# **Determinants of competition: A comparative analysis of CEE and CIS countries**

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## Abstract

The aim of this paper is to provide a comparative analysis of the key variables that have an impact on the intensity of competition in CEE and CIS countries. The business and competitive environment across these two regions are widely discussed in the economic literature. However, there is a small number of papers that directly investigate determinants of competition. Using firm-level data and I analyze the factors that determine competition across transition countries. I found a positive relationship between lower entry barriers and intensity of competition. Another interesting result is that enterprises from CEEC face significant pressure from foreign competitors in contrast to the post-Soviet countries. In addition there is an important finding that implementation of the hard budget constraints highly intensifies competition in CIS countries.

Keywords: competition, entry barriers, exit barriers, hard budget constraints

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## Introduction

Fifteen-year experience of functioning of transition economies shows that, despite the similar initial conditions after the collapse of socialist system, there are significant differences both with respect to implemented economic policy and to its effects. Countries of Central and Eastern Europe handled with crisis effects and most of them till the midst of 90s found the way for economic growth. At the same time, CIS countries adopted rather slow reformation process. Only overcoming the consequences of World crisis in 1998, they stood on the path of steadily growth. Later on, the difference in economic development and business environment between the two groups became even more notable.

Integration of CEE countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) to the European Union provided them with broad business opportunities and opened access to its single market. This unique interstate space has no discriminatory restrictions on movement of goods, services, capital or working force. Cancellation of border's barrier function and harmonization of national norms and standards should lead to fair competition. However, trade liberalization (when many enterprises from countries that are EU-members have access to the market) makes this task rather complicated because of the following reasons. Under the conditions of a single market customs fees disappear but scientific and technical costs of economic activities increase. Market scale raises profits of enterprises but it also brings a danger of bankruptcy for its weakest participants. Sometimes competitors are tempted to replace R&D or restructuring of production by a collusion agreement in order to divide the market. Governments in turn support nonviable enterprises instead of further development of innovations.

The results of economic integration in the post-soviet area are rather humble – not only on the CIS level but also on the level of subregional grouping. Until now only several

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countries (Moldova, Kyrgyzstan, Georgia, Ukraine) joined WTO. Attempts to create a free trade zone were not very successful and only some elements of it were implemented. Besides, a presence of such a political and economic leader as Russia complicates a creation of some supranational bodies of control in CIS. Integration into CIS can be interpreted to a large extent as a method of opening the borders for an expansion of Russian business.

A survey, conducted by a Ukrainian Antimonopoly Committee among domestic enterprises shows that 52% of them feel significant pressure from domestic competitors in 2005. At the same time, nearly 29% of Ukrainian enterprises do not feel any pressure from CIS firms and nearly 50% - from any foreign competitors (Ukrainian Antimonopoly Committee, 2007). I can assume that similar situation prevails in other post-soviet countries. Despite the policy of trade liberalization conducted by the governments of the main CIS countries, business environment is not very reliable for the foreign competitors. For instance, foreign enterprises are considerably more efficient than their post-Soviet rivals, but policy of local authorities can create an essential obstacle for their abilities to organize business in CIS countries.

Considering business environment in transition economies, it is worth mentioning a question of soft budget constraints, mostly in the form of subsidies and tax arrears. They help state enterprises to overcome low profitability and inefficiency but significantly distort competition on the market. During the early 90s enterprises in transition economies, especially the ones from post-soviet countries, still continued to enjoy soft budget constraints. Later this practice became less intensive but some countries continue to support their firms. Data from the Transition report for 2005 made by EBRD provides interesting results. According to the estimations, Czech Republic spent nearly 6% of its GDP on government subsidies to enterprises every year from 1999 till 2004. Hungary, Poland and Slovakia have this value on the level of 2% (Transition report, 2005). For many CIS countries (like Russia or

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Ukraine) the information about government subsidies in the report is unavailable but I expect that their values are significantly higher than in most of CEE countries.

Several papers (Fisher and Sahay (2000), Gros and Suhrcke (2000), Rousso and Steves (2003), Aidis (2005)) investigate macroeconomic performance and business environment in transition countries. All of them find that the quality of business environment is positively related to the marcoeconomics. There is also a connection between this paper and research of intensity of competition in transition economies performed by Vagliasindi (2000). She investigates determinants of competition but mainly concentrates on implementation of competition policy. However, there is no empirical literature that directly explores determinants of competition between the two groups of transition economies.

On the basis of above analysis, I would like to formulate hypotheses which then I test in this research.

- Theoretical and empirical literature predicts that the presence of entry barriers is a significant factor, which impedes competition. In case of transition economies where market institutions are not well developed they should be very important determinants of degree of competition.
- 2) Due to more competitive environment, openness of markets and more intensive processes of integration and globalization I expect that enterprises in CEE countries face stronger pressure from foreign competitors in contrast to the post-soviet countries.
- Entry barriers towards innovations should have larger influence on intensity of competition in CEE countries in contrast to CIS.
- 4) Though majority of transition economies turned to the policy of hard budget constraints, I expect that tax arrears should be still important determinant of competition for the post-soviet business environment.

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5) Some limitation of markets in CIS countries may enable bargaining power of suppliers towards enterprises in this region. Possibility of their influence on EU markets seems very low and can be feasible only in some industries.

The empirical results testify most of the above-mentioned hypothesis. Entry barriers in the form of the pressure from domestic competitors have significant impact across transition economies. There is a strong evidence of competition's increase due to reduction of entry barriers. Firms from CEEC face entry barriers not only from domestic but also from foreign competitors. This result is significant under different specifications of the model. Another important finding of the paper is that financial discipline highly intensifies competition in the post-Soviet countries.

The paper is organized in a following way. The first chapter is devoted to the discussion of related literature. The second and the third chapters provide a general description of the data and its statistical analysis. Fourth chapter explains the econometric model and its extension. Fifth chapter discusses results of estimation. The paper ends by conclusions in chapter sixth.

## **Chapter 1: Literature review**

Competition and its main determinants are one of the main topics in theoretical and empirical literature on Industrial Organization. Usually authors consider one structural factor such as entry or exit barriers or price elasticity of demand and investigate its effect. These effects can be rather different due to market specification, number of operating firms or peculiarities of business environment.

Entry barriers are considered to be very important factors that depresses competition. Usually they take form of cost advantages of incumbents. The Industrial Organization literature developed a solid theoretical background of this question and modern authors built econometric models to verify it. For instance, Bresnahan and Reiss (1987) investigate the entry condition in different markets. They developed an econometric model in order to test the abilities of incumbents to create barriers that might affect entry into markets. Empirical estimations show that there are significant differences between industries. Firms that face high sunk costs have more tendency to monopoly power and as a result create entry barriers for newcomers. Dunne, Klimek, Roberts and Yi Xu (2009) receive similar results. They show that fixed costs incurred by the firms that already operate in the industry and entry costs of potential rivals determine number of competitors. Increase in the number of firms in the industry decreases utility from continuing to operate in it or joining.

Apart of fixed or sunk costs entry barriers in some industries may also give cost advantages through learning by doing. Siebert (1999) found that multiproduct enterprises have higher advantages from learning by doing effects than from the effects of the economy on scale. In this case a life cycle of products matters because both effects are significant during the different periods. Research and development also plays an important role in achievement of cost advantages. Tirole (1988) recognizes two types of innovations – product and process. The first is connected with development of new goods and services and the second – with an improvement of production process that reduces cost. Lukach, Kort, Plasmans (2005) investigate the behavior of enterprises towards R&D in case of entry of the newcomers. The model developed by the authors shows that the effect from R&D depends on its intensity and possibility to prevent the entry. If entry is unavoidable then the firm puts lower efforts in innovations due to their relative inefficiency. Under the opposite situation, the incumbent has much higher stimulus for research. Hoppe and Lee (2003) received similar results. They discovered an inverse relationship between the power of incumbents to discourage entry and incentives to innovations.

Exit barriers, which I use in my research, are presented by soft budget constraints, which reduce financial discipline and as a result depress competition. Hungarian economist Janos Kornai, who introduced this economic category and many other authors investigate soft budget constraints in transition economies. According to Schaffer (1997) unprofitable firms still enjoy soft budget constraints. They appear in forms of subsidies from budget, overdue credits or tax arrears. The last seems to be the main force of softening the budget constraints. Frydman, Gray, Hessel and Rapaczynski (1997) examine the influence of soft budget constraints on firms' performance. The main finding is that exit barriers undermine financial discipline of enterprises and can be efficient only with subsequent privatization of loss-making firms.

It is worth mentioning that soft budget constraints are inherent not only for post-soviet countries but also to the new EU members. Moore (2009) finds that large firms in Czech Republic and Poland enjoy some credit softness. At the same time, the evidence for the presence of soft budget constraints in Hungary and Baltic countries is weak. Another finding is that joining the EU impedes practice of soft budget constraints in those countries.

