Coordination of Fiscal and Monetary Regulation in Armenia

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ABSTRACT

The aim of the study is to reveal if there is a coordination of fiscal and monetary policies in Armenia, as well as to assess its impact on economic growth in the country. **Methods used**: statistical analysis, logistic regressions, mathematical modeling. The authors analyzed the economic growth rates and annual GDP growth per capita in Armenia from 1990 to 2018. They described the model of coordination of fiscal and monetary regulation. The relationship and interdependence between the monetary and fiscal regulation mechanisms are represented by mathematical equations. Provided are the calculations for the optimal values of fiscal and monetary indicators, as well as economic indicators for Nash equilibrium. **The study results** showed that fiscal and monetary regulation in Armenia is ineffective; there is no coordination of regulatory mechanisms, which is detrimental to the economic growth rate. The authors **conclude** that it is necessary to revise approaches to monetary and fiscal policies for a greater emphasis on coordination and harmonization of macroeconomic regulation instruments to ensure sustainable economic growth in the long term.

Keywords: monetary regulation; fiscal policy; coordination of monetary and fiscal policies; fiscal regulation

INTRODUCTION

The main objective of state regulation is to achieve a high level of prosperity of the population. The experience of many countries shows that harmonization of fiscal and monetary policies, as well as the focus on sustainable economic growth, lead to an increase in the level and quality of life in the country. Besides the common goal, monetary and fiscal policies pursue conflicting goals. Thus, public debt management always defeats the purpose of monetary regulation, aimed at ensuring price stability in the economy.

The theoretical and practical foundations of the balance between fiscal and monetary regulation are well disclosed in the world scientific literature. Yet, exploring a particular group of countries, various authors come to many contradictory conclusions. The main area of research is to find a compromise between GDP growth and unemployment, on the one hand, and ensuring stable and low inflation, on the other hand. Moreover, we take the hypothesis about the need to dominate in either fiscal or monetary policy as a basis.

As a rule, the theory states that the dominance of monetary regulation is preferable. However, the experience of some countries proves that the excessive independence of the Central Bank and its focus on low inflation leads to a slowdown of economic growth. In this regard, the experience of Armenia is as a vivid example [1].

We think that the emphasis should be made on ensuring balanced and coordinated policy by the Central Bank and the government, rather than on fiscal or monetary goals.

In the framework of this study, the task is to determine a coordination model of monetary and fiscal regulation, which will consider the peculiarities of the Armenian economy, and will also be focused on ensuring sustainable economic growth rates.

LITERATURE REVIEW

A wide range of literature is devoted to the issues of coordination of monetary and fiscal policies, including in terms of achieving higher and more sustainable economic growth rates. It is obvious that both instruments of macroeconomic regulation frequently pursue contradictory tasks. In particular, the problem of public debt and its financing mechanisms usually

becomes an obstacle between fiscal and monetary policies. A high public debt can have a significant impact on the relationship between fiscal and monetary authorities [2]. Laurens and de la Piedra also point to public debt and budget deficits as a key factor in the interaction between fiscal and monetary policies [3]. They emphasize that the Central Bank's strategy can affect, for example, the capacity of the government to finance the budget deficit by affecting the cost of debt service and by limiting or expanding the available sources of financing.

Many authors considered the relationship between inflation and budget deficits. Thus, Sargent and Wallace [4] argued that in the short term, budget deficits should not cause inflation. However, in 2003, the study results by L. Katao and M. Terrones [5] spanning 107 countries over 42 years proved that the budget deficit has an impact on price changes not only during high- or hyperinflation, but also in its moderate ranges, even if the consequences in the second case are much weaker. The study showed a strong positive association between deficits and inflation among developing economies, but not among low-inflation advanced economies. On the other hand, many authors [6–8] argue that in the face of inflationary pressures caused by instability in world markets, the task of ensuring price stability comes to the fore. This fact puts monetary policy objectives in the foreground, which implies monetary dominance in the economy [9].

However, both authorities can influence economic growth. Both fiscal and monetary policies have a sufficient range of instruments that could influence GDP elements. In this case, the main task is to find a balance between the goals and the policies of the central bank and fiscal authorities [10, 11].

Typically, coordination of monetary and fiscal policy is fraught with great difficulties. Christian Beddies [12] offers an approach to the coordination problem between monetary and fiscal policy. He divides all literature in this field into three strands: the first is the time inconsistency problem and suggestions for its solution; the second is the institutional models of monetary policy, and the third part is the interaction of fiscal and monetary authorities. As for the third part, he notes that with the inconsistent formation of two separate policies for regulating the economy, it is necessary to define common concepts in order to identify the results of the interaction between these policies. He also notes the importance of a compromise between unemployment/GDP and inflation.

In his work, Alan Blinder (1982) [13] supplements the mentioned reasons with two more important factors: different ideas about objectives important for society and different forecasts about the likely affects of fiscal and/or monetary policy actions on the economy.

In this regard, finding a balance between fiscal and monetary policies is possible to a higher extent by determining the most favorable positions in terms of economic growth and development.

