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Working paper "Does offshoring shape employers' labor market power? A comparative analysis of Belgian and Dutch firms 8

Key word list

Wage markdowns, wage markups, firm-level offshoring.

Definitions and acronyms

Acronyms	Definitions
CIF	Cost, Insurance and Freight
CN	Combined Nomenclature
FOB	Free On Board
FTE	Full Time Equivalent
ISCED	International Standard Classification of Education
MNE	MultiNational Enterprise
NACE	Nomenclature of Economic Activities
OECD	Organisation for Economic Co-operation and Development
RCA	Revealed Comparative Advantage
SOI	"Standaard OnderwijsIndeling" (Dutch education classification)
SR	Solow Residual
TFP	Total Factor Productivity
VAT	Value Added Tax

1. Introduction

1.1. General context

This deliverable is part of work package 4 “Factor reallocation and allocative efficiency” aimed at to describing how labor market frictions, international trade and financial institutions affect firm dynamics and factor allocation.

1.2. Deliverable objectives

The acceleration of technological progress, the reduction in transport and communication costs and the fragmentation of production has profoundly affected international trade patterns in recent decades. Empirical studies using firm panel data have investigated the impact of increased offshoring on various firm outcomes such as total employment, the composition of labor demand in terms of skill- or occupation types, average wages, firm survival and innovation. Against the concern that firms' monopsony power has been on the rise in recent years, this paper examines how different facets of offshoring relate to the prevalence and intensity of employers' labor market power.

Our empirical analysis is based on firm-level data sourced from firm annual accounts and VAT declarations complemented with information on international transactions at the country, firm and product level sourced from the Transaction Trade database. Having access to such rich data for Belgian as well as Dutch firms over the period 2009-2017 allows us to compare the interplay between firm-level offshoring and firms' labor market power in two small open economies that differ in terms of global focus.

2. Methodological approach

We use the production function approach introduced by Dobbelaere and Mairesse (2013 for estimating jointly labor market and product market imperfections. Labor market imperfections give rise to a wage-employment contract off the firm's labor demand curve. Labor market imperfections may either stem from firms' monopsony power enabling them to set a wage markdown, or from workers' monopoly power forcing employers to pay a wage markup. Accounting for a possible interdependence between labor and product market imperfections ensures that our estimates of wage markdowns, wage markups and price-cost markups are not contaminated.

We estimate translog production functions for each of the 19 two-digit manufacturing industries in both countries relying on a control function approach that allows us to control for unobserved productivity shocks. We use the estimated production function coefficients together with data on firms' inputs to compute output elasticities at the firm-year level. We use firms' estimated output elasticities and revenue shares for labor and intermediate inputs to infer their joint market imperfections parameter that allow us to pin down the extensive margin of firms' labor market power (that is, either wage markdown-pricing or wage markup pricing). Conditional on the extensive margin, we can recover the intensity of

wage markdowns through the magnitude of estimated labor supply elasticities at the firm level or the intensity of wage markups through the magnitude of workers' bargaining power.

We first document the prevalence and intensity of wage-markdown pricing and wage-markup pricing in Belgian and Dutch companies covering the period 2009-2017. We then investigate whether firm-level offshoring matters for firms' labor market power at the extensive as well as the intensive margin. Thanks to highly comparable data drawn from Business registers, VAT declarations and Transaction Trade databases, we can estimate how firm-level offshoring and industry-wide import competition relate to firms' labor market power. We measure offshoring activities based on the ratio of imports to sales and use rich information in the Transaction Trade database that reports values and volumes of international transactions, export and import, at the firm, country and product level. Values for exports are reported as FOB-type value and values for imports as CIF-type values. In addition, we are in a position to examine different margins by distinguishing offshoring of finished goods from offshoring of intermediate goods and by analyzing the relationship of imports from different origins and firms' labor market power.

3. Summary of activities and research findings

First, we find that in both countries labor market imperfections are the norm. These imperfections mainly arise from workers' monopoly power enabling them to push through wages above the marginal revenue product. We observe such labor market setting favoring workers in about 50% (40%) of firm-year observations in Belgium (the Netherlands). For another 30% of firm-year observations in both countries, we find that labor market imperfections give rise to a labor market setting favoring employers who impose wage markdowns on workers.

Second, workers' bargaining power is higher in Belgian firms, with an average value of 0.53 compared to 0.39 in Dutch firms. In both countries, workers obtain about 66% of their marginal product of labor in firms that set wage markdowns.

Third, firm-level offshoring plays an important role in shaping firms' labor market power. In both countries, we find that offshoring of both intermediate and finished goods is associated with a higher probability of wage-markdown pricing and a lower probability of wage-markup pricing. Hence, offshoring gives rise to a labor market setting favoring employers, which is most pronounced in the Netherlands.

Fourth, these findings at the extensive margin also hold at the intensive margin. Irrespective of the nature of imports, offshoring is accompanied with higher monopsony power of Belgian and Dutch employers. In Belgium, we also see that offshoring is negatively associated with workers' bargaining power.

Fifth, the origin of imports seems to be important for Belgian firms but far less so for Dutch firms. Imports of finished goods from low- and middle-income countries while imports of intermediate goods from high-income countries matters for the prevalence as well as the

intensity of wage markdowns. Our results suggest that the extensive as well as the intensive margin of workers' bargaining power in Belgium firms is mostly affected by offshoring of finished goods from non-OECD countries and offshoring of intermediate goods from neighboring countries and China. The more global focus of Dutch companies and the more global scale of the vertical chain in which Dutch firms operate clearly shows up at the extensive margin of labor market power. We find that the positive (negative) association of imports of finished as well as intermediate goods and wage markdowns (wage markups) holds irrespective of their origin.

4. Conclusions and future steps

We conclude that offshoring shapes firms' labor market power, irrespective of the nature of imports. Firm-level offshoring of finished as well as intermediate goods favors employers as firms with offshoring activities are more likely to impose wage markdowns and less likely to pay wage markups. These findings at the extensive margin also show up at the intensive margin. Offshoring is associated with higher monopsony power of Belgian and Dutch firms while accompanied with lower workers' bargaining power in Belgian firms. In the Netherlands, the results at the extensive margin are stronger than at the intensive margin and larger than in Belgium. In Belgian firms, offshoring plays an important role at the extensive as well as the intensive margin of firms' labor market power. Contrary to the nature of imports (finished versus intermediates), the origin of imports matters for Belgian firms' labor market power. This is far less so for Dutch companies which could be explained by their more global focus and the more global scale of the vertical chain in which they operate.

5. Publications resulting from the work described

Submission to academic journal after revision.

6. Bibliographical references

Dobbelaere, S. and Mairesse, J. 2013. Panel data estimates of the production function and product and labor market imperfections. *Journal of Applied Econometrics* **28(1)**: 1-46.

Does offshoring shape employers' labor market power? A comparative analysis of Belgian and Dutch firms*

—Preliminary version, please do not quote—

May, 2021

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Abstract: This paper examines the relationship between firm-level offshoring and the prevalence and intensity of labor market power at the firm level. For this purpose, use Belgian and Dutch manufacturing firm-level data over the period 2009-2017 from Business registers and VAT declarations combined with information in the Transaction Trade database that reports values and volumes of international transactions at the firm, country and product level. Our data allows to distinguish between firm-specific and industry-wide imports by country of origin and between firm-level offshoring of finished versus intermediate goods. In both countries, labor market imperfections mainly stem from workers' bargaining power forcing employers to pay a wage markup, that is real wages above the marginal product of labor. Irrespective of the nature of imports, offshoring benefits employers, which is most pronounced in the Netherlands. Both imports of finished and intermediate goods are associated with a smaller prevalence of wage markups and a larger prevalence of wage markdowns, that is real wages below the marginal product of labor arising from firms' monopsony power. In both countries, such relation also holds at the intensive margin of firms' labor market power as offshoring is accompanied with higher monopsony power of firms. In Belgium, we also observe that offshoring is negatively related to the intensity of wage markups measured by workers' bargaining power. The origin of imports matters for Belgian companies but far less so for Dutch firms, which could be explained by the more global focus of Dutch companies and the more global scale of the vertical chain in which they operate.

JEL-Classification: F14, F16, J42, J50.

Keywords: Wage markdowns, wage markups, firm-level offshoring.

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1 Introduction

With the fragmentation of production and the increasing importance of outsourcing, trade in intermediate goods through offshoring has gained importance in the global economy over the past decade. Media attention to offshoring has predominantly focused on its negative aspects induced by a substitution effect. Indeed, the standard view is that rising imports of cheap low-skilled inputs substitute for domestic low-skilled workers in industrialized countries, leading to a decline in their wages and employment and increasing inequality between high- and low-skilled workers.

By now, there exist many empirical studies using firm panel data that have examined the relationship between offshoring and various firm outcomes such as total employment, the skill or occupational composition of labor demand, average wages, firm survival and innovation. Recent theoretical papers on offshoring explicitly model imperfections in the labor market through some sort of rent-sharing mechanism that generates interfirm wage dispersion (see Hummels et al. (2018) for a recent survey). In spite of the growing importance of labor market imperfections in recent international trade theory, no empirical study has so far investigated whether and how offshoring shapes labor market power, which is the purpose of this study. We argue that such investigation is important given the concern that firms' monopsony power is on the rise and empirical evidence on increased firms' wage-setting power aggravating wage in equality (see e.g. Webber (2015), Rinz (2020)) and decreasing the share of income going to labor (e.g. Brooks et al. (2021)).

We use the production function approach introduced by Dobbelaere and Mairesse (2013) for estimating jointly labor market and product market imperfections. Labor market imperfections give rise to a wage-employment contract off the firm's labor demand curve. Such imperfections may either stem from firms' monopsony power enabling them to set a wage markdown, or from workers' monopoly power forcing employers to pay a wage markup. Accounting for a possible interdependence between labor and product market imperfections ensures that our estimates of wage markdowns, wage markups and price-cost markups are not contaminated.

We first document the prevalence and intensity of wage-markdown pricing and wage-markup pricing for Belgian and Dutch manufacturing companies, using firm panel data covering the period 2009-2017 in both countries. We then investigate whether firm-level offshoring matters for employers' labor market power.

We contribute to the empirical international trade literature along various dimensions. Our paper is the first to document the prevalence and intensity of both wage markdowns and wage markups in two small economies, Belgium and the Netherlands, that both have a strong international focus. Second, thanks to highly comparable data drawn from Business

registers, VAT declarations and Transaction Trade databases, we can estimate how firm-level offshoring and industry-wide import competition relate to firms' labor market power. In addition, we are in a position to examine different margins by distinguishing offshoring of finished goods from offshoring of intermediate goods and by analyzing the relationship of imports from different origins and employers' labor market power.

Several novel findings emerge. First, we find that in both countries labor market imperfections are the norm. These imperfections mainly arise from workers' monopoly power enabling them to push through wages above the marginal revenue product. We observe such labor market setting favoring workers in about 40% (50%) of firm-year observations in Belgium (the Netherlands). For another 30% of firm-year observations in both countries, we find that labor market imperfections give rise to a labor market setting favoring employers who impose wage markdowns on workers.

Second, workers' bargaining power is higher in Belgian firms that pay wage markups, with an average value of 0.53 compared to 0.39 in the Dutch counterparts. In both countries, workers obtain about 66% of their marginal product of labor in firms that set wage markdowns.

Third, firm-level offshoring plays an important role in shaping employers' labor market power. In both countries, we find that offshoring of both intermediate and finished goods is associated with a higher probability of wage-markdown pricing and a lower probability of wage-markup pricing. Hence, offshoring gives rise to a labor market setting favoring employers, which is most pronounced in the Netherlands.

Fourth, these findings at the extensive margin also hold at the intensive margin. Irrespective of the nature of imports, offshoring is accompanied with higher monopsony power of Belgian and Dutch employers. In Belgium, we also see that offshoring is negatively associated with workers' bargaining power.

Fifth, the origin of imports seems to be important for Belgian comapnies but far less so for Dutch firms. Imports of finished goods from low- and middle-income countries and imports of intermediate goods from high-income countries matter for the prevalence as well as the intensity of wage markdowns of Belgian firms. Our results suggest that the extensive as well as the intensive margin of wage markups in Belgian firms is mostly affected by offshoring of finished goods from non-OECD countries and offshoring of intermediate goods from neighboring countries and China. The more global focus of Dutch companies and the more global scale of the vertical chain in which Dutch firms operate clearly shows up at the extensive margin of labor market power. We find that the positive (negative) association of imports of finished as well as intermediate goods and wage markdowns (wage markups) holds irrespective of the origin of imports.

We proceed as follows. Section provides a review of the relevant theoretical literature and main empirical findings. Section 3 highlights some institutional characteristics in Belgium and the Netherlands. Section 4 presents the main ingredients of the theoretical structural productivity model with imperfect product and labor markets. Section 5 discusses our econometric model and the estimation procedure. Section 6 presents the Belgian and Dutch firm panel data. Section 7 documents the prevalence and intensity of labor and product market power in both countries. Section 8 investigates the relationship between firm-level offshoring and firms' labor market power at the extensive and the intensive margin. Section 9 concludes.

2 Synopsis of related literature

Let us first summarize why labor market power might vary across firms that differ in terms of international activities. Given our focus of interest, we pay particularly attention to the existing theoretical literature and empirical findings on the relationship between firm-level imports (offshoring) and industry-level imports (import competition) and labor market power, and on empirical studies using firm-level data. For an extensive survey on the impact of offshoring on wages, employment and displacement (including empirical studies relying on matched employer-employee data), we refer to Hummels et al. (2018). For a review of the literature on the relationship between export/foreign direct investment behavior and product/labor market imperfections, we refer to Dobbelaere and Kiyota (2018) and references therein.

Offshoring and labor market effects. A recent theoretical literature on heterogeneous firms and trade explicitly incorporates imperfect labor markets that feature firm-worker rent sharing to be the key but differ in the precise mechanism that ties firm wages to firm performance. A first set of papers consider fair wages (Egger and Kreickemeier (2009), Amiti and Davis (2012)) or efficiency wages (Davis and Harrigan (2011)) as a source of labor market imperfections, with productivity-specific wages resulting from a fair-wage effort mechanism in the former and different monitoring technologies in the latter. A second set focuses on search and matching frictions such that ex-post bargaining over the surplus of production can potentially induce wages to vary with revenue across firms (Davidson et al. (2009), Helpman et al. (2010), Coşar et al. (2016), Fajgelbaum (2020)). A third set considers firm-level unionization as a source of labor market imperfections, with decentralized collective bargaining producing inter-firm wage disparities (Montagna and Nocco (2013)).

A number of theoretical papers model explicitly the impact of offshoring taking into account imperfect competition in the labor market. Again, most papers rely on a bargaining framework and consider rent sharing to be the key mechanism through which

offshoring affects wages/wage bargaining. Since offshoring lowers costs and raises profits, theory predicts that part of these higher rents might be transmitted to domestic workers through some form of an offshoring wage premium as a result of a the bargaining process. This prediction is based on several arguments such as the high productivity of offshoring activities (e.g. Grossman and Rossi-Hansberg (2008)), technology-enhancing effects (e.g. Mion and Zhu (2013) and Goel (2017)) or changes in the labor composition (e.g. Hromcová and Agnese (2019)).

Mitra and Ranjan (2010) construct a two-sector general-equilibrium model in which unemployment is caused by search frictions. Offshoring leads to higher wages and lower unemployment if there is sufficient intersectoral mobility. These effects arise from the dominance of the productivity-enhancing (cost-reducing) effect of offshoring (akin to Grossman and Rossi-Hansberg (2008)) over its negative relative price effect on the offshoring sector. In the absence of search frictions, there is only a wage-increase effect.

Sethupathy (2013) embeds search costs in a model with heterogeneous firms, endogenous price-cost markups, productivity effects à la Grossman and Rossi-Hansberg (2008) and bargaining. This model considers lower marginal costs as a channel through which a rise in offshoring activities affects workers' bargaining power. This offshoring effect is stronger for more productive firms and offshoring reallocates production toward more productivity firms. Employment effects are ambiguous for the more productive firms as the positive productivity effect counteracts the negative employment effect from offshoring. Dumont et al. (2006) postulate that offshoring can also substitute for domestic labor, causing a reduction in wages and hence, a reduction in wage bargaining.

