Monetary Policy: Effects of the Decrease of the Interest Rates of the Federal Reserve in Dollarized Economies (USA, Ecuador, El Salvador and Panama)

Política Monetaria: efectos de la disminución de los Tipos de Interés de la Reserva Federal en economías dolarizadas (EEUU, Ecuador, El Salvador y Panamá)

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ABSTRACT

This research estimates the effect of the expansive monetary policy on the Federal Reserve in the economic growth and inflation in the countries with dollarized economies. In the evaluation of the effects of the monetary policy, it is used the data of both the Mundial Bank, the Federal Reserve Bank of the United States of America, and the econometric strategy of panel data with fixed and individual effects. The results show that the application of the expansive monetary policy fulfills the aim of revitalizing the economic growth after the Major Recession, without significant effect on the inflation of those economies.

Keywords: Growth, inflation, monetary policy, Dollarization, interest rates.

RESUMEN

Esta investigación estudia el efecto de la política monetaria expansiva de la Reserva Federal en el crecimiento económico y la inflación en los países con economías dolarizadas. En la evaluación de los efectos de la política monetaria, se utilizan los datos del Banco Mundial, del Banco de la Reserva Federal de los Estados Unidos de América, y la estrategia econométrica de datos de panel con efectos fijos e individuales. Los resultados muestran que la aplicación de la política monetaria expansiva cumple el objetivo de dinamizar el crecimiento

económico después de la Gran Recesión, sin efecto significativo en la inflación de esas economías.

Palabras clave: inflación, política monetaria, dolarización, tipos de interés.

JEL Classification / Clasificación JEL: B23, C23, E23, E31, E58, O41.

1. Introduction

The monetary policy is the main tool used by the Central Banks of each country, in order to maintain price stability and control the economic fluctuations; thus, through demand adjustments of the money supply in open market operations, such as purchase of public debt to commercial banks, increasing the money supply that controls the interest rates, influencing the economy in general and the interest rates in the long term (International Monetary Fund, 2018). The FMI (2018) indicates that after the global financial crisis, the Central Banks of more developed economies, taking the case of those of the United States, the interest rates decreased, in the case previously pointed out even fell to zero; using up the options of conventional monetary policy, going to the purchase of bonus, thereby, reducing the interest rate in a long term, easing the monetary conditions.

One of the main models of exponent models of growth of the neoclassical current, is the model designed by Solow-Swan (1956) which determines as principal factors of economic growth the capital and the work, it is mentioned that the growth of the production was possible thanks to the efficient combination of these factors; subsequently Robert Barro (1990), proposes a model in which through the size and right approach of the tax policy, through public spending, the economic growth can be optimized in the long term; Ruiz (2007), would accept the impact of the development of the natural resources, in addition to the consequences that would imply for the environment; since the neoclassical current considered those resources as endless; these theories have been chosen in the present research, since it represents the fundamental axis of the economies in research and mainly those occidental economies, on the one side, the capitalist influence of the United States of North America and the Keynesian inheritance in the economic policies; in addition to this, the vast majority of the countries are endowed with abundant natural resources, what makes that the mentioned theories ideal to the present research, and in such a way, could obtain clear results about the influence of the monetary policy tool under consideration.

In the case of the inflation, it has been analyzed under the tenets of the current monetarist that considers the claim, that is to say, public spending, policy regarding the minimum salaries, as stimulators of the inflation; and concerning the neoliberal current, that considers the monetary amount as the cause of this problem; is necessary to be analyzed considering both "supply

and demand", in order to have a better appreciation of the nature and impact of the monetary policy in those economies, without ignoring factors that could give genuine consistence to the results. Since there are various similar researches among highlight those carried out by Rodríguez and Cernichiaro (2017), Fiorelli and Meliciani, (2019) and Orlik (2014) which, examine the relation between the monetary policy, the economic growth and the inflation; this investigation is different from those previously mentioned, since it has an individual analysis of the policy in each year of validity, allowing to know the duration and level of its effects in the survey indicators.

The aim of the research is determine the level and nature of the impact of one external monetary policy in a developed economy in the economic growth and the price stability correlated to this theoretical and empirical determinants, of economies in ways of development that fall short of the ability of issuing its own currency; in the world there are three countries that use the Dollar as legal tender coin, in addition to the issuer. These countries are Ecuador, El Salvador and Panamá, tropical paradises with abundant natural resources.

