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Trends and prospects of Lithuania's trade in agricultural and food products with BRICs

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Abstract

This study explores trends and perspectives of Lithuania's trade in agricultural and food products with the BRIC countries. Agriculture is one of the priority sectors of Lithuania's economy and plays an important economic and social role. The share of agricultural and food products within the overall foreign trade of Lithuania is significant, and exports to the BRIC countries account for nearly one third of the Lithuanian agricultural and food products exports. BRICs economic development and growing population leads to the increasing food consumption. The potential of these markets is attractive for Lithuania's foreign trade. Therefore, consideration of trade flow in food and agricultural products between Lithuania and the BRIC countries is currently very topical. The econometric forecasting model of Lithuania's Export and Import flows, created by the authors, was applied to predict trade with the BRIC countries in the medium-term period. The authors analyzed the structure of Lithuania's trade in agricultural and food products with the specific BRIC countries, estimated influence of external and internal factors changes.

Keywords: *foreign trade in agricultural and food products, econometric model, forecast, Lithuania, BRIC.*

JEL codes: *F17, F47.*

1. INTRODUCTION

In 2001 Goldman Sachs identified Brazil, Russia, India and China as the four markets with an increasing importance to the global economy development (O'NEILL et al. 2009). BRIC countries account for 40 percent of the world population. No matter the current global political and economic influence of BRIC countries is significantly lower than that of the confederacies of industrial countries, the latter are forced to pay a better regard to the growing influence of BRICs. A remarkable development potential is available within BRICs and under globalization conditions the said countries make attempts to jointly deal with financial and economic problems having become more acute due to the global financial downturn. BRICs is not a confined union and it is highly probable that in the future it will be joined by other countries (on 18 February 2011 joining of Republic of South Africa to it was declared). The position of industrial Western countries can be superseded by the countries with new economy, the leaders of which become the BRIC countries irrespective of versatile development rates among the latter.

To the opinion of Goldman Sachs analysts, the worldwide influence of BRICs will proceed to increase during the second decade. Their forecasts read that BRICs will surpass the USA in 2018 and by the year 2020 the economy of Brazil will approximate to that of Italy with the economies of India and Russia (individually) being similar to those of Spain, Canada or Italy (DOMINIC WILSON et al. 2010). For now Japan has been out-topped by China which is the second in the world after the USA. Rocketing in the number of middle class population with its income varying between $6,000 and $30,000 is being witnessed during the recent decade. Particular growth is observed in China and India. A more rapid increase in the said number of middle class population is expected in the decade to come. This tendency capacitates the increasing consumption of agricultural and food products in particular and will further lead to the import of goods with an increased added value.

As per anticipatory data of the Department of Statistics to the Government of the Republic of Lithuania, the export of goods to BRIC countries in 2010 is valued at 2590 million euro with import from them making 6235 million euro and trade turnover amounting to 8825 million euro (DEPARTMENT … 2011). Trade with BRIC countries takes an increasing share of the overall foreign trade of Lithuania, c.f. the year 2004 export to BRICs accounting for 9.6 percent of the overall export of Lithuania and the year 2010 export of already 16.5 percent is observed, and the increased share of import from 25.7 to 35.3 percent and trade turnover from 18.8 to 26.4 percent is reported.

A share of agricultural and food products in the overall trade with BRICs is also tending to enlarge. These indices underwent different changes with continuous increase in exports to BRIC countries (at a particularly high pace during 2005-2008) with an exception of 2009 when 36 percent decrease was stated and a resumed growth since 2010 when the level of 2008 was surpassed, and varying scale of imports with its ups and downs. As a result the trade turnover with its reduction by 34 percent in 2009 tended to increase in 2010 again and the year 2008 level of 857 million euro was reached (DEPARTMENT … 2011). The trade balance of 64 million euro in 2004, the year 2010 amounted to 697 million euro. Rapid resumption of trade with BRIC countries after the downturn should be stated which points at the growing demand of food products as a result of the improved economic situation.

