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STUDY OF THE DYNAMICS OF THE NATIONAL CURRENCY RATE ON THE EXAMPLE OF ARMENIA

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Abstract. *The purpose of this paper is to construct an econometric model for investigating the dynamics of currency on the example of the modern national currency of Armenia. This paper considers the possibility of such modeling using the example of the Armenian dram exchange rate. The main goal was to find out whether the construction of an effective course model, capable of producing relatively reliable indicators on the basis of the given components. As a result of work, the weak correlation between the course and the fundamental factors of the economy was found, which was explained by the share of shadow economy which was calculated later. However, I managed to prove that the assessment of the course for a short period of time using knowledge of the economy fundamental's and the ability to use econometric tools is possible.*

Keywords: *currency; Armenia; key factors of economy; econometric model; economic forecast*

ИССЛЕДОВАНИЕ ДИНАМИКИ НАЦИОНАЛЬНОЙ ВАЛЮТНОЙ СТАВКИ НА ПРИМЕРЕ АРМЕНИИ

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Аннотация. *В статье исследуется динамика валютного курса на примере современной национальной валюты Армении. Определяется возможность построения эффективной модели валютного курса на основе относительно надежных показателей. Выявлена слабая корреляция между валютным курсом и фундаментальными факторами экономики, что объясняется заметной долей теневой экономики. Доказано, что оценка динамики курса за короткий промежуток времени при использовании фундаментальных знаний экономики и эконометрических инструментов — возможна.*

Ключевые слова: *валюта; Армения; ключевые факторы экономики; эконометрическая модель; экономический прогноз*

1. Introduction

1.1. The Republic of Armenia in EAEU

Armenia — industrial-agrarian country. It has significant reserves of copper and molybdenum and polymetallic ores, building stone, mineral waters, deposits of precious metals, semi-precious and precious stones. Also, the country has large agriculture development and it plays a significant role for GDP index.

Armenia's economy is one of the fastest growing in the former USSR. In the context of a complex and rugged terrain, Armenian economic activity is concentrated about 60% of the territory of Armenia. Approximately 75% of the gross domestic product as of 2004 was carried out in the private sector. Also, the economy relies on large taxpayers, which are related to the heavy industry.

Speaking about The Eurasian Economic Union, it has an integrated single market of 183 million people and a gross domestic product of over 4 trillion U.S. dollars. The EAEU introduces the free movement of goods, capital, services and people and provides for common policies in the macroeconomic sphere, transport, industry and agriculture, energy, foreign trade and investment, customs, technical regulation, competition and antitrust regulation. Provisions for a single currency and greater integration are envisioned in future. The union operates through supranational and intergovernmental institutions. The Supreme Eurasian Economic Council is the "Supreme Body" of the Union, consisting of the Heads of the Member States. The second level of intergovernmental institutions is represented by the Eurasian Intergovernmental Council (consisting of the Prime Ministers of member states). The day-to-day work of the EAEU is done through the Eurasian Economic Commission as an executive body, which is a supranational body similar to European Commission.

In this paper, I will analyze some statistical data from public resources and try to make some guesses about the influence of different factors on the general index of country's economy. Also, before that, I'll write some notes about the general situation in Armenia: what is current situation in the republic? What socio-economic problems it has? What government does to change in the situation.

1.2. Armenian currency exchange rate policy

In the Armenian Republic, there is a Central Bank in charge of monetary policy (Central Bank of Armenia). Central Bank is aimed at improving the reliability and international prestige of drama RA through the effective management of foreign exchange reserves of the Republic of Armenia, the creation of a favorable legal framework for the economic current currency operations and capital flows, as well as for foreign investors. Principles of operation of the monetary system, and a framework of legislative regulation developed an appropriate exchange rate regime was introduced for the realization of these goals.

Though, Central Bank of RoA has a policy of floating exchange rate, which is in harmony with the principles of the liberalization of capital account transactions, and an independent monetary policy. The Central Bank participates in the foreign exchange market operations based on the goals of monetary policy. Based on the mature foreign exchange market exchange rate of the Central Bank publishes the average exchange rates of the national currency — dram against foreign currency.

Also, Armenia has currency legislative protocol. Currency legislation is a set of legal rules that define the procedure and conditions of foreign exchange operations in the Republic of Armenia, the order currency values, the ownership and use, as well as control over the observance of the currency legislation of the Republic of Armenia.

1.3. Choice of statistical data: exogenous and endogenous factors

In my analytical work, I have gathered many different exogenous and endogenous factors for my analysis, like Volume of Shadow economy within the country, its percentage from GDP, bank rate of Armenia and USA, the GDP of these 2 countries, import and export of Armenia, unemployment rate, price for gasoline, commodity turnover, foreign debt, index of industrial production (IIP) and some other ones.

In the context of a complex and rugged terrain, Armenian economic activity is concentrated about 60% of the territory of Armenia. Approximately 75% of the gross domestic product as of 2004 was carried out in the private sector. The largest taxpayer of the country for the year 2011 is the Zangezur (Kajaran) Copper-Molybdenum Combine.