The baseline scenario in this research, is steered by the rule of Taylor (1993), that proposes an economic political rule in order to steady the production and control the inflation, that suggests an increase of the nominal interest rate when the real production and inflation rate oversteps its objective, while, when they decrease under the acceptable levels, suggest the decrease of the nominal interest rate; explaining an inverse relation among the levels of nominal interest rate with the production and the inflation rate.

In this context, this research examines the importance of the use of the tools of monetary policy and how these decisions can be adopted in future crisis with the certitude of the obtained results, through the effect of the reduction of the interest rate to 0% in the economic growth and the stabilization of prices in the 4 countries that use the dollar as a legal tender, and three of them have adopted it, due to serious internal economic joints; the analysis is conducted in the period 2001-2017, using econometrics with data panel, through the application of a dichotomy variable as an alternative to the Chow test of structural change, analyzing first, the direct effect of the politics in a neoclassical model of growth and inflation, later through the inclusion of variables of control, based on the empiric variable to verify the robustness of the obtained relations; without considering variables such as the investigation –development or the human capital due to the fact that in the first case there are no enough data, in the second case, the human capital shows high levels of multicollinearity with the rest of explicative variables.

Effectively, the obtained results are strong since in most cases take issue with the named literature, certain cases agree with specific cases in other researches because of the feature of the single currency of a certain region or economic community. The obtained results show the partial enforcement of the neoclassical tenet and null respecting to Keynesians, since it shows a determinant and positive relation of the capital factor, while the impact of the labor force is counterproductive in the economic growth, the public expense

does not have a leading role even though claims it positive influence in the growth, its impact is not determinant in considering in the public policy, it has to be considered that the decisions in monetary policy are adopted by the Federal Reserve in research, having benefits in average for the growth of the countries of dollarized economies. However, the research of the inflation shows particular results since this is not significantly affected by the aggregate offer and demand, reason why these economies would present more stability to the present case the decisions and interests of the United States of America. According to the results, the politics should be headed to improve the productivity of the capital, taking into consideration the increase of the labor force, explaining several things because of the migration, reconducting the politics to a further lightening, since this factor is negatively influenced by the economic growth.

The research is divided in several sessions: starting with the revision of the literature, next specifies the data and econometric methodology, followed by the results and discussion of them according to the literature, and finally the conclusions and politic implications are presented as core part of the research.

2. Revision of the Literature

In order to understand in a better way the economic phenomenon involved in the present research. The present section is composed by the three main sections show the essential aspects of theorical and empirical base which is itself based.

2.1. Determinants in the economic growth

Benitez (2014), Valenzuela (2008) and Loayza (2008) using an approach of countable and econometric techniques, find out that the determinants of the growth of an undeveloped country are the overall productivity of the factors and the capital accumulation, also attributing to a serious of structural growths, however, Chirinos (2007) considers that the growths happens due to the macroeconomics stability, access to finance, develop of the institutions and geographic features; on the other side, Aguirre (2007) considers the success of the neoclassical model, supporting the liberation of the economy, emphasizing in the "capital" inversion, in the technological and the education, being the work factor little significant in the model, in spite of being object of public policy, this would be detrimental for the economic growth, since it would lead to an ageing of the labor force.

2.2. Determinants of the inflation

Morán (2014) states that the currency shocks are an important inflation source, the same as the public expense, wage shocks and the money supply

are determinants, but their impact is lower than the previous; Evia and Méndez (2008) consider the depreciation of actives, the money supply and the international inflation as factors that directly influence on the national economy, in addition to unfavorable climate conditions, as well as Moran (2014) indicates that this causes a rise in prices and raw materials. Trajtenberg, Valdecantos, and Vega (2016) point that in the case of Latin America, there is a preponderance on the part of the factors of the offer such as: nominal exchange rate, international prices Evia and Méndez (2008) and distributive conflict of the wealth on the factors of demand, what contradicts the orthodox economy that in general, attributes the inflationary effects to the aggregate demand. Gee and Limo (2016) through an econometric data panel research, concluded that the monetary offer is determinant of the inflation only in long term and the gap of the product is determinant in the short term.