Some theoretical papers consider the relationship between an offshoring threat, rather than actual offshoring, and labor market outcomes. Ranjan (2013) sets up a search and matching model but lets wage bargaining to take place either collectively between workers organized in a union and the firm (as in many European countries) or individually between each worker and the firm (as in the US). Under collective bargaining, the possibility of offshoring (lower offshoring costs) induces lower wages and lower unemployment. However, under individual bargaining, offshoring increases unemployment. Jeon and Kwon (2018) argue that the wage bargaining process might weaken if firms consider a probability to offshore. Using South Korean plant-level data, they validate this theoretical prediction. Kramarz (2008) models imperfect competition in product markets and shows that firms facing strong unions are likely to offshore more intensively than firms facing weaker unions because an increase in offshoring reduces the rents that the union and the firm bargain over. Using French matched employer-employee data, he shows empirical support for this prediction.

On the empirical side, few papers have investigated the relationship between offshoring and

labor market imperfections. Using data on French manufacturing firms, Carluccio et al. (2015) find that in firms covered by collective bargaining, the responsiveness of wage to offshoring (and also to exports) is larger than in uncovered firms. These results provide empirical support of offshoring affecting wages through rent sharing. Give that the threat to offshore activities might strengthen the firm's position at the bargaining table, one can question whether the bargaining process is exogenous to offshoring (and other forms of internationalization). Dealing with such potential endogeneity bias, Carluccio et al. (2016) find that offshoring does not affect the probability of signing a collective wage agreement in French firms. Caselli et al. (2021) show a relationship between offshoring (and export intensity) and labor market power. Offshoring and importing intermediates from China increases firms' labor market power while exporting firms pay higher wages explaining the positive relationship between export intensity and workers' bargaining power.

In sum, based on existing theories, the relationship between offshoring and workers' bargaining power is a priori unclear, which is reflected in available empirical evidence. It depends on which of the two forces, the productivity augmenting effect of offshoring increasing rent sharing versus the negative effect of offshoring on workers' bargaining power through replacing domestic employment, dominates. As far as we know, theoretical papers that explicitly focus on the impact of offshoring on firms' wage-setting (monopsony power) are non-existent.

Import competition and labor market effects. Models with heterogeneous firms and trade in an open-economy setting (e.g. Melitz and Ottaviano (2008)) usually examine the impact of trade shock which captures some form of trade liberalization (lower tariff and/or non-tariff barriers). The move to a more open economy puts firms in import-competing industries under pressure because it signals either lower expected profits or higher expected costs from more reliance on external financing (Bloom et al. (2016)). Consequently, it is predicted that larger and more productive firms export and expandm, and small and less productive firms exit or become smaller (Melitz (2003). Indirectly, such models predict that import competition reduces the rents to be shared and through this channel erodes workers' bargaining power, especially for workers employed in low-productive firms.

On the empirical side, Dumont et al. (2006) use firm data for five European countries, find unions to be wage-oriented and internationalization having a significant negative effect on workers' bargaining power. Abraham et al. (2009) and Boulhol et al. (2011) provide evidence of import competition putting pressure on both firms' price-cost markups and workers' bargaining power, especially when there is increased competition from low-wage countries. Nesta and Schiavo (2018) investigate the impact of import competition from both low-wage and industrial countries on product and labor market imperfections in France. They show that import competition from advanced countries tends to lower

workers' bargaining power, whereas import competition from China seems to push French firms upscale, thus improving the share of rents going to workers. Caselli et al. (2021) find that Chinese import competition reduce workers' bargaining power and price-cost markups in French manufacturers. The authors propose a decomposition analysis whereby bargaining power is decomposed in price-cost markup, marginal productivity of labor, wages and industry price index components. Their decomposition exercise reveals that the lower bargaining power (or the narrower gap between real wages and the marginal product of labor) triggered by Chinese import competition is induced by higher productivity (marginal product of labor) rather than lower wages. This effect is heterogeneous because firms that determine wages through wage-setting rather than through wage-bargaining do not experience a reduction in their labor market power following increased Chinese competition. Using German firm-level data, Mertens (2020) shows that the effect of exports and imports of final goods on labor market imperfections depends on the type of labor market power (firms' monopsony power versus workers' bargaining power). More specifically, increased export demand strengthens firms' monoposony power while increased import competition increases workers' bargaining power. Baumgarten and Lehwald (2019) show that increased import exposure from China and Eastern Europe has led to an increase in the probability of German plants leaving industry-wide bargaining agreements, accounting for about one fifth of the overall decline in the German manufacturing sector. The effect is found to be most pronounced for small and medium-sized plants.

Using data on Spanish manufacturers, Moreno and Rodríguez (2011) test the hypothesis that import competition reinforces market discipline in both product and labor markets. They find the pro-competitive effect of imports on price-cost margins to be pronounced in the case of final goods whereas the pro-efficiency effect partially outweighs the pro-competitive effect in the case of intermediate goods. Likewise, the bargaining power of workers is found to be smaller for importers of final goods but unaffected for importers of intermediate goods.

In sum, based on existing theoretical and empirical evidence, the relationship between import competition and workers' bargaining power depends on the nature of imported goods (finished versus intermediate goods) and on whether the pro-competitive versus the pro-efficiency effect dominates. Akin to theories for offshoring, theoretical predictions on the impact of import competition on firms' wage-setting (monopsony power) are hard to make. Existing empirical evidence on this relationship is not unambiguous.

3 Institutional background

This section highlights some institutional characteristics in Belgium and the Netherlands which serve as background information for our comparative study. These characteristics might shape firms' operational environment in general and, within our context, the prevalence and intensity of labor and product market imperfections (see also Konings et al. (2001) and Du Caju et al. (2011) for a discussion on this issue).

On the labor market side, industrial relations in Belgium and the Netherlands share some similar wage bargaining institutional characteristics but also differ on important aspects. In both countries, there is a broadly regulated system of wage bargaining characterized by a dominance of industry-level wage bargaining, the existence of statutory minimum wages and extension mechanisms guaranteeing that most workers belonging to the private sector are covered by collective agreements. The wage bargaining system in Belgium is considered to be even more regulated than in the Netherlands because of state-imposed automatic wage indexation and larger government interventions. Trade union density rates are also higher (Caju et al. (2008)). In terms of employment protection, the OECD indicators show that employment protection is significantly higher and above the OECD average in Belgium, which is due to much stricter regulation on permanent contracts, while at the OECD average in the Netherlands (Venn (2009); OECD (2013)). Both countries significantly eased the regulation on temporary contracts during the 1990s (Martin and Scarpetta (2012)).

In all EU member states, employees are represented in trade unions which are mostly organized on a industry-wide basis and which embody the traditional form of employee representation, and works councils which are organized at the company or establishment level. In Belgium, trade union representation dominates and in terms of union membership, trade unions are among the strongest in the OECD with 52% of employees in unions which is largely above the OECD average of 19% Caju et al. (2008); Fulton (2013)).

Collective bargaining is highly structured. There are three levels with the industry level playing the dominant role. At the centralized level, a national agreement determines a standard for the maximum hourly increase of gross labor compensation according to the expected evolution of labor costs in the neighboring countries during the first year. This so-called "wage margin" acts as a guideline for complementary negotiations at the industry and firm levels, which are held in the subsequent year (Novella and Sissoko (2013)). Industry-level bargaining is organized around joint committees bringing together employers' and unions' representatives at the industry level. It is the relevant bargaining level for about 98% of all firms (Druant et al. (2008)). Collective labor agreements might also be concluded at the firm level with large firms having a higher probability of firm-level

collective bargaining (Economie (2007)). This structure explains the very high proportion of employees covered by collective bargaining (96%).

The dominant form of coordination, which refers to the extent to which wage negotiations are coordinated across the different bargaining levels, is automatic wage indexation, which is an exception in the OECD. This mechanism binds wage increases to cost of living raises in order to guarantee a constant level of purchasing power for employees and those who receive benefits.[4] Another particular characteristic of the wage bargaining system is that blue-collar and white-collar workers are represented by separate unions. Pay scales for blue-collar workers depend primarily on job descriptions while pay scales for white-collar workers are defined according to seniority. Beyond collective bargaining, the wage-setting system shows individualized characteristics with incentive pay and performance reviews determining individual wage increases or promotion.

Contrary to Belgium, employee representation at the workplace only occurs through works councils in the Netherlands. Trade union membership is low (21%) and only slightly above the OECD average. Despite low union density, a broad majority agrees with the unions' policies. Every year, collective bargaining starts at the centralized level, where employer associations, trade unions and the government reach an agreement on the desirable development of wages which serves as an advice for actual negotiations on contracts and wages at the industry level. Modest wage increases have been central in these negotiations (Hartog and Salverda (2018)).[5] At both the central and industry level, the government plays the role of moderator, ensuring that agreements are based on consensus. As such, the collective bargaining system is conducive to social stability. Collective labor agreements are concluded at the company level in very large companies. The existence and widespread use of extension procedures for industry-level wage agreements, making these agreements binding for all employers and employees within the industry even if some employers or trade unions did not directly sign the agreement, explains the high rate of collective bargaining coverage despite low trade union density. Of all Dutch employees, 83% are covered by a collective contract: 69% by industry-level contracts and 14% by company contracts (Borghans and Kriechel (2009)). This wage-setting process is complemented by the prevalent use of some type of incentive pay defining the position of an employee on the pay scale.

On the product market side, the Dutch political authorities have been slower to adapt competition law in par with European Union legislation. In Belgium, the general price regulation system was replaced by the first Competition Act similar to the European

[4] In particular, wages are automatically indexed according to the health price index, which is the national consumer price index excluding tobacco, motor fuels and alcoholic beverages.

[5] Since 1982, wage claims by Dutch trade unions have been mostly below the EU average (Kleinknecht et al. (2006)).

Union legislation in 1991. In the Netherlands, the old Economic Competition Act of 1956, based on the abuse principle, was only replaced by the new Competition Act, based on the prohibition principle, in 1998. At the same time, the Dutch Competition Authority (known under its Dutch acronym, NMa) started to operate.

Firm-level studies focusing on the 1990s document higher price-cost margins in both manufacturing and services in the Netherlands (Konings et al. (2001), Hupkes and Maks (2006)). Disparity of price-cost margins could result from pronounced differences in trade and competition policy that existed between both countries. Competition policy kept markets open which shaped a competitive environment in Belgium while the use of protective policies rather sheltered firms from import competition in the Netherlands (Van Cayseele et al. (2000)). Using industry-level data covering the period 1993-2007, Ozbugday and Brouwer (2012) do not find a deterrent impact of the 1998 change in the competition law on price-cost margins in Dutch manufacturing.

Varying levels of import competition between Belgium and the Netherlands are confirmed by data on import penetration rates provided by the OECD: trade openness in manufacturing and to a lesser extent in services is higher in Belgium (Pascal (2001)). Using firm-level data covering the period 1996-2004, Abraham et al. (2009) provide evidence of pro-competitive effects resulting from trade opening in Belgium. In addition, differences in the intra-sectoral composition of exports between both countries might drive differences in price-cost margins, as the latter are affected by variation in the value-added content and import price competition. For example, the input price of intermediates for high-tech goods versus semi-finished goods depends on the value-added content, as reported by the European Commission (Gereffi and Sturgeon (2013)). They show that the value-added content of trading and domestic goods broken down by domestic and foreign parts is different between both countries over the period 2000-2011. In addition, a much higher revealed comparative advantage (RCA) indicator in high-tech products for the Netherlands and systematic differences in RCA indices in manufacturing and services between both countries are reported.

From an international trade perspective, both Belgium and the Netherlands have a strong international focus, with Dutch companies having a more global focus than Belgian firms. For example, Annelies et al. (2020)) report that Belgian listed firms mostly trade with European countries while Dutch listed firms trade more and mainly with non-European countries.

4 Theoretical framework

To model a firm's product and labor market power, we follow Dobbelaere and Mairesse (2013) and nest two polar models of wage formation in imperfect labor markets in the seminal productivity model of Hall (1988) with imperfect product markets.

Each firm at any point in time produces output (Q_{it}) using labor (N_{it}), intermediate input (M_{it}) and capital (K_{it}). We assume that all producers that are active in the market are maximizing short-run profits and take the price of intermediate input as given.[6] Each firm must choose the optimal quantity of output and the optimal demand for intermediate input and labor. We assume that capital is predetermined and thus no choice variable in the short run.

The first-order condition for output yields the firm's price-cost markup $\mu_{it} = \frac{P_{it}}{(C_Q)_{it}}$ with P_{it} the output price and $(C_Q)_{it}$ the marginal cost of production. The first-order condition for intermediate input is given by setting the marginal revenue product of intermediate input equal to the price of intermediate input: $(Q_M)_{it} = \mu_{it}\frac{J_{it}}{P_{it}}$, with $(Q_M)_{it}$ the marginal product of intermediate input and J_{it} the price of intermediate input. Using this first-order condition and the first-order condition for output, we obtain an expression for firm i's price-cost markup μ_{it}:

$$\mu_{it} = \frac{(\varepsilon_M^Q)_{it}}{\alpha_{it}^M}, \tag{1}$$

with $(\varepsilon_M^Q)_{it}$ the output elasticity with respect to intermediate input and $\alpha_{it}^M = \frac{J_{it}M_{it}}{P_{it}Q_{it}}$ the share of intermediate input expenditure in total revenue. The value of μ_{it} determines the firm's type of competition prevailing in the product market or its product market setting (denoted PMS). The product market setting is defined to be perfectly competitive if the firm engages in marginal cost pricing (PMC) and, hence, has no product market power. The product market setting is defined to be imperfectly competitive if the firm sets a price-cost markup (PMU), which is our model consistent measure of product market power.

[6] This assumption might be perceived as being restrictive, given recent evidence on the importance of imperfect competition in intermediate goods markets. Morlacco (2019) extends our model to account for imperfect competition in all variable input markets and uses full company accounts and exhaustive records of export and import flows of French firms. Kikkawa et al. (2019) rely on a model of oligopolistic competition in firm-to-firm trade and use business-to-business transactions of the universe of Belgian firms. We defend our restrictive assumption on two grounds. The first is a data reason. In line with Morlacco (2019), we could easily model imperfections in intermediate input markets as additional unit costs that create wedges between marginal costs and marginal products. However, data constraints preclude us from considering this choice. The second reason is that we prefer to focus our empirical analysis on relationship between firm-level offshoring and employers' labor market power, abstaining from non-competitive buyer behavior in the market of intermediate inputs.

Firm i's wage formation process, and, hence, its optimal demand for labor depends on the prevalence and the source of labor market imperfections. The firm's type of competition prevailing in the labor market or its labor market setting (denoted LMS) is defined to be perfectly competitive if the firm engages in marginal product pricing (WMP), that is, pays the marginal employee a real wage equal to her marginal product.[7] Its labor market setting is defined to be imperfectly competitive if the firm either pays a wage markup (WMU), that is, pays the marginal employee a real wage exceeding her marginal product; or sets a wage markdown (WMD), that is, pays the marginal employee a real wage lower than her marginal product. Its labor market setting is defined to be imperfectly competitive if the firm either pays a wage markup (WMU), that is, pays the marginal employee a real wage exceeding her marginal product; or sets a wage markdown (WMD), that is, pays the marginal employee a real wage lower than her marginal product.

Intuitively, the perfectly competitive labor market setting ($LMS = WMP$) arises when the wage-employment contract lies on the firm's labor demand curve, which characterizes profit-maximizing employment levels.[8] Analogous to the case of intermediate input, the first-order condition for labor under $LMS = WMP$ is given by setting the marginal revenue product of labor equal to the price of labor: $(Q_N)_{it} = \mu_{it}\frac{W_{it}}{P_{it}}$ with $(Q_N)_{it}$ the marginal product of labor and W_{it} the price of labor. Hence, absent labor market imperfections, there exists no wedge between the output elasticities of intermediate input and labor and their respective revenue shares. Since this wedge is derived using the first-order conditions for output, intermediate input and labor, we call this wedge the firm's joint market imperfections parameter ψ_{it}:

$$\psi_{it} = \frac{(\varepsilon_M^Q)_{it}}{\alpha_{it}^M} - \frac{(\varepsilon_N^Q)_{it}}{\alpha_{it}^N} = 0 \tag{2}$$

with $(\varepsilon_N^Q)_{it}$ the output elasticity with respect to labor and $\alpha_{it}^N = \frac{W_{it}N_{it}}{P_{it}Q_{it}}$ the share of labor input expenditure in total revenue.