Since Lithuania's accession to the European Union (EU) in 2004, different rates of Lithuania's trade in agricultural and food products with the EU, the third (all non-EU) countries and the

BRIC countries have been observed. In comparison to 2004, with a number of the EU member states making 25, the value of exported products to the EU in 2010 increased by 2.8 times while export to the third countries and BRICs increased by 4.6 and 7.1 times respectively. A share of BRICs in export to the third countries made 70 percent in 2010. However, import development trends are different: import from the EU increased by 2.9 times and 1.9 and 1.7 times from the third countries and BRICs accordingly. A significant share in import from the third countries is covered by BRICs and accounts for 23 percent. The reported figures prove an exclusive significance of trade with BRICs to Lithuania and undeniable relevance of the question "how this trade is going to evolve in the future?"

The study is targeted at analysing the tendencies of trade with BRICs and estimating their role for Lithuania's foreign trade in agricultural and food products. Consideration of these tendencies and influence of internal and external factors leads to forecasting of trade indices with BRIC countries for medium-term period. The tools employed in the present scientific researches include index, correlation, regression, cluster and time series analyses as well as model of econometric modelling and graphic simulation of the research results.
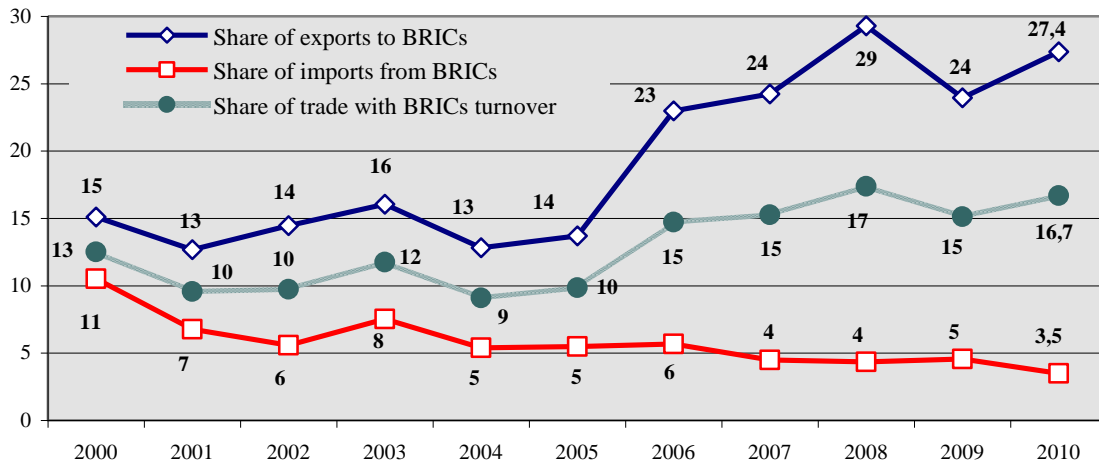
2. TRENDS OF LITHUANIA'S TRADE IN AGRICULTURAL AND FOOD PRODUCTS WITH BRICs

According to the WTO data, the following figures are informed for the year 2009 in regard to the Lithuania's foreign trade in agricultural and food products: 21.4 percent in exports and 16.0 percent in imports (WTO 2010). Anticipatory data of Lithuania's Department of Statistics point at the reduction of the above figures by respectively 18.1 and 13.0 percent in 2010, when the recovery of the entire economy of Lithuania was witnessed (DEPARTMENT … 2011).

Favourable climatic conditions are present in Lithuania for the agrarian sector development. Forage plants grow well in this country thus advantageous possibilities are available for pursuing the specialised agrarian sector directed towards meat and diary production, and cattle and pig rearing. A share of crop growing in the scheme of the entire agricultural production accounted for 56.6 percent with the remaining 43.4 percent going to animal fodder. Grain, rape, sugar beets and potatoes are raised and horticulture and gardening are developed. Food industry relying on processing of the local resources is among the areas of specialisation of Lithuania's industry. Trends of agricultural development are in strong correlation with the dynamics of food industry production and exports. The Lithuanian market appears to be loss-making to some producers of agricultural and food products due to the small scope of the internal market. For the reason the said sector of the Lithuanian economy is directed towards exports.

In 2009 a share of agriculture and the related services in gross value added made 3.7 percent while a share of manufacture of food products, beverages and tobacco products was 4.1 percent.

In 2010 the export share of agricultural and food products to BRICs made 27 percent of the entire exports of the said products from Lithuania with the reported 3.5 percent of import from BRICs within the entire imports of the said products to Lithuania. A share of the trade turnover was reported at 17 percent (Fig. 1).

