COMPETITION IN THE PORTUGUESE ECONOMY

ESTIMATED PRICE-COST MARGINS UNDER IMPERFECT LABOUR MARKETS

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Abstract

This article estimates price-cost margins for the Portuguese markets in a context of imperfect competition in the labour market. The database used includes virtually the universe of Portuguese firms for the period 2005-2009. The results strongly reject the hypothesis of perfect competition in both labour and product markets. Estimated price-cost margins are very heterogeneous across markets and the average for the overall economy ranges between 25 and 28 per cent, depending on the variables used to weight each market. In addition, the tradable sector presents a lower price-cost margin than the non-tradable sector. According to the methodology used, workers' bargaining power in the Portuguese economy is approximately 13 per cent, without a clear distinction between tradable and non-tradable sectors. Finally, workers' bargaining power is highly and positively correlated with price-cost margins across markets.

Keywords: Market Competition, Portuguese Economy, Production Function

JEL Codes: L10, L60, O50

Non-technical summary

Sustained economic growth and higher aggregate welfare are important objectives in the euro area. The existence of competition across firms in each market contributes to this aim by promoting an efficient allocation of resources, both in static and dynamic perspectives. In this context, measuring competition across markets emerges as a relevant policy issue.

One of the most common approaches to measure market power within the relevant market is to test the distance between prices and marginal costs. A substantial gap implies the rejection of the perfect competition paradigm, signalling that firms hold market power. The test of perfectly competitive markets generally relies on a set of assumptions. One of them is the existence of perfect competition in the labour market, i.e., workers are paid exactly according to their productivity. Nevertheless, there is extensive evidence that this assumption does not hold and, more importantly, it significantly underestimates market power in the product market. By receiving wages above productivity, employees are in fact capturing some of the market power held by the firm. If these rents are disregarded, product market imperfection is perceived to be lower than what it is in reality.

This paper contributes to the empirical literature by jointly testing perfect competition in Portuguese product and labour markets, following Roeger (1995), Crépon et. al. (2005), Dobblaere (2004) and Abraham (2004). It analyses the role of labour market imperfection in the assessment of product market competition, highlighting the differences between tradable and non-tradable sectors. If the competitive setup is substantially different across markets, there might be an overallocation of resources towards those where competition intensity is weaker, with potential negative effects on the overall competitiveness of the country. This empirical research question is particularly interesting in the case of the Portuguese economy, whose current adjustment process partly corresponds to the correction of such misallocations.

One of the most attractive features of the methodology suggested by Roeger (1995) is the possibility of using standard econometric techniques such as OLS. The subtraction of primal and dual Solow residuals drops the unobservable term related to technological progress and the inconsistency contained in Hall (1988) is solved. This approach avoids using instrumental variables and GMM, which often yields results that are strongly dependent on the choice of instruments. Additionally, the methodology does not require deflators. This is particularly relevant given that firm-level deflators are generally not available and thus a source of measurement error is avoided. However, it requires a measure of the cost of capital. In order to reduce measurement error, capital costs and depreciation rates used in the paper are based on firm-level data, in contrast with the standard approach that relies on aggregate figures, common to all markets.

Estimations are conducted for each market separately in order to account for the structural differences amongst them. Using firm-level data for 2005-2009, markets are established at a fairly high level of disaggregation, i.e. at a 3-digit level in NACE Rev. 1.1. Nonetheless, drawing conclusions for the main economic sectors and the overall economy requires the aggregation of the results. In order to derive robust conclusions, several weights are used, namely gross value added, sales and employment. Tradable and non-tradable aggregates were obtained using a more refined measure than the standard manufacturing and non-manufacturing assumption. Following Amador and Soares (2012), tradable and non-tradable sectors were defined using export-to-sales ratios.

The key findings of the paper are the following. **i)** Perfect competition in the product market is widely rejected in the Portuguese economy, both assuming perfect or imperfect labour markets. Moreover, there is a significant heterogeneity across markets. Price-cost margins across markets range from 6 to 62 per cent, reaching figures between 25 and 28 per cent for the overall economy, depending on the set of weights considered. **ii)** Perfect competition in the labour market is also rejected in three quarters of markets. Workers' bargaining power for the overall economy lies between 12 and 14 per cent, according to the aggregation variable, without a clear distinction between tradable and non-tradable sectors. **iii)** There is a substantial underestimation of market power by assuming perfectly competitive labour markets. The price-cost margin underestimation for the overall economy is around 11 p.p. but it reaches 35 p.p. in some markets. **iv)** Results point to a positive and significant correlation between distortions in product and labour markets. The correlation between the price-cost margin and bargaining power across markets is around 81 per cent. **v)** Market power is higher in the non-tradable sector but bargaining power in tradable and non-tradable sectors is very similar. The non-tradable sector presents a weaker intensity of competition than the tradable, regardless of the assumption on the labour market setup.

From a policy perspective, results highlight the need to approach labour and product market reforms in an integrated way. In addition, the paper confirms the existence of a significant scope to improve competition in Portuguese markets, particularly in the non-tradable sector.

1 Introduction

Competition in the product market is a key ingredient for an efficient allocation of resources in the economy and henceforth it is one of the channels that can be used to increase aggregate welfare. Therefore, the identification of markets where there are large deviations from the perfect competition paradigm is an important policy concern. Conceptually, market power relates to firms' ability to increase profits by sustaining prices above marginal costs. Empirically defining relevant markets and establishing robust measures of competition are strong challenges.

This article uses the methodology presented by Roeger (1995), which closely relates to the approach proposed by Hall (1988), to test whether there is a significant gap between prices and marginal costs within the relevant market, i.e., how far away is the structure of each market from the perfect competition paradigm. The methodology proposed by Hall (1988) for the estimation of price-cost margins is based on the relation between the Solow residual and the growth rate of inputs. One of the main problems is that this relation cannot be estimated by standard econometric methods such as OLS, since input growth rates are likely to be correlated with technological progress, which is not observable. In this context, Hall (1988) suggests the use of instrumental variables. Nevertheless, finding suitable instruments is, in general, a severe obstacle. More recently, other authors propose the use of the generalized method of moments, such as Dobbelaere (2004), or the use of a control function, as proposed by Olley and Pakes (1996) and Levinsohn (1993).

An alternative methodology was proposed by Roeger (1995). This methodology uses the difference between the Solow Residual obtained by profit maximization and cost minimization problem of the firm, in order to overcome the main source of endogeneity in the formulation of Hall (1988). In the standard version of these methodologies, it is generally assumed that firms hold a technology with constant returns to scale and use homogeneous inputs that adjust instantly in perfectly competitive markets. However, the literature has questioned the validity of these assumptions, particularly with respect to perfect competition in the labour market. In this context, both methodologies were modified to simultaneously estimate product and labour market imperfections, measured by the price-cost margin and workers' bargaining power, respectively.

This paper uses Portuguese firm-level data from 2005-2009 to test the perfect competition paradigm in the product market assuming perfectly competitive labour market and also allowing for non-perfectly competitive labour market structures, as in Roeger (1995), Crépon et al. (2005), Dobbelaere (2004) and Abraham et al. (2009). The aim of the paper is to contribute to the empirical literature on product market competition and gather evidence for the Portuguese economy. A distinctive feature of the paper is the coverage of a large number of

markets in the economy (including services) and the distinction between tradable and non-tradable sectors, following Amador and Soares (2012a). This distinction is relevant from the perspective of resource allocation as high price-cost margins in non-tradable sectors tend to draw resources out of export-oriented activities, thereby contributing to the accumulation of external imbalances. Other distinctive features are the use of firm specific measures for the cost of capital and depreciation rates, the inclusion of tangible and intangible assets and the test for sample selection bias resulting from the exclusion of negative profits.

The paper concludes that perfect competition is rejected for virtually all markets in the economy, though there is substantial heterogeneity in price-cost margin estimates across markets. To obtain results for the overall economy, markets were weighted according to their relevance in sales, gross value added and employment. The results found for the Portuguese economy suggest a price-cost margin between 25 and 28 per cent, depending on the variables used to weight each market. Additionally, our findings point to a significant underestimation of firm's market power by assuming competitive labour markets. In fact, the overall economy price-cost margin is underestimated by around 11 p.p., though the underestimation can reach 35 p.p. in some markets. Similarly, perfect competition in the labour market is rejected in around 75 per cent of the markets. Workers' average bargaining power in the Portuguese economy lies between 12 and 14 per cent, according to weights considered for each market. Consistent with the results in the empirical literature, workers' bargaining power is positive and strongly correlated with price-cost margins across markets in the economy. Finally, the distinction between tradable and non-tradable sectors uncovers interesting patterns. Tradable and non-tradable sectors depict, on average, different levels of imperfection in the product market but not in the labour market. Market power is, on average, higher in the non-tradable sector than in the tradable sector. In addition, average bargaining power has been found similar between the two sectors. Nevertheless, there is a significant dispersion across markets in both sectors, particularly in the non-tradable. Moreover, several non-tradable markets stand amongst those with highest estimates for bargaining power and price-cost margin.

The paper is organized as follows. The next section briefly reviews the methodology used in the estimation of price-cost margins under competitive and imperfect labour markets. Next, section 3 describes the database and defines the variables used. Section 4 discuss the results obtained, focusing on the difference between tradable and non-tradable sectors. Section 5 presents some concluding remarks.

2 Methodology

Technological progress and market power are closely related from the theory point of view. The seminal contribution of Solow (1957) introduced growth accounting to identify the role of technological progress. Later, Hall (1988) and Roeger (1995) relaxed the assumption of perfect competition in the product market, allowing for the estimation of markups. Both settings relied on the assumptions of efficient and homogeneous input markets, instantaneous adjustment of all input factors and constant returns to scale. Subsequently, the assumption of perfect competition in the labour market was relaxed, allowing for the joint estimation of price-cost margins and workers' bargaining power (see Crépon et al. (2005), Dobbelaere (2004) and Abraham et al. (2009)). Naturally, if any of these assumptions does not hold, estimators in both setups are likely to be biased.

2.1 Price-cost margin estimation

A standard neoclassical production function is given by:

$$Q = A f(K, L, M) \tag{1}$$

where Q stands for real output, A is a technological parameter and K, L and M represent capital, labour and intermediate inputs, respectively. Assuming Hicks-neutral technological progress, the logarithmic differentiation of the production function yields the growth rate of output as follows:

$$\Delta q = \varepsilon^k \Delta k + \varepsilon^l \Delta l + \varepsilon^m \Delta m + \theta \tag{2}$$

where θ stands for technological progress, q is the log of output, k, l and m are the logs of inputs and ε^K, ε^L and ε^M are output elasticities with respect to capital, labour and intermediate inputs, respectively. Profit maximizing firms operating in competitive output and input markets implies that market power is null and marginal productivity of each input can be replaced by the corresponding price. Therefore, output elasticities with respect to each input match corresponding shares in nominal output, that is:

$$\varepsilon^J \equiv \frac{\partial Q}{\partial J} \frac{J}{Q} = \frac{P_J J}{PQ} \equiv \alpha^J \tag{3}$$

where P stands for the deflator of output, P_J is the deflator of input and $J = K, L$ and M. Assuming constant returns to scale, $(\varepsilon^K + \varepsilon^L + \varepsilon^M = 1)$ and perfect competition in the output

market, the Solow (1957) residual (SR) is obtained as:

$$SR \equiv \Delta q - (1 - \alpha^L - \alpha^M)\Delta k - \alpha^L \Delta l - \alpha^M \Delta m = \theta \qquad (4)$$

Under these assumptions, the Solow residual corresponds exactly to the technological progress. Nevertheless, if there is some level of market power, the SR no longer correctly captures technological progress as output elasticities with respect to each input do not match corresponding production shares. In the presence of market power in the product market, output elasticities become $\varepsilon^J = \mu \alpha^J$, where μ is the markup ratio. Replacing output elasticities obtained through firm profit maximization in the growth accounting equation for each input yields:

$$\Delta q = \mu(\alpha^L \Delta l + \alpha^K \Delta k + \alpha^M \Delta m) + \theta \qquad (5)$$

Using the constant returns to scale assumption $(\alpha^K + \alpha^L + \alpha^M)\mu = 1$, the Solow residual can be rewritten as:

$$SR = \left(1 - \frac{1}{\mu}\right)(\Delta q - \Delta k) + \frac{1}{\mu}\theta \qquad (6)$$

Therefore, the classical price-cost margin can be obtained from the estimate of the parameter $(1 - 1/\mu)$ in equation 6. This parameter corresponds to the Lerner index defined as $(P - MgC)/P$ where P and MgC represent the price and marginal cost, respectively. However, the last term in equation 6 is not observable, thus the OLS estimator is inconsistent. The solution proposed by Hall (1980) consists in using instrumental variables. However, it is generally difficult to establish suitable instruments, besides results tend to be sensitive to the choice of instruments. In this context, Roeger (1995) proposed an alternative approach.