There are several approaches to solving the problem of the interaction of monetary and fiscal regulation in the literature. **The first approach** implies the absence of any interaction. At the same time, both fiscal and monetary policies are completely independent from each other, and decision-making takes place without knowing each other's decisions. In the scientific literature, this approach is known as the Cournot model [14].

The second approach, known as the Stackelberg model, involves the dominance of one of the tools of macroeconomic regulation, either fiscal or monetary policy [15]. The Cournot model is taken as a basis of this approach, but the assumption of the equality of macroeconomic regulation instruments is replaced by more realistic scenarios where one of the instruments is dominant. This approach involves the selection of the priority goals from the point of view of macroeconomic regulation, which relates to either fiscal or monetary policy.

Finally, **the third approach** involves the coordination of fiscal and monetary policies to ensure economic growth [11]. By such coordination, we can understand the ongoing process of interaction between fiscal and monetary authorities, in order to solve the tasks of macroeconomic regulation. Some studies [3] prove that in the absence of coordination and matching goals of fiscal and monetary policies, a significant increase in interest rates is highly probable in the financial market or an increase in the country's public debt in the economy.

In their study "Some Unpleasant Monetarist Arithmetic", Sargent and Wallace [4] conclude that, given absolute rational expectations, a decrease in money supply growth can lead to higher inflation. In other words, the implementation of tight monetary and soft fiscal policies can lead to an increase in the inflationary

background. At the same time, considering the cases of the dominance of one of the policies, the authors conclude that coordination of monetary and fiscal policies should be accompanied by a certain level of stimulation or restriction from regulatory instruments. It is only in this case, when it will lead to positive shifts in ensuring sustainable economic growth.

In her work "Equilibrium strategies in a fiscal-monetary game. A simulation analysis" [16], Irena Woroniecka-Leciejewicz concluded that the actions of fiscal and monetary authorities have a positive impact on the economy provided that instruments are applied in a certain interval of values. The effectiveness of their actions decreases with very high or low values of instruments, which are the result of radically restrictive or expansive policy. The choice of the optimum fiscal policy depends upon the decision of monetary authorities, and this dependence is inversely proportional. That is, the more restrictive the monetary policy, the more expansive, in response, the fiscal policy, and vice versa. Similarly, the response of monetary authorities depends on fiscal policy. For example, carrying out an expansive monetary policy, the central bank must limit its policy to avoid an undesirable increase in inflation. However, this work is based on the assumption that monetary authorities want to achieve the desired level of inflation, and the fiscal ones seek economic growth.

Modern studies on the coordination of fiscal and monetary policies place a great emphasis on the crisis conditions, which force to some extent the revision of the goals and objectives of both fiscal and monetary policy [17]. In particular, the authors focus on the key issues of our time from the point of view of the interaction of fiscal and monetary policies. They note that the global financial crisis forced to rethink the role of the central bank in terms of solving fiscal problems, especially in the field of investments in state treasury bonds or setting negative interest rates on financial resources, which obviously affects the results of fiscal policy.

Other authors [18] considered the interaction between monetary and fiscal policies and used a data sample for the period from 1991 to 2016 for 42 countries, given the cyclical nature of monetary and fiscal policies. Countries were also classified by institutional and structural characteristics. The main conclusion made by the authors is that the implementation of inflation targeting, as well as the independence of "monetary authorities", is usually due to counter-cyclical monetary and fiscal policies, as well as coordination between them.

Some analysts of the European Parliament have a totally new view [19]. In their opinion, the coordination of fiscal and monetary policies is only possible in theory, meaning that those responsible for macroeconomic regulation should not try to achieve a balance between the two authorities.

Recent studies have examined fiscal and monetary policies in the context of economic stabilization [20–22]. At the same time, the authors, for the most part, come to the conclusion that fiscal policy, rather than monetary policy, can become an economic growth driver. First of all, this conclusion is due to a recession in the global money market, negative interest rates and increased risks on world stock exchanges.

However, in a developing economy, a poorly developed financial system, as well as high interest rates, coordination of fiscal and monetary policies is still relevant. In this regard, at the next stage of the study, we identified a model that is most adaptable to the conditions of the Armenian economy.

DESCRIPTION OF THE COORDINATION MODEL OF FISCAL AND MONETARY REGULATION

As part of the study, we took the coordination model described in the study by Irena Woroniecka-Leciejewicz "Equilibrium strategies in a fiscal-monetary game. A simulation analysis" (2015) [16]. She estimated the key parameters characterizing the effectiveness of fiscal or monetary policy instruments and analyzed the impact of monetary and fiscal regulation on key macroeconomic objectives. The main hypothesis is that, ceteris paribus, an increase in the budget deficit causes an increase in GDP growth.

The model consists of two logistic regressions that have the same independent and different dependent variables that describe monetary and fiscal policies, and reveal the connection and interdependence between the mechanisms of monetary and fiscal regulation.

The original model consists of two equations:

$$y_{ij} = f\left(b_i, r_j\right) = \frac{\alpha_1}{1 + \beta_1 e^{-\chi_1 b_i}} + \frac{\alpha_2}{1 + \beta_2 e^{-\chi_2 r_j}} + \delta_1,$$

$$p_{ij} = f\left(b_i, r_j\right) = \frac{\alpha_3}{1 + \beta_3 e^{-\chi_3 b_i}} + \frac{\alpha_4}{1 + \beta_4 e^{-\chi_4 r_j}} + \delta_2,$$

where *y* is inflation; *p* — is economic growth; *b* — is budget deficit growth; *r* — is interest rate.