Figure 1: A share of trade in agricultural and food products with BRICs within the entire foreign trade of Lithuania in the said products, percent

Since May 1, 2004, when Lithuania has become the member of the European Union, EU regulatory action in the market - export subsidies (refunds) for the trade with non-EU countries – started. Compensation is paid for the export of major agricultural, food and fishery products listed in the European Economic Community Treaty Annex. Despite of the EU obligation towards WTO to decline all forms of export subsidies to the non-EU countries by the year 2013 it is considered that the export perspectives for the future are good enough since the capacity, productivity and competitiveness of the Lithuanian agricultural and food sector should boost until the said year. Moreover, the EU intends to provide support to stimulate the sale of agricultural and food products on domestic and non-EU markets without allocation of direct subsidies (Council Regulation (EC) No. 2702/1999; Council Regulation (EC) No. 2826/2000).

In terms of the growing demand of food products, BRIC countries are attractive to Lithuania as a potential and perspective market. Russia is the closest BRICs neighbour to Lithuania. With the time long-lived trading relations have been established with Russia having similar traditions of agricultural and food product consumption whilst China, India and Brazil are distant countries from geographic perspective with differing food consumption traditions from those typical of Lithuania. Thus the basic share of trade with BRIC countries is targeted on Russia. In 2010 Russia accounted for 99.5 percent of export and 47.6 percent of import within the overall trade with BRICs.

The market of ***Russia*** has always been important to Lithuania for agricultural and food products trading. The year 2010 export structure revealed Russia proceeding to keep the leading position among 118 countries to which agricultural and food products have been imported from Lithuania. As for import partners Russia took the 13th position out of the total 109 countries.

In 2004 Russia held 12.7 percent of the total export of the Lithuanian agricultural and food products while in 2010 the figure increased to 27.2 percent and export value since 2004 to 2010 rocketed over 7 times and amounted to 773 million euro. In comparison with 2004,

imports of products in 2008 increased by 1.7 times however, gradual reduction during 2009 and 2010 was observed. Trade turnover in 2010 made 811 million euro and was the largest since 2000. Trade balance in agricultural and food products with Russia remains positive for a number of years and it reached the top score in 2010 making 735 million euro. Export surplus tends to continuously increase: in 2004 it outbalanced import 3.4 times with the said index in 2010 pointing at even 20.2 times.

Traditionally, Lithuania exports abundance of diary products to Russia where they are very well-known and valued for high quality. According to FAO, cheese export from Lithuania to Russia in 2008 accounted for 15 percent of the overall cheese imports with the following respective figures of 20 percent of the exported whey powder, 1.8 percent of skimmed milk powder and 0.4 percent of butter (FAOSTAT 2011). Lithuania places on the Russian market more than 30 percent of import of diary products. Besides, approximately 0.5 million live pigs are delivered to Russia from Lithuania on an annual basis. In 2008 a number of live pigs delivered to Russia made 46 percent of the overall pig imports of Russia (FAOSTAT 2011) and nearly 85 percent of the total pig export from Lithuania. Irrespective of unfavourable export conditions witnessed by the Lithuanian exporters now and then conditioned by altering and emerging new nontariff barriers, successful export of the Lithuanian production to Russia proceeds to continue.

Abundant amounts of fruit, berries, mushrooms and various vegetables are exported to Russia by Lithuania. Though a significant share of these is raised outside Lithuania, the settled trading relations enable continuous export of large amounts of the said products to Russia. Significant scope of import of beverages and meat of bovine animals as well as products intended for animal feed and forage additives to Russia also takes place.

If compared with 2009, reduced scope of imports from Russia is observed in 2010. Nevertheless, Russia remains one of the key partners of vegetable oil import to Lithuania. Moreover, large amounts of fish, beverages, mushrooms, spreadable fat mixtures and sauces.

The Russian market is risky yet. Currently attempts are made in Russia to defend the internal market by increasing the supply level of the domestic agricultural and foods products that is why export and import tariffs tend to vary more and more. Irrespective of this the Lithuanian entrepreneurs manage not reduce the trade scope.

In 2010 only 0.4 percent of the overall turnover went to **Brazil** in Lithuania's foreign trade in agricultural and food products. Only beverages - beer and a variety of vodkas - used to be exported to Brazil by Lithuania during a couple of recent years. During former years the exports of whey powder, confection out of sugar took place.