Considering the firm's dual optimization problem, i.e., the cost minimization for a given level of output, the first order condition along with Shepard's lemma implies:

$$\Delta p = \alpha^L \Delta w + \alpha^K \Delta r + \alpha^M \Delta p^m - \theta \qquad (7)$$

where p is the log of output price, w, r, p^m are the wages, cost of capital and cost of intermediate inputs, in logarithms. Assuming imperfect competition in the output market and constant returns to scale, the (dual) Solow residual (SR^d) obtained through cost minimization is:

$$-SR^d \equiv \Delta p - \alpha^L \Delta w - \alpha^K \Delta r - \alpha^M \Delta p^m = (1 - \frac{1}{\mu})(\Delta p - \Delta r) - \frac{1}{\mu}\theta \qquad (8)$$

Finally, adding the Solow residuals under primal and dual approaches (equations 6 and 8), it

is possible to write:

$$SR - SR^d = \left(1 - \frac{1}{\mu}\right)[(\Delta p + \Delta q) - (\Delta r + \Delta k)] \tag{9}$$

where

$$SR - SR^d \equiv (\Delta p + \Delta q) - \alpha^L(\Delta w + \Delta l) - \alpha^M(\Delta p^m + \Delta m) - (1 - \alpha^M - \alpha^L)(\Delta r + \Delta k) \tag{10}$$

Thus, the term related to technological progress in equation 9 is eliminated, solving the inconsistency problem mentioned above.[1] This approach allows estimating the price-cost margin consistently by OLS. Furthermore, it avoids the use of deflators, which is a source of measurement error, particularly using firm level data. However, it is required a measure of the cost of capital.

2.2 Price-cost margin under imperfect competition in the labour market

In the previous subsection market power was estimated assuming that workers received perfectly competitive wages, i.e., assuming that workers' bargaining power is null. However, this assumption is not supported by empirical evidence.

The approaches suggested by Hall (1988) and Roeger (1995) can be modified to account for imperfect competition in the labour market (see Crépon et al. (2005), Dobbelaere (2004) and Abraham et al. (2009)).[2] Under imperfect labour markets, wages (W) and the number of workers (L) are simultaneously chosen according to a standard efficient bargaining problem.[3] The Nash bargaining involves sharing the surplus between firms that maximize profits and workers whose utility depends on employment and wages, that is:

$$\max_{L,W} \Omega = \left[(W - \overline{W})L\right]^{\phi} (PQ - WL)^{(1-\phi)} \tag{11}$$

where $\overline{W}$ is the reservation wage (related to the alternative wage in the labour market and the unemployment benefits), and $1 \geq \phi \geq 0$ represents workers' bargaining power, where $\phi = 0$ corresponds to competitive labour markets and $\phi = 1$ to a total appropriation of the firm's

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[1]There may still exist an endogeneity problem in Roeger (1995) formulation, for instance, in the presence of measurement error in inputs.

[2]It could be argued that imperfect competition should be extended to other input factors, namely intermediate inputs and capital.

[3]There are alternative models of negotiation between firms and workers where wages and number of workers are decided sequentially (see, e.g., Walque et al. (2009)). In addition, there are methodological choices in the Nash bargaining setup that may change results, including the firm's thread point at the moment of negotiation. In this context, the definition of capital stock (gross or net) as well as the use of GVA alternatively to sales can also change results.

surplus by the workers. The first order condition for *L* is given by:

$$W = (1 - \phi)\frac{\partial(PQ)}{\partial L} + \phi\frac{PQ}{L} \tag{12}$$

where:

$$\frac{\partial(PQ)}{\partial L} = \frac{\partial Q}{\partial L}\left[\frac{\partial P}{\partial Q}Q + P\right] = \frac{P}{\mu}\frac{\partial Q}{\partial L} \tag{13}$$

Assuming imperfect competition and an isoelastic demand for output $P = Q^{-\frac{1}{\eta}}$, where η being is the price elasticity of demand, then $1/\eta$ is the Lerner index and $(1 - 1/\eta) = 1/\mu$. Next, using the ratio of labour costs on output and equation 12, it is possible to obtain:

$$\frac{WL}{PQ} = \frac{L}{PQ}\left[(1 - \phi)\frac{P}{\mu}\frac{\partial Q}{\partial L} + \phi\frac{PQ}{L}\right] \tag{14}$$

Therefore, the elasticity of output with respect to labour is given by:

$$\varepsilon^L = \mu\alpha^L + \mu\frac{\phi}{1 - \phi}(\alpha^L - 1) \tag{15}$$

The adjusted output elasticities with respect to intermediate inputs and capital become, respectively:

$$\varepsilon^M = \mu\alpha^M \tag{16}$$

$$\varepsilon^K = 1 - \mu\alpha^M - \mu\alpha^L - \mu\frac{\phi}{1 - \phi}(\alpha^L - 1) \tag{17}$$

Substituting output elasticities in equation 2, the Solow residual becomes:

$$SR = \left(1 - \frac{1}{\mu}\right)(\Delta q - \Delta k) + \left(\frac{\phi}{1 - \phi}\right)(\alpha^L - 1)[\Delta l - \Delta k] + \frac{1}{\mu}\theta \tag{18}$$

and the dual counterpart is:

$$-SR^d = \left(1 - \frac{1}{\mu}\right)(\Delta p - \Delta r) + \left(\frac{\phi}{1 - \phi}\right)(\alpha^L - 1)[\Delta w - \Delta r] - \frac{1}{\mu}\theta \tag{19}$$

where *w* and *r* stand for the logarithm of wages and the user cost of capital. Therefore, allowing for imperfect competition in the labour market and under constant returns to scale,

the modified Roeger (1995) approach is:

$$SR - SR^d = \left(1 - \frac{1}{\mu}\right)[(\Delta p + \Delta q) - (\Delta r + \Delta k)]$$

$$+ \frac{\phi}{(1-\phi)}(\alpha^L - 1)[(\Delta l + \Delta w) - (\Delta r + \Delta k)] \quad (20)$$

This equation allows to jointly estimating price-cost margins and workers' bargaining power. The exclusion of the last term induces a bias in the price-cost margin estimate, which is higher the higher the bargaining power, the share of labour costs in output and the larger the difference between the growth rate of nominal labour and capital costs.

3 Database and definition of variables

3.1 Database description

The data used in this paper is drawn from *Informação Empresarial Simplificada* (IES) jointly collected by *Instituto Nacional de Estatística*, *Banco de Portugal*, Ministry of Justice and Ministry of Finance since 2006. This database provides extremely detailed information on balance sheet and income statements items for virtually the universe of non-financial firms.[4] The data used in the paper consists of an unbalanced panel from 2006 to 2009 comprising around 350.000 firms per year.[5]

Some observations were eliminated from the database to ensure robust estimations. Firstly, firms reporting less than two consecutive observations were eliminated. Additionally, only firms reporting strictly positive sales, labour costs, intermediate inputs and net capital stock (tangible and intangible) were considered. Secondly, observations associated to depreciation rates outside the [0,1] range were disregarded. The same approach was adopted for the share of labour costs and intermediate inputs in total sales. Moreover, observations below the 1st percentile and above the 99th percentile in the distribution of growth rates of sales, labour costs, intermediate inputs and tangible and intangible assets were excluded. Thirdly, consistent with profit maximization in the long run, firms exhibiting negative operational profits were withdrawn, representing approximately 22 per cent of the observations in the database. Finally, sectors as "Agriculture, Mining and Quarrying", "Education" and "Health" were disregarded given their low share in total gross value added (GVA) or the significant relevance of the public sector.

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[4]The initial raw data set coincides with the one used in Amador and Soares (2012*a,b*). However at odds with these papers, the information drawn from *Central de Balanços* for 2000-2004 was not considered. Since *Central de Balanços* contains information on a sample of Portuguese firms, comprising mainly large ones, the final set of information was insufficient to ensure the significance of the estimated parameters. On the contrary, in the case of IES, despite being available on a comparable basis for a limited number of years its almost universal coverage provides a substantial set of observations

[5]Although IES formally began in 2006, it included a report for 2005. For this reason, for the purpose of this paper, IES is considered from 2005 onwards.

Throughout the paper, it is assumed that price-cost margins and bargaining power are equal across all firms within each market. To overcome the well known difficulties in establishing relevant markets, the standard in the literature is to use an economic activity classification. This paper defines markets at 3-digit level in NACE Rev.1.1. Markets associated to less than 5 observations for a given year were eliminated. Overall, the paper considers a total of 156 markets, 108 of which are considered tradable and 48 non-tradable. As discussed in Amador and Soares (2012*a*), the set of tradable markets includes all manufacturing markets plus those markets where export-to-sales ratios exceed 15 per cent. In this sample, the non-tradable sector represents 56 per cent of GVA, 61 per cent of sales and 54 per cent of total employment in the period 2006-2009.

3.2 Definition of variables

The set of variables required to estimate equations 20 and 9 is relatively wide. Firstly, output corresponds to sales from goods and services, and its growth rate is $\Delta p_t + \Delta q_t$. Secondly, labour costs are given by nominal wages and other benefits including social security contributions and its growth rate is represented by $\Delta l_t + \Delta w_t$. Thirdly, shares of labour and intermediate inputs (α^L and α^M) consist of the ratios of labour costs and costs of goods and services to sales, respectively. Figure 1 displays the distribution of these shares across firms in 2008, distinguishing between firms operating in tradable and non-tradable sectors. In the Portuguese economy, the average labour cost and intermediate input shares are 25 and 62 per cent, respectively. As expected, the average labour share is higher in the non-tradable sector than in the tradable (31 and 22 percent, respectively.) Consistently, the share of intermediate inputs is lower in the non-tradable sector (53 and 57 per cent, respectively.)