In the context of an emerging economy, such as India, Mohanty and John (2015) through a SVAR model, tries to identify the main determinants of the inflation after the global financial crisis, in which could detect that in a short term, the main movers of the inflation were the output gap and the price of crude oil as is stated, having an important impact on the tax deficit in the long term; equally Okimoto (2019) in the Japanese case through the Curve of Philips of smooth transition, examines the inflation regimes, considering important the oil price adding that the share price is extremely important in order to determine the level of prices; in other research, Murshed and Nakibullah (2015) evaluation the relation between the fixed exchange rate and the high inflation in countries that belong to the Persian Gulf Cooperation Council, concluding that on the contrary as it was speculated, the exchange rate has an impact statistically no significant in the short and long term, notwithstanding, they found out that the underlying foreign inflation has a determinant role on the consumer prices of these countries.

2.3. Effects of the Monetary Policy on the Economic Growth and the Inflation

The literature that analyzes the effects of the monetary policy, that are different in three aspects: the first, it considers the effects of the interest rate variations when a region has a single currency, the second looks into in the econometric analysis having underpinned results by empirical livelihoods that let have a clearer perception of the macro economical effects of the monetary policy, and the third focuses on the monetary policy of a developed country in compared to undeveloped economies.

Firstly, Suriñach et al. (2000) considering a regional approach, point out the existence of asymmetries on the production in the transmission of the monetary shocks, thus existing a potential risk for the countries of the EMU, these asymmetries would increase henceforth the level of cyclic asynchrony of the regions with negative consequences that this fact can involve; Rodríguez, Faria, and Padrón (2013) can conclude that the monetary policy of European

Central Bank, in addition to have caused persistent "regional monetary tensions", has had a questionable effectiveness with reference to the suspected monetary neutrality and the monetary character of the inflation; Murgia (2019) builds a new measure of the shocks of monetary policy, the European industrial production responds positively to a decrease of the rate interest, on the contrary, the inflation responds weakly with a modest decrease.

In the second part, Rodríguez and Cernichiaro (2017) present two models of structural auto regressive vectors "VARS", with economy data from Mexico, which indicates that the effects of the monetary policy on the components of aggregate expenditure are null, but highlights the existence of an inverse relation between the interest rate of monetary policy and the production, considering the inflation, it cannot be verified its inverse, suggesting that there are external factors no considered in the model; Fiorelli and Meliciani (2019) use a model VAR and FAVAR in order to study the effects of the exogenous innovations in methods of conventional and non-conventional economic policies about industrial production and inflation after the crisis, concluding that, unlike the simple VAR model, the FAVAR approach can examine the transmission of the shocks of monetary policy in the real economy, showing that the conventional and non-conventional methods of monetary policy are not substitutes, but rather complementary; Gambacorta, Hofmann, and Peersman (2014) through the estimation with a VAR panel in eight advanced economies, in the period of financial crisis, finds out that an exogenous increase in the balances of the Central Banks in the lower limit zero that leads to a growth of the production and the inflation; Cuevas (2008), through a multivariate model of correction of errors, suggest that the monetary expansion in a small, open economy, that is to say, a decrease of the interest rate, it results in an increase of level of prices instead of a production growth, having in the short term a modest effect in the inflation and insignificant in the economic growth and in a long term a negative effect in the production, as a result of the loss of the money value; support these results, Catalán and Galindo (2005) indicates that in the case of Mexico the first two years will have a bigger impact in the inflation, highlighting that the monetary shock would decrease the unemployment rate, being this policy more effective in the first year and a half; similarly Orlik (2014) indicates that lax measures on monetary policies, from the interest rate could not be expected higher economic growth, not even a period of partial recuperation, the actual beneficiaries will be the government sector due to one reduction in its costs; however, Téllez and Venegas (2013) in this period of study ensure that the monetary authority has a big dilemma with the result of the macro-economical indicators and the world economic signs because they are so mismatched, that the direction of the monetary policy could include decisions in three scenarios: to decrease the objective interest rate, to maintain or increase it, Reyes and Gómez (2000) delimits that themselves the interest rates do not guarantee the exit from the recession, since if the entrepreneur's foresee negative outputs of their inversions do not request any credit, because it would worsen their losses.