In contrast to marginal product pricing, labor market imperfections give rise to wage-employment contracts off the firm's labor demand curve. We consider two polar sources of such imperfections. Labor market imperfections may arise from firms' monoposony power that enables them to set a wage markdown ($LMS = WMD$). There exist different underlying theoretical structural models leading to wage-employment contracts below the firm's labor demand curve. Wage-markdown pricing may, e.g., arise when (i) workers have heterogeneous preferences over work environments of different potential employers,

[7] Defining perfect competition in the labor market in such a way is in line with Addison et al. (2014).

[8] Such solutions arise under either perfect competition in the labor market, in which case the firm unilaterally chooses the profit-maximizing number of workers at the exogenously-given wage or under right-to-manage bargaining Nickell and Andrews (1983), in which case the firm unilaterally chooses the profit-maximizing employment level at the bargained wage.

(*ii*) employers collude, or (*iii*) employers are active in highly concentrated labor markets (Manning (2003), Manning (2011), Manning (2021)). Considering the first –widely-used– theoretical structural model, Dobbelaere and Mairesse (2013) show that the first-order condition for labor is given by: $(\varepsilon_N^Q)_{it} = \mu_{it}\alpha_{it}^N \left(1 + \frac{1}{(\varepsilon_W^N)_{it}}\right)$, with $(\varepsilon_W^N)_{it} \in \mathbb{R}_+$ the wage elasticity of the labor supply of firm i, measuring the degree of wage-setting power that firm i possesses. $(\varepsilon_W^N)_{it}$ is our model consistent measure of labor market power under $LMS = WMD$. Hence, the firm's joint market imperfections parameter ψ_{it} under $LMS = WMD$ is equal to:

$$\psi_{it} = \frac{(\varepsilon_M^Q)_{it}}{\alpha_{it}^M} - \frac{(\varepsilon_N^Q)_{it}}{\alpha_{it}^N} = -\frac{\mu_{it}}{(\varepsilon_W^N)_{it}} < 0 \tag{3}$$

Labor market imperfections may also stem from workers' monopoly/bargaining power that forces employers to pay a wage markup ($LMS = WMU$). There exist different underlying theoretical structural models leading to wage-employment contracts above the firm's labor demand curve. Wage-markup pricing may, e.g., arise when (*i*) a firm and its workforce negotiate simultaneously over wages and employment McDonald and Solow (1981), (*ii*) a firm bargains over wages with a workforce of declining size caused by employees gradually losing their job after bargaining breaks down Dobbelaere and Luttens (2016), or (*iii*) an employee bargains individually over wages with a firm that does not incur hiring costs Stole and Zwiebel (1996). Considering the first –widely-used– theoretical structural model, DobbelaereMairesse2013 show that the first-order condition for labor is given by: $(\varepsilon_N^Q)_{it} = \mu_{it}\alpha_{it}^N - \mu_{it}\gamma_{it}(1-\alpha_{it}^N-\alpha_{it}^M)$, with $\gamma_{it} = \frac{\phi_{it}}{1-\phi_{it}} \geqslant 0$ the relative extent of rent sharing and $\phi_{it} \in [0,1]$ the part of economic rents going to the workers or the degree of workers' bargaining power during worker-firm negotiations. ϕ_{it} is our model consistent measure of labor market power under $LMS = WMU$. Hence, the firm's joint market imperfections parameter ψ_{it} under $LMS = WMU$ is equal to:

$$\psi_{it} = \frac{(\varepsilon_M^Q)_{it}}{\alpha_{it}^M} - \frac{(\varepsilon_N^Q)_{it}}{\alpha_{it}^N} = \mu_{it}\frac{\phi_{it}}{1-\phi_{it}}\left[\frac{1-\alpha_{it}^N-\alpha_{it}^M}{\alpha_{it}^N}\right] > 0 \tag{4}$$

The pricing rules in the product and labor markets lead to six possible regimes of competitiveness $R \in \Re = \{PMC\text{-}WMD,\ PMU\text{-}WMD,\ PMC\text{-}WMP,\ PMU\text{-}WMP,\ PMC\text{-}WMU,\ PMU\text{-}WMU\}$ that we consider. Each corresponds to a combination of the type of competition prevailing in the product market or product market setting $PMS \in \{PMC,\ PMU\}$, and the type of competition prevailing in the labor market or labor market setting $LMS \in \{WMD,\ WMP,\ WMU\}$. These regimes are characterized as subsets of dimension two in the two-dimensional space of the key parameters of our static productivity model, which are the price-cost markup μ_{it} and the joint market imperfections parameter ψ_{it}. Table 1 summarizes the six possible regimes.

<Insert Table 1 about here>

5 Econometric framework

In order to obtain consistent estimates of the output elasticities $(\varepsilon_N^Q)_{it}$ and $(\varepsilon_M^Q)_{it}$, we only consider production functions with (i) a scalar Hicks-neutral productivity term which is observed by the firm but unobserved by the econometrician (denoted by ω_{it}) and (ii) common technology parameters, governing the transformation of inputs to units of output, across a set of producers (denoted by the vector β). These two assumptions imply the following expression for the production function:

$$Q_{it} = F(N_{it}, M_{it}, K_{it}; \beta) \exp(\omega_{it}) \tag{5}$$

Guided by data availability in both countries, we cluster producers based on industry. In order to obtain consistent estimates of the production function coefficients (β) for each of our 19 two-digit manufacturing industries in each country, we need to control for unobserved productivity shocks ω_{it}, which are potentially correlated with the firm's input choices. Following standard practice in the existing literature, we apply the estimation procedure proposed by Ackerberg et al. (2015) using the insight that optimal input choices hold information about unobserved productivity. We denote the logs of Q_{it}, N_{it}, M_{it} and K_{it} by q_{it}, n_{it}, m_{it} and k_{it}, respectively.

We impose the following timing assumptions. Capital k_{it} is assumed to be decided a period ahead (at $t-1$) because of planning and installation lags. Labor is "less variable" than material. More precisely, n_{it} is chosen by firm i at time $t-b$ $(0 < b < 1)$, after k_{it} being chosen at $t-1$ but prior to m_{it} being chosen at t. This assumption is consistent with e.g. firms needing time to train new workers.

We assume that productivity (ω_{it}) evolves according to an endogenous first-order Markov process. In particular, we allow a firm's decision to engage in foreign direct investment (denoted MNE_{it-1}) to endogenously affect future productivity, which is supported by evidence in international economics applications (see e.g. Blomström and Kokko (1999), Helpman et al. (2004), Girma et al. (2005), Greenaway and Kneller (2007)). As such, we can decompose ω_{it} into its conditional expectation given the information known by the firm in $t-1$ (denoted I_{it-1}) and a random innovation to productivity (denoted ξ_{it}):

$$\omega_{it} = \mathbb{E}[\omega_{it}|I_{it-1}] + \xi_{it} = \mathbb{E}[\omega_{it}|\omega_{it-1}, MNE_{it-1}] + \xi_{it} = g(\omega_{it-1}, MNE_{it-1}) + \xi_{it} \tag{6}$$

with $g(\cdot)$ a general function. ξ_{it} is assumed to be mean independent of the firm's information set at $t-1$.

Given these timing assumptions, firm i's intermediate input demand at t depends directly on n_{it} chosen prior to m_{it}, i.e. the input demand function for m_{it} is conditional on n_{it}:

$$m_{it} = m_t(n_{it}, k_{it}, MNE_{it}, \omega_{it}) \tag{7}$$

Eq. (7) shows that ω_{it} is the only unobservable entering the intermediate input demand function. This scalar unobservable assumption together with the assumption that $m_t(\cdot)$ is strictly increasing in ω_{it} conditional on n_{it}, k_{it} and MNE_{it} (strict monotonicity assumption), allow to invert ω_{it} as a function of observables:

$$\omega_{it} = m_t^{-1}(m_{it}, n_{it}, k_{it}, MNE_{it})\,. \tag{8}$$

Considering the logarithmic version of Eq. (5) and allowing for an idiosyncratic error term including non-predictable output shocks and potential measurement error in output and inputs (ϵ_{it}) gives:

$$y_{it} = f(n_{it}, m_{it}, k_{it}; \beta) + \omega_{it} + \epsilon_{it} \tag{9}$$

where $y_{it} = q_{it} + \epsilon_{it}$ with ϵ_{it} assumed to be mean independent of current and past input choices.[9]

We approximate $f(\cdot)$ by a second-order polynomial where all logged inputs, logged inputs squared and interaction terms between logged inputs are included (translog production function):

$$\begin{aligned} y_{it} = \beta_0 &+ \beta_n n_{it} + \beta_m m_{it} + \beta_k k_{it} + \beta_{nn} n_{it}^2 + \beta_{mm} m_{it}^2 + \beta_{kk} k_{it}^2 \\ &+ \beta_{nm} n_{it} m_{it} + \beta_{nk} n_{it} k_{it} + \beta_{mk} m_{it} k_{it} + \omega_{it} + \epsilon_{it} \end{aligned} \tag{10}$$

where β_0 has to be interpreted as the mean efficiency level across firms.

Substituting Eq. (8) in Eq. (10) results in a first-stage equation of the form:

$$y_{it} = f_{it} + m_t^{-1}(m_{it}, n_{it}, k_{it}, MNE_{it}) + \epsilon_{it} = \varphi_t(n_{it}, m_{it}, k_{it}, MNE_{it}) + \epsilon_{it} \tag{11}$$

which has the purpose of separating ω_{it} from ϵ_{it}, i.e. eliminating the portion of output y_{it} determined by unanticipated shocks at time t, measurement error or any other random noise (ϵ_{it}).

Hence, the first stage involves using Eq. (11) and the moment condition $\mathbb{E}[\epsilon_{it}|I_{it}] = 0$ to obtain an estimate $\widehat{\varphi}_{it}$, of the composite term $\varphi_t(n_{it}, m_{it}, k_{it}, MNE_{it}) = f_{it} + m_t^{-1}(m_{it}, n_{it},$

[9] Note that $(\varepsilon_N^Q)_{it} = \frac{\partial f(\cdot)}{\partial n_{it}}$ and $(\varepsilon_M^Q)_{it} = \frac{\partial f(\cdot)}{\partial m_{it}}$. These output elasticities are by definition independent of a firm's productivity shock.

$k_{it}, MNE_{it})$, which represents output net of ϵ_{it} In our application, estimation of Eq. (11) is implemented by regressing output on a second-order polynomial series expansion where all logged inputs, logged inputs squared and interaction terms between logged inputs are included. To allow for time variation in φ_t , these polynomial terms are interacted with a time trend.

Given a particular set of parameters β , we can compute (up to a scalar constant) an estimate of ω_{it} :

$$\begin{aligned}\widehat{\omega}_{it}(\beta) &= \widehat{m}_t^{-1}(m_{it}, n_{it}, k_{it}, MNE_{it}) \\ &= \widehat{\varphi}_{it} - \beta_0 - \beta_n n_{it} - \beta_m m_{it} - \beta_k k_{it} - \beta_{nn} n_{it}^2 - \beta_{mm} m_{it}^2 - \beta_{kk} k_{it}^2 \\ &\quad - \beta_{nm} n_{it} m_{it} - \beta_{nk} n_{it} k_{it} - \beta_{mk} m_{it} k_{it}\end{aligned} \tag{12}$$

In order to implement the second stage and to identify the production function coefficients, we need to recover the innovation to productivity (ξ_{it}) to form moments on. Using Eq. (12), a consistent (non-parametric) approximation to $\mathbb{E}[\omega_{it}|\omega_{it-1}, MNE_{it-1}]$ is given by the predicted values from regressing nonparametrically $\widehat{\omega}_{it}(\beta)$ on $\widehat{\omega}_{it-1}(\beta)$ and MNE_{it-1} . The residual from this regression provides us with an estimate of ξ_{it} .

Given the timing assumptions on input use, the following population moment conditions can be defined: $\mathbb{E}[\xi_{it}(\beta)d] = 0$ where the set of instruments is:

$$d_{it} = \left\{n_{it-1}, m_{it-1}, k_{it}, n_{it-1}^2, m_{it-1}^2, k_{it}^2, n_{it-1}m_{it-1}, n_{it-1}k_{it}, m_{it-1}k_{it}\right\} \tag{13}$$

Exploiting these moment conditions, we can now estimate the production function coefficients β using standard GMM and rely on block bootstrapping for the standard errors. The estimated production function coefficients $\widehat{\beta}$ are then used together with data on inputs to compute the output elasticities at the firm-year level. In particular, we calculate the firm-year elasticity of output with respect to labor as:

$$(\widehat{\varepsilon}_N^Q)_{it} = \widehat{\beta}_n + 2\widehat{\beta}_{nn} n_{it} + \widehat{\beta}_{nm} m_{it} + \widehat{\beta}_{nk} k_{it} \tag{14}$$

Similarly, we calculate the firm-year elasticity of output with respect to material as:[10]

$$(\widehat{\varepsilon}_M^Q)_{it} = \widehat{\beta}_m + 2\widehat{\beta}_{mm} m_{it} + \widehat{\beta}_{mn} n_{it} + \widehat{\beta}_{mk} k_{it} \tag{15}$$

Using the shares of labor and intermediate input expenditure in total revenue, α_{it}^N and α_{it}^M , respectively, and our estimates of the output elasticities, $(\widehat{\varepsilon}_N^Q)_{it}$ and $(\widehat{\varepsilon}_M^Q)_{it}$, we are able to compute $\widehat{\mu}_{it}$ and $\widehat{\psi}_{it}$. Since we only observe $Y_{it} = Q_{it}\exp(\epsilon_{it})$, we do not observe

[10] Under a Cobb-Douglas production function $(\varepsilon_N^Q)_{it}$ and $(\varepsilon_M^Q)_{it}$ would be equal to $\widehat{\beta}_n$ and $\widehat{\beta}_m$, respectively.

the correct expenditure shares for N_{it} and M_{it}. We can recover an estimate of ϵ_{it} from the first stage to adjust the expenditure shares as follows:[11]

$$\widehat{\alpha}_{it}^{N} = \frac{W_{it}N_{it}}{P_{it}\frac{Y_{it}}{\exp(\epsilon_{it})}} \tag{16}$$

$$\widehat{\alpha}_{it}^{M} = \frac{J_{it}M_{it}}{P_{it}\frac{Y_{it}}{\exp(\epsilon_{it})}} \tag{17}$$

Using Eqs. (14), (15), (16), and (17), we compute $\widehat{\mu}_{it}$ and $\widehat{\psi}_{it}$ as follows:

$$\widehat{\mu}_{it} = \frac{(\widehat{\varepsilon}_{M}^{Q})_{it}}{\widehat{\alpha}_{it}^{M}} \tag{18}$$

$$\widehat{\psi}_{it} = \frac{(\widehat{\varepsilon}_{M}^{Q})_{it}}{\widehat{\alpha}_{it}^{M}} - \frac{(\widehat{\varepsilon}_{N}^{Q})_{it}}{\widehat{\alpha}_{it}^{N}} \tag{19}$$

Based on the estimates $\widehat{\mu}_{it}$ and $\widehat{\psi}_{it}$, we are able to determine the product market setting PMS $\in$ {PMC,PMU} and the labor market setting LMS $\in$ {WMP,WMU,WMD} of firm i at time t as follows. Following Dobbelaere and Kiyota (2018), we account for estimation uncertainty in $\widehat{\mu}_{it}$ and $\widehat{\psi}_{it}$ by using a testing procedure that relies on the the 95% two-sided confidence intervals (CI) for μ_{it} and $gap_{Nit} = \frac{(\varepsilon_{N}^{Q})_{it}}{\widehat{s}_{Nit}}$.

The 95% confidence interval for μ_{it} is equal to $[\widehat{\mu}_{it} - 1.96 \times \widehat{\sigma}_{\widehat{\mu}_{it}}, \widehat{\mu}_{it} + 1.96 \times \widehat{\sigma}_{\widehat{\mu}_{it}}] = [A_{\widehat{\mu}_{it}}, B_{\widehat{\mu}_{it}}]$, with $\widehat{\sigma}_{\widehat{\mu}_{it}}$ the standard error of $\widehat{\mu}_{it}$ being an estimator of the standard deviation of the sampling distribution of $\widehat{\mu}_{it}$. The 95% confidence interval for gap_{Nit} is $\left[\widehat{gap}_{Nit} - 1.96 \times \widehat{\sigma}_{\widehat{gap}_{Nit}}, \widehat{gap}_{Nit} + 1.96 \times \widehat{\sigma}_{\widehat{gap}_{Nit}}\right] = \left[A_{\widehat{gap}_{Nit}}, B_{\widehat{gap}_{Nit}}\right]$ with $\widehat{\sigma}_{\widehat{gap}_{Nit}}$ the standard error of $\widehat{gap}_{Nit}$.

