

Foreign Trade and Economic Growth of the Russian Far East¹

D A Izotov ¹

¹ Economic Research Institute FEB RAS, Khabarovsk, Russia

E-mail: izotov80@yandex.ru

Abstract. The available estimates of theoretical and empirical studies demonstrate the ambiguity of the mutual influence of foreign trade and economic growth. Evaluation of the mutual influence of trade and economic growth of regions extended to the country as a whole is an important problem, which requires an empirical analysis of long-term trends, allowing us to study the coherence of the economic space of the national economy. This study is aimed at obtaining a quantitative assessment of the impact of foreign trade on the economic growth of Russia's border regions (the Far East) compared with other factors. Based on the collected disparate data of Russian regional statistics, the contribution of foreign trade to the economic growth of the Far East in the framework of the neoclassical approach was estimated. The long-term positive impact of exports and imports on the Far Eastern regions' economic growth for all model specifications was confirmed. For the Far East, the impact of exports and imports on economic growth is stronger than for Russia as a whole, due to greater integration of the Far Eastern region with foreign markets. It was revealed that regional specificity substantially corrected the tendency of the positive impact of foreign trade on the Far East's economic growth. The identification of the impact of foreign trade on the economic growth of the region can act as a guide for implementing accelerated development policies, including for state industrial and investment policies.

1 Introduction

Researchers pay much attention to the study of factors of economic growth. Currently studies on the evaluation of factors and sources of economic growth are based on various theoretical postulates, including interdisciplinary ones. Estimates of theoretical and empirical research demonstrate a variety of trends in the interaction of economic growth and foreign trade. The results of researches depend on temporal and spatial characteristics, so economic growth and foreign trade can be both a cause and a consequence of each other [1].

On the one hand, it is argued that economic growth is a prerequisite for increasing foreign trade. Within the framework of this approach, economic growth as an explanatory variable is included in a number of factors in gravity models that describe the factors of foreign trade of different countries and regions [2]. On the other hand, feedback is assessed, because economic growth is generated by foreign trade and exports in particular. In this case, the indicators of foreign trade are tested as factors that explain the dynamics of economic growth [3] in neoclassical models.

Estimates of Russia's economic growth factors are regularly published by international and Russian research organizations. Russia is characterized by differentiated living conditions of the population and production, as well as by significant differences in the dynamics of economic growth and in the scales of foreign trade between regions. The Russian Far East has a long border with the countries of North-East Asia. As it is supposed, its economic development in many respects is defined by scales of foreign trade activities.

¹ The reported study was funded by RFBR according to the research project № 18-010-00702.



Nevertheless, a relatively small number of studies have been devoted to the assessment of the factors of economic growth in the Russian regions [4; 5], as well as in the case of the Russian Far East [6-9]. Estimates reflecting the impact of foreign trade on economic growth of all Russian regions [10] and the Russian Far East in particular, are highly episodic and outdated [11].

This study is aimed at obtaining a quantitative assessment of the impact of foreign trade on the economic growth of the Far East and all Russian regions in comparison with other factors for the current period: 2007–2016. It can be assumed that, despite significant socioeconomic transformations, foreign trade indicators have a long-term statistically significant positive impact on economic growth in conditions of differentiated development of the regions of Russia and the Far East in particular. It also assumes that regional specificity contributes to a correct assessment of the effects of foreign trade on economic growth.

2 Foreign Trade and Economic Growth of the Russian Far East: model description and data

The Solow model [16] is an economic model of long-run economic growth set within the framework of neoclassical economics. It attempts to explain long-run economic growth by looking at capital accumulation, labor, and increases in productivity, commonly referred to as technological progress. Depending on the task, the original neoclassical model in the various studies was transformed [12].

To test the hypothesis of maintaining economic growth through exports [13], imports [14], foreign trade turnover [15], openness and terms of trade [16], institutional and structural characteristics of the foreign trade sector [17] and so on, the original neoclassical model was expanded by incorporating additional independent variables:

$$Y = f(A, K, L, X), \quad (1)$$

where Y represents total production or output; A – refers to the technology or “knowledge” parameter; K – capital; L – labor; X – the factor of foreign trade. In a number of studies, the dependent variable is presented without taking into account net exports, if available gross domestic value statistics at the national [18], sectoral [19] and regional levels [20] allow this.

At the core of the model is a neoclassical (aggregate) production function, often specified to be of Cobb–Douglas type. The model (1) is estimated using regression analysis methods, for which a log transformation is employed:

$$\ln(Y_t) = \ln(A_t) + \alpha \ln(K_t) + \beta \ln(L_t) + \gamma \ln(X_t) + \varepsilon_t \quad (2)$$

where α – is the elasticity of output with respect to capital; β – is the elasticity of output with respect to labor; γ – is the elasticity of output with respect to foreign trade; t – time.

