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Decomposition of Economic Growth in Belarus

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During the last decade Belarus was one of the leaders of growth in the CEE region. Kruk and Bornukova (2013) have analyzed the sources of growth and found that capital accumulation was the main contributor to growth. The contribution of total factor productivity (TFP) to growth was, on the contrary, quite modest. On the sectoral level, capital accumulation was not always accompanied by the increases in TFP. Hence, the new growth policy, modernization, with the bottom line "more capital" may not be the best option for enhancing productivity-based growth. The competitive advantages of Belarus lie in the resource-based and non-tradable sectors, while the majority of the manufacturing sectors are lagging behind in productivity. Belarus has symptoms of a Dutch disease without the trade surplus, and the devaluation of 2011 did not cure it.

During 2003-2012, Belarus had an average growth rate of 7.1%, and during the 'fat years', i.e. 2003-2008, it was even higher – 9.5%. Intuitively, this prominent growth is questionable, as it was achieved in the context of dominating state ownership, centralized allocation of resources, government's control at the factor and goods markets, as well as poor infrastructural reforms (for instance, according to the indices of the EBRD). The Belarusian case challenges the mainstream paradigm of growth in transitional countries, which assumes that the progress in market reforms is the key factor for high and sustainable growth.

The simplest and most widespread explanation of the Belarusian phenomena is based on 'non-standard' gains in productivity. This approach assumes that productivity is the engine of growth (World Bank (2012); Demidenko and Kuznetsov (2012)). To a large extent, these gains in productivity are seen as "artificial", resulting from Russian injections into the Belarusian economy: cheap gas, specific schemes of oil trade, and preferences in access to the Russian markets (Kruk (2010)). However, under this approach, decomposing the growth in productivity by 'natural' and 'artificial' parts is hardly possible, as the impact of these factors is already hidden in the available data.

The IMF (2010) gave a substantially different explanation of Belarusian growth. They claimed that the average growth of 8.3% over the period of 2001-2008 was mainly capital-based with a contribution of 4.8 percentage points, while the contribution of productivity growth was only 3.0 percentage points (the rest of growth was explained by labor and cyclical factors).

The main reason behind the substantial difference in the explanation of growth factors is the statistical data on capital used during the growth accounting exercise. Belarusian official statistics reports the data on capital stock based on a direct survey of capital assets according to both gross and net (wealth)

capital concept. However, the growth rates of capital are reported only for the gross stock of capital. These growth rates are questionable as they demonstrate 'unnatural stability' – they fluctuate around 2% for the last 20 years, despite the fact that investments during this period has displayed huge and volatile growth. Statistical offices in other CIS countries have reported similar dynamics of the capital stock. Voskoboynikov (2012), and Bessonov and Voskoboynikov (2008) show that this trend is a consequence of the statistical methodology used in Russia (which the Belarusian methodology is very similar to). In particular, the trend is driven by biased capital investments deflators (which are overestimated) from the periods of high inflation (1990-s and early 2000-s).

If official data is used as the capital input for the growth accounting exercise, the contribution of TFP to growth will be overestimated. Hence, in the studies of the World Bank (2012) and Demidenko and Kuznetsov (2012), the leading role of TFP may be due to the use of the official data on the capital stock.

Motivated by this concern, we use two different methods to evaluate the value of capital inputs (see Kruk and Bornukova (2013) for more details). The first alternative to using the data from direct capital survey is to exploit a perpetual inventory method (PIM): the historical assessment of initial capital stock is further adjusted by the flow of investments and depreciation. However, if there is a bias in deflators within the sample, the series will also be distorted. This problem may be eliminated if the initial stock will be selected at the moment when there is no bias in investment deflator, in the period of moderate inflation. We call this approach PIM-backward.

The second approach to constructing capital series exploits the concept of productive capital and the data on the flow of capital. It assumes that the productive capacity of a capital good depends on its age. The productive stock of a capital good (i.e. the gross stock adjusted by the age-efficiency profile) generates a flow – capital services. The latter is the productive stock adjusted by the user cost of the individual capital good. For the total output of an industry (or economy) one should aggregate the inputs by different capital goods, which in contrast to the net (wealth) concept depends not only on the value of capital goods, but also on their user costs. This approach has solid theoretical foundations, which is the reason it is prioritized in productivity studies.