High elasticity of demand testifies the impossibility for the enterprise to occupy its own market niche and as a result to avoid competitive activity. Singh and Vives (1984) examine Bertrand and Cournot duopolies under linear and nonlinear demands. Their results show that the former is more efficient than the latter independently of whether the goods are substitutes or complements. So, price competition prevails the quantity one and is more efficient. However, Häckner (1999) who tries to verify the results of Singh and Vives doubts them. He indicates that there is strong dependence on the assumption about duopoly. If a number of firms in the industry begin to increase, there would be no clear differences between two types of competition.

Market power of suppliers also depresses competition. A degree of product differentiation sometimes can be very high and as a result it is rather difficult or expensive to change a supplier. Moreover, if a share of one supplier is rather high then it may determine costs of output production. Puiu (2010) investigates the power of suppliers as a component of five Porter's competitive forces in Romanian retail market. Her results show that bargaining power of suppliers decreases due to joining EU and market expansion. Foreign rivals that received easy access to the market, lowered prices and increased competition among suppliers. I expect that the same situation is other transition economies that join EU.

Vagliasindi (2000) explores intensity of competition of micro-level across transition economies. Notably, she focuses on implementation of competition policy and some structural determinants in order to investigate their influence on competition. Her results prove that intensity of competition is higher in case of low entry barriers and high price elasticity of demand.

## **Chapter 2: Data description**

Data comes from the Business Environment and Enterprise Performance Survey (BEEPS) that is available on www.ebrd.com. BEEPS was launched as a joint project of the World Bank and European Bank for Reconstruction and Development (EBRD) in 1999. The sample contains information about economic performance and business environment of firms in transition economies. For the purposes of my research I use the data from the survey which was conducted in 2005. It covers 7600 firms in 27 transition countries. The survey is a cross-section and includes 16 countries from Central and Eastern Europe (CEE) and 11 countries of Commonwealth of Independent States (CIS).<sup>1</sup>

Each countries sample contains information about at least 200 firms. The largest samples are from Turkey, Ukraine, Russia, Romania, Hungary and Poland. Firms are chosen for the survey randomly but there are several criteria of selection. Firstly, at least 10% of firms in the sample should be small (less than 50 workers) and at least 10% should be large (more than 250 workers). Secondly, at least 10% of enterprises should be state-owned and at least 10% - foreign-owned. Thirdly, at least 10% of firms have to be export-oriented. Fourthly, firms in the sample should represent not only a capital and largest cities but also small ones.

The data is collected by telephone or face-to-face interviews. It has mostly the qualitative nature. Some questions have a simple "Yes/No" answer but many questions are scaled in which respondents should evaluate influence of some factors on firms' performance or business environment in which they operate. When respondents refuse to answer, do not know or do not answer the values are missing.

<sup>&</sup>lt;sup>1</sup> CEE (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, FYROM (Makedonia), FR Yugoslavia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia, Turkey); CIS (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine, Uzbekistan, Tajikistan)

## Chapter 3: Descriptive statistics and variable specification

Due to the specificity of the data, which has the qualitative character and mostly is presented by yes/no or some question with ordinal answers, I provide a description of variables which I use in econometric models in forms of tables where they are grouped according to different size, ownership and age categories. I follow size distribution provided in BEEPS according to which small firms have from 2 to 49 workers, medium – from 50 to 249 and large firms have more than 250 workers. I divide enterprises into three categories according to the year when they were established. If a firm was founded before 1991 I define it as old. Medium-age enterprises are founded between 1991 and 1999. New firms are established starting from 2000. Ownership is divided in two categories – private and state.

#### **Degree of competition**

Table 1 shows the percentage distribution of firms that have monopolistic position on the market in both groups of countries. In this table, as well as in the others in this chapter I use the following convention: the data from CEE countries appears in white cells; the data from CIS countries is shown in shaded cells. It can be clearly seen from the table that there is a significant variation among different categories of firms but overall intensity of competition in CIS countries is lower comparing to CEE countries especially among private firms. The possible explanation of this observation can be the wave of privatization that took place in post-soviet countries. It became an instrument of redistribution of state property for oligarchial groups. Many state enterprises that have a strategic importance or even natural monopolies were privatized. For example, according to analytical report made by Center for Social and Economic Research (CASE) 20 enterprises-monopolies were privatized in Ukraine in 2004 (Paskhaver and Verhovodova, 2006). These firms may continue to operate on the monopolistic markets even after a change of owners. Both tables present evidence of positive correlation between size of firms and monopolization, but as expected the percentage of large firms irrespective of age that enjoy monopoly power is higher. This refers to both private and state enterprises. The remarkable difference between the distributions of the two groups of firms is that percentage of new CIS enterprises that face no competitors is substantially higher. This can be explained by the development of new industries and products as a result of transition from planned to market economy. Another difference is that percentage of monopolies among state firms in CIS countries is also higher. This is because of the fact that state enterprises sometimes operate in industries protected from competition by legislation.

Size		Priv	vate		State				
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
	2,16%	3,53%	5,73%	3,29%	0,00%	0,00%	2,44%	0,97%	
Old	0,96%	6,76%	14,71%	7,34%	0,00%	18,18%	15,79%	14,29%	
	0,50%	1,99%	10,23%	1,31%	0,00%	2,67%	6,52%	1,93%	
Medium	2,28%	2,20%	4,35%	2,46%	3,13%	0,00%	5,71%	2,67%	
	0,36%	4,65%	0,00%	0,92%	0,00%	0,00%	0,00%	0,00%	
New	6,40%	2,22%	27,27%	7,53%	0,00%	0,00%	10,00%	2,08%	
	0,87%	2,84%	6,94%	1,90%	0,00%	1,48%	4,17%	1,36%	
Avg	3,03%	4,00%	12,44%	4,68%	2,48%	2,35%	9,38%	4,07%	

Table 1. Distribution of firms that have a monopolistic power in countries of CEE and CIS<sup>2</sup>

Source: BEEPS (2005). Data is based on the question about the number of competitors, which the firm faces on the national market. Possible answers are 1 (no competitors); 2 (from 1 to 3 competitors); 3 (4 and more competitors). The table reflects the distribution of firms for which the answer is 1.

Oligopolistic distribution of the firms is presented in table 2. The percentage of enterprises that face several competitors gradually increases from small to large firms independently of age for both groups of countries. There is no such variation among different categories of firms if compare CEE and CIS countries but it worth mentioning that the

<sup>&</sup>lt;sup>2</sup> Percentages of distribution for CIS countries are highlighted

percentages of the latter are somewhat higher. Age of firms seems not determinative, especially for private firms. There is only one striking difference: a percentage of new firms that operate under oligopoly conditions is much higher for CIS countries than for the CEE ones. Again, the possible explanation of this observation can be the development of new industries that are not very competitive.

Size		Priv	ate			State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
Old	10,78%	17,25%	24,48%	15,48%	4,55%	17,50%	26,83%	18,45%	
	13,46%	21,62%	24,51%	20,06%	60,00%	18,18%	31,58%	31,43%	
Medium	10,73%	14,29%	18,18%	11,81%	18,12%	30,67%	28,26%	23,55%	
	13,90%	21,43%	31,88%	17,46%	23,96%	33,93%	28,57%	27,81%	
New	10,18%	16,28%	0,00%	10,74%	35,29%	35,00%	44,44%	36,25%	
	15,12%	26,67%	31,82%	18,83%	25,00%	22,22%	30,00%	25,00%	
Avg	10,66%	15,69%	21,88%	12,86%	20,85%	27,41%	29,17%	24,66%	
	14,12%	22,13%	27,98%	18,40%	25,62%	29,41%	29,69%	27,78%	

Table 2. Distribution of firms that have from 1 to 3 competitors in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative question about the number of competitors, which the firm faces on the national market. Possible answers are 1 (no competitors); 2 (from 1 to 3 competitors); 3 (4 and more competitors). The table reflects the distribution of firms for which the answer is 2.

#### **Entry barriers**

Entry barriers are important factors that have significant impact on competition. There are many different types of them but I will investigate only some of them. The first is the pressure that competitors put on the firm to reduce the costs of production. Firms that already operate in an industry have some advantages in costs comparing to the newcomers. This may be explained by the economies of scale, effects of learning by doing and previous innovations. The other possible reasons are previous innovations, experience or that incumbents have organized connections with suppliers. Table 3 presents information about the percentage of firms of different age, size and ownership that does not face any pressure from domestic competitors towards cost reduction for both groups of countries.

