PERSISTENT GROWTH SLOWDOWNS IN FAST-GROWING MIDDLE-INCOME ECONOMIES

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From the second half of the 20th century, a set of emerging economies have undergone a remarkable developing path. During the first years of the global financial crisis of 2007–2008, Brazil, Russia, India, China, and South Africa (BRICS) were only slightly affected by its negative impacts. However, after 2013, a considerable growth slowdown period has evolved in these countries with the exception of the Indian economy. In the current study, we examine whether the growth dynamics of the BRICS economies shows significant correlation with the fluctuation of commodity prices, especially in the case of raw materials. Besides applying a cross correlation model on the quarterly commodity price indices and real GDP growth data, the research also focuses on the export structure of the selected fast-growing countries. As a closing element of our paper, a brief analysis is carried out regarding the correlations of growth patterns within the BRICS economies.

Keywords: growth slowdowns, emerging economies, middle-income trap, commodity prices

JEL classification indices: F14, F63, O11, O13

1. INTRODUCTION

Since the 1970s, due to the accelerating processes of economic globalisation, a number of countries – the so-called emerging economies – have produced a remarkably dynamic growth path. Factors such as huge internal and external markets, a constantly growing population and thus labour force, an abundance of

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natural resources and the development of the manufacturing industry functioning according to the economies of scale have created an export-led growth scenario in countries like Brazil, Russia, India, China and South Africa (hereafter referred to as BRICS economies).

In this analysis, the selected fast-growing economies are examined from 1999 until the second quarter of 2016, relying on the data of the economic growth indicators of the World Development Indicators, the Harvard Atlas of Economic Complexity, the International Monetary Fund's (IMF's) quarterly data of commodity prices, and the national bureaus of statistics of the BRICS countries. Since half of the examined economies were closely affected by the Asian financial crisis starting in 1997, it shall be taken into account that its impacts had been already lessened by the turn of the millennium. At the same time, the closing element of our calculations is the post-crisis period following the 2008 financial crisis, with regard to the fact that most BRICS economies have produced a significant growth slowdown after 2013. In the selection process of the examined time period, the availability of quarterly data has also played a crucial role: latter condition can also be satisfied when searching for the above-mentioned data between 1999 and 2016. Moreover, there are ten years to review before the crisis of 2008, offering the potential of identifying possible relations concerning fast economic growth and its further slowdown episodes.

The main goal of our paper is to investigate the possible relation between growth slowdowns and the volatility of commodity prices. In Section 2, we provide a brief literature review of some slowdown characteristics as well as of the Kaldorian approach to economic growth regarding developing countries. Section 3 provides a consolidated view of the five countries' economic performance after the global crisis of 2008. In Section 4, some results have been gathered concerning the possible triggers of growth slowdowns, focusing on the current recession's effects. Moreover, we focus on the examination of the BRICS economies' export structure as a dimension of exposure to commodity prices of raw materials and energy. In Section 5, we analyse growth slowdowns through a commodity price-based cross-correlation model developed on the basis of the IMF's quarterly set of data. Section 6 concentrates on the significance of the export structure within the BRICS group, seeking some possible answers to the question of which country shows more exposure to commodity prices. The main hypothesis of the current research is that the growth dynamics of the BRICS economies shows a strong correlation with the fluctuation of commodity prices, especially in the case of the raw materials.

Before starting our analysis, we would like to briefly summarise the growth path of the BRICS countries. When examining the pre-crisis 4 years (2005–2008, see *Figure 1*), we have to highlight the performance of China which achieved a

12.0% average GDP growth rate. Continuing the comparison, India also stands out with its 8.6% between 2005 and 2008, while Brazil (4.6%) and South Africa (4.9%) show much lower, but still comparably high values. In this period, Russia was situated somewhere between the fastest and less dynamically growing economies of the BRICS group, producing a 7.1% per year average. The US, as an external basis of comparison, was growing at a 1.9% average rate. As a matter of fact, the post-crisis 3.5 years have managed to destabilise the previously described rates.

