganizing firms, of reorganized business functions, and of integrated reorganized business functions, in the sample and the full survey

| | | | Sample | Survey |
|---|---|---|---|---|
| | | # Firms | 5,597 | 6,914 |
| Share of firms | Offshoring | Unweighted | 2.54 | 2.51 |
| | | Weighted | 1.85 | 1.66 |
| | Reshoring | Unweighted | 1.88 | 1.82 |
| | | Weighted | 1.32 | 1.20 |
| | | # Business functions | 44,776 | 56,336 |
| Share of business functions | Offshored | Unweighted | 0.516 | 0.515 |
| | | Weighted | 0.347 | 0.318 |
| | Reshored | Unweighted | 0.288 | 0.288 |
| | | Weighted | 0.204 | 0.191 |
| Share of within-firm reorganizations | Offshoring | Unweighted | 68.0 | 69.0 |
| | | Weighted | 61.8 | 63.8 |
| | Reshoring | Unweighted | 87.6 | 88.3 |
| | | Weighted | 85.8 | 86.7 |

*Notes:* This table displays the share in percentage of reorganizing firms, reorganized business functions, and of reorganized business functions within the firm, for both offshoring and reshoring decisions. Weighted shares are weighted with survey weights. "Survey" refers to the survey results, "Sample" to the sample used in the regressions.

Table S.2: Correspondence table between business functions and industries

| **Business function** | **NACE Rev. 2** |
|---|---|
| Manufacturing | 02 – 39, except 19 |
| Construction | 41 – 43 |
| Transportation and logistics | 49 à 53 |
| Sales services | 45 – 47, 73, 82.2, 82.3 |
| ITC services | 61 – 63 |
| Administrative and financial services | 69, 70.2, 78 |
| Engineering and conception | 71 |
| R&D | 72 |

*Notes:* This table shows the manual correspondence between the business functions in the survey and 2- or 3-digit industry NACE codes. Sales services group wholesale activities, marketing, and call centers. The "Others" category corresponds to the rest of the NACE codes.

Table S.3: Who reorganizes its value chain? Weighted regressions

| | Dep. Var = 1 if $f$ reorganizes | | | | |
|---|---|---|---|---|---|
| | Offshoring | Reshoring | Reorganization | | |
| | (1) | (2) | (3) | (4) | (5) |
| (Log) Value added per worker$_f$ | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| | (0.004) | (0.004) | (0.005) | (0.006) | (0.006) |
| (Log) Capital per worker$_f$ | -0.002 | -0.005*** | -0.006** | -0.008*** | -0.010*** |
| | (0.002) | (0.002) | (0.002) | (0.003) | (0.003) |
| Share of HS workers$_f$ | 0.058*** | 0.014 | 0.068*** | 0.080*** | 0.064*** |
| | (0.012) | (0.011) | (0.015) | (0.018) | (0.018) |
| Manufacturing firm$_f$ | 0.023*** | 0.029*** | 0.048*** | | |
| | (0.006) | (0.006) | (0.007) | | |
| FMNE$_f$ | 0.046*** | 0.021*** | 0.062*** | 0.061*** | 0.053*** |
| | (0.008) | (0.006) | (0.009) | (0.009) | (0.009) |
| DMNE$_f$ | 0.031*** | 0.013** | 0.041*** | 0.043*** | 0.038*** |
| | (0.007) | (0.006) | (0.008) | (0.008) | (0.008) |
| Foreign goods purch.$_f$ | | | | | 0.018* |
| | | | | | (0.010) |
| Foreign services purch.$_f$ | | | | | 0.025*** |
| | | | | | (0.008) |
| Average (%) | 1.85 | 1.32 | 3.06 | 3.06 | 3.06 |
| Industry fixed effects | | | | ✓ | ✓ |
| Observations | 5,597 | 5,597 | 5,597 | 5,597 | 5,597 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 1. Covariates are relative to year 2017. We include one observation per firm. Observations are weighted by survey weights. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table S.4: What is reorganized? Weighted regressions

| | Dep. Var = 1 if $b$ is reorganized by $f$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Offshoring | | | | Reshoring | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Share of HS workers$_f$ | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.001 | 0.001 | 0.001 | 0.001 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Share of HS workers$_b$ | -0.003 | | 0.008*** | 0.011*** | -0.010*** | | -0.007*** | -0.002 |
| | (0.002) | | (0.003) | (0.003) | (0.002) | | (0.002) | (0.003) |
| Routineness$_b$ | | 0.016*** | 0.022*** | 0.023*** | | 0.010*** | 0.007*** | 0.009*** |
| | | (0.003) | (0.004) | (0.005) | | (0.002) | (0.002) | (0.003) |
| Core business function$_{fb}$ | | | | 0.008*** | | | | 0.008*** |
| | | | | (0.001) | | | | (0.001) |
| Average (%) | .347 | .347 | .347 | .347 | .204 | .204 | .204 | .204 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 44,776 | 44,776 | 44,776 | 44,776 | 40,592 | 40,592 | 40,592 | 40,592 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 2. Covariates are relative to year 2017. We include one observation per firm × business function. Observations are weighted by survey weights. In Columns (5) to (8), because of the industry fixed-effects, we discard the industries in which no reshoring is observed: R&D, engineering, and business services. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table S.5: How are business functions reorganized: within or outside the firm? Weighted regressions

