

Productivity or the External Environment: Which is More Important for Growth in Emerging Markets?

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ABSTRACT

Objective: Assessing and comparing growth promoting effects associated with productivity determinants and external environment determinants in 34 emerging market economies.

Research Design & Methods: The study is based on growth regression research design. Two different modelling frameworks – panel OLS and Arellano-Bond GMM estimator – are exploited. The study operates with a unique dataset, covering 34 emerging market economies over 11 years (2007-2017). A traditional set of growth regressors is enriched by the measures of productivity determinants. A set of country-specific measures of the external environment stance are computed and exploited in the modelling framework. Moreover, for capturing numerous attributes of growth promoting effects, the study considers alternative measures of economic growth.

Findings: Both productivity and external environment determinants are meaningful for growth in emerging market. However, external environment determinants dominate in explaining short-term growth, while productivity determinants are more important for long-run sustainable growth.

Implications & Recommendations: The importance of external conditions for emerging markets should not lead us to incorrect belief that productivity fundamentals do not matter anymore. Changes in the external environment are more likely to generate relatively short-term growth rate fluctuations. Hence, a country aiming to secure sustainable growth should still first of all think about productivity fundamentals.

Contribution & Value Added: The study allows to explain recent signs of decoupling between productivity gains and output growth without challenging the foreground role of productivity for generating growth.

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INTRODUCTION

As we are close to enter the 4th decade of economic transition in Central and Eastern Europe (CEE), there is a resurged interest in studies about growth in emerging markets (EM). To a large extent, it stems from the contradictions and collisions between growth theory predictions and recent evidence from EM.

The role of productivity (total factor productivity, TFP) gains in EM's growth tends to be the central challenge herewith. Growth theory assumes that TFP gains must be the most powerful channel of growth. Before the Great Recession the majority of empirical studies on emerging markets mainly supported this vision (e.g. Klenow & Rodriguez-Clare, 1997; Hall & Jones, 1999). This view became a kind of near-consensus, although some influential studies (e.g. Young, 1995) argued that capital accumulation was the most crucial for growth in EM.

The evidence from the current decade seems to be challenging that near-consensus on productivity. On the one hand, numerous studies document the deficit of TFP gains for the bulk of EM after the Great Recession (e.g. IMF, 2015, 2016, 2017; Adler *et al.*, 2017). On the other hand, EM keep on growing and output growth definitely outpaces those of productivity (IMF, 2017). Hence, one may argue whether productivity is crucial for growth in EM any more.

Which growth determinant(s) can explain the mismatch between output and productivity growth and fill the gap in understanding the sources of growth in EM? A recent study by IMF (2017) puts external conditions as a key nominee for this role. It argues that just external conditions have contributed substantially to EM's growth, compensating for the lack of productivity gains.

But this kind of response (if accepted) leads to numerous contradictions/challenges. For instance, whether the growth-enhancing effect of external conditions can be theoretically justified and treated as a persistent substitute to productivity. In practice, the latter means whether a current growth path in EM is sustainable. From the economic policy perspective, it puts the issues of good growth-promoting policies again on the agenda. For instance, shall a country refocus from productivity enhancers to securing favourable external conditions (e.g. through economic integration, trade agreements, etc.)?

Documented empirical evidence about the importance of external conditions for EM (e.g. IMF, 2017), is still not the ultimate diagnosis. Studies focused on detecting growth determinants are very sensitive to exploited data and methodology (Acemoglu, 2009; Calderon, Loyaza, & Schmidt-Hebbel, 2006). Hence, the issue of relative importance of external conditions and productivity requires more evidence and research.

This article deals with the subject matter at the 'primary' level of growth research, i.e. at the level of growth determinants. Documenting and assessing explanatory power of alternative growth determinants usually serves as the basis for further theoretical and empirical research. Barro-style growth regressions (Barro, 1991; 2001) is the core element of the research design of the study. However, it is enriched by a number of important ingredients. First, it differentiates between a shorter and longer time-horizon in respect to growth outcomes. Second, a unique dataset has been formed/computed for the study, which allows to control for a wide set of productivity and external conditions determinants. Third, the study employs alternative estimators – OLS fixed effect framework and

GMM Arellano and Bond estimator – for estimating the growth effect of determinants of interest. Dual estimation framework provides robustness check, on the one hand, and secures enough room for economic interpretations, on the other hand.

The objective of the study is to assess and compare growth-promoting effects associated with productivity determinants and external environment determinants in 34 emerging market economies. Herewith, these two groups of determinants are treated as rivals in a sense.

The rest of the study is organised as follows. Section 2 provides a literature review and formulates the agenda for this study. Section 3 is devoted to data description and methodological issues. Section 4 reports and discusses the results. Section 5 concludes.

LITERATURE REVIEW

Since Solow (1957) a notion that TFP is the major channel of economic growth has become a cornerstone of the economic growth theory. The notion was reappraised within the endogenous growth concept (e.g. Aghion & Howitt, 1992; Grossman & Helpman, 1991; Romer, 1990). However, empirical evidence on the patterns of economic growth is not that straightforward. On the one hand, Hall and Jones (1999), Klenow and Rodriguez-Clare (1997), Wolff (1991) provide empirical support to the theory. On the other hand, Jorgenson, Ho and Stiroh (2005), as well as Christensen, Cummings and Jorgenson (1981) oppose it, stating that the mainstream approach underestimates the role of capital accumulation.

Empirical evidence on growth in EM supplies more food for reflection. Before the Great Recession, the mainstream approach admitted productivity and determinants behind it as the key for explaining growth in EM (e.g. Jones, 2016; Klenow & Rodriguez-Clare, 1997). But herewith the opposing empirical evidence was more convincing, especially at the level of individual countries. Young (1995), showed that the contribution of TFP to output growth in 'Asian tigers' was 'not particularly low, ...but not extraordinary high'. Torre and Colunga (2015) showed that in Mexico the contribution of TFP to growth between 1990 and 2011 was negative. Kruk and Bornukova (2014) argued that Belarusian growth was mainly due to capital accumulation. The estimates by De Gregorio (2018) showed that for numerous EM TFP gains between 1990 and 2014 were modest.