Between 2013 and 2016, growth dropped by half in the case of China (7.2%). The lowest results have been produced by Brazil, achieving a –0.9 percent average, followed by Russia's –0.6%. In South Africa, the situation has also notably worsened (1.5%), while India is making an exception with its 7.1% average growth since it is the only economy capable of reaching a higher growth rate compared to the 2001–2004 average (6%). Moreover, India's economic growth did not show signs of slowdown between 2009 and 2016, while every other member of the BRICS group has been coping with this problem. Regarding the US's performance, it has successfully exceeded the pre-crisis rate of expansion with its 2.1% average quarterly growth (WDI 2016).

There have been several academic debates concerning the slowdown of certain emerging economies, but one of the most important questions is whether these countries are producing only a temporary fall in their GDP growth path, or
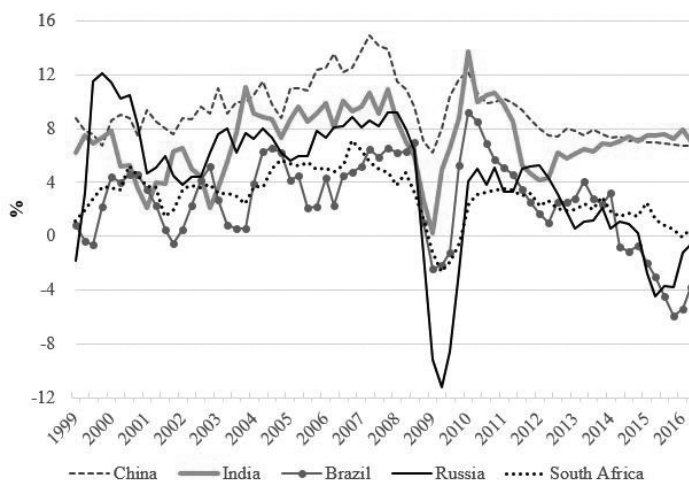

Figure 1. Real GDP growth rate of the BRICS economies (1999–2016)

Source: Author's calculations based on the National Bureau of Statistics of China, Ministry of Statistics and Programme Implementation (MOSPI) and OECD as a secondary source, Instituto Brasileiro de Geografia e Estatística (IBGE), Federal State Statistics Service (ROSSTAT), and the Statistics South Africa.

whether it can be assumed that the above-mentioned tendency is a completely new and long-lasting phenomenon rather than a short, internally or externally driven episode. In order to find some possible answers, we will construct a model that will allow us to make predictions in this field.

2. LITERATURE REVIEW

2.1. Slowdown characteristics

According to some researchers, one of the main characteristics of the current slowdown in the BRICS countries is that it can be viewed as synchronous and protracted. Furthermore, the phenomenon can be observed particularly in the case of the biggest members of the fast-growing economies. However, much more significant is the assumption that this tendency shows a high degree of likelihood to continue in a longer term as well, since factors such as import, export, investment, and private consumption have shown deceleration after 2010 (Didier et al. 2016: 11–12.). The authors also highlight that when examining the main sources of the slowdown, we have to take a closer look at both external and internal economic and socio-political processes. Quite disadvantageous circumstances could develop a few years after the financial crisis of 2008, leading to the beginning of the growth slowdown. However, after 2014, the primary factors of the deepening economic deceleration have become the internal processes of the countries, such as increasing inflation and short-term interest rate (Didier et al. 2016: 15).

Qureshi et al. (2015) suggest that in the short run, emerging countries will probably have to face an unbeneficial macroeconomic environment that will certainly not contribute to further rapid growth scenarios, creating a situation in which growth slowdowns may gain a strong structural dimension as well. The study reveals that in the case of the emerging economies, one-third of the growth deceleration is driven by the above-mentioned structural changes and the remaining two-thirds of the process may have occurred due to the relatively slow recovery of the developed countries.

To continue, permanent slowdowns evolving in certain countries' economic growth can be also examined from the perspective of the so-called "middle-income trap". Several studies have recently appeared documenting this aspect, yet according to one of the most cited papers, the trap "is the phenomenon of hitherto rapidly growing economies stagnating at middle-income levels and failing to graduate into the ranks of high-income countries" (Aiyar et al. 2013: 3).