The calculation results of the parameters were presented by a matrix (see *Table*).

The matrix represents the correlation between inflation and economic growth, which in turn corresponds to the values of the interest rate and the budget deficit growth. The study by Irena Woroniecka-Leciejewicz revealed a pattern according to which the lowest inflation and the lowest economic growth rates correspond to the most stringent restrictive measures of regulation, and conversely, high inflation and GDP growth were accompanied by expansive policy.

The study considers two cases:

• in the first case, it is assumed that fiscal authorities try to maximize GDP growth, while monetary authorities try to minimize inflation;

• in the second case, it is assumed that monetary and fiscal authorities determine specific goals, that is, the desired level of inflation and some planned GDP dynamics.

In the first case, fiscal authorities choose the optimal fiscal response $i^*(j)$ to each monetary strategy *j*, which maximizes the GDP growth rate. Monetary authorities act similarly: monetary authorities respond with the corresponding strategy $j^*(i)$ to each strategy i chosen by fiscal authorities to minimize the inflation rate.

In such a situation, fiscal authorities have a dominant strategy, which is the optimal response to the government, regardless of the decisions made by the central bank concerning the interest rate. The dominant strategy of fiscal authorities is the most expansive fiscal policy. Similarly, the most radically restrictive monetary policy is the dominant strategy for monetary authorities, which means the optimal one, no matter which fiscal strategy the government chooses.

Thus, the equilibrium in the game is achieved by dominant strategies that motivate the combination of the most restrictive monetary policy and the most expansive fiscal policy.

In the second case, we assumed that fiscal and monetary authorities try to minimize the deviations of GDP growth and inflation from the desired values of *y** and *p**. It is still assumed that for each monetary strategy *j*, fiscal authorities choose the optimal fiscal response $i^*(j)$, and for fiscal strategy *i*, monetary authorities choose the optimal monetary response $j^*(i)$. Thus, the optimal

responses of fiscal policy characterize the reaction of fiscal authorities to the potential moves of the central bank. Conversely, the optimal monetary responses describe the reaction of monetary authorities to various fiscal strategies.

For the case when fiscal and monetary authorities want to minimize quadratic deviation from the desired values between real economic growth and inflation, the calculations were carried out under various assumptions. The location of the equilibrium point was no longer obvious and was dependent on the efficiency of fiscal and monetary policies, as well as on the priorities of the government and the central bank. In this study, we presented the results of the analysis corresponding to these two factors.

The table shows the optimal fiscal actions for each possible monetary policy, based on minimizing the quadratic deviation of GDP growth from the desired value. Similarly, it shows the optimal measures of monetary authorities, representing the optimal response to potential fiscal strategies. Monetary policy limitation was dependent on the government's choice of fiscal policy. The wider the fiscal policy, the more restrictive is the monetary policy adopted by the central bank in response to avoid excessive inflation. Similarly, the optimal actions of monetary authorities represent a reaction to potential fiscal strategies. It should be noted that the limits imposed by monetary policy depends on the government's choice of fiscal policy. The broader the fiscal policy, the more restrictive is the central bank's monetary policy to avoid excessive inflation. Similarly, the restriction or expansion of fiscal policy depends on the central bank's monetary policy. The more restrictive the monetary policy, the "broader" is the response by fiscal policy. Since the desired economic growth (at higher interest rates) is achieved, a more expansive fiscal policy, characterized by a higher budget deficit, is required. Conversely, in respond to a broader monetary policy, the government pursues a correspondingly more restrictive policy.

Picture 1 shows the optimal values of fiscal and monetary indicators, as well as the indicators of economic objectives for Nash equilibrium (GDP growth = 3.5%, CPI = 2.5%).

The author admits minor, close to zero, changes to the fiscal policy instrument (Δb_i) and the monetary policy instrument (Δr_j). Due to the illustrated wider

Monetary-fiscal game — Payoff matrix

Government — fiscal policy		Central Bank — monetary policy					
		←*Restrictive Expansive*→					
		Monetary strategy M_1 (interest rate r_1)		Monetary strategy M_2 (interest rate r_2)		...	Monetary strategy M_n (interest rate r_n)
↑ Restrictive Expansive ↓	Fiscal strategy F_1 (budget deficit b_1)		p_{11}		p_{12}	...	p_{1n}
		y_{11}		y_{12}		... y_{1n}	
	Fiscal strategy F_2 (budget deficit b_2)		p_{21}		p_{22} ...		p_{2n}
		y_{21}		y_{22}		... y_{2n}	
						...	
	Fiscal strategy F_m (budget deficit b_m)		p_{m1}		p_{m2} ...		p_{mn}
		y_{m1}		y_{m2}		... y_{mn}	

Source: [18, p. 76].

range of changes in their values, the specifics of the impact on the economy, including GDP growth and inflation, are more evident. Within a certain range of values of fiscal and monetary policy instruments, called "effective" values, the influence of instruments on the economy is tangible and corresponds to the equilibrium in the fiscal-monetary game. You can also notice that, within the effective range of values of mixed-policy instruments, the choice of the optimal fiscal policy depends on the decision of monetary authorities: as already mentioned, the more restrictive the monetary policy is, the more expansive the fiscal policy becomes, and vice versa.

