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Terms of Trade and Industrialization: Case of Economies with Manufacturing Exports

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Abstract

The paper explores the macroeconomic effect of industrialization on terms of trade and economic growth for economies with prevailing manufacturing exports. We tested such hypothesis as influence of terms of trade adjustment annual growth on manufacturing value added annual growth in economies with manufacturing exports and vice versa; influence of terms of trade adjustment annual growth and manufacturing value added annual growth on GDP per capita growth in economies with manufacturing exports. In the research we used annual data of GDP per capita (annual %), manufacturing, value added (annual %) and terms of trade adjustment (annual %) in 2008-2018 for 51 countries with manufacturing exports. For this purpose, we estimated vector autoregression model for panel data. Analysis of impulse response functions shows that the positive shock in manufacturing value added growth leads to slight increase in terms of trade adjustment growth in the second year and further stabilization in the seventh period. In turn, shock in terms of trade adjustment growth provokes smaller upsurge in manufacturing value added growth than in previous case. At the same time, shock in manufacturing value added growth results in gross national product per capita growth increase and its further stabilization in three years term. In addition, gross national product per capita growth reacts to shock in terms of trade adjustment growth by slight rising.

Keywords

Terms of Trade, Industrialization, Economic Growth, Panel VAR Model, Manufacturing Value Added Growth

JEL Classification

F14, F43, O14

Introduction

As to the evidence of macroeconomists, periods of industrialization in a number of countries are accompanied by terms of trade improving[1]. On the contrary, falling of exports prices might be observed in periods of deindustrialization, even taking into account commodities exports. Therefore, that, at macroeconomic level the deindustrialization results in terms of trade deterioration.

If country specializes in manufacturing exports, an increase in terms of trade leads to the rise of exports-GDP ratio and therefore to economic growth. In turn, the negative impact is observed mainly due to Dutch disease impact on the commodity export economy.

However, according to many researchers, the advanced industrial sector ensures a high level of economic development because of competitiveness rising, introduction of new technologies, productivity increasing and production growth stimulating.

[1] Terms of trade characterizes ratio of exports prices to the prices of imports. If the prices of exports of goods and services rise relatively to the prices of imports, the country is becoming wealthier and poorer otherwise.

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As an example, analysis of the US trade for 1800–2018 let emphasize periods of industrialization with corresponding trade deficits or surpluses (Historical U.S., 2019). It was highlighted period of industrialization (1870-1970) that corresponded to the US trade surplus while exporting manufactured goods and machinery. The same situation was in Peru in 1950-1997 (Roca and Simabuko, 2004).

In this research, we are attempting to study the macroeconomic effect of industrialization on terms of trade and economic growth for economies with prevailing manufacturing exports. For this purpose, we prove the relationship between industrialization and terms of trade improving (and vice versa) in economies with prevailing manufacturing exports after economic crisis of 2008.

In other words, we want to justify the existence of foreign trade channel of industrialization effects transmission on economic growth in countries with prevailing manufacturing exports after 2008.

Thus, to do this we have to test such hypotheses to testify the relationship of industrialization and terms of trade changes in 2008-2018:

- Influence of terms of trade adjustment annual growth on manufacturing value added annual growth in economies with manufacturing exports and vice versa.
- Influence of terms of trade adjustment annual growth and manufacturing value added annual growth on GDP per capita growth in economies with manufacturing exports.

Literature Review

The terms of trade fluctuations have a significant influence on the economies worldwide, and their macroeconomic indicators. Especially, it concerns developing and commodity exporting countries (Aliyu, 2011; Cao and Kozicki, 2017; Choudhri and Schembri, 2010; Daumal and Özyurt, 2010; Grigoli et al., 2016; Hall, 2011; Ijaz et al., 2014; Janus, 2019; Jawaid and Waheed, 2011; Lukáčik et al., 2016; Sengupta et al., 2013; Zaouali and Zaouali, 2015).

In addition, a number of studies are dedicated to the research of oil price shocks impact on economies and terms of trade in particular, for instance (Aliyu, 2011; Maravalle, 2013; Wei, 2019).

Moreover, considerable attention is paid to the study of terms of trade impact on countries' economic growth, their national income and current account balance, for example (Edwards, 1988; Obstfeld, 1982; Obstfeld, 1980; Obstfeld, 1982; Sachs, 1981; Svensson, 1983; Tehseen, 2011). For example, in the paper (Obstfeld, 1980) author shows that increase in imported intermediate goods price leads to a current account surplus in a small open economy with floating exchange rate.

Some of them are devoted to the history of industrialization in different regions of the world (for instance papers (Alam, 2012; Federico and Vasta, 2010; Paolera et al., 2018)) and its relationship with terms of trade volatility as well.

Thus, González et al. (2006) analyzed the sources of Mexican exception with de-industrialization based on Mexico's data from 1750 to 1879 while the economic gap between the industrial and primary production regions was expanding. Due to the research results, the terms of trade and Dutch disease effects were characterized as slight.

Paolera et al. (2018) used manufacturing GDP data to explore the industrialization processes in such countries as Argentina, Brazil, Chile and Colombia. They concluded that external shocks and economic policy mainly explained fluctuations of industrialization rates. At the same time, terms of trade improving and liberalization caused deindustrialization processes.