After the Great Recession the concerns about the role of productivity in EM's growth intensified. Empirical evidence signals the lack of productivity gains in EM (IMF, 2015, 2016, 2017; Adler *et al.*, 2017; Nezinsky & Fifeikova, 2014). Apart from being crucially important itself, this challenge gives a rise to at least two additional concerns in respect to EM.

First, it resurges interest in the role of growth channels¹ in terms of the growth accounting procedure. In other words, if accepting the statement of lowering contribution from productivity, the point of interest is – which channel(s) has/have substituted the TFP one in securing growth in 2010s? For instance, IMF (2017) argue that decreasing TFP contribution during the last 15 years in EM was substituted by the ones associated with capital intensity

¹ The sense of terms 'growth channel (factor)' and 'growth determinant' within this study confirms to the generally accepted one in the literature (e.g. Barro, 2001; Hall & Jones, 1999; Wong, 2001). The term 'growth channel (factor)' denotes the contribution of accumulation of inputs (labor, capital, human capital) and those of TFP gains to growth, basing on the growth accounting procedure. The term 'growth determinant' denotes forces behind growth that may affect it through different channels. Sometimes alternative terminology may be used to denote the same issue. For instance, Acemoglu (2009) denotes growth channels as 'growth proximates', while growth determinants as 'growth causes'.

(mainly) and human capital accumulation (to a lower extent). The latter, if accepted, casts doubts on the sustainability of this new growth regime, given theoretical considerations.

Second, the generally accepted view on growth determinants becomes questionable. The bulk of growth determinants highlighted in the literature may be systemised within three broad groups: institutions (Acemoglu, Johnson, & Robinson, 2001), technologies and ideas (e.g. Jones, 2016), and allocative efficiency (e.g. Hsieh & Klenow, 2009). The determinants within these groups are usually associated with productivity, i.e. they are treated to affect growth through the productivity channel. If there are doubts about the productivity channel itself, these growth determinants should be re-examined as well.

Updating the debate about the role of external conditions in growth performance (e.g. Calderon *et al.*, 2006; Arora & Vamvakidis, 2005), IMF (2017) argue that just external conditions are the growth determinant that have compensated for the lack of productivity gains. However, this kind of explanation does not offset all the contradictions mentioned above. First, if accepting external conditions as an alternative to productivity-based growth, we actually must match corresponding determinants to other growth channels. Hence, shall we think about the external environment as the growth determinant acting through (physical or human) capital accumulation? Nevertheless, the rationale for treating external conditions as the growth determinant emphasizes its engagement just into the productivity channel of growth (Arora & Vamvakidis, 2005). Alternatively, shall we think about more sophisticated mechanisms of the impact of the external environment on productivity?

Second, presumably weakening growth and the strengthening role of external conditions are the phenomena that should be considered in different time dimensions. Treating external conditions as the determinant of long-term growth does not seem evident *per se*. Justification for linkages between the external environment and long-term growth mainly covers such institutional features of external engagement as trade and financial openness (e.g. Dollar & Kraay, 2003; Edison, Klein, Ricci, & Slok, 2002). But as Calderon *et al.* (2006) show, even these linkages are not robust. In turn, matching such indicators of the external environment as the stance of external demand, trade conditions, financial conditions (e.g. IMF, 2017; Arora & Vamvakidis, 2005) to long-term growth outcomes might be even less theoretically justified. On the contrary, matching them to business cycle /short-term output fluctuations tends to be more natural (e.g. Paweta, 2018; Kaminsky, Reinhart, & Vegh, 2004).

Studying productivity and external conditions at the level of growth determinants (i.e. assessing and comparing their growth promoting effect) might be an important step to assemble the growth puzzle in EM in the last decade. According to Acemoglu (2009, p. 15), this approach serves as 'the input into the types of theories that we would like to develop'. The approach is based on growth regressions pioneered by Barro (1991, 2001) as a tool for studying a conditional distribution of income among countries. However, it requires proper fine-tuning according to the pursued objective.

MATERIAL AND METHODS

Methodology

The central element of the research design for this article is the growth regression approach. The original Barro growth regression framework may be summarised as follows (Acemoglu, 2009, p. 83):

$$\gamma_{i,t,t-1} = \alpha * \log(y_{i,t-1}) + \beta * X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where:

- γ_{it} - output (per capita) growth rate;
- $y_{i,t-1}$ - level of output (per capita);
- α, β - coefficient and matrix of coefficients;
- $X_{i,t}$ - growth determinants;
- $\varepsilon_{i,t}$ - error term.

However, three types of concerns are associated with this framework. First, numerous technical drawbacks may cast doubts on the results. Acemoglu (2009) summarises these drawbacks for the case of original specification and estimating through OLS as: (a) endogeneity; (b) room for misinterpretation of the economic sense of regression coefficients; (c) weak theoretical background of the approach for open economies. Hence, proper specification of growth regression and estimation technique are critically important for the robustness of the results.

Second, a proper measure of growth on the left-hand side of the regression matters as well. Recalling the concerns about proper matching of external conditions to growth outcomes (either to business cycle or to long-term growth) makes the distinction between output growth rates by time-horizon reasonable. Furthermore, for international comparisons a standard measure of growth (based on domestic SNA statistics) might also contain some drawbacks.

Third, the approach is extremely sensitive to the bundle of the growth determinants considered. Calderon *et al.* (2004) show that contradictions among researchers on growth determinants often occur because they operate with different sets of 'nominees' for growth determinants. For instance, Rodrick, Subramanian and Trebbi (2004) oppose the results of previous research arguing that 'once institutions are controlled for ... it 'trumps' everything else'. Hence, the initial set of growth determinants 'nominees' matters and should reflect and correspond to the objectives of the exercise. Similar to this logic, incorporation of growth determinants closely linked with productivity into growth regressions with 'standard' determinants (including those associated with external conditions) might be an important step for puzzling out the collisions between productivity and external conditions in the context of growth in EM.

