

ROLE OF THE FIXED EXCHANGE RATE REGIME IN DEVELOPING COUNTRIES (THE CASE OF CHINA)

Miloš Todorović, Jelena Mladenović*

University of Niš, Faculty of Economics, Niš, Serbia

*mladenovic.jelena88@gmail.com

Abstract

The subject of this paper is determining role of the fixed exchange rate regime in developing countries, through the analysis of the Chinese exchange rate, and its repercussions on the balance of goods and services and the economic growth in the period from 1983 to 2014. The aim of the paper is to identify the economic growth environment of China by analysing three types of relationships: the relationship between exchange rate and exports of goods and services, relationship between exports of goods and services and gross domestic product, and relationship between exchange rate and growth rate of gross domestic product. The research conducted in this work confirms great importance of the fixed exchange rate regime in developing countries for reducing the economic development gap in relation to developed countries. Based on the research results, the work recommends coordinated action of monetary and fiscal policies, as a measure through which exchange rate policy could stimulate economic growth, while discouraging inflationary tendencies in the economy.

Key words: economic growth, exchange rate, export, international trade.

УЛОГА РЕЖИМА ФИКСНОГ ДЕВИЗНОГ КУРСА У ЗЕМЉАМА У РАЗВОЈУ (ПРИМЕР КИНЕ)

Апстракт

Предмет рада је утврђивање улоге режима фиксног девизног курса у земљама у развоју посредством анализе девизног курса Кине и реперкусија које исти има на биланс роба и услуга и привредни раст у периоду од 1983. до 2014. године. Рад за циљ има одређивање амбијента у коме се остварује привредни раст Кине и исти покушава да оствари, при чему су анализирани три врсте односа: између девизног курса и извоза роба и услуга, између извоза роба и услуга и бруто домаћег производа, те између девизног курса и стопе раста бруто домаћег производа. Истраживање обухваћено радом потврдило је велики значај режима фиксног девизног

курса код земаља у развоју за смањивање јаза у привредној развијености у односу на развијене земље.

Кључне речи: привредни раст, девизни курс, извоз, међународна трговина.

INTRODUCTION

Since the mid-nineteen-seventies, it has been generally accepted that, in the conditions of market economy, the floating exchange rate regime is the only acceptable one. However, a completely independent formation of foreign currency supply and demand and a free formation of the exchange rate have never existed. Government monetary credit or foreign trade policy measures have always more or less influenced the formation of the exchange rate. The example of China in the past thirty years has shown something quite different from the generally accepted neo-liberal paradigm. Guided by the proverb that “it does not matter whether a cat is white or black, as long as it catches mice”, China has maintained a fixed exchange rate regime and demonstrated that such a policy can significantly contribute to achieving extremely high economic growth rates. This paper analyses the effectiveness of such a policy, which may be a guide to developing countries in modelling the exchange rate policy and economic development.

The starting hypothesis in this paper is that, in developing countries, the fixed exchange rate regime can give much better results in reducing economic development gap. Skilful harmonisation of monetary and fiscal policy with exchange rate policy leads developing countries to higher economic growth rates, as evidenced by the example of China.

The key data sources have been taken from the World Bank, International Monetary Fund, and the Bank for International Settlements. The paper dominantly applies statistical methods, correlation and regression analyses.

1. LITERATURE REVIEW

The choice of the exchange rate regime is determined by numerous factors. In accordance with the optimal currency area theory, the key determinants of the choice of the exchange rate regime are geographical location, trade links, country size, openness and internal shocks. Thus, more open countries will apply tied exchange rate. “A stable exchange rate provides benefits from trade, while a flexible exchange rate allows absorption of shocks.” (Aliyev, 2014). According to Rodrik, an inadequate exchange rate management can be disastrous for economic development (Rodrik, 2007). Avoiding domestic currency overvaluation is one of the key rules that any country should stick to in its aims to boost economic growth, i.e. create

an environment conducive to economic growth. Domestic currency overvaluation is linked to the shortage of foreign currency, rent and corrupt activities, unsustainably high current account deficit, balance of payments crisis, and macroeconomic instability in general – all of which is extremely harmful to economic growth. Rodrik indicates that, in a large number of countries, periods of high growth are associated with undervalued local currency. However, the same author emphasises that this relationship applies only to developing countries. When a country reaches a certain level of development, link between the undervalued exchange rate and economic growth weakens.

The choice between a fixed and flexible exchange rate should be led by a tendency to minimize inconsistency in the level of output and employment. Despite this fact, the nature of the shocks in an economy can be different and caused by a number of factors. If the economy is exposed to nominal shocks which are result of the supply and demand of money, the choice of the fixed exchange rate regime is more adequate because it absorbs shocks better. On the other hand, in the case of real shocks, which are related to the level of production, the flexible exchange rate regime is more adequate (Fejzaj, 2014).

Using the inflation rate and gross investments as control variables, some authors (Jacob, 2016) prove the existence of a significant positive link between the fixed exchange rate regime and economic growth. This relationship is explained by the stability factor, which is characteristic of the fixed exchange rate regime.

Mundell concludes that the greatest increase in real income per capita is recorded under the fixed exchange rate (Mundell, 1995). Moreno supports the idea of a higher economic growth by even 3%, due to the introduction of a fixed exchange rate (Moreno, 2001). Ghosh et al. use their own classification of the exchange rate regime to confirm superiority of the fixed exchange rate regime over the flexible exchange rate in terms of stimulating economic growth (Ghosh, Gulde, Wolf, 2002). On the basis of their own classification of foreign exchange rates, Hussain et al. find that flexible exchange rate regime has a positive effect on economic growth in developed countries, while such a link is not established in the case of developing countries. Moreover, in some of them, which are characterised by hyperinflation, this regime has led to reduction in the economic growth rate (Husain, Mody, Rogoff, 2005). Bleaney and Francisco criticise these results, identifying a much larger difference in the case of fixed exchange rate (Bleaney & Francisco, 2007). Aghion et al. prove that volatility of exchange rate leads to reduced economic growth rates in countries with poorly developed financial sector, while in financially developed countries, there is no significant impact of exchange rate volatility on economic growth (Aghion, Bacchetta, Ranciere, Rogoff, 2009).