The main imported product is raw tobacco and its imports tend to increase on an annual basis (in 2010 its imports increased fivefold than in 2004 with import value growing by as many as nine times – up to 10.7 million euro). In 2010 Brazil was the main supplier of raw tobacco with its tobacco imports making 25 percent of the overall tobacco imports to Lithuania. It should be stated that the tending growth of an annual share of exports accounts for the products of tobacco processed in Lithuania (in 2008 it made 4.3 percent of the entire exports of agricultural and food products, in 2009 it accounted for 5.8 percent and in 2010 it was as many as 6.3 percent). Imports of instant coffee are also significant. In 2010 instant coffee import from Brazil made 9.0 percent of the overall instant coffee imports to Lithuania with the value amounting to 1.9 million euro. However, 99 percent of coffee beans are imported

from the EU states which do not raise coffee plants themselves. Imports of confection out of sugar, i.e. sweets and chewing gum also take place from Brazil. Brazil is known all over the world as an exporter of top quality beef and veal. Lithuania fails to produce the said quality meat thus it may undertake its import from Brazil.

Study of trade with BRICs shall take into account the so-called 'Rotterdam effect'. Every year the increasing scope of imports of agricultural products from the Netherlands to Lithuania are witnessed. The 'Rotterdam effect' means that a foreign trade transaction is reported for EU statistics first as the imports from a non-EU country to the EU Member State where the goods crossed the EU border and were released to free circulation. This statistical record is part of Extrastat. The following movement of the goods from this EU Member State to the EU Member State which is the final real importing country is then recorded as a dispatch (export) and arrival (import) between these two EU Member States within Intrastat. The 'Rotterdam effect' exists as well for Community exports, but to a lesser extent. The 'Rotterdam effect' inflates the exports and imports of the EU Member States which are exposed to this phenomenon (COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT… 2009). Thus one may state that some part of the products exported from Brazil, just as well as from other BRICs, is placed on the Lithuanian market from the Netherlands though no statistical reflection of the phenomenon is present.

Analysts of Standard Chartered Plc Bank currently observe the ongoing changes in the global economy leadership (ADAM, S. 2010). It is forecasted that China will overtake the U.S. to become the world's largest economy by 2020, helped by faster expansion and an appreciation of its currency.

In 2010 *China* was the 36th in Lithuania's export structure of agricultural and food products and the 21st - in import. The value of products exported to China made 3.6 million euro. Frozen blackberries were the main item of export. The largest share of products imported from China includes frozen fish (for 4.4 million euro), fresh fruit and nuts (3.4 million euro), canned vegetables and fruit (2.4 million euro), products intended for animal fodder and different seeds (sunflowers, vegetables). Balance of trade with China persists to remain negative with continuous increase of deficit.

In 2010 *India* was the 62nd export partner of Lithuania and took the 29th position in imports. Trading scope is not large with turnover making 8.8 million euro. Trade balance with India remains negative for a number of years. Lactose is the only product exported to India every year. Lithuania imports products out of surimi, instant coffee, tinned cucumbers, raw tobacco and nuts.

Analysis of trade with the BRIC countries indicates the boosting role of the said partners in the Lithuanian agricultural and food product exports. A share of their exports to non-EU countries keeps growing steadily: in 2004 it made 46 percent and in 2010 – 70 percent. In different years the BRICs share of imports from non-EU countries accounted for 23-27 percent. Positive balance in trading with the BRICs increased almost 11 times since 2004.

Russia remains the key partner in trade. In the year 2010 exports it derived over 99 percent of the value of products exported to the BRICs and it made 55 percent of imports from the BRICs. The global role of Russia as one of the key grain exporters has diminished during the recent years and it may proceed so for more years to come. The complex situation in Russia's meat sector persists. No matter the Government of Russia intends priority development of

sectors of agriculture including pig and poultry rearing, expansion of dairy and beef cattle farms and rapid increment of the scope of production, a relatively slow pace of the development of these is witnessed.

