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Assessing the Macroeconomic Effects of Competition Policy - the Impact on Economic Growth

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Abstract

In this paper we analyse the impact of competition policy on economic growth, using a panel data model in which we include several control variables (selected on the basis of an extended Solow-Swan growth model) as well as cross-section specific effects. The sample we use consists of 138 countries for which annual data was collected between 2009 and 2013. The results indicate a direct relationship between competition policy effectiveness (as computed by the World Economic Forum) and the percentage change in real GDP per capita, thus providing empirical evidence of the positive effects of competition policy enforcement on macroeconomic performances.

Keywords: *competition policy; antitrust; economic growth; growth models*

JEL Classification: *K21; L40*

Introduction

Competition policy can positively influence economic growth through its effects on productivity. Within a normal competitive environment, companies seek increasingly efficient ways of producing and distributing goods, they are motivated to adopt new technologies and, not least, to innovate[1]. These sources of productivity growth stimulate the economic development.

However, markets are not automatically defined by effective and loyal competition. Anticompetitive practices, unfair competition, legislative provisions and interventions with anticompetitive effects are factors that slow down or hinder market entry, the introduction of new technologies, innovation and restructuring processes, generating negative effects on productivity. In this context, competition policy must act effectively, in order ensure a normal functioning of markets.

[1] Unlike the relation between competition and economic efficiency and the one between competition and technological diffusion (especially when markets are open to international competition), which are widely accepted, there is not much consensus over the impact of competition on innovation. This specific link represents a widely debated topic in literature. Recent studies have found evidence of an inverted-U relationship between these two variables.

The economic theory shows that competition policy can lead to increased productivity through three main channels[2]:

(i) The selection effect – which reduces the market share of less efficient competitors;

(ii) The restructuring effect – which increases companies' motivation to reduce costs;

(iii) The entry effect – which stimulates entry of more efficient competitors.

The magnitude of these effects depends, on one hand, on the economic, political and social characteristics and, on the other hand, on the extent and effectiveness of competition policy enforcement. The above remarks apply to all pro-competitive measures and policies. Competition authorities should use all tools at their disposal in order to ensure that markets function in accordance with fair competition principles. Beyond enforcing competition law, such an approach requires active involvement in the implementation of pro-competitive reforms of the national legislative framework.

The process of reviewing and eliminating redundant constraints imposed by legislation and other governmental constraints enables the positive forces of competition and stimulates the economy as a whole[3].

Romania is one of the countries that are actively involved in shaping and reforming the national legislative framework in terms of its impact on competition. Between 2014 and 2015, the Romanian Competition Council, together with the Chancellery of the Prime Minister, the Ministry of Public Finances and The Organisation for Economic Co-operation and Development, carries out an extensive evaluation project on the competitive impact of existing regulations in three sectors with significant contribution to GDP:

- Food processing,
- Transportation and
- Constructions.

The project aims to identify and review anticompetitive provisions.

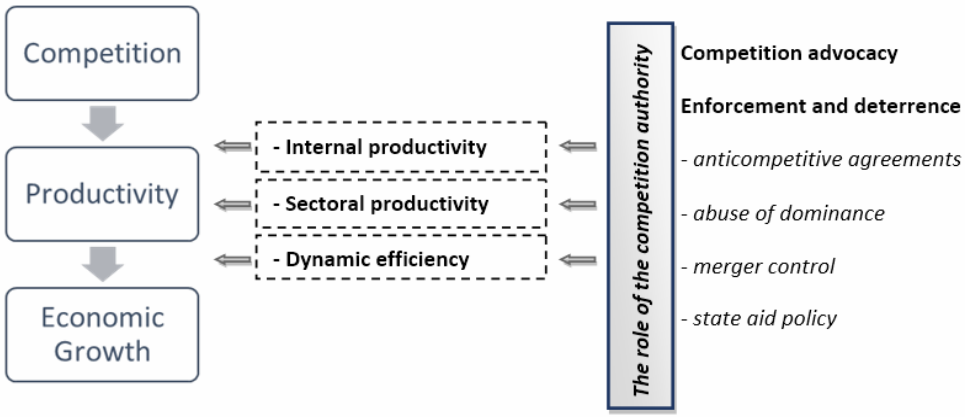

Fig. 1. The effects of competition on economic growth and the role of competition policy

Source: The Romanian Competition Council, *Annual Report*, 2013, p. 10

Economic theory and numerous studies carried out at company or industry level bring solid evidence regarding the existence of a positive impact of competition (and therefore, of the effective enforcement of competition policy) on economic growth through productivity.