However, outside this range, when fiscal authorities are prone, for example, to radically restrictive policies, the optimal response of the other no longer changes under the influence of further radicalization of monetary policy of the central bank. For example, if one moves toward an extremely broad monetary policy, the optimal fiscal response will no longer respond to a further weakening of monetary policy. To summarize, we can say that in countries with extremely limiting or extremely wide interest rate strategies, the optimal fiscal response turns into a dominant strategy.

ANALYSIS OF THE EFFECTIVENESS OF MONETARY AND FISCAL REGULATION IN ARMENIA

The effectiveness of monetary and fiscal regulation determines the effectiveness of the entire macroeco-

nomic policy in the country. In fact, the welfare of the population directly reflects the effectiveness of fiscal and monetary policies. In turn, effective policy of fiscal and monetary authorities is essential for the coordination of these instruments of macroeconomic regulation.

However, Armenia's experience indicates little success in achieving both sustainable economic growth and higher GDP per capita. As we can see in *Fig. 2*, the last decade was accompanied by a recession. In particular, there is slow economic growth, as well as a lack of growth in per capita income. As mentioned above, the effectiveness of both fiscal and monetary policies directly affects economic growth in general.

Considering the abovesaid, we will first analyze the effectiveness of fiscal and monetary regulation in Armenia.

ANALYSIS OF FISCAL POLICY INDICATORS IN ARMENIA

A key indicator of the effectiveness of fiscal policy in a developing economy is a balanced state budget. A negative balance is usually the result of inefficient budget allocation, as well as fiscal policy. Of course, a negative budget balance is an inherent part of the modern economy of almost all countries of the world. With rare exceptions, almost all countries today are characterized by a budget deficit.

However, when it comes to developed economies, a negative budget balance, as a rule, does not entail
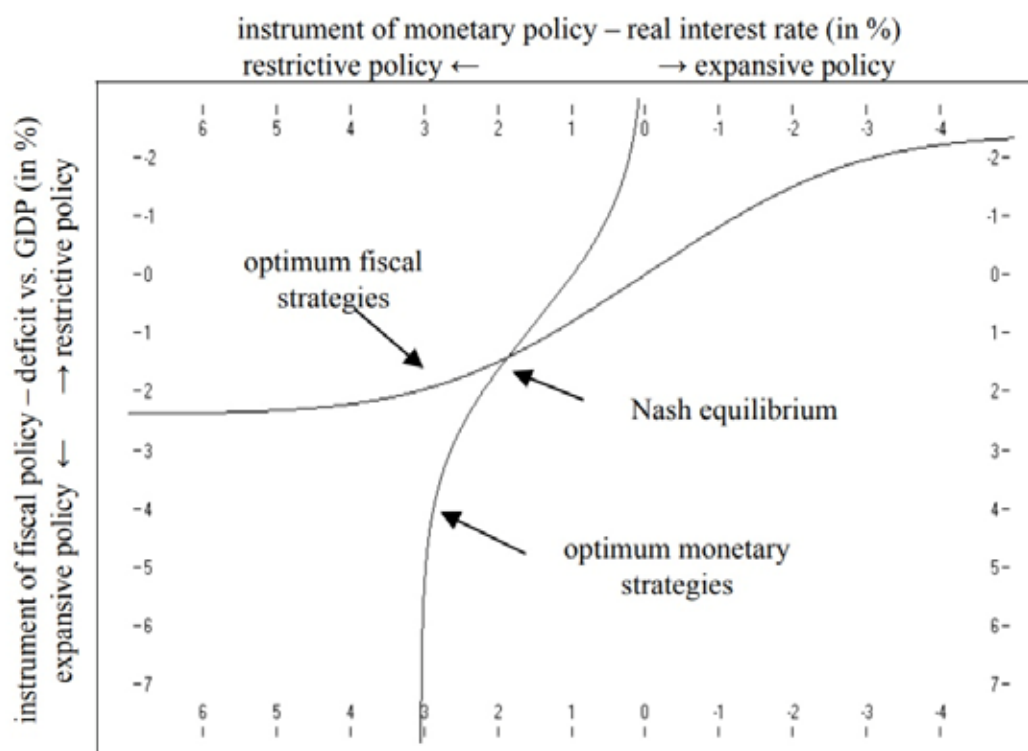
Fig. 1. **Optimum fiscal and monetary strategies**
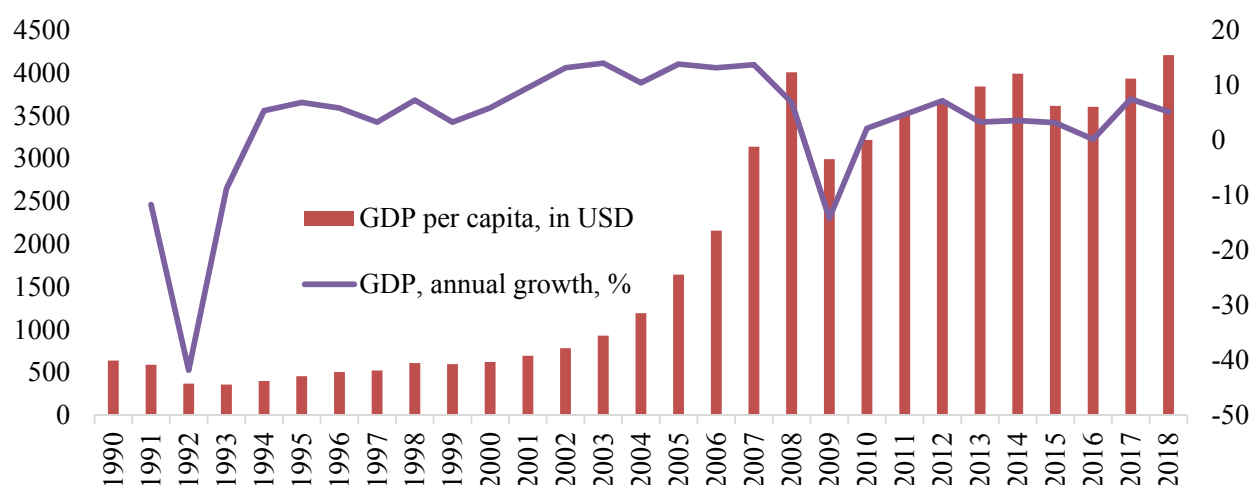*Source:* [10, p. 85].

