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Competition and Inflation in Central, Eastern and Southeastern Europe: A Sectoral Analysis

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Competition and Inflation in Central, Eastern and Southeastern Europe: A Sectoral Analysis[1]

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Abstract

Using the Amadeus firm-level database, this paper examines sector-specific competition in a number of Central, Eastern and Southeastern European (CESEE) countries and it's impact on price developments. More specifically, the paper provides an overview of two key indicators of the level of competition, namely returns on assets (RoA) and the concentration of sales, across 20 industries in 11 CESEE countries.[3] We find large differences in these indicators between individual sectors, while differences between countries are considerably smaller. Over time, profit margins have increased in most sectors as a result of the rapid catching-up process in the CESEE region, while concentration ratios have declined, suggesting that the region was during the period covered in this paper (1999-2007) still in a phase of rapid market expansion. Using sector-specific inflation equations we find that the intensity of competition as measured by the RoA has a significant impact on HICP inflation in a number of sectors. Notably the results for the sectors 'food & beverages' as well as 'housing & utilities' warrant particular attention. Enhancing the level of competition in these sectors may help to (at least temporarily) reduce consumer price inflation in the region.

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[1] This article draws partly on Feldkircher, M., R. Martin and J. Wörz, 2010, Measuring Competition in CESEE: Stylised Facts and Determinants across Countries and Sectors, in: Focus on European Economic Integration Q3/10, OeNB, 38-62.
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[3] Please note that we use the notions "intensity," "degree" and "level" of competition interchangeably throughout this study.

1) Introduction

Economic theory suggests that competitive markets exert a positive influence on the economic development of countries. Competitive markets encourage the entry of new firms and act as a powerful selection mechanism for existing companies, ensuring that only the most efficient survive. As argued by Schumpeter back in 1942, incumbent firms with market power are constantly threatened by existing competitors as well as new market entrants. Given this permanent threat of competition, firms need to innovate, which in turn spurs productivity growth. Competition thus improves the allocation of production factors across and within sectors, creates powerful incentives for innovation and productivity growth and ultimately contributes to economic growth. Hence, economic policymakers have strong incentives to ensure a highly competitive environment. This is further corroborated by the view that highly competitive markets will also ensure that consumer needs are served best through an appropriate product range, high-quality products and services, and low prices. It is therefore no surprise that competition policy plays an important part in the economic policy framework of most countries and of the EU.

In principle, the positive effects of competition on economic growth apply to all economies. As far as Central, Eastern and Southeastern European (CESEE) countries are concerned, however, there are some special aspects. First, most CESEE countries are (very) small and open economies. In particular in the non-tradable sectors, where outside producers cannot increase the level of domestic competition via imports, the number of companies is likely to be limited which increases the danger of oligopolistic or even monopolistic market structures. At the same time the openness of the economies makes them particularly vulnerable to external price shocks such as changes in global food and energy prices. In fact, the recent experience shows that inflation dynamics in the CESEE countries are more strongly affected by such external shocks than e.g. the inflation dynamics in the larger and more closed euro area. Second, the economic "starting point" of all CESEE countries 20 years ago was characterized by state-owned monopolies. Unlike countries with an uninterrupted capitalist history, the CESEE countries had to (re-)create competitive market structures and functioning competition policies from scratch, a process which was (and in some cases still is) driven by the process of their accession to the EU and the associated adoption of the *acquis communautaire*.

The existing literature on competition in CESEE is rather limited. Moreover, some of the papers focus on competition policy and the impact of competition on economic performance. Hölscher and Stephan (2004), for example, provide an overview of the state of competition

policy in a number of CESEE countries prior to their accession to the EU. Vagliasindi (2006) analyzes the link between competition policy and the intensity of competition in CESEE. The author uses survey results to assess the implementation of competition policy as well as the intensity of competition. A key finding of the paper is that the implementation of competition policy has a significant positive impact on the intensity of competition. At the same time, Vagliasindi argues that privatization helps create functioning markets only if it is accompanied by suitable institutional reforms.

A number of papers look at the link between competition and economic performance. Djankov and Murrell (2002) survey the available literature on the impact of product market competition on enterprise efficiency in transition economies and find that in Eastern European countries, product market competition – through both domestic and import competition – has a significant effect in terms of improving enterprise performance.[4] Carlin, Schaffer and Seabright (2004) find that monopolies in transition countries innovate less and grow more slowly than firms facing at least a minimum of rivalry. The authors also argue that the presence of only a few rivals enhances firm performance more than the presence of many competitors. The evidence they present for the second finding is, however, empirically weaker. The authors use the results of the cross-country Business Environment and Enterprise Performance Survey (BEEPS), in which firms were asked, inter alia, to provide a self-assessment of the intensity of competition that they are facing.[5] Using the same database, Commander and Svejnar (2007) find that competition (as well as foreign ownership) has a positive impact on firms' performance, defined as the level of sales, controlling for inputs. Fernandes (2009) looks at the structure and performance of the services sector in transition economies. Using EBRD transition indices, she finds a positive and significant impact of liberalization on productivity growth in services sectors and in downstream manufacturing industries.[6] Gradzewicz and Hagemejer (2007) argue that both domestic competition and foreign competition (imports) significantly lower the level of markups. Their measure of domestic competition is the Herfindahl index of market concentration. Ospina and Schiffbauer (2010), using firm-level data from the World Bank Enterprise Survey, find that competition has a positive impact on firm productivity.[7]

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[4] They also find, however, that increased competition may have negative effects on efficiency when incentives are weak, as was often the case during the early transition period (Djankov and Murrell, 2002, p. 763).

[5] Specifically, firms were asked to report the number of competitors in the market for their main product, the expected impact of a price increase by 10% and their price-cost margin (Carlin, Schaffer and Seabright, 2004, p. 16).

[6] Campos and Coricelli (2002) provide a useful overview of the impact of liberalization and institutions on growth in transition.

[7] Like the BEEPS indicator of competition intensity, the World Bank survey is based on firms' self-assessment.