In the paper (Williamson, 2010) author explored industrial production growth in Latin America, the European periphery, the Middle East, South Asia, Southeast Asia and East Asia during 1870-1940. He identified factors that contributed to the industrialization processes acceleration in these regions such as productivity growth, inexpensive labour force, the real depreciation of the exchange rate that raised the price of industrial goods at domestic market, and tariffs that protected this market.

In addition, authors of (Meissner and Tang, 2017) examined features of industrialization in Japan while analyzing Japanese exports data from 1880 to 1910, which was characterized by significant increasing, composition change and priorities shifts. Due to results of the research, these changes account for over 30 percent of exports growth over this period.

Speaking about industrialization on microeconomic level, paper (Braguinsky et al., 2020) explored industrialization aspects in the Japanese cotton spinning industry for over 20 years.

In turn, researchers in paper (Morck and Nakamura, 2017) explained rapid state-led industrialization in Japan by its liberal institutions and bank financing.

The effect of trade fluctuations on capital accumulation was analyzed in (Basu and McLeod, 1991) based on simple stochastic growth model of an open economy. Authors confirmed that impact of imported resources led to the uncertainty of exports prices. In addition, due to research results volatile exports prices tend to decrease domestic investment in developing economies. Moreover, it was concluded that temporary price shocks have permanent effect on output.

In paper (Mputu, 2016) author empirically examined the relationship between terms of trade, trade openness and

economic growth based on the fixed and random effects models for 13 countries in sub-Saharan Africa from 1980 to 2011. It is identified that international trade is beneficial for countries deeply dependent on commodities exports. In addition, the results of the research confirm that the terms of trade have a positive relationship with GDP; in turn, trade openness has a negative influence on GDP.

Significant negative long-term and short-term effects of terms of trade on economic growth in Pakistan was confirmed in (Jebran et al., 2018) based on autoregressive distributed lag model results. At the same time, labour effects economic growth in a positive way in the short and long run. Although capital stock effects economic growth only in the long run.

The authors of (Tehseen and Ali, 2012) suggested a positive long-term relationship between terms of trade and economic growth in India. On the contrary, volatility of terms of trade provokes significant, but negative impact on economic growth in India.

In turn, Gunter and Sejas (2017) examined the factors of terms of trade deterioration in Bangladesh by using econometric toolkit. Results of the research have confirmed negative impact of exchange rate devaluations and rising of exports quantity on terms of trade.

Sasaki (2014) investigated the relationship between international trade and per capita consumption growth. Based on growth model he concluded that given the population growth rate is negative, small open economy is becoming an agricultural one. On the contrary, the large economy is transforming into the manufacturing one.

In the context of terms of trade influence on countries' economic growth it should be mentioned the Harberger-Laursen-Metzler effect. It means that deterioration of terms of trade leads to a fall in real income, savings and current account ultimately.

However, the impact of terms of trade on current account balance might be ambiguous due to income and substitution effects (Obstfeld, 1982).

At the same time, according to Sachs (1981) only a temporary positive shock to the terms of trade has a positive effect on the current account balance and real income of the country.

Also it worth noting the importance of consumer expectations nature regarding future shocks and type of transmission channel (Dunkan, 2003).

The impact of internal shocks (demand, supply and nominal shocks) and external shock (term of trade shock) on GNI per capita in open economies with a predominance of low-processed exports (13 countries) is investigated in (Bazhenova, 2014). Results of constructed panel structural vector autoregressive model show that positive demand and nominal shocks cause acceleration of GNI per capita, otherwise supply shock leads to its falling. Terms of trade shock has a temporary positive effect on growth rate of GNI per capita. It confirms that in commodity countries a positive supply shock can lead to decrease of real exchange rate, competitiveness and a slowdown of income growth (the so-called "Dutch disease").

Focusing on Ukraine's trends, in the paper (Bazhenova, 2015) the impact of quantitative and price terms of trade indices and their components (permanent and temporary) on current account growth rate and GDP in Ukraine is considered. Due to the results of the research Harberger-Laursen-Metzler effect is confirmed in models based on the quantitative terms of trade index and its temporary component. At the same time, price terms of trade index has a significant impact on the volatility of GDP growth rate.

Data and Methodology

Thus, we used the manufactures[2] exports (% of merchandise exports) to divide countries on economies with manufacturing exports and with non-manufacturing one. So, according to authors' approach, the countries with manufactures exports of more than 50% of merchandise exports were considered as ones with manufacturing exports, otherwise with non-manufacturing one. Therefore, we identified 57 countries with manufacturing exports and 68 non-industrialized countries in 2018 (Tab.1). The data was extracted from World Development Indicators dataset.

The statistical characteristics of manufactures exports (% of merchandise exports) for each group are presented in Tab. 2.

We used manufacturing value added annual growth to identify periods of industrialization acceleration in economies. We analyzed fluctuations of terms of trade by adding terms of trade adjustment annual growth. Finally, we included GDP per capita as a main indicator of economies' performance.

Analysis of the data shows the dependence of GDP per capita growth and manufacturing value added annual growth in countries with manufacturing exports. For example, values of GDP per capita growth and manufacturing value added annual growth in countries with manufacturing exports in 2018 are presented in Fig. 1.