Size		Priv	ate			State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
Old	7,54%	13,33%	12,50%	10,19%	18,18%	12,50%	12,20%	13,59%	
	25,00%	20,27%	23,53%	22,60%	0,00%	9,09%	31,58%	20,00%	
Medium	8,00%	5,32%	17,05%	8,00%	10,87%	12,00%	17,39%	12,36%	
	15,98%	18,13%	15,94%	16,51%	32,29%	16,07%	17,14%	24,60%	
New	7,27%	9,30%	12,50%	7,67%	17,65%	0,00%	11,11%	12,50%	
	23,26%	11,11%	27,27%	21,34%	25,00%	22,22%	0,00%	18,75%	
Avg	7,78%	9,02%	13,89%	8,67%	13,27%	10,37%	14,58%	12,67%	
	18,87%	18,13%	21,24%	19,00%	29,75%	16,47%	18,75%	22,96%	

Table 3. Distribution of absence of entry barriers (pressure to reduce costs from domestic

competitors) in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative question about the pressure which firm takes up from the domestic competitors to reduce its costs. Possible answers are 1 (not important); 2 (slightly important); 3 (fairly important); 4 (very important). The table reflects the distribution of firms for which the answer is 1. Percentage distribution shows that enterprises from CEE countries face more pressure

towards cost reduction from domestic competitors comparing to the post-Soviet countries. In case of private enterprises, the percentages increase with size for both groups of countries and it is quite natural. Large firms can face economy of scale due to significant amount of production. The relationship between age of enterprises and the pressure seems to be nonlinear. Average percentages indicate that state ownership gives better protection from competition but the difference is not very significant.

The situation with pressure from foreign firms is rather similar. Comparative analysis of table clearly shows that firms from post-Soviet countries face nearly two times less pressure from foreign competitors. Openness of the markets in CEE countries intensifies competition and puts additional pressure on enterprises of this region. It is interesting to note that percentages decrease with increase of the size independently of ownership. The possible explanation is that it is more difficult for large firms to implement some new technologies or change manufacturing methods especially in the short period. The variation among age groups is not very large. The remarkable thing is also that private firms from post-Soviet countries face somewhat lower pressure from foreign competitors than the state-owned. Perhaps, the latter are less efficient than the former in CIS region.

Table 4. Distribution of absence of entry barriers (pressure to reduce costs from foreign

Size		Priv	ate			State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
Old	31,68%	23,53%	21,35%	27,16%	22,73%	22,50%	21,95%	22,33%	
	52,88%	41,22%	43,14%	45,20%	40,00%	27,27%	31,58%	31,43%	
Medium	32,76%	27,24%	23,86%	31,23%	24,64%	25,33%	23,91%	24,71%	
	43,36%	39,01%	40,58%	42,02%	30,21%	21,43%	14,29%	24,60%	
New	37,09%	20,93%	12,50%	34,36%	11,76%	10,00%	11,11%	11,25%	
	55,23%	40,00%	31,82%	50,21%	45,00%	38,89%	10,00%	35,42%	
Avg	33,08%	25,21%	21,88%	30,30%	21,33%	22,22%	21,88%	21,72%	
0	47,36%	40,00%	40,93%	44,34%	33,06%	25,88%	18,75%	27,41%	

competitors) in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative question about the pressure which firm takes up from the foreign competitors to reduce its costs. Possible answers are 1 (not important); 2 (slightly important); 3 (fairly important); 4 (very important). The table reflects the distribution of firms for which the answer is 1.

Another entry barrier is the pressure that competitors put on the firm for development of new products or services. Intuitively, firms from former USSR should perceive lower entry barriers of this type and comparative analysis completely testifies this statement. Percentage distribution provided by table 5 clearly shows the validity of this hypothesis. Again, percentages are two times larger for CIS countries but mostly for private firms. State enterprises show roughly similar results. It is interesting to note that percentages decrease with the increase of the size. As I mentioned previously, large enterprises may face difficulties to introduce new technologies because it requires more time and resources. Variation among the different age and ownership groups is not very large.

Size		Priv	ate		State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg
Old	7,76%	10,59%	7,81%	8,54%	18,18%	7,50%	19,51%	14,56%
	24,04%	15,54%	29,41%	22,03%	0,00%	9,09%	26,32%	17,14%
Medium	6,85%	7,31%	15,91%	7,43%	7,25%	10,67%	15,22%	9,65%
	11,62%	12,64%	13,04%	12,01%	23,96%	19,64%	11,43%	20,32%
New	6,55%	9,30%	12,50%	7,06%	15,69%	5,00%	22,22%	13,75%
	19,19%	13,33%	22,73%	18,41%	25,00%	11,11%	10,00%	16,67%
Avg	7,01%	8,85%	10,42%	7,75%	10,43%	8,89%	17,71%	11,54%
	15,04%	13,87%	22,80%	14,33%	23,14%	16,47%	15,63%	19,26%

Table 5. Distribution of absence of entry barriers (pressure to develop new products and<br/>services from domestic competitors) in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative question about the pressure which firm takes up from the domestic competitors to develop new products and services. Possible answers are 1 (no pressure); 2 (low pressure); 3 (medium pressure); 4 (high pressure). The table reflects the distribution of firms for which the answer is 1.

Percentage distribution of the pressure of foreign competitors towards development of new products and services presents similar results but absolute values are larger. Again, there is a clear growing tendency of entry barriers with an increase of a size of firms. As usual, age of firms does not have impact on distribution but the pressure that state firms face seems to be larger for both CEE and CIS countries.

 Table 6. Distribution of absence of entry barriers (pressure to develop new products and services from foreign competitors) in countries of CEE and CIS

Size		Priv	ate			State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
Old	31,03%	25,49%	20,83%	27,27%	27,27%	25,00%	24,39%	25,24%	
	50,00%	42,57%	43,14%	44,92%	40,00%	36,36%	26,32%	31,43%	
Medium	32,01%	27,57%	22,73%	30,67%	24,64%	24,00%	19,57%	23,55%	
	39,21%	37,36%	36,23%	38,47%	22,92%	10,71%	14,29%	17,65%	
New	41,09%	18,60%	12,50%	37,42%	9,80%	10,00%	33,33%	12,50%	
	54,65%	40,00%	22,73%	48,95%	35,00%	22,22%	10,00%	25,00%	
Avg	33,03%	26,04%	21,18%	30,37%	21,33%	22,22%	22,92%	21,95%	
U	44,20%	39,73%	38,34%	44,34%	25,62%	16,47%	17,19%	20,74%	

Source: BEEPS (2005). Data is based on the qualitative question about the pressure which firm takes up from the foreign competitors to develop new products and services. Possible answers are 1 (no pressure); 2 (low pressure); 3 (medium pressure); 4 (high pressure). The table reflects the distribution of firms for which the answer is 1.

#### **Barriers of exit**

Exit barriers are represented by soft budget constraints, which are defined as a presence of tax overdue in the firms during for at least three months. Distributions, presented in table 7, show following results. There are some variations between private and state enterprises and the former enjoy soft budget constraint in the larger extent than the latter but still percentages are not large. Old firms present somewhat higher relationship with exit barriers than the other two age categories. Perhaps it is harder for them to sustain competition of newer firms and they require some subsidies in order to survive. Surely, soft budget constraints depress intensity of competition and productivity of firms. Distributions show that transition economies (especially post-soviet) leave the practice of subsiding the loss-making firms.

Size		Priv	vate			Sta	ate	
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg
Old	4,09%	7,45%	11,46%	6,57%	9,09%	5,00%	7,32%	6,80%
	5,77%	6,08%	14,71%	8,47%	0,00%	9,09%	10,53%	8,57%
Medium	3,96%	6,98%	4,55%	4,56%	2,90%	2,67%	0,00%	2,32%
	2,49%	6,59%	1,45%	3,41%	1,04%	1,79%	5,71%	2,14%
New	4,73%	6,98%	0,00%	4,91%	3,92%	5,00%	0,00%	3,75%
	1,16%	6,67%	4,55%	2,51%	5,00%	5,56%	0,00%	4,17%
Avg	4,10%	7,18%	9,03%	5,25%	3,79%	3,70%	3,13%	3,62%
0	2,64%	6,40%	8,81%	4,60%	1,65%	3,53%	6,25%	3,33%

Table 7. Distribution of soft budget constraints in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative question about whether a firm has overdue taxes during the last 3 months or more. Possible answers are no or yes. The table reflects the distribution of firms for which the answer is yes.

#### Price elasticity of demand and supply

Table 8 provides information about the distribution of firms, which have inelastic demand function. Comparison of percentages gives a number of interesting results. Though the numbers look similar but firms of CIS countries seems to face inelastic demand more frequently. The variation between different sizes of enterprises is not very significant. In

many cases there is a some positive correlation between a size and inelastic demand i.e. large firms face less competition which is quite natural. It is interesting to note that the percentage of new firms that face inelastic demand, especially among the large firms is higher. This difference can be explained by the fact that these firms produce some new products, which still do not have substitutes on the market.