With the aim of identifying the effects of undervaluation of domestic currency on economic growth, Gluzmann et al. were analyzed the effects of devaluation on different components of GDP (Gluzmann, Levy-Yeyati, Sturzenegger, 2012). These authors proved that undervalued currency had stimulative effect on domestic savings and investment, as well as on employment.

Back in 1996, Boltho commented on the possible effects of devaluation on the supply side, and pointed out that some devaluation models can have positive effects on exports. Higher output level can stimulate investment and result in increased productivity (Boltho, 1996).

Chinese fixed exchange rate policy from the beginning until today could be an example of how exchange rate can stimulate economic growth. In the initial period of reform, China applied defensive devaluation (Ćirović, 2000), (1996), aimed at correcting the existing disparities between domestic and foreign price levels.

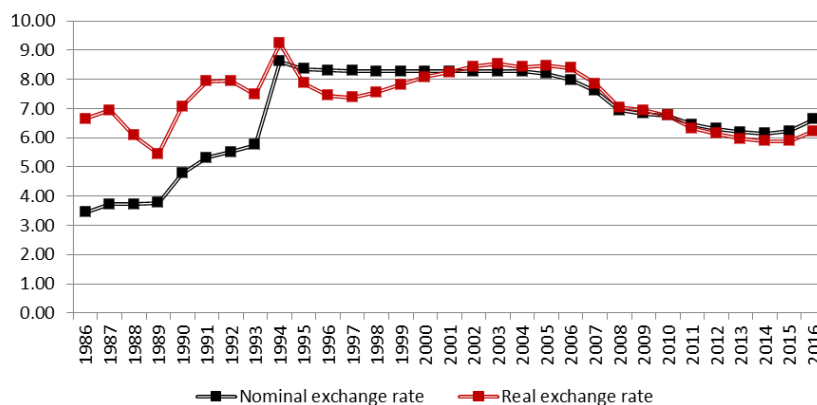
Reducing the value of the national currency causes very complex effects, particularly when comparing short-term and long-term effects. In the short term, it increases debt (expressed in national currency – J curve), import prices react far faster than export prices, which, through transmission mechanisms, has an inflationary effect, and there is no guarantee that, in the long term, beneficial effect on the growth of real exchange rate will be maintained (Bahmani-Oskooee, Hegerty, Kutan, 2008). In addition, devaluation deteriorates terms of trade, and even has a negative effect on output (Upadhyaya, 1999) through reduced real aggregate demand due to rising prices. With bad combination of price elasticity of demand at home and abroad, devaluation definitely topples growth rates. Therefore, the only way to sustain positive effects of devaluation on exports and economic growth in the long term is through a restrictive monetary and/or fiscal policy, which will maintain inflation within the limits, without annulling the positive effects of devaluation.

2. RESEARCH RESULTS

2.1. Exchange Rate as a Generator of Export Activity

The comparative analysis of developments in nominal and real exchange rate of Chinese yuan to dollar is the starting point in measuring the impact of this monetary factor on the growth rates of China.

The calculation used yuan and dollar consumer price indices as price indices for these currencies. The base year used in the analysis is 1986.

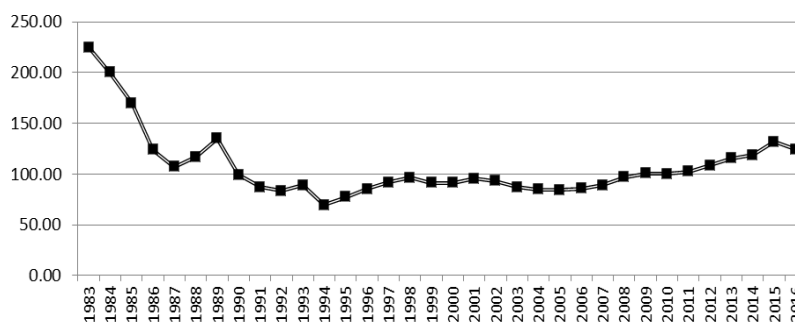


Graph 1. Nominal exchange rate and real exchange rate, China, 1986-2016

Source: Authors, based on World Bank data

As nominal and real exchange rates are presented in accordance with direct quotation, i.e. European Convention, it can be said that, from 2006 onwards, the value of Chinese yuan has increased, i.e. its revaluation has occurred, given that China applies a system of fixed exchange rates. This means that, from 2006, Chinese price competitiveness has decreased, caused by the movements of exchange rate.

Relying on World Bank data on the real effective exchange rate and growth of exports of goods and services, using the SPSS programme, the impact of the real exchange rate on exports of goods and services was analysed. It should be noted that the World Bank uses indirect quotation.



Graph 2. Real effective exchange rate, base index (base = 2010), China, 1983-2016

Source: Authors, based on World Bank data

The graph shows that, based on the World Bank data, China had exchange rate overvalued in the period from 1983 to 1989, while from 1989 to 2010 it was undervalued. From 2010 to 2016, yuan overvaluation

tendency was recorded again, meaning that there was a decrease in price competitiveness compared to the previous period.

Table 1. Descriptive statistics for the real effective exchange rate and exports of goods and services, China, 1983-2016

Indicators	Mean	Standard deviation
Real effective exchange rate	107.59	33.22
Exports of goods and services	13.39	10.58

Source: Authors, based on World Bank data

Table above shows that the mean real effective exchange rate was 107.59, which, in this particular case, means the existence of the average undervaluation of Chinese yuan in the analysed three-decade period. As for the growth rate of exports of goods and services, it was about 13.39% on average in the observed period. Standard deviation (deviation from the mean) was greater in the case of the real effective exchange rate, than in the case of exports of goods and services.

Table below shows the correlation analysis. Pearson's coefficient of -0.393 indicates negative and medium strong correlation between the two observed variables. This data shows that there is a connection between the observed variables, whose direction is negative, i.e. increase of one variable causes the other to decrease. The level of statistical significance of 0.024 is less than the defined risk of error of 0.05, which confirms that between the real effective exchange rate and exports of goods and services there is a statistically significant correlation.