The modified Solow model can be used to assess the impact of foreign trade on the economic growth of Russian regions. In this case, an important objective of the study is the selection of statistical indicators correctly reflecting the contribution of foreign trade, as well as “labor” and “capital” to the economic growth.

Output. In this study, the dependent variable (Y) is represented in absolute value (million rubles), corrected by its volume index.

Capital. The real values of investments in fixed assets (K) (million rubles) were obtained using its volume index.

Labor. The number of worked hours (L) (thousand hours) was calculated on the basis of the indices of the average length of work of a representative employee in the main job and the average annual number of employed in the economy from the statistical compilations “Labor and Employment in Russia” and “Regions of Russia”.

Foreign trade. Foreign trade indicators in model (2) are estimated at constant prices. For the regions of Russia, the volume index of exports and imports in official statistical compilations is not reflected. The main difficulty in assessing the real values of foreign trade in Russia's regions is the incompleteness of statistics for long periods of time. Availability of corresponding statistics on the volume and value parameters of exports and imports' commodity groups for all regions of Russia covers a ten-year period (2007–2016). On the basis of the disparate, collected data of customs

statistics, the values of exports (*EX*) and imports (*IMP*) were estimated at constant prices (million rubles) by extrapolation. The estimation was carried out at the lowest possible level of aggregation of the commodity nomenclature of foreign economic activity (from four to ten-digit codes), using calculated volume indices for the corresponding groups of goods for this purpose.

Indicators are based on statistics for 2007–2016: in the case of the first sample – for the 9 regions of the Russian Far East, in the second sample – for 80 regions of Russia. The indicators are evaluated as panel data. Output, capital and foreign trade are expressed in constant 2007 prices.

3 Impact of Foreign Trade on Economic Growth: Results of The Evaluation Model

The model (2) was estimated with fixed effects. This makes it possible to take into account the effect of factors fixed across time and across regions. Fixed effects for the regions and years allow considering specific features of economic growth for each region and year, respectively. The regressions are characterized by the absence of multicollinearity and heteroscedasticity. Regression (2) was evaluated by two specifications (models): 1) for fixed effects only for period (time) (Model 1); 2) for fixed effects for cross-section (regions) (Model 2).

3.1 Economic growth and exports

The quantitative impact of exports on the economic growth of the Far East and all Russian regions is shown in Table. 1.

Table 1. The results of assessment the economic growth factors of the Russian regions (independent variable – exports), 2007–2016.

	Far Eastern regions		All Russian regions	
	Model 1	Model 2	Model 1	Model 2
ln (<i>EX</i>)	0.02**	0.03	0.07	0.01*
ln (<i>L</i>)	0.27	0.24*	0.45	0.23
ln (<i>K</i>)	0.58	0.10	0.54	0.18
Constant	1.72	7.05	-0.65	6.87
Total panel observations	90	90	800	800
Cross-section fixed	no	yes	no	yes
Period fixed	yes	no	yes	no
R ²	0.95	0.99	0.96	0.99
F-statistic	129	2801	1585	3031
Prob (F-statistic)	0	0	0	0

Note: * – $p < 0.05$; ** – $p < 0.10$; for other coefficients – $p < 0.01$.

Source: the author's calculations.

Estimates showed that exports were statistically significant and positively influenced the economic growth of Russian regions, which is confirmed by the coefficients obtained in all models. The account of specific features for each region showed (Model 2) that the positive impact of exports on economic growth in comparison with the results obtained for dependencies with fixed effects for time (Model 1) is increasing for the regions of the Far East, whereas for all regions of Russia it's declining. The obtained estimates indicate that the spatial structure of the Russian economy corrects the trend of the impact of exports on economic growth. For the Far East, the impact of exports on economic growth is stronger than for Russia as a whole.

3.2 Economic growth and imports

The results of regression estimates are shown in Table. 2.

Table 2. The results of assessment the economic growth factors of the Russian regions (independent variable – imports), 2007–2016.

	Far Eastern regions		All Russian regions	
	Model 1	Model 2	Model 1	Model 2
$\ln(IMP)$	0.07	0.05	0.04	0.01
$\ln(L)$	0.26	0.20*	0.45	0.21
$\ln(K)$	0.58	0.12	0.6	0.18
Constant	1.36	7.17	-1.03	7.11
Total panel observations	90	90	800	800
Cross-section fixed	no	yes	no	yes
Period fixed	yes	no	yes	no
R^2	0.96	0.99	0.95	0.99
F-statistic	141	3324	1332	3055
Prob (F-statistic)	0	0	0	0

Note: * – $p < 0.05$; for other coefficients – $p < 0.01$.

Source: the author's calculations.

