

COMPETITION IN THE PORTUGUESE ECONOMY: A VIEW ON TRADABLES AND NON-TRADABLES*

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ABSTRACT

This article analyzes competition indicators in the Portuguese economy in the period 2000-2009, focusing on the differences between tradable and non-tradable sectors. The article computes the Herfindahl-Hirschman index and the price-cost margin, i.e., classical concentration and profitability measures, for a large set of markets. The analysis carried out is fundamentally distinct from the one conducted by competition authorities, aiming to set an overall scenario for competition developments. The article concludes that, although there are apparently no widespread problems, there is substantial room for improvements in the business competition environment in several markets, notably in the non-tradable sector.

1. Introduction

Competitive markets are a key ingredient in medium and long term economic growth and the intervention of public authorities is sometimes warranted to correct competition related distortions. Several aspects are acknowledged as important to assure a competitive business environment. Firstly, free-entry and exit of firms and low administrative costs tend to generate greater market competition, leading to higher productivity and investment. Free entry implies an increase in efficiency because prices tend to be drawn closer to marginal costs, implying an efficient allocation of resources in the economy, i.e., *static efficiency*. In this context, firms tend to become more efficient, cutting waste and duplication, which means higher productive efficiency. Companies that fail to undertake such adjustments are pressured to exit the market, freeing-up market quota for the most efficient ones. Secondly, a competitive business environment fosters innovation aimed at reducing production costs and creating new products. In the Schumpeterian perspective, the substitution of old technologies and products by new ones, relates with the concept of *dynamic efficiency*, which is determinant for total factor productivity growth. The effects of increased competition on investment are rooted on firms' need to increase productivity and market shares, as discussed in empirical work by Alesina *et al.* (2005).

This topic is particularly relevant, given the low potential GDP growth rate and the macroeconomic imbalances currently present in the Portuguese economy. In fact, it has been suggested that one of the causes for the present macroeconomic situation was the progressive reallocation of resources from the tradable to the non-tradable sector in the years preceding and following the accession to the monetary union in 1999. Such reallocation of resources might be related with competition issues, as suggested by the path of market concentration and profit margins. Therefore, the aim of this article is to provide

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empirical evidence on cross-sector competition developments in Portugal, focusing on the distinction between tradable and non-tradable sectors. Although this approach is fundamentally different from the in-depth market investigations carried out by competition authorities, it provides a broad cross-sectoral perspective along a relatively long time span (2000-2009).

Studies on market power based on sectoral aggregate and firm-level data exist for many countries and could be organized along two different strands. The first strand of research is based on regressions, departing from growth accounting equations and profit maximization firms under imperfect competition (Hall (1988) and Roeger (1995)). Some empirical works based on sectoral aggregate data are Martins and Scarpetta (1999), Christopoulou and Vermeulen (2008) and Badinger (2007). Examples using firm-level data are Altomonte et al. (2010), Kiyota et al. (2009) and Estrada (2009). The second strand of research consists in the computation of markups from firm-level data or national accounts. Examples of studies with firm-level data are Altomonte et al. (2010) for 8 EU countries, Braila et al. (2010) for Belgium, Maliranta et al. (2007) for Finland and Creusen et al. (2006) for Netherlands, who have also used different competition indicators. The latter strand of research, adopted in this article, also takes into account firm-level heterogeneity, which is disregarded in regression based studies.

There are almost no studies on sectoral competition developments in the portuguese economy. One exception is Molnar and Bottini (2010), who used firm-level data from the Amadeus database and estimated markups for services sectors from 1993 to 2006. The authors concluded that Portugal, along with central European OECD countries, Italy and Sweden, presents high markups in services markets comparatively to a large set of European countries.

The article is organized as follows. The next section, briefly reviews two classical competition indicators - the Herfindahl-Hirschman index and the price-cost margin. Section 3 presents the databases and the classification of tradable and non-tradable markets. Section 4 presents the results for individual markets and section 5 reports sectoral aggregations and results for the overall economy. Finally, section 6 presents some conclusions.¹

2. Classical measures of competition

2.1. Herfindahl-Hirschman index

The index attributed to Herfindahl (1950) and Hirschman (1945) (HHI) is one of the most popular empirical indicators in the competition literature. This index adequately assesses competition when concentration is the result of both an unequal distribution of market shares and a reduced number of market players. The HHI links market concentration with competition because the former leads to a higher likelihood of collusive behaviour and higher ability to set prices above marginal costs, that is, a lower level of competition. Although facing some methodological limitations, the HHI is a classical tool for preliminary analysis by regulatory authorities. The HHI in industry j is defined as:

$$HHI_j = \sum_{i=1}^N s_i^2$$

Where N is the number of firms in industry/market j and s_i stands for the market share of firm i . The HHI index ranges from close to 0 in perfect competition to 1 in monopoly.² When there are n equal

¹ Additional results and further detail on the subject of the current article can be found in "Competition in the Portuguese economy: An overview of classical indicators", Banco de Portugal, Working Paper 8 /2012.

² Alternatively, the index is scaled by 10000 if the market shares s_i are set in the interval [0,100].

firms HHI equals $\frac{1}{n}$. Empirical literature usually defines $HHI < 0.1$ as the threshold for low levels of concentration, $0.18 \geq HHI \geq 0.1$ for moderately concentrated markets and $HHI > 0.18$ for highly concentrated markets (see for example Scheffman et al. (2002)). In addition, authorities accept or block mergers and acquisitions depending on the level and magnitude of the change in the HHI.³

The HHI presents some conceptual and empirical implementation problems. Firstly, it fails to correctly identify reallocation and selection effects which may result from higher competition associated to an increase of incumbents' aggressiveness. In this case, market shares of more efficient firms will increase at the expense of less efficient ones, leading to a reallocation effect. In addition, less efficient firms may be pushed out of the market, leading to a selection effect. In the latter case, HHI increases convey the wrong signal in terms of competition. The inability to capture reallocation and selection effects is extensive to all competition measures based on market shares. Secondly, the correct computation of the index requires information about all firms operating in the market. This is limitative when databases represent only a sample of firms, especially if observed entry and exit simply results from changes in coverage. Thirdly, information on firm's sales includes exports, thus affecting the assessment on domestic market concentration. Moreover, imports are also relevant to assess domestic market competition, thus inducing an additional potential bias. One should refer that this bias is more severe in markets associated to stronger exposure to international trade. This aspect is particularly important in the case of tradable markets, limiting the interpretation of results. Finally, the level of the HHI strongly depends on the definition of market.