There are very few studies that examine the link between competition and inflation. Cavelaars (2003) finds that the average markup (proxied by the inverse of the wage share in GDP) is a significant explanatory variable for inflation across a sample of 21 countries during the period 1988-2000. Przybyla and Roma (2005) conclude the markups significantly influence average inflation across 14 sectors in 8 EU countries during the period 1980-2001. The significance of their results depend, however, on the precise definition of their markups. Janger and Schmidt-Dengler (2010) find that stronger competition (also proxied by markups) tends to reduce in particular the variability of the price level whereas the negative impact of competition on inflation holds only for some of the time periods that they cover.

To the best of our knowledge, no paper has yet systematically examined the country- or sector-specific differences in indicators for the intensity of competition in CESEE. In addition, the link between competition and inflation has not been systematically analyzed for the CESEE countries. Against this backdrop, in this paper we use the Amadeus firm-level database to provide an overview of two key indicators of the intensity of competition that are commonly used in the literature, namely returns on assets (RoA) and the concentration of sales, across 20 sectors in 11 CESEE countries.[8]

In the next section, we discuss conceptual issues related to the measurement of competition and explain our selection of competition indicators. Section 3 provides an exposition of the database and describes the level of competition in our sample across different sectors and countries as well as changes in the level of competition over time. Section 4 presents an empirical investigation of the link between our selected indicators of competition and sectoral inflation developments. Section 5 concludes.

2) Measurement Issues

Despite the considerable interest by economic policy-makers in competition issues, there is a clear lack of theoretically sound and empirically viable concepts and data to measure the intensity of competition. Choosing suitable indicators for the analysis of competition intensity thus involves difficult choices and compromises. The two groups of indicators most commonly used in the literature are concentration measures (e.g. sales or employment concentration) and profit indicators (e.g. RoA or profit margins).[9] In either case the

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[8] Bulgaria (BG), the Czech Republic (CZ), Estonia (EE), Croatia (HR), Hungary (HU), Lithuania (LT), Latvia (LV), Poland (PL), Romania (RO), Slovenia (SI) and Slovakia (SK).
[9] A more recent study focusing on the measurement of competition is Creusen et al. (2006), using four measures of competition. The authors find that the different indicators frequently contradict each other as regards changes in the intensity of competition over time, since they respond differently to a reallocation of output from inefficient to efficient firms. The vast majority of the studies on the link between product market competition

interpretation of the level of and changes in these indicators is, however, not free of theoretical ambiguity. A relatively high level of RoA would e.g. a priori indicate relatively less intense competition. At the same time very low or negative RoA may indicate predatory behavior of (some) market participants, i.e. (excessively) intense competition. In addition, RoA levels depend strongly on industry-specific characteristics and RoA tend to increase over time due to higher cost-effectiveness of surviving firms without a detrimental effect on competition.

Lower concentration as a result of lower entry barriers to a market would normally be seen as indication for an increase in competition. However, when firms in a market act more aggressively, thus driving out less efficient firms, the subsequent rise in concentration would not automatically imply less competition. This behavior was e.g. recently observed in the telecommunication sector in many Western European countries. A rise in competition tends to increase the market share of more efficient firms. This reallocation effect may even lead to a counterintuitive positive correlation between concentration and competition as well as between profit margins and competition.

This brief discussion makes clear that the interpretation of the standard indicators of the intensity may yield misleading results. In order to reduce (although not eliminate) this risk we use two alternative indicators of competition in our descriptive analysis, namely RoA and sales concentration. For the empirical analysis on the link between competition and sector-specific inflation, however, we focus on the arguably more powerful indicator of these two indicators, namely RoA.[10]

Looking at the two indicators of competition in combination yields four different scenarios (see Chart 1)

First, if RoA and the concentration index are both low, it is likely that the intensity of competition in the market concerned is strong. Conversely, if both measures are high it is likely that the intensity of competition is low. The two 'mixed' scenarios are obviously more difficult to interpret. On balance, however, it would appear more likely that a low RoA indicates relatively strong competition even if the concentration in the relevant sector is high and vice versa.

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and enterprise restructuring surveyed in Djankov and Murrell (2002) use, however, only one indicator of competition, usually a concentration measure such as sales concentration.
[10] This is due to the fact that more recently and based on theoretical considerations profit indicators such as RoA are by and large seen as the relatively more important indicator of competition, although the above-mentioned caveats in interpretation still apply (Janger and Schmidt-Dengler (2010), Boone (2004)).

Chart 1: Combined interpretation of key competition indicators

Concentration   index
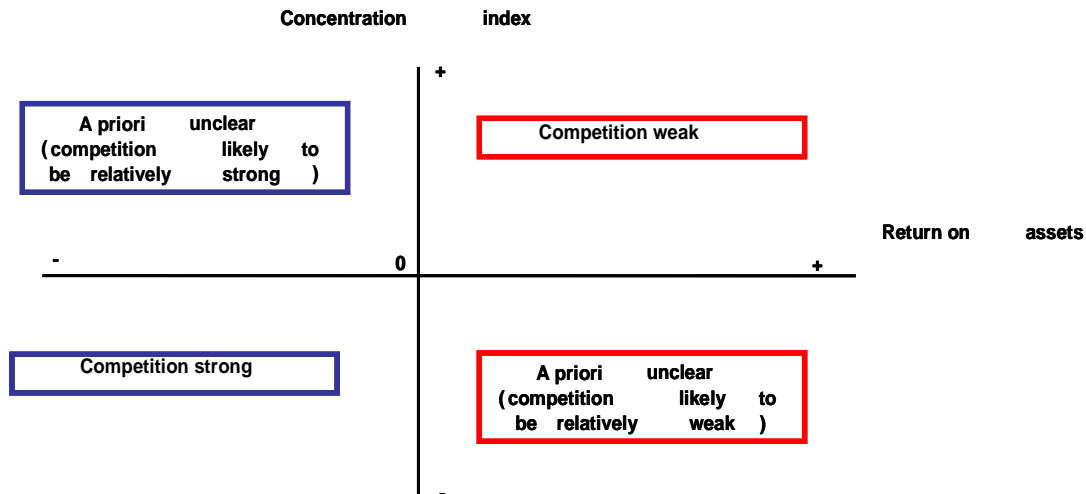
- Both indicators used for the descriptive analysis are calculated from the Amadeus database.[11] The sectoral RoA is defined as profit and loss before taxes over total assets (fixed and current) in per cent: $RTAS = \left(PLBT \middle/ TOAS \right) * 100$