Table 2. Correlation analysis, Real effective exchange rate and Exports of goods and services, China, 1983-2014

		Real effective exchange rate	Exports of goods and services
Real effective exchange rate	Pearson Correlation	1	-.393*
	Sig. (2-tailed)		.024
	N	32	32
Exports of goods and services	Pearson Correlation	-.393*	1
	Sig. (2-tailed)	.024	
	N	32	32

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Authors, based on World Bank data

Regression analysis is applied to determine the correlation between the two variables – exports of goods and services and real effective exchange rate. It has been shown that increase in the real effective exchange rate by one unit (in terms of indirect quotation) leads to a decrease in exports of goods and services by 0.125. In other words, increase

in the value of the real effective exchange rate and its appreciation by one yuan leads to a decrease in exports of goods and services by the same amount, which is consistent with the theoretical findings of the correlation between exchange rate and exports. According to the coefficient of significance which value is 0.24, there is statistical representativeness of the model for the level $p < 0.05$.

Regression analysis has allowed for the calculation of the coefficient of determination (R Square), which shows how much of the variance of the dependent variable is explained by the model. In the present case, the coefficient of determination is 0.159, which means that the model explains about 16% of the variance of the growth rate of exports of goods and services. Although this is not a high level of coefficient of determination, the realised level of significance is 0.024, indicating the statistical representativeness of the model. Furthermore, the value of adjusted R square (0.131) is very close to value of R square (0.159), what is one more confirmation of validity of model.

Table 3. Regression analysis, Coefficient of determination^b, Real effective exchange rate and Exports of goods and services, China, 1983-2014

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.398 ^a	.159	.131	9.87021

a. Predictors: (Constant), Real effective exchange rate

b. Dependent Variable: Exports of goods and services

Source: Authors, based on World Bank data

Table 4. Real effective exchange rate and Exports of goods and services, ANOVA^b, Kina, 1983-2014

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	550.775	1	550.775	5.654	.024 ^a
	Residual	2922.633	30	97.421		
	Total	3473.408	31			

a. Predictors: (Constant), Real effective exchange rate

b. Dependent Variable: Exports of goods and services

Source: Authors, based on World Bank data

The economic interpretation of this statistics implies that growth of the real effective exchange rate decreases exports. It should be borne in mind that the World Bank applies indirect foreign exchange quotation method, meaning that growth of the real effective exchange rate is, in fact, an increase of its value, i.e. a decrease of its price competitiveness.

Given this fact, negative impact on exports is quite logical. This is in full compliance with what the theory states.

For the purpose of testing, for a moment the impact of inflation on the exchange rate will be abstracted, and focus placed on the nominal exchange rate and its impact on exports. Nominal exchange rate of China during the period from 1983 to 2014 was, on average, 6.38 yuans for one US dollar. Within the model, the nominal exchange rate base index is considered, with 2010 taken as the base year.

Table 5. Correlation analysis, Nominal exchange rate and Exports of goods and services, China, 1983-2014

		Exports of goods and services	Nominal exchange rate
Exports of goods and services	Pearson Correlation	1	.490**
	Sig. (2-tailed)		.004
	N	32	32
Nominal exchange rate	Pearson Correlation	.490**	1
	Sig. (2-tailed)	.004	
	N	32	32

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors, based on World Bank data

Correlation analysis shows that, in the case of China, during the reporting period, there is a positive and very strong correlation between exports of goods and services and nominal exchange rate. In addition, the model is statistically significant at the risk of error of 0.01.

Table 6. Regression analysis, Coefficient of determination^b, Nominal exchange rate and Exports of goods and services, China, 1983-2014

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.490 ^a	.240	.214	9.38286

a. Predictors: (Constant), Nominal exchange rate

Source: Authors, based on World Bank data

In order to determine the impact of the nominal exchange rate on exports of goods and services, regression analysis was conducted. It was found that an increase in the nominal exchange rate by 1 yuan leads to an increase in exports by 0.49. Furthermore, regression analysis resulted in the coefficient of determination (R Square) of 0.240, meaning that the model explains about 24% of the variance. However, the realised level of significance of regression analysis of 0.04 indicates that the model is statistically representative.

Table 7. Nominal exchange rate and Exports of goods and services, ANOVA^b, China, 1983-2014

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	832.268	1	832.268	9.454	.004 ^a
	Residual	2641.139	30	88.038		
	Total	3473.408	31			

a. Predictors: (Constant), Nominal exchange rate

b. Dependent Variable: Exports of goods and services

Source: Authors, based on World Bank data

Finally, what follows is the determination of correlation between the real exchange rate of yuan to dollar and exports of goods and services. The average value of the real exchange rate of China during the period from 1983 to 2014 was 7.39 yuans for 1 US dollar.

Table 8. Correlation analysis, Real exchange rate and Exports of goods and services, China, 1983-2014

		Exports of goods and services	Real exchange rate
Exports of goods and services	Pearson Correlation	1	.592 ^{**}
	Sig. (2-tailed)		.001
	N	29	29
Real exchange rate	Pearson Correlation	.592 ^{**}	1
	Sig. (2-tailed)	.001	
	N	29	29

^{**}. Correlation is significant at the 0.01 level (2-tailed).

Source: Authors, based on World Bank data

Correlation analysis indicates a positive and very strong correlation between the real exchange rate and exports of goods and services, since the Pearson coefficient is 0.592. The statistical significance of correlation coefficient of 0.01 indicates a high degree of significance of the observed correlation. The real exchange rate, i.e. exchange rate adjusted given the effect of inflation, therefore, exhibits an even greater degree of correlation with exports of goods and services in the case of China.

Regression analysis that tracks the influence of the real exchange rate of yuan to dollar on exports of goods and services shows that the increase in the real exchange rate, i.e. its devaluation by 1 yuan leads to an increase in exports of goods and services by 0.592. The coefficient of determination obtained by regression analysis in the amount of 0.592 indicates that the model explains about 59% of the variance. The analysis

of variance (ANOVA), however, points to the realised level of significance of 0.01, indicating that the model is representative.