Figure 1: Distribution of labour and intermediate input shares on sales (2008)

(a) Labour share

(b) Intermediate inputs share
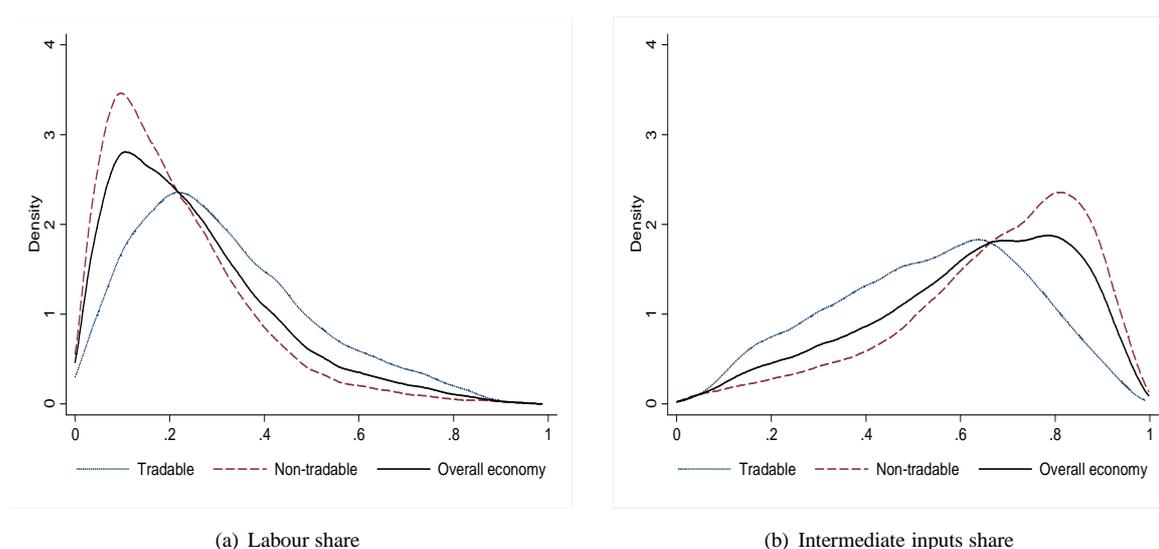
Figure 2: Depreciation rate and financial cost of capital (2008)

(a) Depreciation rate

(b) Financial cost of capital
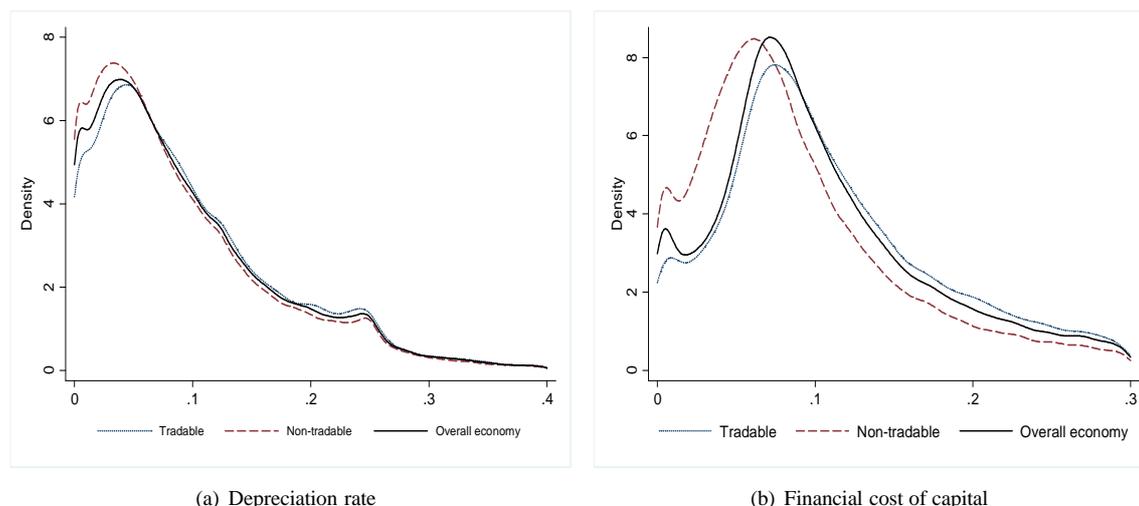
The estimation of equation 20 requires also information on the stock of capital and its cost of use. At odds with most studies, the stock of capital considered in paper includes both tangibles and intangibles (net of depreciations at book value). If intangibles are dismissed results can be substantially biased, particularly at services level where these assets tend to assume an extremely relevant role.

The user cost of capital is the price to pay for hiring or purchasing one unit of capital services and includes a measure of the financial cost of capital and the depreciation rate. Following Jorgenson and Hall (1967), the user cost of capital of firm i in year t is defined as $r_{i,t} = (i_{i,t} - \widehat{P_t^I} + \delta_{i,t})P_t^I$ where $i_{i,t}$ is the financial cost of capital, $\delta_{i,t}$ is the depreciation rate, P_t^I and $\widehat{P_t^I}$ represent the level and growth rate of investment goods price, respectively. These elements derive from the standard equation that relates the value of an asset to the discounted real flows of rentals expected over its lifetime.[6]

Unlike most studies in the literature, both depreciation rates and the financial cost of capital were calculated at firm-level, potentially reducing measurement error. Firstly, the deflator of investment goods (P_t^I) was obtained directly through national accounts. Secondly, firm-level depreciation rate is calculated as the ratio of total depreciations in year t to gross capital stock in year $t-1$, i.e., for firm i in year t, $\delta_{i,t} = \text{depreciation}_{i,t}/K_{i,t-1}$. Figure 2a) depicts the depreciation rate distribution for Portuguese firms in 2008. The distribution is positively skewed and the average for the overall economy is around 10 per cent, with no significant differences between firms in tradable and non-tradable markets. These figures are in line with the ones used in similar papers. For example, Christopoulou and Vermeulen (2012) uses a rate of 8 per cent with longitudinal data, Boulhol et al. (2006) uses rates of 5 and 7 per cent, while Konings and Vandenbussche (2005) assumes a depreciation rate of 10 per cent.

Lastly, while the calculation of the depreciation rate is relatively straightforward, the finan-

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[6]For further details on the methodologies used to measure the capital stock and its user cost see OECD (2001).

Figure 3: Real user cost of capital (2008)
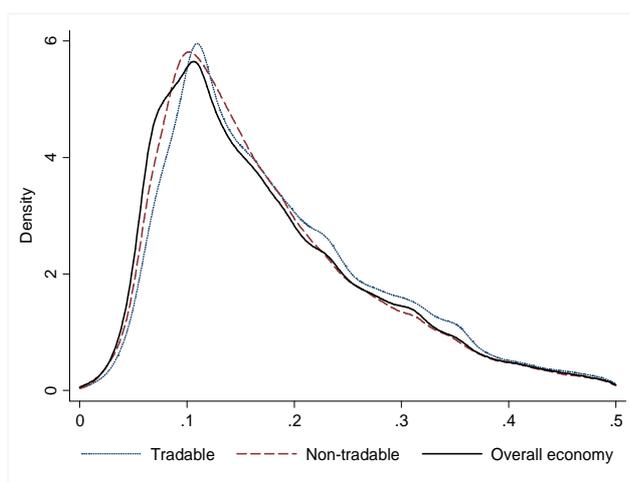
Note: The distribution displayed in the chart corresponds to the real financial cost of capital added to the depreciation rate.

cial cost of capital is more complex. This article assumes that the financial cost of capital is given by the ratio between interest and financial debt for each firm and year. Thus, the underlying assumption is that funding through equity is equivalent to funding through debt. Figure 2b) displays the distribution of the financial cost of capital across firms in 2008. The distribution is positively skewed, with an average of approximately 15 per cent and a median of 10 per cent. Additionally, the density in the lower costs of capital is higher in the non-tradable sector than in the tradable sector.

In order to avoid a substantial loss of observations, the financial cost of capital of the firms that report no debt, interest payments or ratios outside the $[0, 1]$ range was considered equal to the average of the respective market in each year. Figure 3 displays the distribution of the user cost of capital across firm in the Portuguese economy, using the imputation above referred. This distribution is positively skewed with an average of about 20 per cent.[7]

4 Results

In this section we test the paradigm of perfect competition in product markets of the Portuguese economy in the period 2006-2009, allowing for imperfect labour markets, i.e., estimating equation 20 for each market, distinguishing those with a tradable and non-tradable nature. The equation is estimated by OLS with clustered errors which will be our benchmark estimation. The equation is estimated by OLS with clustered errors (benchmark). Fixed effects, random effects and two-step Heckman regressions are also estimated to ensure robust

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[7]Note that this is a simplified version of the true cost of capital which should consider both taxes and the financing structure of each firm. Since capital costs are introduced in the regression in growth rates, we have decided to keep a simplified version of this measure. Note also that a more refined measure implies stronger data requirements which can also induce a selection bias.

Figure 4: Price-cost margin across markets under imperfect labour markets (2006-2009)
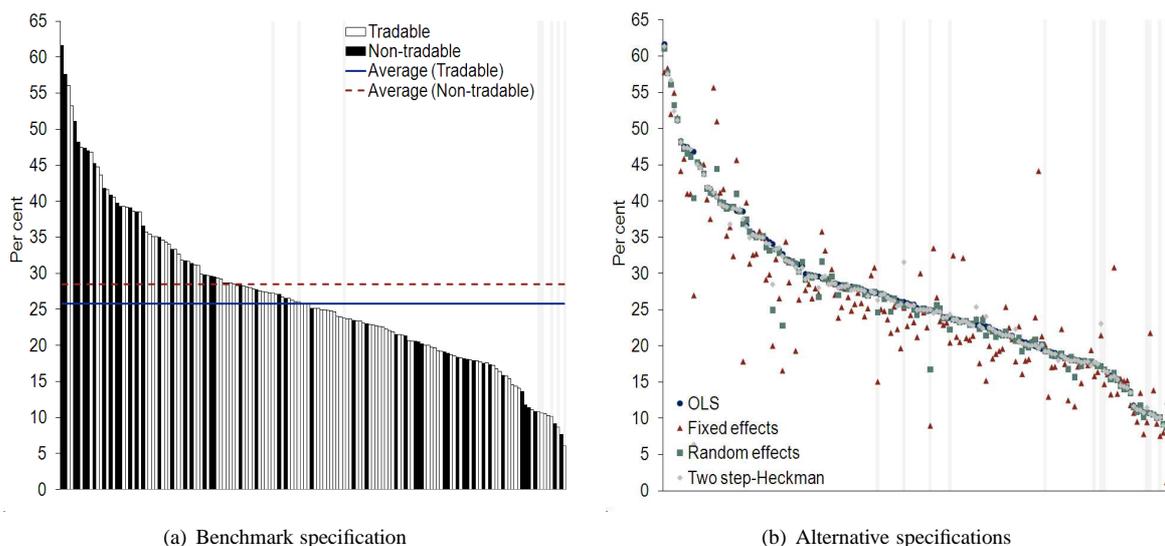
(a) Benchmark specification   (b) Alternative specifications

Note: Each market corresponds to a 3 digit level in NACE Rev. 1.1 classification. Black bars identify non-tradable markets using the definition in Amador and Soares (2012a). Grey bars correspond to coefficients not significant at a 0.05 significance level, in at least one specification. The benchmark specification corresponds to OLS estimations for each market with cluster errors.

results.[8] Furthermore, aggregations for some sectors are also presented along with the results for the overall economy. Moreover, results are contrasted with the ones obtained under the hypothesis of perfect competition in the labour market.

The perfect competition paradigm is widely rejected in Portuguese product markets. At a significance level of 5 per cent, estimated price-cost margins are statistically different from zero for virtually all markets considered (95 per cent of the markets). Figure 4a) ranks estimated price-cost margins from the highest to the lowest, uncovering a substantial heterogeneity across markets.[9] Price-cost margins range between a minimum of 6 per cent and a maximum of 62 per cent. This range is higher in the non-tradable sector than in the tradable. Moreover, competition in the non-tradable sector is less intense compared to the tradable sector. Unweighed price-cost margins are 29 and 26 per cent, respectively. This pattern is also visible using manufacturing and non-manufacturing aggregates. Furthermore, our results for the aggregate economy point to an unweighed price-cost margin of 27 per cent.

From a policy perspective, it is particularly relevant to ensure that the results obtained are robust across econometric specifications. Figure 4b) reports price-cost margins estimated by fixed effects, random effects and two-step Heckman regressions for each market, sorted according to the benchmark specification.[10] One of the striking aspects is that the rank of

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[8]Fixed effects regressions are run to account measurement errors related to the firm associated for instance to the simplified assumption of the cost of capital. The two-step Heckman regressions are run to account for the potential sample selection bias associated to the exclusion of firm reporting negative operation profits. Random effects regressions are estimated to make sure that our results remain unchanged to the estimation assumptions.

[9]For details on estimated price-cost margins in each market see table 2 in Appendix.