As reported by Naude et al. (2016: 23), the processes in one of the fastest growing countries played a significant role in the overall slowdown trajectory. China's GDP growth rate dropped by half after 2014 compared to years right after the financial crisis. The authors conclude that such an outcome should serve as an example of the inefficient model when a country bases its growth completely on export. After a certain point, adopting technological methods of the more developed economies in itself becomes insufficient because only innovation and the high value-added products and services can contribute to achieving a higher income level group and to sustaining long-term economic growth. Another problem is the decreasing volume of manufacturing in countries such as Brazil, South Africa, and Russia. Since this sector of the economy used to employ high numbers of people, providing thereby a low level, but constant livelihood, the currently ongoing growth slowdown has affected masses of labourers, leading to the further deepening of poverty and thus several other negative socio-economic outcomes.

2.2. Economic growth in developing countries – The Kaldorian approach

In his growth studies, Nicholas Kaldor explored the possible reasons of unequal development in different countries. In contrast to the Keynesian approach, Kaldor specified that on the one hand, the output of economies depends much more on the availability of natural resources than on the effective demand. In a short run, the supply of goods and services should rather be considered inelastic and it is not affected by the positive changes of monetary demand. On the other hand, there is a strong correlation between technical progress and the rate of capital accumulation. Kaldor argues that when more capital is invested in a worker, the introduction of a more developed technology can be expected. To continue, technologies of advanced level will probably lead to the use of more capital (Kaldor 1957).

When analysing the development of emerging economies, considerable attention has to be paid to the role of productivity growth. A wide variety of explanations focus on the latter phenomenon in the economic literature. For instance, neoclassical approaches afford equal importance to each sector in productivity studies compared to the structuralists who consider the manufacturing industry as the main driver of innovation, of growing – static and dynamic – returns of scale, and thus of the productivity increase of a given economy. However, after a higher than average income per capita has been achieved (the so-called maturity stage in the economic development of the country), the manufacturing industry will inevitably account for a smaller part within the GDP (Nassif et al. 2013).

We accept – with partial modifications – the two hypotheses listed in the United Nations' Discussion Paper and set a third one regarding the growth path of the BRICS economies (Nassif et al. 2013):

– In a given country, significant structural changes largely contribute to economic development. Moreover, the export of high value-added products plays a critical role in the catching-up of emerging economies.

– The catching-up process of a developing country strongly relies on the ability to develop a diversified and export-orientated manufacturing industry that will employ a large proportion of the active population.

– If the above-mentioned conditions are fulfilled, the possibility of the middle-income trap may significantly decrease. Regarding the upgrading path of developing economies, Felipe, Abdon, and Kumar concluded that "countries that have attained upper-middle-income (…) status or high-income (…) had, in general, more diversified, sophisticated, and non-standard export baskets at the time they were about to make the jump than the countries stuck in the middle-income trap today" (Felipe et al. 2012: 46–47).

In 2013, UN researchers made an attempt to estimate the so-called Kaldor-Verdoorn coefficient[1] for Brazil. According to the results, Brazil is indeed capable of a long-term economic growth. Moreover, its manufacturing sector is functioning within the framework of dynamic economies of scale, as had already been noted by Kaldor in 1966. Nassif et al. (2013) estimated that between 1990 and 2010, the Kaldor-Verdoorn coefficient attained a relatively high value (0.52) and thus they could demonstrate that the growth of the manufacturing industry contributes to the increase of labour productivity.[2]

However, in 1970, Kaldor turned his attention from global economic growth towards some regional issues. Among several other conditions, his model is based on the hypothesis that export growth entails regional growth. Kaldor considered export the most important element of aggregate demand at both national and regional level (Kaldor 1970; Thirlwall 2013). Our study also covers the significance of export structure by analysing the BRICS' economies dependence on commodity price changes and export structure.

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[1]   The original equation was the following: $p = a + bq$, where p stands for the exponential growth factor of labour productivity in the case of the manufacturing industry, b is the already mentioned Kaldor-Verdoorn coefficient, and q is the exponential growth of the manufacturing output (Verdoorn 1949; Kaldor 1966; Nassif et al. 2013).