Table 9. Regression analysis, Coefficient of determination^b, Real exchange rate and Exports of goods and services, China, 1983-2014

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.592 ^a	.351	.327	8.78705

a. Predictors: (Constant), Real exchange rate

b. Dependent Variable: Exports of goods and services

Source: Authors, based on World Bank data

Table 10. Real exchange rate and Exports of goods and services, ANOVA^b, China, 1983-2014

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1126.707	1	1126.707	14.592	.001 ^a
	Residual	2084.730	27	77.212		
	Total	3211.437	28			

a. Predictors: (Constant), Real exchange rate

b. Dependent Variable: Exports of goods and services

Source: Authors, based on World Bank data

The last instance of validation of a positive correlation between the exchange rate and exports of goods and services is the calculation of the real effective exchange rate. Specifically, for comparison purposes, what follows is an analysis based on authors' calculation of the real effective exchange rate, taking into account euro and dollar, as currencies in which the highest percentage of Chinese foreign trade is realised. The basis of this calculation is the World Bank data on the nominal exchange rate of yuan to dollar, as well as on consumer price index (CPI) of China and the United States, while data on the nominal exchange rate of yuan to euro has been taken from the European Central Bank, and the euro CPI calculated as the average CPI of Germany, France, Italy, and Spain, as the biggest Eurozone countries, with a total population of 250 million. Weights, as the shares of euro and dollar in China's foreign trade, were taken from the Bank for International Settlements (<http://www.bis.org/statistics/eer/>). The observed period was from 2001 to 2014, due to a lack of data relating to euro for the previous period.

The following table presents the mean and standard deviation of the real effective exchange rate and growth of exports of goods and services of China in the period from 2001 to 2014. Average real effective exchange rate in this period was 103.22 yuans, which is to say that it was

undervalued, because the value of the real effective exchange rate greater than 100 indicates devalued currency in terms of the application of direct quotation. Regarding the growth of exports of goods and services, the same indicator was, on average, 13.95 for a period of 14 years. Standard deviation in this case was greater in respect of the real effective exchange rate, which means that, in respect of this indicator, there were major deviations from the mean in relation to exports of goods and services.

Table 11. Descriptive statistics, Real effective exchange rate and Exports of goods and services, 2001-2014

Indicators	Mean	Standard deviation
Real effective exchange rate	103.2186	21.67023
Exports of goods and services	13.9514	10.10985

Source: Authors, based on World Bank, European Central Bank, and Bank for International Settlements data

Table 12. Correlation analysis, Real effective exchange rate and Exports of goods and services, China, 2001-2014

		Real effective exchange rate	Exports of goods and services
Real effective exchange rate	Pearson Correlation	1	.544
	Sig. (2-tailed)		.044
	N	14	14
Exports of goods and services	Pearson Correlation	.544	1
	Sig. (2-tailed)	.044	
	N	14	14

Source: Authors, based on World Bank European Central Bank, and Bank for International Settlements data

Pearson's correlation coefficient is 0.544, which means that there is a positive and strong correlation between the mentioned variables.

Regression analysis shows that the increase in the real effective exchange rate by one unit leads to an increase in exports of goods and services by 0.544. Coefficient of determination is 0.296, which is to say that the model explains about 30% of the variance.

Table 13. Regression analysis, Coefficient of determination, Real effective exchange rate and Exports of goods and services, China, 2001-2014.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.544 ^a	.296	.237	8.83069

Predictors: (Constant), Real effective exchange rate

Dependent Variable: Exports of goods and services

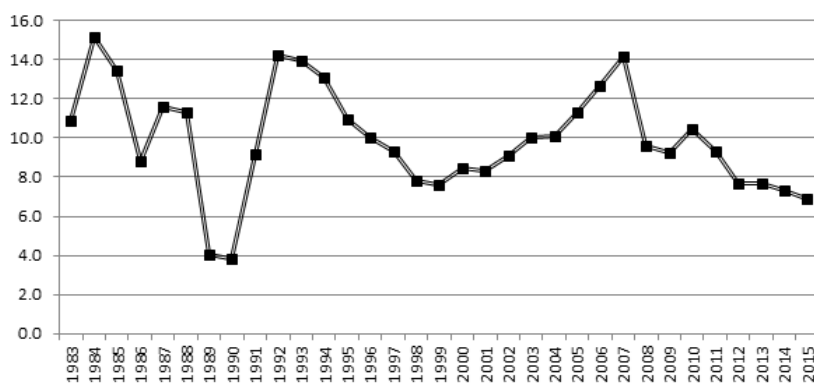
Source: Authors, based on World Bank, European Central Bank, and Bank for International Settlements data

So, the final conclusion on the impact of the exchange rate on exports of goods and services in the case of China points to a positive correlation between the variables analysed. The analysis confirms that the devalued yuan leads to an increase of Chinese exports and vice versa.

2.2. Export as a Determinant of Economic Development

The previous segment of the work has shown that, in the case of China, exchange rate is a generator of exports. Undervalued value of yuan makes Chinese products cheaper abroad, and has a stimulating effect on Chinese exports. However, one should not forget that this undervaluation is minimal (below 10%), which IMF considered acceptable for a time when the international monetary system was based on fixed exchange rates (up to 1973). This segment of the work will focus on the analysis of the correlation between exports and economic growth.

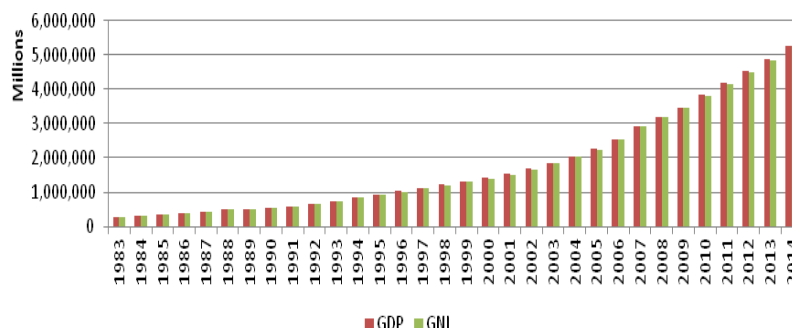
Bellow we will see GDP growth rate, gross domestic product and gross national income – the key indicators of growth and development.