Bearing these caveats in mind, the growth regression approach in this study is enriched with three additional important ingredients. First, two alternative specifications for growth regressions are exploited – panel OLS fixed effects estimator and Arellano-Bond estimator. The former is better for the economic interpretation and decomposition of actual growth by determinants. The latter is econometrically robust, and serves as the robustness check for the former. Second, the study differentiates among output growth measures (left-hand side of growth regression) in two dimensions: time-horizon and the concept of measurement. Third, following the objective of the study, two groups of 'nominees' for growth determinants are considered – external conditions and productivity determinants. They are treated as 'rivals' in explaining growth outcomes in EM. An important novelty herewith is engaging numerous variables associated with productivity as potential growth determinants into the scope of analysis. Moreover, a unique database of external conditions indicators was formed for the study. Computing procedures for these variables aim at securing their exogeneity in respect to growth indicators.

For mitigating technical drawbacks (b) and (c) of Barro-style growth regression (mentioned above) the field has worked out an augmented approach that incorporates fixed effects model. Bearing this in mind, Acemoglu (2009, p. 85) argues that the following specification is meaningful for studying growth determinants:

$$\log(y_{i,t}) = \alpha * \log(y_{i,t-1}) + \beta * X_{i,t} + \delta_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

where:

- $y_{i,t}$ - level of output (per capita);
- α, β - coefficient and matrix of coefficients;
- $X_{i,t}$ - growth determinants;
- δ_i - country fixed effect;
- μ_t - time fixed effect;
- $\varepsilon_{i,t}$ - error term.

In many empirical growth studies, to highlight the focus on growth rate (not level) this framework is modified through rearranging the first term from the right-hand side to the left-hand one and implicitly implying the restriction of $\alpha = 1$. Furthermore, for this study the focus on just two groups of growth determinants and treating them as 'rivals' is actualized through the absence of direct control for 'standard' growth determinants (e.g. initial conditions, integration into the global economy, etc.). However, allowing for a constant term, and both individual cross-section and time fixed effect is expected to capture the impact of such determinants. Finally, the following framework is employed:

$$\gamma_{i,t} = \alpha + A * X_{i,t} + B * Z_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad (3)$$

where:

- $\gamma_{i,t}$ - output growth indicators;
- α - common intercept
- A, B - matrixes of coefficients
- $X_{i,t}$ - the vector of external conditions indicators;
- $Z_{i,t}$ - the vector of productivity indicators
- α_i - country-specific fixed effects
- α_t - time fixed effect
- $\varepsilon_{i,t}$ - error term.

The specification (3) stems from theoretical considerations (Acemoglu, 2009, p. 85) and includes fixed effects (both in time and cross-section dimension) by definition. Hence, OLS fixed effects estimator is applied herewith (without prior econometric specification tests, e.g. Durbin-Wu-Hausman test).

The specification (3) allows for a meaningful economic interpretation, but there might be doubts in robustness when estimating this specification. Arellano and Bond (1991) show that in cases when the panel is dynamic with rather small T and rather large N, the problem of endogeneity is likely to arise, leading to inconsistent estimates of the model. They worked out an alternative specification that solves the problem of endogeneity. In the application to this study Arellano-Bond estimator is specified according to (4). Following Arellano and Bond (1991), the specification (4) is estimated using generalised method of moments (GMM).

The models (3) and (4) are estimated for 4 different measures of output growth rate (response variables), but with the same explanatory variables. First, output growth rates

are differentiated by the time-horizon. The simplest choice for the response variable is an annual GDP per capita growth rate. However, this rate tends to be too volatile because of the contribution of the business cycle fluctuations. It is worthwhile to get rid of the latter, if bearing in mind the focus on the long-term growth. In other words, we should refocus on the trend² of GDP and its growth rate. However, Coibion, Gorodnichenko, and Ulate (2017) show that the vast majority of techniques aiming at getting rid of demand shocks fail to do so. Moreover, full refocusing on the trend growth rate might lead to ignoring that part of variation which could be assigned to demand shocks by mistake. So, we have a kind of a trap. The 'raw' measure of output growth is too volatile and includes unnecessary fluctuations associated with demand shocks. At the same time, it is doubtful to obtain a credible measure of trend growth. In this situation, dealing with both time-horizons and treating corresponding output growth rates as alternative response variables might be a proper solution. Moreover, considering two time-horizons might be useful for detecting the properties of the alternative groups of growth determinants.

$$\gamma_{i,t} = \Gamma * \gamma_{i,t-j} + A * X_{i,t} + B * Z_{i,t} + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad (4)$$

where:

- $\gamma_{i,t}$ - output growth indicators;
- $\gamma_{i,t-j}$ - lagged dependent variable;
- A, B, Γ - matrixes of coefficients;
- $X_{i,t}$ - the vector of external conditions indicators;
- $Z_{i,t}$ - the vector of productivity indicators;
- α_i - country-specific fixed effects;
- α_t - time fixed effect;
- $\varepsilon_{i,t}$ - error term.

Second, output growth rates are differentiated by the measurement concept. A 'standard' one employs the growth rates of real GDP per capita for each country. However, these growth rates might keep too many common factors and 'traces' from the external environment inside themselves. Hence, they might be excessively sensitive to external conditions. Employing relative indicators of countries' well-being (with a common numeraire) and treating corresponding first differences as the measures of growth might eliminate/mitigate 'traces' from external conditions. Hence, the study also employs the speed of closing the income gap (i.e. the ratio between the level of GDP per capita in a country vs. the one in the US³) of a country as the alternative measure of its output growth.

According to this concept, a country can 'obtain some reward' for more growth sustainability and less dependence on external shocks. For instance, if a country's growth is more stable than the sample average one, but still close to the sample mean, the 'standard' approach would not stress this country from the mass, while this approach would do this. Moreover, within 'the speed of closing the income gap' approach we can obtain a kind of a natural mechanism for the meaningful comparison of growth in countries with

² The terms 'potential output' and 'potential growth' are frequently used in this context, as well. Following the theoretical definition of 'potential output', it might reflect a 'perfect' way to remove demand shocks. But in practice, the term is frequently used in different meanings and I assume different techniques behind it. Hence, in order to avoid the misuse of the term and emphasize an 'imperfect' way of removing demand shocks, I use a more neutral term – trend output.