To determine firm i's PMS at time t, we use the 95% CI for μ_{it}. If the lower bound of the 95% CI ($A_{\widehat{\mu}_{it}}$) is lower than or equal to unity, firm i is characterized to be perfectly competitive (PMC) at time t. If $A_{\widehat{\mu}_{it}}$ exceeds unity, firm i is characterized by imperfect competition (PMU) at time t.

To determine firm i's LMS at time t, we compare the 95% CIs for gap_{Nit} and μ_{it}. In particular, firm i engages in wage-marginal-product pricing (WMP) at time t if the 95% CIs for gap_{Nit} and μ_{it} overlap. This implies that $\widehat{\mu}_{it}$ is not significantly different from $\widehat{gap}_{Nit}$, hence $\widehat{\psi}_{it} = 0$ at the 5% significance level. Firm i imposes a wage markdown on workers at time t if $A_{\widehat{gap}_{Nit}} > B_{\widehat{\mu}_{it}}$. As such, $\widehat{\psi}_{it} < 0$ at the 5% significance level. Workers force firm i to pay a wage markup at time t if $A_{\widehat{\mu}_{it}} > B_{\widehat{gap}_{Nit}}$. Hence, $\widehat{\psi}_{it} > 0$ at the 5% significance level.

[11] This correction is important as it eliminates any variation in expenditure shares that comes from variation in output not correlated with $\varphi_t(\cdot)$.

Once firm i's labor and product market settings (extensive margin) at time t is determined, we are able to quantify market power in product and labor markets (intensive margin). As explained in Section 4, the product and labor market imperfection parameters are derived from the estimated joint market imperfections parameter $\widehat{\psi}_{it}$ and their respective standard errors are computed using the Delta method (Wooldridge (2010)).

6 Data

Combining firm and country-level perspectives for two countries, our analysis primarily serves the purpose of examining how firm-level offshoring shapes labor market imperfectionsat the firm level. The selection of Belgium and the Netherlands is motivated by differences in institutional characteristics, the fact that the two economies have a strong international focus and the ability to build two highly comparable microdata sets that span the period 2009-2017. The latter ensures that our results reflect underlying economic differences which enables us to perform a reliable international comparative study.

In both countries, the unbalanced panel datasets to estimate firm-year measures of product and labor market power are sourced from firm annual accounts and VAT declarations. The observational unit is the firm, which can be thought of as the economic actor in the production process.[12] We consider enterprises active in the manufacturing industry, i.e. classified under headings 10 to 33 in the NACE Rev2 classification.

For Belgium, employment (N) defined as the average number of employees in full-time equivalents over the year, the wage bill (WN), the capital stock (to proxy K) measured as the stock of fixed tangible assets and ultimate control of ownership to define the MNE status of a firm are reported in firms' annual accounts collected by the National Bank of Belgium. Intermediate input consumption (to proxy M) and nominal sales (to proxy Q) are taken from VAT declarations.

For the Netherlands, firm data on value-added (to proxy M), nominal sales, persons employed (FTE, N), the wage bill (WN) the book value of tangible assets (to proxy K) and the ultimate control of ownership (to define MNE status) are drawn from compulsory reporting of firms and income statements available in the Dutch Business Register collected by Statistics Netherlands and data from Profit and VAT tax information referred to as Baseline.

[12] The Eurostat definition is as follows: an enterprise is an organizational unit producing goods or services which has a certain degree of autonomy in decision-making. An enterprise can carry out more than one economic activity and it can be situated at more than one location. An enterprise may consist out of one or more legal units, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Enterprise.

To convert nominal values into real, inflation-adjusted data, we use two-digit industry price deflators for output, intermediate inputs and capital from the OECD STAN database for Belgium and from the OECD National Accounts Statistics for the Netherlands.

We relate the prevalence and intensity of firm-year labor market imperfection parameters to a number of covariates. By having access to imports at the firm-level, we can distinguish between firm-specific offshoring ($IMPsh$ variables) and industry-wide import competition ($IMPcomp$ variables), which are our covariates of interest. Following Biscourp and Kramarz (2007) and Mion and Zhu (2013), we measure offshoring activities based on the ratio of imports to sales and use rich information in the Transaction Trade database that reports values and volumes of international transactions, export and import, at the firm, country and product level. Values for exports are reported as FOB-type value and values for imports as CIF-type values.[13] Products are classified using the 8-digit CN (Combined Nomenclature) classification.

In addition to firm-level total imports, we are able to distinguish between two different types of firm-level offshoring: offshoring of intermediate and finished goods. The purpose of this distinction is to account for the different nature of imports of goods that will be further processed as inputs within the firm versus imports of goods that are ready to be sold.[14] The identification of final versus intermediate goods is based on the comparison between the imported product and the firm 4-digit industry of economic activity. We convert the CN classification used for trade flows into 4-digit NACE codes, focusing on products for which a one-to-one correspondence exists, a condition that holds for the vast majority of products. We classify an imported good as final if it falls within the same 4-digit NACE sector as the firm main activity, otherwise the good is considered as intermediates.

In addition to this final-intermediate goods classification, we consider offshoring from various income-level countries (high-income versus middle- and low-income countries, following the World Bank classification) and country regions (e.g. (non-)OECD, neighboring countries and China) which could also have varying effects on employers' labor market power. As such, offshoring of final goods is defined as: $IMPsh^c_{final,it} = \frac{IMP^c_{final,it}}{P_{it}Q_{it}}$, with $IMP^c_{final,it}$ equal to imports of final goods of firm i coming from country (group) c in year t. Offshoring of intermediate goods is defined as: $IMPsh^c_{int,it} = \frac{IMP^c_{int,it}}{P_{it}Q_{it}}$, with

[13] FOB-type values include the transaction value of the goods and the value of services performed to deliver goods to the border of the exporting country. CIF-type values include the transaction value of the goods, the value of services performed to deliver goods to the border of the exporting country and the value of the services performed to deliver the goods from the border of the exporting country to the border of the importing country.

[14] This allows for a finer classification than the industry-level distinction between final and intermediate goods. For instance, when an industrial bakery imports sugar, these imports will be classified as intermediate inputs. When a sugar producer imports sugar, this will be classified as final goods imports.

$IMP^c_{int,it}$ equal to imports of intermediate goods of firm i coming from country (group) c in year t.

As a robustness test, we clean the firm-product level trade data for re-export activities. Because of its central location in Europe and thanks to the size of its main port, about one third of trade in goods in Belgium can be considered as re-exports. More specifically, the volume of exported products for which an identical volume has been imported within the same year is identified as re-export and cleaned from the data.[15]

We match trade data to Belgian and Dutch manufacturing industries in order to measure import competition at the industry level. Data on international trade are sourced from the OECD STAN Bilateral Trade Database. This database consists of estimates of imports and exports of goods, broken down by reporting (or declaring) and partner countries[16] including all OECD member countries and a wide range of non-OECD economies. The trade flows are divided into nine categories of goods, including the three main end-use categories (capital goods, intermediate inputs and consumption) and broken down by economic activities based on the Revisions 4 of the ISIC classification (Zhu et al. (2011)). Similar to offshoring, we consider import competition from various income-level countries (high-income versus middle- and low-income countries) and country regions (e.g. (non-)OECD and China). Following Bernard et al. (2006), Mion and Zhu (2013), and Dorn et al. (2020), we define import competition as the import share of country group c of the goods produced by industry j in year t: $IMPcomp^c_{jt} = \frac{IMP^c_{jt}}{Q_{jt}+IMP_{jt}-EXP_{jt}}$, where IMP^c_{jt} and IMP^c_{jt} represent the value of imports from country group c and all countries, respectively, EXP_{jt} stands for the value of exports and Q_{jt} for the value of domestic production.

Additional controls include the firm's export share (defined as the exports-to-sales ratio $EXPsh$), the firm's capital intensity (defined as the logarithm of the capital-to-labor ratio $\ln(\frac{Q}{N})$), firm size (defined as the logarithm of the number of workers), the firm's revenue total factor productivity (Tfp) and the firm's workforce composition. Firm-year varying TFP estimates are obtained by estimating translog production functions separately for each of our 19 industries in both countries. For Belgium, the workers' skill type is sourced from the Social Balance Statistics which reports employment (number of employee or in FTE) by education type, distinguishing between primary education ($Shprim$), secondary education ($Shsec$), upper non-university education and university degree. We aggregate

[15] Re-export activities are identified as import of product p by firm i in year t that firm i exports within the same year. More specifically, re-export volumes are defined as $reEXP_{ipt} = min(EXP_{ipt}, IMP_{ipt})$, where EXP stands for exports and IMP for imports. Net import values are adjusted by subtracting re-export from total import, applying the import (export) unit value aggregated across destination countries: net imports is equal to $P^{IMP}_{ipt} IMP_{ipt} - P^{IMP}_{ipt}.reEXP_{ipt}$ (net exports is equal to $P^{EXP}_{ipt} EXP_{ipt} - P^{EXP}_{ipt} reEXP_{ipt}$. Note that this correction cannot be applied to trade flows by origin or destination country because it would imply (heroic) assumptions on where the re-exported flows come from and go to.

[16] The origin of imports and the destination of exports.

the last two categories to construct the share of workers with upper education ($Shupuniv$). To define the skill type of each employee in Dutch firms, we use their education type reported in the Education database which comes from the Polis Administration and the Labour Force Survey ("Enquête BeroepsBevolking, EBB"). The Education databases provides the highest level of education attained by an individual on October 1 of the year and is complete for persons up to the age of 35 years old. For the remaining individuals, the education type comes from the EBB using population weights. The education type is based on a 2-digit SOI-code (Dutch education classification, "Standaard Onderwijsindeling") and is converted to the ISCED classification (International Standard Classification of Education).

We first deleted firm-year observations with labor and intermediate consumption shares greater than or equal to one and smaller than or equal to zero. In order to remove outliers, we also disregarded firm-year observations with cost shares in the bottom 1% and top 1% of the respective industry-year distributions. We selected firms that survive at least three consecutive years because lagged inputs are needed to construct moment conditions in our estimation framework. For Belgium (the Netherlands), we obtain an unbalanced estimation sample consisting of 52,544 (81,705) observations for 6,695 (11,379) firms over the years 2009-2017.

Tables 2 and 3 report the means of our variables for Belgium and the Netherlands, respectively. In Belgium, real firm output, labor, materials and the Solow residual (SR) or conventional TFP measure have been stable over the considered period while capital has decreased at an average annual growth rate of 2.1%. In the Netherlands, labor, real firm output, materials and the Solow Residual have increased at an average annual growth rate ranging between 1.1% and 1.6% whereas capital has decreased at an average annual growth rate of 8.9%. In both countries, about 6% of firms are MNEs. The share of exporters and importers is higher in Belgium (respectively, 45% and 52% as compared to 31% and 36% in the Netherlands). In both countries, the average share of imports of final goods to sales is about the same (2.9% in Belgium and 2.7% in the Netherlands) while the average share of imports of intermediate goods is higher in Belgium (7.5% as compared to 4.9% in the Netherlands). In both countries, the largest share of imports comes from neighboring countries.

<Insert Tables 2 and 3 about here>

7 Prevalence and intensity of labor and product market power

7.1 Extensive margin of labor and product market power

Using our panels of 6,695 Belgian firms and 11,379 Dutch firms covering the period 2009-2017, we now apply the econometric framework described in Section 5. First, we estimate translog production functions for each of the 19 two-digit industries in both countries relying on a control function approach that allows us to control for unobserved productivity shocks. We use the estimated production function coefficients together with data on firms' inputs to compute output elasticities at the firm-year level. Tables 4 and 5 present means (overall and by two-digit industries) of the estimated output elasticities of labor, intermediate inputs, and capital as well as the resulting returns to scale, i.e. the sum of the three output elasticities, for Belgium and the Netherlands respectively. For the whole sample, average output elasticities are very similar across the two countries: about 0.25 for labor, 0.75 for intermediate inputs, and 0.03 for capital, with close to constant returns to scale. We also notice some differences in production technologies across manufacturing industries.

<Insert Tables 4 and 5 about here>

We now use firms' estimated output elasticities and revenue shares for labor and intermediate inputs to infer their joint market imperfections parameter and price-cost markup that allow us to pin down firms' time-varying labor and product market settings. Tables 6 and 7 summarize the outcome of the classification procedure for Belgium and the Netherlands, respectively, and, hence, inform us about the extensive margin of firms' labor and product market power. Recall that by considering jointly market power in both markets, we account for a possible interdependency between the prevalence (and the intensity) of labor and product market imperfections and by doing so, we rule out that our estimates of wage markdowns, wage markups and price-cost markups are contaminated.

From Tables 6 and 7, it follows that in both countries, labor market imperfections are the norm rather than the exception and give rise to a power imbalance favoring workers who are able to force employers to pay a wage markup. In Belgium, 33% of observations are classified as free from labor market imperfections involving marginal-product wages, whereas for 29% of observations we find a wage markdown at the detriment of workers and for 38% a wage markup at the detriment of firms. Market imperfections are also the norm in the product market where 77% of observations show markup pricing while only 23% involve marginal-cost pricing. The overwhelming prevalence of imperfections in labor and product markets is even more so in the Netherlands. Only 17% of firm-year

observations involve wage-employment outcomes on the labor demand curve (absence of labor market imperfections) whereas 33% involve wage-markdown pricing and even 50% wage-markup pricing. In the product market, up to 95% of observations involve price-cost markup pricing.

Considering jointly the prevalence (or absence) of labor and product market power, it turns out that in both countries, the largest group combines wage-markup pricing with price-cost markup pricing (32% of observations in Belgium and 50% in the Netherlands). In Belgium, the combination of marginal-product wages and price-cost markups comes second (26% of observations), followed by another 19% of observations involving wage-markdown pricing and price-cost markup pricing. In the Netherlands, the second and third group are switched, with 29% of observations featuring wage-markdown and price-cost markup pricing and 16% combining marginal-product wages and price-cost markups. In both countries (only 7% of observations in Belgium and 1% in the Netherlands) are free from market imperfections in that they combine marginal-product wages with marginal-cost prices. The least prevalent combination in both countries is wage-markup and price-marginal cost pricing, which confirms expectations given that rents to be split between workers and firms are arguably small under marginal-cost pricing.

<Insert Tables 6 and 7 about here>

Let us now focus on the prevalence of labor/product market settings across firms that differ in terms of offshoring activities. In particular, we compare the prevalence of labor/product market power of offshorers (that is, firms that report a positive ratio of imported goods to sales) and firms with no offshoring activities. We reveal clear differences in the prevalence of labor market power across firms with and without offshoring activities (see Tables 8 and 9 for Belgium and the Netherlands, respectively). A labor market setting favoring employers (that is, wage-markdown pricing) is more frequent and a labor market setting favoring employees (that is, wage-markup pricing) is less frequent when firms engage in offshoring activities. Such differences are most pronounced in the Netherlands. These correlations suggest that engagement in offshoring activities benefits employers. In both countries, absence of labor market power (that is, wage-marginal product pricing) is higher among offshorers. The prevalence of product market power (that is, price-cost markup pricing) is more frequent for firms with offshoring activities in Belgium but less frequent for offshorers in the Netherlands, with differences in product market settings being much smaller than differences in labor market settings.

<Insert Tables 8 and 9 about here>

Exploiting the time-varying nature of our estimates of firms' joint market imperfections parameter and price-cost markup, we also examined persistence in firms' labor and

product market setting by investigating one-year transition probability rates across respective states over the period, where the states are defined as $\{WMD,\ WMP,\ WMU\}$ in the case of firms' labor market setting and $\{PMC,\ PMU\}$ in the case of firms' product market setting. Tables A.1 and A.2 in Appendix A report transitions for respectively the labor market and product market settings at the overall level for Belgium. Similar transition matrices for the Netherlands are provided in Tables A.3 and A.4.