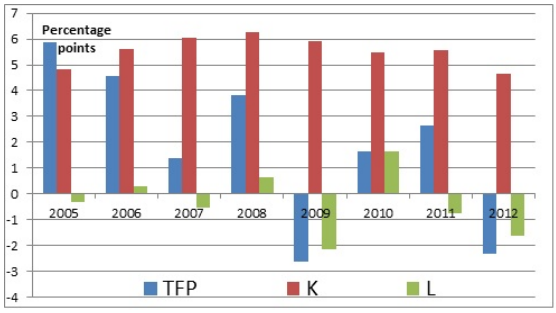
From the view of available data in the case of Belarus, this approach has a number of powerful advantages. First, we use individual deflators for individual capital goods, which are expected to be less biased than total deflators for the industry. Second, we use heterogeneous depreciation rates for each capital good in each industry based on actual data of 'accounting depreciation', while we would have to use homogenous assumptions for each industry in the case of net (wealth) concept. Third, we can exclude residential housing from our measure of capital input.

There are, however, also disadvantages. First, data of newly employed capital goods (in direct surveys of capital assets) and data on capital investments differ rather substantially. Traditionally, the data on capital investments is treated as more reliable, but based on the direct surveys of capital assets we have to use the series of newly employed capital goods as a flow variable when running PIM. Second, we use exogenous real interest rate for computing unit user costs, but the results are very sensitive to our assumptions on the real interest rates across industries. Third, the necessity to exclude residential housing from the data (because of 'mixed historical prices') may be interpreted as a loss of information. Given the strengths and weaknesses of the approach, we prioritize it on the industrial level, but prefer the PIM-backward approach for an aggregate economy analysis.

Based on the PIM-backward measure for the total economy (see Figure 1), we may argue that the contribution of TFP to growth was more modest during the last decade than what

was reported in the majority of previous studies on Belarusian growth. This finding is of fundamental importance for the growth agenda: only productivity-based growth may be treated as sustainable, since capital growth will slow down as the capital approaches its stationary value. We argue that only the policy directed to promotion of productivity is vital for growth prospects.

Figure 1. Contribution of Production Factors and TFP to the Growth of Gross Value Added (PIM-Backward Approach)



The dynamics of productivity divided according to industries (see Table 1) display that the leaders in productivity growth are either industries that produce non-tradable goods (communications, finance, construction) or those that have a chance of 'artificial productivity gains' (chemical and petrochemical manufacturing, and fuel).

Table 1. Initial Level and Growth Rates of Productivity in Major Industries

Industry	TFP level in 2005 (total economy = 100)	Average growth rate in 2006-2010
Communications	84.2	13.2
Finance, credit, insurance	187.9	11.3
Chemical and petrochemical manufacturing	126.1	11.1
Construction	140.2	10.4
Fuel	119.9	8.2
Other manufacturing	68.9	7.1
Logging, woodworking, pulp and paper	94.6	5.6
Building materials	138.8	4.2
Trade and catering	206.0	4.2
Machinery and metal-working	108.5	3.0
Agriculture	61.1	2.0
Ferrous metallurgy	125.7	1.1
Food	144.2	0.7
Transport	112.8	0.6
Light industry	86.7	-0.4
Electric power	119.1	-4.2

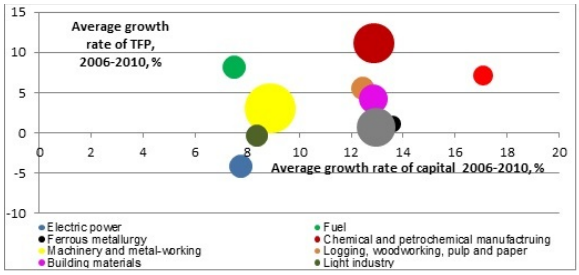
However, the theory suggests that the leaders in productivity growth should be the industries producing tradable goods. . This contradiction may be interpreted in two ways. First, one may argue that a more competitive environment and larger share of private ownership (which are seen in the financial industry, trade and catering) are the core reasons for high productivity level and growth rates in 'domestic industries'. Second, an attractive position of 'domestic industries' may reflect a high level of domestic prices rather than 'natural' productivity. The base year for our computations is 2009, in which both the real effective exchange rate of the national currency and income were relatively high. The devaluation of 2011 fixed the problem only temporarily, since the inflation in 2011-2013 quickly eroded the benefits of the devaluation. Therefore, the indicators, in terms of 2009 prices, may capture the changes in nominal values as the main component of the productivity gains, while from a longer-term perspective it would be seen as mainly price movements without substantial progress in productivity. In our view, the second explanation is the main reason for the non-standard disposition of productivity levels and growth rates among industries.