Agricultural products imported from Brazil, China and India are mainly those which cannot be raised in Lithuania due to the prevailing climatic conditions while the imported food products include the ones the production scope of which cannot be covered by the local industry alone as a result of a shortage in the local and imported raw materials. Coffee beans and top quality beef and veal can be imported from Brazil by Lithuania. China is the worldwide largest grower and importer of tea and is known as a raiser of a variety of fruit and vegetables. These include tropical fruit, apples, peaches and citrus fruit. Great variety of fruit, potherbs, tea, tobacco, coffee beans, different variety nuts is raised in India. All these products are in great demand in the internal market of Lithuania. Fish exports from China make about one third of the global fish supplies. The Lithuanian manufacturers of fish products are well known in numerous countries since this branch of food industry is well developed indeed and able to process more raw materials by exporting products to a large EU market where strong positions of the Lithuanian producers are held.

The potential of BRICs markets is attractive for Lithuania. Therefore, consideration of prospects of Lithuania's trade with these countries is currently very topical.

3. SPECIFICATION OF MODEL

The econometric forecasting model of Lithuania's foreign trade in agricultural and food products with BRIC countries is based on Armington model (ARMINGTON 1969). The basic idea of the said model is the following - the same commodity item manufactured domestically and on the foreign market is considered to be a different commodity. It means that the goods manufactured on domestic and foreign markets are not considered substitutes. Thus a consumer may distinguish the origin of commodity manufacture and take his own decision on buying either domestically manufactured or imported ones as their prices may differ. It further means that relative prices and incomes may be treated as the key factors in export and import modelling. Quantitative evaluation of influence of alteration of incomes and relative prices on export and import is made by application of elasticity indices. The elasticity index stands for the indication of percentage ratio of two variables. The Armington model is widely applied for modelling of both, the overall imports and exports of a single country (CELOV et al. 2003) and those among the actual countries (JYRKI 2003).

Below the specification of the adapted Armington model for modelling and forecasting of the Lithuanian foreign trade in agricultural and foods products with BRIC countries is presented:

Export demand

$$log(X_t^i) = a_0 + a_1 \, log(Y_t^i) + a_2 \, log(P_{Xt}^i \, / \, EY_t^i) + D_t^i + \varepsilon_t^i \qquad (1)$$

Where:
X_t^i – Lithuania's export in agricultural and food products to BRICs
Y_t^i – BRIC country's GDP, current prices (national currency)
$P_{Xt}^i \, / \, EY_t^i$ – the relative export price
P_{Xt}^i – Lithuania's export deflator based foreign currency (the year 2000 = 100%)
EY_t^i – BRIC country's GDP deflator
D_t^i – deterministic part of the model: trend (*t*), dummy variables

a_1 – the BRIC country's GDP elasticity of export
a_2 – the relative price elasticity of export
ε_t^i – white noise error
i = {Brazil (BR), Russia (RU), India (IN), China (CN)}

Import demand

$$log(M_t^i) = b_0 + b_1 \, log(Y_t) + b_2 \, log(P_{M\,t}\,/\,EY_t) + D_t^i + \varepsilon_t^i \tag{2}$$

Where:
M_t^i – Lithuania's import in agricultural and food products from BRICs
Y_t – Lithuania's GDP, current prices (national currency)
$P_{M\,t}\,/\,EY_t$ – the relative import price
$P_{M\,t}$ – Lithuania's import deflator (the year 2000 = 100%)
EY_t – Lithuania's Harmonised Index of Consumer Prices (HICP) of food products compared with the base period (the year 2005 = 100%)
b_1 – Lithuania's GDP elasticity of import
b_2 – the relative price elasticity of import
D_t^i – deterministic part of the model: trend (t), dummy variables
ε_t^i – white noise error
i = {Brazil (BR), Russia (RU), India (IN), China (CN)}

X_t^i and M_t^i are called endogenous variables of the model while the remaining ones are exogenous. The following marks/legends of the model parameters are foreseen: $a_1 > 0$, $a_2 < 0$, $b_1 > 0$, $b_2 < 0$. It should be pointed out that the model may include the lagged endogenous and exogenous variables. The application of logarithmic indices in the model can be explained by multiplicative relations being more typical among the economic indices. Besides, it enables the treating of the model parameter values as elasticity indices.

4. DATA AND THE RESULTS

4.1. Data used

For econometric modelling of the Lithuanian export and import of agricultural and food products (hereinafter – export and import) the quarterly and annual time series of statistical data of Lithuania and BRIC countries have been employed:

- The Lithuanian gross domestic product at current and constant prices;

- Lithuania's Harmonised Index of Consumer Prices (HICP) of food products compared with the base period (the year 2005 = 100%);

- Export and import price index compared with the base period (the year 2000 = 100%);

- Gross domestic product at current and constant prices expressed in the national currencies of BRIC countries;

- Currency exchange rates.