- The Herfindahl index on sales for a given sector is defined by the sum of the squared market shares: $\sum_{j=1}^{N} s_j^2$ with s_j denoting firm j's share of sales in total industry sales ($a_j / \sum_{j=1}^{N} a_j$) and N the number of firms operating in the respective industry sector. For both indicators, lower levels are associated with a higher intensity of competition in the market.

The sector breakdown we use in this paper is guided by two main considerations: First, we wanted to aggregate firms according to the distance from the final consumer at which they operate. Thus, we distinguish between manufacturing sectors, wholesale trade sectors, retail trade sectors and consumer services.

1. Manufacturing (group M, containing three sectors)
2. Wholesale trade (group HH, containing seven sectors)
3. Retail trade (group HR, containing seven sectors)
4. Consumer services (group H, containing three sectors)

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[11] Standardized accounting and disclosure rules, which cannot automatically be assumed for data in the Amadeus database, are crucial for cross-country comparisons. A further caveat are changes over time in the firms included in the database, which in turn affects the indicators of competition we use. That said, a comparison of the coverage of employment in Amadeus with employment data provided by Eurostat suggests that the employment coverage is fairly good for most countries. There is no obvious data source against which the representativeness of the RoA or sales concentration data contained in Amadeus can be checked. However, the strong correlation between employment and sales-based Herfindahl indices suggests that Amadeus sales data are also fairly representative.

Second, we wanted to arrive at a classification which could be matched as closely as possible to subcomponents of the Harmonised Index of Consumer Prices (HICP). Out of the 20 sectors that are analysed in this paper we have 12 HICP-compatible activities, of which 8 are counted separately at the wholesale and retail level.

In addition, the choice of sectors was also determined by data availability and we excluded a number of sectors where the government is expected to have a major impact on competition intensity, e.g. public services and education.[12]

3) Stylised facts on Returns on Asset and sales concentration in CESEE

This section provides stylized facts on the intensity of competition across countries and sectors as well as changes in intensity over time. More specifically, the section identifies those sectors or countries where the selected indicators for competition intensity are particularly high or low relative to other sectors or countries.

Charts 2 and 3 show country-by-country box plots of RoA and the Herfindahl sales concentration index for the period from 1999 to 2007 for the 20 above-mentioned sectors. The box plots show the minimum, 25% quartile, 50% quartile, 75% quartile and the maximum value of the underlying distribution. Observations falling above or below 1.5 times the interquartile range are marked as outliers.

The RoA box plot (Chart 2) suggests that in most CESEE countries covered in this paper the distribution of RoA is fairly concentrated. To some extent Estonia (on the upside) and Slovenia (on the downside) may be seen as exceptions. In addition, the spread across sectors seems particularly pronounced in Slovakia. The sector-specific outliers are concentrated in a few sectors, namely communication (H08), retail sales of miscellaneous goods and services (HR12) and retail sales in the recreation and culture sector (HR09).

Looking at the concentration of sales, Chart 3 shows that that also for this indicator the differences across countries are not very pronounced. Concentration levels in Lithuania, Slovakia and Slovenia tend to be on average somewhat higher that in most countries and the sales concentration in Romania tends to be somewhat lower. In addition, in a number of CESEE countries sales in the communication sector (H8) are highly concentrated relative to other sectors.
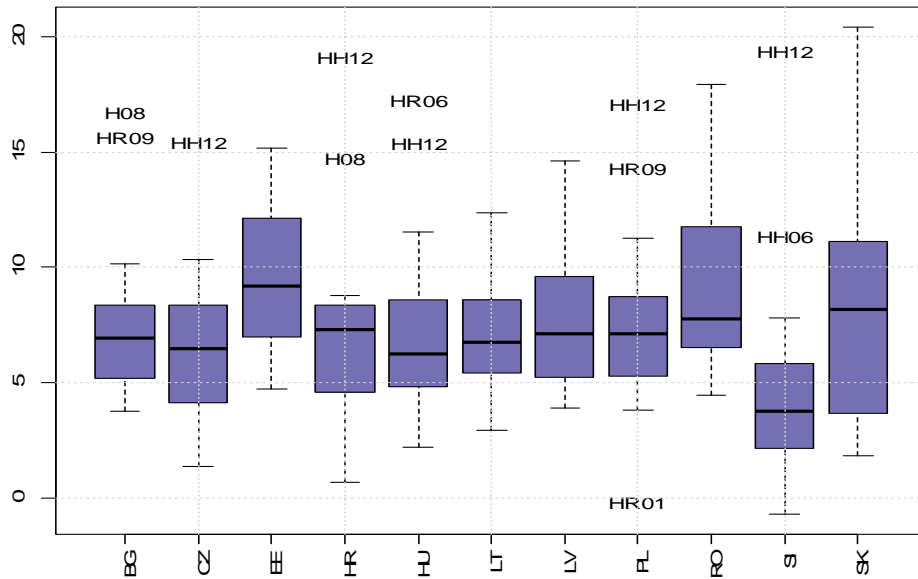
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[12] We also excluded agriculture, forestry, mining and quarrying given their diminishing economic importance. The annex gives a complete list of all sectors used in the analysis.
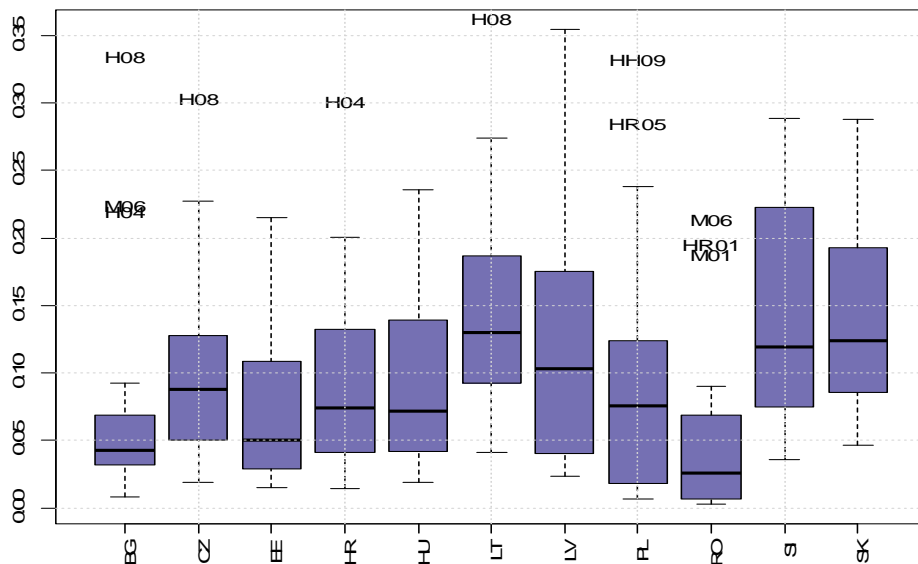
Chart 2