Fig. 2. **Economic growth rate in the Republic of Armenia (in %) and GDP per capita (in USD)**
Source: Database of the National Statistical Service of the Republic of Armenia. URL: https://www.armstat.am/ru/ (accessed on 20.01.2020).

further negative outcomes. In most cases, the budget deficit is covered by domestic public debt, which in general, to some extent, even has positive outcomes. For example, the development of the financial sector in the country.

A negative budget balance in a developing economy have different outcomes. The budget deficit is usually covered by external sources of credit, which leads to

negative outcomes, including a slowdown in economic growth in the long term.

In this sense, the experience of Armenia is a prime example. The chronic budget deficit over the past 23 years has been accompanied by a steady increase in external public debt. As we can see in *Fig. 3*, the highest budget deficit is observed in the period of 1998–2002, as well as from 2009 up to this day. Since 2009, the

Fig. 3. **State budget of the Republic of Armenia, % of GDP**

Source: Database of the National Statistical Service of the Republic of Armenia. URL: https://www.armstat.am/ru/ (accessed on 20.01.2020).
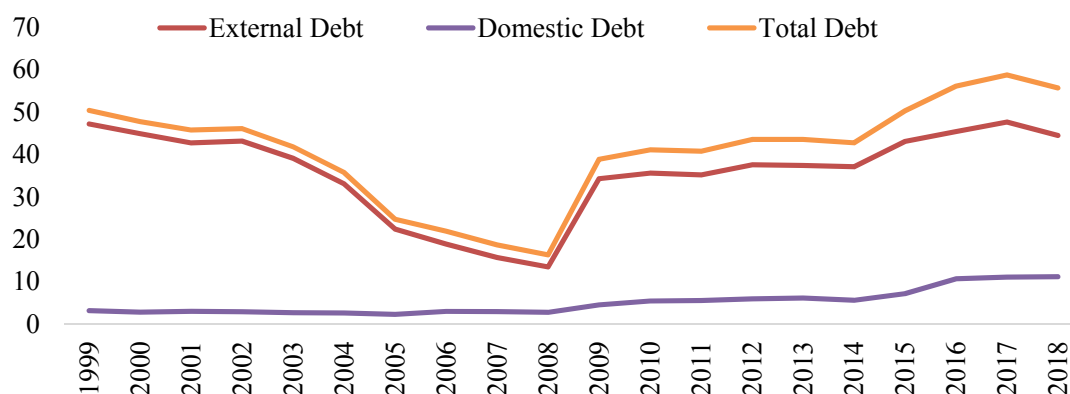

Fig. 4. **Public debt of the Republic of Armenia (in % of GDP)**

Source: Database of the National Statistical Service of RA. URL: https://www.armstat.am/ru/ (accessed on 20.01.2020).

public debt of Armenia, both internal and external, has been characterized by constant growth (see *Fig. 4*). As of 2018, the total public debt was 55.7% of GDP and almost reached the critical value established by the Armenian Constitution. The external debt amounted to 44.5% of GDP, which is the dominant position in the total debt of the country.

However, these are not the only indicators that speak of an unhealthy system of public finance in the country. The key issues of fiscal regulation include the dominance of indirect taxes in the structure of budget tax revenues, the not-so-efficient tax administration system, the inflexible system of tax burden distribution, and many other problems. It should be noted that the list of the reasons for the insolvency of Armenia's fiscal policy is not complete; however, it includes key factors that lead to a slowdown in economic growth over the past ten years.