[2] Due to World Bank dataset, manufactures include commodities such as chemicals, basic manufactures, machinery and transport equipment, miscellaneous manufactured goods, but excluding non-ferrous metals.

Table 1. Countries with manufacturing exports (with more than 50% of manufactures exports (% of merchandise exports)) in 2018.

Country	Manufactures exports	Country	Manufactures exports
Andorra	94	Korea, Rep.	88
Antigua and Barbuda	57	Latvia	62
Austria	81	Lebanon	63
Barbados	60	Lithuania	62
Belarus	53	Luxembourg	82
Belgium	76	Malaysia	70
Bermuda	75	Malta	61
Bosnia and Herzegovina	70	Mauritius	61
Botswana	97	Mexico	81
Bulgaria	58	Morocco	72
China	93	Netherlands	68
Costa Rica	55	North Macedonia	84
Croatia	66	Pakistan	74
Czech Republic	91	Philippines	84
Denmark	69	Poland	80
Egypt, Arab Rep.	52	Portugal	76
El Salvador	77	Romania	82
Estonia	69	Singapore	75
Finland	67	Slovak Republic	90
France	80	Slovenia	84
Germany	85	Spain	72
Hong Kong SAR, China	96	Sweden	73
Hungary	87	Switzerland	91
India	70	Tanzania	74
Ireland	89	Thailand	77
Israel	92	Turkey	81
Italy	83	United Kingdom	75
Japan	88	United States	59
Jordan	75		

Table 2. The statistical characteristics of manufactures exports (% of merchandise exports) in economies with manufacturing exports and with non-manufacturing one.

	Economies with Manufacturing Exports	Economies with Non- Manufacturing Exports
Mean	75.60	20.47
Median	75.22	16.47
Max	96.82	49.04
Min	51.70	1.13
Standard Deviation	11.73	14.10
Percentile 25%	68.02	9.63

Moreover, most countries with higher level of manufacturing value added growth have higher GDP per capita growth rates. As an example, Ireland is characterized by development of high technology and innovation-based industries with the highest GDP per capita growth and second largest (after Slovak Republic) manufacturing value added growth rate among economies with manufacturing exports. In this context, we should mention Slovak Republic as a leader in automobile production per capita, thus, it has the highest level of manufacturing value added annual growth. In addition, it worth noting that such countries as China, Hong Kong, Korea have not the highest levels of these indicators.

