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ABSTRACT

of the dissertation for the degree of Doctor of Philosophy

THE ECONOMIC MECHANISM OF ENSURING CURRENCY-RATE STABILITY OF THE NATIONAL ECONOMY

Speciality:	5310.01 – World Economy
Field of science:	Economic sciences
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GENERAL CHARACTERISTICS OF THE WORK

The actuality of the dissertation and degree of learning the problem. Ensuring macroeconomic stability is the main goal of every state. The exchange rate of the national currency relative to the currencies of foreign economic partners, as well as the currencies used for international settlements, is of particular importance. Thus, import and export activity, among other factors, also depends on the exchange rate. On the other hand, the exchange rate also affects the cross-country capital flow. Considering the importance of foreign direct investment for economic growth, it becomes clear how important exchange rates are for national economies.

Achieving macroeconomic stability in the national economy in the conditions of globalization of the world economy is accompanied by certain problems. Financial crises occurring on a global scale do not affect macroeconomic stability in every country, including Azerbaijan. One such impact was the 2008 financial crisis. The financial markets of Azerbaijan managed to get out of this crisis with minimal losses. However, the sharp drop in the price of crude oil in the world market since July 2014 did not affect the exchange rate of the manat. Azerbaijan devalued the manat more than twice. This event revealed the weak sides of Azerbaijan's economy. One of these weaknesses is related to the instability and ineffectiveness of the foreign exchange intervention policy.

The devaluation of the manat in 2015 highlighted the importance of implementing an effective exchange rate policy in the country. However, the Mundell-Fleming trilemma argues that there is no universal recipe for maintaining key macroeconomic indicators at an appropriate level. So, the improvement of any indicator, as a rule, leads to the deterioration of another indicator or indicators. Therefore, it is important to select a more priority indicator for the strategic development of Azerbaijan's economy.

It should be noted that the known theoretical generalizations and practical results of representative studies cannot be the basis for concrete action in any country. For example, the theory confirms that the depreciation of the national currency increases the competitiveness

of local goods and services. A 2015 IMF study concluded that a 10 percent depreciation of the real effective value of the currency in the economy is associated with a 1.5 percent average increase in real net exports in GDP. Based on such results, some researchers suggest using devaluation as a means of economic growth. But there are many practical examples that question the effectiveness of this tool. Moreover, this can be observed not only in the economy of developing countries, but even in the economy of developed countries. For example, devaluation in Japan after the 2008 global financial crisis not only did not increase exports, but decreased them.

Thus, we can argue that the expected results in determining the exchange rate depend on the specific characteristics of the country. Therefore, the provision of currency stability in Azerbaijan should be studied by taking into account the current and prospective development strategy of our country. One of the important directions of such studies is related to the evaluation of the interaction of the exchange rate and other macroeconomic indicators.

Theoretical generalizations about the interaction of the exchange rate with other macroeconomic indicators have been reflected in various studies.

Theoretical studies on exchange rate formation and its interaction with other macroeconomic indicators investigated by Mouhamed A., McKinnon R.I., Whelan K., Clark P.B., MacDonald R., Lyons R.K., Edwards S., Anupam M., Varun R. ., Volcker P.A., Yeager L.B., Boughton J.M., Mundell R.A., Black F., Frazier L., Pettinger T., Tobin J.A., Spahn P.B., Habermeier K, Kokenyne A., Veyrune R., Anderson H., Obsfeld and etc.

Empirical studies related to this problem were also conducted in the case of Azerbaijan. The studies of the Central Bank of the Republic of Azerbaijan (CBA), the International Monetary Fund (IMF), including the studies of M. Albino-War and B. Quill regarding currency stability in Azerbaijan are noteworthy. The main subject in the empirical studies conducted on the case of Azerbaijan was the changes that may occur in the national currency exchange rate as a result of the large amount of oil revenues entering the country. F. Qanbarov, F. Hasanov, F. Huseynov, O. Guliyev and etc. İnvestigated

the effects of oil revenues on the exchange rate. M. Sh. Garayev, I.V. Khan-Khoyskaya, A.M. Bagirova, O. Babashov, S. Aliyev, R. Hasanov, Sh. Mukhtarov, Y. Yuksel, E. Ibadov, G. Hamidov and others studied the macroeconomic effects of devaluation. Sh. Hajiyev, M. Gulaliyev, D. Valiyev, I. Karimli, Z. Mammadov, A.A. Alakbarov, Sh. Bayramov and other researchers studied the interaction between the exchange rate and Azerbaijan's foreign economic relations.