[10]The two-step Heckman procedure was used to test and correct the potential sample selection bias associated with the exclusion of a substantial number of firms with negative operational profits. The inverse Mills ratio is significant for around 30 percent of the markets, at a 5 per cent significance level. The explanatory variables in the participation equation are firm's age, sales and lagged total assets, in

Figure 5: Price-cost margins under perfect and imperfect labour markets and underestimation bias
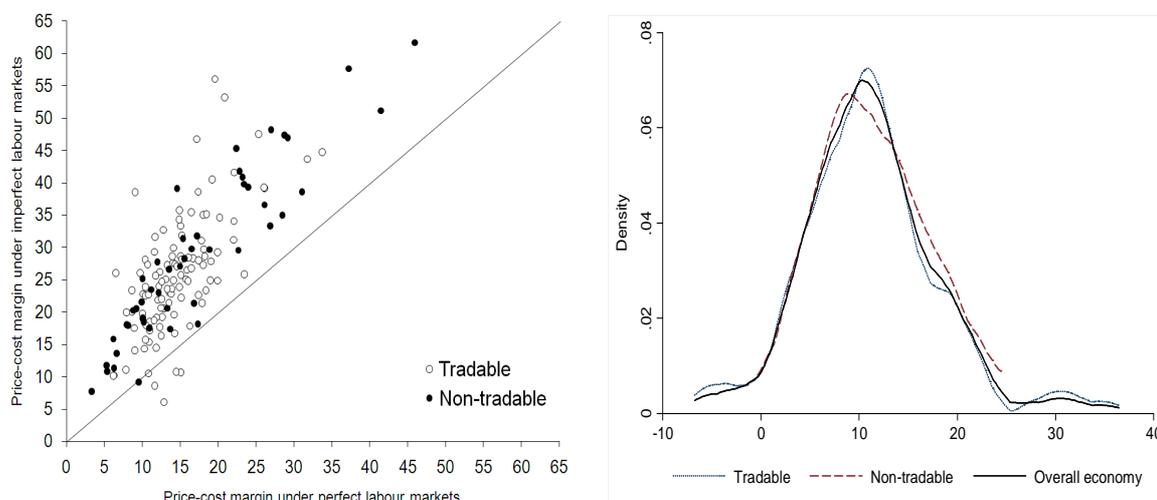
(a) Price-cost margins under perfect and imperfect labour markets

(b) Bias from assuming perfect labour markets

Note: Each market corresponds to a 3 digit level in NACE Rev. 1.1 classification. Black bars identify non-tradable markets using the definition in Amador and Soares (2012a). The underestimation bias corresponds to the difference between the price-cost margin estimated assuming imperfect labour markets and the one obtained under perfect labour markets. Coefficients were obtained by OLS with clustered errors for each market.

markets obtained through the different specifications is largely unchanged, implying that the identification of markets associated to potentially less intense competitive environment is robust across econometric specifications. Furthermore, the null hypothesis of perfect competition is consistently rejected. In fact, the percentage of markets where there is statistical evidence not to reject the perfect competition paradigm is below 8 per cent for all specifications, and these markets belong exclusively to the manufacturing sector.[11]

One of the results in the literature is that price-cost margin estimates become higher once labour markets are not assumed to be perfectly competitive, i.e., when workers hold some bargaining power. In this case, the regression captures the overall surplus extracted by the firm from the consumer through its market power, including the part that is transferred to the workers through their bargaining power. In fact, by assuming perfectly competitive labour markets (zero bargaining power for the workers), labour costs are incorrectly assumed to translate workers' productivity leading to an underestimation of the market power held by the firm. Figures 5a) and 5b) illustrate this result by comparing price-cost margins presented above with those obtained assuming perfect competition in labour markets and plotting the distribution of this bias by market. The average underestimation is 11 p.p., though in some markets the bias reaches values above 35 p.p.. Results in the empirical literature have also pointed to a substantial underestimation. Bassanetti et al. (2010) refers an underestimation of

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logarithm. Following Dunne and Hughes (1994), survival is associated to firm's age and size effects. Furthermore, the introduction annual dummies in the remaining econometric approaches did not affect the results thus were not included. The Hausman test was also performed for each market, and random effects were rejected in around 45 per cent the markets at a 5 per cent significance level.

[11]For further details on estimated price-cost margins under alternative econometric specifications see table 3 in Appendix.

Figure 6: Price-cost margin distribution under competitive and imperfect labour markets

(a) Imperfect labour markets

(b) Competitive labour markets
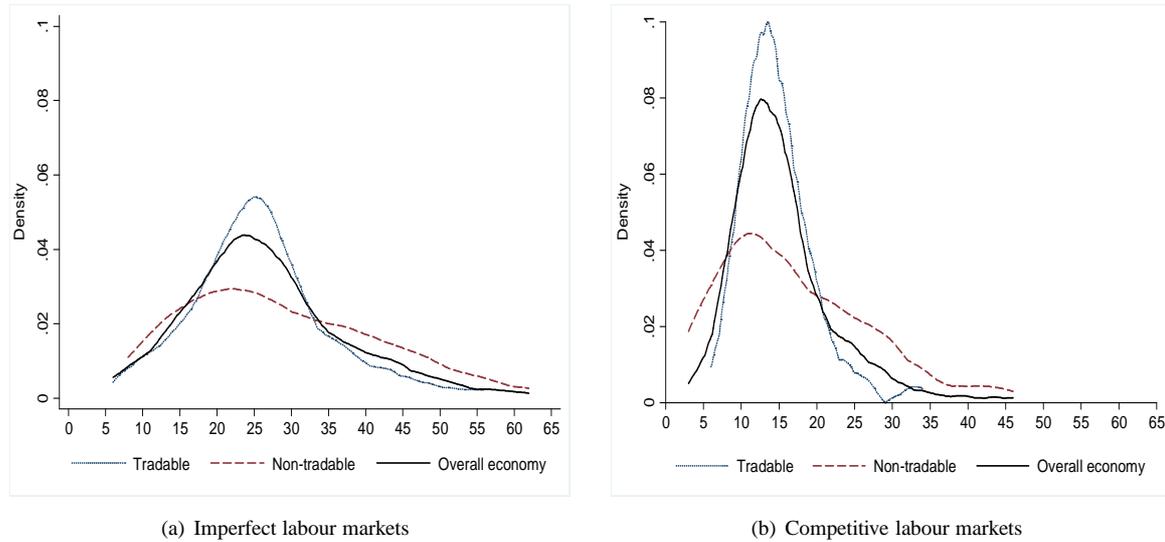
Note: Each market corresponds to a 3 digit level in NACE Rev. 1.1 classification. Non-tradable markets correspond to the definition in Amador and Soares (2012a). Coefficients were obtained by OLS with clustered errors for each market.

10 p.p., while Dobbelaere (2004) reports a higher underestimation, around 20 p.p., but only considering the manufacturing sector. Still the correlation between estimated margins in both frameworks is very high (80 per cent). This result suggests that the markets previously identified as having a poor competition setting were not totally misidentified. Moreover, the results found for the tradable and non-tradable sectors remain despite the significant level of underestimation. Under competitive labour markets, the price-cost margin distribution presents a lower dispersion but its right tail remains heavier in the non-tradable than in the tradable sector (see figure 6). The non-tradable sector reports less intense competition and its dispersion is still higher.

The bargaining power (ϕ) for each market can be recovered from the estimate for $\phi/(1-\phi)$ in equation 20. Figure 7a) reports workers' bargaining power in each of the markets sorted in descending order. Similarly to the results found for the product market, the assumption of perfect competition in the labour market is widely rejected (about 75 per cent of the markets at a significance level of 5 per cent). This percentage is higher in the non-tradable (85 per cent) than in tradable sector (72 per cent). In this context, output elasticities with respect to labour are 33 and 15 per cent in the tradable and non-tradable sectors (using GVA weights), respectively, and these figures are smaller than labour shares. Workers' bargaining power is very heterogeneous, reaching values above 30 per cent in specific markets of "Transports" and "Real estate activities" but also very low figures in markets related to "Trade" and the manufacturing sector. Negative values are abnormal and associated non significant estimates, i.e., markets where it is not possible to reject the existence of perfect competition in the labour market. Unweighted average bargaining power for the overall economy stands at 14

Figure 7: Workers' bargaining power across markets (2006-2009)
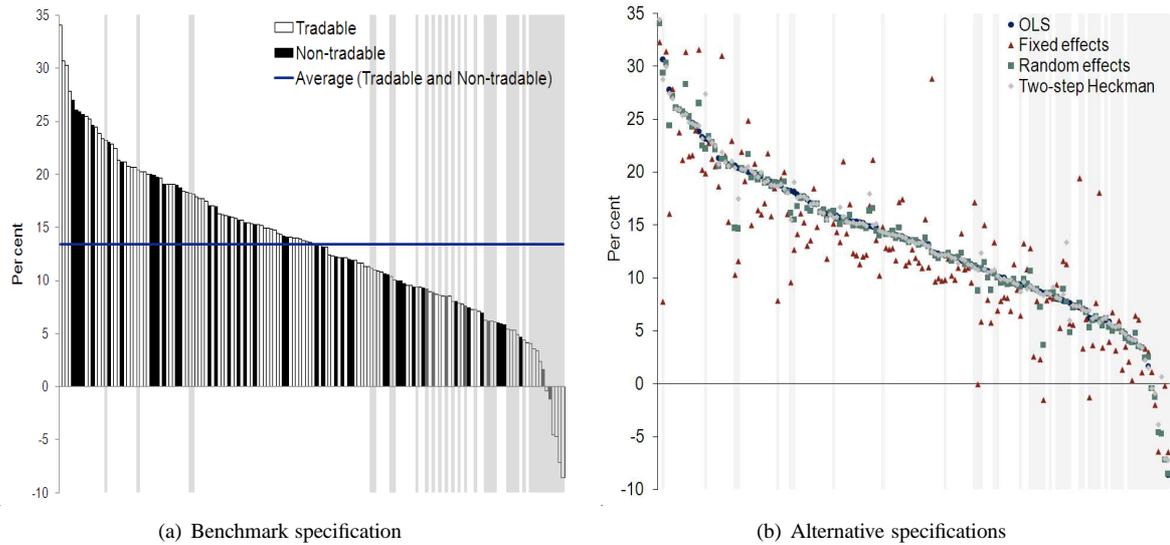
| (a) Benchmark specification | (b) Alternative specifications |

Note: Each market corresponds to a 3 digit level in NACE Rev 1.1 classification. Black bars identify non-tradable markets using the definition in Amador and Soares (2012a). Grey bars correspond to coefficients not significant at a 0.05 significance level, in at least one specification. The benchmark specification corresponds to OLS estimations for each market with cluster errors.

per cent similarly to figures found for tradable and non-tradable sectors. To ensure robustness, alternative estimation strategies were also performed. Figure 7b) overlaps estimates sorted according to the benchmark specification. The results are broadly consistent, though it can be seen that some estimates obtained using fixed effects differ from the benchmark.

Consistent with results found in the empirical literature, the degree of imperfection in the product market is closely related to the imperfection in the labour market. The correlation between price-cost margins and bargaining power across markets is around 81 per cent (figure 8). For example, Estrada (2009) reports a correlation of 50 per cent for several EU countries in the period 1980-2004. Considering only the manufacturing sector, Boulhol et al. (2006) studied 20 markets in the UK in the period 1988-2003 and reports correlations of 71 and 53 per cent in different specifications, while Dobbelaere (2004) reports a correlation of 87 per cent for a set of Belgian firms in the period 1988-1995. The latter paper presents two different explanations for the positive correlation between price-cost margins and workers' bargaining power. One explanation is that a high bargaining power leads to increased wages and a reduction of the rents kept to the firm. Consequently, some firms exit the market, thus reducing the intensity of competition in the product market. On the contrary, it can be argued that workers tend to exert less bargaining pressure if there is no surplus to be extracted from the firm, which is the case when there is strong competition in the product market. In this context, Blanchard and Giavazzi (2003) suggest a model that relates labour and product market imperfections.