Thirdly, Daza and Uribe (2016) explore the effects of the monetary policy of the United States on the economies of Colombia, Perú and Chile, through the use of models SVAR-X, they mention that the American monetary policy has diverse effects and these have limited magnitude on the studied economies, it could be highlighted that each of them has its own currency and they do not depend directly on the NorthAmerican country, Diaz (2012) and Orlik (2017) as it happens with Mexico, that its strong dependence on the neighbor to the North, it has generated low levels of economic growth, although subordinating the monetary policy and macroeconomic stability has brought complications mainly to developing countries.

3. Data and Methodology

3.1. Data

The present article uses secondary information taken from the database belonged to World Bank (2019) for Ecuador, El Salvador, Panamá and the United States of North America, and also extracted from the Federal Reserve Bank of the United States of North America (2019), because in 2001 converge the studied economies considering the use of the dollar as a legal tender, until 2017, when the Federal Reserve increases the interest rate to 1%.

The variable used to explain the econometric model, in the case of the model of economic growth is GPD growth (% annual), the policy of reduction of the interest rate of the dollar to 0% in 2010 as a dichotomy variable, taking the 0 value in the period 2001-2009 and 1 in the period 2010-2017; as independent variables are the gross fixed capital formation (fbkf) and the economically active population (eap); the control variables are the general public spending (ps) and the total income of natural resources (nr)

In the estimation model is the Inflation Rate IPC, as dependent variable, the policy of decrease of interest rate of dollar to 0% in 2010 as dichotomy variable, taking the 0% value in the period 2001-2009 and 1 in the period 2010-2017; as independent variable is Money Supply (ms); the control variable are: the minimum interprofessional salary (w), the general public spending (ps) as it can be observed in the chart 1, its symbolism, definitions and its respective considerations.

In order to have a better research and analysis of the results for the nominal variables expressed in US dollars at constant prices of 2010, it is applied its natural logarithmic scale. Then, in the table 2 it is detailed the statistical descriptions of the variables, the research is based on the data in the period 2001-2017 (17 observations).

The statistical data point out that the four dollarized countries in this research have had, 3.5% on average concerning the economic growth, and it needs to be considered the difference among a developed economy such as the American in relation to the other three countries that has an average and medium to low income, the variability of the data in general is 2.9, among each country is 2.09 and in each country is 2.26, that shows a rather homogeneous group considering

Table 1. Dependent and independent variables to be used

Variable		Definition	
Dependent variables			
Inflation	π	Rate Inflation	Consumer Price Index
Economic growth	Gdpg	GDP growth (% yearly)	The annual percentage growth of GDP according to the market rates base don constant local currency.
Independent variables			
Capital (logarithm)	fbkf	Gross fixed capital formation (FBKF)	Constant US dollars 2010
Labor force (logarithm)	eap	Economically active population (EAP)	Includes people among 15-65 years old who contribute work in producing goods and services in the period 2001-2017. (ln)
Money suply (logarithm)	ms	Is the amount of currency outside the banks.	Constant US dollars 2010 (ln)
Control variables			
Minimun interprofessional salary (logarithm)	W	Is the minimum legal value set in labour policy	Constant US dollars 2010. (ln)
Total incomes from natural resources (logarithm)	Nr	Incomes from natural resources renewable and nonrenewable	Constant US dollars 2010. (ln)
Public spending (logarithm)	Sp	It includes all the expenses of inversion and currents of government to buy goods and services	Constant US dollars 2010. (ln)
Dichotomous variable			
Policy (monetary)	pe	Interest Rates 0% (FED)	Measure that was adopted after the financial crisis in 2008 on the part of the Federal Reserve

Source: Own elaboration according definitions made by World Bank (2019).

the economic growth rate, concerning the inflation rate shows 3.44% on average, the variability of the data in general is 4.8 percentual points, value almost similar in each country, what is 4.5%, values that contrast with the variability among countries, that is 1.95.

The economic policy to be assessed is monetary, in this case, the decrease in the interest rate, at the end of 2007, the NorthAmerican bank entered a crisis, provoking the bankruptcy of banking entities mainly investment ones, in addition to big companies which had a big government involvement, provoking a breakdown of the New York Stock Exchange, because of this, the Federal Reserve decided to facilitate access to continuous credit in 2008, reducing the discount rate to 2% in April 2008 and to practically zero in December 2008, at the beginning of the Deep Recession, the graphic 2 shows the rate decrease to 0%. Lucas (2019) mentions that the problem of locating interest rates to zero, apart from the possibility that it could cause a substantial price increase, being the main tool of the monetary policy was depleted.