The object and the subject of the study. The object of the study is the exchange rate policy implemented in Azerbaijan. The subject of the study is the assessment of the impact of exchange rate shocks on the main macroeconomic indicators.

The main question of the research: How do exchange rate shocks in Azerbaijan affect the country's macroeconomic indicators and how prevent from it negative effects?

The purpose and tasks of the study. The aim of the dissertation work is to develop a complex of economic measures that ensure the stability of the exchange rate, which is important for the development of the national economy. In accordance with the purpose of the study, the following tasks were defined:

- Comparative analysis of theoretical approaches to the exchange rate;
- Classification of factors affecting the exchange rate;
- Comparative analysis of various studies on the impact of the exchange rate on the national economy;
- Comparative analysis of theoretical approaches to ensuring the stability of exchange rates;
- Classification of problems related to the regulation of exchange rates;
- Establishing state mechanisms to ensure exchange rate stability.
- Studying the world experience on state regulation of the exchange rate.
- Quantitative assessment of the impact of the exchange rate on macroeconomic indicators;

• Assessment of the impact of the exchange rate shock in Azerbaijan in 2015 on the main macroeconomic indicators of the country.

• Determining the main directions of improvement of the exchange rate policy in Azerbaijan.

Research methodology. During the research, various methods were used, including system analysis, comparative analysis methods, econometric methods, including multivariate regression analysis and statistical analysis. During the study, special attention was paid to shock changes in the exchange rate and non-monetary factors that cause exchange rate shocks. Dialectical and systematic approaches were used in the research process, a number of methods of scientific research were used, for example, structural-functional analysis and synthesis, classification, comparison, generalization, evaluation, etc. has been used.

Information-empirical base of the research. The data of the World Bank, the Central Bank of Azerbaijan and the State Statistics Committee of the Republic of Azerbaijan formed the information-empirical base of the research.

Main provisions submitted for defense.

• Contrary to the results of some studies, the trend of falling prices in world markets is justified (1.2.1).

• The value characteristics of the currency are systematized, and based on this, new definitions of the concepts of "fixed currency" and "fixed exchange rate" are proposed. (1.3)

• The concept of "fixed exchange rate" was defined by the author and its main features were indicated. The concepts of "total fixed exchange rate" and "optimal exchange rate" (1.3) are defined.

• The problems arising from the macro adjustment of exchange rates have been identified and systematized (2.1)

• Circumstances in which inflation in the country can lead to the strengthening of the national currency are described and justified (2.2)

• The unreasonableness of the negative attitude towards additional money emission, as well as the expediency of the synthesis

of emission and foreign borrowing for the payment of the public debt are justified. Based on this, a proposal to cover the budget deficit is put forward (2.2).

• The impact of the exchange rate on the volume of GDP was evaluated based on cross-country cross-sectional data. (3.1.2 in full).

• The reasons for the weak reaction of exports to the shock devaluation of the national currency have been determined (3.1.2, model 2).

Scientific novelty of the dissertation. The scientific innovations of the study are as follows:

• The negative impact of the non-systematic approach to economic growth in monetary policy is justified. In particular, the necessity of selecting and regulating foreign investments (1.2.1) is justified.

• The reasons for the correlation between the real exchange rate and economic growth are determined. (2.1, Clause 6)

• The problems arising in the quantitative assessment of the impact of the exchange rate jump on other economic indicators have been identified (3.1.1).

• The effects of the devaluation of the national currency on imports and exports in developing countries were studied (3.1.2, model 2).

• Taking into account the characteristics of the economy of Azerbaijan, the uniqueness of the impact of the devaluation of the Manat against the dollar on the import activity in Azerbaijan and the deviations from the existing theory are justified;

• Proposals for mitigating the negative effects of exchange rate shocks have been developed (3.3.3).

Theoretical and practical significance of research. Generalized proposals on exchange rate adjustment and reduction of negative effects of shock fluctuations can be used by the government and the Central Bank to improve monetary, fiscal and foreign economic policies.

Approval and application. The main provisions of the dissertation are reflected in ten scientific works published in scientific

journals recommended by the Higher Attestation Commission, in the materials of 7 articles and 3 conference materials (2 of scientific works published abroad). Some of the results obtained during the research were used for the evaluation of import operations in the McDonald's Azerbaijan company. A letter about this was addressed to Western Caspian University from McDonald's Azerbaijan company. Also, some results obtained during the research were proposed for practical use in the "Economic evaluation of projects" department of the Scientific-Research Project Institute of SOCAR. There is an execution certificate about it.