Distribution of Return on Assets across Countries (1999-2007)

Source: Authors' calculations.

Chart 3

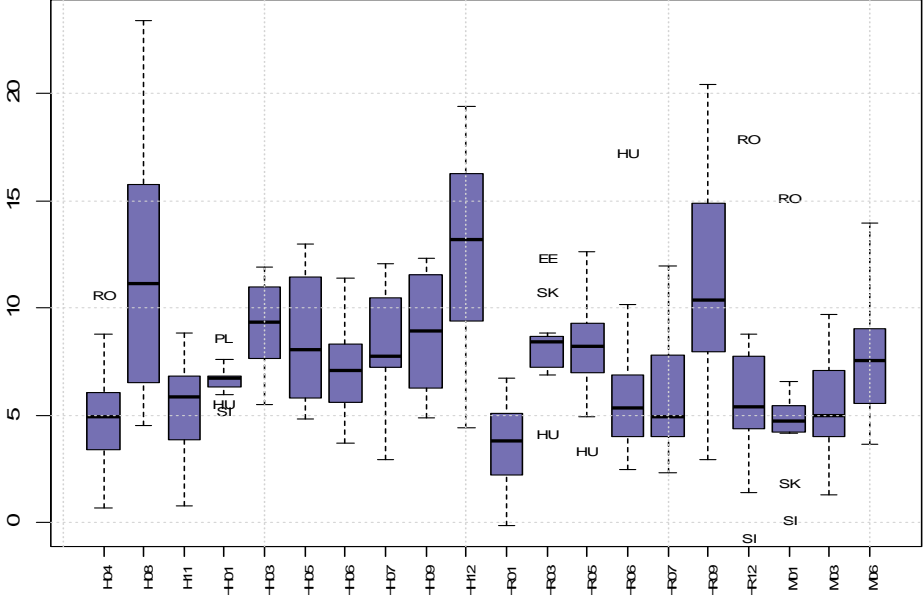**Distribution of Sales Concentration across Countries (1999-2007)**

Source: Authors' calculations.

Charts 4 and 5 present the two indicators for competition from a sectoral perspective,. Examining first the distribution of RoA across sectors (Chart 4) confirms some of the findings outlined above. The communication sector (H08) and the two retail sectors 'sales of

miscellaneous goods and services' (HR12) and 'recreation and culture' (HR09) are again the sectors with the largest variation in RoA as well as the highest average RoA Romania appears to be an (upward) outlier in a number of sectors.
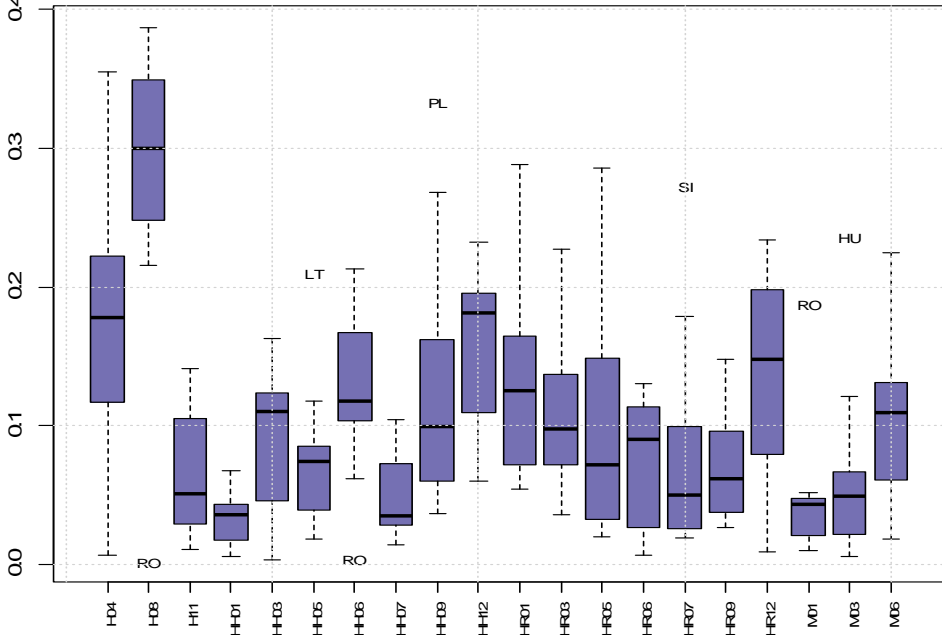
Chart 4

Distribution of Return on Assets across Sectors (1999-2007)

Source: Authors' calculations.