[2] Aghion, P., Schankerman, M., On the Welfare Effects and Political Economy of Competition-enhancing Policies, *The Economic Journal*, no. 114, 2004, pp. 800–824.
[3] The Romanian Competition Council, *Competition Developments in Key Sectors*, 2014, p. 17.

However, the empirical approach of the relation between competition intensity or competition policy effectiveness and key macroeconomic variables defining economic performance is limited, especially since it is difficult to identify appropriate aggregate measures for the exogenous variable[4].

The macroeconomic effects of competition policy can be assessed in various ways. There are three main categories of studies addressing this topic: studies aiming to determine the impact of competition policy on competition intensity (whose results, in conjunction with theoretical and empirical well defined findings on the role of competition enable researchers to draw conclusions regarding the macroeconomic effects of competition policy enforcement), studies analysing the impact of competition on macroeconomic performances (assuming the relationship between competition policy effectiveness and competition intensity implicit) and studies analysing directly the impact of competition policy on macroeconomic performances.

In this paper, the emphasis is on the third category. We start by reviewing the literature on the impact of competition policy on economic growth[5].

Dutz and Hayri [1999][6] study the impact of different competition related measures on the long term growth. They perform a cross-sectional analysis in order to capture their macroeconomic effects.

The analysis consists of three stages. In the first stage, a simplified model of growth is developed, using core variables well defined in the literature. In the second phase, the authors study the partial correlations between variables characterizing competition (i.e. on competition policy, structure and mobility) and the unexplained economic growth resulting from the specified growth model. Finally, in the third stage, they test the robustness of correlations.

The authors reach the conclusion that competition policy effectiveness is positively associated with long-term growth, as the results show that the main competition related measures positively influence the unexplained growth.

Dutz and Vagliasindi [2000][7] focus on the influence transmission mechanisms of competition policy effectiveness on economic growth.

The research is conducted in cooperation with the European Bank for Reconstruction and Development and it represents a trenchant thematic analysis on transition countries from Central and Eastern Europe. A total of 18 countries, characterized by relatively similar geographical, historical and cultural features are included.

The authors base their analysis on three categories of objective indicators: law enforcement, competition advocacy and institutional effectiveness. They identify positive and significant correlations between effective competition policy enforcement and expansion of more efficient private companies. Given the result, Dutz and Vagliasindi consider that governments can influence business environment through competition policy effectiveness, encouraging mobility and efficient allocation of resources.

Petersen [2013][8] uses two types of competition policy measures to analyse the effects of its enforcement on growth and democracy: a binary variable that indicates the presence of an

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[4] Ahn, S., *Innovation and Productivity Growth: A Review of Theory and Evidence*, OECD Working Paper no. 317, 2002, p. 20.
[5] Studies are listed chronologically.
[6] Dutz, M. A., Hayri, A., *Does More Intensive Competition Lead to Higher Growth?*, CEPR Discussion Paper no. 2249, 1999.
[7] Dutz, M. A., Vagliasindi, M., *Competition Policy Implementation in Transition Economies: An Empirical Assessment,* EBRD Working Paper no. 47, 2000.
[8] Petersen, N., Antitrust Law and the Promotion of Democracy and Economic Growth, *Journal of competition law & economics*, vol. 9, no. 3, 2013, pp. 593-636.

antitrust regime and a "formal" index (ALI), computed using the methodology developed by Nicholson (2004).

The author assesses the relationship between the binary variable and growth (percentage change in GDP per capita), economic development (GDP per capita) and democracy. All data for the exogenous variables are triennial averages. ALI is used as an alternative approach, only in the case of the last two relationships.

The analysis is carried out using panel data models. The control variables (i.e. GDP per capita, trade openness, a measure of democracy, population size and resources as a share of exports) are introduced in the model with three lags. The sample includes 154 countries for which data was collected between 1960 and 2007.

The results show a strong positive relationship between the existence of an antitrust regime and both growth and economic development and a positive relationship between legislation quality and development level. In the case of democracy, on the other hand, no statistically significant effects have been identified.