Graph 3. GDP growth rate, 1983-2015

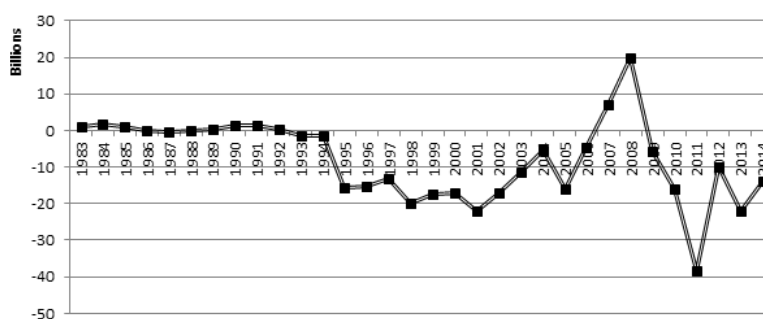
Source: Authors' calculation, based on World Bank data

The lowest GDP growth rate was recorded in 1990 at the level of 3,84%, while the highest was recorded in 1984 and was even 15,20%, as a result of the first phase of economic reforms. As a result of the crisis, there was a slight reduction in the growth rate to 7% in 2009. The growth rate was returned to the level before the crisis in the 2010. After that there was a reduction in growth and stagnation. In spite of this, growth rate nowadays is nearly 8%.



Graph 4. Gross domestic product (GDP) and Gross national income (GNI), 1983-2014
Source: Authors' calculation, based on World Bank data

Graph above presents a permanent impressive GDP growth, as well as GNI of China in analyzed period. These indicators were greater than 5 trillion dollars. The graph also shows very little difference between GDP and GNI over the period. As the difference between these two indicators is foreign direct investment, on the basis of this trend we can deduce the approximate equality of imports and exports of capital. Detailed following of this difference can be based on the chart below.



Graph 5. Difference between GNI and GDP, 1983-2014
Source: Authors' calculation, based on World Bank data

In the previous chart we can observe a neutral position of China regarding the movement of capital from 1983 to 1994. From 1995 to 2006, China was a net importer of capital, furthermore from 2006 to 2009 it was a net exporter of capital, and from 2009 to the present day capital imports was greater than exports, what is a logical outcome since China is a developing country with very cheap labor.

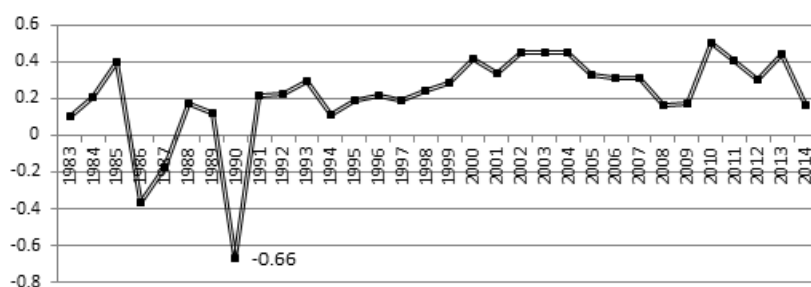
One of the key instruments that analyse the impact of exports on economic development is the *foreign trade multiplier*. The foreign trade

multiplier shows by how much the national income of the country will increase due to the increase of its exports by one additional unit (Acin et al., 2006). The increase in income causes an increase in imports to a certain extent, which, in turn, depends on the level of income elasticity of imports. Income elasticity of imports shows the percentage change in imports relative to the percentage change in income. This indicator can be calculated using the following form:

$$\varepsilon_m = \frac{\frac{\Delta M}{M}}{\frac{\Delta Y}{Y}} = \frac{\Delta M \times Y}{\Delta Y \times M}$$

where ε_m is income elasticity of imports, ΔM is increase in imports, and ΔY increase in national income.

Average income elasticity of imports in the case of China for the period from 1983 to 2014 was 0.22. In fact, during the period, China's increase in national income by 1 caused average increase in imports by 0.22. This data shows that an increase in income causes a slight change in imports.

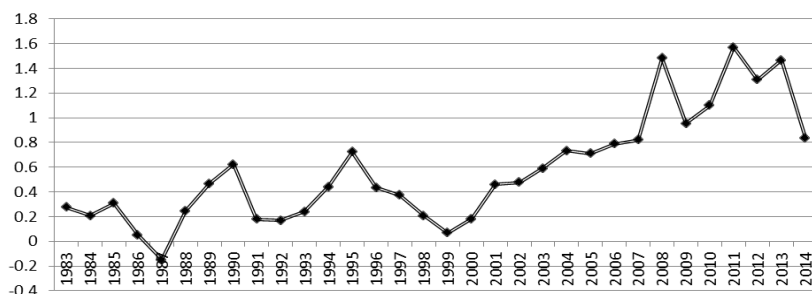


Graph 6. Income elasticity of imports, China, 1983-2014

Source: Authors' calculation, based on World Bank data

In the first few years, imports elasticity grew, and subsequently had two series of significant decline. Imports elasticity in 1990 reached the lowest point, when it was even -0.66. However, after that, there was a rapid growth of imports elasticity, and in the period from 1994 to 2014 it was at approximately similar level, with no significant fluctuations. In 2014, the increase in income by 1% led to an increase in imports by 0.16%.

It can be assumed that in periods of low income elasticity of imports, an increase in income went to savings rather than imports, which was the consequence of an increased living standard. Whether it was really so was checked by determining income elasticity of savings. The average of this indicator for the period from 1983 to 2014 was 0.57, which means that the increase in income by 1 caused average increase in savings by 0.57. The graph below will show income elasticity of savings.



Graph 7. Income elasticity of savings, China, 1983-2014

Source: Authors' calculation, based on World Bank data

The graph shows that in the year of the lowest income elasticity of imports (in 1990), there was a growth in income elasticity of savings, which is to say that the reduction of imports actually led to an increase in savings.

Calculation of foreign trade multiplier is based on the calculation of the marginal propensity to import. The lower the marginal propensity to import, the greater the effect of exports on increasing income. Marginal propensity to import is calculated as the relationship between changes in imports and changes in income:

$$b = \frac{\Delta M}{\Delta Y}$$

As the foreign trade multiplier is calculated as the reciprocal value of the marginal propensity to import, it follows that:

$$m = \frac{1}{b}$$

To avoid the problem of taking the marginal propensity to imports as a constant, foreign trade multiplier is calculated as the reciprocal value of the average propensity to import. The average propensity to import for the period from 1983 to 2014 in the case of China amounted to 0.29, while the foreign trade multiplier calculated on that basis was 3.48. Economic interpretation of this data shows that increase in exports by one dollar leads to increased income by 3.48 dollars, which is an enormous value. This shows a strong positive impact of exports on economic development, i.e. on gross national income (GNI), as one of its indicators.