Chart 5

Distribution of Sales Concentration across Sectors (1999-2007)
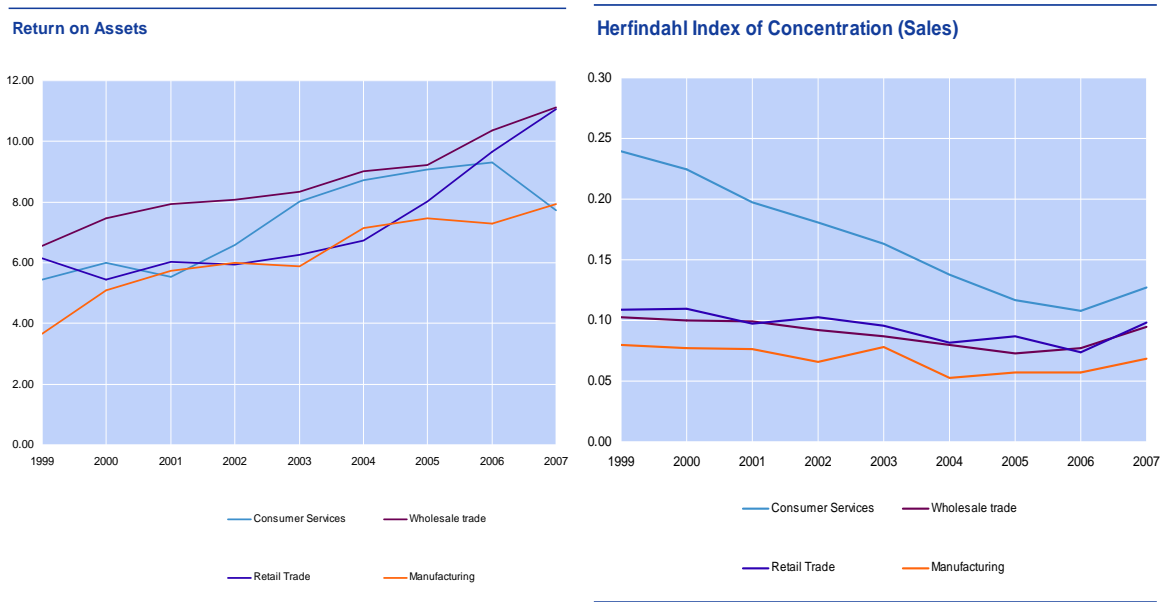

Source: Authors' calculations.

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The sales concentration index across sectors (Chart 5) shows a particularly high level of concentration and/or an above-average degree of dispersion in the housing (H4), the wholesale and retail sectors 'miscellaneous goods and services' (HH12 and HR12) and – above all – in the communication sector (H8) There is no clear picture as regards country outliers. Romania appears three times as an outlier, twice on the lower and once on the upper end of sales concentration scale.

Besides looking at the distribution of the two indicators for competition across countries and sectors, it is also interesting to see how they have evolved over time and whether there are large variations between the different sector groups. Chart 6 thus provides an overview of the evolution of RoA and sales concentration ratios for different sector groups.

Chart 6: Evolution of the two competition indicators, 1999-2007.

Source: Authors' calculations.

Overall there is a clear increase in RoA across all sector groups, which seems to have accelerated towards the end of the observation period. This is possibly due to the strong growth and catching up process in the CESEE countries during these years. The level of RoA remained the highest in the wholesale trade sector group followed during most of the period by the consumer services sector group. RoA in manufacturing remained persistently the lowest. The Herfindahl sales concentration index declined in all sector groups during most of the period under review, in particular in consumer services.

In order to bring out changes in these indicators which are largely unrelated to the catching-up process, we subtract in Chart 7 for each sector the average change in RoA and sales concentration.

Chart 7: Relative changes in key competition indicators.

Source: authors' calculations. Note: Sector-specific deviations from the average change in return on asstes and the concentration index between the periods 1999–2001 and 2005–2007; see table A2 for a description of sector codes used here.
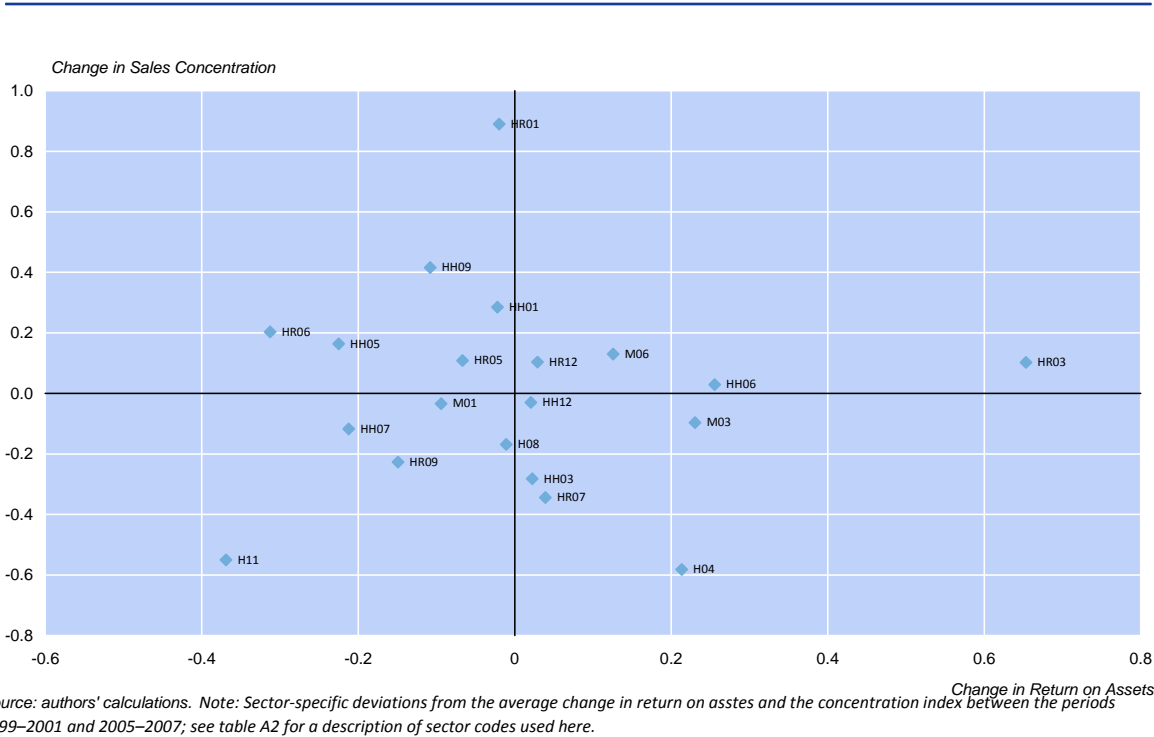
Source: Authors' calculations.
Note: Sector-specific deviations from the average change in profit margins and the concentration index between the periods 1999–2001 and 2005–2007; (M) denotes manufacturing, (W) wholesale trade and (R) retail trade.