Gutmann and Voigt [2014][9] use a binary variable indicating the existence of a competition law and estimate the relationship between it and GDP per capita growth rate, total factor productivity growth rate, investments, corruption and competition policy effectiveness (resulted from experts' evaluation).

For each relationship the same regression model is used, in which were included, along with the key independent variable (the existence of competition policy), proxies for the degree of democratization and economic liberalization, the number of years that have passed since competition law enactment and two dummy variables - one for the European Union membership and one for the high-income country status.

The authors conclude that competition law enactment has a positive impact on economic growth, through the beneficial effects of such a measure on investments.

Data and Methodology

In order to empirically assess the impact of competition policy enforcement on economic growth we use a panel data model. This type of models implies regression estimation using data that have both cross-sectional and temporal dimensions. In our case, the observations correspond to a set of 138 countries subject to the World Economic Forum evaluation process (performed in order to determine the effectiveness of competition policy enforcement) and a period of 5 years (2009-2013)[10].

The first methodological step is to define the general form of the regression model. We start from the two variables we want to check the relationship for: competition policy effectiveness (as explanatory variable) and economic growth (as dependent variable). In order to have the right image of the relationship between these two key variables, we must take into account the determinants of economic growth. They will be included in the model as control variables.

$$GROWTH_{it} = \alpha + \beta \times COMP_{POLICY_{EFF_{it}}} + \gamma_n \times CONTROL_{it} + \xi_{it} \quad (1)$$

where:

[9] Gutmann, J., Voigt, S., *Lending a Hand to the Invisible Hand? Assessing the Effects of Newly Enacted Competition Laws*, Assessing the Effects of Newly Enacted Competition Laws, 2014.

[10] Initially, data was collected for all countries covered by the World Economic Forum during the period of interest. However, after a first review, 13 countries where withdrawn from the database as they had missing data, during all five years, for at least one of the variables included in the model.

$GROWTH_{it}$ = the economic growth of country *i* in year *t*;

$COMP\_POLICY\_EFF_{it}$ = the competition policy effectiveness for country *i* in year *t*;

$CONTROL_{it}$ = the control variables' *N*-dimensional vector;

ε_{it} = the residual variable.

In order to identify the control variables, we use an extended Solow-Swan growth model, in which growth is driven by physical capital, human capital, trade openness, population growth and the initial level of GDP per capita. This approach will enable us to interpret the differences in growth at both period and country level.

Economic growth is introduced in the model as real GDP per capita percentage change (not. GROWTH). For competition policy effectiveness we use the World Economic Forum indicator as a proxy (not. COMP_POLICY_EFF).

The five control variables are:
- Gross capital formation (% of GDP) – not. GFC;
- Mean years of schooling[11] – not. SCHOOL;
- Trade openness (measured as exports plus imports over GDP) – not. TRADE_OP;
- Population growth (annual %) – not. POP_GR;
- Initial level of GDP per capita (in constant prices) – not. GDP_INIT.

For all variables annual values were collected, using the following data sources: the World Economic Forum (for competition policy effectiveness), the World Bank (for economic growth, GDP, gross capital formation, imports, exports and population dynamic) and the United Nations Development Programme (for the mean years of schooling).

The next step consists of making a decision on the inclusion of cross-section (i.e. country) specific effects.

Panel data models enable heterogeneity handling by controlling for country specific variables that cannot be observed or measured, which do not vary over time (like cultural factors, institutional features, specific trade practices etc.).

When included, specific individual effects are usually managed using one of the following alternatives: fixed effects or random effects techniques. The difference between the models with fixed effects and the ones with random effects is largely attributed to the assumptions on how heterogeneity is captured[12] and to the appropriate estimation methods[13]. EViews handles random effects models using Panel Feasible Generalized Least Squares, while fixed effects are addressed through Panel Least Squares.

Choosing the suitable model in the present case is done using the Hausman test. In its general form, the test can be applied to choose between two models which seek to answer the same questions. In the case of specific effects, the comparison is made between a random effects model and a fixed effects model. The null hypothesis in this particular situation is that a random effects model is the appropriate option. The results (Figure 2) allow us to reject this hypothesis.

[11] The average number of years of education received by people ages 25 and older.
[12] In the case of random effects, as opposed to the one of fixed effects, one starts from the assumption that individual effects are not correlated with unobserved regressors.
[13] Murăraşu, B., Bobaşu, A., Output Spillovers from Trade and Financial Linkages in Central and Eastern Countries: A Panel Analysis, *The Review of Finance and Banking*, vol. 6, no. 2, 2014, p. 84.