³ Levels of GDP per capita measured in Geary-Khamis international dollar (UN, 1992, p. 64)

a substantially different level of well-being. At the same time, this measure by definition would display a strong correlation with the ‘standard’ growth rate⁴.

The values of all explanatory variables are standardised, which secures the comparability of explanatory power by different regressors in the model, basing on the estimated coefficients. Standardised values are computed according to:

$$X_i^{st} = \frac{(X_i - \mu_x)}{\sigma_x} \quad (5)$$

where:

X_i^{st} - standardized value of X_i ;

X_i - explanatory variable i ;

μ_x - mean value of X ;

σ_x - standard deviation of X .

The process of estimation assumes a multi-step approach with sequential inclusion of explanatory variables, starting from external conditions indicators, while productivity indicators are included only after them. This procedure assumes to secure the external environment indicators to ‘realize all their explanatory potential’ and allows tracking for the stability and significance level of the estimated coefficients, which serves as a kind of robustness check. If Z_{it} variables can add and/or ‘pull-over’ some explanatory effect from X_{it} variables, it would witness the importance of productivity as straightforward growth-enhancers. If the procedure of saturating a model with explanatory variables exhibits robust results (stable and significant coefficients), an opposite exercise is done – sequential cut, i.e. getting rid of insignificant variables. The latter leads to the best specification of a model, which is reported in the article. If models with the same response variables based on the specifications (3) and (4) exhibit similar results, it witnesses robustness of the results. If that is the case, the specification (3) may be used for the decomposition of growth by growth determinants.

The Sample and Sources of Data

For the objective of the study, the sample of 36 countries traced by EBRD (2017) is meaningful. Two countries – Kosovo and Uzbekistan – are excluded from the sample, because of the lack of data. So, the sample includes 34 countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Egypt, Estonia, Georgia, Greece, Hungary, Jordan, Kazakhstan, Kyrgyz Republic, Latvia, Lebanon, Lithuania, Macedonia, Moldova, Mongolia, Montenegro, Morocco, Poland, Romania, Russia, Serbia, Slovak Republic, Slovenia, Tajikistan, Tunisia, Turkey, Ukraine. From this sample, Belarus and Tajikistan are considered only for growth measurement, but excluded from modelling exercises, because of the absence of data on explanatory variables. The main source of the data is the World Development Indicators (WDI) database of the World Bank.

The period sample is 2007-2017. It is justified for two reasons. First, productivity indicators based on the methodology by WEF (2017) have been available only since 2007. Second, just this period complies with the trend of an increasing role of the external environment for EM (IMF, 2007).

⁴ For the sample of 34 countries considered, the coefficient of correlation between these two measures of growth is 0.84.

Response Variables

Combining both dimensions – time-horizon and the measurement concept – the study operates with four measures of output growth.

A ‘standard’ shorter-term growth rate is computed according to:

$$ygr_{i,t} = \frac{Y_{i,t}}{Y_{i,t-1}} \quad (6)$$

where:

$ygr_{i,t}$ - a ‘standard’ shorter-term output growth rate for a country i ;

$Y_{i,t}$ - GDP per capita of country i (in Geary-Khamis 2011 international dollars).

A ‘standard’ longer-term growth rate is computed according to:

$$ygr_{tr_{i,t}} = \left(\frac{Y_{i,t}}{Y_{i,t-5}} \right)^{\frac{1}{5}} \quad (7)$$

where:

$ygr_{tr_{i,t}}$ - a ‘standard’ longer-term output growth rate for a country i ;

$Y_{i,t}$ - GDP per capita of a country i (in Geary-Khamis 2011 international dollars).

A shorter-term growth rate according to ‘income gap’ concept is computed according to:

$$yf_{i,t} = IG_{i,t} - IG_{i,t-1} \quad (8)$$

where:

$yf_{i,t}$ - a shorter-term output growth rate of a country i according to income gap concept;

$IG_{i,t}$ - the ratio of GDP per capita (in Geary-Khamis 2011 international dollars) in a country i to the one in the US.

A longer-term growth rate according to the ‘income gap’ concept is computed according to:

$$yf_{tr_{i,t}} = \frac{(IG_{i,t} - IG_{i,t-5})}{5} \quad (9)$$

where:

$yf_{i,t}$ - a shorter-term output growth rate for a country i according to income gap concept;

$IG_{i,t}$ - the ratio of GDP per capita (in Geary-Khamis 2011 international dollars) in a country i to the one in the US.

External Conditions Indicators

External demand

The approach for computing country-specific external demand conditions is based on Arora and Vamvakidis (2005). First, the procedure assumes identifying the major trade partner for each country from the sample. The rule for forming the corresponding list assumes that the share of exports going to major trade partners should not be less than 70% of total exports for each year. Having formed the list, total exports to these countries are assigned as ‘new total exports’ of the domestic country, and corresponding shares are recalculated basing on it.

Second, macroeconomic variables that are to characterise external demand in trade partners are chosen. A number of options are available here: domestic demand (in trade

partners), imports, GDP, etc. Two from these options are employed: total imports and GDP per capita growth rates. The latter leads to generating two alternative series of external demand. When estimating the models, the series with better explanatory power is included in each model.

Third, the indicator of external demand growth is computed according to:

$$ed_gr_{i,t} = \sum_{j \in \theta_i} \omega_{j,t} * gr_dem_{j,t} \quad (10)$$

where:

$ed_gr_{i,t}$ - external demand growth for a country i ;

θ_i - trade partners of a country i ;

$\omega_{j,t}$ - the share of a country j in a country i 's exports;

$gr_dem_{j,t}$ - indicator of demand growth in a country i .

If real imports growth rate is used for gr_dem , external demand is noted as ed_gr . In the case of real GDP per capita growth rate, the notation used is $ed2_gr$.