ANALYSIS OF ARMENIAN MONETARY POLICY

The Central Bank of Armenia pursues inflation targeting policy for thirteen years. The nominal anchor of monetary policy has been reviewed only three times since 2006, and at the initial implementation stage of the inflation targeting policy. *Fig. 5* illustrates the implementation results of monetary regulation by the Central Bank of Armenia within the inflation targeting. As we can see, neither the actual value of the cumulative Consumer Price Index, nor Core Inflation (the main target of the Central Bank of Armenia) fall into the target range during most of the periods under consideration (see *Fig. 5*). Thus, it is difficult to talk about the successful implementation of the inflation targeting policy due to the dynamics of inflation indicators in Armenia [23].
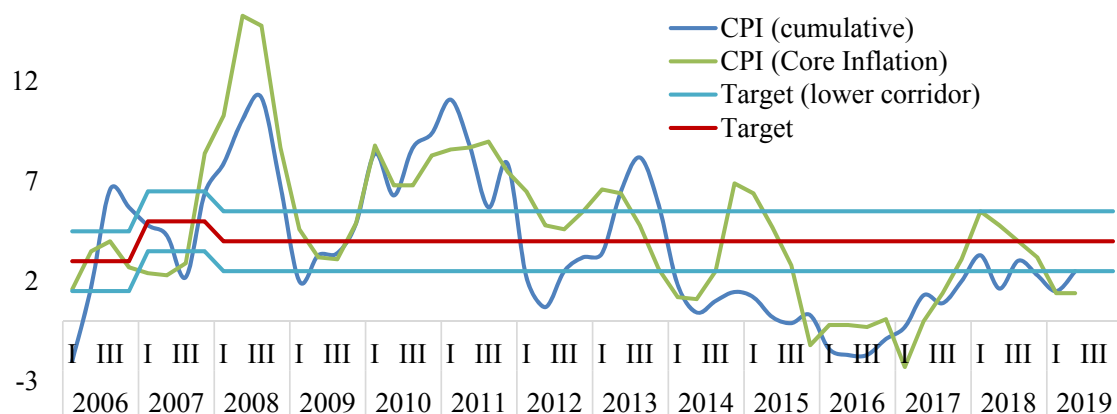
Fig. 5. **Central Bank of Armenia's target and the actual value of the CPI, %, quarterly**
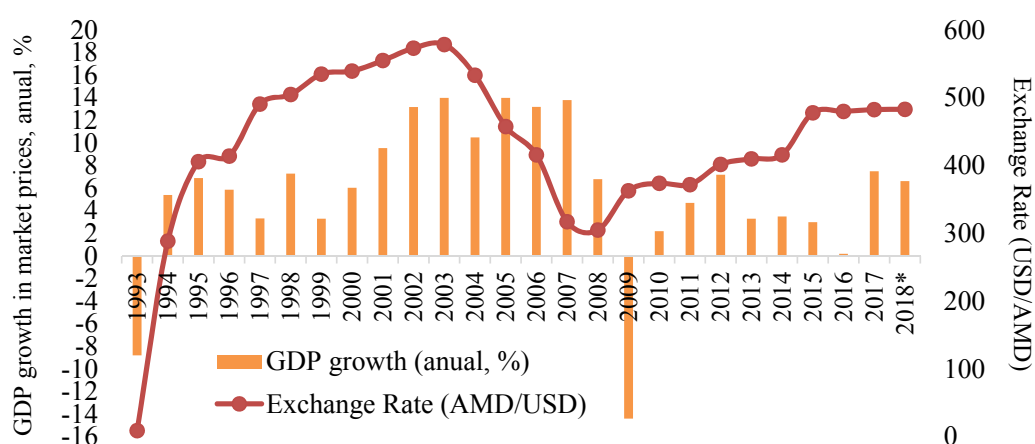*Source:* Database of the Central Bank of the Republic of Armenia. URL: https://www.cba.am/ru (accessed on 20.01.2020).

Fig. 6. **Economic growth and exchange rate USD/AMD, 1993–2018**
Source: Database of the Central Bank of the Republic of Armenia. URL: https://www.cba.am/ru, Database of the National Statistical Service of the Republic of Armenia URL: https://www.armstat.am/ru/ (accessed on 20.01.2020).

The study proves that the current policy has a negative effect on economic growth, especially in the last decade (see *Fig. 6*). In particular, foreign exchange regulation, which is aimed to maintain stable dynamics of the exchange rate of the Armenian dram, led to a slowdown in economic growth, as well as to many other negative structural outcomes in the country's economy [1, 24].

We cannot call Armenia's monetary regulation efficient.

One of the reasons for the inefficiency of the policies implemented both by the Central Bank of Armenia and fiscal authorities is the lack of balance and coordination between these two instruments of macroeconomic policy. Thus, it seems relevant to estimate coordination of fiscal and monetary policies. In this regard, the objective of the study was to estimate coordination of monetary and fiscal policies in Armenia.

ADAPTATION OF THE COORDINATION MODEL OF FISCAL AND MONETARY REGULATION. CASE OF ARMENIA

We took two regression equations as a basis for the coordination model of monetary and fiscal regulation in Armenia. Here, the dynamics of the Dram exchange rate is the dependent variable characterizing monetary regulation, and the dynamics of the GDP growth rate of the Republic of Armenia is the indicator of fiscal policy effectiveness.