Size		Priv	vate			State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg	
Old	23,28%	15,29%	19,27%	20,15%	9,09%	12,50%	24,39%	16,50%	
	36,54%	32,43%	35,29%	34,46%	20,00%	18,18%	15,79%	25,71%	
Medium	18,81%	15,95%	15,91%	18,11%	20,29%	21,33%	15,22%	19,69%	
	23,86%	24,18%	34,78%	24,97%	17,71%	25,00%	20,00%	20,32%	
New	22,55%	18,60%	0,00%	21,47%	25,49%	35,00%	11,11%	26,25%	
	22,67%	26,67%	36,36%	24,69%	25,00%	22,22%	30,00%	25,00%	
Avg	20,38%	15,86%	17,71%	19,17%	20,38%	20,74%	18,75%	20,14%	
	25,33%	27,73%	35,23%	27,45%	19,01%	23,53%	25,00%	21,85%	

Table 8. Distribution of inelastic demand in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative hypothetical question about a change of sales of a firms if it increases prices of its main products by 10% comparing to main competitors. Possible answers are 1 (customers continue to buy the same quantity); 2 (customers buy slightly lower quantity); 3 (customers buy significantly lower quantity); 4 (customers stop buying products). The table reflects the distribution of firms for which the answer is 1.

Distribution of inelastic supply does not show any significant difference between the two groups of countries. Nearly quarter of private firms and one third of state will buy materials from the suppliers even despite a 10% increase in its price. Small enterprises are more dependent on the suppliers irrespectively of ownership and age. Possibly, small enterprises operate in industries in which dominate only few suppliers. This shows the power of suppliers and their influence on competition.

One remarkable similarity between two distributions is the fact that percentage of new firms that face inelastic supply is slightly higher in contrast to the other age groups. This connection has an easy explanation. Firms that already operate in industries for some time have already organized channels of procurement. Relatively new enterprises are in this case in

worth situation and that's why they choose to bear higher costs of production than to switch to another supplier. State firms face more inelastic supply than private. Perhaps, the former connected by contracts with state suppliers and that is why rather limited in their choice.

Size		Priv	vate		State			
Age	Small	Medium	Large	Avg	Small	Medium	Large	Avg
Old	28,66%	19,22%	19,79%	24,10%	27,27%	17,50%	31,71%	25,24%
	25,96%	22,30%	37,25%	27,68%	0,00%	9,09%	21,05%	14,29%
Medium	22,28%	20,60%	17,05%	21,67%	37,68%	17,33%	26,09%	29,73%
	22,20%	26,37%	23,19%	23,33%	41,67%	30,36%	28,57%	35,83%
New	24,00%	13,95%	37,50%	23,01%	43,14%	40,00%	44,44%	42,50%
	29,07%	28,89%	27,27%	28,87%	35,00%	33,33%	40,00%	35,42%
Avg	24,01%	19,53%	19,44%	22,62%	37,91%	20,74%	30,21%	31,00%
	24,27%	25,07%	31,09%	25,49%	38,84%	28,24%	28,13%	32,96%

Table 9. Distribution of inelastic supply in countries of CEE and CIS

Source: BEEPS (2005). Data is based on the qualitative hypothetical question about a quantity which a firm will be buying from its main supplier if the latter increases the price by 10%. Possible answers are 1 (a firm continues to buy the same quantity); 2 (a firms continues to buy slightly lower quantity); 3 (a firms continues to buy slightly lower quantity); 4 (a firms changes its supplier). The table reflects the distribution of firms for which the answer is 1.

## **Chapter 4: Model description**

In order to perform a comparative analysis of determinants of competition I will use the probit and the ordered probit estimation methods. My choice is determined by a binary and ordered nature of the variables, which I use in the model.

Following the methodology of Vagliasindi (2001) I will run regression for CEE and CIS countries where the dependent variable COMP is a binary-choice variable which describes a degree of competition and may have two outcomes: 0 in case of monopolistic environment and 1 if a number of competitors is at least one. First, I regress a model controlling for an entry barriers, exit barriers, demand and supply price elasticity.

$$COMP = c + \overline{\beta}_1 \overline{X}_1 + \overline{\beta}_2 \overline{X}_2 + \overline{\beta}_3 \overline{X}_3 + \overline{\beta}_4 \overline{X}_4 + \beta_5 hbc + \overline{\beta}_6 \overline{X}_6 + \overline{\beta}_7 \overline{X}_7 + \varepsilon$$
(1)

where  $\overline{X_1}$  and  $\overline{X_3}$  are vectors of dummy variables indicating high, medium and low pressure from domestic and foreign competitors towards costs reduction;  $\overline{X_2}$  and  $\overline{X_4}$  are vectors of dummy variables indicating high, medium and low pressure from domestic and foreign competitors towards development of new products and services; *hbc* is a dummy variable that shows a presence of hard budget constraints;  $\overline{X_6}$  and  $\overline{X_7}$  are vectors of dummy variables indicating high, medium and low price elasticity of demand and supply.

On the next stage I include to (1) some basic variables:

$$COMP = c + \overline{\beta_1} \overline{X_1} + \overline{\beta_2} \overline{X_2} + \overline{\beta_3} \overline{X_3} + \overline{\beta_4} \overline{X_4} + \beta_5 hbc + \overline{\beta_6} \overline{X_6} + \overline{\beta_7} \overline{X_7} + \beta_8 med \_ firms + \beta_9 large\_ firms + \beta_{10} age\_ med + \beta_{11} age\_ new + \beta_{12} state + \varepsilon$$

$$(2)$$

where *med\_firms and large\_firms* are dummies for controlling size of firms; *age\_med* and *age\_new* are dummies that indicate age of firms; *state* is a dummy for controlling state ownership. In order to check the validity of my results I run the same regressions but this time using model of ordered probit. In contrast to the previous model where I considered dependent variable COMP as a binary with only two outcomes, i.e. monopoly and competitive environment I introduce also oligopoly. The dependent variable now is ordinal with values 1 (no competitors), 2 (1-3 competitors) and 3 (4 and more competitors). I expect that this specification can help to omit some drawbacks of the previous model and gives more precise estimations.

Since I perform a comparative analysis of determinants of competition using two separate equations for each group of countries, it is worth checking the difference between the coefficients in them. For this purpose, I use the basic model but apply it to the whole sample that contains information about both CEE and CIS countries. Introducing the dummy variable  $CEE\_d$  that has value 1 if the observations belong to enterprises from CEE countries and 0 otherwise I have the following extension of the model.

$$COMP = c + \overline{\beta}_1 \overline{X_1} + \overline{\beta}_2 \overline{X_2} + \overline{\beta}_3 \overline{X_3} + \overline{\beta}_4 \overline{X_4} + \beta_5 hbc + \overline{\beta}_6 \overline{X_6} + \overline{\beta}_7 \overline{X_7} + CEE\_d + + \overline{\gamma}_1 * CEE\_d * \overline{X_1} + \overline{\gamma}_2 * CEE\_d * \overline{X_2} + \overline{\gamma}_3 * CEE\_d * \overline{X_3} + \overline{\gamma}_4 * CEE\_d * \overline{X}_4 + (3) + + \gamma_4 * CEE\_d * hbc + \overline{\gamma}_5 * CEE\_d * \overline{X_6} + \overline{\gamma}_5 * CEE\_d * \overline{X_7} + \varepsilon$$

where the interaction term  $\overline{\gamma}_i * CEE\_d * \overline{X}_i$  indicates the difference in variable's coefficients for two groups of countries. I use this test also for the ordered probit model.

## **Chapter 5: Empirical results**

I run the binary probit regression for CEE and CIS countries in order to find determinants of intensity of competition that are significant for each group of countries and perform a comparative analysis. The results are presented in table 10.

Equation 1 represents barriers of entry, exit, demand and supply elasticity. Because I use the probit model, it is difficult to evaluate marginal effect that has every regressor on the dependent variable. I am interested in absolute values of my variables' coefficients and signs. In both groups of countries, a pressure from domestic competitors towards cost reduction and development of new products and services is highly significant. The results of estimation show that reduction of entry barriers increases competition. In addition, it is interesting to note that in some cases low entry barriers have no effect on the intensity of competition.

As expected, competition from the foreign firms is insignificant for CIS countries. Due to the peculiarities of business environment and high corruption, domestic firms mostly compete against each other. In case of firms from Central and Eastern Europe the situation should be completely different because of market openness and more transparent conditions of doing business. However the probit model somewhat contradicts my expectations. Firms in CEEC face pressure only from foreign competitors to develop new products and services. Medium entry barrier of this type is significant at 10% level and has a negative sign. The possible explanation of this fact is that in order to enter the market a newcomer should develop new products or services because it is difficult to withstand competition from firms that already operate in the industry.