Sources of statistical data: the Database of Indicators of Department of Statistics of Lithuania; the Bank of Lithuania (BL); Eurostat database; International Monetary Fund (IMF) World Economic Outlook Database; United Nations Statistics Division; authors calculations.

The below assumptions have been made in the forecasting of Lithuania's trade with BRIC countries during the period of 2011-2015:

- The forecasted rather than actual values of exogenous variables have been used for the year 2010.

- Lithuania's variation tendencies of Harmonised Index of Consumer Prices (HICP) of food products during the period of 2011-2015 will be equal to the forecasted HICP tendencies for all goods.

- The accessible forecasts of exogenous variable values of the Bank of Lithuania, International Monetary Fund (IMF) are employed (Table 1).

- Forecasts of Lithuania's macroeconomic indices by the Bank of Lithuania until the year 2012 are given thus an assumption is made that during the forecasted period of 2013-2015 the forecasts of indices will be in line with the forecasts published for 2012.

- Exchange rates of the national currencies of BRIC countries and the Lithuanian Litas are fixed in the actual level of 2009.

Forecasts include an assumption that no natural disasters, unfavourable air conditions or outbursts of animal or plant diseases are going to be faced.

Table 1: The forecasted annual growth rates of exogenous variables for 2010-2015, in percent

| Country | Variable | Year | | | | | | Source |
		2010	2011	2012	2013	2014	2015	
Lithuania	Real gross domestic product	1.3	3.3	4.1	4.1	4.1	4.1	BL
	Gross domestic product deflator	1.3	2.9	3.0	3.0	3.0	3.0	BL
	Harmonised Index of Consumer Prices	1.2	2.8	3.4	3.4	3.4	3.4	BL
	Import deflator	9.6	6.0	4.5	4.5	4.5	4.5	BL
	Export deflator	10.3	6.3	4.3	4.3	4.3	4.3	BL
Brazil	Real gross domestic product	7.5	4.1	4.1	4.1	4.1	4.1	IMF
	Gross domestic product, current prices	14.8	9.3	8.9	8.82	8.8	8.8	IMF
Russia	Real gross domestic product	4.0	4.3	4.4	4.2	4.1	4.0	IMF
	Gross domestic product, current prices	15.1	13.4	10.8	10.8	10.8	9.7	IMF

Country	Variable	Year						Source
		2010	2011	2012	2013	2014	2015	
India	Real gross domestic product	9.7	8.4	8.0	8.2	8.1	8.1	IMF
India	Gross domestic product, current prices	19.02	15.7	13.8	13.8	13.8	13.7	IMF
China	Real gross domestic product	10.5	9.6	9.5	9.5	9.5	9.5	IMF
China	Gross domestic product, current prices	14.3	13.2	12.1	11.8	11.8	11.8	IMF

Source: BL – the Bank of Lithuania, IMF - International Monetary Fund.

Lithuania's gross domestic product (GDP) at the currant prices used as an exogenous variable is derived by multiplying the real GDP and GDP deflator. GDP deflator of an individual BRIC country is calculated at the currant prices of GDP for the respective country and dividing it with real GDP.

4.2. Estimated Equations

Due to the exports to BRIC countries taking place not every quarter of the studied period (1999-2010), the use of aggregated annual data has been decided for the purpose of econometric modelling and forecasting of export. Moreover, due to the same reason, i.e. absence of export during some years, export to Brazil and China econometric modelling has been refused. Econometric modelling of import has been performed on the quarterly data basis. The key data have not been seasonally adjusted. Seasonal factors were estimated by including quarterly dummy variables (Q_1, Q_2, Q_3, Q_4) into the model. It should be noted that only those exogenous variables the parameter values of which are statistically significant are retained in the model.

Table 2 provides the results of estimating equation separately for each country.