The result suggests that half of the sectors experienced a decrease in RoA over the period since 1999 relative to the general upward trend in RoA. At the same time half of the sectors experienced an increase in sales concentration despite the general downward trend in this indicator during the 1999-2007 period. The typology presented in Chart 1 above would suggest that in around half of the 20 sectors the intensity of competition has either clearly increased (production of food & beverages, freight transportation, retail trade in the recreation & culture sector, restaurants & hotels as well as communication) or decreased (production of chemicals & pharmaceuticals, the wholesale health sector and the retail sectors for clothing & footwear as well as miscellaneous goods and services). For the other half the chance is ambiguous with one indicator suggesting an increase in the level of competition and the other suggesting a decrease.

Overall, a number of stylized facts emerge from the descriptive analysis. First and foremost, the variation in the competition indicators is much more pronounced across sectors than across countries, which is why the subsequent empirical analysis on the link between competition in price developments is based on a sectoral rather than a country-specific analysis. Second, a number of sectors appear to be outliers as regards their competition

indicators, notably communication, housing and miscellaneous goods and services. These sectors are characterized by large sales concentration and/or higher RoA, suggesting a more limited intensity of competition than in other sectors. Over time, RoA levels tended to increase, whereas sales concentration rates tended to decline during the observation period. Looking at the two indicators of competition in combination, various sectors display a pattern that diverges from this trend, reflecting great sectoral heterogeneity in the evolution of the intensity of competition during the observation period.

4) Competition and consumer price developments

This section of the paper looks at the link between competition and consumer price developments. Although inflation is a monetary phenomenon in the long run, other factors (such as variations in aggregate demand, technological changes or commodity price shocks) influence consumer price developments over shorter horizons. One such factor influencing consumer prices can be the intensity of competition. More specifically, so-called "market power inflation" occurs when firms operate in an environment that is characterized by a lack of competition (e.g. in monopolistic markets or via collusion with competitors). A positive correlation between our competition indicators and inflation can thus be interpreted as evidence for market power inflation in our sample.

In order to test empirically for the link between the intensity of sector-specific competition and sectoral price developments, we specify simple sector-specific regression models for HICP inflation. Our dependent variable is the sector-specific HICP inflation rate, which we regress on key 'standard' determinants of inflation (lagged inflation, the output gap, the growth rate of M3), aggregate and sector-specific cost variables (oil prices, material and staff costs) and the log of RoA as our preferred measure of competition intensity. In addition, we include a number of other control variables like industrial sentiment and the industry size. Our empirical model is given in equation 1:

$$Inf_{ikt} = \alpha + \gamma * Inf_{ikt-1} + \beta_1 * gap_{it} + \beta_2 * m3_{it} + \beta_3 * oil_t + \beta_4 * isi_{ikt} + \beta_5 * size_{ikt} + \\ \beta_6 * material_{ikt} + \beta_7 * staff_{ikt} + \beta_8 * RoA_{ikt} + \varepsilon_{ikt}$$

(1)

Equation (1) is estimated separately for each sector, whereby inflation (Inf_{ikt}) is measured by the corresponding HICP subcomponent, being most closely related to the economic activity under consideration. As mentioned above, we can distinguish between competition at the

wholesale versus retail level for seven of the twelve subcomponents, thus giving us 20 individual sectors for which we have a measure of HICP inflation and competition.

We chose to work with a dynamic estimation method, using the 1-step GMM estimator as proposed by Arellano and Bond (1991). This allows us to identify the long-term relationship between competition and inflation and to control for country specific fixed effects.[13] We present the results for those sectors which show a significant relationship between our competition variable (RoA) and inflation in Table 1 below. The regression statistics confirm our choice of a dynamic specification. In all sectors apart from chemicals and freight transport the AR(1) test on the inclusion of the first lag of the endogenous variable is highly significant while the AR(2) test is usually insignificant pointing towards a high persistence of inflation.