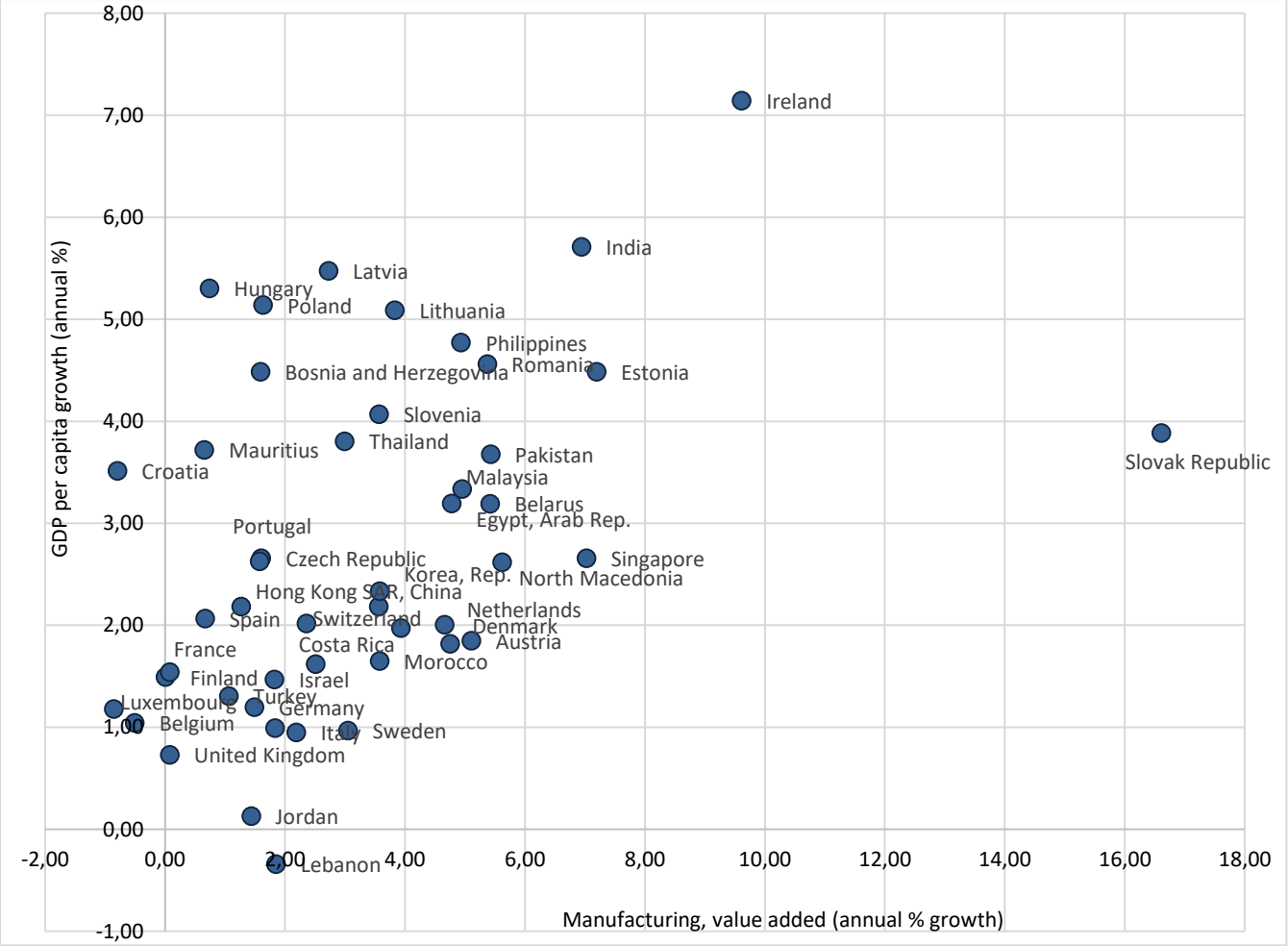

Fig. 1. GDP per capita growth and manufacturing value added annual growth in countries with manufacturing exports in 2018

So that, in the research we used annual data of GDP per capita (annual %), manufacturing, value added (annual %) and terms of trade adjustment (annual %) in 2008-2018 for 51 countries with manufacturing exports. We had to exclude such countries as Andorra, Antigua and Barbuda, Barbados, Bermuda, China, and Malta because of lack of some data. The description of variables used in the research is presented in Tab. 3.

Table 3. Description of variables used.

Variable	Description
gdp_ln	Logarithm of GDP per capita (annual %)
va_ln	Logarithm of manufacturing, value added (annual %)
tot_ln	Logarithm of terms of trade adjustment (annual %)

The variables were tested for common (Lewin, Lin, & Chu and Breitung criteria) and individual (Im, Pesaran, and Shin criteria and another two based on ADF-Fisher Chi-square and PP-Fisher Chi-square criteria) unit root processes. Unit root testing results show that all variables are stationary in levels (Tab. 4).

We used vector autoregression toolkit for panel data to explore relationship of industrialization and terms of trade improving as well as GDP per capita growth in economies with manufacturing exports. This model describes the dynamic interdependencies between several time series in the best way, when the past values of the variables explain current ones. Because we analyze the existence of foreign trade channel of industrialization transmission on economic growth, for instance, by testing the influence of terms of trade adjustment annual growth and

manufacturing added value annual growth on GDP per capita growth in economies with manufacturing exports.

The panel vector autoregression model in the reduced form is:

$$Y_{it} = A_0 + \sum_{j=1}^{k} A_j Y_{it-j} + \varepsilon_{it} \quad (1)$$

Y_{it} - vector of endogenous variables ($i = \overline{1,n}; t = \overline{1,T}$),

A_0 - vector of intercepts,

A_j - matrix of coefficients ($j = \overline{1,k}$) ,

ε_{it} - disturbances.

Table 4. Unit Root testing results.

	gdp_ln		va_ln		tot_ln	
	Level	1st differences	Level	1st differences	Level	1st differences
Common unit root process						
Levin, Lin & Chu	-26.0993*[3]	-	-24.5597*	-	-64.0959*	-
Breitung t-stat	-6.88927*	-	-12.3047*	-	-	-
Individual unit root process						
Im, Pesaran and Shin W-stat	-12.7721*	-	-9.96813*	-	-11.6202*	-
ADF - Fisher Chi-square	313.816*	-	273.248*	-	242.957*	-
PP - Fisher Chi-square	463.611*	-	475.472*	-	280.417*	-

Results

Thus, to identify the relationship between industrialization and terms of trade changes we should testify and analyze such effects:

- Impact of terms of trade fluctuations on manufacturing value added growth in the short and long run.
- Impact of manufacturing value added growth on terms of trade fluctuations in the short and long run.
- Impact of manufacturing value added growth and terms of trade fluctuations on GDP per capita growth in the short and long run.

For this purpose, we estimated vector autoregression (VAR) model for panel data of the following form:

$$\begin{gathered} tot\_ln_{it} = 0.19 tot\_\ln_{it-1} + 0.02 tot\_\ln_{it-2} + 0.45\ va\_ln_{it-1} + \\ +0.15\ va\_ln_{it-2} - 0.75 gdp\_ln_{it-1} - 1.03 gdp\_ln_{it-2} + 3.86 \\ va\_ln_{it} = 0.02 tot\_\ln_{it-1} + 0.02 tot\_\ln_{it-2} + 0.53\ va\_ln_{it-1} + \\ -0.17\ va\_ln_{it-2} + 0.82 gdp\_ln_{it-1} + 0.59 gdp\_ln_{it-2} + 1.33 \\ gdp\_ln_{it} = 0.05 tot\_\ln_{it-1} - 0.02 tot\_\ln_{it-1} + 0.02\ va\_ln_{it-1} + \\ +0.12\ va\_ln_{it-2} + 0.08 gdp\_ln_{it-1} + 0.07 gdp\_ln_{it-2} + 1.22 \end{gathered} \quad (2)$$

Based on our calculations, this model describes the dynamic interdependencies between terms of trade adjustment annual growth and manufacturing value added annual growth on GDP per capita growth in economies with manufacturing exports in the best way compared to linear regression models with panel data. However, in some cases non-linear models are appropriate for analysis of macroeconomic processes (Lukianenko et al., 2020).