[2]   According to Kaldor (1966), in the case of developing economies an approximately 0.50 value can be accepted as a completely suitable parameter.

3. OVERVIEW OF THE BRICS ECONOMIES' PERFORMANCE

In order to draw conclusions concerning the fast-growing countries' economic slowdown, it is important to examine their current role in global economy. As *Table 1* shows, the five emerging countries have indeed quite a significant impact in world economy: on the one hand, their total GDP as a percentage of the world's total GDP is more than 30% in PPP terms. On the other hand, with a population of over 3 billion, these economies represent more than a third (about 43%) of the global population. In 2015, China was the largest economy of the world: its total economic output of about USD 19,500 billion exceeded the overall output of the other 4 BRICS members. GDP per capita in the most developed member country (Russia) was about 4 times higher than in India, which has just been upgraded to the "Lower-Middle Income" category of the World Bank classification.

However, the average trade openness of these countries is still relatively low (22.2%) with the exception of Russia, the latter achieving more than 40%. In the last two decades, the external balance on goods and services has been strongly positive in China and Russia, while it has been neutral or slightly positive in case of the other 3 members. Hence, export-based data show larger openness than an import-based or a combined external trade indicator.

As indicated in *Figure 2*, the largest amplitude of growth can be detected in Brazil, which is currently undergoing a severe recession period along with Russia, while India and the USA were only slightly affected by the slowdown tendency.

Table 1. Main indicators of the BRICS countries

	Brazil	Russia	India	China	South Africa	Total
GDP, Total (USD Billion, Nominal, 2015)	1,775	1,326	2,074	10,866	313	16,354
GDP, Total (USD Billion, PPP, 2015)	3,192	3,580	7,983	19,524	724	35,003
% of World total	2.9%	3.2%	7.2%	17.6%	0.7%	31.5%
World ranking (2015, WDI)	7	6	3	1	28	–
Population (Millions, 2015)	206.7	146.7	1,330.9	1378.8	55.7	3,118.8
Growth rate, % (y/y) 2010–2015	0.80	0.04	1.25	0.44	1.08	0.80
GDP per capita (USD, PPP, 2015)	15,443	24,404	5,998	14,160	12,998	11,223
World ranking (2015, WDI)	76	48	122	84	88	–
Total exports (2014, US Billion)	233	555	387	2340	111	3626
Exports per capita (USD, 2014)	1,127	3,783	291	1,697	1,993	1,163
Exports per GDP (%)	13.1%	41.9%	18.7%	21.5%	35.5%	22.2%

Source: WDI (2016), Harvard Atlas of Economic Complexity.
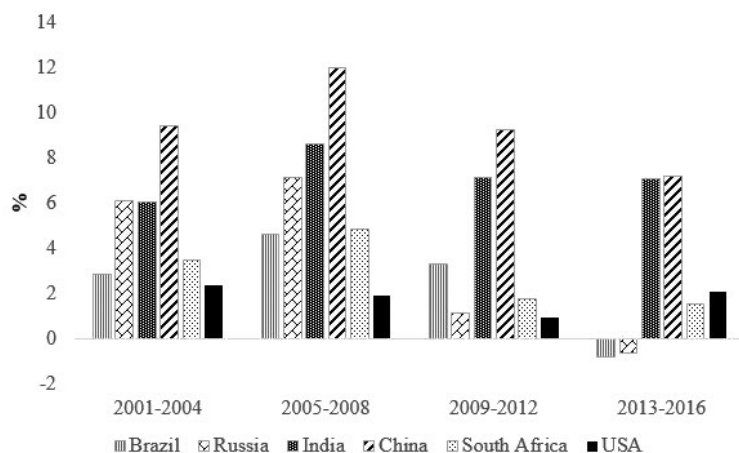
Figure 2. Comparison of the four-year growth rates (4 years = average of 16 quarters)

Source: See Figure 1.