Correlated Random Effects - Hausman Test Equation: Untitled Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	206.104673	6	0.0000

Fig. 2. Hausman Test results, using EViews

Source: Author's own elaboration

At this point, we know that fixed effects are statistically preferred to random effects in order to estimate the regression parameters in our case.

The next step is to check whether their inclusion in the model is justified. For this, we run *The Redundant Fixed Effects Test* in EViews. This procedure consists of checking the fixed effects' significance using Least Squares. The null hypothesis is that fixed effects are redundant. The results (Figure 3) allow us to reject this hypothesis.

Redundant Fixed Effects Tests Equation: Untitled Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.079974	(137,496)	0.0000
Cross-section Chi-square	482.994452	137	0.0000

Fig. 3. Redundant Fixed Effects Test results, using EViews

Source: Author's own elaboration

Therefore, given the control variables and the decision to include fixed effects, the regression equation (1) can be rewritten as follows:

$$GROWTH_{it} = \alpha_i + \beta \times COMP\_POLICY\_EFF_{it} + \gamma_1 \times GFC_{it} + \gamma_2 \times SCHOOL_{it} + \\ + \gamma_3 \times TRADE\_OP_{it} + \gamma_4 \times POP\_GR_{it} + \gamma_5 \times GDP\_INIT_{it} + \varepsilon_{it} \quad (2)$$

where the notations have the same meaning as previously described.

When using a fixed effects model, cross-section specific effects are captured by the intercept. In our case, this implies each country has its own intercept α_i, while the coefficients for the explanatory variables will be the same.

This model allows us to test if competition policy effectiveness is correlated with economic growth, once we take into account the main growth determinants, GDP per capita from previous year and country fixed effects.

Results and Conclusions

In order to estimate the regression model (2), we use Panel Least Squares with fixed effects in EViews. The results are displayed in Figure 4.

Dependent Variable: GROWTH
Method: Panel Least Squares
Date: 02/09/15 Time: 18:57
Sample: 2009 2013
Periods included: 5
Cross-sections included: 138
Total panel (unbalanced) observations: 640

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COMP_POLICY_EFF	1.071788	0.555979	1.927749	0.0545
GFC	0.237462	0.043325	5.480984	0.0000
SCHOOL	5.538737	1.253826	4.417469	0.0000
TRADE_OP	0.112603	0.015271	7.373866	0.0000
POP_GR	-0.842258	0.249962	-3.369546	0.0008
GDP_INIT	-0.001634	0.000191	-8.573972	0.0000
C	-43.53999	10.45944	-4.162747	0.0000

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.623316	Mean dependent var	1.634771
Adjusted R-squared	0.514716	S.D. dependent var	4.126902
S.E. of regression	2.874897	Akaike info criterion	5.145019
Sum squared resid	4099.457	Schwarz criterion	6.148849
Log likelihood	-1502.406	Hannan-Quinn criter.	5.534654
F-statistic	5.739535	Durbin-Watson stat	2.023563
Prob(F-statistic)	0.000000		

Fig. 4. EViews regression output

Source: Author's own elaboration

The results we have obtained from estimating the regression parameters indicate a strong relationship between competition policy effectiveness and economic growth.

The coefficient for the WEF indicator is statistically significant at a significance level of 5.45%. It is worth mentioning that the significance level improves when the model is estimated using logarithms for level variables – p-value becomes 0.21%.The key finding of our empirical study is that competition policy has a significant contribution to economic growth. In order for this to happen, it is necessary for it to be effectively enforced, so as to be able to protect and foster effective competition.

The coefficients' signs for the control variables are consistent with economic theory and empirical studies on economic growth modelling, namely: positive effects for physical and human capital, as well as for trade openness and negative effects for initial level of GDP per capita and population growth.

The coefficient for the initial level of GDP per capita is interpreted as a test of the convergence hypothesis[14]. After taking into account the determinants of growth, we expect countries with lower initial income to grow faster than countries with higher income, during the period of interest. As for the negative impact of population growth, the result stems from the fact that rapid population growth rates can create difficulties in raising living standards and protecting the environment. Population growth implies a redistribution of wealth among more people, causing a GDP per capita reduction, at least in the short term[15].

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[15] According to the World Bank.