2.2. Price-cost margin

From a theoretical point of view market competition is closely related to market power. The higher the latter the lower the level of competition is. Market power is defined as the ability to set prices above marginal costs. The classical measure of market power is the Lerner (1934) index, also referred as mark-up ratio. For a profit maximizing firm, this ratio is defined as the difference between price and marginal cost divided by price. The first order condition of the profit maximization problem of the firm is:

$$P(Q) + \frac{dP}{dQ}(1+v)q_i = MC(q_i)$$

where q_i is the production of firm i , MC is the marginal cost, Q and P stand for total production and price, respectively, and $(1+v)$ is the common conjectural variation.⁴ The Lerner index for firm i is:

$$L_i \equiv \frac{P_i - MC_i}{P_i} = \frac{s_i(1+v)}{\varepsilon}$$

where $\varepsilon \equiv -\frac{dQ}{Q} / \frac{dP}{P}$ is the elasticity of demand and s_i is the market share of firm i .

The Lerner index equals 0 in the polar case of perfect competition, increases with market power and it is lower than 1 in monopoly. Detailed information on prices is generally not available and marginal costs are unobserved, thus the price-cost margin (PCM) is used as an approximation to the Lerner index. The PCM for firm i is considered as:

³ For example, the guidelines in the US in 1982 set critical HHI levels for concentration: 0.1 with a change of 0.01 and 0.18 with a change of 0.005.

⁴ The conjectural variation defines how a firm anticipates the response of a competitor to changes in its production. Depending on the values of v , the first order conditions for various competitive models emerge. When the Cournot quantity model is considered $v = 0$, i.e., each firm believes the other firm's choice is independent from its own; when the perfectly competitive model is considered $v = -1$, implying a price equal to marginal cost; when v equals the slope of the reaction curve of the other firm, the Stackelberg model emerges, i.e., the first firm chooses its output on the basis of how it conjectures the other firm will respond. Finally, when a monopoly is considered, the conjectural variation does not exist as total production is attached to one firm.

$$PCM_i = \frac{\text{Sales}_i - \text{Variable Costs}_i}{\text{Sales}_i}$$

Sales comprise revenues from the transaction of goods and services and variable costs consist of the cost of materials, cost of services (e.g., subcontractors, electricity and fuels) and labour costs. More specifically, labour costs include wages, other compensation items and social security contributions. Capital is assumed to be a fixed input, thus its cost is not included in variable costs.⁵ Therefore, rents should be excluded from variable costs, though this was not the case in this article. The reason is that the response rate regarding this variable is small in the database, thus its exclusion from total costs of services might induce another type of bias in the results.

There are several sources of bias that limit the ability of the PCM to work as a measure of market power. Firstly, as marginal costs are unobserved, average costs are used as a proxy. In the case of constant returns to scale both measures coincide but in the presence of decreasing (increasing) returns to scale, there is an upward (downward) bias in the level of PCM. Secondly, the PCM also reflects product quality and efficiency levels. In fact, more efficient firms or those producing higher quality goods present higher PCM, though they do not necessarily hold higher market power. Thirdly, market PCM is not monotone in the degree of competition. The reason for the lack of theoretical robustness is its inability to correctly capture the previously mentioned reallocation and selection effects. These effects occur if efficient incumbents adopt more aggressive pricing strategies. In this case, market PCM may increase as a consequence of a transfer of market share towards such firms, suggesting that there was a competition reduction when in fact the opposite has occurred. Finally, PCM evolution also reflects the business cycle. In periods of expansion, firms have scope to increase the PCM and the reverse tends to happen in recessions, *i.e.*, the indicator has been found as mildly pro-cyclical in some empirical studies.

The computation of PCMs by market involves two steps. The first step is the definition of markets, *i.e.*, the implicit selection of firms operating there. The standard approach in the literature is to use a sectoral classification such as CAE as a market segmentation criterion.⁶ The underlying assumption is that firms sell one good and compete in only one market. Therefore, multi-product firms are a source of bias, especially if products are not close substitutes. Different market segmentation criteria could yield different results. The second step is the aggregation of firm-level PCMs. Assuming that all firms have the same weight, market PCM corresponds to the unweighed average of firm level results. However, this approach can yield a distorted scenario for the market PCM because there is a significant level of heterogeneity across firms. Alternatively, weights can be assigned according to firm's market shares, which is the standard approach in the literature. Therefore, the relevant distribution becomes $s_i PCM_i$. Weights can be either time dependent or fixed at values recorded in a selected period. The former option implies an evolution in market PCM that results from changes both in firm-level PCM and market structure.

3. Database and market classification

3.1. Database description

Data used in this article draws on firms' annual accounts reported under *Informação Empresarial Simplificada* (Simplified Firm Information, Portuguese acronym: IES). IES data exists from 2006 onwards and it covers virtually the universe of Portuguese non-financial firms. Although IES began in 2006, there was a report including information for 2005, which was taken into account in the analysis. The

⁵ In the literature, alternative definitions are used. Some authors include taxes and subsidies, others argue that R&D expenses and the depreciation of intangible goods are related to efficiency, thus they should be included in variable costs.

⁶ CAE is the portuguese acronym for classification of economic activities and it is basically equivalent to NACE.

last year of this study is 2009, comprising around 350.000 firms. The almost universal coverage of IES emerges from its nature, as it is the system through which firms report mandatory information to the tax administration and the statistical authorities. Under IES, firms provide detailed balance sheets and profit and loss accounts information, as well as additional information on variables such as the number of employees and exports. Prior to 2006, information on the annual accounts of Portuguese firms was collected under a non-compulsory survey named *Central de Balanços* (CB).⁷ This survey presented lower coverage in terms of number of firms and gross value added (GVA), with a bias towards large firms. CB data was used from 2000 to 2004.