4. POSSIBLE TRIGGERS OF THE GROWTH SLOWDOWN

Examining the possibility of a middle-income trap, in the current study we agree with the presumption according to which in the case of certain BRICS countries, growth slowdown was driven by external factors between 2010 and the beginning of 2014, and is being strongly influenced by country-specific factors in the ensuing period.

– Taking into consideration the short-term effects of the crisis of 2008, global trade was one of the first global sectors to mirror the slowdown tendencies of the economies (World Bank Group 2016: 182). In 2009, the world's share of exports of goods and services as a percentage of Gross World Product[3] fell to 26.6%, while a year earlier it was around 30.8%. In 2012, the level of 2008 was almost attained (30.7%), but since then, there has been a gradual deceleration. According to the latest data, it fell to 29.3% in 2015, and most researches make prognoses for further decrease (World Bank 2016).

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[3]   Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services), and transfer payments (World Bank methodology).

– Besides global trade, commodity prices also declined significantly during the first years of the crisis: in the case of oil and metals, an at least 50% decline was recorded, while in the agro sector, a 30% fall was detected compared to 2011 (World Bank Group 2016: 182–183).
– As a third major factor, we have to mention the shrinking ratio of investments, driven by the growing risk regarding several uncertainties developed by the financial crisis of 2008 (World Bank Group 2016: 183).

After the first intensive waves of the crisis it has become clear that such developed and open economies as for example the EU countries had been indeed strongly affected. While the EU was struggling with deep recession, the BRICS countries (especially India and China) were set as an example of regions less sensitive to the crisis. However, after 2014, the above-mentioned claim could no longer be supported since most of these emerging economies – with exception of India – started to show signs of slowdown episodes. Since 2014, the internal, country-specific factors have been gaining greater importance. One of the most significant effects is the total factor productivity decrease, or, more precisely, the slowing increase of the TFP (World Bank Group 2016: 184). In the case of the emerging countries, the year of 2014 can be regarded the weakest one compared to the 18 years' average before the crisis of 2008 (Didier et al. 2016: 25).

5. ANALYSING GROWTH SLOWDOWNS THROUGH A COMMODITY PRICE-BASED CROSS-CORRELATION MODEL

It has become evident that 5–6 years after the financial crisis of 2008, certain previously fast-growing middle-income countries are producing slowing economic growth. This statement is particularly true for the economies that are major suppliers of raw materials. It can be assumed that their previous growth had been based on the increase of raw material prices. According to our hypothesis, the growth dynamics of the BRICS countries shows a strong correlation with the fluctuation of commodity prices, especially in the case of the raw materials.

In order to create our model, we have used the so-called Combined Commodity Price Index (CCPI) published by the IMF (2006) concerning the five examined economies. The index is composed of the following categories:
– Fuel and energy: crude oil, natural gas, and coal;
– Food and beverage: cereals, vegetable oils, meat, seafood, sugar, bananas, oranges, coffee, tea, and cocoa;
– Agricultural raw materials: timber, cotton, wool, rubber, and hides;
– Metals and ores: copper, aluminium, iron ore, tin, nickel, zinc, lead, and uranium.