Focusing on the three labor market settings, wage markups are the most persistent: 85% (91%) of Belgian (Dutch) companies characterized by wage-markdown pricing also impose a wage markdown in the subsequent year. In terms of persistence, wage markups come next: for 83% (86%) of Belgian (Dutch) firms with a wage markup at time t, we also observe a wage markup at $t+1$. In both countries, switches from wage-markdown towards wage-markup pricing (or the other way around) are rarely observed. Paying workers real wages according to their marginal product is the least persistent labor market setting: 71% (57%) of Belgian (Dutch) firms with marginal-product wages stay in this setting in the subsequent year. In both countries, firms with no labor market power are equally likely to switch either to a labor market setting favoring employers (i.e. imposing a wage markdown) or to a labor market setting favoring employees (that is, paying a wage markup) in the next year.

Focusing on the two product market settings, price-cost markups are the most persistent: 92% (99%) of Belgian (Dutch) firms characterized by price-cost markup pricing also charge prices above marginal costs in the subsequent year. Finally, 68% (58%) of Belgian (Dutch) firms characterized by price marginal cost pricing at time t continue to have no market power in the product market at $t+1$.

Tables A.5-A.8 reports transition matrices across firms that differ in terms of offshoring activities. For both subsets of firms within both countries, we find the same ranking of persistence in labor/product market settings as for the full set of firms. Persistence in terms of having no labor market power (wage-marginal product pricing) appears to be higher among offshorers as compared to non-offshorers in both countries while persistence in terms of wage-markup pricing is larger for non-offshorers in the Netherlands. Persistence in terms of price-marginal cost pricing is largest among offshorers in both countries. In both countries, offshorers with no labor market power tend to switch more towards wage-markdown pricing in the next year while non-offshorers with no labor market appear to change more towards wage-markup pricing.

7.2 Intensive margin of labor and product market power

So far, we have documented the prevalence of labor and product market power, that is, we have focused on the extensive margin. To recover the magnitude of labor and product

market power at the intensive margin, we focus on widely-used models of imperfect competition. Consistent with two widely-used models of imperfect competition in the labor market, we measure the magnitude of labor market power either by the wage elasticity of a firm's labor supply curve $(\varepsilon_W^N)_{it}$ which informs us about the size of the wage markdown or the workers' bargaining power ϕ_{it} which informs us about the size of the wage markup (see Section 4). More specifically, a larger labor supply elasticity (that is, less monopsony power for the firm) indicates a narrower wage markdown. A larger workers' bargaining power (that is, more monopoly power for the workers) indicates a wider wage markup. Both structural parameters $(\varepsilon_W^N)_{it}$ and ϕ_{it} are transformations of a firm's wage markdown and a firm's wage markup, respectively.[17] Consistent with standard models of imperfect competition in the product market, we measure the magnitude of product market power by a firm's price-cost markup μ_{it}.

We document average values of the intensity of wage markdowns, wage markups and price-cost markups for all firms, the subset of offshorers and the subset of firms without offshoring activities in the relevant labor/product market setting (see Tables 10 and 11 for Belgium and the Netherlands, respectively). Conditional on a labor market setting favoring employers, we observe that firms' monopsony power is roughly at par in Belgium and the Netherlands. More specifically, for the 29% (33%) of Belgian (Dutch) firm-year observations involving wage-markdown pricing, we find that the average labor supply elasticity in Belgian (Dutch) firms amounts to 3.06 (3.13), which is close to mean values of advanced countries reported in other studies (see Sokolova and Sorensen (2021)). Assuming that firms can use all of their monopsony power, this implies that workers are paid about 66% of their marginal product in both countries (that is, the average wage markdown is about 0.66).

Conditional on a labor market setting favoring employees, we find that workers' monopoly power is higher in Belgium. More specifically, for the 38% (50%) of Belgian (Dutch) firm-year observations involving wage-markup pricing, the average value of workers' absolute bargaining power amounts to 0.53 in Belgium and 0.39 in the Netherlands.

Conditional on exercising product market power, the magnitude of price-cost markups is larger in the Netherlands: Dutch (Belgian) firms charge prices are on average 37% (17%) above marginal costs. These estimates lie within the range of recent estimates for European countries as reported in Soares (2019).

At the extensive margin, we document that engagement in offshoring activities is associated with a higher prevalence of wage-markdown and a lower prevalence of wage-markup pricing in both countries and a higher (lower) prevalence of price-cost markup

[17] $(\varepsilon_W^N)_{it}$ is a direct transformation of a firm's wage markdown as there exists a 1-1 relationship: a higher $(\varepsilon_W^N)_{it}$ implies a narrower wage markdown. ϕ_{it} is an indirect transformation: a higher ϕ_{it} implies a higher wage markup.

pricing in Belgium (the Netherlands). When it comes to wage-markdown pricing in both countries and price-cost markup pricing in the Netherlands, our descriptive results at the extensive margin also holds at the intensive margin. More specifically, firms engaging in offshoring activities appear to have larger monopsony power than non-offshorers in both countries (see last columns in Tables 10 and 11) and offshorers seem to set lower price-cost markups in the Netherlands. However, the picture is less clear for wage-markup pricing in both countries and price-cost markup pricing in Belgium: on average, Belgian firms with offshoring activities tend to share more rents with their workers but seem to exercise equal product market power compared to their non-offshoring counterparts whereas workers' bargaining power does not seem to differ across firms' offshoring status. Such rather mixed picture could, however, be driven by confounding factors that differ across firms with and without offshoring activities and by not having distinguished between firm-level offshoring of final versus intermediate goods. In the next section, we therefore infer partial correlations from estimating regressions.

<Insert Tables 10 and 11 about here>

8 Does offshoring shape labor market imperfections?

This section aims to examine whether firm-level offshoring matters for firm-level labor market imperfections based on regression analysis. To examine how firm-level offshoring and exposure to import competition shape the extensive margin of labor market power, we run multinomial probit regressions for the labor market setting being either one favoring employers who set wage markdowns or one favoring workers who receive wage markups. The baseline is a labor market setting in which workers obtain the marginal product of wages. As such, we specify the following model:

$$\begin{aligned} LMS_m^* &= \mathbf{x}_m\beta_m + \epsilon_m, \qquad m = 1,2 \\ LMS_m &= I(LMS_m^* > 0), \quad m = 1,2 \\ \epsilon &= (\epsilon_1, \epsilon_2)\prime \sim N(0, \Sigma) \end{aligned} \tag{20}$$

where LMS_1 = Pr(LMS=WMD|$\mathbf{x}$) and LMS_2 = Pr(LMS=WMU|$\mathbf{x}$). The baseline category is LMS=WMP. The vector x includes firm observables, such as offshoring measures (split by type and source country group), the export-to-sales ratio, firm size (number of employees), capital intensity, the share of employees with upper education and total factor productivity, and industry observables such as import competition measures (split by source country group). Since contemporaneous values of the observables are likely to be endogenous, we use one-year lagged values for all variables (e.g. $LIMPsh$ stands for the 1-year lagged value of the share of total imports at the firm level). We also include a

full set of year and industry fixed effects. Firm i's labor market setting at time t might also depend on unobservable factors ϵ_m such as managerial ability and its corporate culture.

We consider four specifications. In each specification, we consider the offshoring and import competition measures as our variables of interest and the remaining observables as control variables. In specification 1, we include firm-level and industry-wide total import shares ($IMPsh$ and $LIMPcomp$, respectively). In specification 2, we distinguish two different types of firm-level offshoring: offshoring of finished goods ($LIMPsh\_final$) and intermediate goods ($LIMPsh\_int$). In specification 3, we examine even more margins by differentiating between the origin of imports. More specifically, we distinguish between a firm-specific effect for those firms importing finished and intermediate goods from high-income versus middle-/low-income countries ($LIMPsh\_X\_high$ and $LIMPsh\_Xl\_midlow$, where $X \in \{final, int\}$) and an industry-wide import competition effect from high-income versus middle-/low-income countries ($LIMPcomp\_high$ and $LIMPcomp\_midlow$). In specification 4, we further refine both firm-level and industry-level imports by country of origin. We categorize countries into four mutually exclusive groups to define offshoring variables: neighboring countries, OECD countries excluding neighoring countries, non-OECD countries excluding China and China ($LIMPsh\_X\_neig$, $LIMPsh\_X\_OECDexclneig$, $LIMPsh\_X\_nonOECDexclChina$ and $LIMPsh\_X\_China$, where $X \in \{final, int\}$). We classify countries into three groups to define import competition: OECD countries, non-OECD countries exclusive China and China ($LIMPcomp\_OECD$, $LIMPcomp\_nonOECDexclChina$ and $LIMPcomp\_China$).

Tables 12 and 13 present the marginal effect of the regressors for the probability of a wage markdown from the multinomial probit regressions for Belgium and the Netherlands, respectively. From specification 1, we learn that offshoring as an aggregate activity is associated with an increase in the conditional probability of a wage markdown in both countries, with the positive association being higher for the Netherlands. Offshoring might substitute for domestic labor. As such, offshoring activities are likely to increase intra-firm labor replacement and to decrease firm's labor demand, giving employers monopsony power. Recent evidence for Belgium by Merlevede and Michel (2020) shows indeed a negative impact of downstream offshoring on employment in upstream manufacturing firms. Capturing the different facets of offshoring in specification 2 shows that offshoring of intermediate and finished goods seem to be of equal importance in terms of increasing the likelihood of wage-markdown pricing in Belgium while imports of intermediate goods plays a larger role in Dutch firms. Differentiating between the origin of imports (see specification 3 and 4) reveals clear similarities and differences in firm-level offshoring effects across our two countries. First, offshoring of finished goods from non-OECD countries matters most for wage-markdown pricing in both countries. Second, the large

positive association between offshoring of intermediate goods and the probability of a labor setting favoring employers in the Netherlands holds for all country source groups while importing intermediate goods from neighboring and other OECD countries seems to drive the positive association between offshoring of intermediate goods and firms' labor market power in Belgian companies. Such differences could be explained byDutch firms having a more global focus with the different stages of production process being located across different countries.

Industry-wide import exposure does not correlate with the probability of imposing wage markdowns in Belgian firms. However, import competition effects depend on the source country group in Dutch firms: import competition from OECD countries and China have a negative effect on the likelihood of wage-markdown pricing while import competition from non-OECD competition has a positive effect. This is consistent with imports from OECD countries being in direct competition with domestic production which put pressure on local firms.

<Insert Tables 12-13 about here>

In Tables 14 and 15, we report the marginal effect for the probability of a wage markup for Belgium and the Netherlands, respectively. Overall, our results provide evidence of offshoring being associated with a lower probability of paying wage markups. Evidence from an Eurostat survey on a set of EU countries including Belgium and the Netherlands shows that firms primarily engage in offshoring to reduce costs, which is in line with theoretical predictions (e.g. as in Antras and Helpman (2004)).[18] In the absence of a complete pass-through of these cost reductions to domestic wage increases, increased offshoring might dampen wage bargaining, which is consistent with our findings. From specification 2, we learn that the negative relationship between offshoring activities and the likelihood of wage-markup pricing does not hinge on the nature of firm-level imports. Again, the negative correlation, both in the case of offshoring of finished and intermediate goods, is much stronger in absolute value in the Netherlands. Distinguishing across source country groups shows that offshoring of final goods originating from neighboring countries as well as non-OECD countries (excluding China) are driving the negative correlations in both countries. Offshoring intermediate inputs from high-income countries seems to prevent workers in Belgian firms from exercising their bargaining power while the origin of imported intermediate goods does not matter for workers in Dutch firms. In the latter, offshoring from non-OECD countries and China appears to decrease the likelihood of a wage markups even more than offshoring from OECD countries. Again, these findings may reflect the global scale in which Dutch firms as compared to Belgian firms operate.

[18] See outsourcing survey data results at https://ec.europa.eu/eurostat/web/economic-globalisation/globalisation-in-business-statistics/global-value-chains.

Concerning the impact of import competition on wage bargaining, we find some ambiguous results.

Industry-wide import competition is accompanied with a drop in the probability of wage-markup pricing in Belgian firms, which is in line with the existing literature (e.g. Dumont et al. (2006), Boulhol et al. (2011), Baumgarten and Lehwald (2019), Caselli et al. (2021)). The ability to push through wage markups is hard for workers in Dutch firms exposed to import competition from non-OECD countries while import competition from OECD countries and China counterbalance such effect.

<Insert Tables 14-15 about here>

Let us now turn to the intensive margin and examine how firm-level offshoring and industry-wide competition shape the intensity of labor market power. We correct for censoring by fitting type II Tobit models, in which the first-stage probit participation equation for $\psi_{it} < 0$ (in the case of a wage markdown) and ($\psi_{it} > 0$ in the case of a wage markup), respectively, and the second-stage outcome equation for the respective labor imperfection parameters (firm-level labor supply elasticity $(\varepsilon_W^N)_{it}$ or wage markdown β_{it} under wage markdown-pricing and workers' relative bargaining power γ_{it} under wage-markup pricing) include the same regressors, but these are allowed to have different coefficients in the two equations. We use the same set of regressors and the same four model specifications as in the extensive margin analysis.

We report the results for the second-stage output equation for the intensity of wage-markdown pricing measured by the firm's labor supply elasticity in Tables 16-17 and measured by the magnitude of wage markdowns for both countries in Tables 18-19 in both countries, respectively. For Belgium, it follows from Tables 16 and 18 that the patterns for the firm-level offshoring and industry-wide import competition measures that showed up at the extensive margin also hold at the intensive margin. More specifically, given a wage markdown, firms importing finished as well as intermediate goods display lower labor supply elasticities and narrower wage markdowns, that is, such firms have higher monopsony/wage-setting power. Again, the nature of imports does not play a role but the country of origin does play a role. More specifically, The negative correlation between offshoring of finished goods and firms' monopsony power is primarily due to imports from non-OECD countries and China whereas such negative correlation arises from offshoring intermediate inputs from OECD countries. Industry-wide exposure to import competition does not seems to affect the intensity of firms' labor market power, neither economically, nor statistically.

Unlike the extensive margin results, only imports of final goods from neighboring countries seem to fortify the wage-setting power of Dutch firms, as shown by the negative association

between such imports and either firms' labor supply elasticities or wage markdowns in Tables 17 and 19. Also, contrary to our findings at the extensive margin, only offshoring of intermediate goods from OECD countries positively correlates with firms' monopsony power. In line with the extensive margin results, we observe a small, negative correlation between industry-wide import competition exposure and the intensity of firms' labor market power, which seem to be driven by two countervailing impacts: a negative one coming from imports of intermediate goods from OECD countries and a positive one coming from imports of intermediate goods from non-OECD countries.

<Insert Tables 16-19 about here>

Table 20 presents the results for the second-stage output equation for the intensity of wage-markup pricing measured by the magnitude of workers' bargaining power for Belgium and shows that these intensive margin results are very much in line with the extensive margin results. In firms where workers are paid above their marginal revenue product, firm-level offshoring of both finished and intermediate inputs is associated with a drop in workers' bargaining power. In the case of offshoring of finished goods, such negative correlation is driven by imports from non-OECD countries, which could be rationalized by labor cost reductions. In the case of offshoring of intermediate goods, imports from neighboring countries and China seem responsible for dampening workers' bargaining power during negotiations. Industry-wide import competition does not appear to be important for workers' bargaining power in wage formation. Unlike the results for Belgium, firm-level offshoring does not play a large role in affecting the intensity of workers' bargaining power in Dutch firms that pay wage markups (see Table 21). Only offshoring of intermediate goods correlates negatively with workers' bargaining power and this is true irrespective of the country of origin. Also, unlike the results for Belgium, import competition exposure from OECD countries is positively correlated with workers' bargaining while the opposite hols for import competition exposure from non-OECD countries, rendering the overall impact of import competition non-significant. Absence of an import competition effect from China is in line with Balsvik et al. (2015) showing that the Dutch manufacturing industry is specialized in products that are rather not competing with imports from China.

<Insert Tables 20-21 about here>

9 Conclusion

The acceleration of technological progress, the reduction in transport and communication costs and the fragmentation of production has profoundly affected international trade patterns in recent decades. Empirical studies using firm panel data have investigated the impact of increased offshoring on various firm outcomes such as total employment, the composition of labor demand in terms of skill- or occupation types, average wages, firm survival and innovation. Against the concern that firms' monopsony power has been on the rise in recent years, this paper examines how different facets of firm-level offshoring relate to the prevalence and intensity of firms' labor market power.