So far we have addressed market power of both firms and workers for individual markets and found a very substantial level of heterogeneity. However, to draw patterns across sectors and

Figure 8: Product and labour market imperfection
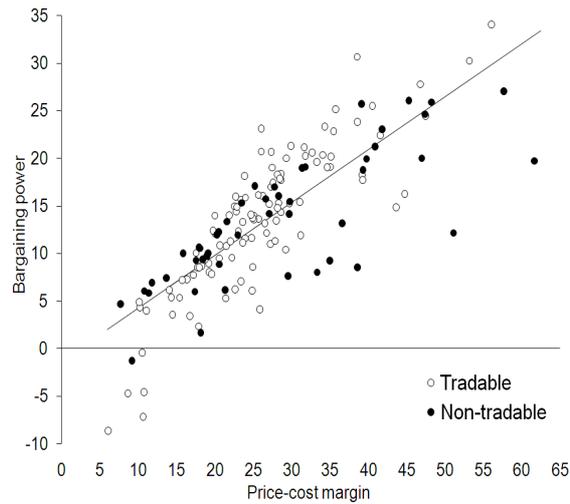
Note: Each market corresponds to a 3 digit level in NACE Rev 1.1 classification. Black bars identify non-tradable markets using the definition in Amador and Soares (2012a). Coefficients were estimated by OLS estimations with cluster errors for each market .

provide figures for the overall economy requires an aggregation of individual markets. Table 1 reports estimated price-cost margins and workers' bargaining power, aggregating markets into sectors considering several weights (markets, sales, GVA and employment).[12] At sectoral level, high price-cost margins are still associated to high bargaining power. "Electricity" and "Construction" exhibit the highest price-cost margins (above 35 per cent) associated to workers' bargaining power above other sectors of the economy (around 14 and 20 per cent, respectively). In contrast, the lowest price-cost margins are associated to "Trade" and to a lesser extent the manufacturing sector. In these cases, bargaining power is also lower than in other sectors of the Portuguese economy. Furthermore, results obtained using several aggregation variables and alternative specifications are not substantially changed.

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[12]The weights used are based on the average of the period 2006-2009

Table 1: Price-cost margins and workers' bargaining power per sector (2006-2009) (per cent)

Sectors	Nb. markets (1)	Non-rejection of perfect competition (percentage of markets)(2)	Min	Max	Median	Non-weighted average	Weighted average		
							Sales	GVA	Employment
Price-cost margin $(1-1/\mu)$									
Overall economy	156	5.1	6.1	61.7	25.2	**26.6** (5.45)	**24.9** (3.08)	**27.7** (4.15)	**25.7** (1.93)
Tradable	108	7.4	6.1	56.1	25.0	**25.8** (6.16)	**24.7** (4.81)	**25.7** (3.99)	**25.4** (2.58)
Non-tradable	48	0.0	7.7	61.7	26.9	**28.5** (3.73)	**25.1** (2.82)	**29.3** (4.18)	**25.9** (1.67)
Manufacturing	93	8.6	6.1	46.8	24.8	**24.7** (6.36)	**24.2** (5.47)	**25.3** (4.64)	**24.7** (3.04)
Non-manufacturing	63	0.0	7.7	61.7	27.8	**29.5** (5.44)	**25.3** (2.83)	**28.8** (4.11)	**26.2** (1.64)
Electricity & water supply	3	0.0	29.6	39.2	38.6	**35.8** (6.64)	**38.0** (6.57)	**38.1** (6.58)	**38.5** (6.68)
Construction	5	0.0	28.3	47.5	39.3	**38.9** (2.81)	**44.6** (0.69)	**44.1** (0.70)	**43.2** (0.71)
Trade	23	0.0	7.7	57.7	19.0	**20.9** (1.77)	**17.2** (0.90)	**19.7** (0.93)	**20.4** (1.02)
Transports & communications	10	0.0	21.4	56.1	27.8	**31.7** (6.49)	**26.8** (5.00)	**26.3** (5.11)	**27.5** (3.73)
Other services	22	0.0	9.2	61.7	34.0	**34.4** (3.94)	**32.8** (1.67)	**30.3** (1.75)	**21.8** (1.70)
Bargaining power (φ)									
Overall economy	156	23.7	-8.6	34.1	13.5	**13.5** (5.23)	**11.9** (2.56)	**12.9** (3.41)	**12.8** (2.20)
Tradable	108	27.8	-8.6	34.1	13.9	**13.5** (5.57)	**11.5** (4.99)	**11.8** (4.05)	**12.7** (2.51)
Non-tradable	48	14.6	-1.2	27.0	12.2	**13.5** (3.70)	**12.2** (2.14)	**13.7** (3.25)	**12.8** (2.10)
Manufacturing	93	30.1	-8.6	30.7	13.8	**13.1** (5.84)	**11.8** (5.65)	**13.0** (4.44)	**13.4** (2.91)
Non-manufacturing	63	14.3	-1.2	34.1	12.3	**14.0** (5.22)	**11.9** (2.18)	**12.8** (3.32)	**12.4** (2.05)
Electricity & water supply	3	66.7	7.6	25.7	8.6	**14.0** (6.74)	**9.7** (4.54)	**10.5** (4.52)	**16.0** (4.75)
Construction	5	0.0	16.0	24.7	19.1	**20.6** (2.44)	**23.4** (0.56)	**23.2** (0.57)	**22.8** (0.58)
Trade	23	4.3	4.7	27.0	10.0	**11.4** (1.73)	**9.4** (0.77)	**10.9** (0.83)	**11.6** (1.04)
Transports & communications	10	20.0	5.3	34.1	16.4	**16.1** (4.99)	**13.5** (4.36)	**12.7** (4.53)	**13.0** (3.21)
Other services	22	18.2	-1.2	30.3	14.5	**14.2** (4.02)	**11.6** (1.79)	**9.7** (2.23)	**6.0** (3.47)

Note:(1) Each market corresponds to a 3 digit level in NACE Rev. 1.1. Coefficients were obtained by OLS with cluster errors, for each market. Standard errors, reported in parenthesis, were computed using the delta method (Greene (1993)).(2) The non-rejection of the hypothesis of perfect competition is evaluated at a significance level of 5 per cent.

As mentioned above, assuming perfect competition in the labour market significantly changes the estimate for product market imperfection. The overall economy price-cost margin for the Portuguese economy is around 15 per cent assuming competitive markets and 27 per cent under imperfect labour markets. At sectoral level, the bias is particularly relevant in "Electricity and water supply" and "Construction" where the underestimation is more than 15 p.p. across specifications, regardless of the variables used to weight individual markets. However, the patterns identified on the sectors assuming the highest and lowest price-cost margins are still unchanged. "Trade" and the manufacturing sector present the lowest price-cost margins and "Electricity and water supply", "Construction" and "Other services" exhibit the highest price-cost margins.[13]

Similar studies on product and labour market competitive settings can be found for other countries. However, the papers may exhibit substantial differences in terms of sectors included, sample periods, databases features and some methodological details, which limits comparability. Estrada (2009) uses industry data and reported price-cost margin estimates for Germany, Spain, Italy and France 34.7, 25.3, 22.8 and 16.2 per cent, respectively, and workers' bargaining power of 20.2, 7.2, 12.6 and 14.2 per cent, respectively. Additionally Moreno and Rodríguez (2010) use a sample of 2000 firms of the Spanish manufacturing sector in the period 1990-2005 and reported a price-cost margin under imperfect labour markets of 17.6 per cent and a coefficient for workers' bargaining power that lies between 13 and 15 per cent. Similarly, Dobbelaere (2004) and Abraham et al. (2009) report an average price-cost margin of 33 to 26 per cent for the Belgian manufacturing sector, along with a bargaining power of 24 and 12 per cent, respectively. Considering a set of French firms in the manufacturing sector, Crépon et al. (2005) reports a price-cost margin of 30 per cent and a high figure for workers' bargaining power (66 per cent).

Finally, we break down market power of both firms and workers of the aggregate economy into main economic sectors and tradables and non-tradables aggregates (see figures 9). The non-tradable sector accounts for around 60 per cent of the overall price-cost margin and bargaining power in the economy using GVA weights. At sectoral level, "Transports and communications", "Electricity and water supply" and "Construction" represent around 43 per cent of the price-cost margin and 42 per cent of the overall bargaining power.

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[13]For additional details on estimated price-cost margins under perfect competition in the labour market see table 4 in Appendix.

Figure 9: Sectoral contribution to overall price-cost margin and bargaining power

(a) Price-cost margin

(b) Price-cost margin

(c) Bargaining power

(d) Bargaining power
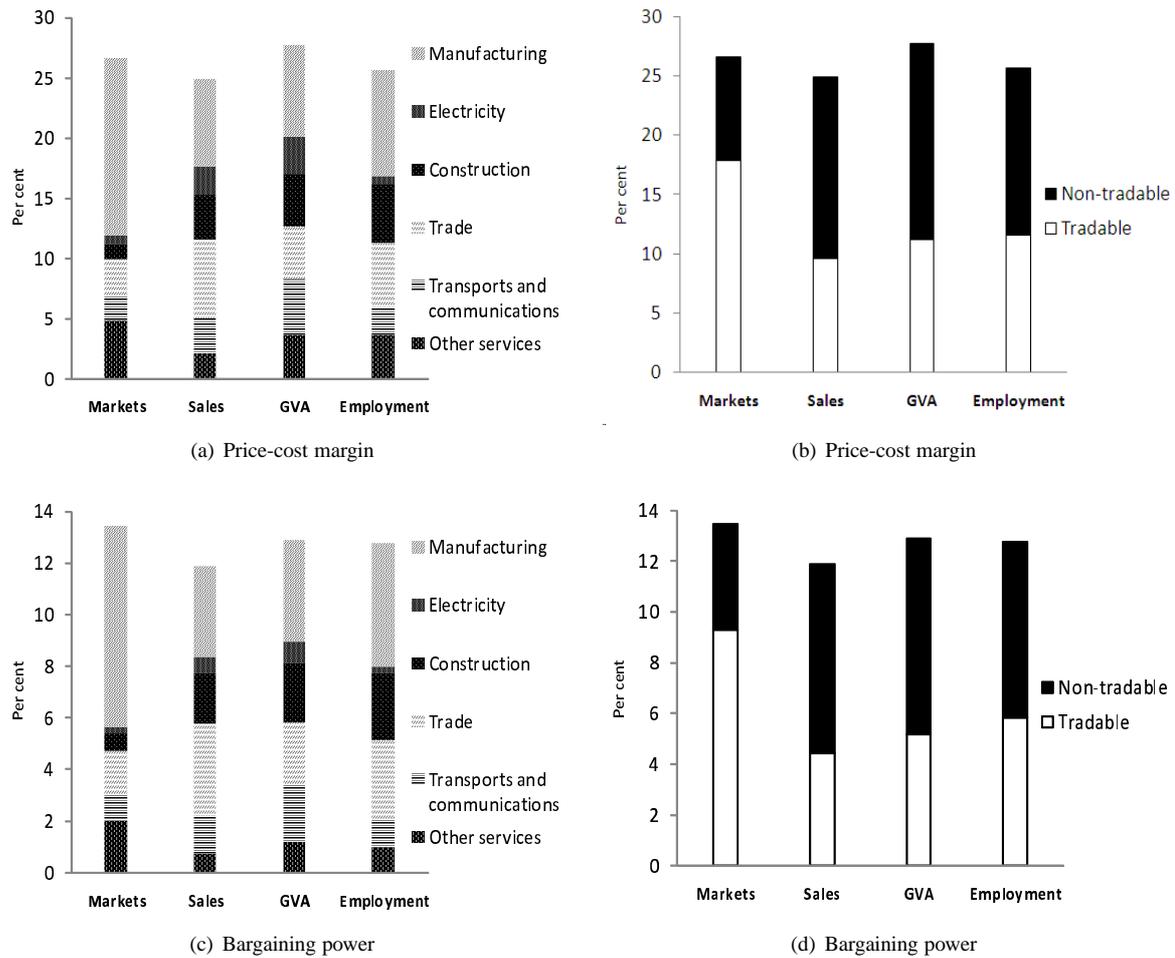
5 Concluding remarks

This paper estimates price-cost margins in the Portuguese economy for the period 2006-2009, assuming both perfect and imperfect competition in the labour market using the methodology proposed by Roeger (1995) and the extension proposed by Crépon et al. (2005), Dobbelaere (2004) and Abraham et al. (2009). The perfect competition paradigm is widely rejected in the Portuguese economy both in product and labour markets.