The name of the institution where the dissertation work was conducted. Dissertation work was performed at the Western Caspian University.

The total volume of the dissertation, taking into account the volume of its individual structural formations in signs separately, the total volume of the dissertation with signs. Dissertation work (263896 characters) consists of introduction (12927 characters), 3 chapters (211021 characters), including chapter I (74444 characters), chapter II (69959 characters), chapter III (66618 characters), conclusion (13972 characters), literature consists of list (17851 characters) and appendices (6326 characters). The volume of the dissertation is 221342 characters, excluding figures, tables and the list of references.

The structure of the dissertation

Introduction

Chapter I: Theoretical issues of the exchange rate and its effects on economic growth

1.1. Theoretical issues of the exchange rate, factors affecting it

1.2. Conceptual foundations of the effects of exchange rates on the national economy

1.3. Theoretical foundations of exchange rate stability

Chapter II: Economic mechanisms of currency risk regulation in the context of sustainable development of the national economy

2.1. Problems arising during the macro-regulation of the exchange rate

2.2. State mechanisms for ensuring the stability of the exchange rate

2.3. Experience of state regulation of exchange rates

Chapter III: Quantifying the effects of the exchange rate on the economy and mitigating its negative effects

3.1. Quantitative assessment of the effects of the exchange rate on macroeconomic indicators;

3.2. Assessment of the impact of the 2015 exchange rate shock on macroeconomic indicators;

3.3. Directions for improving exchange rate policy in Azerbaijan

Conclusion and suggestions

Reference list

Supplements

Provisions submitted to the defense

The first chapter analyzes "Theoretical issues of the exchange rate and its impact on economic growth". In this chapter there were investigated a) theoretical issues of exchange rates, the consequences of their change, as well as factors affecting the formation of exchange rates; b) conceptual bases of the influence of the exchange rate on the national economy; c) the theoretical foundations of exchange rate stability.

First provision: There is a downward trend in real prices in international trade. The main reasons for this are a) expansion of competition, b) development of production technology, c) flexibility of import and export, d) Antimonopoly legislation, e) liberalization of foreign relations.

Although perfectly competitive segments account for a small portion of world trade, the majority of goods and services traded in the world belong to a monopolistically competitive market or oligopolistic structure. Although these are not perfectly competitive markets, fierce competition exists in today's world and in these markets. Such competition ultimately leads to a significant reduction in prices.

Competition chases innovative products. A prime example of this is the smartphone market. History shows that despite international agreements on copyright and patent law, even Apple's monopoly in this segment did not last long, and the Apple-Samsung duopoly was even shorter-lived. A similar situation exists in other innovative markets, including the pharmaceutical market.

The diffusion process of innovative products plays an important role here.

The second important factor stimulating the reduction of prices in both domestic and world markets is the improvement of production technologies. Over the past decades, technological improvement has been developing at a high pace. The USA, Western European countries, Japan, Singapore, South Korea, Israel and other developed countries allocate a large amount of funding to the development of science and education.

A good example of the impact of technology on world prices is computers, mobile phones, various types of television equipment, etc. are products based on information and communication technologies.

The third important factor that lowers the real prices of products in the world market is the elasticity of exports and imports. The high price elasticity of goods and services in the modern world is primarily due to fierce competition in all product segments. Modern consumers have a wide choice not only among manufacturers of products with the same name, but also among well-known brands. Substitutability prevents producers from raising prices.

One of the factors affecting the decrease of real prices in the world market is the existence of anti-monopoly laws in some developed countries. Such laws prohibit the formation of cartels and deals between producers and prevent price increases.

One of the processes that has an important impact on the expansion of competition, technological diffusion, import and export activity in the world market is the liberalization of foreign trade. All aspects of globalization have an important impact on the expansion of this process. The role of the World Trade Organization (WTO) as an institutional body should be specially mentioned. If all countries become members of the WTO, equalization of the price of both goods and services and labor is possible.

Second provision: "Stable currency" usually means the stability of the value of a currency relative to goods and services, and "fixed exchange rate" means the stability of its value relative to another currency (or set of other currencies).

First, it is necessary to define the concept of "fixed exchange rate". Since the term "stable currency" is often used in scientific literature, it is useful to clarify this issue first. This is extremely important given that the misuse of these terms can cause confusion. We can mention at least the following four different values of money:

1. Consumption value of currency. This is true of commodity money, the consumption value of modern fiat money is almost zero.