Our empirical analysis is based on firm-level data sourced from firm annual accounts and VAT declarations complemented with information on international transactions at the country, firm and product level sourced from the Transaction Trade database. Having access to such rich data for Belgian as well as Dutch firms over the period 2009-2017 allows us to compare the interplay between firm-level offshoring and firms' labor market power in two small open economies that differ in terms of global focus. We use the production function approach introduced by Dobbelaere and Mairesse (2013) to measure the prevalence and intensity of firms' labor market power. At the extensive margin, firms either impose a wage markdown on workers or pay a wage markup to workers. The magnitude of firms' labor supply elasticity informs us about the intensity of wage markdowns and the magnitude of workers' bargaining power informs us about the intensity of wage markups.

Our core result is that offshoring shapes employers' labor market power, irrespective of the nature of imports. Firm-level offshoring of finished as well as intermediate goods favors employers as firms with offshoring activities are more likely to impose wage markdowns and less likely to pay wage markups. These findings at the extensive margin also show up at the intensive margin. Offshoring is associated with higher monopsony power of Belgian and Dutch firms while accompanied with lower workers' bargaining power in Belgian firms. In the Netherlands, the results at the extensive margin are stronger than at the intensive margin and larger than in Belgium. In Belgian firms, offshoring plays an important role at the extensive as well as the intensive margin of firms' labor market power. Contrary to the nature of imports (finished versus intermediat goodss), the origin of imports matters for Belgian firms' labor market power. This is far less so for Dutch companies which could be explained by their more global focus and the more global scale of the vertical chain in which they operate.

Tables

Table 1: Regimes of competitiveness

Regime R	$LMS = WMD$: $\psi_{it} < 0$	$LMS = WMP$: $\psi_{it} = 0$	$LMS = WMU$: $\psi_{it} > 0$
$PMS = PMC$: $\mu_{it} - 1 = 0$	PMC-WMD	PMC-WMP	PMC-WMU
$PMS = PMU$: $\mu_{it} - 1 > 0$	PMU-WMD	PMU-WMP	PMU-WMU

Table 2: Descriptive statistics for the Belgium, 2009-2017

	Mean	Sd	p25	p50	p75	
Real firm output growth rate (Δq_{it})	-0.006	0.219	-0.089	0.001	0.090	52,543
Labor growth rate (Δn_{it})	0.002	0.146	-0.053	0.000	0.056	52,544
Intermediate inputs growth rate (Δm_{it})	-0.007	0.257	-0.109	0.001	0.108	52,544
Capital growth rate (Δk_{it})	-0.021	0.427	-0.175	-0.075	0.068	45,800
Revenue share of labor (α_{Lit})	0.253	0.130	0.158	0.237	0.329	52,544
Revenue share of intermediate inputs (α_{Mit})	0.670	0.161	0.558	0.681	0.792	52,544
1-(α_{Nit})-(α_{Mit})	0.078	0.132	0.007	0.075	0.153	52,544
ln(wagebill$_{it}$)	13.656	1.387	12.622	13.413	14.413	52,544
ln(output$_{it}$)	10.546	1.551	9.408	10.281	11.388	52,544
ln(employment$_{it}$)	2.956	1.210	2.041	2.728	3.622	52,544
ln(intermediate inputs$_{it}$)	10.098	1.691	8.877	9.868	11.075	52,544
ln(capital$_{it}$)	8.570	1.859	7.439	8.585	9.681	52,544
ln(real output per worker) ($\ln(\frac{Q}{N})_{it}$)	7.590	0.720	7.102	7.508	7.984	52,544
ln(real value added per worker) ($\ln(\frac{Q-M}{N})_{it}$)	6.469	0.519	6.174	6.445	6.747	52,443
Capital intensity ($\ln(\frac{K}{N})_{it}$)	5.614	1.330	4.895	5.775	6.506	52,544
Solow Residual	0.001	0.150	-0.059	0.003	0.064	45,799
Share of workers with primary education	0.131	0.256	0.000	0.000	0.120	52,544
Share of workers with secondary education	0.395	0.361	0.000	0.370	0.723	52,544
Share of workers with upper education	0.065	0.136	0.000	0.000	0.078	52,544
IMPcomp	1.540	1.980	0.522	0.633	2.061	52,553
IMPcomp_high	1.180	1.213	0.447	0.530	1.762	52,553
IMPcomp_midlow	0.359	0.945	0.080	0.095	0.272	52,553
IMPcomp_OECD	0.964	1.045	0.347	0.379	1.495	52,553
IMPcomp_nonOECD	0.625	1.270	0.167	0.278	0.541	52,553
IMPcomp_nonOECDexclChina	0.436	0.735	0.121	0.250	0.394	52,553
IMPcomp_China	0.140	0.343	0.007	0.055	0.136	52,553
MNE	0.063	0.243	0.000	0.000	0.000	52,544
EXP	0.448	0.497	0.000	0.000	1.000	52,544
EXPsh	0.183	0.327	0.000	0.000	0.286	52,544
EXPsh_cor	0.084	0.211	0.000	0.000	0.001	52,544
EXPxIMP	0.385	0.487	0.000	0.000	1.000	52,544
IMP	0.518	0.500	0.000	1.000	1.000	52,544
IMPsh	0.113	0.190	0.000	0.000	0.189	52,544
IMPsh_cor	0.029	0.085	0.000	0.000	0.000	52,544
IMPsh_high	0.104	0.188	0.000	0.000	0.166	52,544
IMPsh_midlow	0.009	0.049	0.000	0.000	0.000	52,544
IMPsh_OECD	0.104	0.186	0.000	0.000	0.166	52,544
IMPsh_neig	0.066	0.129	0.000	0.000	0.080	52,544
IMPsh_OECDexclneig	0.034	0.100	0.000	0.000	0.016	52,544
IMPsh_nonOECD	0.012	0.056	0.000	0.000	0.000	52,544
IMPsh_nonOECDexclChina	0.004	0.032	0.000	0.000	0.000	52,544
IMPsh_China	0.006	0.035	0.000	0.000	0.000	52,544
IMPsh_final	0.029	0.096	0.000	0.000	0.001	52,544
IMPsh_final_cor	0.009	0.046	0.000	0.000	0.000	52,544
IMPsh_final_high	0.027	0.098	0.000	0.000	0.000	52,544
IMPsh_final_midlow	0.003	0.028	0.000	0.000	0.000	52,544
IMPsh_final_OECD	0.026	0.097	0.000	0.000	0.000	52,544
IMPsh_final_neig	0.015	0.061	0.000	0.000	0.000	52,544
IMPsh_final_OECDexclneig	0.010	0.062	0.000	0.000	0.000	52,544
IMPsh_final_nonOECD	0.004	0.033	0.000	0.000	0.000	52,544
IMPsh_final_nonOECDexclChina	0.002	0.019	0.000	0.000	0.000	52,544
IMPsh_final_China	0.002	0.022	0.000	0.000	0.000	52,544
IMPsh_int	0.075	0.143	0.000	0.000	0.092	52,544
IMPsh_int_cor	0.018	0.061	0.000	0.000	0.000	52,544
IMPsh_int_high	0.077	0.149	0.000	0.000	0.099	52,544
IMPsh_int_midlow	0.006	0.035	0.000	0.000	0.000	52,544
IMPsh_int_OECD	0.077	0.148	0.000	0.000	0.098	52,544
IMPsh_int_neig	0.050	0.108	0.000	0.000	0.048	52,544
IMPsh_int_OECDexclneig	0.024	0.072	0.000	0.000	0.007	52,544
IMPsh_int_nonOECD	0.006	0.035	0.000	0.000	0.000	52,544
IMPsh_int_nonOECDexclChina	0.002	0.021	0.000	0.000	0.000	52,544
IMPsh_int_China	0.004	0.024	0.000	0.000	0.000	52,544
Firms	6,695					

Note: $SR_{it} = \Delta q_{it} - \alpha_{Nit}\Delta n_{it} - \alpha_{Mit}\Delta m_{it} - (1 - \alpha_{Nit} - \alpha_{Mit})\Delta k_{it}$.

Table 3: Descriptive statistics for the Netherlands, 2009-2017

	Mean	Sd	p25	p50	p75	
Real firm output growth rate (Δq_{it})	0.013	0.315	-0.088	0.009	0.107	79,875
Labor growth rate (Δn_{it})	0.011	0.156	-0.052	0.000	0.070	79,875
Intermediate inputs growth rate (Δm_{it})	0.014	0.427	-0.104	0.006	0.122	79,857
Capital growth rate (Δk_{it})	-0.089	2.539	-0.158	-0.044	0.082	79,301
aemp (α_{Nit})	0.235	0.106	0.155	0.228	0.304	81,705
amat (α_{Mit})	0.582	0.147	0.474	0.578	0.686	81,705
1-(α_{Nit})-(α_{Mit})	0.183	0.115	0.110	0.174	0.248	81,705
ln(wagebill$_{it}$)	6.058	1.341	5.204	6.009	6.880	81,601
ln(output$_{it}$)	7.598	1.410	6.552	7.437	8.464	81,705
ln(emmployment$_{it}$)	2.748	1.001	1.990	2.615	3.331	81,705
ln(intermediate inputs$_{it}$)	7.017	1.544	5.867	6.851	7.979	81,705
ln(capital$_{it}$)	5.459	2.355	4.461	5.809	6.926	81,705
ln(real output per worker) (ln($\frac{Q}{N}$)$_{it}$)	4.850	0.765	4.390	4.839	5.288	81,705
ln(real value added per worker) (ln($\frac{Q-M}{N}$)$_{it}$)	3.931	0.637	3.592	3.982	4.310	81,635
Capital intensity (ln($\frac{K}{N}$)$_{it}$)	2.711	2.229	2.063	3.200	4.056	81,705
Solow Residual	0.016	0.504	-0.063	0.007	0.074	79,295
Share of workers with primary education	0.156	0.150	0.042	0.125	0.222	81,495
Share of workers with secondary education	0.265	0.179	0.146	0.250	0.361	81,495
Share of workers with upper education	0.145	0.215	0.000	0.063	0.222	81,495
IMPcomp	1.104	2.457	0.414	0.577	1.067	81,715
IMPcomp_high	0.774	1.247	0.329	0.474	0.866	81,715
IMPcomp_midlow	0.328	1.263	0.076	0.138	0.230	81,715
IMPcomp_OECD	0.773	1.326	0.327	0.463	0.849	81,715
IMPcomp_nonOECD	0.330	1.163	0.085	0.146	0.240	81,715
IMPcomp_nonOECDexclChina	0.171	0.601	0.033	0.088	0.147	81,715
IMPcomp_China	0.160	0.575	0.011	0.055	0.102	81,715
MNE	0.060	0.238	0.000	0.000	0.000	81,705
EXP	0.315	0.464	0.000	0.000	1.000	81,705
EXPsh	0.151	6.022	0.000	0.000	0.007	81,705
EXPsh_cor	0.139	5.403	0.000	0.000	0.005	81,705
EXPxIMP	0.256	0.436	0.000	0.000	1.000	81,705
IMP	0.363	0.481	0.000	0.000	1.000	81,705
IMPsh	0.076	2.617	0.000	0.000	0.007	81,705
IMPsh_cor	0.064	2.174	0.000	0.000	0.005	81,705
IMPsh_high	0.051	0.787	0.000	0.000	0.001	81,705
IMPsh_midlow	0.025	1.901	0.000	0.000	0.000	81,705
IMPsh_OECD	0.057	0.767	0.000	0.000	0.003	81,705
IMPsh_neig	0.046	0.468	0.000	0.000	0.000	81,705
IMPsh_OECDexclneig	0.011	0.343	0.000	0.000	0.000	81,705
IMPsh_nonOECD	0.019	1.927	0.000	0.000	0.000	81,705
IMPsh_nonOECDexclChina	0.003	0.028	0.000	0.000	0.000	81,705
IMPsh_China	0.020	1.927	0.000	0.000	0.000	81,705
IMPsh_final	0.027	1.617	0.000	0.000	0.000	81,705
IMPsh_final_cor	0.023	1.352	0.000	0.000	0.000	81,705
IMPsh_final_high	0.016	0.319	0.000	0.000	0.000	81,705
IMPsh_final_midlow	0.011	1.349	0.000	0.000	0.000	81,705
IMPsh_final_OECD	0.018	0.297	0.000	0.000	0.000	81,705
IMPsh_final_neig	0.015	0.266	0.000	0.000	0.000	81,705
IMPsh_final_OECDexclneig	0.003	0.055	0.000	0.000	0.000	81,705
IMPsh_final_nonOECD	0.009	1.378	0.000	0.000	0.000	81,705
IMPsh_final_nonOECDexclChina	0.001	0.019	0.000	0.000	0.000	81,705
IMPsh_final_China	0.009	1.378	0.000	0.000	0.000	81,705
IMPsh_int	0.049	1.715	0.000	0.000	0.003	81,705
IMPsh_int_cor	0.040	1.429	0.000	0.000	0.001	81,705
IMPsh_int_high	0.035	0.624	0.000	0.000	0.001	81,705
IMPsh_int_midlow	0.014	1.159	0.000	0.000	0.000	81,705
IMPsh_int_OECD	0.039	0.621	0.000	0.000	0.001	81,705
IMPsh_int_neig	0.031	0.339	0.000	0.000	0.000	81,705
IMPsh_int_OECDexclneig	0.008	0.319	0.000	0.000	0.000	81,705
IMPsh_int_nonOECD	0.010	1.164	0.000	0.000	0.000	81,705
IMPsh_int_nonOECDexclChina	0.002	0.020	0.000	0.000	0.000	81,705
IMPsh_int_China	0.011	1.164	0.000	0.000	0.000	81,705
Firms	11,379					

Note: $SR_{it} = \Delta q_{it} - \alpha_{Nit}\Delta n_{it} - \alpha_{Mit}\Delta m_{it} - (1 - \alpha_{Nit} - \alpha_{Mit})\Delta k_{it}$.

Table 4: Estimated output elasticities by two-digit industry for Belgium (means)

Industry (NACE2)		Output elasticity of... labor	inter-mediate inputs	capital	Returns to scale	Obs.	Firms
Food products	(10)	0.260	0.729	0.031	1.020	7,829	1,213
Beverages	(11)	0.200	0.749	0.073	1.021	544	78
Textiles	(13)	0.253	0.757	0.019	1.029	1,749	271
Wearing apparel, leather	(14–15)	0.187	0.831	0.014	1.033	824	125
Wood and wood products	(16)	0.258	0.755	0.049	1.062	1,835	285
Paper and paper products	(17)	0.243	0.791	0.045	1.079	907	132
Printing and recorded media	(18)	0.292	0.754	0.046	1.092	2407	379
Chemicals and petroleum products	(19–20)	0.172	0.798	0.042	1.012	1,902	290
Basic pharmaceutical products	(21)	0.298	0.792	-0.063	1.027	406	61
Rubber and plastic products	(22)	0.169	0.787	0.040	0.996	2,130	324
Non-metallic mineral products	(23)	0.184	0.749	0.046	0.979	3,121	466
Basic Metals	(24)	0.356	0.778	0.032	1.166	579	86
Fabricated metal products	(25)	0.262	0.678	0.023	0.963	9,899	1,519
Machinery and equipment	(28)	0.302	0.762	0.040	1.104	3,214	493
Computer and electronic products	(26)	0.385	0.757	0.028	1.170	832	128
Electrical equipment	(27)	0.263	0.725	0.020	1.008	1,044	155
Motor vehicles and trailers	(29)	0.258	0.801	0.050	1.109	595	88
Furniture	(31)	0.209	0.735	0.026	0.971	2,227	337
Other Manufacturing	(32)	0.237	0.698	0.041	0.976	1,737	265
All		0.249	0.736	0.033	1.018	43,781	6,695

Table 5: Estimated output elasticities by two-digit industry for the Netherlands (means)

Industry (NACE2)		Output elasticity of...			Returns to scale	Obs.	Firms
		labor	inter-mediate inputs	capital			
Food products	(10)	0.210	0.871	0.054	1.136	12,396	2,131
Beverages	(11)	0.214	0.849	0.000	1.064	192	36
Textiles	(13)	0.313	0.759	0.034	1.106	1,707	279
Wearing apparel, leather	(14–15)	0.226	0.756	0.022	1.004	1,090	199
Wood and wood products	(16)	0.233	0.762	0.028	1.022	2,472	417
Paper and paper products	(17)	0.224	0.756	0.030	1.010	921	159
Printing and recorded media	(18)	0.293	0.704	0.032	1.029	4,768	824
Chemicals and petroleum products	(19–20)	0.219	0.783	0.036	1.037	1,724	309
Basic pharmaceutical products	(21)	0.216	0.740	0.049	1.006	351	68
Rubber and plastic products	(22)	0.230	0.757	0.027	1.014	3,057	521
Non-metallic mineral products	(23)	0.220	0.755	0.032	1.008	2,174	378
Basic Metals	(24)	0.200	0.762	0.037	0.999	740	126
Fabricated metal products	(25)	0.300	0.679	0.039	1.018	14,591	2,392
Machinery and equipment	(28)	0.265	0.725	0.019	1.010	6,670	1,165
Computer and electronic products	(26)	0.235	0.816	0.018	1.069	1,891	343
Electrical equipment	(27)	0.224	0.770	0.028	1.022	1,829	313
Motor vehicles and trailers	(29)	0.245	0.767	0.027	1.039	1,399	252
Furniture	(31)	0.315	0.783	0.024	1.123	3,814	669
Other Manufacturing	(32)	0.307	0.656	0.036	0.999	4,549	798
All		0.261	0.752	0.035	1.049	66,335	11,379

Table 6: Firms' labor and product market settings in Belgium

Labor market setting	Product market setting		$\sum$
	Price marginal cost	Price-cost markup	
Wage markdown	9.7	19.1	28.8
Wage marginal product	7.0	25.8	32.8
Wage markup	6.4	32.0	38.4
$\sum$	23.1	76.9	

Notes: 2010–2017 and 6,534 firms. Percentages of 39,758 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$) and the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market and product market settings.