Estimation results with respect to barriers of exit are negatively correlated with intensity of competition in CEE countries and positively – in CIS. Unfortunately, the significance is very low and that is why this variable is uninformative.

Compatition	1 (CEE)	1(CIS)	2(CEE)	2(CIS)
Competition	I (CEE)	from domestic compet	2 (CEE)	2 (C13)
High antry harriage (agat	0.750720***		0.742164***	0 255292***
reduction)	0.738728	$(0.303330^{-1.1})$	(0.742104)	(0.190495)
Medium entry barriers	0.816280***	0.100727)	0.766/60***	0.139463)
(cost reduction)	(0.239506)	(0.215686)	(0.253388)	(0.270396)
Low entry barriers (cost	0.017005***	0.026714	0.01/627***	0.028536
reduction)	(0.264964)	(0.26714)	(0.276330)	(0.273839)
High entry barriers	0.620868**	0.413298***	0.628529**	0.372082***
(developing new products)	(0.250564)	(0.183019)	(0.271584)	(0.187765)
Medium entry barriers	0 947745***	0.805433***	0.939383***	0 758908***
(developing new products)	(0.253660)	(0.218032)	(0.270502)	(0.223744)
Low entry barriers	0 440359*	0 959624***	0 404204	0 941106***
(developing new products)	(0.250275)	(0.279123)	(0.262180)	(0.285945)
	Pressure	from foreign competi	tors	(11 111 1)
High entry barriers (cost	0.283564	-0.422912	0.377926	-0.326157
reduction)	(0.296163)	(0.322827)	(0.316462)	(0.328539)
Medium entry barriers	-0.096525	-0.242041	-0.018096	-0.210719
(cost reduction)	(0.256959)	(0.273296)	(0.273035)	(0.278427)
Low entry barriers (cost	0.123013	-0.375259*	0.196938	-0.331855
reduction)	(0.268728)	(0.220255)	(0.290032)	(0.225007)
High entry barriers	-0.397912	0.397017	-0.392703	0.404391
(developing new products)	(0.292689)	(0.321652)	(0.312339)	(0.327114)
Medium entry barriers	-0.459063*	0.170962	-0.430912	0.205390
(developing new products)	(0.260531)	(0.260783)	(0.274565)	(0.266338)
Low entry barriers	-0 386997	0 114554	-0.413702	0 143734
(developing new products)	(0.263329)	(0.217932)	(0.281915)	(0.224060)
(developing new products)	(0.20002))	Barriers to exit	(0.201)10)	(0.221000)
HBC	-0.019652	0 270135	-0 254128	0 156752
inde	(0.326582)	(0.236257)	(0.360577)	(0.242720)
	Dema	nd and supply elasticit	v	(0.212720)
High demand elasticity	0 502703**	1 003830***	0 510528**	1 0/7/82***
ringh demand elastienty	(0.100674)	(0.235965)	(0.21/247)	(0.2/3571)
Madium domand alasticity	0.1990/4)	0.220050*	0.214247)	0.243371)
Weaturn demand elasticity	(0.300131)	(0.529039)	(0.412878) (0.227161)	(0.288973)
Low demand elasticity	0.20250/**	0.177002***	0.451020**	0.102332)
Low demand elasticity	(0.595504)	(0.437903)	(0.431029)	(0.146123)
Uigh gunnly alasticity	0.025201	0.143310)	(0.18/080)	0.106061
High supply elasticity	-0.023291 (0.172856)	-0.144122 (0.142348)	(0.184057)	-0.100001 (0.145677)
Madium mulu alastisitu	0.020124	(0.142346)	(0.164957)	0.000055
Medium supply elasticity	(0.020124)	0.039898	0.105440	-0.000955
I am multi alantiaita	0.1240642)	0.230427)	0.0717(0	(0.232043)
Low supply elasticity	-0.124033	0.232003 (0.180710)	-0.0/1/00	0.230408
	(0.191499)	Degie veriebleg	(0.203801)	(0.163993)
Maline Course	1	Dasic variables	0.5274((***	0.0552(7*
Medium firms			$-0.53/466^{***}$	-0.25536/*
1 0			(0.1/4913)	(0.146637)
Large firms			-0.943309***	-0.480463***
M F			(0.180658)	(0.158509)
Medium age firms			-0.350848	0.163290
N. C			(0.324947)	(0.146/68)
New firms			-0.500/28	0.1091/1
State Course			(0.320944)	(0.185/68)
State firms			0.3/3300*	-0.185942
N	2007	1440	(0.225116)	(0.150814)
N	2997	1448	2997	1448
$\chi^2$	114.5181	125.1349	154.1759	140.5653
	001.0570	055.0151	101.02.52	<b>a</b> (a) (a) <b>a</b>
Log-likelyhood	-201.0552	-277.3154	-181.2263	-269.6002
	0.001/(/)	0.104005	0.000.407	0.00(705
McFadden R-squared	0.221664	0.184085	0.298427	0.206785

### Table 10. Determinants of competition in CEE countries. The binary probit regressions

Notes: \*\*\* significance at 1% level; \*\*significance at 5% level; \* significance at 10% level

Price elasticity of demand has a positive sign and intensifies competition in both groups of countries (mainly the high and the low one). It is worth mentioning that high price elasticity seems to be much more important for CIS countries. Intuitively, high price elasticity of demand is not usual for CIS markets, therefore when it happens, it has higher positive effect on intensity of competition.

According to the results of estimations, suppliers do not have significant impact on degree of competition in CEE and CIS countries. Though the variables have different signs, the absolute values are small and significance is very low. This is unexpected because I predicted that suppliers also determine competition, especially in post-soviet countries where their number should be smaller.

I control for some basic variables such as size of the firms, their age and ownership. Size dummies are negative and highly significant for both groups of countries. Their signs show that bigger firms depress intensity of competition in contrast to the omitted variable that represents small firms. This confirms facts from the descriptive statistics, which shows that more than 50% of large firms operate under monopolistic or oligopolistic environment. Age dummies have a positive sign but are not significant and do not have large influence on competition. The ownership dummy proves to be marginally significant only for enterprises from Central and Eastern Europe.

Table 1 in Appendix provides the results of the differences between variable's coefficients in equations for two groups of countries. The model estimation shows that there is no difference in effects of the domestic entry barriers towards cost reduction between CEE and CIS countries. However, the differences between coefficients indicating entry barriers with respect to innovations are highly significant. Positive sign indicates that entry barriers connected with R&D play more important role in determining intensity of competition for firms from Central and Eastern Europe. This result testifies my third hypothesis.

As it was mentioned earlier, estimation results of the binary probit model show that high price elasticity of demand highly intensifies competition in post-Soviet countries. Testing the difference between coefficients, I confirm it.

The ordered probit model (Table 11) provides better results of estimation due to the better specification of competitive environment. I want to concentrate on some remarkable points that were received after using another specification of the basic model. Firstly, absolute values of main coefficients are smaller but the significance became higher. Pressure from domestic competitors for cost reduction seems to have the strongest influence among entry barriers in CEE countries. For post-Soviet countries the most influential variable is pressure from domestic competitors to develop new products and services. Secondly, the model provides better prediction of influence of foreign competitors. The estimation results for medium and low entry barriers for CEEC are significant at 5% confidence level. Thirdly, a presence of hard budget constraints highly intensifies competition in CIS countries. This result is in line with my assumption that barriers of exit still determinate competition in postsoviet countries. Fourthly, dummies that indicate state ownership are significant in both cases and have negative sign. State-owned enterprise can be subjects of government subsidies and as a result depress competition. Estimated coefficients show that this variable has nearly the same effect in CEE and CIS countries.

Results of the test for the difference in coefficients for the ordered probit model are provided in Table 1 in Appendix. They confirm the main findings from the previous model.