All mentioned indicators are endogenous variables. Vector autoregression model for panel data was estimated with an intercept and two lags determined via Schwarz, Akaike and Hannan-Quinn information criteria.

The constructed VAR model satisfies the stability conditions that identified by inverse roots modulus values of AR characteristic polynomial estimated (Fig. 2).

[3] * indicates significance at 1%

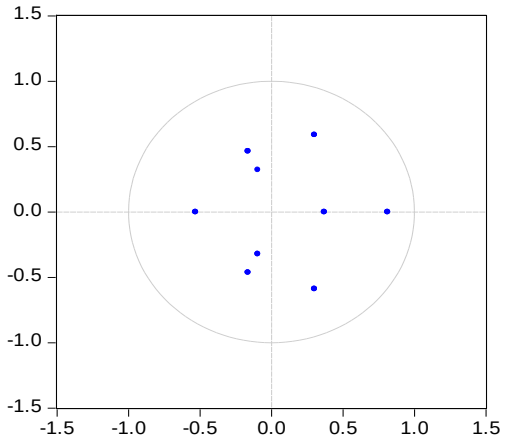

Fig.2. Inverse roots modulus of AR characteristic polynomial of VAR model

VAR Residual Portmanteau Test for Autocorrelations identifies absence of disturbances' autocorrelation in vector autoregression model (null hypothesis is no residual autocorrelations up to lag h) (Tab. 5).

Table 5. VAR Residual Portmanteau Test for Autocorrelations.

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df[4]
1	2.151271	NA	2.277817	NA	NA
2	2.829067	NA	3.040336	NA	NA
3	2.842203	0.9702	3.056101	0.9620	9

Discussion

Commenting on the model results, we conclude that 1% increase in terms of trade adjustment annual growth leads to 0.02% rising of manufacturing value added annual growth in the next two periods respectively. In turn, 1% increase in manufacturing value added annual growth provokes 0.45% spur in terms of trade adjustment annual growth next year and 0.15% rising in a two-year term. Thus, we see that industrialization leads to the terms of trade improvement during two years period in economies with manufacturing exports. At the same time, the opposite effect is quite slight.

In addition, we should note that the volatility of GDP per capita is explained by its own fluctuations by almost 37% since the third year (Tab. 6). The variation in the terms of trade fluctuations and manufacturing value added accounts for about 2% and 61% of the fluctuations of GDP per capita growth.

Thus, based on the VAR model we should analyze such responses:

- Response of *tot_ln* to shock in *va_ln*.
- Response of *va_ln* to shock in *tot_ln*.
- Response of *gdp_ln* to shock in *va_ln*.
- Response of *gdp_ln* to shock in *tot_ln*.

For this purpose, impulse response functions as a response to Cholesky one standard deviation innovations were generated (Fig. 3).

Analysis of impulse response functions shows that the positive shock in manufacturing value added growth leads to slight increase in terms of trade adjustment growth in the second year and further stabilization in the seventh period. In turn, shock in terms of trade adjustment growth provokes smaller upsurge in manufacturing value added growth than in previous case.

At the same time, shock in manufacturing value added growth results in gross national product per capita growth increase and its further stabilization in three years term. In addition, gross national product per capita growth reacts for shock in terms of trade adjustment growth by slight rising.

Thus, we might assume that GDP per capita growth reacts on terms of trade adjustment growth through manufacturing value added growth.

[4] df is degrees of freedom for (approximate) chi-square distribution

Table 6. Variance decomposition of GDP per capita growth.

Period	S.E.	tot_ln	va_ln	gdp_ln
1	0.279634	0.336595	56.64818	43.01523
2	0.282268	1.921446	55.62046	42.45809
3	0.303901	1.813214	61.53658	36.65021
4	0.306127	2.025792	60.91972	37.05448
5	0.306949	2.046000	60.99998	36.95402
6	0.307391	2.046426	61.09331	36.86027
7	0.307489	2.051745	61.05523	36.89302
8	0.307502	2.054713	61.05083	36.89446
9	0.307542	2.054833	61.05955	36.88562
10	0.307546	2.055033	61.05824	36.88673
11	0.307547	2.055224	61.05785	36.88693
12	0.307549	2.055237	61.05817	36.88659
13	0.307549	2.055241	61.05812	36.88664
14	0.307549	2.055255	61.05810	36.88665
15	0.307549	2.055255	61.05811	36.88663
…				
20	0.307549	2.055256	61.05811	36.88663