TABLE 2. STATISTICS OF THE VARIABLES TO BE ANALYZED

Variable		Main	Stat. Desv.	Min	Max	Observations	
GDP Growth	Overall	3.525	2.913	-2.537	11.984	N =	68
	Between		2,093	1.900	6.375	n =	04
	Within		2.269	-2.275	9.135	T =	17
Inflation	Overall	3.443	4.818	-0.731	37.678	N =	68
	Between		1.956	2.105	6.349	n =	04
	Within		4.505	-2.489	34.772	T =	17
(Log) FBKF	Overall	3.168	0.290	2.643	3.791	N =	68
	Between		0.295	2.864	3.557	n =	04
	Within		0.134	2.781	3.402	T =	17
(Log) EAP	Overall	16.237	1.759	14.476	19.180	N =	68
	Between		2.014	14.641	19.130	n =	04
	Within		0.079	16.068	16.399	T =	17
(Log) Public Spending.	Overall	23.785	2.773	21.558	28.551	N =	68
	Between		3.170	21.780	28.484	n =	0 4
	Within		0.205	23.367	24.234	T =	17
(Log) Natural Resources.	Overall	21.138	3.222	16.788	26.405	N =	68
	Between		3.646	17.696	25.519	n =	04
	Within		0.514	20.168	22.047	T =	17
(Log) Money Supply.	Overall	25.371	3.083	22.966	30.385	N =	59
	Between		3.359	23.047	30.138	n =	04
	Within		0.255	24.568	25.998	T =	14.75
(Log) W	Overall	5.805	0.777	4.771	7.136	N =	64
	Between		0.810	5.183	6.977	n =	04
	Within		0.274	5.196	6.352	T =	16

Source: Own elaboration according to data belonged to World Bank (2019).

Figure 1. Evolution of the average economic growth and the average inflation rate in the dollarized countries (USA, Ecuador, El Salvador and Panamá) in the period 2001-2017countries
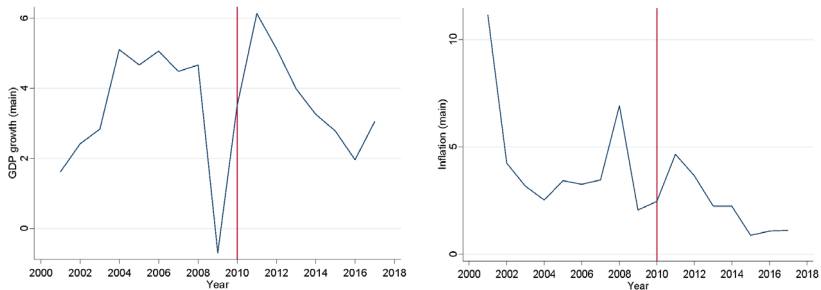
Source: Own elaboration according dates made by World Bank (2019).

Figure 2. Evolution of the interest rate of the Federal Reserve in the period 2001-2017

Source: Own elaboration according to data of Federal Reserve (2019).

Table 3 shows the correlation among the economic growth and the determinant factors, in this case, presents a moderate-positive correlation with fixed capital (r= 0-65) and a low and a negative correlation with the labor force, the natural resources income and the public spending (r=-0.30). Moreover, it shows the existence of multicollinearity (r> 0.8) between the labor force and public spending; labor force and natural resources incomes, as an indication that the vast majority of the economically active population depends on these economic sectors for its subsistence in these countries, either as a work source or as receptors of public transfers.

Table 3. Correlation matrix of economic growth, capital, work, natural resources income and public spending

	GDP Growth.	(log) Fbkf	(log) Eap	(log) Spend Pub.	(log) Natu. Resources
GDP Growth	1				
(log) Fbkf	0.6519*	1			
(log) Eap	-0.3795	-0.3133	1		
(log) Public Spend.	-0.3187	-0.2046	0.9840*	1	
(log) Natu. Resour.	-0.3082	-0.2520	0.9269*	0.8692*	1

Table 4 shows the correlation between the inflation rate and the determinant factors, in this case, presents a low negative correlation with the level of money supply, the legal minimum inter professional salary and the public spending (r< 0.30). It shows the existence of multicollinearity (r> 0.8) between the level of money supply and the public spending; money supply and MIS, which indicates a strong institutional dependence among the Central Government and the respective Bank Centrals.