Tressure from domestic competitors           Uigh entry barriers         0.258581***         0.258581***           0.12712)         0.177687*           Medium entry barriers         0.556262***         0.452278**         0.128021         0.128021         0.1170581           Low entry barriers         0.134344         0.0150239**         0.128021         0.112946         0.3221***           developing mey products         0.12843         0.128021         0.128025         0.128255           developing new products         0.128025         0.128457         0.128457           developing new products         0.128025         0.128427         0.167442         0.028621***         0.0128456           developing new products         0.17827         0.167442         0.028621***         0.0128456           developing new products         0.167442         0.028677         -0.1616742         0.012873         0.012873         0.012874	Competition	1 (CEE)	1 (CIS)	2 (CEE)	2 (CIS)
High cutry barriers (cost         0.30900***         0.232635***         0.279604**         0.22881***           Medium entry barriers         0.55622***         0.451278**         0.525430***         0.4117958           Medium entry barriers         0.55622***         0.451278***         0.525430***         0.41242           Low entry barriers         0.118469         0.12535         0.150239         0.128062         0.1175039           Ingle netry barriers         0.13344         0.33671***         0.112946         0.322251****           Medium entry barriers         0.4190***         0.44010***         0.012630         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.0128020         0.128020         0.0128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.128020         0.138148         0.218037         0.228021**         0.039277         0.136178         0.049739***         0.44673***         0.136178         0.128149         0.116355         0.128149         0.116355         0.128149         0.116355         0.1281459	•	Pressure	from domestic compet	titors	, , ,
reduction)         (0.12936)         (0.117098)         (0.127112)         (0.11758)           Medium entry barriers         0.552622***         0.45327***         0.552430***         0.175039           I ow entry barriers         0.118469)         (0.123658)         (0.128022)         (0.128022)         (0.128022)         (0.128022)           I developin per products)         (0.125148)         (0.12373)         (0.126820)         (0.121820)           Medium entry barriers         0.141940***         0.400731***         0.41018***         0.3731***           (developin per products)         (0.128055)         (0.122113)         (0.124465)           I ow entry barriers         0.41929***         0.464739***         0.440173***         0.613149***           (developin per products)         (0.128055)         (0.13221)         (0.134250)         (0.134267)           (developin per products)         (0.12827)         (0.181296)         (0.134250)         (0.134267)           (eduction)         (0.11221)         (0.113426)         (0.12087)         (0.11218)           (eduction)         (0.11221)         (0.114455)         (0.12087)         (0.12718)           (eduction)         (0.11221)         (0.114450)         (0.12087)         (0.11713)	High entry barriers (cost	0.309000***	0.282625***	0.279604**	0.285881***
	reduction)	(0.125936)	(0.117098)	(0.127112)	(0.117658)
(cost reduction)         (0.118469)         (0.12368)         (0.120184)         (0.12442)           Low enty barriers (cost (developin new products)         (0.13234)         (0.150239)         (0.12802)         (0.151040)           High entry barriers         (0.13343)         (0.130731)***         (0.126820)         (0.121820)           Medium entry barriers         (0.12134)         (0.120743)         (0.12103)         (0.12465)           Idevelopin new products)         (0.12103)         (0.12137)         (0.12465)         (0.12405)           Idevelopin new products)         (0.122042)         (0.12103)         (0.1347)***         (0.4465)           Idevelopin new products)         (0.12204)         (0.13073)         (0.14937)         (0.14865)           Idevelopin new products)         (0.12211)         (0.144204)         (0.13073)         (0.14937)           Reduction)         (0.12211)         (0.144195)         (0.12087)         (0.144670)           Idevelopin new products)         (0.12074)         (0.12373)         (0.144670)           Idevelopin new products)         (0.12074)         (0.14473)         (0.144670)           Idevelopin new products)         (0.13142)         (0.14473)         (0.14473)           Idevelopin new products)         (0.131462)	Medium entry barriers	0.556262***	0.453278***	0.525430***	0.433524***
Low entry harriers (cost         0.5488.09**         0.176391         0.505068**         0.175039           High entry harriers         0.127235)         0.0152039)         (0.12802)         (0.12802)           Medium entry barriers         0.123434         0.336571***         0.128520)         (0.12820)           Medium entry barriers         0.441940***         0.400731***         0.401018***         0.374371***           Low entry barriers         0.491929***         0.440173***         0.634149***         0.634149***           (developing new products)         0.120182)         0.120182)         0.120182)         0.120182)           Low entry barriers         0.491929***         0.440173***         0.634149***           (developing new products)         0.120182)         0.122113)         0.13126           Medium entry barriers         0.029279         -0.167442         0.029277         -0.136178           Medium entry barriers         0.035419         -0.22861*         0.011837*         -0.192236           Medium entry barriers         0.023427)         0.114250         0.0148257         0.01773           (developing new products)         0.114040         0.120753         0.01773         0.0144670           Low entry barriers         -0.03360*** <td< td=""><td>(cost reduction)</td><td>(0.118469)</td><td>(0.123658)</td><td>(0.120184)</td><td>(0.124442)</td></td<>	(cost reduction)	(0.118469)	(0.123658)	(0.120184)	(0.124442)
reduction) (0.12725) (0.150239) (0.12802) (0.12804) (0.121820) (0.121820) (0.121820) (0.12375) (0.120743) (0.126820) (0.121820) (0.121820) (0.120731*** (0.401018**** (0.374371***) (0.120155) (0.120155) (0.120157) (0.02017) (0.020	Low entry barriers (cost	0.548850***	0.176391	0.505068***	0.175039
High entry barriers         0.12344         0.336571***         0.112946         0.22251***           Medium entry barriers         0.41940***         0.400731***         0.401018***         0.34371***           Ideveloping new products)         0.120182)         (0.125389)         (0.122113)         (0.12665)           Low entry barriers         0.491929***         0.649739***         0.46173***         0.634149***           Ideveloping new products)         (0.12085)         (0.122113)         (0.149267)         (0.149267)           Ideveloping new products)         (0.132427)         (0.181296)         (0.134526)         (0.18236)           Medium entry barriers         0.055189         -0.221319         0.111318         -0.217407           (cost reduction)         (0.132427)         (0.144256)         (0.120879)         (0.144670)           Low entry barriers         0.033607**         -0.152217         (0.144670)         (0.12213)         (0.121718)           Irigh entry barriers         0.034835         -0.17328         -0.04277*         -0.172217           Irigh entry barriers         -0.03630***         -0.02473**         -0.062094           (developing new products)         (0.110434)         (0.14235)         (0.172217)           Medium entry barriers	reduction)	(0.127235)	(0.150239)	(0.128902)	(0.151040)
	High entry barriers	0.134344	0.336571***	0.112946	0.322251***
Medium entry barriers $0.41940^{***}$ $0.40073^{***}$ $0.37437^{***}$ $0.37437^{***}$ I.ow entry barriers $0.49192^{***}$ $0.649739^{***}$ $0.64173^{***}$ $0.634149^{***}$ (developing new products) $(0.120182)$ $(0.120182)$ $(0.120182)$ $(0.120182)$ High entry barriers (cost $0.02277$ $-0.167442$ $0.022677$ $-0.136178$ (cost reduction) $(0.1123427)$ $(0.181296)$ $(0.13427)$ $(0.182436)$ Medium entry barriers $0.055189$ $-0.221319$ $(0.114457)$ $(0.120173)$ (cost reduction) $(0.119231)$ $(0.144195)$ $(0.12173)$ $(0.121718)$ Irigh entry barriers $-0.234838^*$ $-0.138425$ $(0.12217)$ $(0.12717)$ Medium entry barriers $-0.305360^{***}$ $-0.213238$ $-0.204737^{**}$ $-0.062094$ (developing new products) $(0.11924)$ $(0.141293)$ $(0.114373)$ $(0.122669)$ (developing new products) $(0.119656)$ $(0.147723)$ $(0.128545^{**})$ $-0.03530^{***}$ (developing new products)	(developing new products)	(0.125348)	(0.120743)	(0.126820)	(0.121820)
$\begin{array}{c} (developing new products) \\ (0.128398) \\ (0.128398) \\ (0.128398) \\ (0.128398) \\ (0.128398) \\ (0.128398) \\ (0.129279) \\ (0.18235) \\ (0.18226) \\ (0.130073) \\ (0.130073) \\ (0.149937) \\ (0.149937) \\ (0.130073) \\ (0.149937) \\ (0.13937) \\ (0.14927) \\ (0.18247) \\ (0.181296) \\ (0.134526) \\ (0.134526) \\ (0.134526) \\ (0.134526) \\ (0.134526) \\ (0.134526) \\ (0.11348) \\ (0.120745) \\ (0.11348) \\ (0.120745) \\ (0.11348) \\ (0.120745) \\ (0.11348) \\ (0.120745) \\ (0.11347) \\ (0.121718) \\ (0.121718) \\ (0.121718) \\ (0.1134838) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113485) \\ (0.113475) \\ (0.113475) \\ (0.113475) \\ (0.113755) \\ (0.11718) \\ (0.121718) \\ (0.113475) \\ (0.113475) \\ (0.113755) \\ (0.11717) \\ (0.121718) \\ (0.121718) \\ (0.113475) \\ (0.113475) \\ (0.113475) \\ (0.113475) \\ (0.113755) \\ (0.11717) \\ (0.12469) \\ (0.113492) \\ (0.113375) \\ (0.113375) \\ (0.12469) \\ (0.113492) \\ (0.113375) \\ (0.11377) \\ (0.12469) \\ (0.12469) \\ (0.110377) \\ (0.12469) \\ (0.11037) \\ (0.12469) \\ (0.120640) \\ (0.110372) \\ (0.12660) \\ (0.110372) \\ (0.12660) \\ (0.147723) \\ (0.12658) \\ (0.11037) \\ (0.126630) \\ (0.107727) \\ (0.12658) \\ (0.107727) \\ (0.085474) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.093428) \\ (0.097541) \\ (0.097401) \\ (0.08768) \\ (0.075401) \\ (0.08768) \\ (0.075401) \\ (0.08567) \\ (0.075401) \\ (0.08768) \\ (0.075401) \\ (0.08567) \\ (0.097401) \\ (0.08568) \\ (0.075401) \\ (0.097401) \\ (0.08768) \\ (0.09748) \\ (0$	Medium entry barriers	0.441940***	0.400731***	0.401018***	0.374371***
Low entry barriers $0.49199^{***}$ $0.649199^{***}$ $0.64119^{***}$ $0.63419^{***}$ High entry barriers $0.128055$ $(0.128025)$ $(0.139204)$ $(0.13927)$ High entry barriers $0.02927$ $(0.1612015)$ $(0.138256)$ $(0.184256)$ Medium entry barriers $0.055189$ $-0.221319$ $(0.114470)$ $(0.128015)$ Low entry barriers $0.01120410$ $(0.128015)$ $(0.128015)$ $(0.128015)$ Low entry barriers $0.01130460$ $(0.120745)$ $(0.118473)$ $(0.112231)$ High entry barriers $-0.205801^{***}$ $-0.123238$ $-0.26437^{***}$ $-0.062194$ (developing new products) $(0.113046)$ $(0.12328)$ $-0.26437^{**}$ $-0.062094$ (developing new products) $(0.119429)$ $(0.11637)$ $(0.12265)$ $(0.12328)$ Low entry barriers $-0.206800^{**}$ $-0.067978$ $-0.25454^{**}$ $-0.025729$ (developing new products) $(0.110344)$ $(0.160778)$ $(0.149979)$ $(0.12057)$ HBC $0.01938$ $0.48019$	(developing new products)	(0.120182)	(0.125598)	(0.122113)	(0.126465)