Correlation analysis also examined the correlation between exports of goods and services and gross domestic product (GDP). Pearson coefficient of 0.993 indicates that between them there is an extremely significant level of correlation. The significance level of 0.000 indicates that the correlation between these variables has the highest level of significance.

Table 14. Correlation analysis, Exports of goods and services and Gross domestic product (GDP), China, 1983-2014

		Exports of goods and services	BDP
Exports of goods and services	Pearson Correlation	1	.993**
	Sig. (2-tailed)		.000
	N	32	32
GDP	Pearson Correlation	.993**	1
	Sig. (2-tailed)	.000	
	N	32	32

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors, based on World Bank data

Regression analysis examined the impact between these two variables, whereby exports of goods and services was taken as independent and gross domestic product (GDP) as dependent variable. The model shows that increase in exports by one unit leads to an increase in GDP by 2.18 units. The conducted regression analysis shows that the coefficient of determination is 0.987, which means that 99% of the variance of GDP is explained by the model. Moreover, the level of significance of the regression model is 0.000. All this indicates that the model is statistically representative.

Table 15. Regression analysis, Coefficient of determination^b, Exports of goods and services and Gross domestic product (GDP), China, 1983-2014

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.993 ^a	.987	.986	1.75313E11

a. Predictors: (Constant), Exports of goods and services

b. Dependent Variable: GDP

Source: Authors, based on World Bank data

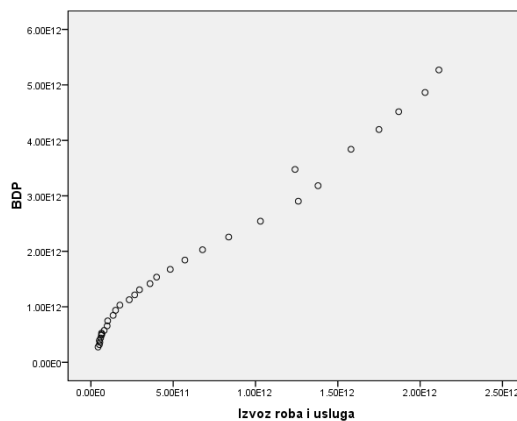
Table 16. Exports of goods and services and Gross domestic product (GDP), ANOVA^b, China, 1983-2014

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.746E25	1	6.746E25	2194.883	.000 ^a
	Residual	9.220E23	30	3.073E22		
	Total	6.838E25	31			

a. Predictors: (Constant), Exports of goods and services

b. Dependent Variable: GDP

Source: Authors, based on World Bank data



Graph 8. Dispersion diagram – Gross domestic product (GDP) and Exports of goods and services, China, 1983-2014

Source: Authors' contribution

The positive trend of the curve in dispersion diagram, from the lower left to the upper right corner, is another proof of the high degree of correlation between the observed phenomena. At low values of exports of goods and services, China achieved low values of GDP in the reporting period, and conversely.

The data obtained is characterised by the highest level of statistical representativeness, and proves the highest level of impact of exports on economic development in China. Therefore, the challenge is to test the relative contribution of exports to economic growth of China. To answer this challenge, a model was developed and the statistical method of regression analysis applied, where the dependent variable is the growth rate of GDP, while the independent variables are exports of goods and services, value added of an industry, gross domestic savings, inward foreign direct investment, and gross domestic investment. Among these factors, two factors have a negative effect on the growth rate of GDP – gross domestic savings and inward foreign direct investment. Thus, the increase in *gross domestic savings* by 1 leads to reduced economic growth by 0.59, while increase in *inward foreign direct investment* by 1 leads to reduced economic growth by 1.03. The negative impact of savings on economic growth can be explained by the fact that at low level of development, higher propensity to savings decreases aggregate demand and hence output. Regarding the negative impact of inward foreign direct investment on the growth rate, the same can be explained by the structure of investment. Foreign investment in certain sectors and industries is often not the productive activity if one takes into account the repatriation of profits and a positive effect on imports, and therefore lacking stimulating effect on growth. As far as

other indicators are concerned, all have a positive effect on economic growth, of more or less intensity. The increase in *value added of an industry* by 1 leads to an increase in the growth rate by 0.44, an increase in *gross domestic investment* leads to increased growth rates by 0.04, while the increase in *exports of goods and services* by 1 leads to an increase in the growth rate by 1.34. This has proven the dominant positive impact of exports of goods and services on economic growth.

This confirms the direct positive impact of exports on economic development. As the exchange rate has a direct proportional effect on exports, and exports affects economic development, it turns out that there is a positive correlation between the exchange rate and economic development, *ceteris paribus*. However, in order to achieve validity in presenting this conclusion, the next segment will focus on investigating the correlation between exchange rate and GDP.

2.3. The Role of Exchange Rate in Boosting Economic Development

Using correlation analysis for testing the relationship between the real effective exchange rate and the growth rate of GDP, Pearson coefficient of 0.712 was determined, which proves the existence of a strong positive correlation between the analysed indicators. The statistical significance of 0.003 indicates that the correlation between observed variables is highly significant.

Table 17. Correlation analysis, Real effective exchange rate and Growth rate of GDP, China, 2001-2015

		Real effective exchange rate	Growth rate of GDP
Real effective exchange rate	Pearson Correlation	1	.712*
	Sig. (2-tailed)		.003
	N	15	15
Growth rate of GDP	Pearson Correlation	.712*	1
	Sig. (2-tailed)	.003	
	N	15	15

*. Correlation is significant at the 0.01 level (2-tailed).

Source: Authors, based on World Bank, European Central Bank, and Bank for International Settlements data

The statistical method of regression analysis has shown that the increase in the real effective exchange rate, i.e. its devaluation by one unit, leads to an increase in the growth rate of GDP by 0.709. The coefficient of determination (R Square) is 0.437, which is to say that the model explains 47% of variance of the growth rate of GDP. Furthermore, the realised significance is 0.003, which means that the regression model is statistically significant.