In accordance with the estimates received, the import of goods had a statistically significant positive impact on the economic growth of the Far East and Russian regions in all evaluated models. In Model 2, the elasticity of the impact of imports on economic growth is less, compared with the results obtained for models with fixed effects for time. Evaluation of the Schwartz criterion for choosing the best alternative model showed the preferability of models with fixed effects for regions, i.e. Model 2.

4 Conclusion

For the Far East regions and Russia as a whole, foreign trade interactions are important sources of economic growth. On the basis of the estimates, the hypothesis of a long-term positive impact of exports and imports on the Far Eastern regions' economic growth for all model specifications was confirmed. The indicators of foreign trade are offsetting the negative impact of other factors. For the Far East, the impact of exports and imports on economic growth is stronger than for Russia as a whole, due to the greater integration of the Far Eastern region with foreign markets. It was revealed that regional specificity substantially corrected the tendency of the positive impact of foreign trade on the Far East's economic growth. As a result, taking into account the regions' specifics made it possible to obtain a more precise estimate of foreign trade impact on economic growth in comparison with aggregated models.

References

- [1] Hye Q, Wizarat S, Lau W.-Y 2013 Trade-led growth hypothesis: An empirical analysis of South Asian countries *Economic Modelling* vol. 35 pp. 654–660.
- [2] Tinbergen J 1962 *Shaping the World Economy: Suggestions for an International Economic Policy*. Twentieth Century Fund, New York.
- [3] Balassa B 1978 Exports and Economic Growth: Further evidence *Journal of Development Economics* vol. 5 pp. 181–189.
- [4] Drobishevskiy S, Lugovoi O, Astafeva E & others 2005 *Factors of Economic Growth of Russian Regions*. Institute of economic transition, Moscow.

- [5] Lugovoy O, Polyakov E, Dashkeyev V, Fomchenko D, Mazayev I 2006 Determinants of Economic Growth of Russian Regions. *Paper submitted to the EcoMod International Conference on Regional and Urban Modeling, Brussels*, http://www.iep.ru/files/persona/lugovoy/deter_en.pdf, last accessed 2018/05/01
- [6] Ledyeva S, Linden M 2008 Determinants of Economic Growth: Empirical Evidence from Russian Regions *The European Journal of Comparative Economics* vol. 5(1) pp. 87–105.
- [7] Mikheeva N.N. 1998 *Macroeconomic Analysis on the Basis of Regional Accounts*. Dalnauka, Vladivostok.
- [8] Yasenovskaya I V 2006 *Interregional interaction of the subjects of Federation in the Russian Far East*. KSAPL, Khabarovsk.
- [9] Vlasyuk L I, Redko V V 2010 Economic growth factors of the Russian Far East in 2000–2007 *Spatial Economy* vol. 4 pp. 32–41.
- [10] Velichko A S 2011 Estimation of the productivity of factors of economic growth in the regions of the Russian Far East *Bulletin of the Pacific State University of Economics* vol. 3(59) pp. 72–87.
- [11] Belousova A V Export as a factor of regional economic growth *Vestnik of the Far East Branch of the Russian Academy of Sciences* vol. 5 pp. 116–124.
- [12] Durlauf S N, Quah D T 1999 The new empirics of economic growth *Handbook of macroeconomics* vol. 1 pp. 235–308.
- [13] Hachicha N 2003 Exports, export composition and growth: a simultaneous error-correction model for Tunisia *International Economic Journal* vol. 17(1) pp. 101–120.
- [14] Lawrence R Z, Weinstein D E 1999 Trade and Growth: Import-Led or Export-Led? Evidence from Japan and Korea *NBER Working Paper* 7264, <http://www.nber.org/papers/w7264.pdf>, last accessed 2018/05/31
- [15] Siliverstovs B, Herzer D 2007 Manufacturing exports, mining exports and growth: cointegration and causality analysis for Chile (1960–2001) *Applied Economics* vol. 39 pp. 153–167.
- [16] Awokuse T O 2003 Is the export-led growth hypothesis valid for Canada? *Canadian Journal of Economics* vol. 36(1) pp. 126–136.
- [17] Sachs J D, Warner A.M 1997 Sources of Slow Growth in African Economies *Journal of African Economies* vol. 6(3) pp. 335–376.
- [18] Herzer D, Nowak-Lehmann F D, Siliverstovs B 2006 Export-led growth in Chile: assessing the role of export composition in productivity growth *The Development Economies XLIV* pp. 306–328.
- [19] Ghatak S, Milner C, Utkulu U 1997 Exports, export composition and growth: cointegration and causality evidence for Malaysia *Applied Economics* vol. 29 pp. 213–223.
- [20] Shafiullah M, Selvanathan S, Naranpanawa A 2017 The role of export composition in export-led growth in Australia and its regions *Economic Analysis and Policy* vol. 53 pp. 62–76.