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Low entry barriers	$0.491929^{***}$	$0.649/39^{***}$	$0.4461/3^{***}$	$0.034149^{***}$ (0.140027)
High entry barriers (cost reduction)         0.029279         -0.167442         0.029277         -0.136178           Medium entry barriers         0.055189         -0.221319         0.111318         -0.217407           (cost reduction)         0.0119231         (0.144195)         (0.120879)         (0.144670)           Low entry barriers         0.0170161         -0.228621*         0.201833*         -0.192236           (developing new products)         0.134450         (0.112718)         (0.1124473)         (0.11718)           High entry barriers         -0.305360***         -0.12328         -0.264737**         -0.062094           (developing new products)         (0.119460)         (0.12923)         (0.118473)         (0.128569)           Low entry barriers         -0.206800*         -0.060789         -0.01945**         -0.026577           (developing new products)         (0.119429)         (0.111637)         (0.120539)           Barriers to exit         -         -         -         -           HBC         0.010938         0.480191***         0.024617*         (0.149797)           (0.126660)         0.209530***         0.02773         (0.149797)         (0.149797)           HBC         0.010233701         (0.108577)         (0.094728) <td>(developing new products)</td> <td>(0.128033) Droggurg</td> <td>(0.149204)</td> <td>(0.130073)</td> <td>(0.149937)</td>	(developing new products)	(0.128033) Droggurg	(0.149204)	(0.130073)	(0.149937)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	High antry harriage (agat	Pressure	0 167442	LOFS	0 126179
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	High entry barriers (cost reduction)	(0.029279)	-0.16/442 (0.181296)	0.092677	-0.1301/8 (0.182436)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Multi munto la mismo	(0.132427)	(0.181290)	(0.134320)	(0.182430)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Medium entry barriers	(0.055189)	-0.221319	(0.111318) (0.120870)	-0.21/40/ (0.144670)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Low optry herriors (cost	0.171051	(0.144193)	(0.120879)	0.102226
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	reduction)	(0.171031) (0.113046)	(0.120745)	(0.201833)	(0.192230)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	High entry barriers	-0.23/838*	(0.120745)	(0.114437)	-0.067173
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	(developing new products)	(0.131402)	(0.169742)	(0.133755)	(0.172217)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Medium entry harriers	-0 305360***	-0 123238	-0 264737**	-0.062094
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	(developing new products)	(0.116956)	(0.141293)	(0.118473)	(0.142869)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Low entry barriers	-0.206800*	-0.069789	-0.219545**	-0.035729
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	(developing new products)	(0.110364)	(0.119429)	(0.111637)	(0.120639)
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		(*******)	Barriers to exit	((()))	(******
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	HBC	0.010938	0 480191***	-0.044077	0 419343***
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	1120	(0.126660)	(0.147723)	(0.128568)	(0.149979)
High demand elasticity $0.282472^{***}$ (0.085474) $0.694220^{***}$ (0.106511) $0.276138^{***}$ (0.086530) $0.662579^{***}$ (0.107727)Medium demand elasticity $0.286154^{***}$ (0.093428) $0.348183^{***}$ (0.108657) $0.037802^{***}$ (0.09728) $0.338908^{***}$ (0.110090)Low demand elasticity $0.086100$ (0.077398) $0.290530^{***}$ (0.078513) $0.291504^{***}$ (0.08752)High supply elasticity $0.118216$ (0.0774119) $0.099241$ (0.086827) $0.127599^{*}$ (0.075401) $0.087686$ )Medium supply elasticity $0.033701$ (0.094012) $0.110769$ (0.097707) $0.034004$ (0.088627) $0.087290$ (0.095518)Low supply elasticity $0.029666$ (0.092066 $0.128537$ (0.097707) $0.018220$ (0.098491) $0.113276$ (0.098491)Large firms $-0.219809^{***}$ (0.082079) $-0.318061^{***}$ (0.09513) $-0.219809^{***}$ (0.09510)Large firms $-0.593691^{***}$ (0.093621) $-0.310061^{***}$ (0.097107) $-0.32121^{***}$ 		Dema	nd and supply elasticit	v	(0.1.1))
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	High demand elasticity	0 282472***	0 694220***	0 276138***	0 662579***
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ingh demand endstrenty	(0.085474)	(0.106511)	(0.086530)	(0.107727)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Medium demand elasticity	0.286154***	0.348183***	0.307802***	0.338908***
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		(0.093428)	(0.108657)	(0.094728)	(0.110090)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Low demand elasticity	0.086100	0.290530***	0.122974	0.291504***
High supply elasticity $0.118216$ (0.074119) $0.099241$ (0.086827) $0.127599*$ (0.075401) $0.104339$ (0.087686)Medium supply elasticity $0.033701$ (0.094012) $0.110769$ (0.120676) $0.034004$ (0.095518) $0.087290$ (0.121376)Low supply elasticity $0.029666$ (0.082079) $0.128537$ (0.097707) $0.018220$ (0.083407) $0.113277$ (0.098491)Medium firms $0.029666$ (0.0982079) $0.128537$ (0.097707) $0.018220$ (0.083407) $0.113277$ (0.098491)Medium firms $-0.219809***$ (0.068213) $-0.219809***$ (0.079501)Large firms $-0.593691***$ (0.083649) $-0.318061***$ (0.097159)Medium age firms $0.020391$ (0.090462) $0.034713$ (0.098491)Medium age firms $-0.019619$ (0.090462) $0.034713$ (0.098494)N $2997$ 1448 $-0.2129***$ (0.076874) $-0.216905**$ (0.087494)N $2997$ 1448 $168.4331$ $268.8987$ $194.8571$ Log-likelyhood $-1411.543$ 0.062422 $-1087.052$ 0.071902 $-1371.072$ 0.083182	, ,	(0.077398)	(0.087054)	(0.078513)	(0.087752)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	High supply elasticity	0.118216	0.099241	0.127599*	0.104339
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$		(0.074119)	(0.086827)	(0.075401)	(0.087686)
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Medium supply elasticity	0.033701	0.110769	0.034004	0.087290
Low supply elasticity $0.029666$ ( $0.082079$ ) $0.128537$ ( $0.097707$ ) $0.018220$ ( $0.083407$ ) $0.113277$ 		(0.094012)	(0.120676)	(0.095518)	(0.121376)
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Low supply elasticity	0.029666	0.128537	0.018220	0.113277
Basic variablesMedium firms-0.219809*** (0.068213)-0.219809*** (0.079501)Large firms-0.593691*** (0.083649)-0.362121*** (0.097159)Medium age firms-0.20391 (0.090462)0.010080 (0.090462)New firms-0.019619 (0.098393)0.0109421)State firms-0.224219*** (0.076874)-0.216905** (0.087494)N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood-1411.543-1087.052-1371.072LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.089304		(0.082079)	(0.097707)	(0.083407)	(0.098491)
Medium firms-0.219809*** (0.068213)-0.219809*** (0.079501)Large firms-0.593691*** (0.083649)-0.362121*** (0.097159)Medium age firms0.020391 (0.090462)0.010080 (0.090462)New firms0.020391 (0.090462)0.034713 (0.098393)State firms-0.219809*** (0.097159)N29971448 (0.076874) $\chi^2$ 187.9564168.4331Log-likelyhood-1411.543-1087.052LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182			Basic variables	-	
Large firms $(0.068213)$ $(0.079501)$ Large firms $-0.593691^{***}$ $(0.083649)$ $-0.362121^{***}$ $(0.097159)$ Medium age firms $0.020391$ $(0.090462)$ $0.010080$ $(0.090462)$ New firms $-0.019619$ $(0.098393)$ $0.034713$ $(0.109421)$ State firms $-0.224219^{***}$ $(0.076874)$ $-0.216905^{**}$ $(0.087494)$ N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood $-1411.543$ $-1087.052$ $-1371.072$ LR index (Pseudo-R <sup>2</sup> ) $0.062422$ $0.071902$ $0.089304$ $0.083182$	Medium firms			-0.318061***	-0.219809***
Large firms-0.593691*** (0.083649)-0.362121*** (0.097159)Medium age firms0.020391 (0.090462)0.010080 (0.086202)New firms-0.019619 (0.098393)0.034713 (0.098393)State firms-0.224219*** (0.076874)-0.216905** (0.087494)N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood-1411.543-1087.052-1371.072LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.089304				(0.068213)	(0.079501)
Medium age firms $(0.083649)$ $(0.097159)$ Medium age firms $0.020391$ $0.010080$ New firms $-0.019619$ $0.034713$ New firms $-0.019619$ $0.034713$ State firms $-0.224219^{***}$ $-0.216905^{**}$ N299714482997N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood $-1411.543$ $-1087.052$ $-1371.072$ LR index (Pseudo-R <sup>2</sup> ) $0.062422$ $0.071902$ $0.089304$	Large firms			-0.593691***	-0.362121***
Medium age firms0.0203910.010080New firms-0.019619(0.086202)New firms-0.0196190.034713State firms-0.224219***-0.216905**N299714482997N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood-1411.543-1087.052-1371.072LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.089304				(0.083649)	(0.097159)
New firms $(0.090462)$ $(0.086202)$ New firms $-0.019619$ $0.034713$ State firms $-0.224219***$ $-0.216905**$ N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood $-1411.543$ $-1087.052$ $-1371.072$ LR index (Pseudo-R <sup>2</sup> ) $0.062422$ $0.071902$ $0.089304$	Medium age firms			0.020391	0.010080
New firms-0.019619 $0.034713$ State firms $0.098393$ $(0.109421)$ N299714482997 $\chi^2$ 187.9564168.4331268.8987Log-likelyhood-1411.543-1087.052-1371.072LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.089304	NT C			(0.090462)	(0.086202)
State firms $(0.098393)$ $(0.109421)$ N299714482997 $(0.076874)$ $\chi^2$ 187.9564168.4331268.8987194.8571Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182	new tirms			-0.019019	0.034/13 (0.100421)
State Infits $-0.224219^{+1.1}$ $-0.216903^{+1.1}$ N2997144829971448 $\chi^2$ 187.9564168.4331268.8987194.8571Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182	State firme			0.098393	(0.109421)
N2997144829971448 $\chi^2$ 187.9564168.4331268.8987194.8571Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182	State IIIms			-0.224219***	-0.210905**
$\chi^2$ 187.9564168.4331268.8987194.8571Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182	N	2007	1448	2007	1//8
$\chi^2$ 107.304100.4531200.0507194.8371Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R <sup>2</sup> )0.0624220.0719020.0893040.083182	2	187 9564	168 4331	2/3/	194 8571
Log-likelyhood-1411.543-1087.052-1371.072-1073.840LR index (Pseudo-R2)0.0624220.0719020.0893040.083182	$\chi^{2}$	10/.7304	100.4331	200.0707	1/4.03/1
LR index (Pseudo- $R^2$ ) 0.062422 0.071902 0.089304 0.083182	Log-likelyhood	-1411.543	-1087.052	-1371.072	-1073.840
	LR index (Pseudo-R <sup>2</sup> )	0.062422	0.071902	0.089304	0.083182