In this article, only a subset of the data was used. Firstly, public sector related activities such as education and health care were not included. Moreover, agriculture, hunting and forestry along with mining and quarrying were not considered given their low weight in total GVA. Secondly, markets which do not have at least one firm in all the years were not considered. Overall 166 markets were considered, each one corresponding to a CAE 2.1 classification at 3 digit level.⁸ Thirdly, firms with null sales or variable costs were excluded but those that do not report labour costs were included. Lastly, firms with negative PCM were included in the analysis. In the short-run, profit maximization is consistent with the existence of non-positive PCMs. If revenues cover at least fixed costs, firms incur in losses lower than those that would be registered if they exited the market. For this reason losses do not immediately determine an exit. Nevertheless, the lowest 1 per cent observations in the pooled distribution of PCMs were eliminated, consisting of unreasonably negative values.

The final data set includes 1.368.551 firms/years, from 2000 to 2009, comprising 342.764 different firms. Almost half of the firms have at least 5 observations and around four fifths are present in two consecutive years, which implies a significant level of firm dynamics.

3.2. Classification of tradable and non-tradable markets

One of the main restrictions to firms' market power is exposure to international competition. Markets with strong international exposure are likely to follow the law of one price and are commonly classified as tradable. A rough proxy used in the empirical literature is to consider manufacturing markets as tradable and non-manufacturing as non-tradable. The problem with this proxy is that technological progress and trade liberalization brought international competition to many services activities, moving the borderline between tradable and non-tradable markets.

The empirical literature on this issue is scarce. Gregorio et al. (1994) use the export to production ratio as a measure of international exposure and set the threshold at 10 per cent. Under this approach, the use of manufacturing as a proxy for the tradable sector seems to be quite accurate, though the analysis was conducted at a high level of aggregation. Using a different methodology, Jensen and Kletzer (2010) provide a distinction based on a detailed market classification, uncovering a significant level of heterogeneity in services and classifying several of them as tradable. The export to sales ratio is one good measure to evaluate exposure to international competition, though a bias may exist because imports are ignored. In addition, it is assumed that firms in one market account for all the exports in that market.

Panel a) of Chart 1 plots the distribution of the export to sales ratio in portuguese markets, distinguishing between manufacturing and non-manufacturing markets for the average of the period 2006-2009. It is clear that several non-manufacturing markets exhibit high export to sales ratios. In this article, markets

⁷ Activities such as "financial intermediation", "public administration and defense; compulsory social security" and "extra-territorial organizations and bodies" are not part of IES or CB universe.

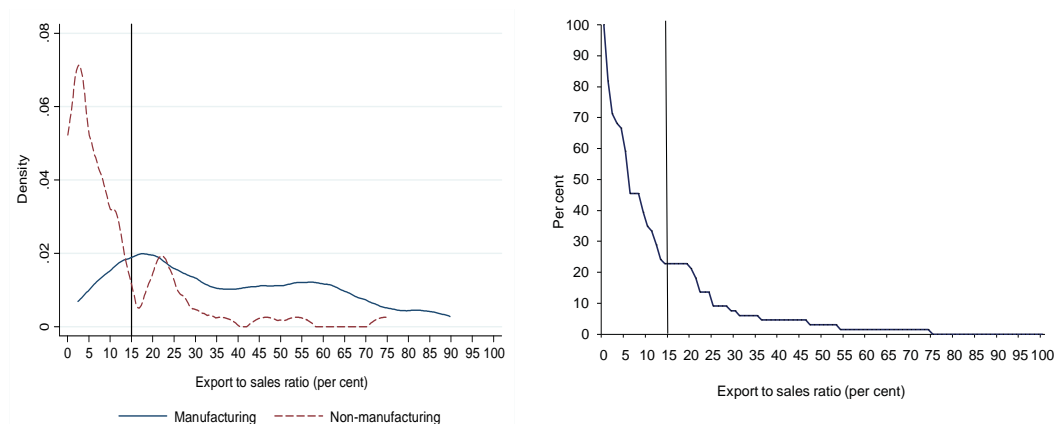
⁸ In 2006 there was a change from CAE 2.1 to CAE 3.1. In order to ensure comparability an equivalence table was used. In addition, as significant reclassification of firms was prevalent in the database in the years before 2005, whenever possible, the classification resulting from the conversion from CAE 3.1 to CAE 2.1 was applied retrospectively.

Chart 1

CLASSIFICATION OF TRADABLE AND NON-TRADABLE MARKETS

a) Distribution of export to sales ratio in 2006-2009

b) Threshold sensitivity: accumulated distribution of non-manufacturing markets by export to sales ratio



Source: Author's calculations.

with an export to sales ratio above 15 per cent (the vertical line in Chart 1) are considered as tradable, along with all manufacturing markets.⁹ Using this criterion, around 23 per cent of non-manufacturing markets are considered as tradable. Overall, in this article, the tradable sector includes all manufacturing markets, some transport related markets and some business services. This sector corresponds to a total of 115 markets representing 44 per cent of GVA in the average of the period 2005-2009.

The choice of a 15 per cent threshold for the exports to sales ratio is consistent with similar studies (Knight and Johnson (1997) and Dixon *et al.* (2004)) and it is quite robust for Portuguese data. Panel b) of Chart 1 shows that the percentage of non-manufacturing markets classified as tradable would not change for thresholds between 14 and 19 per cent.

4. Competition in the Portuguese economy

4.1. Concentration

Panels a) and c) of Chart 2 present Gaussian kernels for the HHI in 2009, unweighted and weighted according to average GVA in the 2005-2009 period, respectively. In both panels, the distinction between tradable and non-tradable sectors was maintained. It should be mentioned that HHI levels for the tradable sector are less informative as the relevant market is likely not to coincide with the internal market.

Unweighted kernels for HHI show that there is a high density in relatively low concentration levels, *i.e.*, the distributions are positively skewed, especially in the non-tradable sector. In 2009, average HHI in the tradable sector is 0.16, much higher than 0.098 in the non-tradable. However, there is still substantial density for HHI levels above 0.18, the threshold typically set to identify highly concentrated markets, notably in the tradable sector (13 per cent of non-tradable markets and 38 per cent of tradable markets were highly concentrated in 2009). Nevertheless, when markets are weighted according to GVA, the distributions for tradable and non-tradable markets become more alike and density in low concentration

⁹ Market's exports are proxied by the sum of exports of firms within that market. Statistical data for exports of services are not published at the disaggregation level used in this article.