2. Value of currency relative to goods and services. This value depends on how many goods and services can be purchased for a given single currency. Accordingly, this ability (or strength) of a certain

currency is manifested in the market of goods and services. When the set of these goods and services is limited to the consumption basket, the change in the value of the currency relative to the goods and services is measured by the rate of inflation.

3. The value of the currency relative to another currency. As is clear from this statement, it depends on how much other specific currency can be bought for the value of a given currency unit. Accordingly, this ability (or strength) of a particular currency is manifested in the foreign exchange market and is called the exchange rate.

4. Investment value of money. This is the ability of the currency to bring income to its owner. In economics, the subjective definition of this value leads to the concept of opportunity cost of money (opportunity value), but the universal objectified approach measures it either with average credit rates or with indices of some financial market. In most cases, however, the investment value of a currency is measured by interest rates and determined in the financial or capital markets.

The third provision: There is a need to specify the concepts of "fixed exchange rate", "aggregate fixed exchange rate" and "optimal exchange rate".

In the dissertation work, the concepts of "Fixed exchange rate", "aggregate fixed exchange rate" and "optimal exchange rate" were given new and essentially somewhat different definitions in the economic literature.

Definition 1. Following the general definition of the concept of "stability", by exchange rate stability we mean the following two options:

1. A specific exchange rate is called "stable" if it is stable relative to the major currencies of the world.

2. The exchange rate of a certain currency is called "fixed" if its effective exchange rate is actually fixed.

It is clear that the concept of "stability" used in these judgments should also be defined. For this purpose, we apply the definition of stability from mathematics, which is adequate for this case.

Definition 2. The exchange rate is considered stable relative to any factor if a slight change in this factor leads to a slight change in the exchange rate.

Definition 3. The concept of aggregate stability of the exchange rate can be presented, which expresses the stability of the exchange rate relative to all factors. However, this definition is only theoretical, such an exchange rate is practically impossible for floating regimes.

The definitions we offer have a number of advantages:

• First, they are concrete.

• Second, they are consistent with accepted approaches in economic theory and practice.

• Thirdly, they make it difficult to use the concept of "fixed exchange rate". Namely, in most cases the meaning of this concept is assumed to be intuitive, but in our definition it is made concrete.

• Fourthly, such an approach allows for the formalization of the definition, facilitates its study and brings rigor to it. Let's demonstrate this formalization. Consider the exchange rate as its determinant function:

$$er = f(\pi, r, s, \Delta c, p, bop, d, gi, \Delta gdp, pol\_sit, conf, tt, etc)$$

here er -is the exchange rate; π – inflation; r - interest rate; s-speculation level; Δc – change of competitiveness; p-the relative strength of other currencies; bop-balance of payments; d - public debt; gi- level of state intervention; Δgdp-level of economic growth; pol_sit - political situation; conf - trust level; tt – trade condition; etc - refers to other factors.

The following remarks can be noted here:

1) The stability of our definition with respect to any of these factors implies a continuous function with respect to this factor.

2) Aggregate stability is continuous across all variables.

3) The stability of the exchange rate relative to any factor during the determination of the price of the exchange rate does not mean the stability of its other prices.

4) As can be seen from the meanings of determinants, some of them are not quantitative in nature. To apply a function using the scaling method, you need to set a numerical value, which can be done.

5) By definition, the fixed exchange rate and the currency corridor regime are aggregate stable.

6) In the absence of correlation between factors, the issue of ensuring aggregate stabilization becomes complicated.

7) In our proposed definition, the stability of the exchange rate implies a slight change in the value of the factor. Of course, with its significant change, the exchange rate can change dramatically.

8) In order to study the effect of specific factors on the exchange rate, including the issue of stability on the given factor, the ceteris paribus hypothesis, which is widely used in economic research, can be applied to the proposed function, i.e., the assumption of determining other variables.

9) Finally, note that the given function is not abstract - it will be studied in the next sections using econometric methods.

Definition 4. The exchange rate that ensures the greatest sustainable economic growth will be called the optimal exchange rate.

Obviously, this definition is less constructive, but, in our opinion, it accurately expresses the meaning of a fixed exchange rate.

In the second chapter entitled "Economic mechanisms of currency risk regulation in the conditions of sustainable development of the national economy" were studied a) problems arising from macro-regulation of exchange rates; b) state mechanisms ensuring exchange rate stability; c) the experience of state regulation of exchange rates. The provisions provided for defence in this chapter are as follows:

Fourth provision: Problems such as the Mundell-Fleming trilemma, Growth and volatility of financial markets, Audible noise, Strategy selection, Rational course determination, and Synchronicity confusion arise during the macro-adjustment of exchange rates.