| | Dep. Var = 1 if $b$ is reorganized within $f$ | | | | | |
|---|---|---|---|---|---|---|
| | Offshoring | Reshoring | Offshoring | Reshoring | Offshoring | Reshoring |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| (Log) Value added per worker$_f$ | -0.103*** | 0.009 | -0.104*** | 0.006 | -0.102*** | 0.006 |
| | (0.032) | (0.027) | (0.032) | (0.024) | (0.031) | (0.024) |
| Core business function$_{fb}$ | 0.213*** | 0.264*** | 0.247*** | 0.193*** | 0.194*** | 0.179*** |
| | (0.024) | (0.016) | (0.028) | (0.021) | (0.028) | (0.021) |
| Log $\frac{M}{W}_b$ | | | -0.014 | 0.183*** | 0.173*** | 0.204*** |
| | | | (0.041) | (0.033) | (0.062) | (0.045) |
| Log $\frac{K}{W}_b$ | | | -0.044* | -0.093*** | -0.060** | -0.086*** |
| | | | (0.026) | (0.031) | (0.026) | (0.026) |
| Share of HS workers$_b$ | | | | | -0.028 | -0.044 |
| | | | | | (0.058) | (0.055) |
| $(\frac{K_{inc}}{K})_b$ | | | | | 0.670*** | 0.152 |
| | | | | | (0.187) | (0.157) |
| Average (%) | 7.66 | 5.83 | 7.66 | 5.83 | 7.66 | 5.83 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,096 | 840 | 1,096 | 840 | 1,096 | 840 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 3. Covariates are relative to year 2017. We include one observation per firm × business function. Observations are weighted by survey weights. Columns (1)-(3)-(5) are restricted to firms with at least one offshored activity, and (2)-(4)-(6) to firms with at least one reshored activity. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table S.6: Where are business functions offshored? Weighted regressions

| | Dep. Var = 1 if $b$ is offshored in $d$ | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Log Average distance$_d$ | -0.050*** | | | | |
| | (0.006) | | | | |
| Log GDP/Capita$_d$ | 0.010 | | | | |
| | (0.008) | | | | |
| Share of HS workers$_b$ × Log GDP/Capita$_d$ | | -0.032 | 0.066 | | |
| | | (0.033) | (0.049) | | |
| Share of HS workers$_b$ × India$_d$ | | | 0.456*** | | |
| | | | (0.161) | | |
| Share of RD workers$_b$ × Log GDP/Capita$_d$ | | | | -0.026 | 0.158* |
| | | | | (0.064) | (0.093) |
| Share of RD workers$_b$ × India$_d$ | | | | | 0.865*** |
| | | | | | (0.306) |
| Average (%) | 13.8 | 13.8 | 13.8 | 13.8 | 13.8 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Business function fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ |
| Destination fixed effects | | ✓ | ✓ | ✓ | ✓ |
| Observations | 2,250 | 2,250 | 2,250 | 2,250 | 2,250 |

*Notes:* This table reports average marginal effects of the logit estimation of Equation 4. Covariates are relative to year 2017. We include one observation per firm × business function × destination. Observations are weighted by survey weights. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$

Table S.7: How are business functions reorganized: within or outside the firm? Costinot et al. (2011)

| | Dep. Var = 1 if $b$ is reorganized within $f$ | | | | | |
|---|---|---|---|---|---|---|
| | Offshoring | Reshoring | Offshoring | Reshoring | Offshoring | Reshoring |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| (Log) Value added per worker$_f$ | -0.096*** | 0.015 | -0.096*** | 0.015 | -0.096*** | 0.015 |
| | (0.031) | (0.029) | (0.031) | (0.026) | (0.031) | (0.025) |
| Routineness$_b$ | 0.101*** | 0.237*** | 0.101*** | 0.210*** | 0.159*** | 0.208*** |
| | (0.019) | (0.025) | (0.019) | (0.017) | (0.034) | (0.033) |
| Log $\frac{K}{L}_b$ | | | 0.001 | 0.120*** | 0.007 | 0.114*** |
| | | | (0.014) | (0.015) | (0.015) | (0.014) |
| Share of HS workers$_b$ | | | | | 0.051 | -0.128 |
| | | | | | (0.158) | (0.154) |
| Log $(\frac{RD}{Sales})_b$ | | | | | 0.026** | 0.031*** |
| | | | | | (0.013) | (0.012) |
| Average (%) | 8.58 | 5.9 | 8.58 | 5.9 | 8.58 | 5.9 |
| Firm controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 1,096 | 840 | 1,096 | 840 | 1,096 | 840 |

*Notes:* This table reports average marginal effects of the logit estimation of the same model as in Costinot et al. (2011). We include one observation per firm × business function. * $p < 0.10$ ** $p < 0.05$ *** $p < 0.01$