The analysis of the monetary transmission mechanism in Albania using VAR

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Abstract
    This research paper aims to analyze the monetary transmission mechanism in Albania from 2002 to 2016 including the impact of remittance using VAR analysis. The capacity of monetary policy to affect output is a widely discussed topic in empirical literature; therefore, studying the effectiveness of transmission channels is crucial for appropriate design and implementation of it. Using time series data, interest rate, exchange rate, money supply channels effect on real GDP is analyzed since they are considered to be the most important by the Central Bank of Albania. It is concluded that monetary transmission mechanism channels are not strong. Statistical significant evidence is found only for the variable of interest rates and money supply. Other two variables exchange rates, and remittances do not exhibit a significant impact on real GDP. In addition, impulse response function analysis is also implemented to understand how shocks in the depended variables affect real GDP.
Keywords: transmission mechanism, monetary policy, VAR, Albania

1. Introduction
    An important issue in macroeconomics is the relationship between nominal and real variables or at what degree are nominal factors able to affect the real economy? To express it in a different way is monetary policy indeed able to create real output growth and what are the main channels effectively working transition countries. The monetary transmission mechanism describes how changes in the nominal variables such as money stock, exchange rates or short-term nominal interest rates affects real variables such as aggregate output. Studying it becomes very important for the right design and implementation of monetary policy especially in transition countries such as Albania where there is still a lack of clarity regarding its effects. Monetary policy actions start from the central bank which is the authority responsible for conducting monetary policy and which main targets are achieving price stability or higher employment.
    Most of the literature, which provides us with insight regarding monetary policy and its transmission channels, belongs to the advanced economies. Therefore, the main challenges and contribution we can give are to fill the literature gap providing research also for transition countries in order to be able to understand what are the most effective channels of the transmission mechanism in these countries and how central banks and policymakers can operate. According to Kolasi, Shijaku, and Shtylla, (2010), one of the most important questions is "what is (are) the most important channels the function for the Albanian economy?". Albanian is considered a transition country with an economy characterized by an underdeveloped financial system, where the capital market is inexistent and there are definitely a number of structural reforms need to be undertaken.
    Monetary policy transmission mechanism in transition countries differs from the developed one. In transition countries, due to the changes in the political system, there is an underdevelopment of financial institutions, which is also reflected as a weakness in transmission

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channels of monetary policy (Fetai&Zeqiri, 2010). Countries such as Albania have undergone significant structural changes in their economy and they are still in an ongoing process of building their institutions. In additions even among transition countries, there are differences because the transmission mechanism depends on other characteristics of their economy such as size, openness, development of the financial sector, etc (Égert&MacDonald, 2009).

The three most important transmission mechanisms, the subject of study in this research paper are money supply, nominal interest rates, and exchange rates in Albania. Nominal interest rates are the oldest monetary policy transmission mechanism. Central bank through expansionary monetary policy lowers the interest rates, which reduces the cost of capital and fuels investments by increasing the output (Davoodi, Dixit, & Pinter, 2013).

As Bank of Albania (BoA) prepares its monetary policy for the entrance in the European Monetary Union in the long-term, the knowledge of monetary policy transmission mechanisms becomes crucial. Therefore, the main objective of this research paper is to analyze three monetary transmission channels, which appear to the most relevant in the case of Albania: monetary policy rate, exchange rate, and money supply. While looking at these three channels it will also be checked for the impact of remittances on output. Remittances are an essential part of the Albanian economy and according to World Bank (2016), they make approximately 8.9% of GDP. The incomes from emigrants in Albania are considered as a source of finance for productive purpose through investments in the short-term and long-term. From 1992 to 2016 there has been a decreasing trend in remittance flow in Albania (World Bank,2016). Therefore while checking for the impact of monetary transmission channels it cannot be ignored an important variable such as remittances. Muço, Sanfey, and Taci (2004) state that remittances and exchange rates are closely connected. One of the main factors contributing to exchange rate stability is remittances.