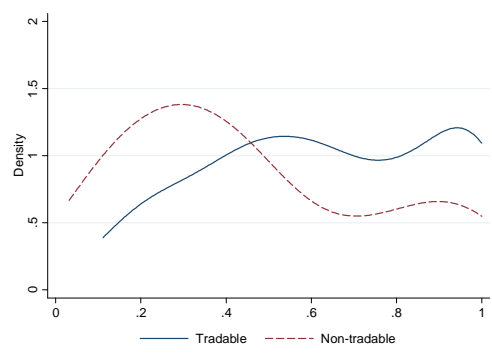
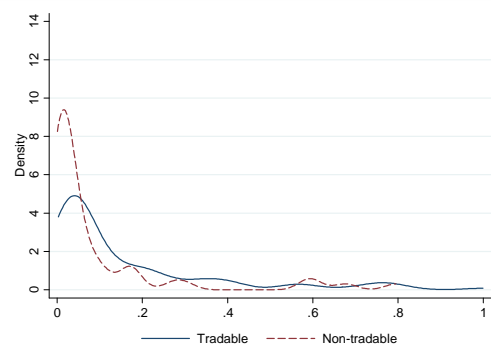
Chart 2

DISTRIBUTION OF HERFINDAHL-HIRSCHMAN INDEX (HHI) AND CONCENTRATION RATIO (C10) IN 2009

Unweighted

a) HHI

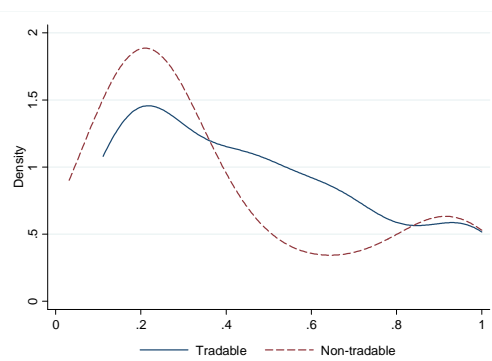
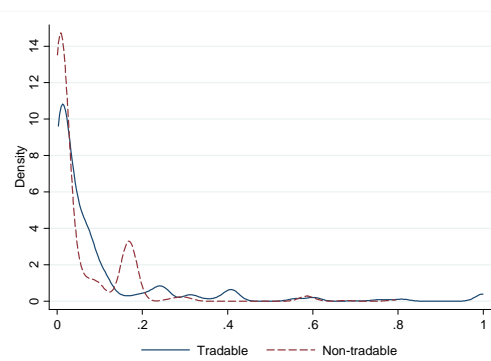
b) C10



Weighted according to GVA

c) HHI

d) C10

**Font:** Author's calculations.**Note:** Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

levels increases. This result suggests that there is a set of markets with low GVA weight and high levels of concentration. The analysis based on HHI suggests a predominance of low concentration markets, though the role of biggest firms should not be disregarded. It is important to note that the largest firms account for a significant share of total sales, especially in the tradable sector. However, this result is somewhat minimized when distributions are weighted according to GVA. That is visible in panels b) and d) of Chart 2, which plot the distribution of the share of the 10 largest firms in each market - C10. This fact should be taken into account in the competition assessment.

Market concentration trends are assessed in two ways. Firstly, the percentage of markets that record an increase in the HHI is presented for the two sample sub-periods, inferring on possible competition reductions. Secondly, the magnitude of those changes is decomposed according to classes of high, moderate and low concentration. In fact, if concentration increases in highly concentrated markets, there is an increased likelihood of collusive behaviour among incumbents. From a policy point of view, this is more worrying than when concentration increases occur in low concentrated markets.

Table 1 presents the percentage of markets that record an increase in HHI for the two sample sub-periods. Results are reported in relative terms, i.e., cases of potentially lower competition are adjusted for the total number of markets, GVA, sales or employment in the selected sector, depending on the weighting option. In the 2005-2009 period, 51 per cent of markets recorded increases in concentration. If these markets are weighted according to their GVA, sales or employment, concentration increases become significantly more relevant in the economy. For the overall economy, higher concentration is relatively widespread across markets and significant in terms of resources involved. Considering the period 2000-2004, the percentage of markets where concentration increased is lower (44 per cent), as well as the representativeness of these changes in terms of resources involved. Nevertheless, the coverage of the database in this period is much lower, which may have a particularly strong impact when concentration measures are computed. In addition, due to incomplete coverage, GVA, sales and employment weights used for 2000-2004 refer to the 2005-2009 period, implying that there is no structure effect when the two sub-periods are compared.

The results for the overall economy hide a substantial degree of heterogeneity across sectoral aggregates. In the period 2005-2009, although markets where concentration increases do not exceed 50 per cent in the non-tradable sector, the share of resources involved in terms of sectoral GVA, sales and employment is substantially higher. This means that the importance of non-tradable markets where concentration increased is higher in terms of resources involved than in terms of percentage of markets. This difference is less significant in the tradable sector. Overall, competition reductions are more significant in the non-tradable sector, though they affect a larger percentage of tradable markets.

The bottom panel of Table 1 considers a more detailed classification for non-manufacturing markets. The most striking result is in the "Construction" sector, where all markets recorded increases in HHI in the period 2005-2009. In the "Trade" sector, about half of the markets recorded increases in concentration and they represent about three quarters of resources used in the sector. In the period 2000-2004 the numbers are lower, especially for the "Trade" sector. At the opposite extreme is "Electricity and water supply", where the percentage of markets associated to higher concentration is low and totally unrepresentative in terms of resources used in this sector.

Upward concentration trends are particularly worrying if they occur in highly concentrated markets and they assume a non-tradable nature. Chart 3 breaks down increases in concentration along the three referred categories (high, moderate and low concentration) for the two sub-periods considered.