1. Mundell-Fleming trilemma - it is impossible to ensure the following at the same time: a) independent monetary policy; b) fixed exchange rate and c) free movement of capital. The Mundell-Fleming trilemma is also called the impossible trinity.

2. Growth and volatility of financial markets. Huge sums of so-called "hot money" frequently flow from one country to another in search of high interest rates, destabilizing exchange rates.

3. Audible noise (noise) - is called "noise" in scientific literature. This effect has increased with the development and widespread use of the Internet and digital technologies, including the speed with which noise spreads in financial markets.

4. Strategy selection. There are two popular approaches to using exchange rates to stimulate economic growth; a) Promotion of stability and b) promotion of competition, the use of which creates specific obstacles to economic growth.

5. Determining a rational course.

6. Confusion of synchronicity. This term comes from econometrics and refers to the problem of determining variables (parameters) according to the classification of exogeneity and endogeneity. The point is that in econometric models (hence the judgments derived from these models) some factors are exogenous, i.e. given from outside (i.e. fixed), and some are considered endogenous, i.e. calculated within the framework of the model. But if there is a correlation between exogenous and endogenous factors, the calculated value of the latter and the a priori fix, which is assumed to be practically constant, that is, the exogenous parameter, are assumed to be unchanged. That is, a paradox emerges, expressed in econometrics by a mixed assessment, and in real life by the inadequacy of political decisions.

The fifth provision: Although the Central Bank's inflation targeting leads to the strengthening of the national currency, it is necessary not to overdo it - it is enough to keep the inflation level slightly lower compared to competitors, otherwise the contribution of very cheap exports to economic growth will be quite low.

There are two situations in which inflation can cause the national currency to appreciate.

1) If the product (or service of this country) is rare or unique and demanded by foreigners, when it becomes more expensive, partners have to pay more in the currency of this country, and accordingly, the

demand for this currency increases, which leads to an increase in its exchange rate. happens.

2) If the product is not unique (that is, there is a substitute for it in other countries) and if it becomes more expensive than its competitors, but remains cheaper than their selling price, the amount of demand for it will not change, but will be greater. Manat will be required for its purchase, i.e. demand for manat will increase and its exchange rate will rise.

The sixth prvision: The synthesis of options for additional issuance of national currency and borrowing from foreign agents is appropriate for the stability of the exchange rate. This will have a minimal impact on both the exchange rate and the interest rate, but inflation will not be avoided. But according to the Mundell-Fleming trilemma, this is natural.

1) Additional issuance of national currency. If the state wants to avoid the strengthening of the national currency, this is the only way. It is considered unpopular because it is not recommended by the International Monetary Fund (IMF), whose main argument is to spur inflation through an increase in the money supply.

But we need to dwell on this issue in more detail. First, IMF recommendations have repeatedly failed in various countries. Secondly, this organization is organized according to the principle of "joint-stock company" in which the main share belongs to the USA and Western Europe, and accordingly serves the interests of these countries. In particular, one of the main tasks of the IMF is to receive income in the form of interest on the given debts. Thirdly, it is known that the IMF imposes heavy (in some cases slave-like) economic and often political conditions on the countries when they give loans. Fourth, if the government is confident that it will cope with inflation and prevent hyperinflation, then even double-digit (but controlled) inflation is not a threat, but can be conducive to economic growth. Fifth, additional issuance devalues the national currency, which will lead to increased exports and economic growth.

2) Borrowing from foreign agents. Of course, at this time the debt is taken in foreign currency, most of it is exchanged in the domestic market. In most cases, because of the large amount of

borrowing, the supply of foreign currency in the domestic currency market increases significantly, which leads to the strengthening of the national currency.

In the third chapter entitled "Quantitative evaluation of the impact of the exchange rate on the economy and the main directions of mitigating its negative consequences" were investigated a) quantitative evaluation of the impact of the exchange rate on economic indicators was carried out; b) the interaction effect of the exchange rate shock of 2015 with the main macroeconomic indicators of the country was revealed; c) The main directions of improvement of the exchange rate policy in Azerbaijan. In this chapter, the following provisions are introduced for defence.

Seventh provision: If the fixed exchange rate of the dollar doubles, then the nominal GDP in national currency will grow at an average rate of 20% faster than the previous year.