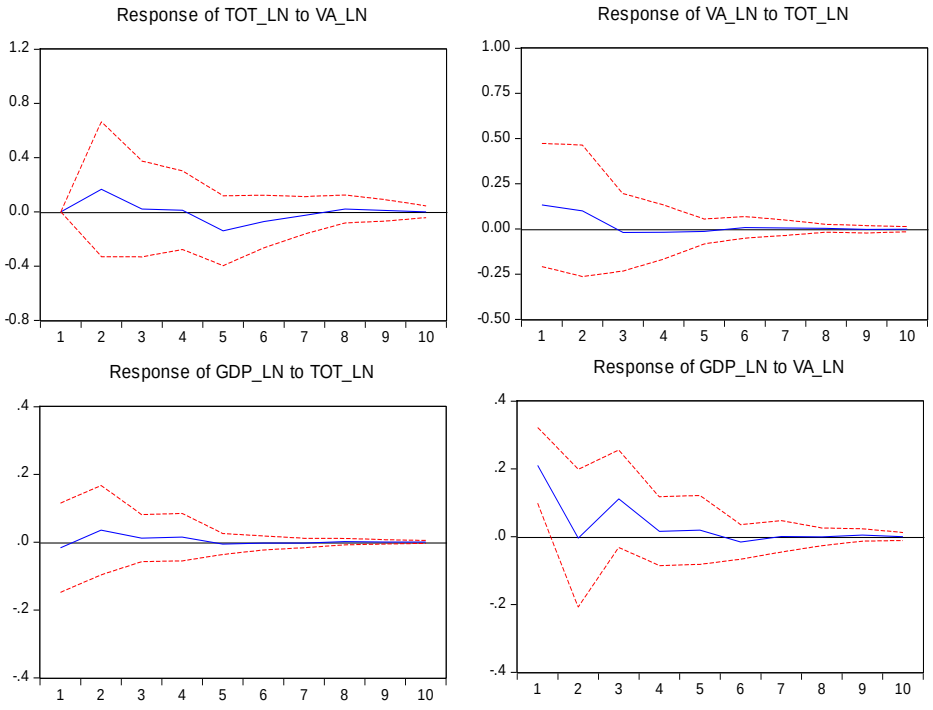

Fig.3. Graphs of impulse response functions for panel VAR model

Conclusion

Discussions about the relationship of industrialization processes and changes in terms of trade have always been of interest to both macroeconomists and policy makers because of their ultimate contribution to economic growth.

The contribution of external sector to economic growth is contradictious. Most emerging and developing economies pursue a strategy of exports-lead economic growth. However, at the same time, it may results in deterioration of terms of trade and further economic slowdown.

To avoid these consequences in exports-oriented economies the inflow of foreign direct investment is to be transferred into the real sector of the economy (mainly, into the high-tech production and infrastructure

development). This should results in transition to the domestic market-oriented economy.

In turn, domestic market-oriented economy is characterized by a large share of high-tech products in the exports structure, accumulation of FDI in the real economy, inflow of labor into exports-oriented industries.

So that, introduction of domestic-oriented economy model should aim at ensuring sustained economic growth.

At this stage, the focus should be on expanding internal demand by stimulating household and government spending that will reduce dependence on exports of goods and services in the long run. Thus, intensive growth factors are to be the main triggers of the domestic market-oriented economy.

These transition processes are accompanying by industrialization of economies and terms of trade improving. Otherwise, de-industrialization mainly results in terms of trade deterioration. In case of economy's specializing in manufacturing exports, an increase in terms of trade may lead to the speeding up of economic growth. In turn, in the commodity exports economies terms of trade improving might result in Dutch disease.

Thus, to testify the relationship of industrialization processes and terms of trade changes we tested several hypotheses: influence of terms of trade adjustment annual growth on manufacturing added value annual growth in economies with manufacturing exports and vice versa; influence of terms of trade adjustment annual growth and manufacturing added value annual growth on GDP per capita growth in economies with manufacturing exports. For this purpose, we estimated vector autoregression model for panel data.

Based on model results, we concluded that 1% increase in terms of trade adjustment annual growth leads to 0.02% rising of manufacturing value added annual growth in the next two periods after the shock. In turn, 1% increase in manufacturing value added annual growth provokes 0.45% spur in terms of trade adjustment annual growth next year and 0.15% rising in a two-year term.

Analysis of impulse response functions shows that the positive shock in manufacturing value added growth leads to slight increase in terms of trade adjustment growth in the second year and further stabilization in the seventh period. In turn, shock in terms of trade adjustment growth provokes smaller upsurge in manufacturing value added growth. At the same time, shock in manufacturing value added growth results in gross national product per capita growth increase and its further stabilization in three years term. In addition, gross national product per capita growth reacts for shock in terms of trade adjustment growth by slight rising.

Thus, we might assume that GDP per capita growth reacts on terms of trade adjustment growth through manufacturing value added growth that will be the subject for further research.

References

Alam, M. S. (2012). Colonialism and Industrialization: Empirical Results. https://doi.org/10.2139/ssrn.2031131.

Aliyu, U. R. (2011). Oil Price Shocks and the Macroeconomy of Nigeria: A Non-linear Approach. *J. for International Business and Entrepreneurship Development*, *5*(3), 179–198. https://doi.org/10.1504/jibed.2011.038029.

Basu, P., & McLeod, D. (1991). Terms of Trade Fluctuations and Economic Growth in Developing Economies. *Journal of Development Economics*, 37, 89-110. https://doi.org/10.1016/0304-3878(91)90083-8.