Table 1

INCREASES IN THE HERFINDAHL-HIRSCHMAN INDEX (PER CENT)								
Weight	CB (2000-2004)				IES (2005-2009)			
	Markets	GVA	Sales	Employment	Markets	GVA	Sales	Employment
Overall Economy	44	43	44	57	51	63	65	69
Aggregates								
Tradable	50	52	46	61	53	57	60	62
Non-tradable	31	37	43	53	45	67	68	76
Non-manufacturing sector								
Electricity and water supply	25	0	0	0	25	12	6	58
Construction	60	97	98	98	100	100	100	100
Trade	38	27	39	32	46	78	73	72
Transports and communications	8	21	22	54	50	42	58	72
Other services	33	47	53	36	43	51	44	47

Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

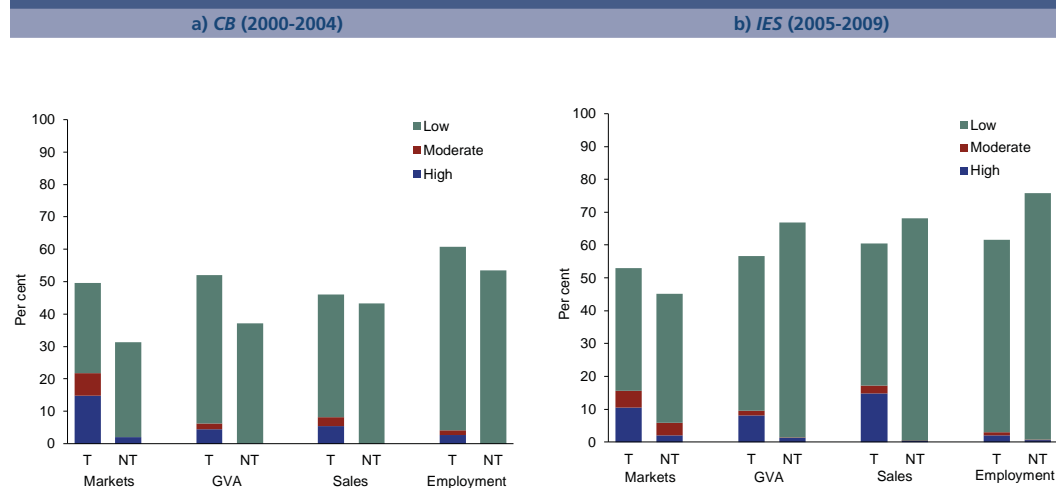
It should be noted that the decomposition within each sector does not adjust for the structure in terms of concentration categories, *i.e.*, the fact that each category has a different weight within each sector is disregarded. The aim of this analysis is to assess the relevance of competition reductions in the economy and not to draw conclusions in terms of incidence of competition reductions by concentration category. Therefore, increases in concentration occurring in highly concentrated markets are analysed, while keeping their relevance in the total distribution of markets in the sector.

Chart 3 shows that most of the markets where concentration increased present low average levels of HHI, both in 2000-2004 and 2005-2009 periods, particularly in the non-tradable sector.¹⁰ In the tradable sector, about one fifth of markets that increased concentration in the second sub-period belong to the high concentration category, being also relevant in terms of GVA and sales involved.

A complementary approach consists in computing the percentage change in the HHI for each market in the two sub-periods. Chart 4 ranks markets according to these rates of change and signals non-tradables with black bars. The first result is that both tradable and non-tradable markets stand amongst those with the highest and lowest rates of change, implying once more a very heterogeneous scenario in terms of economic activities. Several non-tradable markets stand amongst those with the lowest (negative) percentage changes in concentration in the period 2000-2004. The highest percentage increases in the 2005-2009 period are related to more capital intensive manufacturing sectors such as “Manufacturing of other chemical products” (CAE 246) but also “Manufacture of jewelery and related articles” and services like (CAE 362), “Architectural and engineering activities and related technical consultancy” (CAE 742). Strongest concentration reductions in this period include “Legal, accounting, book-keeping and auditing activities; consultancy” (CAE 741), “Manufacture of rubber products” (CAE 251) and “Forging, pressing, stamping and roll forming of metal; powder metallurgy” (CAE 284).

Chart 3

BREAKDOWN OF INCREASES IN CONCENTRATION FOR TRADABLE (T) AND NON-TRADABLE SECTORS (NT)



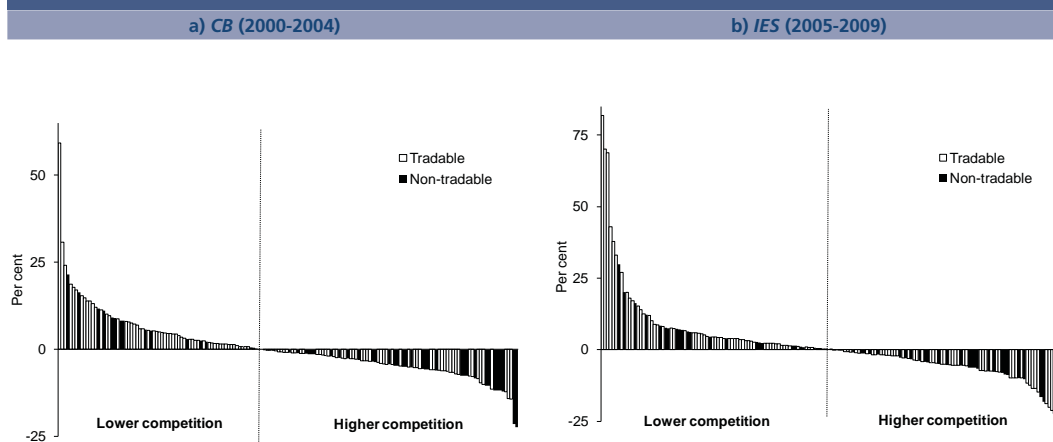
Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

¹⁰ The classification of markets bases on average levels of concentration and it is naturally affected by the change observed in the indicator. Although this option may increase the percentage of markets classified as highly concentrated, it is more robust than classifying a market basing on a single year of HHI. Robustness tests confirmed that, under the current approach, the number of markets transiting to higher categories is insignificant.