Considering that empirical research in Albania on this topic are still scarce this research paper aims to contribute to the literature by implementing vector autoregressive (VAR) model using data from 2002Q4 to 2016Q1. The rest of the paper is organized as follows: section 2 provides theory and policy implementation in Albania, section 3 gives the literature review regarding this topic starting from the developed, emerging and transition economies. In section 4, the research model and methodology for empirical analysis are provided continuing with the model sets, data and data specification, descriptive statistic, VAR methodology application, Granger Causality, and impulse response functions. In section, 5 are provided discussion and conclusions.

2. Literature review

For an appropriate implementation monetary policy, it is of great importance an accurate understanding and assessment of the speed of effect a particular policy change have on the economy. Principal transmission channels identified in the literature are the interest rate, exchange rate, asset price, credit and balance sheet channel (Mishkin, 1996; Ireland,2016). Interest rate channel is based on two assumptions. The first assumption is that central banks can affect nominal interest rates in the short run. An important factor here is wage and price rigidity, which means wages and prices adjust slowly. This indicates that variation in nominal policy interest rates affects the real interest rates directly. The second assumption of this channel is that investment and consumption expenditures are sensitive to changes in interest rates. The more elastic these two elements are the greater is the impact of monetary policy (Brinkmeyer, 2014). Interest rate channel operated through three stages. In the first stage changes in policy, rates pass

to commercial banks and affect credit and deposit rates, in the second stage deposit and credit rates affect consumer spending which means there will be a change in aggregate demand. Later on, this demand will be translated into a decrease or increase of GDP and inflation (Muric, 2010).

Exchange rate transmission mechanism channel appears to be one of the most important, especially in transition countries. In transition countries, the exchange rate stability is considered an essential element because the impact it has on the economy through the pass-through effect in inflation is relatively large (Besimi, 2004). A decrease in interest rates will make domestic deposits less attractive; therefore, there will be a decrease in domestic currency demand, which results in depreciation of domestic currency relative to foreign currency. A depreciation of foreign currency will make goods and services inside the country cheaper and therefore net exports increase. However, depreciation of the domestic currency has a direct impact on inflation, especially in small open economies. For instance, a deprecation of domestic currency will cause an increase in prices due to imported prices and increased demand for exports. Mishkin (2001) besides traditional interest rate channels explains other assets channels such as stock prices, real estate prices and exchange rates. It also highlights the importance of exchange rate transmission mechanism and the role this mechanism has in aggregate demand and inflation especially in small open economies.

Vonnák (2008) studies different channels of the monetary transmission mechanism and their effectiveness in the Hungarian economy. The reaction of prices in this country due changes in monetary policy is quick while output changes are not significant. This is attributed to the essential role exchange rate plays through pass-through effect in prices considering the fact that Hungry is also a small open economy. Simic and Malesevic-Perovic (2012) investigate the monetary policy transmission mechanism in the Balkans in order to evaluate the reaction of output and prices to a shock in monetary policy. The six countries they take under investigation are Turkey, Bulgaria, Croatia, Macedonia, Slovenia, and Romania. They use monthly data from 2000 to 2011 and structural vector autoregressive (SVAR) model. For the six countries, an increase in interest rates results to have mixed outcomes in output and prices by affecting it both negatively and positively. However, the results in all countries appearing to be statistically insignificant implying weak effectiveness of monetary policy to affect the economy. In an earlier study in Macedonia Fetaiand Zeqiri(2010) also studies the money supply and exchange rate channels effectiveness in transmitting the monetary policy effect on real economic activity. Using a VAR methodology, they conclude that shocks in money supply stocks do not generate a significant effect on real GDP. However, one percent shock in the exchange rate does significantly affect the real GDP.

In Albania, the monetary transmission mechanisms that appear to be functioning are the interest rate, exchange rate, and credit channel. Koka, Bozdo, and Çuçi, (2013) explore the impact financial crisis of 2008 and the effect of monetary policy in Albanian economic growth during the period of 2000-2012. From 2000, BoA employed indirect monetary instruments such as changing the base interest rate. During this period the impact of monetary policy through interest rate channels, appear to be important.