Table 2: The results of estimating equation

Country	Estimated Equations
Export demand	
Russia	$log(X_t^{RU}) = -15.38 + 1.31 log(Y_t^{RU}) + 0.53 D_t^{RU} + \varepsilon_t^{RU}$ (3.7) (12.61) (5.75) Adj.R^2 = 0.94, DW = 1.27, p(Q_4) = 0.81
India	$\Delta log(X_t^{IN}) = -0.74 \Delta log(X_{t-1}^{IN}) + \varepsilon_t^{IN}$ (-3.27) Adj.R^2 = 0.57, DW = 2.9, p(Q_4) = 0.13

Country	Estimated Equations
Import demand	

Brasil

$$log(M_t^{BR}) = 0.17log(Y_t) + 0.02t + 0.26Q_{3t} + \varepsilon_t^{BR}$$
$$\quad\quad\quad\quad (12.86) \quad\quad\quad (4.72) \quad (1.96)$$

Adj.R^2 = 0.45, DW = 1.84, p(Q_4) = 0.54

Russia

$$log(M_t^{RU}) = -3.90 + 0.58log(Y_t) + 0.40log(M_{t-1}^{RU}) - 0.85Q_{3t} + \varepsilon_t^{RU}$$
$$\quad\quad (-2.38) \quad (3.16) \quad\quad\quad (4.39) \quad\quad\quad\quad (7.36)$$

Adj.R^2 = 0.70, DW = 1.72, p(Q_4) = 0.41

India

$$log(M_t^{IN}) = -3.40 + 0.33log(Y_{t-2}) + 0.36log(M_{t-1}^{IN}) + 1.08D_t^{IN} + \varepsilon_t^{IN}$$
$$\quad\quad (-2.44) \quad\quad (2.30) \quad\quad\quad (3.22) \quad\quad\quad\quad (4.75)$$

Adj.R^2 = 0.54, DW = 1.98, p(Q_4) = 0.57

China

$$log(M_t^{CN}) = 0.09log(Y_t) + 0.47log(M_{t-1}^{CN}) + 0.02t - 0.26Q_{2t} - 0.27 Q_{3t} + \varepsilon_t^{CN}$$
$$\quad\quad (4.82) \quad\quad\quad\quad (3.79) \quad\quad\quad\quad (3.46) \quad (-3.13) \quad\quad (-3.39)$$

Adj.R^2 = 0.84, DW = 1.84, p(Q_4) = 0.93

Notes: Δ denotes a difference operators, e.g. $\Delta log(X_t^{IN}) = log(X_t^{IN}) - log(X_{t-1}^{IN})$; number in brackets are *t-statistics*. Adj.R^2 - the adjusted coefficient of determination, DW - Durbin-Watson statistic, and p(Q_4) - the actual probability level of the null hypotheses of uncorrelated (Ljung-Box Q_4) error term.
Source: Own calculations.

Analysis of the derived results referring to Table 2 reveals that statistically insignificant factor of relative prices has been removed from all equations. Coefficients of other variables are statistically significant at 1%, 5% and 10% significance level. The model adequacy statistics (*Adj. R^2, DW, p(Q_4)*) indicate that there are no significant model adequacy problems. *Adj. R^2* statistics of econometric model accuracy indicates what share of export and import changes is explained by the applied model. The Durbin-Watson test is a test for first-order serial correlation in the residuals of model. The value of Durbin-Watson statistic is close to 2.0 if the residuals are uncorrelated. The Ljung-Box test is test for higher orders serial correlation in the residuals of model. For all models, the Ljung-Box (*p(Q_4)>0.05*) statistic does not reject the null hypothesis of uncorrelated residuals. We used dummy variables (D_t^{RU}, D_t^{IN}) in the estimations to explain the downward shifts in the export and the import so D_t^{RU} is one for 2004 and zero in other cases; D_t^{IN} is one for 2004 Q1 and 2005 Q4 and zero in other cases.

Analyses of the derived export demand models point at a large elasticity of Lithuania's export to Russia for the indicator of Russia's economic activity. Rates of growth of Lithuania's export to India depend on the relevant changes during the past period.

Analyses of the derived import demand models reveal that the Lithuanian GDP fluctuations have influence on Lithuania's import from Brazil. The trend included into the model outlines

the increasing tendency of imports from Brazil. Lithuania's import from Russia depends on the Lithuanian GDP and import during the last quarter. Tendencies of Lithuania's import from India are stipulated by the Lithuanian GDP two quarters ago and import during the last quarter. Lithuania's GDP, Lithuania's import from China during the last quarter and the growing trend lead to the increasing imports of Lithuania from China.

The BRIC country's GDP elasticity of export suggests that on average a 1% increase of the Russian GDP would increase the export to Russia by 1.31%.