Chart 4

CHANGE OF HERFINDAHL-HIRSCHMAN INDEX BY MARKET



Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

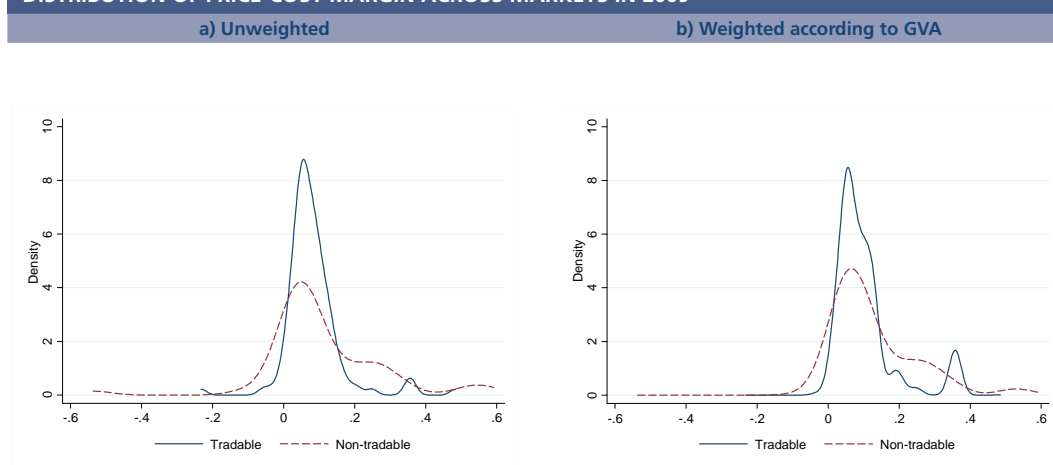
4.2. Profitability

The assessment of profitability in different markets follows the same structure adopted for concentration in the previous subsection. Chart 5 presents the PCM Gaussian kernels across markets (computed from firm-level PCM weighted according to its market share), adopting the sectoral classifications previously presented. Panel a) presents unweighted kernels and panel b) weighted kernels according to average GVA for the 2005-2009 period.

The tradable sector presents an unweighted average PCM of 8.1 per cent in 2009, which compares with 11 per cent in the non-tradable sector. The kernels for PCM suggest that the distribution is substantially more concentrated for the tradable sector, i.e., tails are heavier in the non-tradable distribution. In 2009,

Chart 5

DISTRIBUTION OF PRICE-COST MARGIN ACROSS MARKETS IN 2009



Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

90 per cent of tradable markets present PCM between 0 and 20 per cent. For non-tradable markets this density is much lower, reaching 62 per cent. There is also significant heterogeneity in PCMs across markets in the economy, mostly in the non-tradable sector. It should be noted that both tradable and non-tradable distributions remain unchanged when markets are weighted according to their GVA.

Table 2 presents the percentage of markets that registered an increase in PCM for the two sample sub-periods, signaling potential lower intensity of competition. Similarly to HHI, results are reported in relative terms and different weights are used.

In the 2005-2009 period increases in profitability are relatively generalized across markets (46 per cent) and significant in terms of resources (57, 57 and 52 per cent of GVA, sales and employment, respectively). For the overall economy, the main difference regarding concentration measures is that increases in market profitability are relatively less widespread across markets and less relevant in terms of GVA, sales and employment. In sectoral terms, in the 2005-2009 period, the percentage of non-tradable markets that registered an increase in PCM is higher than in the tradable sector. It is also more significant in terms of resources involved. In fact, 59 per cent of non-tradable markets record an increase in PCM, in contrast with 41 per cent in the tradable sector. In terms of resource allocation, non-tradable markets where profitability increased during the 2005-2009 period account for about two thirds of GVA, sales and employment in this sector. In contrast, only around 40 per cent of GVA, sales and employment in the tradable sector showed increases in PCM.

The analysis of the first sub-period shows a similar pattern, though the percentage of markets and the share of resources associated to tradable markets where profitability increased is higher. Similarly to concentration, average weights for 2005-2009 were used to aggregate profitability increases in the 2000-2004 period, eliminating the structure affect. It should be recalled that under *IES* market weights are based on the universe of firms, thus adequately reflecting the actual productive structure.

The bottom panel of Table 2 considers a more detailed sectoral classification for the non-manufacturing sector. Similarly to concentration measures the most striking result concerns the "Construction" sector, where all markets recorded increases in PCM in the period 2005-2009. In "Electricity and water supply" and "Other services" higher profitability is prevalent, suggesting lower competition. However, in the latter sector the share of resources involved is comparatively smaller. In the first sub-period, the "Construction" sector shows a lower percentage of markets with increases in profitability, though the percentage of GVA, sales and employment is already very high.

Table 2

INCREASES IN PRICE-COST MARGIN (PER CENT)								
Weight	CB (2000-2004)				IES (2005-2009)			
	Markets	GVA	Sales	Employment	Markets	GVA	Sales	Employment
Overall Economy	50	59	54	64	46	57	57	52
Aggregates								
Tradable	46	51	50	54	41	44	42	37
Non-tradable	59	64	57	71	59	67	65	64
Non-manufacturing sector								
Electricity and water supply	75	21	19	64	50	91	87	93
Construction	40	92	95	91	100	100	100	100
Trade	46	41	45	37	50	55	56	48
Transports and communications	58	72	61	33	42	39	39	65
Other services	67	60	58	77	67	73	82	45

Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

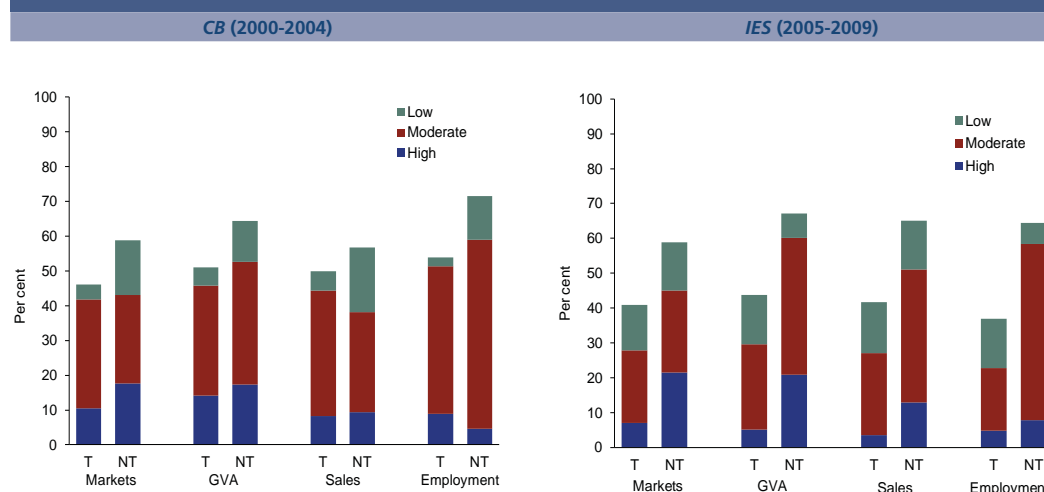
Similarly to concentration measures, it is important to break down the changes in market PCM according to average profitability categories, while keeping in mind the remarks on the interpretation of results. In this case, low, moderate and high profitability were defined, according to the 25th, 50th and 75th percentiles of the 2000-2009 overall PCM distribution (low profitability: $PCM < 4.6\%$, moderate: $11.8\% \geq PCM \geq 4.6\%$, high: $PCM > 11.8\%$). In this sense, increases in profitability in highly profitable markets may signal a stronger probability of collusive behaviour among incumbents, thus deserving more concern from a policy point of view. High PCMs are generally associated to markets with higher sunk costs and, consequently, higher entry barriers.