Table 7: Firms' labor and product market settings in the Netherlands

Labor market setting	Product market setting		$\sum$
	Price marginal cost	Price-cost markup	
Wage markdown	3.3	29.2	32.6
Wage marginal product	1.3	16.0	17.3
Wage markup	0.5	49.7	50.2
$\sum$	5.1	94.9	

Notes: 2010-2017 and 11,296 firms. Percentages of 66,126 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$) and the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market and product market settings.

Table 8: Labor and product market settings of offshorers (non-offshorers) in Belgium

Labor market setting	Product market setting		$\sum$
	Price marginal cost	Price-cost markup	
Wage markdown	10.4 (9.0)	21.5 (16.8)	31.9 (25.8)
Wage marginal product	7.5 (6.4)	30.6 (20.9)	38.1 (27.3)
Wage markup	3.3 (9.6)	26.7 (37.3)	30.0 (46.9)
$\sum$	21.2 (25.0)	78.8 (75.0)	

Table 9: Labor and product market settings of offshorers (non-offshorers) in the Netherlands

Labor market setting	Product market setting		$\sum$
	Price marginal cost	Price-cost markup	
Wage markdown	5.9 (1.9)	35.6 (25.6)	41.5 (27.4)
Wage marginal product	2.1 (0.8)	21.3 (12.9)	23.4 (13.7)
Wage markup	0.4 (0.6)	34.7 (58.2)	35.0 (58.8)
$\sum$	8.4 (3.3)	91.6 (96.7)	

Table 10: The intensity of labor and product market imperfections in Belgium (means)

Market imperfection intensity	All	Offshorer	
		Yes	No
Joint market imperfections parameter (ψ_{it})	–0.018	–0.091	0.056
... when wage markdown ($\psi_{it} < 0$)	–0.669	–0.810	–0.491
... when wage markup ($\psi_{it} > 0$)	0.473	0.599	0.391
Given wage markdown ($\psi_{it} < 0$) ...			
Plant-level labor supply elasticity ($(\varepsilon_w^N)_{it}$)	3.063	2.742	3.466
Wage markdown (β_{it})	0.673	0.646	0.706
Given wage markup ($\psi_{it} > 0$) ...			
Workers' absolute bargaining power (ϕ_{it})	0.529	0.576	0.498
Workers' relative bargaining power (γ_{it})	4.556	6.163	3.513
Price-cost markup (μ_{it})	1.115	1.129	1.102
... when markup pricing ($\mu_{it} > 1$)	1.162	1.171	1.153

Notes: Based on the estimates of the price-cost mark-up ($\widehat{\mu}$) and the joint market imperfections parameter ($\widehat{\psi}$), we classify firm-year observations to labor market and product market settings. Conditional on a labor/product market setting, structural parameters are recovered.

Table 11: The intensity of labor and product market imperfections in the Netherlands (means)

Market imperfection intensity	All	Offshorer	
		Yes	No
Joint market imperfections parameter (ψ_{it})	0.022	–0.185	0.140
... when wage markdown ($\psi_{it} < 0$)	–0.804	–0.850	-0.765
... when wage markup ($\psi_{it} > 0$)	0.570	0.497	0.595
Given wage markdown ($\psi_{it} < 0$) ...			
Plant-level labor supply elasticity ($(\varepsilon_w^N)_{it}$)	3.127	2.699	3.497
Wage markdown (β_{it})	0.657	0.636	0.675
Given wage markup ($\psi_{it} > 0$) ...			
Workers' absolute bargaining power (ϕ_{it})	0.394	0.390	0.396
Workers' relative bargaining power (γ_{it})	3.156	2.315	3.441
Price-cost markup (μ_{it})	1.346	1.250	1.400
... when markup pricing ($\mu_{it} > 1$)	1.366	1.275	1.415

Notes: Based on the estimates of the price-cost mark-up ($\widehat{\mu}$) and the joint market imperfections parameter ($\widehat{\psi}$), we classify firm-year observations to labor market and product market settings. Conditional on a labor/product market setting, structural parameters are recovered.

Table 12: Average marginal effects for the probability of a wage markdown from multinomial probit regressions for Belgium

	(1)	(2)	(3)	(4)
LIMPsh	0.190***			
	(0.032)			
LIMPsh_final		0.221***		
		(0.056)		
LIMPsh_final_high			0.133**	
			(0.053)	
LIMPsh_final_midlow			0.477***	
			(0.157)	
LIMPsh_final_neig				0.130
				(0.088)
LIMPsh_final_OECDexclneig				0.141*
				(0.075)
LIMPsh_final_nonOECDexclChina				0.585**
				(0.248)
LIMPsh_final_China				0.766***
				(0.257)
LIMPsh_int		0.185***		
		(0.040)		
LIMPsh_int_high			0.172***	
			(0.038)	
LIMPsh_int_midlow			0.084	
			(0.136)	
LIMPsh_int_neig				0.149***
				(0.050)
LIMPsh_int_OECDexclneig				0.233***
				(0.078)
LIMPsh_int_nonOECDexclChina				0.149
				(0.201)
LIMPsh_int_China				0.228
				(0.166)
LIMPcomp	0.006*	0.006*		
	(0.003)	(0.003)		
LIMPcomp_high			0.006	
			(0.014)	
LIMPcomp_midlow			0.006	
			(0.011)	
LIMPcomp_OECD				0.003
				(0.016)
LIMPcomp_nonOECDexclChina				-0.001
				(0.040)
LIMPcomp_China				0.024
				(0.075)
LEXPsh	0.017	0.021	0.019	0.014
	(0.019)	(0.019)	(0.019)	(0.019)
LSize	0.016***	0.016***	0.016***	0.016***
	(0.005)	(0.005)	(0.005)	(0.005)
LCapint	0.013***	0.013***	0.013***	0.013***
	(0.004)	(0.004)	(0.004)	(0.004)
LShupuniv	-0.117***	-0.116***	-0.115***	-0.117***
	(0.033)	(0.033)	(0.033)	(0.033)
LTfp	0.002	0.004	0.006	0.006
	(0.035)	(0.035)	(0.035)	(0.035)
Log likelihood	–30,012.1	–30,025.6	–30,013.2	–29,950.6
Number of observations		32,188		

Notes: 2010–2017. The dependent variable is a categorical variable for the classification of the labour market setting as involving either marginal-product wages or a wage mark-down or a wage mark-up. Reported numbers are average marginal effects on the probability of a wage mark-down with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 13: Average marginal effects for the probability of a wage markdown from multinomial probit regressions for the Netherlands

	(1)	(2)	(3)	(4)
LIMPsh	0.641***			
	(0.063)			
LIMPsh_final		0.414***		
		(0.096)		
LIMPsh_final_high			0.342***	
			(0.118)	
LIMPsh_final_midlow			0.771***	
			(0.152)	
LIMPsh_final_neig				0.476***
				(0.085)
LIMPsh_final_OECDexclneig				0.046
				(0.250)
LIMPsh_final_nonOECDexclChina				0.904***
				(0.312)
LIMPsh_final_China				0.531***
				(0.204)
LIMPsh_int		0.816***		
		(0.085)		
LIMPsh_int_high			0.775***	
			(0.099)	
LIMPsh_int_midlow			0.999***	
			(0.159)	
LIMPsh_int_neig				0.784***
				(0.106)
LIMPsh_int_OECDexclneig				0.567***
				(0.161)
LIMPsh_int_nonOECDexclChina				0.874***
				(0.287)
LIMPsh_int_China				0.874***
				(0.215)
LIMPcomp	-0.013***	-0.014***		
	(0.005)	(0.005)		
LIMPcomp_high			-0.035***	
			(0.012)	
LIMPcomp_midlow			0.003	
			(0.014)	
LIMPcomp_OECD				-0.124***
				(0.022)
LIMPcomp_nonOECDexclChina				0.292***
				(0.055)
LIMPcomp_China				-0.129***
				(0.045)
LEXPsh	0.026	0.037	0.043*	0.050*
	(0.025)	(0.025)	(0.026)	(0.027)
LSize	-0.011**	-0.014***	-0.015***	-0.016***
	(0.005)	(0.005)	(0.005)	(0.005)
LCapint	0.002	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
LShupuniv	0.021	0.018	0.016	0.013
	(0.020)	(0.020)	(0.020)	(0.020)
LTfp	-0.314***	-0.308***	-0.309***	-0.307***
	(0.046)	(0.046)	(0.046)	(0.046)
Log likelihood	–48,512.9	–48,452.6	–48,414.5	–48,348.8
Number of observations		52,443		

Notes: 2010–2017. The dependent variable is a categorical variable for the classification of the labour market setting as involving either marginal-product wages or a wage mark-down or a wage mark-up. Reported numbers are average marginal effects on the probability of a wage mark-down with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 14: Average marginal effects for the probability of a wage markup from multinomial probit regressions for Belgium

	(1)	(2)	(3)	(4)
LIMPsh	-0.351***			
	(0.040)			
LIMPsh_final		-0.300***		
		(0.075)		
LIMPsh_final_high			-0.190***	
			(0.071)	
LIMPsh_final_midlow			-0.864***	
			(0.201)	
LIMPsh_final_neig				-0.234**
				(0.105)
LIMPsh_final_OECDexclneig				-0.150
				(0.122)
LIMPsh_final_nonOECDexclChina				-1.170***
				(0.359)
LIMPsh_final_China				-0.701*
				(0.368)
LIMPsh_int		-0.361***		
		(0.048)		
LIMPsh_int_high			-0.368***	
			(0.045)	
LIMPsh_int_midlow			-0.217	
			(0.175)	
LIMPsh_int_neig				-0.412***
				(0.061)
LIMPsh_int_OECDexclneig				-0.319***
				(0.093)
LIMPsh_int_nonOECDexclChina				0.088
				(0.242)
LIMPsh_int_China				-0.719***
				(0.229)
LIMPcomp	-0.011***	-0.010***		
	(0.004)	(0.004)		
LIMPcomp_high			-0.014	
			(0.015)	
LIMPcomp_midlow			-0.007	
			(0.013)	
LIMPcomp_OECD				0.002
				(0.019)
LIMPcomp_nonOECDexclChina				-0.045
				(0.049)
LIMPcomp_China				0.034
				(0.088)
LEXPsh	-0.047**	-0.055**	-0.044**	-0.043**
	(0.022)	(0.021)	(0.022)	(0.021)
LSize	-0.030***	-0.031***	-0.030***	-0.029***
	(0.006)	(0.006)	(0.006)	(0.006)
LCapint	-0.027***	-0.027***	-0.027***	-0.026***
	(0.004)	(0.004)	(0.004)	(0.004)
LShupuniv	0.049	0.044	0.045	0.050
	(0.034)	(0.034)	(0.034)	(0.034)
LTfp	-0.159***	-0.160***	-0.166***	-0.163***
	(0.042)	(0.042)	(0.042)	(0.043)
Log likelihood	–30,012.1	–30,025.6	–30,013.2	–29,950.6
Number of observations			32,188	

Notes: 2010–2017. The dependent variable is a categorical variable for the classification of the labour market setting as involving either marginal-product wages or a wage mark-down or a wage mark-up. Reported numbers are average marginal effects on the probability of a wage mark-down with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 15: Average marginal effects for the probability of a wage markup from multinomial probit regressions for the Netherlands

	(1)	(2)	(3)	(4)
LIMPsh	-0.879***			
	(0.090)			
LIMPsh_final		-0.614***		
		(0.144)		
LIMPsh_final_high			-0.466***	
			(0.169)	
LIMPsh_final_midlow			-1.177***	
			(0.224)	
LIMPsh_final_neig				-0.619***
				(0.108)
LIMPsh_final_OECDexclneig				-0.011
				(0.363)
LIMPsh_final_nonOECDexclChina				-1.220***
				(0.433)
LIMPsh_final_China				-0.833***
				(0.302)
LIMPsh_int		-1.045***		
		(0.111)		
LIMPsh_int_high			-0.978***	
			(0.127)	
LIMPsh_int_midlow			-1.330***	
			(0.215)	
LIMPsh_int_neig				-0.984***
				(0.136)
LIMPsh_int_OECDexclneig				-0.754***
				(0.210)
LIMPsh_int_nonOECDexclChina				-1.191***
				(0.390)
LIMPsh_int_China				-1.188***
				(0.273)
LIMPcomp	0.014***	0.014***		
	(0.005)	(0.005)		
LIMPcomp_high			0.040***	
			(0.013)	
LIMPcomp_midlow			-0.006	
			(0.016)	
LIMPcomp_OECD				0.142***
				(0.023)
LIMPcomp_nonOECDexclChina				-0.329***
				(0.058)
LIMPcomp_China				0.136***
				(0.048)
LEXPsh	-0.071*	-0.071*	-0.072*	-0.076*
	(0.040)	(0.040)	(0.040)	(0.040)
LSize	0.017***	0.017***	0.016***	0.017***
	(0.006)	(0.006)	(0.006)	(0.006)
LCapint	-0.003*	-0.003	-0.003	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)
LShupuniv	-0.042*	-0.043**	-0.040*	-0.040*
	(0.022)	(0.022)	(0.022)	(0.022)
LTfp	0.452***	0.451***	0.455***	0.456***
	(0.055)	(0.055)	(0.054)	(0.054)
Log likelihood	–48,512.9	–48,452.6	–48,414.5	–48,348.8
Number of observations		52,443		

Notes: 2010–2017. The dependent variable is a categorical variable for the classification of the labour market setting as involving either marginal-product wages or a wage mark-down or a wage mark-up. Reported numbers are average marginal effects on the probability of a wage mark-down with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 16: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markdown pricing measured by the magnitude of labor supply elasticities for Belgium

	Log of firm-level labor supply elasticity ($(\varepsilon_W^N)_{it}$)			
	(1)	(2)	(3)	(4)
LIMPsh	-0.584***			
	(0.089)			
LIMPsh_final		-0.688***		
		(0.154)		
LIMPsh_final_high			-0.571***	
			(0.150)	
LIMPsh_final_midlow			-1.190***	
			(0.289)	
LIMPsh_final_neig				-0.461**
				(0.232)
LIMPsh_final_OECDexclneig				-0.775***
				(0.280)
LIMPsh_final_nonOECDexclChina				-1.037*
				(0.618)
LIMPsh_final_China				-1.214***
				(0.417)
LIMPsh_int		-0.370***		
		(0.101)		
LIMPsh_int_high			-0.502***	
			(0.100)	
LIMPsh_int_midlow			-0.549*	
			(0.283)	
LIMPsh_int_neig				-0.570***
				(0.140)
LIMPsh_int_OECDexclneig				-0.500**
				(0.198)
LIMPsh_int_nonOECDexclChina				-1.093*
				(0.577)
LIMPsh_int_China				-0.327
				(0.381)
LIMPcomp	-0.001	0.001		
	(0.010)	(0.010)		
LIMPcomp_high			0.057	
			(0.059)	
LIMPcomp_midlow			-0.051	
			(0.045)	
LIMPcomp_OECD				0.048
				(0.072)
LIMPcomp_nonOECDexclChina				0.215*
				(0.128)
LIMPcomp_China				-0.555**
				(0.240)
LEXPsh	-0.070	-0.119**	-0.066	-0.076
	(0.057)	(0.054)	(0.057)	(0.054)
LSize	0.117***	0.109***	0.115***	0.119***
	(0.020)	(0.020)	(0.020)	(0.020)
LCapint	-0.067***	-0.068***	-0.068***	-0.067***
	(0.013)	(0.013)	(0.013)	(0.013)
LShupuniv	0.229*	0.227*	0.236**	0.242**
	(0.120)	(0.121)	(0.120)	(0.121)
LTfp	1.048***	1.022***	1.027***	1.039***
	(0.120)	(0.121)	(0.120)	(0.121)
Log likelihood	-17,773.8	-17,804.3	-17,766.0	-17,733.3
Number of observations	14,861	14,861	14,861	14,861