Financial conditions indicator

Each country is assigned to a specific sub-region, for which financial conditions indicators are computed. The indicator for the corresponding sub-region represents a country in the modelling framework. Eleven sub-regions are considered: advanced EU, South-East EU, South-East non-EU, Central Europe, CIS, Caucuses and Central Asia Oil Importers, Caucuses and Central Asia Oil Exporters, MENA Oil Importers, Asia Pacific, Russia and Turkey. Two large countries – Russia and Turkey – turn out to be too influential for the dynamics of financial flows for the whole region if including them according to the geographical and economic criterions. All other regions consist of a number of countries (the majority of which are not from those 34 considered in the study). For each sub-region the following indicator is computed:

$$fci_{i,t} = \sum_{j \in i} \omega_{j,t} (FDI_{j,t} + PI_{j,t} + OI_{j,t}) / GDP_{j,t} \quad (11)$$

where:

$fci_{i,t}$ - financial conditions indicator for a sub-region i ;

$\omega_{j,t}$ - the share of a country j GDP in i 's region GDP;

$FDI_{j,t}$ - foreign direct investments inflow in a country j ;

$PI_{j,t}$ - portfolio investments inflow in a country j ;

$OI_{j,t}$ - other investments inflow in a country j ;

$GDP_{j,t}$ - GDP of a country j .

Trade conditions

Trade conditions indicator is computed for each country as the ratio between exports and imports prices according to:

$$trc_{i,t} = \frac{x_p_{i,t}}{m_p_{i,t}} \quad (12)$$

where:

trc_i - trade conditions for a country i ;

x_p_i - exports price index for a country i (2010=1);

m_p_i - imports price index for a country i (2010=1).

Productivity Indicators

Productivity determinants for the study are taken from the database by WEF (2017). WEF (2017) argue that it ‘...aims to measure factors that determine productivity, because this has been found to be the main determinant of long-term growth’. Moreover, they provide some empirical evidence showing that the indicators have an explanatory power for growth (WEF, 2017, p. 4). They name an aggregate index as Global Competitiveness Index (CGI), but emphasize that understand competitiveness herewith ‘as the set of institutions, policies, and factors that determine the level of productivity of an economy’ (WEF, 2017, p. 11). CGI consists of 114 indicators grouped by 12 sub-indexes, which in turn form 3 broad groups (WEF, 2017).

The methodology of WEF (2017) assumes that in each year a country obtains a score between 1 and 7 on each indicator, which is the aggregation of corresponding numerous sub-scores on every indicator. However, the criteria on every sub-indicator may change somehow in time, reflecting changing global standards. From this perspective, a progress in any indicator is more a sign of improving country’s stance on relative basis (i.e. vs. the frontier economies), rather than on absolute one. For instance, if a country has improved its performance on a particular indicator, but the global (and especially corresponding frontier economies) progress has been more intensive, a score of the country is likely to deteriorate in comparison to previous period. The latter facilitates to the stationarity of the data on individual indicators from panel view (i.e. as a rule, there is no common unit root for a set of countries).

Given their economic sense and statistical properties, WEF sub-indexes are good productivity determinants ‘nominees’. However, 12 determinants of productivity as explanatory variables might be redundant, especially taking in mind (i) individual productivity indicators are likely to be correlated with each other, thus causing multicollinearity; (ii) the lack of degrees of freedom, given that the sample is not so big. Hence, extracting principal components (5 ones for this study) from the whole set of WEF productivity sub-indexes is more reasonable.

Data Summary

Table 1 reports the list of the indicators used in the study, their notation and short description.

Specifications (3) and (4) assume that right-hand side variables are stationary. Hence, their stationarity is to be checked. The results of unit root tests are reported in Table 2.

All the series are stationary in terms of panel unit root according to Levin-Lin-Chu test. However, some variables (e.g. trade conditions and the majority of productivity indicators) display the occurrence of individual unit roots (i.e. for individual cross-sections). However, the employed methodology treats panel time-series as integral ones. Hence, panel stationarity according to Levin-Lin-Chu test is a sufficient precondition for estimating the models (3) and (4) without further transformation of the data.

Table 1. Description and notations for the dataset

Notation	Description	Period
ygr	Shorter-term output growth rate according to 'standard' concept	2007-2017
ygr_tr	Longer-term output growth rate according to 'standard' concept	2007-2017
yf	Shorter-term output growth rate according to 'income gap' concept	2007-2017
yf_tr	Longer-term output growth rate according to 'income gap' concept	2007-2017
ed_gr	External demand (imports-based measure), growth rate, % per annum	2007-2017
ed2_gr	External demand (GDP-based measure), growth rate, % per annum	2007-2017
fci	Financial conditions indicator, index between 0 and 100	2007-2017
trc	Trade conditions, index, 2010=100 for each country	2007-2017
wef_pc1	1st principal component out of 12 productivity indicators	2007-2017
wef_pc2	2nd principal component out of 12 productivity indicators	2007-2017
wef_pc3	3rd principal component out of 12 productivity indicators	2007-2017
wef_pc4	4th principal component out of 12 productivity indicators	2007-2017
wef_pc5	5th principal component out of 12 productivity indicators	2007-2017

Source: own study.

Table 2. The Results of Unit Root Tests for Regressors

Series	Test specification	Levin-Lin-Chu	Im-Pesaran-Shin	ADF-Fisher
ed_gr	Individual intercept	-10.95***	-6.56***	162.06***
ed2_gr	Individual intercept	-8.85***	-5.15***	137.09***
fci	Individual intercept	-10.48***	-4.93***	130.60***
trc	Individual intercept	-3.86***	-0.50	68.8
wef_pc1	Individual intercept	-3.40***	2.55	39.66
wef_pc2	Individual intercept	-2.78***	1.75	46.17
wef_pc3	Individual intercept	-7.42***	-1.77**	81.41*
wef_pc4	Individual intercept	-3.32***	0.08	54.56
wef_pc5	Individual intercept and trend	-3.69***	-0.69	72.21

Notes: all the tests assume unit root as the null hypothesis (panel unit root in case of Levin-Lin-Chu, and individual unit root in case of Im-Pesaran-Shin, and ADF-Fisher tests). The values of corresponding test statistic is provided for each test, with following notations: * – rejection of test null hypothesis at 10% level, ** – rejection of test null hypothesis at 5% level, *** – rejection of test null hypothesis.

Source: own calculations in Eviews 10.

RESULTS AND DISCUSSION

OLS Fixed Effects Estimator

Estimated growth regressions specified according to (3) are reported in Table 3.