Our study did not reveal a significant effect of a strong change in the dollar exchange rate on the country's nominal GDP in dollar terms. At the same time, there is a fairly high positive correlation between the jump in the exchange rate of the US dollar and the nominal GDP expressed in national currencies, which manifests itself more clearly in the following year.

The direct dependence of nominal GDP growth (denominated in the national currency) on the exchange rate of the US dollar in the following year is also reflected in the econometric model we built (1):

$$GDP\_GR\_1 = 0{,}89 + \underset{(0{,}06)}{0{,}21} \cdot ER\_GR, \qquad R^2 = 0{,}39 \qquad (1)$$

where GDP_GR_1 is the nominal GDP in national currency in the next year, ER_GR is the exchange rate of the US dollar.

First of all, we note that according to statistical characteristics, the model expressed by equation (1) is adequate. Thus, the value of the coefficient of determination $R^2 = 0{,}39$ shows that there are other important factors affecting the growth of nominal GDP. This result is natural. Thus, there are many other factors that affect the GDP volume. However, the p-value of the C(2) coefficient proves that the H_0 hypothesis is rejected even at the 1% significance level.

Autocorrelation is also absent in the model. Thus, the Durbin-Watson coefficient is within the permissible range (DW = 2.25).

Thus, it can be accepted that the model is adequate. That is, it can be concluded that one unit increase in the dollar exchange rate index leads to a 0.2 unit increase in the nominal GDP index.

The eighth provision: the exchange rate of the Azerbaijani manat to the US dollar is negatively dependent on the ratio of exports to imports.

We are primarily interested in the determining factors of the exchange rate. The decisive role of the balance of payments in the formation of the exchange rate is known as a textbook fact. Azerbaijan is no exception.

As in the previous section, we use the ratio of exports to imports as an indicator, not the trade balance.

Comprehensive analyzes have shown that the peak of the effect of the ratio of exports to imports on the exchange rate is expected by a three-month lag (lag). As expected, the exchange rate of the US dollar depends negatively on the ratio of exports to imports (2):

$$EXCH\_RATE\_OFF = 1{,}58 - \underset{(0{,}06)}{0{,}17} \cdot EXPORT(-3)/IMPORT(-3) \quad (R^2 = 0{,}28) \quad (2)$$

Here, EXCH_RATE_OFF is the official exchange rate of the US dollar to the manat;

EXPORT(-3) – is the volume of exports in the last three months in US dollars (million US dollars);

IMPORT(-3) – is the volume of imports in the last three months in US dollars (million US dollars);

This linear model can be considered adequate. Thus, the regressor coefficient is significant at the 1% interval. The main reason why the coefficient of determination in this model is small ($R^2 = 0.28$) is the high intervention of the Central Bank in the formation of the official exchange rate of the dollar in Azerbaijan. The level of autocorrelation in this model is also high (DW = 0.58).

The model shows that a one-unit increase in the ratio of exports to imports causes the US dollar to depreciate by 17 cents. Considering

that the average value of the ratio of exports to imports in the used time series is 1.5.

It makes sense to check the result obtained in the linear model using the logarithmic model. Based on econometric calculations, we can express the logarithmic model as follows:

$$\ln(EXCH\_RATE\_OFF)=0{,}33-0{,}27\cdot\ln(EXPORT(-3)/IMPORT(-3)) \quad (R^2=0{,}28) \quad (3)$$
$$(0{,}09)$$

As can be seen, the statistical properties of this model are better than the linear model: the t-statistic is larger (in absolute value), the coefficient of determination (R^2=0.31) is higher, and the sum of the RSS residuals is almost twice as small as compared to model 2 (1.54 vs. 0.94).

According to the 3rd model, a 1 percent increase in the ratio of exports to imports causes the dollar to depreciate by 0.27 percent relative to the manat. A corresponding comparison shows that this is fully consistent with the conclusion of the linear model.

The exchange rate of the manat against the US dollar is one of the important factors of inflation. An increase in the dollar exchange rate by 1 manat increases the inflation rate by 13%.

Analyzing the effect of the manat exchange rate against the dollar, as well as the non-oil real effective exchange rate on inflation, we came to the conclusion that the exchange rate against the dollar has a serious impact on inflation. The model is adequate. So, the coefficient of determination R^2= 0.96. The t-statistic is quite high (t=24.0), there is no autocorrelation (Durbina-Watson coefficient=1.91). We can express the model mathematically as in equation (4):

$$CPI = -9{,}8+13{,}1\cdot EXCH\_RATE\_OFF, \quad (R^2 = 0{,}96) \quad (4)$$
$$(0{,}55)$$

where CPI is the consumer price index, EXCH_RATE_OFF is the exchange rate of the manat against the US dollar, expressed in manats.