It has to be highlighted that the above-mentioned commodity price indices are shown in nominal terms in the global market. Therefore, the CCPI is not adjusted for inflation, thus the price changes will likely be more positive than negative in the long run. The aggregated index was created to demonstrate the change of certain raw material prices expressed in US dollars. On the basis of the monthly published data, we have developed quarterly averages to gain the percentage change relative to the previous quarter. In the applied method, sub-indices have been correlated to each other to illustrate their level of independence from one another. It has been found that these sub-indices only moderately correlate with each other (approximately 0.4–0.6), showing that each and every index has an individual set of information – this being the reason why they should be analysed separately. The frequency of positive and negative price changes can be seen in *Figure 3*, where normal distribution cannot be detected in any case.
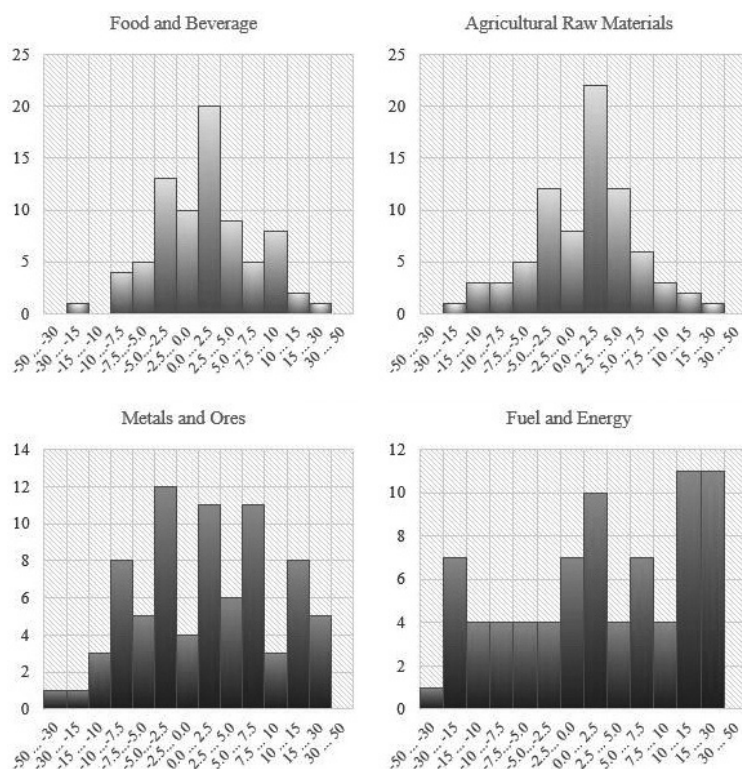

Figure 3. Frequency and distribution of quarterly commodity price changes in the world economy, 1999–2016

Source: Author's calculations based on IMF (2016).

Table 2. Cross correlation between commodity price indices, 1999–2016

	Food and beverage	Agricultural raw materials	Metals and ores	Fuel and energy
Food and beverage	1			
Agricultural raw materials	0.499	1		
Metals and ores	0.507	0.654	1	
Fuel and energy	0.496	0.566	0.590	1

Source: Author's calculations based on IMF (2016).

Nevertheless, a similar pattern might be observed in the two upper (Food and beverage, Agricultural raw materials) and lower graphs (Metals and ores, Fuel and energy). The large differences in standard deviation express the different volatilities of the examined groups. Not surprisingly, oil prices can be considered as the most volatile ones, while food prices are the least likely to change rapidly. In *Table 2* we have illustrated the cross correlation between the four groups of commodity price indices. The strongest relation (a Pearson coefficient of 0.654) can be found between metals and ores compared to agricultural raw materials, while the weakest one occurs in the case of fuel and energy confronted with the food and beverage category.

6. SIGNIFICANCE OF THE EXPORT STRUCTURE: WHICH COUNTRY SHOWS MORE EXPOSURE TO COMMODITY PRICES?

In order to further investigate the possible causes of growth slowdowns regarding the world's fastest developing and biggest economies, it is crucial to examine each country's export structure as well as the extent of its exposure to the already-mentioned commodity prices.