Table 18. Regression analysis, Coefficient of determination^b, Real effective exchange rate and Growth rate of GDP, China, 2001-2015

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.712 ^a	.506	.468	1.46542

a. Predictors: (Constant), Real effective exchange rate

b. Dependent Variable: Growth rate of GDP

Source: Authors, based on World Bank, European Central Bank, and Bank for International Settlements data

Table 19. Real effective exchange rate and Growth rate of GDP, ANOVA^b, China, 1983-2015

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	28.635	1	28.635	13.334	.003 ^a
	Residual	27.917	13	2.147		
	Total	56.552	14			

a. Predictors: (Constant), Real effective exchange rate

b. Dependent Variable: Growth rate of GDP

Source: Authors, based on World Bank, European Central Bank, and Bank for International Settlements data

Therefore, the existence of direct and positive impact of the real effective exchange rate on the growth rate of GDP has been confirmed. This proves that the fixed exchange rate policy can have a very beneficial effect on the growth rate of GDP and exports of developing countries. Therefore, this mechanism could become one of the legal means of reducing the economic development gap instead of imposing devastating neoliberal concept of floating exchange rate.

CONCLUSION

The analysis of the exchange rate, as a factor of economic development of China, in the period from 1983 to 2014, has confirmed the connection between exchange rate movements and exports, which has multiplied national income. The average growth rate of GDP in the observed three-decade period was 10%, while the average value of the nominal exchange rate was 6.38 yuans for one US dollar.

In order to test the validity of results, in determining the connection between exports of goods and services and real effective exchange rate, as the best indicator of price competitiveness of the country abroad, the first stage of the analysis used World Bank data on this indicator, while in the second phase, authors calculated it. The findings were identical, indicating credibility of the analysis. Specifically, between the nominal exchange rate (World Bank data) and exports of goods and services, there is a

positive and very strong correlation, with Pearson coefficient value of 0.490. As for the correlation between real exchange rate and exports of goods and services, positive and very strong correlation was determined, with Pearson coefficient of even 0.592. Finally, exports of goods and services is in negative medium strong correlation with the real effective exchange rate according to the World Bank data (Pearson coefficient = -0,393) and in positive and strong correlation with the real effective exchange rate (Pearson coefficient = 0.544). If one takes into account the indirect quotation used by the World Bank, it can be concluded that these two findings are in full compliance with regard to the final conclusion – in the case of China, between the exchange rate and export there is a positive correlation – with the growth of one variable, the other one increases too.

The research has established the existence of a strong positive direct correlation between the exports of goods and services and GDP, with the Pearson coefficient of even 0.993. In addition, the established foreign trade multiplier of 3.48 confirms the pronounced influence of exports of goods and services on China's income. Specifically, the increase in exports by one dollar results in increase in Chinese income by 3.48 dollars. The impact of imports on the change of income was analysed as well. The positive thing for China is that increase in the national income by 1 causes an average increase of imports by 0.22. As the income elasticity of imports is less than 1 for the period from 1983 to 2014, it can be concluded that increase in income causes small changes in imports. This data also confirms that most of the income on average went to savings. However, by observation of each year, it was found that in the first few years imports elasticity grew, and subsequently had two series of significant decline, indicating an increased living standard, since most of the income went to savings. However, after that, in the period from 1994 to 2014, the level of income elasticity of imports stabilised and moved without significant fluctuations. This is consistent with the theoretical views that only in the higher stages of development significant growth of savings in relation to consumption can be achieved.

Finally, the comparison of the real effective exchange rate and the growth rate of GDP examined a direct impact of exchange rate on economic growth. Correlation analysis confirmed the existence of a strong positive correlation between the above-mentioned variables, with Pearson coefficient of 0.712. This is to confirm that the exchange rate policy of China was in the function of stable economic development.

The key to achieving a successful exchange rate impact on the overall development is keeping a stable exchange rate policy, without frequent fluctuations, with a slight tendency towards undervalued currency, which is far better implemented through a fixed exchange rate. Monetary stability is *conditio sine qua non* for the realisation of this mission. In addition, the reduction of import dependence is something that should be defined as a

long-term goal, since it is import dependency that causes devaluation-inflation spiral, through more expensive imported raw materials, more expensive import of finished products, and increased demand for import substitutes. The message that China sends to developing countries is that prudent fixed exchange rate policy, combined with restrictive measures of monetary and fiscal policies, can contribute significantly to GDP growth and stable economic development. Disinflation through overvalued currency and encouraging development through expansionary monetary and fiscal policies create import-dependent economy with growth of public and foreign debt. Floating exchange rate, as part of the neoliberal paradigm, in turn, denies developing countries the opportunity to use the exchange rate policies to boost their own development.

REFERENCES

- Aliyev, R. (2014). Determinants of the Choice of Exchange Rate Regime in Resource-Rich Countries. Charles University and Academy of Sciences of the Czech Republic, p. 4.
- Acin, Đ., Todorović, M., Acin-Sigulinski, S. (2006). *Međunarodni ekonomski odnosi*. Novi Sad: Pigmalion.
- Aghion, Ph., Bacchetta, Ph., Romain, R., Kenneth, R. (2009). Exchange Rate Volatility and Productivity Growth: The Role of Financial Development. *Journal of Monetary Economics*, 56, 494-513. DOI 10.3386/w12117.
- Bahmani-Oskooee, M., Hegerty, S., Kutan, A. (2008). Do nominal devaluations lead to real devaluations? Evidence from 89 countries. *International Review of Economics and Finance*, 17 (4), 644-670. DOI <https://doi.org/10.1016/j.iref.2007.05.004>
- Bleaney, M., Francisco, M. (2007). Exchange Rate Regimes, Inflation and Growth in Developing Countries – An Assessment. *The B.E. Journal of Macroeconomics*. 7 (1), Article 18.
- Boltho, A. (1996). *Convergence, competitiveness and the exchange rate, Economic Growth in Europe Since 1945*. Cambridge: Cambridge University Press. DOI <https://doi.org/10.1017/CBO9780511758683.006>
- Fejzaj, E. (2014). Determination of Exchange Rate Regimes in an unstable economy. *International Journal of Innovative Research in Science, Engineering and Technology*, 3 (4), 10849-10852.
- Ćirović, M. (2000). *Devizni kursevi [Exchange rates]*. Beograd: Bridge Company.
- Husain, A., Mody, A., Rogoff, K. (2005). Exchange Rate Regime Durability and Performance in Developing versus Advanced Economies. *Journal of Monetary Economics*, 52, 35-64. DOI 10.3386/w10673
- Ghosh, A. R., Gulde, A-M, Wolf, H. (2002). *Exchange Rate Regimes: Choices and Consequences*. Cambridge, Massachusetts: MIT Press. ISBN 0-262-07240-8.
- Gluzmann, P.A., Levy-Yeyati, E., Sturzenegger, F. (2012). Exchange rate undervaluation and economic growth: Diaz Alejandro (1965) revisited. *Economics Letters*, 117, 666-672. URL <http://www.sciencedirect.com/science/article/pii/S0165176512004077>
- Jakob, B. (2016). Impact of Exchange Rate Regimes on Economic Growth. *Undergraduate Economic Review*, 12 (1), 1-22.