	Inflation	(log) Money Supply	(log)W	(log)Public Spending
Inflation	1			
(log) Money Supply	-0.1892	1		
(log) W	-0.2952	0.9541*	1	
(log) Public. Spending	-0.1368	0.9954*	0.9256*	1

3.2. METHODOLOGY

The present research, through a model of panel data of corrected errors, due to the existence of multicollinearity among some of the independent variables of the proposed models, demonstrate the behavior of the economic growth and the inflation towards a 0% interest rate considering the monetary policy. The hypothesis to verify, in the case of economic growth, is the existence of a positive relation with the capital, work, natural resources and the public spending; for inflation there is a positive relation with the level of money supply, public spending and the minimum salary. It will be used the dichotomous variable as structural change, specifying it as a dichotomy variable, with the values of 0 in the lack of economic policy and 1 in the presence of economic policy.

In the case of the economic growth, equation 1, is used as control to the macroeconomic variables: the formation of fixed capital and the economically active population "Solow and Swan, 1956"; natural resources "Ruiz, 2007" and public spending "Barro, 1990", fulfilling the cases of the process previously mentioned, applying natural logarithm to the function. The bases of neoclassical models are appealing, since for undeveloped countries, other variables such as the human capital and investigation and technological development are strongly correlated to the variables already used. In the case of inflation, in equation 2, the public spending and the nominal minimum wages Brito (2019) and the money supply are controllers to the macroeconomic variables, fulfilling the cases of the process previously mentioned, applies natural logarithm to the variables aggregate demand and nominal salaries.

$$GDPgrowth = \beta_1 + \beta_2 lnfbkf + \beta_3 lneap + \mu$$

Where, GDPgrowth, the economic growth rate; fbfk: gross fixed capital formation; eap: economically active population and, μ: error term.

$$\pi = \beta_1 + \beta_2 lnms + \mu$$

Where: the inflation rate; ms: money supply, and μ : error term.

At first, in equation 1, is determined the initial econometric relation, analyzing the growth model of Solow (1956), where, $H_0 = 0$ indicates that

there is no relation among variables and $H_1 \neq 0$ indicates the existence of a relation among variables.

Continually in the equation 3 and 4 is included the variable dummy (PE) indicating the structural change in the economy, in this case, the reduction to zero of the interest rate.

$$GDP\ growth = \beta_1 + \beta_2 lnfbkf + \beta_3 lneap + \beta_4 pe + \mu$$
$$\pi = \beta_1 + \beta_2 lnms + \beta_3 pe + \mu$$

In equations 5 and 6, are included variables of control (Z) for the growth and inflation model respectively, such as the public spending, natural resources incomes and minimum inter professional salary and public spending in each country under consideration.

$$GDP\ growth = \beta_1 + \beta_2 lnfbkf + \beta_3 lneap + \beta_4 pe + \beta_5 Z + \mu$$
$$\pi = \beta_1 + \beta_2 lnms + \beta_3 pe + \beta_4 Z + \mu$$

And the send, in equations 7 and 8 is carried out an analysis concerning the time effects of the economic policy, that is to say, is conducted an analysis of the impact every year of the validity of the economic policy, in the period 2010-2017.

$$GDP\ growth = \beta_1 + \beta_2 lnfbkf + \beta_3 lneap + \beta_4 pe_{tn} + \mu$$
$$\pi = \beta_1 + \beta_2 lnms + \beta_3 PE_{tn} + \mu$$

4. RESULTS AND DISCUSSION

4.1. RESULTS

In this device, the goal fulfillment is analyzed, what is to say, let know the relation among the economic growth and its production factors, similarly, in the case of inflation and how it affects the money supply, the minimum wage and the public spending; in addition to the impact that has a foreign monetary policy in the lack of their own full monetary policy.