Perfect competition in the product market is not rejected in only 5 per cent of the markets. Estimated price-cost margins are very heterogeneous across markets and figures for the overall economy range between 25 and 28 per cent, depending on the weight used for each individual market. In addition, the price-cost margin in the tradable sector is lower than the one observed in the non-tradable, consistently with the pattern observed in previous studies. Moreover, disregarding labour market imperfection implies that the price-cost margin is underestimated on average by 11 p.p..

In approximately 25 per cent of the markets, the hypothesis of perfect competition in the labour market cannot be rejected. The average workers' bargaining power in the Portuguese economy lies between 12 and 14 per cent, depending on the weight used for each market. Additionally, there is substantial heterogeneity across sectors, reaching higher values for "Construction" and "Transports and Communications". Finally, as mentioned in the literature, workers' bargaining power is strongly and positively correlated with the price-cost margin across markets.

This paper confirms the findings of previous studies on the existence of a significant scope to improve competition in Portuguese product markets, particularly in the non-tradable sector. The non-existence of a suitable competitive setup in the past may have favored an over allocation of resources in the latter sector. Thus, improving competition is a crucial condition for a successful and sustainable adjustment process in the Portuguese economy, based on an efficient allocation of resources across firms and markets.

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Table 2: Price-cost margin and workers' bargaining power by market

	NACE Rev.1.1		N.obs	Perfect labour markets		Imperfect labour market				PCM Bias
				PCM	p-value	PCM	p-value	φ	p-value	
T	151	Prod., processing and preserving of meat	842	8.7	0.000	20.0	0.000	12.2	0.000	11.3
T	152	Processing and preserving of fish and fish products	229	10.1	0.000	22.8	0.000	14.4	0.002	12.8
T	153	Processing and preserving of fruit and vegetables	247	15.1	0.000	33.3	0.000	19.6	0.000	18.3
T	154	Manuf. of vegetable and animal oils and fats	361	33.7	0.000	44.8	0.000	16.3	0.000	11.0
T	155	Manuf. of dairy products	431	17.2	0.001	46.8	0.001	27.8	0.000	29.6
T	156	Manuf. of grain mill products	182	6.3	0.000	10.2	0.000	4.4	0.083	4.0
T	157	Manuf. of prepared animal feeds	232	12.8	0.068	6.1	0.089	-8.6	1.842	-6.7
T	158	Manuf. of other food products	6,539	10.4	0.000	22.6	0.000	15.0	0.000	12.2
T	159	Manuf. of beverages	823	31.8	0.000	43.7	0.000	14.9	0.025	11.9
T	171	Preparation and spinning of textile fibres	154	9.0	0.000	14.1	0.000	6.2	0.052	5.1
T	172	Textile weaving	292	10.5	0.000	18.3	0.000	8.7	0.032	7.8
T	173	Finishing of textiles	480	15.8	0.000	25.1	0.000	14.0	0.003	9.3
T	174	Manuf. of textile articles, except apparel	897	12.0	0.000	21.9	0.000	14.0	0.000	9.8
T	175	Manuf. of other textiles	1,169	15.0	0.000	28.6	0.000	18.4	0.000	13.6
T	176	Manuf. of knitted and crocheted fabrics	362	7.9	0.000	20.0	0.000	14.0	0.000	12.1
T	177	Manuf. of knitted and crocheted articles	660	14.1	0.000	29.9	0.000	21.3	0.000	15.8
T	182	Manuf. of other wearing apparel and accessories	6,397	12.5	0.000	16.4	0.000	7.3	0.000	3.8
T	183	Dressing and dyeing of fur; Manuf. of articles of fur	25	26.1	0.002	39.2	0.029	18.3	0.272	13.1
T	191	Tanning and dressing of leather	146	12.8	0.001	32.7	0.001	20.6	0.000	19.9
T	192	Manuf. of luggage, handbags, saddlery and harness	172	9.7	0.000	26.1	0.000	20.7	0.000	16.3
T	193	Manuf. of footwear	2,858	12.3	0.000	17.7	0.000	8.5	0.000	5.4
T	201	Sawmilling and planing of wood; impregnation of wood	932	12.3	0.000	26.2	0.000	16.1	0.000	13.9
T	202	Manuf. of sheets, plywood, laminboard, particle board and fibre board	60	6.2	0.042	10.2	0.140	4.9	0.438	4.0
T	203	Manuf. of builders carpentry and joinery	2,253	16.5	0.000	35.5	0.000	22.8	0.000	19.0
T	204	Manuf. of wooden containers	150	18.0	0.027	27.3	0.164	11.0	0.436	9.2
T	205	Manuf. of other wood products, cork articles, straw and plaiting materials	1,382	15.9	0.000	26.5	0.000	13.2	0.000	10.6
T	211	Manuf. of pulp, paper and paperboard	62	12.6	0.000	19.3	0.006	8.0	0.182	6.6
T	212	Manuf. of articles of paper and paperboard	2,828	13.6	0.000	23.1	0.000	12.4	0.000	9.5
T	221	Publishing	1,203	17.8	0.000	31.1	0.000	15.4	0.000	13.3
T	222	Printing and service activities related to printing	1,604	15.1	0.000	25.7	0.000	13.6	0.000	10.6
T	223	Reprod. of recorded media	36	19.0	0.003	24.9	0.015	8.6	0.352	5.9
T	241	Manuf. of basic chemicals	265	10.9	0.000	15.4	0.000	5.4	0.152	4.5
T	243	Manuf. of paints, varnishes and similar coatings	257	8.6	0.000	23.4	0.001	15.7	0.002	14.8
T	244	Manuf. of pharmaceuticals, medicinal chemicals and botanical products	196	18.0	0.000	35.1	0.000	19.1	0.000	17.0
T	245	Manuf. of soap and detergents and cleaning preparations	272	11.0	0.000	18.6	0.000	9.4	0.002	7.6
T	246	Manuf. of other chemical products	172	10.4	0.000	28.2	0.000	18.3	0.000	17.8
T	247	Manuf. of man-made fibres	19	6.5	0.156	26.1	0.140	23.2	0.063	19.5
T	251	Manuf. of rubber products	215	12.9	0.000	20.6	0.000	9.5	0.022	7.7
T	252	Manuf. of plastic products	1,439	13.1	0.000	25.1	0.000	13.6	0.000	12.0
T	261	Manuf. of glass and glass products	618	13.3	0.000	27.3	0.000	17.0	0.000	14.0
T	262	Manuf. of ceramic products	507	14.9	0.000	35.8	0.000	25.2	0.000	20.9
T	263	Manuf. of ceramic tiles and flags	85	17.4	0.001	38.6	0.001	23.9	0.000	21.2
T	264	Manuf. of bricks, tiles and construction products	130	19.2	0.000	40.5	0.000	25.5	0.000	21.4
T	265	Manuf. of cement, lime and plaster	51	19.9	0.000	29.3	0.000	10.4	0.073	9.3
T	266	Manuf. of articles of concrete, plaster and cement	762	11.7	0.000	31.7	0.000	21.2	0.000	20.0
T	267	Cutting, shaping and finishing of ornamental and building stone	2,210	12.2	0.000	24.0	0.000	15.9	0.000	11.8
T	268	Manuf. of other non-metallic mineral products	117	18.2	0.000	28.6	0.000	14.3	0.012	10.4
T	271	Manuf. of basic iron and steel and of ferro-alloys	20	11.7	0.004	8.6	0.423	-4.7	1.260	-3.0
T	272	Manuf. of tubes	85	10.8	0.000	10.5	0.001	-0.4	1.071	-0.3
T	273	Other first processing of iron and steel	57	7.8	0.000	11.1	0.000	4.0	0.112	3.2
T	274	Manuf. of basic precious and non-ferrous metals	123	8.9	0.000	17.6	0.006	10.1	0.058	8.6
T	275	Casting of metals	196	14.0	0.000	27.6	0.000	17.5	0.000	13.6
T	281	Manuf. of structural metal products	5,543	14.0	0.000	28.6	0.000	17.8	0.000	14.7
T	282	Manuf. of tanks, reservoirs, metal containers, central heating radiators and boilers	175	14.2	0.000	19.6	0.000	7.9	0.084	5.4
T	283	Manuf. of steam generators, except central heating hot water boilers	26	13.8	0.001	22.9	0.000	14.9	0.000	9.1
T	284	Forging, pressing, stamping and roll forming of metal; powder metallurgy	520	15.2	0.000	31.8	0.000	20.3	0.000	16.6

Note: T and NT identify tradable and non-tradable markets. Estimates were obtained under the benchmark specification (OLS with clustered errors, for each market).

Table 2: Price-cost margin and workers' bargaining power by market (continuation)