The assessment of the impact of the non-oil real effective exchange rate of the manat on inflation is also important. Thus, as oil has the main share in Azerbaijan's export, non-oil products dominate

in import as well. We can express the model as in Equation 5. Note that the model is adequate. Thus, the coefficient of determination is high ($R^2 = 0.87$), the hypothesis H_0 is rejected at a confidence interval of 1% for the coefficient of the regressor.

$$CPI = 28{,}8 - 0{,}21 \cdot EX\_RATE\_\_RENO \quad (5)$$
$$(0{,}02)$$

Here, EX_RATE__RENO represents the non-oil real effective exchange rate of the manat, CPI - consumer price index.

According to model (5), when the non-oil effective exchange rate of the manat increases by one unit, the consumer price index decreases by 0.2 percentage points.

There is a positive relationship between the exchange rate of the US dollar relative to the manat and the volume of non-oil exports 3 months later (lag=3). That is, as the manat becomes cheaper compared to the dollar, the export of non-oil products from the country is stimulated.

Econometric calculations show that the model of regression dependence between the official exchange rate of the dollar relative to the manat and the volume of non-oil exports 3 months later is significant at a 1% confidence interval (p-value= 0.0047). Although the coefficient of determination is not high, it explains 31% of the variance of the dependent variable, i.e. non-oil exports. The absence of autocorrelation is one of the facts that prove the adequacy of the model. Thus, we can express the regression dependence between these two indicators as in the following equation (6):

$$EXP\_NOIL = 34{,}3 + 86{,}2 * EXCH\_RATE\_OFF(-3) \quad (R^2 = 0{,}31) \quad (6)$$
$$(27{,}4)$$

EXCH_RATE_OFF – is the exchange rate of US dollar to manat

Thus, left part of this model, t.e. dependent variable EXP_NOIL is the volume of Azerbaijan's non-oil exports in manats.

Thus, if the exchange rate of the dollar against the manat increases by 10 kopecks, then the country's non-oil export can increase by an average of 8.62 million manats.

Conclusion and suggestions

The following results were obtained during the study:

1. The degree of autonomy of the monetary policy of the Central Bank is directly proportional to the degree of liberalization of the foreign exchange market: the stricter the exchange rate control, the lower the degree of autonomy of the monetary policy;

2. The policy of maintaining a specific real exchange rate through monetary policy instruments cannot be effective in the long term, such as inflation, if we do not consider the effects on the main indicators of the economy.

3. Uncontrolled entry of capital into the country, revaluation of the national currency may have a negative impact on economic growth in the medium term. Therefore, selective application of capital controls is necessary to limit their inflows. Malaysia has one of the best practices in this regard.

4. The strengthening of the national currency requires a positive trade balance, which can be achieved by increasing exports and decreasing imports, where national goods and services have a competitive advantage;

5. In countries with an inflexible or partially flexible exchange rate regime, including Azerbaijan, it is difficult to apply statistical and econometric methods when evaluating the interaction of the exchange rate with other macroeconomic indicators due to the low volatility of the exchange rate over time;

6. Cross-country cross-regression analysis showed that if the fixed exchange rate of the dollar suddenly doubles, then the nominal GDP expressed in the national currency will increase on average by 20% faster than the previous year. However, in the second year, this effect not only does not continue, but is negative. This is understandable: since most of the growth occurs in the first year, relatively low growth in the second year compared to very high growth in the first year can lead to a negative correlation.

7. The devaluation of the national currency in developing countries is initially accompanied by a decrease in both imports and exports. On the other hand, it should be taken into account that in some

(mainly high-tech) segments, developing countries are dependent on imports, which slows down the pace of import decline. All these cases show the futility of studying the effect of national currency devaluation on import and export separately. Therefore, it is more appropriate to study the effect of the devaluation of the national currency on the ratio of exports to imports. Our analysis showed that for our sample this effect is more pronounced in the second year after the devaluation.

8. Based on the example of devaluation in Azerbaijan in 2015, it became known that:

• One unit increase in the ratio of export to import leads to a decrease of the exchange rate of the US dollar by 17 cents. If we take into account that the average value of the ratio of export to import in the used time series is 1.5, then one unit increase of this indicator means an increase of almost 1.6 times.

• A 1 percent increase in the ratio of exports to imports causes the dollar to fall by 0.27 percent.