Chart 6 presents this breakdown and shows that, in both subperiods, the increase in profitability takes place mostly in moderately profitable markets. Nevertheless, there is a significant percentage of non-tradable markets where these changes are associated to cases of high average profitability, especially in the period 2005-2009 and involving an important share of this sector's GVA.

Profitability trends by market were estimated for the period 2000-2009. Although there is a break in series due to the different coverage of *CB* and *IES* databases, if it is assumed that *CB* is representative by market, it is possible to compute trends for the overall period.¹¹ Chart 7 ranks estimated profitability trends using PCMs, identifying those with a 10 per cent level of significance with light grey bars. It is particularly striking that a larger percentage of non-tradable markets present positive and significant profitability trends when compared with tradable markets (44 and 29 per cent, respectively), which confirms the analysis carried out above. In addition, only 56 per cent of non-tradable sectors record a negative profitability trend, as opposed to 71 per cent in tradable markets.

Chart 6

BREAKDOWN OF INCREASES IN PROFITABILITY FOR TRADABLE (T) AND NON-TRADABLE SECTORS (NT)



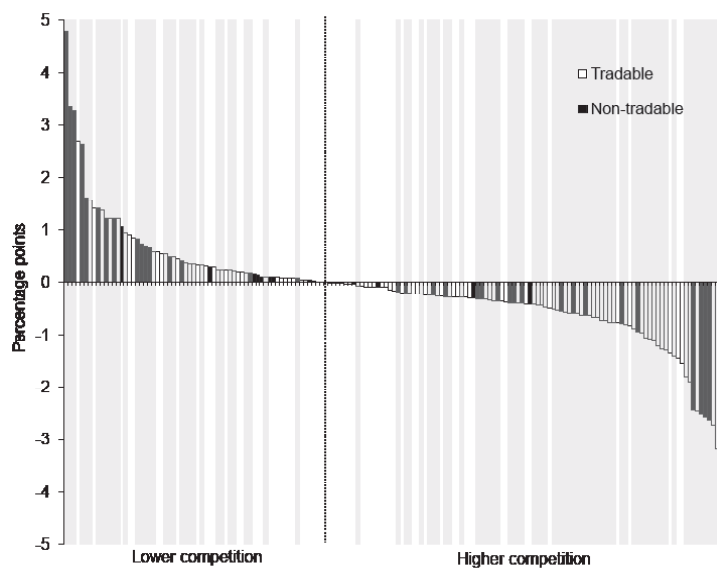
Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

¹¹ Concentration trends were not estimated for the overall period because the break in the database severely affects the level of the HHI. Trends were computed using Newey-West standard errors assuming first order autocorrelation. Note also that PCM series may be non-stationary but the low numbers of degrees of freedom do not allow to test or correct for potential integration.

Chart 7

PRICE-COST MARGIN TRENDS BY MARKET (2000-2009)



Source: Author's calculations.

Note: Markets are defined using 3 digit level in CAE 2.1. The total number of markets considered is 166.

5. Market aggregates

Competition can only be adequately assessed at market level. In addition, HHI and PCM levels are not directly comparable across sectors due to, for instance, technological differences. Nevertheless, it is useful to compute aggregate competition measures both for policy analysis and calibration of macroeconomic models. Three levels of aggregation are considered: total economy; broad sectors; and tradables vs non-tradables. The variable used for aggregation was the GVA share for the average of the period 2005-2009, thus eliminating effects coming from changes in the structure of the economy. Other weighting possibilities include sales or employment.

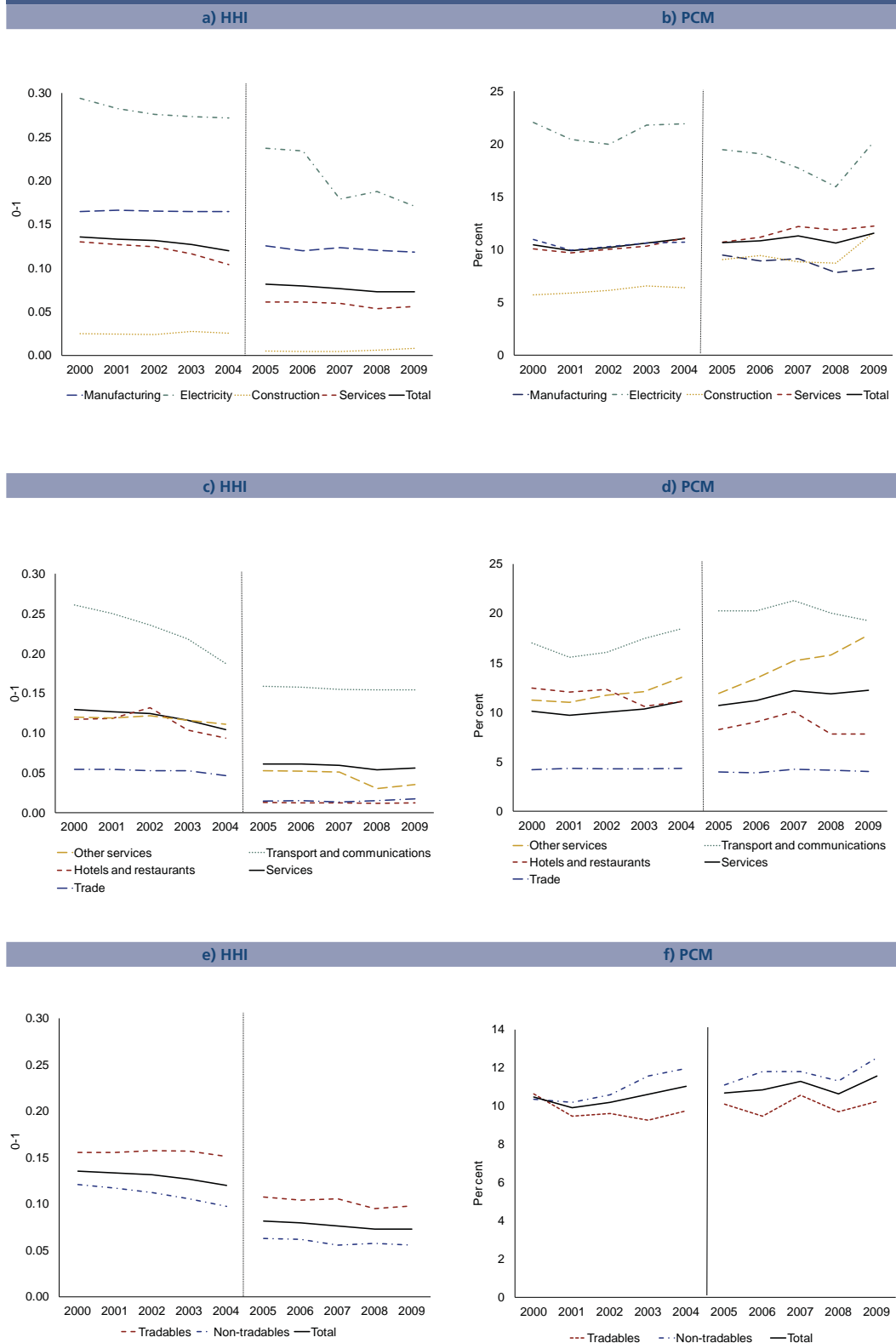
The aggregation based on sales is frequently used in the literature, having the advantage of chaining with the aggregation of firms in a market. The disadvantage of this option is the non consideration of the true relevance of markets for each sector, overstating a decrease in competition in a sector of high sales but very little GVA or employment. Nevertheless, it should be noted that the relevance of each market in terms of competition may not be truly perceived through its GVA share. In fact, specific markets with low GVA share can be extremely relevant as they may be important inputs in other markets. If the aggregation were based on sales, results would be very similar except for tradable and non-tradable sectors. In these sectors average profitability rates in the period 2005-2009 would be 8.4 and 7.9 per cent, respectively, against 10.0 and 11.7 per cent using GVA. In this period, total PCM in the economy with an aggregation based on sales would be 8.1 per cent. In any option the annual path of PCMs is qualitatively similar because fixed weights are used in the aggregation.