The coefficients reported in Table 3 and corresponding significance levels are those for 'best' models, i.e. obtained by going through the intermediary procedures of the sequential inclusion of growth determinants followed by the sequential cut of insignificant variables. The values of the coefficients in the 'best' models are close to those during the intermediary steps. Both external conditions and productivity determinants display persistent explanatory power for growth in the estimated models: their coefficients display a high degree of stability and weak sensitivity to the type of specification, both in terms of the values of coefficients and the significance level. This indicates the stability of corresponding coefficients and ro-

bustness of the results to the inclusion of different bundles of growth determinants. Hence, the estimated models are appropriate for economic interpretations.

Table 3. Growth Regressions Estimated by Panel OLS with Fixed Effects Estimator

Explanatory variables	Response variable			
	Shorter-term perspective		Longer-term perspective	
	ygr	yf	ygr_tr	yf_tr
const	2.28***	0.42***	2.95***	0.51***
ed_gr	1.10***	0.37**	–	0.15**
ed2_gr	–	–	0.35**	–
trc	1.08***	0.27**	0.57***	0.12**
fci	1.83***	0.73***	–	–
wef_pc1	–	–	–	0.29***
wef_pc2	1.47**	0.71***	1.35***	0.46***
wef_pc3	0.92*	0.32*	–	–
wef_pc4	–	–	–	–
wef_pc5	–	–	0.51**	0.34***
Adjusted R-squared	0.532	0.451	0.743	0.739
F-statistic	8.92**	6.72***	21.65***	20.7***

Notes: The values of coefficients are provided for each variable in each specification with notations regarding the significance level. * – denotes significance at 10% level, ** – denotes significance at 5% level, *** – denotes significance at 1% level.

Source: own calculations in Eviews 10.

The results from the regressions specified according to (3) indicate that: (a) both productivity and external conditions determinants possess explanatory power for growth in EM for both a shorter- and a longer-term perspective; (b) for a shorter-term perspective external conditions determinants are more important for growth rather than productivity determinants; (c) for a longer-term perspective productivity determinants are more important for growth, while external conditions determinants (especially, financial conditions indicator) weaken its impact on growth; (d) growth measured through the concept of ‘income gap’ displays much more sensitivity to productivity determinants, and less sensitivity to external ones for both time-horizons; (e) together two groups of growth determinants secure much better explanatory power for longer-term growth, while a huge portion of shorter-term growth remains unexplained by this model specification.

The obtained results seem to be quite rich in terms of widening the boundaries of understanding growth in EM and corresponding policy implications. However, one should bear in mind important caveats associated with this modelling framework, first of all, the endogeneity issue.

Arellano-Bond Estimator

Estimated growth regressions specified according to (4) are reported in Table 4.

The results from the regressions specified according to (4) show that: (a) external conditions determinants dominate in explaining shorter-term growth; (b) in a longer-term perspective the role of productivity determinants increases; (c) for longer-term growth productivity determinants and external conditions determinants are roughly equally important; (d)

the role of individual external conditions determinants differ depending on the time-horizon considered: for shorter-term growth external demand and financial conditions have the largest effect, while for a longer-term perspective this role shifts to trade conditions.

Table 4. Growth Regressions Estimated by Arellano-Bond Estimator

Explanatory variables	Response variable			
	Shorter-term perspective		Longer-term perspective	
	ygr	yf	ygr_tr	yf_tr
y(-1)	0.29***	0.40***	1.12***	1.16***
y(-2)	-0.12***	-0.17***	-0.45***	-0.56***
ed_gr	2.07***	0.66***	0.49***	–
trc	–	–	0.32***	0.10***
fci	1.93***	0.48***	–	–
wef_pc1	–	–	–	–
wef_pc2	–	–	0.63**	0.16***
wef_pc3	–	–	–	–
wef_pc4	–	–	–	–
wef_pc5	-2.32***	-0.66**	–	–
J-statistic	25.27	18.62	24.23	22.0
P-value of J-statistic	0.19	0.55	0.15	0.29

Notes: y(-1) and y(-2) denote the lagged value of corresponding response variable for each regression. For instance, for regression with yf as response variable, these regressors are yf(-1) and yf(-2). The values of coefficients are provided for each variable in each specification with notations regarding the significance level. * – denotes significance at 10% level, ** – denotes significance at 5% level, *** – denotes significance at 1% level.

Source: own calculations in Eviews 10.

The results obtained basing on Arellano-Bond estimator are more or less the same, as in case of the panel OLS estimator. The main distinction herewith, the extent to which the explanatory power of productivity indicators grows (and those of external conditions indicator decreases) when shifting from a shorter-term to a longer-term. Arellano-Bond estimator indicates higher relative importance of external conditions determinants in a longer-term (in comparison to OLS fixed effects estimator). However, an important property of a higher growth-promoting effect of productivity determinants in a longer-term in comparison to a shorter-term (and vice versa for external conditions indicator) still holds. Hence, Arellano-Bond estimator confers robustness to the main results.

Discussion

A ‘big picture’ of the results obtained according to both specifications of growth regression is more or less the same. It may be summarised as follows.

First, both groups of determinants – productivity and external conditions determinants – possess explanatory power for growth in EM for both a shorter- and a longer-term perspective. This produces a kind of a compromise for the field. On the one hand, the study shows that productivity determinants matter for growth in EM (although not to the extent argued by Rodrick *et al.* (2004), i.e. productivity determinants do not crowd out ‘everything else’). On the other hand, it recognizes that external conditions have an important role for

the growth agenda of EM. This conclusion re-echoes with numerous studies arguing about the special role of external conditions for EM (e.g. IMF, 2017; Arora & Vamvakidis, 2005).

Second, relative importance of external conditions determinants and productivity determinants changes when shifting between time-horizons. The longer the time-horizon, the more important productivity determinants and the less important external conditions determinants are. Nevertheless, the latter might not be interpreted in a way that external conditions are associated just with the business cycle fluctuations. Their growth-promoting effect decreases with a longer time-horizon, but it does not decline to zero. This conclusion might be a key for explaining why the role of these two groups of growth determinants substantially differs among studies. If the latter is true, the studies arguing about the pervasive role of external conditions might be 'biased' to a shorter-term, while those praising productivity determinants to a longer-term.