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 17: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markdown pricing measured by the magnitude of labor supply elasticities for the Netherlands

	Log of firm-level labor supply elasticity ($(\varepsilon_W^N)_{it}$)			
	(1)	(2)	(3)	(4)
LIMPsh	-0.811***			
	(0.093)			
LIMPsh_final		-0.657***		
		(0.128)		
LIMPsh_final_high			-0.635***	
			(0.158)	
LIMPsh_final_midlow			-0.763***	
			(0.252)	
LIMPsh_final_neig				-0.708***
				(0.154)
LIMPsh_final_OECDexclneig				-0.448
				(0.302)
LIMPsh_final_nonOECDexclChina				-0.966*
				(0.497)
LIMPsh_final_China				-0.213
				(0.302)
LIMPsh_int		-0.918***		
		(0.115)		
LIMPsh_int_high			-0.897***	
			(0.123)	
LIMPsh_int_midlow			-1.011***	
			(0.246)	
LIMPsh_int_neig				-0.802***
				(0.124)
LIMPsh_int_OECDexclneig				-1.149***
				(0.191)
LIMPsh_int_nonOECDexclChina				-0.610
				(0.435)
LIMPsh_int_China				-0.679**
				(0.293)
LIMPcomp	0.029**	0.030***		
	(0.011)	(0.011)		
LIMPcomp_high			0.100**	
			(0.041)	
LIMPcomp_midlow			-0.027	
			(0.040)	
LIMPcomp_OECD				0.260***
				(0.068)
LIMPcomp_nonOECDexclChina				-0.576***
				(0.171)
LIMPcomp_China				0.218*
				(0.128)
LEXPsh	-0.047	-0.072*	-0.074*	-0.089**
	(0.037)	(0.038)	(0.039)	(0.040)
LSize	0.123***	0.126***	0.126***	0.128***
	(0.016)	(0.016)	(0.016)	(0.016)
LCapint	-0.002	-0.002	-0.002	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)
LShupuniv	-0.032	-0.028	-0.027	-0.028
	(0.058)	(0.058)	(0.058)	(0.058)
LTfp	0.913***	0.905***	0.906***	0.915***
	(0.120)	(0.120)	(0.120)	(0.120)
Log likelihood	-30,811.1	-30,800.7	-30,93.6	-30,779.8
Number of observations	21,785	21,785	21,785	21,785

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 18: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markdown pricing measured by the magnitude of wage markdowns for Belgium

	Log of wage mark-down (β_{it})			
	(1)	(2)	(3)	(4)
LIMPsh	-0.193***			
	(0.040)			
LIMPsh_final		-0.273***		
		(0.076)		
LIMPsh_final_high			-0.208***	
			(0.078)	
LIMPsh_final_midlow			-0.456***	
			(0.139)	
LIMPsh_final_neig				-0.201*
				(0.119)
LIMPsh_final_OECDexclneig				-0.187
				(0.143)
LIMPsh_final_nonOECDexclChina				-0.572**
				(0.279)
LIMPsh_final_China				-0.611***
				(0.196)
LIMPsh_int		-0.103**		
		(0.042)		
LIMPsh_int_high			-0.154***	
			(0.045)	
LIMPsh_int_midlow			-0.214	
			(0.145)	
LIMPsh_int_neig				-0.150**
				(0.064)
LIMPsh_int_OECDexclneig				-0.217**
				(0.088)
LIMPsh_int_nonOECDexclChina				-0.408*
				(0.244)
LIMPsh_int_China				0.055
				(0.190)
LIMPcomp	-0.001	-0.000		
	(0.005)	(0.005)		
LIMPcomp_high			0.003	
			(0.027)	
LIMPcomp_midlow			-0.004	
			(0.021)	
LIMPcomp_OECD				-0.014
				(0.030)
LIMPcomp_nonOECDexclChina				0.125*
				(0.064)
LIMPcomp_China				-0.228*
				(0.121)
LEXPsh	-0.001	-0.020	-0.001	-0.004
	(0.025)	(0.023)	(0.024)	(0.023)
LSize	0.045***	0.042***	0.044***	0.045***
	(0.008)	(0.008)	(0.008)	(0.008)
LCapint	-0.020***	-0.021***	-0.020***	-0.021***
	(0.005)	(0.005)	(0.005)	(0.005)
LShupuniv	0.128***	0.127***	0.130***	0.129***
	(0.047)	(0.047)	(0.047)	(0.047)
LTfp	0.480***	0.470***	0.471***	0.473***
	(0.060)	(0.060)	(0.059)	(0.059)
Log likelihood	-6,732.3	-6,750.8	-6,718.1	-6,691.7
Number of observations	14,861	14,861	14,861	14,861

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 19: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markdown pricing measured by the magnitude of wage markdowns for the Netherlands

	Log of wage mark-down (β_{it})			
	(1)	(2)	(3)	(4)
LIMPsh	-0.167***			
	(0.034)			
LIMPsh_final		-0.073*		
		(0.042)		
LIMPsh_final_high			-0.172***	
			(0.066)	
LIMPsh_final_midlow			-0.029	
			(0.065)	
LIMPsh_final_neig				-0.217***
				(0.065)
LIMPsh_final_OECDexclneig				-0.188
				(0.128)
LIMPsh_final_nonOECDexclChina				-0.316
				(0.249)
LIMPsh_final_China				0.090
				(0.064)
LIMPsh_int		-0.291***		
		(0.042)		
LIMPsh_int_high			-0.295***	
			(0.047)	
LIMPsh_int_midlow			-0.274***	
			(0.100)	
LIMPsh_int_neig				-0.258***
				(0.048)
LIMPsh_int_OECDexclneig				-0.402***
				(0.078)
LIMPsh_int_nonOECDexclChina				-0.033
				(0.168)
LIMPsh_int_China				-0.217*
				(0.124)
LIMPcomp	0.011**	0.012***		
	(0.005)	(0.005)		
LIMPcomp_high			0.037**	
			(0.016)	
LIMPcomp_midlow			-0.008	
			(0.016)	
LIMPcomp_OECD				0.100***
				(0.028)
LIMPcomp_nonOECDexclChina				-0.209***
				(0.068)
LIMPcomp_China				0.070
				(0.050)
LEXPsh	0.056***	0.010	-0.006	-0.023
	(0.017)	(0.015)	(0.016)	(0.015)
LSize	0.026***	0.032***	0.035***	0.037***
	(0.006)	(0.006)	(0.006)	(0.006)
LCapint	-0.001	-0.000	-0.000	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)
LShupuniv	0.004	0.011	0.013	0.017
	(0.022)	(0.022)	(0.022)	(0.022)
LTfp	0.306***	0.292***	0.286***	0.285***
	(0.053)	(0.053)	(0.053)	(0.053)
Log likelihood	-10,353.8	-10,292.8	-10,277.7	-10,237.5
Number of observations	21,785	21,785	21,785	21,785

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 20: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markup pricing measured by the magnitude of workers' bargaining power for Belgium

	Log of workers' relative bargaining power (γ_{it})			
	(1)	(2)	(3)	(4)
LIMPsh	-0.789***			
	(0.180)			
LIMPsh_final		-0.728**		
		(0.369)		
LIMPsh_final_high			-0.683*	
			(0.352)	
LIMPsh_final_midlow			-2.962***	
			(1.030)	
LIMPsh_final_neig				-0.589
				(0.533)
LIMPsh_final_OECDexclneig				-0.697
				(0.553)
LIMPsh_final_nonOECDexclChina				-4.074**
				(2.015)
LIMPsh_final_China				-0.424
				(1.761)
LIMPsh_int		-0.774***		
		(0.210)		
LIMPsh_int_high			-0.733***	
			(0.212)	
LIMPsh_int_midlow			-1.859***	
			(0.721)	
LIMPsh_int_neig				-0.928***
				(0.309)
LIMPsh_int_OECDexclneig				-0.424
				(0.440)
LIMPsh_int_nonOECDexclChina				-0.339
				(1.027)
LIMPsh_int_China				-2.739***
				(0.965)
LIMPcomp	0.004	0.004		
	(0.015)	(0.015)		
LIMPcomp_high			0.050	
			(0.059)	
LIMPcomp_midlow			-0.042	
			(0.054)	
LIMPcomp_OECD				-0.019
				(0.074)
LIMPcomp_nonOECDexclChina				0.344
				(0.218)
LIMPcomp_China				-0.636*
				(0.379)
LEXPsh	-0.046	-0.060	-0.018	-0.024
	(0.099)	(0.099)	(0.099)	(0.098)
LSize	0.273***	0.271***	0.277***	0.279***
	(0.025)	(0.025)	(0.024)	(0.024)
LCapint	-0.304***	-0.305***	-0.305***	-0.304***
	(0.017)	(0.017)	(0.017)	(0.017)
LShupuniv	0.494***	0.491***	0.498***	0.504***
	(0.149)	(0.149)	(0.147)	(0.145)
LTfp	-0.732***	-0.732***	-0.766***	-0.775***
	(0.181)	(0.182)	(0.177)	(0.178)
Log likelihood	-26,283.2	-26,283.3	-26,248.8	-26,205.4
Number of observations	17,203	17,203	17,203	17,203

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

Table 21: Estimates of the second-stage output equation of type II Tobit regressions for the intensity of wage-markup pricing measured by the magnitude of workers' bargaining power for the Netherlands

	Log of workers' relative bargaining power (γ_{it})			
	(1)	(2)	(3)	(4)
LIMPsh	-0.120			
	(0.074)			
LIMPsh_final		-0.058		
		(0.096)		
LIMPsh_final_high			-0.028	
			(0.085)	
LIMPsh_final_midlow			-0.603	
			(0.795)	
LIMPsh_final_neig				-0.515*
				(0.296)
LIMPsh_final_OECDexclneig				0.138
				(0.116)
LIMPsh_final_nonOECDexclChina				0.423
				(1.654)
LIMPsh_final_China				-1.955*
				(1.175)
LIMPsh_int		-0.151		
		(0.106)		
LIMPsh_int_high			-0.121	
			(0.099)	
LIMPsh_int_midlow			-0.693*	
			(0.379)	
LIMPsh_int_neig				-0.247
				(0.196)
LIMPsh_int_OECDexclneig				-0.938**
				(0.391)
LIMPsh_int_nonOECDexclChina				-2.682**
				(1.267)
LIMPsh_int_China				-1.684**
				(0.703)
LIMPcomp	0.001	0.001		
	(0.012)	(0.012)		
LIMPcomp_high			0.009	
			(0.039)	
LIMPcomp_midlow			-0.002	
			(0.040)	
LIMPcomp_OECD				0.234**
				(0.097)
LIMPcomp_nonOECDexclChina				-0.481**
				(0.235)
LIMPcomp_China				0.075
				(0.163)
LEXPsh	-0.049**	-0.049**	-0.048**	-0.056
	(0.024)	(0.024)	(0.024)	(0.039)
LSize	0.023	0.023	0.023	0.004
	(0.017)	(0.017)	(0.017)	(0.019)
LCapint	-0.071***	-0.071***	-0.071***	-0.071***
	(0.006)	(0.006)	(0.006)	(0.006)
LShupuniv	-0.079	-0.079	-0.077	-0.124*
	(0.064)	(0.064)	(0.065)	(0.074)
LTfp	-0.334**	-0.333**	-0.333**	0.063
	(0.156)	(0.156)	(0.159)	(0.175)
Log likelihood	-50,938.2	-50,937.8	-50,915.6	-50,429.0
Number of observations	30,658	30,658	30,658	30,658

Notes: 2010-2017. Reported numbers are coefficients from the outcome equation of type II Tobit regressions with standard errors clustered at the plant level in parentheses. ***/**/* denotes statistical significance at the 1%/5%/10% level. Further covariates included in all specifications are industry and year dummies.

A Results for labor and product market setting switches

Table A.1: Transition matrix for firms' labor market setting for Belgium

Labour market setting in t	Labour market setting in $t+1$		
	Wage mark-down	Marginal-product wages	Wage mark-up
Wage mark-down	83.3	14.9	1.8
Marginal-product wages	14.6	71.2	14.2
Wage mark-up	2.1	13.1	84.8

Notes: 2010-2017, percentages of 39,758 firm-year observations. Based on the estimates of the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market settings.

Table A.2: Transition matrix for firms' product market setting for Belgium

Product market setting in t	Product market setting in $t+1$	
	Marginal cost	Price mark-up
Marginal cost	67.9	32.1
Price mark-up	8.1	91.9

Notes: 2010-2017, percentages of 39,758 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$), we classify observations to product market settings.

Table A.3: Transition matrix for firms' labor market setting for the Netherlands

Labour market setting in t	Labour market setting in $t+1$		
	Wage mark-down	Marginal-product wages	Wage mark-up
Wage mark-down	85.6	11.1	3.3
Marginal-product wages	21.8	57.0	21.2
Wage mark-up	2.4	7.0	90.6

Notes: 2010-2017, percentages of 66,308 firm-year observations. Based on the estimates of the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market settings.

Table A.4: Transition matrix for firms' product market setting for the Netherlands

Product market setting in t	Product market setting in $t+1$	
	Marginal cost	Price mark-up
Marginal cost	58.1	41.9
Price mark-up	1.2	98.8

Notes: 2010-2017, percentages of 66,308 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$), we classify observations to product market settings.

Table A.5: Transition matrix for the labor market setting of offshorers (non-offshorers) for Belgium

Labour market setting in t	Labour market setting in $t+1$		
	Wage mark-down	Marginal-product wages	Wage mark-up
Wage mark-down	85.2 (82.1)	13.6 (15.7)	1.2 (2.1)
Marginal-product wages	13.3 (16.1)	77.8 (63.3)	9.0 (20.6)
Wage mark-up	1.7 (2.2)	14.8 (11.9)	83.4 (86.0)

Notes: 2010-2017, percentages of 39,758 firm-year observations. Based on the estimates of the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market settings.

Table A.6: Transition matrix for the product market setting of offshorers (non-offshorers) for Belgium

Product market setting in t	Product market setting in $t+1$	
	Marginal cost	Price mark-up
Marginal cost	71.2 (65.4)	28.8 (34.6)
Price mark-up	6.9 (9.1)	93.1 (90.9)

Notes: 2010-2017, percentages of 39,758 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$), we classify observations to product market settings.

Table A.7: Transition matrix for the labor market setting of offshorers (non-offshorers) for the Netherlands

Labour market setting in t	Labour market setting in $t+1$		
	Wage mark-down	Marginal-product wages	Wage mark-up
Wage mark-down	86.1 (85.8)	11.4 (10.5)	2.5 (3.8)
Marginal-product wages	22.1 (21.7)	61.5 (53.0)	16.4 (25.3)
Wage mark-up	3.6 (2.1)	11.9 (5.4)	84.6 (92.5)

Notes: 2010-2017, percentages of 66,308 firm-year observations. Based on the estimates of the joint market imperfections parameter ($\widehat{\psi}$), we classify observations to labor market settings.

Table A.8: Transition matrix for the product market setting of offshorers (non-offshorers) for the Netherlands

Product market setting in t	Product market setting in $t+1$	
	Marginal cost	Price mark-up
Marginal cost	62.5 (52.1)	37.5 (47.9)
Price mark-up	2.3 (0.7)	97.7 (99.3)

Notes: 2010-2017, percentages of 66,308 firm-year observations. Based on the estimates of the price-cost mark-up ($\widehat{\mu}$), we classify observations to product market settings.

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