Exchange rate channel is considered as the most dominant channel in Albania due to the structure of the economy where imports and exports constitute almost 80% of GDP. Muçoet, al (2004) conducted as a study to examine the importance of monetary transmission mechanism in Albania during this period of early transition. The paper used VAR and concluded that exchange rate stability played an important role in keeping inflation low during this period and the

transmission link from money supply to prices was weak. In addition, Peeters (2005)also conducted a study by questioning the exchange rated pass-through in Albania as one of the main monetary transmission mechanism. According to his findings, exchange rate transmission channel in Albania has begun to lose its importance. Due to different development in economy, other channels such as wage or credit have begun to replace it. Shijaku et, al (2007) discover that the exchange rate channel is not very strong in Albania and the two important channels of transmission mechanism are the money supply and expectation channel. The literature on the monetary transmission mechanism in Albania finds little evidence and effectiveness of this mechanism (Vika, 2009).

The primary objective of monetary policy implemented by BoA is maintaining inflation of around 3% (BoA, 2018).To achieve this objective, BoA implements the inflation targeting regime, while the exchange rate is freely determined by the demand and supply ratio for the currency in the market. In the operational aspect, monetary policy is realized through indirect intervention in the financial markets. According to BoA (2016), monetary policy has contributed to economic development. BoA has reduced interest rates two times through the first half of the year by lowering it to 1.25%. The interest rate remained at this level throughout the remaining period of the year. In addition, it has narrowed the interest rate corridor in the interbank market, determined by the interests of loans and the overnight deposit. It has also continued to inform the public for continued implementation of expansive monetary policy.

3. Research model and methodology for empirical analysis

Driven by literature review and the nature of data, VAR methodology is chosen to study transmission mechanism in Albania. These models have been used widely in empirical research dealing with time series data. They are capable of describing the dynamics of time series in between variables. Generally, these models are presented through impulse response function or variance decomposition and their main objective is exploring the interrelationship between variables. Elbourne and Haan (2006) suggest applying the VAR methodology because it is better fitted to study the transmission mechanism in transition countries because it needs less data requirement. They also suggest using variables in levels irrespective of being integrated.

In this paper, an unrestricted VAR is implemented. An unrestricted VAR includes all the variables in each equation. Therefore for each variable, an equation is estimated where the independent variables are lag its own, contemporaneous and lags of other variables included. A simple VAR model with two variables *y* and *x* is expressed as:

$$Y_t = c_1 + A_1 Y_{t-1} + \cdots A_p Y_{t-p} + B_0 X_t + \cdots + B_s X_{t-s} + u_t$$

$$X_t = c_2 + C_1 X_{t-1} + \cdots C_p X_{t-p} + E_0 Y_t + \cdots + E_s Y_{t-s} + u_t$$

Where Y_t a vector of k variables and each model is a function of *p* length of those variables and a set of exogenous variables (Holden, 1995).

Estimation for each equation is conducted by OLS, therefore for this model to be consistent the variables need to be stationary. It is also assumed that:

$$E\ (u_t) = 0, E\ (u_t u_s) = 0$$

In this regression *LogGDP* is the dependent variables which is regressed on its own lagged variables and independent variables; interest rates, exchange rates, money supply, and remittances and this procedure is followed for each dependent variable.

To conduct the empirical analysis quarterly data were obtained from the International Financial Statistics (IFS) database of IMF for monetary policy rates, nominal exchange rates, and M2. While nominal GDP and remittances were obtained from BoA. This study is conducted from 2002 to 2016, which is the period BoA had implemented inflation targeting regime and indirect monetary policy instruments. Table 1 represents the variables used in the empirical analysis and description. Some of the variables below, taken into consideration in this analysis are in their natural logarithmic forms such as M2, real GDP, and remittances. The remaining two variables exchange rate and interest rate are included in their original form. Nominal GDP and M2 is converted to real by dividing it with consumer price index (CPI).   In the case of the exchange rate, the first choice was to select a real effective exchange rate. However, due to the lack of data for this variable, Leke/ Euro exchange rates were chosen as a proxy.