- Moreno, R. (2001). Pegging and Stabilization Policy in Developing Countries. *Federal Reserve Bank of San Francisco Economic Review*, 17-29. URL <http://www.frbsf.org/economic-research/publications/2001/article2-3.pdf>
- Mundell, R. (1995). The International Monetary System: The Missing Factor. *Journal of Policy Modeling*, 17 (5), 479-492.
- Rodrik, D. (2007). *The Real Exchange Rate and Economic Growth: Theory and Evidence*. Kennedy School of Government, Harvard University, Cambridge.
- Upadhyaya, K., "Currency devaluation, aggregate output, and the long run: an empirical study", *Economics Letters*, Volume 64, Issue 2, August 1999, 197-202. DOI [https://doi.org/10.1016/S0165-1765\(99\)00088-9](https://doi.org/10.1016/S0165-1765(99)00088-9)
- Website of World Bank, World Bank Indicators (<http://data.worldbank.org/indicator>)
- Website of International Monetary Fund (<http://www.imf.org>)
- Website of European Central Bank (<https://www.ecb.europa.eu>)
- Website of Bank for International Settlements (<https://www.bis.org>)
- Website of The People's Bank of China (<http://www.pbc.gov.cn>)
- Website of XE Live Exchange Rates (<http://www.xe.com>)
- Website of FXStreet, The Forex Market (<http://www.fxstreet.com/>)

УЛОГА РЕЖИМА ФИКСНОГ ДЕВИЗНОГ КУРСА У ЗЕМЉАМА У РАЗВОЈУ (ПРИМЕР КИНЕ)

Милош Тодоровић, Јелена Младеновић

Универзитет у Нишу, Економски факултет, Ниш, Србија

Резиме

Импресивне стопе привредног раста, са једне стране, и истрајавање режима фиксног девизног курса, са друге стране, наметнули су став о значајном доприносу политике девизног курса остваривању екстремно високог привредног раста Кине. Кључна идеја је да ефикасно вођење политике фиксног девизног курса земљама у развоју може помоћи у остваривању виших стопа раста и већег нивоа развијености. За успешно остваривање овакве стратегије потребно је усклађивање монетарне и фискалне политике са политиком девизног курса.

У раду је дат преглед литературе која говори о међуусловљености политике девизног курса и привредног раста и развоја. Иста препоручује избегавање прецењеног девизног курса код земаља у развоју, а са циљем стварања стимулативног амбијента за извоз и, последично, привредни раст. Међутим, једини начин да се на дужи рок одрже позитивни ефекти девалвације на извоз и привредни раст јесте вођење рестриктивне монетарне и фискалне политике, а са циљем одржавања инфлације у границама које неће анулирати позитивне ефекте девалвације.

Анализа узајамне повезаности привредног раста и политике девизног курса Кине у раду је спроведена праћењем три врсте односа: између девизног курса и извоза роба и услуга, између извоза роба и услуга и бруто домаћег производа, те између девизног курса и стопе раста бруто домаћег производа.

У раду је коришћен реални девизни курс, номинални девизни курс, реални ефективни девизни курс који објављује Светска банка и реални ефективни девизни курс израчунат од стране аутора, узимањем у обзир евра и долара као валута у којима се

одвија највећи проценат кинеске спољнотрговинске размене. Корелациона анализа стопе раста извоза робе и услуга и свих поменутих категорија девизног курса потврдила је постојање везе између поменутих варијабли. Регресиона анализа показала је да повећање девизног курса јуана доводи до повећања кинеског извоза роба и услуга, што је у сагласности са теоријским налазима о међузависности девизног курса и извоза.

Друга инстанца анализе односила се на истраживање везе између извоза и бруто домаћег производа. Потврђен је изразито значајан ниво корелације између ових варијабли, док је регресија потврдила теоријске налазе да повећање извоза условљава повећање БДП-а. Утицај извоза на привредни развој анализиран је и посредством израчунавања спољнотрговинског мултипликатора. Вредност овог показатеља за анализирани период износи 3,48, што значи да повећање извоза за 1 \$ доводи до повећања дохотка за 3,48 \$, а што представља изразито велику вредност. Утврђивање доходне еластичности увоза указало је на то да повећање дохотка изазива мале промене у увозу. Претпоставили смо да је у периодима ниске доходне еластичности увоза раст дохотка уместо на увоз коришћен на штедњу, што би била последица повећаног нивоа животног стандарда. Анализа је показала да је у години најниже доходне еластичности увоза (1990) дошло до раста доходне еластичности штедње, што значи да је смањење увоза заиста довело до повећања штедње.

Најзад, анализа везе између девизног курса и стопе раста БДП-а указала је на постојање јаке позитивне везе између поменутих показатеља. Повећање реалног ефективног девизног курса, тј. његова девалвација за једну јединицу, доводи до повећања стопе раста БДП-а за 0,709.

Тако смо доказали да политика фиксног девизног курса има потенцијално јак позитиван утицај на стопе привредног раста земаља у развоју. Стога из рада произлази закључак о коришћењу политике фиксног девизног курса код ове категорије земаља као једног од легалних средстава за смањење јаза у привредној развијености, насупротив наметању разарајућег неолибералног концепта флукутирајућег девизног курса.