Third, for a shorter-term perspective external conditions determinants are more important for growth rather than productivity determinants. External conditions determinants are responsible for a larger part of growth in the models for both response variables in a shorter-term. Although, their relative importance is somehow lower in the case of the 'income gap' concept. From a policy perspective, this might lead to a conclusion that securing attractive external conditions is more effective for short-term growth rather than securing productivity gains.

Fourth, for a longer-term perspective productivity determinants are more important for growth rather than external conditions determinants. This result may be interpreted in the way that the more we focus on a smoothed growth trajectory (i.e. with business cycle fluctuations netted out), the more important productivity gains are (and vice versa for external conditions). From a policy perspective, it leads to the conclusion that securing productivity gains is the most important task for promoting long-term growth.

Fifth, the composition of external conditions determinants is different for a shorter- and longer-term. For a shorter-term, the largest growth-promoting effect stems from financial conditions. However, in a longer-term it totally disappears. A similar picture arises for external demand: its relative importance decreases substantially (although does not disappear at all) when refocusing from shorter- to longer-term growth. Finally, in a longer-term trade conditions turn out to be the most important external conditions determinant, while being the least important in a shorter-term perspective. From a policy perspective, this might mean that improving financial conditions and external demand can trigger growth only for a short-term perspective. A longer-term growth-promoting effect from external conditions mainly associated with trade conditions. Furthermore, it should be remembered that as a rule external conditions are volatile. Hence, their steady improvement during a longer-term is unlikely, which might further restrict their growth-promoting effect.

Sixth, growth measured through the concept of 'income gap' displays much more sensitivity to productivity determinants, and less sensitivity to external ones for both time-horizons. This might reflect the notion: the more we focus on the qualitative properties of growth (e.g. on its ability to secure well-being convergence, which the 'income gap' concept does), the less influential external conditions determinants are.

While the results obtained according to the specification (3) have passed the robustness check through specification (4), the former may be used for the decomposition of

actual growth in EM⁵. This exercise is helpful to understand the role of determinants behind growth for the whole sample and for the individual countries inside it. Figures 1 and 2 provide the decomposition of shorter-term growth from the period-average perspective by countries (period-average growth is decomposed) and from the sample-average perspective by years (annual sample-average growth is decomposed)⁶.

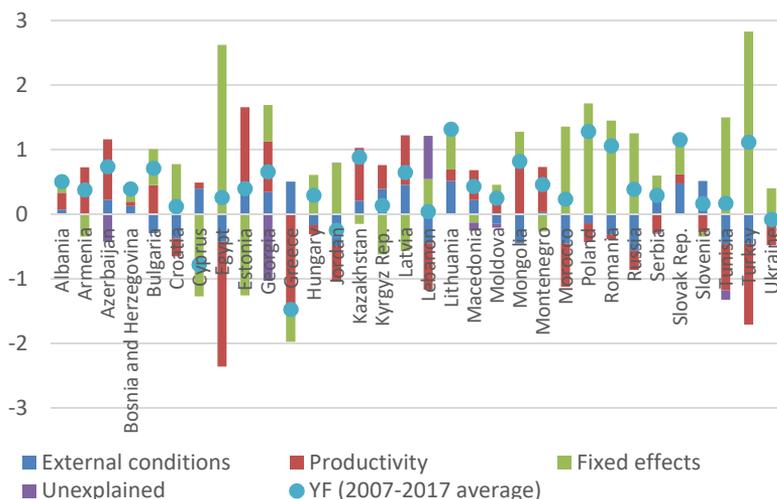


Figure 1. Decomposition of shorter-term growth (yf) by determinants for individual countries, 2007-2017 average, in p.p. of income gap

Source: own calculations based on World bank data (available on <https://wdi.worldbank.org>).

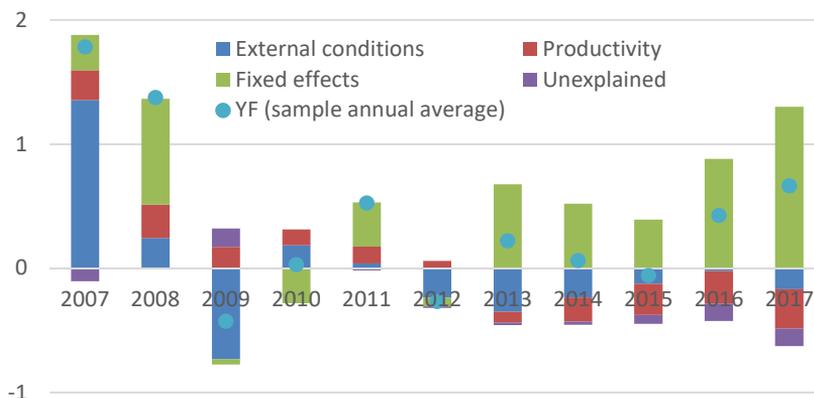


Figure 2. Decomposition of shorter-term growth (yf) by determinants in 2007-2017, sample average, in p.p. of income gap

Source: own calculations based on World bank data (available on <https://wdi.worldbank.org>).

⁵ Specification (6) does not allow to do this in a proper manner, as the estimator removes fixed effects from the model.
⁶ I report the results of this decomposition exercise only for the growth measured according to the ‘closing income gap’ concept, i.e. for *yf* and *yf_tr*, as the results for ‘standard’ growth measure are more or less the same.

Shorter-term growth decomposition shows that although external environment is a major driver according to the model, not many countries enjoyed a substantial contribution from it on average basis in 2007-2017. This reflects the notion about poor room for growth due to external condition given their volatile nature. Hence, even from the perspective of short-term growth, the contribution of productivity is rather significant for many countries.

Figures 3 and 4 provide similar decomposition for a longer-term growth.