• An increase of 1 manat in the exchange rate of the dollar leads to an increase in inflation by 13 percentage points;

• A 1% increase in the dollar causes a 3.25% increase in the consumer price index (CPI);

• One unit increase in the exchange rate of the manat lowers the CPI by 0.2 points. At this time, imports, which have a strong impact on consumer prices, become cheaper in terms of manat.

• The export elasticity of GDP is 0.91, which means that a one percent increase in exports is accompanied by a 0.91 percent increase in GDP (in manat).

• The elasticity of Azerbaijan's non-oil GDP for total export is 0.88, which means that the non-oil GDP increases by 880,000 manats due to an increase of $1 million in exports.

• An increase in the exchange rate of the dollar by, for example, 10 kopecks lead to an average increase in the country's non-oil exports by 8.6 million manats, which seems quite convincing.

• Elasticity of non-oil exports (expressed in manat) with a three-month advance with the official exchange rate of the dollar is 0.7, that is, a 10% increase in the dollar exchange rate leads to a 7% increase in non-oil exports in manat in 3 months.

• The elasticity of dollar-denominated imports to dollar-denominated exports is 0.5.

• the elasticity of imports expressed in dollars in terms of the nominal income of the population is 0.38. That is, a 10% increase in the nominal income of the population increases imports in dollar terms by about 4%;

• The elasticity of imports expressed in manats to exports expressed in dollars is 0.7, that is, a one percent increase in exports in dollars increases imports in manats by 0.7 percent;

• The elasticity of imports expressed in manats with the dollar exchange rate is 1.5, that is, a 1% increase in the dollar exchange rate leads to a 1.5% increase in imports expressed in manats, that is, this dependence is elastic. This conclusion, on the one hand, once again confirms our hypothesis about the dependence of the Azerbaijani economy on imports, on the other hand, the quantitative assessment shows that it is positively elastic even in relation to the exchange rate of the dollar.

9. Since the devaluation of the Azerbaijani manat occurred mainly as a result of the fall in world energy prices, it was accompanied by a negative impact on the GDP expressed in dollars, but depending on the reasons for the devaluation in terms of the manat, the GDP may increase or decrease. For example, immediately after the devaluation shock in 2015, that is, in 2016, real GDP in Azerbaijan decreased by 3.1%, while the average annual growth of real GDP in 2011-2014 was 2.68%.

Based on the results of our research, we can suggest the following principles and directions for improving the exchange rate policy. At this time, the proposed directions can be divided into two blocks: 1) narrow monetary, that is, directly related to currency regulation, and 2) general economic.

1. When determining the exchange rate, it is necessary to target economic growth first. At this time, inflation, employment, etc. macroeconomic indicators such as;

2. It should be taken into account that in addition to the value of the national currency relative to other currencies, there are other values: a) the value in relation to goods and services, that is, the price

level; 2) as the ability to make a profit, i.e. investment value. As for commodity money, in addition, its consumption value.

3. Financial markets need strict control. It was the presence of such supervision that ensured a significant mitigation of the negative consequences of the 2007-2010 crisis, which originated from the financial markets in Canada and Norway.

4. Experience shows that the most effective way to combat rumors in the currency markets is the correct statements of the authorities, first of all, the central bank. Otherwise, the foreign exchange market becomes unstable, and there is a great danger of using rumors not only from local residents, but also from hostile states and other entities.

5. The revaluation of the national currency, which lowers the competitiveness of national goods in world markets, cannot be allowed. There are various means for this.

6. Although the promotion of inflation by the Central Bank leads to the strengthening of the national currency, it is not advisable to be overly burdened in this matter. It is important to keep inflation low compared to competitors;

7. National Bank of Azerbaijan should continue effective policy in the direction of regulating the exchange rate in the small corridor. Such stability is extremely important both for business and to prevent speculative interventions from outside. A transition to a fully floating exchange rate is dangerous at this stage. This can only be possible with the continuous development of the real sector of the national economy.

8. The second block is considered the most important, because the key to stability in the currency market is the stable development of the economy. Thus, the main task facing the country's economy is the general economic task, which is also related to the efficiency of currency regulation, and refers to the diversification of exports. Although this direction of economic policy is not directly related to the features of exchange rate regulation, it is the main direction. First, export diversification is preventive in nature; important to avoid exchange rate shocks: with a wide range of exports, a decrease in price or demand for one or two products will not be as harmful as in the case of mono-exports. Second, export diversification automatically means the production of high-quality and competitive products domestically.

This allows tomitigate the cataclysms after devaluation related to imports.

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