### Table 11. Determinants of competition in CIS countries Ordered probit regressions

Notes: \*\*\* significance at 1% level; \*\*significance at 5% level; \* significance at 10% level

## Conclusions

This paper provides a comparative analysis of determinants of competition in CEE and CIS countries. Using the probit and the ordered probit models, I explore relative significance of different variables that define intensity of competition in both groups of countries.

The results of estimation show that entry barriers have meaningful effect on competition across all transition countries. There is a strong positive correlation between lower barriers and higher intensity of competition concerning pressure from domestic competitors. This result is robust because its significance does not change due to different specifications of the model or introduction of basic variables. An important finding is that pressure towards cost reduction and innovations have relatively equal effect on competition in CEEC in contrast to the CIS countries where the R&D seems to be more important.

Entry barriers in the form of pressure from foreign competitors do not have considerable effect on intensity of competition in transition economies. In case of CIS countries where foreign enterprises face substantial administrative and regulatory barriers and rather high level of corruption it does not seem surprising and testify my expectations. The model gives better results for CEE countries. Medium and low entry barriers towards innovations are highly significant. Other finding of the paper is that barriers to exit highly intensify competition in post-Soviet countries. The results are robust even under 1% of significance.

Another interesting result is the positive relationship between intensity of competition and price elasticity of demand. The remarkable difference between CEE and CIS countries is that high and low elasticity are twice more important for the latter comparing to the former. Supply elasticity has relatively low influence in both cases. In addition, basic variable, which I add to model have similar effect across transition countries. State ownership and size dummies are highly significant and show negative relationship with intensity of competition.

Future researchers can focus on changes in the impact of determinants of competition in CEE and CIS countries. Using long panel data set, they can account for fixed effects during the definite period. This could help to evaluate the effectiveness of implementation of competition policies across transition economies and observe the change in impact of determinants of competition.

## Appendix

Competition	Binary probit	Ordered probit
	0.571755	0.76107/***
	(0.3/1/33)	(0.225251)
(0.433949) (0.233531)		
Pressure from domestic competitors		
High entry barriers (cost reduction)*CEE_d	0.1248/9	-0.116194
	(0.319794)	(0.1/1615)
Medium entry barriers (cost reduction)* CEE_d	-0.133490	-0.149204
	(0.301612)	(0.164687)
Low entry barriers (cost reduction)* $CEE_d$	0.214434	-0.267719
	(0.332845)	(0.188665)
High entry barriers (developing new products)*	0.759756***	0.135066
CEE_d	(0.294240)	(0.164997)
Medium entry barriers (developing new	0.891058***	0.231811
products)* CEE_d	(0.311688)	(0.162578)
Low entry barriers (developing new products)*	0.513058*	0.417081***
CEE d	(0.291663)	(0.163990)
Pressure from foreign competitors		
High entry barriers (cost reduction)* CEE d	0.980726**	0.599428***
	(0.436175)	(0.239669)
Medium entry barriers (cost reduction)* CEE d	0 308733	0 280942
	(0.370270)	(0.203877)
Low entry barriers (cost reduction)* CEF d	0 587623*	0 419434***
Low entry barriers (cost reduction) CEL_u	(0.344536)	(0.178436)
High entry barriers (developing new products)*	-1 072681***	_0 473472**
CFF d	(0.420650)	(0.229206)
Madium antry harriars (dayaloning naw	0.912451**	0.2292009
products)* CFF_d	(0.360603)	(0.195205)
Low entry barriers (developing new products)*	0.500003)	0.195205)
CFE d	(0.225770)	(0.174976)
$\frac{CEL}{u} = \frac{(0.55577)}{(0.174670)}$		
	15 10 EXIL	0.520042***
nbc <sup>+</sup> CLL_a	(0.10/300)	$-0.339942^{+++}$
Demendende	(0.190724)	(0.201217)
Demand and supply elasticity		
High demand elasticity* $CEE_d$	-0.5691/8**	-0.458/65***
	(0.302639)	(0.146419)
Medium demand elasticity* CEE_d	0.030510	-0.113259
	(0.272977)	(0.152663)
Low demand elasticity* <i>CEE_d</i>	-0.054791	-0.235170**
	(0.224968)	(0.121812)
High supply elasticity* <i>CEE_d</i>	0.139262	0.067758
	(0.216079)	(0.119534)
Medium supply elasticity* CEE_d	-0.043896	-0.358404**
	(0.328726)	(0.172114)
Low supply elasticity* CEE d	-0.331209	-0.180120
	(0.255803)	(0.135377)
N	4445	4445
$\chi^2$	282.0487	413.7813
	407 (005	2254.220
Log-likelyhood	-487.6895	-2254.329
McFadden R-squared	0.224306	0.081925

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