Chart 8 presents the results obtained for HHI and PCM, respectively.¹² As mentioned before, levels of concentration and profitability indicators reflect not only competition but also a set of market features such as technology, sunk costs, elasticity of substitution, elasticity of demand and exposure to international trade.

¹² Given the existence of a series break in 2005, due to a change in coverage associated with the transition from CB to IES database, a blank is inserted in this year.

Chart 8

AGGREGATE CONCENTRATION (HHI) AND PROFITABILITY (PCM) (2000-2009)



Panels a), c) and e) present the HHI at the aggregate sectoral level. Panel a) reveals that there are substantial differences in concentration measures across sectors, reflecting different market structures. The "Construction" and "Services" sectors are the least concentrated, while "Electricity" and "Manufacturing" stand among the most concentrated. At the services level (panel c), "Trade" and "Hotels and Restaurants" present a strongly fragmented market structure, as opposed to "Transports" and "Communication". Considering the tradable vs non-tradable distinction (panel e), it is clear that there are no visible trends in the evolution of concentration but the level of the HHI is higher in the former group. As previously mentioned, HHI levels are less informative in the case of the tradable sector as the relevant market is likely not to coincide with the internal market.

Panels b), d) and f) present the PCM at the aggregate sectoral level, following the structure and aggregation weights mentioned previously for the HHI. The PCM for the overall economy stood at near 11 per cent in the 2005-2009 period (panel a). The "Construction" and "Services" sectors recorded increases in PCM from 2005 to 2009, suggesting lower competition (panel b). In the 2000-2004 period a similar trend seems to exist. On the contrary, the "Manufacturing" sector shows a declining PCM in the period 2005-2009.

Considering a more disaggregated classification at the services level (panel d), it is visible that higher profitability is only sizeable in "Other business services" in the period 2005-2009 and in "Hotels and restaurants" between 2005 and 2007. Finally, given the criteria used for classifying tradable and non-tradable sectors, panel f) shows that the latter group of sectors increased profitability, while the tradable sector recorded a stabilization. This led to a slight increase in the overall economy in the period 2005-2009. In the 2000-2004 period an increase in profitability seems to have occurred in both sectors.

6. Concluding remarks

This article provides an overview of competition indicators in the portuguese economy in the period 2000-2009. The existence of a break in the database in 2005 leads to a segmentation of the analysis for the periods 2000-2004 and 2005-2009. This article covers classical concentration and profitability measures, focusing on the differences between the tradable and non-tradable sectors. The analysis carried out is distinct from that of competition authorities. These institutions accurately define the relevant markets and characterize firm's competitive behaviour, while our purpose is to establish an overall competition scenario.

The article concludes that, although there are no widespread problems, some markets offer large room for improvements in the competition environment, notably in the non-tradable sector. Around half of the markets in the economy record increases in concentration or profitability. More importantly, in terms of GVA, sales or employment involved in these markets, positive profitability and concentration trends turn out to be more relevant.

Positive concentration trends are more widespread in the tradable sector than in the non-tradable sector, though in this latter case they are more significant in terms of resources involved. In addition, markets where concentration increased are mostly those with low average levels of HHI, both in the 2000-2004 and 2005-2009 periods, especially in the case of the non-tradable sector.

Regarding profitability, positive trends are more widespread in the non-tradable sector than in the tradable sector. Similarly to concentration, the share of resources involved in these trends is relatively more relevant in the non-tradable sector. Another important result is that there are several non-tradable markets amongst those with high PCM and many of them recorded increases in profitability in the period 2005-2009. In addition, many of these markets also recorded increases in the PCM in the period 2000-2004.

The aggregate sectoral analysis, weighting individual market indicators according to their average share on total GVA, suggests that the non-tradable sector increased profitability while the tradable sector

recorded a virtual stabilization, leading to a slight increase in the PCM for the overall economy in the period 2005-2009. This conclusion seems to confirm the notion that there is substantial room to improve competition in the non-tradable sector, which would allow for a more efficient allocation of resources, favouring the correction of macroeconomic imbalances existing in the Portuguese economy.

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