Bazhenova, O. (2014). Investigation of Economic Growth Drivers: SVAR Approach. *RFI Scientific Papers*, *3*(68), 57-65. (In Ukrainian).

Bazhenova, O. (2015). Modeling the Terms of Trade Shocks Impact on Economic Growth in Ukraine. *Scientific Papers NAUKMA. Economics*, 172, 3-8. (In Ukrainian).

Bazhenova, O. (2017). Modelling of External Sustainability of Ukraine's Economy. Kyiv: Karavela. (In Ukrainian).

Bazhenova, O., & Chornodid, I. (2018). Modeling the Social and Human Capital Factors Effect on the Cross-Country Income Differences. *CEUR Workshop Proceedings, 2*104, 169–178. [online] Available at: http://ceur-ws.org/Vol-2104/paper_180.pdf [Accessed 22, March 2020].

Braguinsky, S., Ohyama, A., Okazaki, T, & Syverson, C. (2020). Product Innovation, Product Diversification, and Firm Growth: Evidence from Japan's Early Industrialization. NBER Working Paper No. 26665. [online] Available at: https://www.nber.org/papers/w26665.pdf [22, Mach, 2020].

Cao, S., & Kozicki, S. (2017). Real GDI, Productivity, and the Terms of Trade in Canada. *Review of Income and Wealth*, 63, 134–148.

Choudhri, E. U., & Schembri, L. L. (2010). Productivity, the Terms of Trade, and the Real Exchange Rate: The Balassa-Samuelson Hypothesis Revisited. *Review of International Economics*, *18*(5), 924–936. https://doi.org/10.1111/j.1467-9396.2010.00917.x.

Daumal, M., & Özyurt, S. (2010). The Impact of International Trade Flows on Economic Growth in Brazilian States. *Review of Economics and Institutions, 2*(1), 1-25. https://doi.org/10.5202/rei.v2i1.27.

Dunkan, R. (2003). The Harberger-Laursen-Metzler Effect Revisited: An Indirect-Utility-Function Approach. Central Bank of Chile. Working paper 250. [online] Available at: https://ideas.repec.org/p/chb/bcchwp/250.html [Accessed 20, Mach, 2020].

Edwards, S. (1988). Temporary Terms of Trade Disturbances, the Real Exchange Rate and the Current Account. NBER Working Paper 2629. [online] Available at: http://www.nber.org/papers/w2629 [Accessed 24, Mach, 2020].

Federico, G., & Vasta, M. (2010). Was industrialization an escape from the commodity lottery? Evidence from Italy, 1861–1939. *Explorations in Economic History*, *47*(2), 228–243. https://doi.org/10.1016/j.eeh.2010.01.001.

González, R. D., Galvarriato, A. G., & Williamson J. G. (2006). Globalization, De-Industrialization and Mexican Exceptionalism 1750-1879. NBER Working Paper 12316. [online] Available at: https://www.nber.org/ papers/w12316 [Accessed 24,