In table 5, it is observed that the capital has a positive effect in the growth, while the labour force has a negative effect, the overall productivity of the factors also is negative for this group of countries.

The result (a) shows that capital and work are statically significant with regard to the economic growth in the four dollarized economies and the natural resources incomes (d) and the public spending are not. The model (b) is offered as a good estimate, which indicates equation 9, suggests that ceteris paribus, as the capital increases 1%, the economic growth of the group of countries will increase 7.22% on average for the four countries in the survey and, increasing 1% the labour force, the economic growth will decrease 0.32%.

TABLE 5. EFFECT OF THE MONETARY POLICY ON THE ECONOMIC GROWTH

	A	B	c	d
(log) FBKF	7.035***	7.216***	8.207***	8.592***
	(6.26)	(6.52)	(6.06)	(5.03)
(log)EAP	-0.305*	-0.320*	1.710	2.578
	(-2.30)	(-2.52)	(1.02)	(0.96)
dummy		1.280**	1.356**	1.375**
		(2.81)	(2.97)	(2.94)
(log) Public Spending			-1.242	-1.589
			(-1.22)	(-1.19)
(log) Natural Resource				-0.179
				(-0.45)
Constant	-13.70***	-14.59***	-21.16**	-24.49*
	(-3.49)	(-3.87)	(-3.26)	(-2.33)
Observations	68	68	68	68
Wald chi2	42.56	52.65	54.88	54.59
Prob > chi2	0.0000	0.0000	0.0000	0.0000

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

$$GDP\ growth = -14.59 + 7.22 lnfbkf \text{-} 0.32 lneap + 1.28 PE1 + \mu$$

The implementation of the interest rate to 0% influences significantly in the economic growth, and positively, what to say, that it increased 1.28% on average in the dollarized economies. It is noted that in all the models are significative in a global level (prob > chi2 = 0.000).

Carrying out the study of individual effects per year, in the table 6, according to equation 7, shows that the policy is significative since it has caused a bigger impact in the first years of its implementation, what is to say, 2010 and 2011, however, the results are not statically significative in the rest years of research.

Considering the effects in the inflation, table 7 shows that the money supply and the variables of control are not statically significative; the money supply and the minimum wage have negative effects in the inflation, while the public spending has positive effects, the interest rate to 0% has a positive and it is not statistically significant. Globally, the models for inflation are not significant.

The result of the estimation due to effects of individual years, in table numbrer 8, acording to equation 8, indicates that the economy policy has been significant in 2015, having a negative effect on the inflation, although they are not significant in other years.

TABLE 6. INDIVIDUAL EFFECT PER YEAR OF THE MONETARY POLICY ON THE ECONOMIC GROWTH

2010	1.827*
	(2.31)
2011	2.495**
	(2.90)
2012	1.490
	(1.70)
2013	0.679
	(0.77)
2014	0.365
	(0.41)
2015	0.512
	(0.58)
2016	0.0467
	(0.05)
2017	0.467
	(0.53)
Constant	-13.30**
	(-3.25)
Observations	68
Wald chi2	55.91
Prob > chi2	0.0000

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 7. EFFECT OF THE MONETARY POLICY ON THE INFLATION

	m	N	o	p
(log)Money Supply	-0.119	-0.0948	-3.611	-2.566
	(-0.97)	(-0.84)	(-1.30)	(-0.84)
Dummy		-0.913	-1.015	0.201
		(-1.31)	(-0.98)	(0.16)
(log) Public Spending			3.681	3.617
			(1.26)	(1.20)
(log) SMI				-4.051
				(-1.28)
Constant	5.720	5.415	6.629	4.670
	(1.63)	(1.72)	(1.38)	(0.90)
Observations	59	59	59	59
Wald chi2	0.94	2.66	2.75	4.36
Prob > chi2	0.3324	0.2644	0.4323	0.3590

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

TABLE 8. INDIVIDUAL EFFECT PER YEAR OF THE MONETARY POLICY ON THE INFLATION

2010	-0.389
	(-0.37)
2011	1.269
	(1.10)
2012	-0.688
	(-0.59)
2013	-1.501
	(-1.28)
2014	-1.283
	(-1.09)
2015	-2.870*
	(-2.44)
2016	-1.729
	(-1.47)
2017	-1.037
	(-0.88)
Constant	5.245
	(1.79)
Observations	59
Wald chi2	11.08
Prob > chi2	0.2700

t statistics in parentheses.
* p < 0.05, ** p < 0.01, *** p < 0.001.