Table 1: Inflation and competition intensity

	Production: Textiles, clothing, leather	Chemicals, pharmaceuticals, rubber and plastics	Housing, water, gas, other fuels	Freight transport	Retail: Food and non-alcoholic beverages	Retail: Clothing and footwear	Wholesale: Furnishing, household equipment, routine maintenance of house	Retail: Furnishing, household equipment, routine maintenance of house	Wholesale: Recreation and culture
lagged inflatio	0.922	-0.190	0.415	0.042	0.357	0.754	1.024	1.024	0.486
	8.94	-2.03	4.31	0.5	1.96	7.15	8.7	8.04	2.98
output gap	-0.061	-0.431	0.731	-0.553	-0.640	0.113	-0.005	-0.108	-0.191
	-0.28	-1.09	2.27	-2.25	-2.47	0.56	-0.03	-0.93	-1.48
M3	0.035	0.009	-0.017	0.062	0.095	0.079	0.041	0.046	0.111
	1.22	0.1	-0.27	1.12	1.26	3.64	1.29	1.58	2.03
Oil price	0.008	0.119	0.046	0.127	0.183	0.030	0.061	0.046	0.004
	0.16	1.2	0.51	2.77	6.07	0.76	3.06	1.91	0.11
Industrial sent	0.111	0.013	-0.348	-0.073	0.188	0.224	-0.079	-0.069	-0.001
	1.24	0.06	-2.59	-0.88	1.89	1.97	-1.18	-1.73	-0.01
industry size	0.987	-10.003	-4.937	-0.561	-11.146	-3.146	2.746	-1.390	-0.017
	1.85	-1.88	-1.5	-0.43	-2.94	-15.92	1.6	-1.7	-0.02
material costs	0.478	1.190	2.414	0.242	0.308	0.229	-0.630	-0.074	0.465
	1.18	1.39	5.71	0.27	0.58	2.23	-1.78	-0.16	1.24
staff costs	-1.158	4.848	3.715	-0.556	8.773	2.710	-1.377	2.361	-1.116
	-1.51	1.94	1.01	-0.47	2.74	9.97	-1.47	2.24	-1.28
return on asse	1.208	-1.075	2.282	2.891	2.081	-1.939	0.480	1.400	1.483
	2.44	-1.65	1.94	1.87	3.66	-3.01	3.33	2.06	2.8
constant	-8.962	77.309	-8.043	5.367	48.041	10.632	-20.231	-9.041	2.221
	-1.17	1.52	-1.36	0.82	2.67	2.8	-1.87	-1.04	0.34
No. of obs.	53	54	54	60	46	50	59	56	54
No. of groups	9	9	9	9	8	9	9	9	9
Chi-squared	696.5177	2.90E+03	169.1291	816.618	596.62	536.1267	553.8835	1.80E+03	7.60E+04
Sargan test	21.8706	40.0224	35.6962	54.6558	29.1649	26.1519	22.3032	32.4453	27.5484
p-Value (Sarg	0.5281	0.051	0.0974	0.0013	0.2571	0.3455	0.672	0.1788	0.2795
AR(1)-test	-2.0515	-1.5138	-1.8655	-1.1398	-2.1583	-2.2172	-2.1638	-2.157	-1.9874
AR(2)-test	-1.2474	-1.3708	-1.5775	-0.8876	-1.4532	0.6156	-1.4607	-1.713	-0.2699

Note: GMM estimation; robust standard errors used, t-values given below coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

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[13] We can assess the strictly exogenous impact of our explanatory variables – in particular the competition variable which is unlikely to have a dominant impact on inflation – in spite of any bias introduced by the serial correlation in the dependent variable and possible endogeneity between lagged values of inflation and the exogenous variables in the model.

In line with our expectations, we find that in a number of sectors lower RoA – indicating more intense competition – has a significant downward impact on HICP inflation. This finding suggests that market power inflation – i.e. inflation caused by firms which are exploiting their weak competitive environment – plays a non-negligible role for inflation developments in CESEE countries. These sectors are rather mixed, encompassing manufacturing, wholesale and retail trade sectors. More specifically, furnishing, household equipment and maintenance of the house, retail of food, freight transportation, recreation and culture and housing and utilities show evidence of market power inflation. Textiles and clothing represent an interesting case: While a low degree of competition at the level of production implies higher consumer price inflation, the opposite result is found at the retail level. This suggests that inflation is significantly influenced by market conditions at the manufacturing level, while cost factors dominate inflation at the retail level – the two cost variables for material and staff both being strongly significant. In the sectors not listed in Table 1, the intensity of competition does not exert a significant role for inflation.

Turning towards our control variables we observe that industry size is often negatively related with inflation, i.e. larger industries tend to have lower inflation rates. Apart from this finding, the results are rather mixed across sectors. Cost inflation is found to play a major role in most sectors. Particularly personnel costs affect consumer prices in many retail sectors but also in chemicals, including the pharmaceutical industry. Material costs are less often related to inflation, we find a positive impact in housing and utilities and in the retail of clothing and footwear. The macro-determinants are not always relevant for inflation at the sector level but notably the oil price impacts significantly freight transportation, furnishing and food. The output gap shows in a number of sectors an – unexpected – negative sign. This may be due to the particularly difficult task of estimating output gaps in the CESEE countries or due to sector-specific determinants such as a dominant role of other explanatory variables.

Overall, the results suggest that the degree of competition plays a significant role in a number of sectors, some of which (food, clothing and footwear and furnishing and maintenance of the house) are of considerable importance for overall consumer price developments

5) Conclusions

Using two alternative indicators for the intensity of competition – namely RoA and sales concentration – the paper first provides some stylised facts on the intensity of competition across 20 sectors in 11 CESEE countries and it's evolution over time. The findings show that the variation in the competition indicators is much more pronounced across sectors than

across countries. This may be due to their common history, the transition process of the 1990s followed by the EU-accession process. Moreover, a number of sectors, notably communication, housing and miscellaneous goods and services, appear to be characterized by a more limited intensity of competition relative to other sectors. Looking at changes over time, RoA levels tended to increase, whereas sales concentration rates tended to decline during the observation period. Looking simultaneously at the changes in RoA as well as sales competition, there appears to be great sectoral heterogeneity in the evolution of the intensity of competition.

Turning to the link between the intensity of competition and price developments we find that in a number of sectors lower RoA – indicating more intense competition – has a significant downward impact on HICP inflation. More specifically, the results suggest that the degree of competition plays a significant role in a number of sectors which are of considerable importance for overall consumer price developments.

Turning to policy conclusions, the results suggests that at least in some sectors, notably the some of the main determining sectors of inflation in the CESEE region governments may contribute to 'taming' inflation by ensuring a high level of competition. This in turn can be done on the one hand by ensuring the effectiveness of 'classic' competition policy such as the effective prevention of cartels and dominant market positions. On the one hand it is important to ensure a business climate that encourages a sufficient number of domestic entrants in the markets and / or sufficient 'external' competition in the form of imports.