If that is the case, the bigger picture looks as follows. Industries producing tradable goods suffer from the lack of progress in productivity, i.e. lose their competitive advantage; enhancements in total productivity are mainly due to industries with 'artificial productivity gains'. The latter allows domestic prices to grow, making a productivity illusion of domestic industries. All together these symptoms are quite similar to the Dutch disease.

One more finding from the productivity analysis at the national level is the lack of productivity gains from reallocation of resources from less productive industries to more productive ones. A scatter-plot between capital accumulation growth rates and TFP

growth rates (see Figure 2) demonstrates no clear relationship between them.

Figure 2. Growth Rates of Capital Input vs. TFP Growth Rates in Manufacturing Branches, 2006-2010.

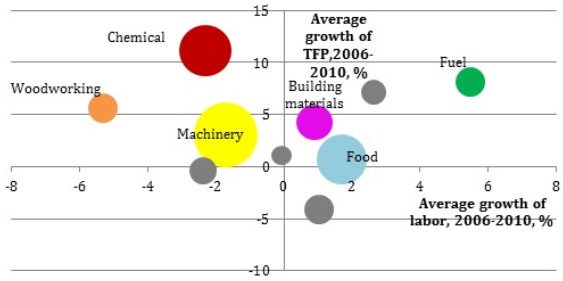


Notes: The sizes of the circles correspond to industry shares in value added.

However, if there was a free allocation of resources, more productive industries would accumulate more capital. Moreover, the same indicators under the PIM-backward approach demonstrate clear negative relationship. A 'soft' interpretation of this phenomenon assumes that the lack of reallocation of capital restrains the development of total productivity. A 'tighter' interpretation assumes that at least in some industries there is a trade-off between capital accumulation and productivity gains. For instance, in Kruk and Haiduk (2013) it is shown that spurring capital accumulation through the practice of directed lending leads to losses in efficiency through a number of channels. Hence, the simplest way to increase aggregate productivity is to depart from the centralized allocation of capital and unblock capital inflows to more productive industries and vice versa.

Figure 3 documents the mobility of labor markets across the manufacturing industries in Belarus. While one can expect that labor flow into more productive industries, it is not completely true for the Belarusian manufacturing sector.

Figure 3: Labor growth and TFP growth in industries of Belarusian manufacturing, (capital services approach).

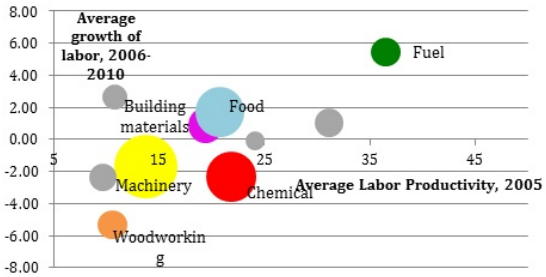


Notes: The sizes of the circles correspond to industry shares in value added.

Two distinct trends emerge in the labor market. On the one hand, some industries exhibit textbook behavior: increases in TFP are associated with increases in the number of people employed. The best example here is the fuel industry, which experiences TFP increases due to preferential oil prices. However, there are industries that gain TFP and lose labor at the same time. The chemical industry, machinery manufacturing and woodworking are examples of this pattern. These industries have experienced rapid capital accumulation, which, coupled with high gains in TFP, should have contributed to the increases in labor productivity. Surprisingly, though, these industries did not attract more labor. A possible explanation for this counterintuitive pattern is the excessive employment at the beginning of the period in question. In this case, a decrease in the number of people employed may have contributed to the increases of TFP.

Indeed, Figure 4 confirms our hypothesis: labor was flowing from the industries with lower labor productivity to the industries with higher labor productivity in general. Industries in which TFP increased and which were accompanied by a labor decrease, featured low labor productivity in the beginning of the period in consideration, more precisely in 2005. Only the chemical industry exhibited the unexpected behavior: it lost labor despite high initial productivity. By getting rid of excessive employment they were contributing to an increase in TFP.

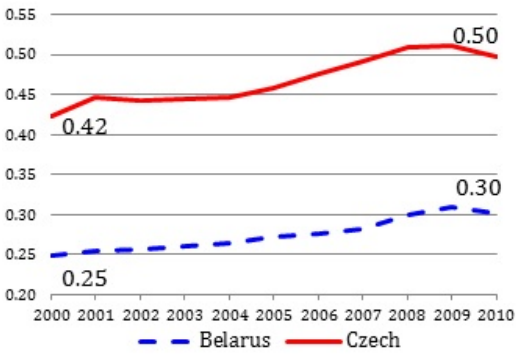
Figure 4: Labor shifts into the sectors with higher labor productivity.