4.2. DISCUSSION

The results of the estimation of economic growth tie in with the findings made by Benítez (2014); Feijoó and Valenzuela (2008) that assign to the total productivity of factors and to the capital accumulation the biggest impact in the economic growth, what is characteristic of the occidental economies that are intense in capital, in addition to this, they bet to the productivity of factors or as it is named technological development; in other aspects, contradicts what Aguirre (2007) presents in the case of the labour force, since in the present investigation it is significant, but with the particularity that it has a negative impact in the growth, and it can be limitans in the development. Researches carried out by Campo and Sanabria (2013); Morales (2011) agree with those in the present research showing that the natural resources incomes influence negatively in the economic growth, because on one hand, there is a disadvantage in terms of trade of the economies in study with regard to its main trade partners of the developed economies, and on the other hand, the inefficient management of the public administration. Public spending also has a negative effect in the growth, contrary to what Benítez (2014) proposed, since

mainly, most of the public spending is concentrated on the current expenditure of the governments, in addition to the inefficient management of resources in the institutions.

The inflation estimated results, oppose to Morán (2014), that demonstrate a negative effect, is not determinant in the level of prices; similarly, contradicts the obtained results by Evia and Méndez (2008), since the negative impact of the monetary effect is not significant for the inflation; it is noted that the public spending demonstrate a positive effect with regard to the inflation, but equally, in the present research none of the factors, both from the demand and the supply side, are not significant determinants that explain the inflation in the dollarized economies.

The analysis of the implementation of the expansive monetary policy indicates that the manipulation of the interest rates affect significantly to the economic growth of the dollarized economies, that contrasts with the results of Rodríguez and Cernichiaro (2017), Cuevas, (2008), Orlik (2014), who conclude that there would not exist further economic growth, otherwise, that would have a negative effect; the current study agrees to Gambacorta et al, (2014) and Murgia (2019) who mention that the decrease of the interest rate would bring to a considerable growth of the economy; moreover, the results in the level of annual periods indicate that the policy has had determinant impacts in 2010 and 2011.

Regarding the inflation, it shows that this economic policy has not been significantly determinant, refuting the found results by Orlik (2014) and Catalán and Galindo (2005); in the analysis carried out in annual periods is highlighted that the measure that has impacted negatively and sightly significant in 2015, being unnoticed in the other periods studied.

5. Conclusions and Policy Implications

5.1. Conclusions

The research deals with economic growth and inflation according to the monetary policy where the dollar is used as legal tender, through regression analysis with data panel. It is important to know the impact of the monetary decisions taken by international agencies due to the features of the studied economic system.

The results show the partial compliance of the Taylor Law, since the decrease of the interest rate does not have significant effect on the inflation, shows a determinant impact on the economic growth, confirming the importance of the intervention of the government through economic policies and at the same time, the important role of the fixed capital for the development of the nations; the positive and significant impact of the expansive monetary policy in the economic growth, has fulfilled the objective of dynamizing the economy after the Deep Recession in 2007, and improving the economic conditions of the dollarized countries, the positive impact on the inflation, but not significant,

that shows the concordance with the neoliberal theoretical basics, since it has the expected influence.

Another particular result obtained, is the negative impact of the labor force, in future researches this topic should be studied, since there is not a theory that supports it and should be known the reasons and conditions for it, one of the speculations of the author is the migration, due to the fact they are countries with a strong currency, they are key objectives of the migrants, and this can be slowing down the economic progress of these countries.

It is important to considerer the limitations of the conditions of the associated economies have to be considered, since the American has wide discrepancies with the Latin American, however, the fact that it is the issuer of legal tender that other countries use, merit a deepening in the analysis of the decisions as far as monetary policy is concerned.

5.2. Policy implications

Since it is an external economic policy, it cannot be issued very direct criteria, as the results show, the countries should intensify the capital investment, improve its legal conditions, the efficiency of the public sector income and set beneficial policies so that the natural resources have an important part in the local growth, such as changes in the conditions of concession of exploitation of them, or failing let the market assign the resources for this sector of the economy.

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