Finally, the topic of this paper clearly warrants further in-depth research in a number of areas. First, there is a need to address again the existing ambiguities in interpreting commonly used indicators of competition. Recent approaches (Boone et al., 2007; Creusen et al., 2006) suggest e.g. that company cost structures should be taken into account, which would allow to assess the response of different indicators to a reallocation of output from inefficient to efficient firms.[14] Second, it would appear promising to conduct further analyses to determine why certain sectors (and to a lesser extend countries) appear to be outliers as far as the intensity of competition is concerned. Third - and related to the point above - the simple sector-specific inflation models used in this paper can be further refined to better reflect sector-specific cost- and price determinants.

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[14] The Amadeus data base does not allow to incorporate firm cost structure into the analysis for the country set at hand since the data was unfortunately to patchy.

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Appendix

Table A1: List of Sectors Used in this Paper

Economic activity	Group	Industrial sector	Description	Including NACE, Revision 2 codes
Consumer services	H	H04	Housing, water, electricity, gas, other fuels	D, E
	H	H08	Communication	4742; 53; 61
	H	H11	Restaurants and hotels	I
Wholesale trade	HH	HH01	Wholesale: Food and non-alcoholic beverages	Items of 46
	HH	HH03	Wholesale: Clothing and footwear	Items of 46
	HH	HH05	Wholesale: Furnishing, household equipment, routine maintenance of house	Items of 46
	HH	HH06	Wholesale: Health	4646
	HH	HH07	Freight transport	Items of 45, 49–51
	HH	HH09	Wholesale: Recreation and culture	Items of 46
	HH	HH12	Wholesale: Miscellaneous goods and services	Items of 46
Retail trade	HR	HR01	Retail: Food and non-alcoholic beverages	Items of 47
	HR	HR03	Retail: Clothing and footwear	Items of 47; 9523; 9601
	HR	HR05	Retail: Furnishing, household equipment, routine maintenance of house	Items of 47; 9524; 9529
	HR	HR06	Retail: Health	4773–4774; 86
	HR	HR07	Passenger transport	Items of 45, 49–51
	HR	HR09	Retail: Recreation and culture	Items of 47; 75; 79; R; 951; 9521
	HR	HR12	Retail: Miscellaneous goods and services	Items of 47; 649; 651; 653; 9525; 96 w/o 9601
Manufacturing	M	M01	Production: Food and non-alcoholic beverages	10; 1107
	M	M03	Production: Textiles, clothing, leather	13–15
	M	M06	Chemicals, pharmaceuticals, rubber and plastics	20–22

Source: authors' concordance.

Table A2: Inflation and competition intensity controlling for openness

	Production: Textiles, clothing, leather	Freight transport	Retail: Food and non-alcoholic beverages	Wholesale: Clothing and footwear	Retail: Clothing and footwear	Wholesale: Furnishing, household equipment, routine maintenance of house	Wholesale: Recreation and culture
lagged inflatio	0.798	0.198	0.292	0.631	0.721	1.074	0.642
	5.31	*1.84*	*2.94*	*4.46*	*8.12*	*5.66*	*3.35*
output gap	0.001	-0.533	-0.365	-0.143	0.154	0.073	0.004
	0	*-2.23*	*-1.17*	*-1.02*	*0.7*	*0.45*	*0.02*
M3	0.017	0.056	0.067	0.033	0.061	-0.002	0.061
	0.6	*1.14*	*0.72*	*1.59*	*3.05*	*-0.05*	*1.15*
Oil price	-0.083	-0.155	-0.022	0.039	-0.010	-0.027	-0.119
	-1	*-2.23*	*-0.2*	*0.76*	*-0.14*	*-0.62*	*-1.77*
Import ratio	0.241	0.173	0.366	0.058	0.138	0.321	0.455
	2.46	*1.04*	*1.52*	*0.81*	*1.24*	*4.51*	*3.46*
Industrial sent	0.020	0.076	0.177	0.175	0.140	-0.289	-0.255
	0.15	*0.44*	*0.78*	*1.62*	*0.94*	*-3.46*	*-1.26*
industry size	1.069	3.521	-10.912	2.689	-2.953	3.306	-1.764
	1.11	*1.1*	*-2.1*	*1.58*	*-4.71*	*1.32*	*-0.93*
material costs	0.412	-0.391	0.274	-0.490	0.193	-0.815	0.261
	1.25	*-0.36*	*0.71*	*-1.66*	*1.77*	*-1.74*	*0.66*
staff costs	-0.814	1.798	8.108	-4.347	2.371	-1.139	0.056
	-1.04	*0.64*	*2.25*	*-3.63*	*5.16*	*-0.78*	*0.07*
return on asse	1.241	2.608	1.592	-1.874	-1.775	0.453	2.627
	1.81	*2.2*	*1.81*	*-1.96*	*-2.3*	*3.12*	*3.01*
constant	-24.957	-76.687	37.247	11.948	4.814	-44.435	-9.829
	-1.65	*-2.83*	*1.12*	*0.99*	*0.47*	*-2.33*	*-0.56*
No. of obs.	50	52	41	47	46	53	50
No. of groups	9	9	8	9	9	9	9
Chi-squared	347.0407	200.622 18	2.4e+03	2.80E+04	401.5674	165.3293 4	194.4316
Sargan test	21.2723	32.6509	25.7804	25.8337	23.9872	16.5274	19.8363
p-Value (Sarg	0.3813	0.0368	0.1732	0.1714	0.2429	0.6834	0.4682
AR(1)-test	-2.2216	-1.8195	-1.7793	-1.9884	-2.2167	-2.146	-2.1565
AR(2)-test	-0.4835	-1.0941	-1.5033	-0.2229	0.4493	-1.2898	-0.586

Note: GMM estimation; robust standard errors used, t-values given below coefficients. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.