Notes: The sizes of the circles correspond to industry shares in value added.

How is Belarus doing relative to other countries? We have compared Belarusian TFP to the TFP of the leader of transition, the Czech Republic, and to the regional leader, Sweden. The Czech Republic is more developed than Belarus (in 2010 Czech GDP per capita (PPP-corrected) was 1.73 times higher than in Belarus), and, theoretically, it should be much more difficult and costly for it to continue approaching the technological frontier. However, our findings suggest that the Czech Republic is catching up with Sweden in terms of TFP, and doing it faster than Belarus (see Figure 5).

Figure 5: TFP of Belarus and the Czech Republic relative to TFP of Sweden, (PIM-backward approach).



Over the last 10 years, Belarus has closed only 5 percentage points of the gap with Sweden. The Czech Republic, where the contribution of TFP to growth was more substantial, has managed to close 8 percentage points of the gap.

In absolute numbers (in 'international' dollars of 2010), aggregate TFP in Belarus in 2010 was 2.92 versus 4.66 in the Czech Republic and 9.38 in Sweden (according to the PIM-backwards method). However, the aggregate picture does not reflect the situation in the sectors of the economy and industries of manufacturing.

Table 2: Comparative advantage of Belarusian industries: winners and losers (capital services approach)

	TFP in 2010 relative to	
	Czech	Sweden
Winners		
Trade and repair	1.37	0.55
Chemicals manufacturing	1.17	-
Hotels and restaurants	1.03	0.46
Food manufacturing	0.89	0.36
Mining and quarrying	0.87	0.36
Losers		
Machinery and equipment	0.58	0.26
Transport and communications	0.56	0.28
Electrical equipment	0.54	0.17
Manufacturing of transport vehicles	0.36	0.28
Electricity, gas and water	0.14	0.13

Table 2 documents the comparative advantages and disadvantages of the Belarusian economy in 2010 according to the capital services approach. Both the capital services approach and the PIM-backwards approach produce the same winners and losers list with the only difference being that the PIM-backwards method has the construction sector among winners. It is not surprising to see resource-based industries among the winners (mining and quarrying mainly reflects the extraction of potash, while the chemical

industry benefits both from potash and from preferential process for Russian oil). Food manufacturing is among the winners mostly due to the price scissors in agriculture: food producers buy their inputs at very low prices. The non-tradable sectors are among winners, and the majority of the manufacturing sectors are among the losers. Again, this is similar to the symptoms of the Dutch disease. It is ironic that Belarus has symptoms of a Dutch disease without the trade surplus. Instead, the desire of the government to inflate wages combined with the preferences for Russia led to the development of the same diagnosis.

Belarusian economic growth is less TFP-led than is commonly believed. While the labor market proves to be relatively successful in its reallocation of employees and its contribution to aggregate increases in efficiency, the capital market is distorted by government interventions. Capital accumulation does not necessarily lead to increases in TFP, and the new modernization policy with the bottom line of "more capital" may not be the best option for enhancing growth. Our conclusion is that Belarus should find new sources for TFP-led growth.

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References

Bessonov, V., Voskoboynikov.I. (2008). "Fixed Capital and Investment Trends in the Russian Economy in Transition.", Problems of Economic Transition, 51(4), pp. 6-48.

Demidenko, M., Kuznetsov, A. (2012). "Ekonomicheskiy rost v Respublike Belarus: factory i otsenka ravnovesiya" (Economic Growth in Belarus: Factors and Equilibrium Assessments), National Bank of the Republic of Belarus, Working Paper No.3.

IMF (2010). "Sources of Recent Growth and Prospects for Future Growth", IMF, Country Report No.10/16.

Kruk, D., Bornukova, K. (2013). "Belarusian Economic Growth Decomposition", unpublished manuscript.

Kruk, D., Haiduk, K. (2013). "The Outcome of Directed Lending in Belarus: Mitigating Recession or Dampening Long-Run Growth?", BEROC Working Paper Series, WP No.22

Kruk, D. (2010). "Vliyanie krizisa na perspectivy dolgosrochnogo ekonomisheskogo rosta v Belarusi" (The Impact of Crisis on the Perspectives of Long-term Growth in Belarus), IPM Research Center Working Paper Seies, WP/10/07.

World Bank (2012). "Belarus Country Economic Memorandum: Economic Transformation for Growth", Country Economic Memorandum, Report No. 66614

Voskoboynikov, I. (2012). "New Measures of Output, Labour and Capital in Industries of the Russian Economy", Groningen Growth and Development Centre, Research Memorandum GD-

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