Chosen factors for econometric model

exchange rate for $	GDP ARM bln	GDP USA bln	Bank r. ARM
588.2961587	1.9116	10284.8	25
574.8580798	2.1185	10621.8	25
565.9364167	2.3763	10977.5	21
560.7748748	2.8071	11510.7	18
535.9774026	3.5766	12274.9	13
454.2680578	4.9005	13093.7	12
439.8805345	6.3845	13855.9	11
361.309036	9.2063	14477.6	10
305.2572602	11.662	14718.6	12
362.1265046	8.6479	14418.7	8.75
373.3955725	9.2603	14964.4	7.75
372.3657411	10.1421	15517.9	8
401.7705282	10.6193	16155.3	8.25
409.8676446	10.1215	16663.2	8.25
415.5475621	11.6444	17348.1	8.25
477.8508795	10.5614	17947	8.25

For Armenia, it was difficult to choose factors to check the influence on the exchange rate for the dollar. Many trials were made, but finally, the model was complete (*table 1*).

For my working model, I have GDP of USA and Armenia, Bank rate of USA as X parameters. As for Y − I took exchange rating of AMD for a dollar.

2. Econometric model

Econometric models are statistical models used in econometrics. An econometric model specifies the statistical relationship that is believed to hold between the various economic quantities pertaining to a particular economic phenomenon under study. An econometric model can be derived from a deterministic economic model by allowing for uncertainty, or from an economic model which itself is stochastic. However, it is also possible to use econometric models that are not tied to any specific economic theory. And this is exactly the case.

2.1. Model specification

The model I have already written what factors I have taken in my econometric model in order to make a proper analysis. The perfect explanation for this combo of factors might be that the currency of US is perfectly correlated with its economy. The Bank rate of the US has an inverse correlation with the model, because lower bank rate causes

Results of t-statistics

	Coefficients	Standart error	t-statistics	P-value
Y-intersaction	149.7386969	245.5742864	0.609749087	0.557106882
GDP ARM bln	40.43506426	6.436858695	6.281800826	0.000144068
GDP USA bln	0.054639053	0.0183058	2.984794534	0.015329842
Bank r. ARM	9.89243337	3.079091318	3.212776871	0.010611564

more commercial banks to borrow money. More money in commercial banks with lower interest rates causes higher demand for issued investment capital, which is essential for a start-up business, small and medium businesses. Higher investment capital causes greater GDP of the state. That is the short explanation for "GDP of US" and "Bank rate of US" factors.

GDP of Armenia also has a negative correlation with the model. This factor can be perfectly explained by general logic. The greater GDP of the country is the greater value its currency has. So, if the value of AMD (dram) currency is greater, it takes less AMD to buy 1 dollar.

3. Test of the model

In the analysis of economic phenomena on the basis of economic and mathematical methods occupy a special place model, revealing the quantitative relation between the studied parameters and factors influencing them. Scientific disciplines, the subject of which is the study of the quantitative aspects of economic phenomena and processes by means of mathematical and statistical analysis, econometrics is, in which the results of the theoretical analysis of the economy are synthesized with the conclusions of mathematics and statistics. The main objective of econometrics is testing the economic theories on factual (empirical) material using methods of mathematical statistics.

The main tool of econometrics is the econometric model, i.e. economic-mathematical model of factor analysis, the parameters of which are estimated by means of mathematical statistics.

This model serves as a tool for analysis and forecasting of specific economic processes based on real statistics. When I was establishing factors for a working model, many of tested in Excel combinations for general economics did not work. For example, the general relationship between such factors as domestic GDP, Bank rate, the price for petrol and Import and Export relationship did not work out. This can be because of a large share of the shadow economy in Armenia. Its value jumps over 40 to 60% from GDP. Because of this, many public statistics that I managed to find were 'painted' by independent agencies, not basing on the real situation in the country.

3.1. T-test

A t-test is any statistical hypothesis test in which the test statistic follows a Student's t-distribution under the null hypothesis. It can be used to determine whether two sets of data are different from each other or not.

A t-test is commonly used when the test statistic would have a normal distribution if the value of the term in the statistic was discovered. When the scaling term is unknown and is replaced by an estimate based on the data, the test statistics (under certain conditions) follow a Student's t distribution.

T-test is considered to be the test for the relevance. If value of coefficients of their factors of t is higher than critical one. My critical t is 2.23. And as you can see in the table above, all coefficients have T-test statistics higher than critical. T-test considered to be passed.

3.2. Fisher test

An F-test is any statistical test in which the test statistic has an F-distribution under the null hypothesis. It is usually used when matching statistical models that have been added to a data set, in order to identify the model that best fits the population from which the data were sampled. Exact "F-tests" mainly arise when the models have been fitted to the data using least squares.

The F-test in a one-way analysis of variance is used to assess whether the expected values of a quantitative variable within several pre-defined groups differ from each other. The advantage of the F-test is that it does not require pre-determine which treatments are to be compared, and we do not require adjusting to take multiple comparisons. The disadvantage of the F-test is that if we reject the null hypothesis, we do not know which treatments can be said to be significantly different from the others, nor, if the F-test is performed at level α, can we state that the treatment pair with the greatest mean difference is significantly different at level α.

F	F Relevance
98.69070058	3.3247E-07

Simply speaking, F-test shows whether the factors that were chosen right. If F critical is less than the real F. In our case, F-test is considered to be passed.

Summary

Despite of these strong relationships between the agricultural style of living and mineral dependence of the Armenian economy, the model did not show any strong correlate with this factors and exchange rate. My only explanation of this fact is that share of the shadow economy is relatively high (it would better say enormously high). It's about 40–60% of GDP. So, many factors of statistics, which were taken, are 'painted' and don't have any correlations with the real situation. The situation with the Armenian economy is rather shadowy.

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