Mach, 2020].
Grigoli, F., Herman, A., & Schmidt-Hebbel, K. (2016). The Impact of Terms of Trade and Macroeconomic Regimes on Private Saving. *Economics Letters*, 145, 172–175. https://doi.org/10.1016/j.econlet.2016.06.020.
Gunter, B. G., & Sejas, V. V. (2017). Free Falling Terms of Trade Despite Industrialization: The Case of Bangladesh. BDRWPS 33. https://doi.org/10.2139/ssrn.3053657.
Hall, A. (2011). Real Gross Domestic Product and the Terms of Trade. *Australian Economic Review*, *44*(3), 245–257. https://doi.org/10.1111/j.1467-8462.2011.00641.x.
Historical U.S. (2019). Trade Balance and Industrialization. Federal Reserve Bank of St Louis., https://www.stlouisfed.org/on-the-economy/2019/august/historical-us-trade-balance-industrialization [Accessed 24, Mach, 2020].
Ijaz, K., Zakaria, M., and Fida, B. A. (2014). Terms-of-Trade Volatility and Inflation in Pakistan. *Lahore Journal of Economics*, *19*(1), 111–132. https://doi.org/10.35536/lje.2014.v19.i1.a5.
Janus, T. (2019). Terms of Trade Volatility, Exports, and GDP. *Economics of Planning*, *53*(1), 25–38. https://doi.org/10.1007/s10644-019-09247-7.
Jawaid, S. T., & Waheed, A. (2011). Effects of Terms of Trade and its Volatility on Economic Growth: A Cross Country Empirical Investigation. *Transition Studies Review*, *18*(2), 217–229. https://doi.org/10.1007/s11300-011-0201-7.
Jebran, K., Iqbal, A., Rao, Z., & Ali, A. (2018). Effects of Terms of Trade on Economic Growth of Pakistan. *Foreign Trade Review, 53*(1), 1-11.
Lukáčik, M., Szomolányi, K., & Lukáčiková, A. (2016). Terms-of-Trade Shocks and Slovak Economy. *Acta Universitatis Bohemiae Meridionalis, 19*(1), 10–19. https://doi.org/10.1515/acta-2016-0006.
Lukianenko, I, Oliskevych, M., & Bazhenova, O. (2020). Regimes Switching Modeling of Unemployment Rate in Eastern Europe. *Ekonomický časopis*, *68*(4), 380 – 408.
Maravalle, A. (2013). Oil Shocks and the US Terms of Trade: Gauging the Role of the Trade Channel. *Applied Economics Letters*, *20*(2), 152–156. https://doi.org/10.1080/13504851.2012.684779.
Meissner, C., & Tang, J. (2017). Upstart Industrialization and Exports, Japan 1880-1910. NBER Working Paper 23481, [online] Available at: https://www.nber.org/papers/w23481 [Accessed 25, Mach, 2020].
Morck, R., & Nakamura, M. (2017). Japan's Ultimately Unaccursed Natural Resources-Financed Industrialization. NBER Working Paper 22865. [online] Available at: https://www.nber.org/papers/w22865 [Accessed 23, Mach, 2020].
Mputu, C. (2016). Terms of Trade, Trade Openness and Economic Growth in Sub-Saharan Africa. [online] Available at: https://repository.stcloudstate.edu/econ_etds/3 [Accessed 29, Mach, 2020].
Obstfeld, M. (1980). Intermediate Imports, the Terms of Trade, and the Dynamics of the Exchange Rate and Current Account. NBER Working Paper 0540. [online] Available at: http://www.nber.org/papers/w0540 [Accessed 29, Mach, 2020].
Obstfeld, M. (1982). Transitory Terms-of-Trade Shocks and the Current Account: The Case of Constant Time Preference. NBER Working Paper 834. [online] Available at: http://www.nber.org/papers/w0834 [Accessed 28, Mach, 2020].
Obstfeld, M. (1982). Aggregate Spending and the Terms of Trade: Is There a Laursen-Metzler Effect? *Quarterly Journal of Economics,* 97, 251-270.
Paolera, G., Amorocho, X. H. D., & Musacchio, A. (2018). The Industrialization of South America Revisited: Evidence from Argentina, Brazil, Chile and Colombia, 1890-2010. NBER Working Paper 24345. https://doi.org/10.3386/w24345.
Roca, S., & Simabuko, L. (2004). Natural Resources, Industrialization and Fluctuating Standards of Living in Peru, 1950-1997: A case Study of Activity-Specific Economic Growth in Reinert E. (ed.), *Globalization, Economic Development and Inequality*, Edward Elgar Publishing.
Sachs, J. D. (1981). The Current Account and Macroeconomic Adjustment in the 1970's. *Brookings Papers on Economic Activity*, 1, 201-268.
Sasaki, H. (2014). International Trade and Industrialization with Negative Population Growth. *Macroeconomic Dynamics*, *19*(8), 1647–1658. https://doi.org/10.1017/s1365100514000030.
Sengupta, J., Nag, R. N., & Goswami, B. (2013). Terms of Trade, Capital Accumulation and the Macro-economy in a Developing Country: A theoretical analysis. *Studies in Agricultural Economics*, *115*(3), pp. 157–165. https://doi.org/10.7896/j.1317.
Svensson, L. (1983*).* The Terms of Trade and the Current Account: Harberger-Laursen-Metzler Effect. *Journal of Political Economy,* 1, 97-125.
Tehseen, S., & Ali, R. (2012). Effects of Terms of Trade and its Volatility on Economic Growth in India. [online] Available at: https://mpra.ub.uni-muenchen.de/38998/1/MPRA_paper_38998.pdf [Accessed 29, Mach, 2020].
Tehseen, J. S. (2011). Effects of Terms of Trade and its Volatility on Economic Growth: A Cross Country Empirical Investigation. [online] Available at: http://mpra.ub.uni-muenchen.de/32694 [Accessed 29, Mach, 2020].
Toledo, H. (2014). Terms of trade instability and output growth in Bolivia. *Journal of Developing Areas*, *48*(2), 275–286. https://doi.org/10.1353/jda.2014.0034.
Wei, W., & Choi, Y. (2018). The Effects of Terms of Trade on Macroeconomy in Asian Countries. *The Journal of Asian Studies*, *21*(2), 167–186. https://doi.org/10.21740/jas.2018.05.21.2.167.
Wei, Y. (2019). Oil Price Shocks, Economic Policy Uncertainty and China's Trade: A Quantitative Structural Analysis. *The North American Journal of Economics and Finance,* 48, 20–31. https://doi.org/10.1016/j.najef.2018.08.016.
Williamson, J. (2010). When, Where, and Why? Early Industrialization in the Poor Periphery 1870-1940. NBER Working Paper 16344. [online] Available at: https://www.nber.org/papers/w16344 [Accessed 30, Mach, 2020].
World Development Indicators. The World Bank. [online] Available at: http://databank.worldbank.org/ data/reports.aspx?source=wdi-database-archives-%28beta%29# [Accessed 30, Mach, 2020].
Zaouali, S., & Zaouali, A. (2015). Terms of Trade Instability, Economic Vulnerability and Economic Growth: The Role of Institutions in Sub-Saharan Africa. *Asian Economic and Financial Review*, *5*(4), 579–590. https://doi.org/10.18488/journal.aefr/2015.5.4/102.4.579.590.