The quarterly data from 2004 to the first quarter of 2019 of the following indicators served as the database for the Armenian economic model: exchange rate — AMD/USD, GDP, foreign debt, direct investment, remittances, export and import in absolute terms of the

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* The source: Data base of the Central Bank of Armenia. URL: https://www.cba.am (accessed on 20.01.2020).

CPI*. All data adjusted for seasonality. Then we logarithmed the data and calculated the first differences; we checked the data for normality of distribution by the Shapiro-Wilk and Shapiro-Francia tests (see *Appendix, Table 1*).

At the first stage of the study, as was mentioned above, the Consumer Price Index and External Debt were taken for independent variables. The regression analysis helped obtain the following equations:

1) $ExR = const - b_1 * CPI - b_2 * ED$ *Equation;* (1)
2) $GDP = const + c_1 * CPI - c_2 * ED$ *Equation.* (2)

However, the regression analysis revealed that the External Debt in both models is an insignificant variable, since at the significance level of 5%, the hypothesis that the coefficient b_2 is 0 is confirmed with a probability of 25.5% for Equation (1) (see *Appendix, Table 2*), and with a probability of 46.5% for Equation (2) (see *Appendix, Table 3*). For a model with a dependent variable Exchange Rate of Dram at the significance level of 5%, the CPI is insignificant with a probability of 92.5%, and for Equation (2), the regressor is significant at the significance level of 10%, with a probability of 8.9%. Thus, it was proved that changes in the External Debt of Armenia do not affect either the country's GDP or the dynamics of the national currency, and with the probability higher than 90%, inflation does not affect the country's exchange rate.

In this regard, the independent variables were changed to Private Cash Transfers and Direct Investments.

1) $ExR = const + b1 * Trans - b2 * D. Inv$ *Equation;* (3)
2) $GDP = const + c1 * Trans + c2 * D. Inv$ *Equation.* (4)

The new model revealed that Direct Investment with a probability of 46.6% for the first (Equation 3) (see *Appendix, Table 4*) and with that of 26.7% for the second regression is an insignificant regressor, and Transfers is an insignificant factor in Equation 4 (see *Appendix, Table 5).*

At the next stage, we carried out another regression analysis, including the following independent variables: External Debt, CPI, Direct Investment, Transfers, Exports, and Imports (see *Appendix, Tables 6 and 7*).

We compared both models with the main indicators of fiscal and monetary policies at the significance level of 10%. As a result, no indicators were identified that would have an impact on both monetary regulation indicators and fiscal policy indicators in Armenia.

CONCLUSIONS

The analysis carried out in this work allowed us to formulate the following main conclusions:

Considering the growth indicators of the Armenian economy, as well as the per capita income, it is possible to question the effectiveness of the implementation of both fiscal and monetary policies in the country. At the same time, the analysis shows that the results of both fiscal and monetary policies negatively affect the rate of economic growth. In particular, high public debt, as well as the structure of revenues and expenditures of the state budget, have been a significant factor in slowing down the economy for at least the last ten years. On the other hand, tight monetary regulation, which restrains the growth of money supply in the last ten years, also negatively affects the achievement of sustainable and long-term rates of economic growth.

On the example of Armenia, the coordination model of monetary and fiscal policies showed no dependence between all the considered factors. This, in turn, indicates non-market regulatory mechanisms present both in fiscal regulation and the Central Bank's policy, and on the other hand, indicates the lack of coordination between the two regulators of the economy at present. Summarizing the model analysis results, the following can be noted: changes in external debt, inflation, and foreign direct investment flows do not affect the exchange rate volatility of the dram, but the volume of transfers to the country affects it. In addition, neither external debt, nor inflation, foreign direct investment, nor transfers affect the country's GDP growth rate. Analysis of coordination of monetary and fiscal regulation in Armenia showed that at this stage, policies are unbalanced, which means they cannot contribute to sustainable economic growth in the near future.

The conclusion is that a need was proved to review the implementation of monetary and fiscal policies in Armenia in terms of both relevance and the allocation of the key and common objective to achieve sustainable economic growth in Armenia in the long term.

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APPENDIX

Table 1

Shapiro-Wilk and Shapiro-Francia tests for normality of data

```
Shapiro-Wilk W test for normal data
```

Variable	Obs	W	V	z	Prob>z
exr	60	0.96807	1.736	1.189	0.11728
gdp	60	0.98244	0.954	−0.101	0.54018
ed	60	0.96953	1.656	1.087	0.13847
cpi	60	0.98629	0.745	−0.634	0.73691
di	60	0.97274	1.482	0.848	0.19827
exp	60	0.98260	0.946	−0.120	0.54760
imp	60	0.98578	0.773	−0.555	0.71057
trans	60	0.96632	1.831	1.303	0.09624

```
Shapiro-Francia W' test for normal data
```