	NACE Rev.1.1		N.obs	Perfect labour markets		Imperfect labour market				PCM Bias
				PCM	p-value	PCM	p-value	φ	p-value	
T	285	Treatment and coating of metals; general mechanical engineering	3,412	16.7	0.000	28.3	0.000	15.3	0.000	11.6
T	286	Manuf. of cutlery, tools and general hardware	660	16.3	0.000	17.9	0.001	2.3	0.809	1.6
T	287	Manuf. of other fabricated metal products	1,818	14.1	0.000	25.0	0.000	13.8	0.000	10.9
T	291	Manuf. of machinery for the prod. and use of mechanical power	251	11.8	0.000	14.5	0.000	3.6	0.387	2.7
T	292	Manuf. of other general purpose machinery	945	14.9	0.000	23.9	0.000	11.6	0.000	9.0
T	293	Manuf. of agricultural and forestry machinery	162	10.4	0.000	15.8	0.001	7.2	0.122	5.4
T	294	Manuf. of machine tools	183	14.3	0.000	27.5	0.000	19.0	0.000	13.2
T	295	Manuf. of other special purpose machinery	1,929	22.1	0.000	41.6	0.000	22.4	0.000	19.5
T	297	Manuf. of domestic appliances n.e.c.	136	11.6	0.000	29.3	0.000	20.0	0.000	17.7
T	300	Manuf. of domestic appliances n.e.c.	48	12.5	0.000	20.7	0.000	10.9	0.024	8.2
T	311	Manuf. of electric motors, generators and transformers	119	11.8	0.000	25.7	0.000	16.2	0.000	13.9
T	312	Manuf. of electricity distribution and control apparatus	189	11.9	0.000	19.2	0.000	9.0	0.002	7.3
T	313	Manuf. of insulated wire and cable	37	10.7	0.002	27.4	0.004	20.7	0.004	16.7
T	315	Manuf. of lighting equipment and electric lamps	289	12.6	0.000	24.7	0.000	14.1	0.000	12.1
T	316	Manuf. of electrical equipment n.e.c.	489	16.0	0.000	24.8	0.000	11.6	0.001	8.8
T	321	Manuf. of electronic valves and tubes and other electronic components	116	14.3	0.000	16.7	0.038	3.4	0.729	2.4
T	322	Manuf. of television and radio transmitters	40	19.9	0.000	24.9	0.000	6.1	0.179	5.0
T	323	Manuf. of television and radio receivers, sound or video equipments	36	15.1	0.014	10.7	0.369	-7.2	1.345	-4.4
T	331	Manuf. of medical and surgical equipment and orthopaedic appliances	719	18.4	0.000	23.4	0.000	7.1	0.045	5.0
T	332	Manuf. of instruments and appliances for measuring	53	13.9	0.001	23.7	0.003	11.1	0.081	9.8
T	333	Manuf. of industrial process control equipment	456	13.3	0.000	23.6	0.000	13.3	0.000	10.3
T	334	Manuf. of optical instruments and photographic equipment	55	11.6	0.002	18.7	0.027	9.4	0.286	7.2
T	341	Manuf. of motor vehicles	43	14.5	0.021	10.8	0.057	-4.6	1.395	-3.7
T	342	Manuf. of motor vehicles, trailers and semi-trailers	279	10.3	0.000	14.3	0.004	5.4	0.386	4.1
T	343	Manuf. of parts and accessories for motor vehicles and their engines	371	10.8	0.000	22.7	0.004	16.0	0.016	11.9
T	351	Building and repairing of ships and boats	294	16.1	0.000	28.5	0.000	17.9	0.000	12.4
T	353	Manuf. of aircraft and spacecraft	29	22.1	0.007	34.1	0.026	20.4	0.101	12.0
T	354	Manuf. of motorcycles and bicycles	90	13.5	0.000	21.5	0.000	10.8	0.004	8.0
T	355	Manuf. of other transport equipment n.e.c.	27	11.0	0.003	17.2	0.001	7.8	0.032	6.2
T	361	Manuf. of furniture	3,751	14.9	0.000	34.3	0.000	23.3	0.000	19.5
T	362	Manuf. of jewellery and related articles	564	17.4	0.000	28.0	0.000	13.5	0.000	10.6
T	363	Manuf. of musical instruments	19	10.5	0.002	23.9	0.118	18.1	0.204	13.4
T	364	Manuf. of sports goods	47	10.0	0.000	19.8	0.001	12.4	0.012	9.7
T	365	Manuf. of games and toys	39	9.1	0.018	38.6	0.004	30.7	0.001	29.5
T	366	Miscellaneous manufacturing n.e.c.	865	14.5	0.000	27.1	0.000	15.2	0.000	12.6
T	371	Recycling of metal waste and scrap	185	15.1	0.000	22.2	0.000	9.6	0.001	7.1
T	372	Recycling of non-metal waste and scrap	273	22.0	0.000	31.2	0.000	11.9	0.024	9.2
NT	401	prod. and distribution of electricity	257	31.1	0.000	38.6	0.000	8.6	0.057	7.5
NT	402	Manuf. of gas; distribution of gaseous fuels through mains	55	22.7	0.000	29.6	0.000	7.6	0.426	6.9
NT	410	Collection, purification and distribution of water	202	14.6	0.000	39.2	0.000	25.7	0.000	24.6
T	451	Site preparation	1,539	25.3	0.000	47.5	0.000	24.5	0.000	22.2
NT	452	Building of complete constructions or parts thereof; civil engineering	30,190	28.8	0.000	47.4	0.000	24.7	0.000	18.7
NT	453	Building installation	11,515	15.6	0.000	28.3	0.000	16.0	0.000	12.7
NT	454	Building completion	7,230	17.2	0.000	31.8	0.000	19.1	0.000	14.6
NT	455	Renting of construction or demolition equipment with operator	223	24.0	0.000	39.3	0.000	18.8	0.000	15.4
NT	501	Sale of motor vehicles	3,970	5.4	0.000	10.8	0.000	6.1	0.000	5.5
NT	502	Maintenance and repair of motor vehicles	9,046	11.2	0.000	23.5	0.000	15.3	0.000	12.3
NT	503	Sale of motor vehicle parts and accessories	4,456	8.1	0.000	17.9	0.000	10.7	0.000	9.8
NT	504	Sale, maintenance and repair of motorcycles and related parts and accessories	993	6.3	0.000	11.4	0.000	5.9	0.000	5.1
NT	505	Retail sale of automotive fuel	2,739	3.3	0.000	7.7	0.000	4.7	0.001	4.4
T	511	Wholesale on a fee or contract basis	4,667	16.5	0.000	26.8	0.000	12.2	0.000	10.3
NT	512	Wholesale of agricultural raw materials and live animals	1,899	8.0	0.000	18.1	0.000	10.6	0.000	10.1
NT	513	Wholesale of food, beverages and tobacco	9,152	6.6	0.000	13.7	0.000	7.4	0.000	7.0
NT	514	Wholesale of household goods	11,015	10.1	0.000	19.1	0.000	10.0	0.000	9.0
NT	515	Wholesale of non-agricultural intermediate products, waste and scrap	10,125	10.1	0.000	19.0	0.000	9.7	0.000	8.9

Note: T and NT identify tradable and non-tradable markets. Estimates were obtained under the benchmark specification (OLS with clustered errors, for each market).

	NACE Rev.1.1		N.obs	Perfect labour markets		Imperfect labour market				PCM Bias
				PCM	p-value	PCM	p-value	φ	p-value	
NT	518	Wholesale of machinery, equipment and supplies	7,205	10.2	0.000	18.4	0.000	9.4	0.000	8.2
T	519	Other wholesale	4,181	10.5	0.000	18.0	0.000	8.6	0.000	7.5
NT	521	Retail sale in non-specialized stores	6,470	5.3	0.000	11.8	0.000	7.0	0.000	6.5
NT	522	Retail sale of food, beverages and tobacco in specialized stores	8,388	6.2	0.000	15.9	0.000	10.0	0.000	9.7
NT	523	Retail sale of pharmaceutical and medical goods, cosmetic and toilet articles	4,889	8.8	0.000	20.3	0.000	12.0	0.000	11.5
NT	524	Other retail sale of new goods in specialized stores	39,375	9.2	0.000	20.5	0.000	12.3	0.000	11.3
NT	526	Retail sale not in stores	1,006	12.2	0.000	23.0	0.000	11.9	0.000	10.8
NT	527	Repair of personal and household goods	811	10.9	0.000	17.6	0.000	9.3	0.000	6.6
NT	551	Hotels	4,093	22.8	0.000	41.8	0.000	23.1	0.000	19.0
NT	552	Camping sites and other provision of short-stay accommodation	735	37.2	0.000	57.7	0.000	27.0	0.000	20.4
NT	553	Restaurants	18,382	10.0	0.000	25.2	0.000	17.1	0.000	15.2
NT	554	Bars	13,765	9.9	0.000	21.6	0.000	13.3	0.000	11.7
NT	555	Canteens and catering	517	13.3	0.000	20.6	0.000	8.9	0.083	7.3
T	602	Other land transport	28,125	19.1	0.000	27.9	0.000	11.3	0.000	8.8
T	611	Sea and coastal water transport	123	19.6	0.000	56.1	0.000	34.1	0.000	36.5
NT	612	Inland water transport	50	23.2	0.000	40.9	0.000	21.3	0.000	17.7
T	621	Scheduled air transport	46	17.4	0.005	22.7	0.000	6.2	0.323	5.3
NT	631	Cargo handling and storage	304	23.4	0.000	39.8	0.000	20.0	0.000	16.4
T	632	Other supporting transport activities	566	17.9	0.000	21.4	0.000	5.3	0.302	3.5
NT	633	Activities of travel agencies and tour operators	1,585	12.0	0.000	27.8	0.000	17.0	0.000	15.8
T	634	Activities of other transport agencies	1,396	12.6	0.000	22.0	0.000	11.3	0.000	9.5
NT	641	Post and courier activities	274	15.4	0.000	31.4	0.000	19.0	0.007	16.0
NT	642	Telecommunications	253	13.5	0.000	26.6	0.000	15.7	0.001	13.1
NT	701	Real estate activities with own property	3,757	45.9	0.000	61.7	0.000	19.7	0.000	15.8
NT	702	Letting of own property	999	41.5	0.000	51.1	0.000	12.2	0.000	9.7
NT	703	Real estate activities on a fee or contract basis	5,254	27.0	0.000	48.2	0.000	25.9	0.000	21.2
NT	711	Renting of automobiles	634	26.8	0.000	33.4	0.000	8.0	0.008	6.5
T	712	Renting of other transport equipment	78	15.2	0.000	28.2	0.000	14.8	0.004	12.9
NT	713	Renting of other machinery and equipment	1,022	26.1	0.000	36.6	0.000	13.2	0.000	10.5
NT	714	Renting of personal and household goods n.e.c.	299	29.2	0.000	47.0	0.000	20.0	0.000	17.8
T	721	Hardware consultancy	1,510	18.1	0.000	29.7	0.000	15.3	0.000	11.6
T	722	Software consultancy and supply	1,370	20.2	0.000	34.7	0.000	19.1	0.000	14.5
NT	723	Data processing	251	16.8	0.000	21.3	0.000	6.2	0.330	4.5
NT	725	Maintenance and repair of office, accounting and computing machinery	170	15.0	0.000	27.1	0.000	14.2	0.000	12.1
T	726	Other computer related activities	1,102	18.5	0.000	35.1	0.000	20.2	0.000	16.7
T	731	Research and experimental development on natural sciences and engineering	89	20.9	0.000	53.2	0.000	30.3	0.000	32.4
NT	732	Research and experimental development on social sciences and humanities	37	22.4	0.000	45.3	0.000	26.1	0.018	22.9
T	741	Legal, accounting, book-keeping and auditing activities; consultancy	23,730	23.5	0.000	25.9	0.000	4.2	0.000	2.4
T	742	Architectural and engineering activities and related technical consultancy	8,016	26.0	0.000	39.3	0.000	17.7	0.000	13.2
NT	743	Technical testing and analysis	655	28.5	0.000	35.0	0.000	9.2	0.247	6.5
NT	744	Advertising	2,895	16.5	0.000	29.8	0.000	15.4	0.000	13.3
NT	745	Labour recruitment and provision of personnel	544	9.5	0.000	9.2	0.000	-1.2	1.234	-0.3
NT	746	Investigation and security activities	413	13.7	0.000	17.4	0.000	6.0	0.042	3.7
NT	747	Industrial cleaning	1,541	17.3	0.000	18.2	0.000	1.7	0.585	0.8
NT	748	Miscellaneous business activities n.e.c.	7,052	18.9	0.000	29.7	0.000	14.2	0.000	10.8

Note: T and NT identify tradable and non-tradable markets. Estimates were obtained under the benchmark specification (OLS with clustered errors, for each market).

Table 3: Average price-cost margin under imperfect labour markets and workers' bargaining power

Price-cost margin	Nb. mk.	OLS				Fixed effects				Random effects				Heckman			
		Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.
Overall economy	156	0.27 (0.054)	0.25 (0.031)	0.28 (0.042)	0.26 (0.019)	0.26 (0.069)	0.23 (0.038)	0.26 (0.05)	0.23 (0.021)	0.26 (0.036)	0.25 (0.018)	0.27 (0.022)	0.25 (0.01)	0.26 (0.037)	0.25 (0.018)	0.27 (0.022)	0.25 (0.01)
Manufacturing	93	0.25 (0.064)	0.24 (0.055)	0.25 (0.046)	0.25 (0.03)	0.24 (0.064)	0.23 (0.059)	0.25 (0.053)	0.24 (0.033)	0.24 (0.035)	0.24 (0.039)	0.25 (0.028)	0.25 (0.015)	0.24 (0.037)	0.23 (0.039)	0.24 (0.028)	0.24 (0.015)
Non-manufacturing	63	0.29 (0.054)	0.25 (0.028)	0.29 (0.041)	0.26 (0.016)	0.28 (0.069)	0.23 (0.036)	0.26 (0.05)	0.23 (0.017)	0.29 (0.036)	0.25 (0.015)	0.28 (0.021)	0.26 (0.008)	0.29 (0.037)	0.25 (0.015)	0.29 (0.021)	0.26 (0.008)
Tradable	108	0.26 (0.062)	0.25 (0.048)	0.26 (0.04)	0.25 (0.026)	0.25 (0.063)	0.24 (0.054)	0.25 (0.054)	0.24 (0.029)	0.25 (0.035)	0.25 (0.035)	0.25 (0.023)	0.25 (0.014)	0.25 (0.036)	0.24 (0.035)	0.25 (0.023)	0.25 (0.014)
Non-tradable	48	0.28 (0.037)	0.25 (0.028)	0.29 (0.042)	0.26 (0.017)	0.28 (0.069)	0.22 (0.036)	0.26 (0.049)	0.23 (0.017)	0.28 (0.024)	0.25 (0.015)	0.29 (0.022)	0.26 (0.008)	0.28 (0.024)	0.25 (0.015)	0.29 (0.022)	0.26 (0.008)
Electricity and water supply	3	0.36 (0.066)	0.38 (0.066)	0.38 (0.066)	0.38 (0.067)	0.33 (0.083)	0.37 (0.096)	0.37 (0.096)	0.36 (0.093)	0.35 (0.046)	0.38 (0.038)	0.38 (0.038)	0.38 (0.038)	0.35 (0.048)	0.38 (0.038)	0.38 (0.038)	0.38 (0.038)
Construction	5	0.39 (0.028)	0.45 (0.007)	0.44 (0.007)	0.43 (0.007)	0.37 (0.032)	0.39 (0.009)	0.39 (0.009)	0.38 (0.009)	0.39 (0.016)	0.44 (0.003)	0.43 (0.003)	0.43 (0.003)	0.39 (0.016)	0.44 (0.003)	0.44 (0.003)	0.43 (0.003)
Trade	23	0.21 (0.018)	0.17 (0.009)	0.20 (0.009)	0.20 (0.01)	0.19 (0.02)	0.15 (0.009)	0.18 (0.01)	0.18 (0.011)	0.20 (0.008)	0.17 (0.003)	0.19 (0.004)	0.20 (0.004)	0.21 (0.008)	0.17 (0.003)	0.20 (0.004)	0.20 (0.004)
Transports and communications	10	0.32 (0.065)	0.27 (0.05)	0.26 (0.051)	0.28 (0.037)	0.30 (0.074)	0.23 (0.044)	0.23 (0.049)	0.24 (0.03)	0.31 (0.036)	0.26 (0.024)	0.25 (0.023)	0.27 (0.017)	0.32 (0.036)	0.27 (0.025)	0.26 (0.023)	0.27 (0.017)
Other services	22	0.34 (0.039)	0.33 (0.017)	0.30 (0.017)	0.22 (0.017)	0.34 (0.094)	0.30 (0.02)	0.28 (0.021)	0.20 (0.02)	0.34 (0.03)	0.33 (0.009)	0.30 (0.01)	0.22 (0.01)	0.34 (0.03)	0.33 (0.009)	0.30 (0.01)	0.22 (0.01)