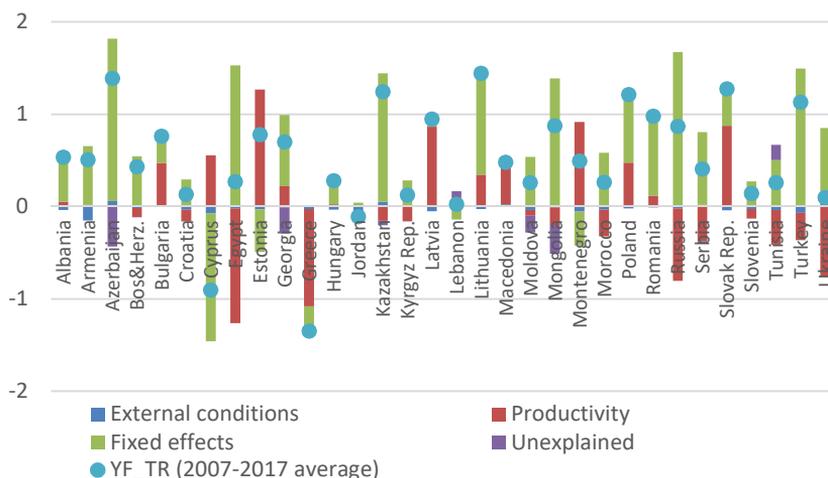


Figure 3. Decomposition of longer-term growth (yf_tr) by determinants for individual countries, 2007-2017 average, in p.p. of income gap

Source: own calculations based on World bank data (available on <https://wdi.worldbank.org>).

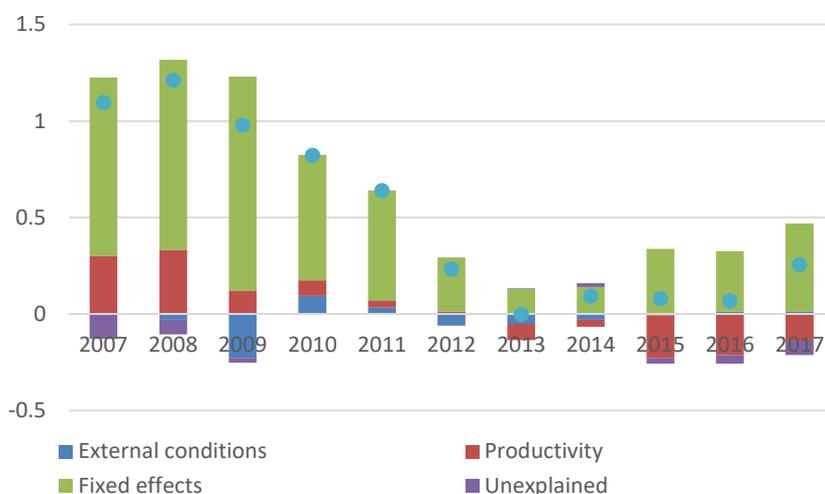


Figure 4. Decomposition of longer-term growth (yf_tr) by determinants in 2007-2017, sample average, in p.p. of income gap

Source: own calculations based on World bank data (available on <https://wdi.worldbank.org>).

For longer-term growth, the contribution of productivity was substantially larger than that of external conditions. At the same time, a huge contribution to growth by fixed effect should be born in mind. It signals that productivity and external conditions determinants are far from explaining growth in EM entirely. From the economic policy view, it also signals that country-specific growth determinants might be also meaningful.

Figure 4 supports a widely accepted evidence of the lack of productivity gains in EM in recent years. However, jointly with Figure 3, it proves that for the whole set of EM this fact stems from very heterogeneous role of productivity in individual countries. However, countries with higher productivity gains still exhibit a higher trend growth. This sheds some more light on the phenomenon of decoupling between productivity and growth and allows to explain it within the framework where productivity is still the major growth driver.

CONCLUSIONS

The article deals with the issue of relative importance of productivity determinants vs. external conditions determinants for growth in EM. It shows that both productivity and external environment determinants are meaningful for growth in EM. However, it is crucial to differentiate between a shorter and a longer-term perspective, as the role of productivity and external conditions determinants changes depending on the time-horizon. In a shorter-term, external conditions determinants are more important for growth. Here-with, external demand and financial conditions are of prior importance. Among the external environment determinants, trade conditions take up their role in a longer-term, while the role of external demand and financial condition weakens in comparison to those in a shorter-term. But in overall, productivity determinants become dominant in a longer-term. It means that productivity is still meaningful for growth and the longer the time-horizon considered, the more important productivity determinants are.

The results of this study, one the one hand, are similar to IMF (2017) and Arora and Vamvakidis (2005), as showing the importance of external conditions for growth in EM. On the other hand, they differ somehow, as stating that in a longer time-horizon productivity becomes more important for economic growth, while the role of external conditions is contracting. In this part, the results of the study are more in line with Rodrick *et al.* (2004). Moreover, the article provides a framework where the ‘growth puzzle’ in EM – decoupling between output and TFP growth rates – can still be explained without challenging the foreground role of productivity for economic growth.

From the perspective of growth-enhancing policy, the article shows that the importance of external conditions for EM should not lead us to incorrect belief that productivity fundamentals do not matter anymore. Changes in the external environment are more likely to generate relatively short-term growth rate fluctuations, while having a modest impact on the sustainable growth trajectory. Hence, a country aiming to secure sustainable growth should still first of all think about productivity fundamentals.

The study also contributes to some more narrow issues of economic research. The evidence that growth measured according to the concept of ‘the speed of closing the income gap’ is more sensitive to productivity determinants rather than the ‘standard’ growth rate, might be an argument for more regular employment of this measure in stud-

ies dealing with international comparisons. The evidence of the sensitivity of growth regressions to inclusion of productivity determinants re-echoes with Rodrick *et al.* (2004), and might be born in mind when exploiting the tool.

The research design of this study has got a number of limitations. First, because of data availability it deals with a relatively short time horizon and a small number of countries. Expanding the framework both in the time and space dimension might be worthwhile. Second, focusing on 'competition' between external conditions determinants and productivity determinants, the study left out of consideration a number of alternative growth determinants. This led to leaving a substantial part of growth in EM either unexplained or assigned to country-specific/time fixed effects. Third, concentrating on the level of growth determinants, the study does not match its effects to growth channels, which might be the contribution to the theory. Directions for future research are associated with overpassing these limitations.

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