Variable	Obs	W'	V'	z	Prob>z
exr	60	0.96284	2.236	1.539	0.06194
gdp	60	0.98195	1.086	0.157	0.43750
ed	60	0.97711	1.377	0.612	0.27032
cpi	60	0.99114	0.533	−1.202	0.88540
di	60	0.96646	2.018	1.342	0.08972
exp	60	0.98008	1.199	0.346	0.36453
imp	60	0.98725	0.767	−0.507	0.69389
trans	60	0.96223	2.273	1.570	0.05821

Equation 1

`. reg exr cpi ed`

Source	SS	df	MS			
Model	.001638075	2	.000819037			
Residual	.063429626	57	.0011128			
Total	.065067701	59	.001102842			

Number of obs	=	60
$F(2, 57)$	=	0.74
Prob > F	=	0.4835
R-squared	=	0.0252
Adj R-squared	=	-0.0090
Root MSE	=	.03336

exr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
cpi	-.0202973	.2149117	-0.09	0.925	-.4506506	.4100559
ed	-.1611133	.1400409	-1.15	0.255	-.4415404	.1193137
_cons	.0023811	.0060813	0.39	0.697	-.0097964	.0145587

Equation 2

`. reg gdp cpi ed`

Source	SS	df	MS			
Model	.022701338	2	.011350669			
Residual	.41741537	57	.007323077			
Total	.440116709	59	.007459605			

Number of obs	=	60
$F(2, 57)$	=	1.55
Prob > F	=	0.2211
R-squared	=	0.0516
Adj R-squared	=	0.0183
Root MSE	=	.08557

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
cpi	.9539452	.5513129	1.73	0.089	-.1500399	2.05793
ed	-.2643653	.3592469	-0.74	0.465	-.9837449	.4550142
_cons	.0341137	.0156003	2.19	0.033	.0028746	.0653528

Equation 3

`. reg exr trans di`

Source	SS	df	MS			
Model	.006550646	2	.003275323			
Residual	.058517055	57	.001026615			
Total	.065067701	59	.001102842			

Number of obs	=	60
$F(2, 57)$	=	3.19
Prob > F	=	0.0486
R-squared	=	0.1007
Adj R-squared	=	0.0691
Root MSE	=	.03204

exr	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
trans	-.0259843	.0106029	-2.45	0.017	-.0472162	-.0047525
di	-.0038367	.0052241	-0.73	0.466	-.0142979	.0066245
_cons	-.0017687	.0041468	-0.43	0.671	-.0100726	.0065352

Equation 4

```
. reg gdp trans di

      Source |       SS           df       MS              Number of obs   =        60
-------------+----------------------------------           F(2, 57)        =      2.09
       Model |  .030102077         2   .015051039           Prob > F        =    0.1328
    Residual |  .410014631        57   .007193239           R-squared       =    0.0684
-------------+----------------------------------           Adj R-squared   =    0.0357
       Total |  .440116709        59   .007459605           Root MSE        =    .08481


         gdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       trans | -.0463965    .028066    -1.65   0.104    -.1025978    .0098048
          di |   .015496   .0138285     1.12   0.267    -.0121951     .043187
       _cons |  .0257304   .0109768     2.34   0.023     .0037497    .0477111
```

Equation 5

```
. reg exr ed cpi di trans exp imp

      Source |       SS           df       MS              Number of obs   =        60
-------------+----------------------------------           F(6, 53)        =      1.30
       Model |  .008329317         6   .001388219           Prob > F        =    0.2748
    Residual |  .056738384        53   .001070536           R-squared       =    0.1280
-------------+----------------------------------           Adj R-squared   =    0.0293
       Total |  .065067701        59   .001102842           Root MSE        =    .03272


         exr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          ed | -.1409364   .1389253    -1.01   0.315    -.4195854    .1377125
         cpi | -.0148495   .2153626    -0.07   0.945    -.4468122    .4171133
          di | -.0054163   .0056413    -0.96   0.341    -.0167313    .0058986
       trans | -.0239945   .0111017    -2.16   0.035    -.0462618   -.0017273
         exp |  .0320741   .0549892     0.58   0.562    -.0782202    .1423685
         imp | -.0431319   .0661985    -0.65   0.518    -.1759094    .0896455
       _cons |   .002615   .0062641     0.42   0.678    -.0099491    .0151791
```

Equation 6

```
. reg gdp ed cpi di trans exp imp
```

Source	SS	df	MS			
Model	.112979393	6	.018829899			
Residual	.327137316	53	.006172402			
Total	.440116709	59	.007459605			

Number of obs	=	60
F(6, 53)	=	3.05
Prob > F	=	0.0123
R-squared	=	0.2567
Adj R-squared	=	0.1726
Root MSE	=	.07856

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ed	-.0999741	.3335861	-0.30	0.766	-.7690632	.569115
cpi	.713522	.5171267	1.38	0.173	-.3237027	1.750747
di	.0026343	.0135458	0.19	0.847	-.0245351	.0298036
trans	-.0333936	.0266574	-1.25	0.216	-.0868615	.0200744
exp	.4058788	.1320395	3.07	0.003	.141041	.6707165
imp	-.2564307	.1589553	-1.61	0.113	-.5752546	.0623933
_cons	.0251164	.0150412	1.67	0.101	-.0050524	.0552852

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