Bargaining power	Nb. mk.	OLS				Fixed effects				Random effects				Heckman			
Overall economy	156	0.14 (0.052)	0.12 (0.026)	0.13 (0.034)	0.13 (0.022)	0.12 (0.058)	0.10 (0.033)	0.11 (0.044)	0.11 (0.03)	0.13 (0.032)	0.12 (0.018)	0.13 (0.021)	0.13 (0.013)	0.14 (0.033)	0.12 (0.018)	0.13 (0.021)	0.13 (0.013)
Manufacturing	93	0.14 (0.058)	0.12 (0.056)	0.13 (0.044)	0.13 (0.029)	0.12 (0.063)	0.11 (0.066)	0.13 (0.052)	0.13 (0.033)	0.13 (0.038)	0.12 (0.047)	0.13 (0.031)	0.13 (0.018)	0.13 (0.039)	0.12 (0.046)	0.13 (0.031)	0.13 (0.017)
Non-manufacturing	63	0.12 (0.052)	0.12 (0.022)	0.13 (0.033)	0.12 (0.02)	0.13 (0.057)	0.10 (0.029)	0.11 (0.043)	0.11 (0.029)	0.14 (0.032)	0.12 (0.014)	0.13 (0.02)	0.12 (0.012)	0.14 (0.033)	0.12 (0.014)	0.13 (0.02)	0.12 (0.012)
Tradable	108	0.13 (0.056)	0.11 (0.05)	0.12 (0.04)	0.13 (0.025)	0.12 (0.061)	0.11 (0.061)	0.11 (0.057)	0.12 (0.03)	0.13 (0.037)	0.11 (0.042)	0.12 (0.026)	0.13 (0.016)	0.14 (0.037)	0.12 (0.041)	0.12 (0.025)	0.13 (0.015)
Non-tradable	48	0.13 (0.037)	0.12 (0.021)	0.14 (0.033)	0.13 (0.021)	0.12 (0.041)	0.10 (0.028)	0.12 (0.04)	0.11 (0.03)	0.13 (0.021)	0.12 (0.014)	0.13 (0.02)	0.13 (0.013)	0.13 (0.021)	0.12 (0.014)	0.14 (0.02)	0.13 (0.012)
Electricity and water supply	3	0.09 (0.067)	0.10 (0.045)	0.11 (0.045)	0.16 (0.047)	0.12 (0.073)	0.09 (0.073)	0.10 (0.073)	0.14 (0.073)	0.13 (0.042)	0.10 (0.035)	0.10 (0.035)	0.16 (0.032)	0.13 (0.043)	0.09 (0.035)	0.10 (0.035)	0.16 (0.032)
Construction	5	0.19 (0.024)	0.23 (0.006)	0.23 (0.006)	0.23 (0.006)	0.20 (0.024)	0.21 (0.008)	0.21 (0.008)	0.20 (0.008)	0.21 (0.013)	0.23 (0.003)	0.23 (0.003)	0.23 (0.003)	0.21 (0.013)	0.23 (0.003)	0.23 (0.003)	0.23 (0.003)
Trade	23	0.10 (0.017)	0.09 (0.008)	0.11 (0.008)	0.12 (0.01)	0.10 (0.017)	0.08 (0.008)	0.09 (0.009)	0.10 (0.01)	0.11 (0.007)	0.09 (0.003)	0.11 (0.003)	0.11 (0.004)	0.11 (0.008)	0.09 (0.003)	0.11 (0.003)	0.12 (0.004)
Transports and communications	10	0.16 (0.05)	0.13 (0.044)	0.13 (0.045)	0.13 (0.032)	0.15 (0.063)	0.11 (0.044)	0.10 (0.049)	0.10 (0.03)	0.16 (0.032)	0.13 (0.023)	0.12 (0.022)	0.13 (0.016)	0.16 (0.031)	0.14 (0.023)	0.13 (0.022)	0.13 (0.016)
Other services	22	0.15 (0.04)	0.12 (0.018)	0.10 (0.022)	0.06 (0.035)	0.14 (0.049)	0.09 (0.025)	0.08 (0.033)	0.05 (0.055)	0.14 (0.025)	0.12 (0.011)	0.10 (0.014)	0.06 (0.023)	0.14 (0.024)	0.12 (0.011)	0.10 (0.014)	0.06 (0.022)
Correlation coef.		0.81				0.84				0.81			0.75				

Table 4: Average price-cost margin under perfect labour markets

Price-cost margin	Nb. mk.	OLS				Fixed effects				Random effects				Heckman			
		Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.	Unw.	Sales	Weighted GVA	Empl.
Overall economy	156	0.15	0.15	0.17	0.15	0.15	0.14	0.16	0.14	0.15	0.15	0.17	0.15	0.15	0.15	0.17	0.15
		(0.031)	(0.016)	(0.02)	(0.009)	(0.037)	(0.018)	(0.022)	(0.01)	(0.017)	(0.008)	(0.01)	(0.005)	(0.017)	(0.008)	(0.01)	(0.005)
Manufacturing	93	0.14	0.14	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
		(0.028)	(0.032)	(0.025)	(0.014)	(0.027)	(0.031)	(0.023)	(0.014)	(0.015)	(0.014)	(0.011)	(0.006)	(0.017)	(0.014)	(0.011)	(0.006)
Non-manufacturing	63	0.18	0.15	0.18	0.16	0.17	0.14	0.17	0.15	0.17	0.15	0.18	0.16	0.17	0.15	0.18	0.16
		(0.031)	(0.014)	(0.02)	(0.008)	(0.037)	(0.016)	(0.022)	(0.009)	(0.017)	(0.007)	(0.01)	(0.004)	(0.017)	(0.007)	(0.01)	(0.004)
Tradable	108	0.15	0.15	0.16	0.15	0.14	0.15	0.16	0.15	0.14	0.15	0.16	0.15	0.15	0.15	0.16	0.15
		(0.028)	(0.029)	(0.022)	(0.013)	(0.027)	(0.028)	(0.022)	(0.012)	(0.015)	(0.013)	(0.01)	(0.006)	(0.017)	(0.013)	(0.01)	(0.006)
Non-tradable	48	0.17	0.15	0.18	0.15	0.16	0.14	0.17	0.14	0.17	0.14	0.18	0.15	0.17	0.15	0.18	0.15
		(0.02)	(0.014)	(0.02)	(0.008)	(0.045)	(0.016)	(0.022)	(0.009)	(0.013)	(0.007)	(0.01)	(0.004)	(0.013)	(0.007)	(0.01)	(0.004)
Electricity and water supply	3	0.23	0.29	0.29	0.23	0.22	0.30	0.29	0.23	0.23	0.29	0.29	0.23	0.23	0.29	0.29	0.24
		(0.04)	(0.038)	(0.037)	(0.033)	(0.045)	(0.046)	(0.045)	(0.038)	(0.021)	(0.018)	(0.018)	(0.016)	(0.021)	(0.018)	(0.018)	(0.016)
Construction	5	0.22	0.27	0.26	0.26	0.21	0.23	0.23	0.23	0.22	0.26	0.26	0.25	0.22	0.27	0.26	0.26
		(0.013)	(0.004)	(0.004)	(0.004)	(0.016)	(0.005)	(0.005)	(0.005)	(0.008)	(0.002)	(0.002)	(0.002)	(0.008)	(0.002)	(0.002)	(0.002)
Trade	23	0.11	0.09	0.10	0.10	0.10	0.08	0.10	0.10	0.11	0.09	0.10	0.10	0.11	0.09	0.10	0.10
		(0.009)	(0.003)	(0.004)	(0.005)	(0.01)	(0.003)	(0.004)	(0.004)	(0.004)	(0.001)	(0.002)	(0.002)	(0.004)	(0.001)	(0.002)	(0.002)
Transports and communications	10	0.17	0.15	0.16	0.17	0.17	0.14	0.15	0.16	0.17	0.15	0.15	0.17	0.17	0.15	0.15	0.17
		(0.032)	(0.02)	(0.019)	(0.014)	(0.031)	(0.018)	(0.019)	(0.014)	(0.017)	(0.012)	(0.012)	(0.008)	(0.017)	(0.012)	(0.012)	(0.008)
Other services	22	0.23	0.24	0.23	0.17	0.21	0.23	0.22	0.16	0.22	0.24	0.23	0.17	0.23	0.24	0.23	0.17
		(0.022)	(0.01)	(0.01)	(0.01)	(0.064)	(0.012)	(0.013)	(0.013)	(0.017)	(0.005)	(0.005)	(0.006)	(0.017)	(0.005)	(0.005)	(0.006)
Bias		**OLS**				**Fixed effects**				**Random effects**				**Heckman**			
Overall economy		0.11	0.10	0.11	0.10	0.11	0.09	0.09	0.09	0.11	0.10	0.11	0.10	0.11	0.10	0.10	0.10
Manufacturing		0.11	0.10	0.11	0.11	0.10	0.09	0.11	0.10	0.11	0.10	0.11	0.11	0.10	0.09	0.10	0.10
Non-manufacturing		0.12	0.10	0.11	0.10	0.12	0.08	0.09	0.09	0.12	0.10	0.10	0.10	0.12	0.10	0.11	0.10
Tradable		0.11	0.10	0.10	0.10	0.11	0.09	0.09	0.09	0.11	0.10	0.10	0.10	0.11	0.09	0.09	0.10
Non-tradable		0.11	0.10	0.11	0.11	0.11	0.09	0.10	0.09	0.11	0.10	0.11	0.11	0.11	0.10	0.11	0.11
Electricity		0.13	0.09	0.10	0.15	0.11	0.08	0.09	0.13	0.12	0.09	0.09	0.15	0.12	0.09	0.09	0.15
Construction		0.17	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.17	0.18	0.18	0.17	0.17	0.18	0.18	0.17
Trade		0.10	0.09	0.10	0.10	0.08	0.07	0.08	0.09	0.10	0.08	0.09	0.10	0.10	0.08	0.10	0.10
Transports and communications		0.14	0.11	0.10	0.11	0.13	0.09	0.08	0.08	0.14	0.11	0.10	0.11	0.14	0.12	0.11	0.11
Other services		0.12	0.09	0.07	0.05	0.13	0.07	0.06	0.04	0.12	0.09	0.07	0.05	0.12	0.09	0.07	0.05