As follows from *Figure 4*, due to the high ratio of fuel, energy products, minerals, ores, and metals, Russia represents the most exposed economy to commodity prices: in 2014, petroleum oils (crude as well as refined) were exported with a value of USD 319 billion. Natural gas and coal also account for a significant part of the Russian export, being altogether worth almost USD 60 billion. In our comparison, Russia is followed by Brazil, where the most important exported goods were iron ore (USD 34.3 billion), soya beans (USD 24.6 billion), petroleum oils (USD 19.5 billion), beet sugar (USD 9.34 billion), and poultry meat (USD 7.24 billion) in 2014 (Harvard Atlas of Economic Complexity 2016). These two economies are currently undergoing quite a severe recession period, which clearly corresponds to the radical fall of fuel and energy prices after 2014.
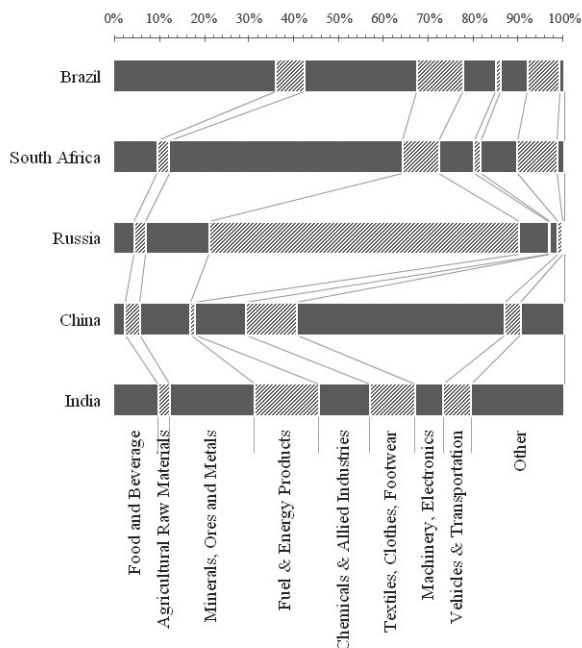
Figure 4. Export structure of the BRICS countries (2014)

In accordance with *Figure 4*, Brazil is followed by South Africa, a country concentrating its export mainly on precious metals, achieving a USD 29.8 billion volume in 2014 (Harvard Atlas of Economic Complexity 2016). India is the first country where the exposure to commodity prices can be considered moderate since the highest values are being produced thanks to the computer software activity reaching USD 75 billion in 2014. Refined petroleum oils are the second largest segment of Indian export (USD 53.5 billion) while diamonds and jewellery of precious metals were exported with a value of USD 37.5 billion.

Our ranking is closed by China, a country being the most independent of commodity prices: here, the export structure is the most diversified one. The first place definitely goes to personal and portable computers (USD 193 billion), followed by several groups of electronic goods as well as different vehicle parts and accessories. Along with machinery and electronics, textiles, clothes, and footwear are also contributing to the country's high volumes of export. In sum, India and China have managed to keep their relatively independent position concerning commodity prices because they were able to create and further develop their high value-added and very competitive products in global markets. The IT industry

of India alone has contributed to the country's balance of trade with about USD 75 billion of software exports. What is this, if not the evidence of a successful catching-up path of certain emerging economies?

7. CONCLUDING REMARKS

By 2016 it became evident that there is an ongoing significant and synchronous economic growth slowdown in the previously fast-growing middle-income countries. We confirmed that there is a strong relation between a country's export structure, its exposure to commodity prices, and economic growth. The example of Brazil and Russia serves as an indicator that in the case of a global crisis, falling commodity prices are likely to break a steep growth path sustained in a preceding time period and may lead to protracted stagnation, thus preventing the given country from upgrading to a higher income group.

It is also important to note that although years of such recession are primarily driven by external, global factors, stagnation itself is reinforced by a set of local, endogenous factors. Moreover, we have to take into account that such a tendency will certainly have a strong and quite negative effect on other developing as well as developed countries of the world, which in a long-term may further contribute to a global economic turmoil (Huidrom et al. 2016).

It is interesting to examine the correlations of growth patterns within the BRICS economies, as we have illustrated in *Table 3*.

It can be seen that the strongest relation has developed between Russia and South Africa. Although these two emerging economies are geographically in completely different regions of the world, their export dependence on energy and raw materials represents a significant intersection. India, again, appears as an outlier country, having relatively weak relations with other BRICS members. Its weakest connection can be detected towards Russia. Thus, a parallel can be drawn between an emerging country's high rate of independence and long-term economic growth.

Table 3. Cross-correlation of economic growth in the BRICS economies

	China	India	Brazil	Russia	South Africa
China	1				
India	0.576	1			
Brazil	0.646	0.351	1		
Russia	0.479	0.254	0.602	1	
South Africa	0.603	0.329	0.648	0.830	1

Source: See Figure 1.

Clearly, further research will be needed in order to draw conclusions regarding the possible solutions for local governments and policymakers, which would focus on the softening of the negative effects of the recession as well as on developing strategies of GDP growth stimulation.

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