The Lithuania's GDP elasticity of import suggests that on average a 1% increase of the Lithuanian GDP would increase the import from Brazil by 0.17%, from Russia - by 0.58%, from India - by 0.33% and from China - by 0.09%.

4.3. Forecasts

The estimate models are applied for forecasting of tendencies of Lithuania's trade with BRIC countries. Results of forecasting are contained in Table 3.

Table 3: The forecasted values of Lithuania's export and import, million euro

Countries	Year				
	2011	**2012**	**2013**	**2014**	**2015**
Export					
Russia	850	972	1112	1262	1426
India	0.4	0.4	0.5	0.5	0.6
Import					
Brazil	18.7	20.6	22.6	24.9	27.4
Russia	47.6	50.5	54.0	57.8	61.9
India	6.3	6.1	6.3	6.5	6.8
China	23.5	26.7	30.7	35.3	40.6

Source: Own calculations.

Export of Lithuania's agricultural and food products to India during 1999-2010 was of fluctuating nature which burdens the selection of an appropriate forecasting model. For the reason the forecasting results were adjusted by authors valuation taking into account the development of the overall export of Lithuania to India. As has been previously mentioned, econometric modelling of export to Brazil and China has been declined. Irrespective of the fact that from geographic perspective Lithuania is far away from Brazil and China, we still consider the increasing scope of export to these countries. It will be conditioned by rapid development of political and economic relations among the EU, China and Brazil. Besides, the increasing number of population of the abovementioned countries make them economically more attractive for Lithuanian entrepreneurs, which in its own turn will enable diversification of Lithuania's exports. Therefore, we assume that exports to Brazil will grow at an average of 0.01 million euro and to China – 0.6 million euro per year.

Table 4: The forecasted rates of Lithuania's export and import growth during 2011-2015, percent

Countries	Year				
	2011	2012	2013	2014	2015
Export					
Russia	10	14	14	13	13
India	6	8	9	11	11
Import					
Brazil	18	10	10	10	10
Russia	25	6	7	7	7
India	-25	-3	4	4	4
China	31	14	15	15	15

Source: Own calculations.

CONCLUSIONS

The analyses revealed the EU countries being predominant in Lithuania's foreign trade in agricultural and food products with annual exports to them making as many as 60-70 percent of the total amount of the exported products. BRIC countries are among non-EU countries (third countries) accounting for 50 to 70 percent of Lithuania's remaining exports in different years. Imports from the EU countries made 78-85 percent of the overall import of Lithuanian agricultural and foods products. A quarter of the remaining annual import accounts for the products imported from BRICs. During the period of 2006-2010 a significant share of 8 to 11 percent was held by the Lithuanian agricultural and food products within the turnover of the entire trade of Lithuania with BRIC countries. These figures enable to maintain that trade in agricultural and food products with BRIC countries is of importance to Lithuania.

Good knowledge of culture and business practices, missing language barriers and geographical proximity brings favourable conditions for the attractiveness of the Russian market to the Lithuanian entrepreneurs. Trade with Russia holds a dominating position in Lithuania's trade in agricultural and food products with BRICs. It accounts for over 99 percent of export to BRIC countries. As for imports Russia accounts for approximately 50 percent of the overall imports from BRICs. Gradual increase in shares of China and India are observed with the least imports present from Brazil.

The forecasts derived by means of econometric modelling revealed that in the years to come one should expect the growing scope of trade with BRICs: if compared with the last year, the following growth is expected: in 2011 – 10 percent, in 2012 and 2013 – 14 percent every year, in 2014 and 2015 –13 percent every year. The growing imports are also forecasted: in 2011– 20 percent, in 2012 – 8 percent, in 2013 – 9 percent, in 2014 and 2015 –10 percent every year. Rapid development of Lithuania's trade with BRIC countries will be stimulated by economic growth of all abovementioned countries and increased demand in BRIC countries. Expanding assortment of trade among the countries and absence of some non-tariff barriers would also contribute to the improvement of trading relations and diversification of the export and import structure. A larger share of market can be acquired by export of exclusive products. The boosting trade with BRICs will stimulate an efficient development of the Lithuanian agricultural and food sector which in its own turn should lead to the growing capacity, productivity, labour efficiency and competitiveness of the Lithuanian farms.

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