Table 1: Variables and their description

Variables	Description
GDP (*yd*)	Real GDP
Money supply (*m*)	Domestic money supply *m*, represented by domestic logarithmic real values of monetary aggregate M2.
Monetary policy rates (Repo) (*r*)	Monetary policy-related interest rates *r*.
Exchange rates (*e*)	Exchange rate *e*, represented by the logarithmic form of domestic currency for Euro, period average rates.
Remittances (*yf)*	Remittance *yf,* approximated by the logarithmic form of remittance in domestic currency.

Based on literature studied two hypotheses are constructed. It is expected that monetary transmission mechanisms to be effective and have a significant affect real GDP and remittances a positive and significant effect. Therefore two hypothesis build are:

H1: Monetary transmission mechanisms channels are effective and have a significant impact on real GDP
H2: Remittances have a positive and significant impact on real GDP

Table 2: descriptive statistics

	Log Gdp	LM2	Log remittance	Repo rates	Exchange rates
Mean	13.94589	13.22207	10.06440	4.710526	133.2967
Median	14.02259	13.27691	10.06420	5.000000	136.8160
Maximum	14.12626	13.40596	10.51557	8.500000	141.6823
Minimum	13.61434	12.87941	9.631497	1.250000	121.7885
Std. Dev.	0.153860	0.155769	0.192653	1.794579	7.203664
Skewness	-0.867175	-0.782240	0.003575	-0.258531	-0.485154
Kurtosis	2.319798	2.361202	2.388137	2.641201	1.497719
Jarque-Bera	8.242776	6.782190	0.889265	0.940713	7.596071
Probability	0.016222	0.033672	0.641060	0.624780	0.022415

Sum	794.9159	753.6580	573.6708	268.5000	7597.913
Sum Sq. Dev.	1.325685	1.358783	2.078457	180.3487	2905.995
Observations	57	57	57	57	57

From descriptive statistics calculated in table 2, it can be controlled if the variables are normally distributed or not. Skewness indicates the degree of asymmetry of a distribution around it's mean and kurtosis characterizes the peak or flatness of the distribution. An asymmetric distribution has a skewness of zero and kurtosis of three. Looking at the figures reported in table 2 all the variables have a skewness near zero but not a kurtosis near three which lead to conclude that variables distribution is shorter than a normal distribution.

In the empirical part, the effect of the money supply, interest rate, and exchange rate in Albania, as well as remittance, on Albanian income is examined using VAR analysis. Firstly, the stationarity of mentioned variables is tested using Augmented Dickey-Fuller (ADF) Unit Root test and Philips Perron (PP). After testing the stationarity of variables, the VAR model is conducted. We begin the analysis by testing the variables for stationarity. The ADF and PP stationarity test is conducted by using the EViews program. (Turan, 2015). Results from table number 3 indicate that the exchange rate is not stationary in level. In addition, the natural log of real GDP, interest rates and the natural log of remittances have probability values near 0.05, which lead us to take the first difference of this series in order to obtain better results. Figure 1 shows that these time series have trend and seasonality. Trend and seasonality affect the value of the series at a different time and make them non-stationary. Taking the first differences will convert this time series into stationary series. In contrast, the money supply appears to be stationary in level; therefore, this variable is included in the model without differencing.

Table 3: ADF and PP test results.

Variables	ADF test t-values	Probability values	First difference t-values	Probability values
GDP	-3.627015**	0.0081	-6.86648***	0.0000
Money supply	-2.781262***	0.0685		
Monetary policy rates (repo)	-4.108975**	0.0001		
Exchange rates	--0.86502*	0.3337	-5.9550***	0.0000
Remittances	-7.402913**	0.0000		

*,**,*** *shows significance levels at 10%, 5% and 1% respectively. The hypothesis of ADF tests are as following H₀: ρ =1 (contain a unit root, the data is not stationary) Hₐ: ρ < 1 (do not contain a unit root, the data is stationary).*

After testing the stationarity of the dependent and independent variables, an unrestricted VAR model is applied to the data. An important issue in a VAR model is to find the number of lags, which yield the best results. In choosing the lag number for implementation of the model Schwarzn Information, criterion (SC) and Hannan-Quinn Information Criterion (HQ) suggest using 1 lag. However, Sequential modified LR test statistic (LR), Final predictor error (FPE) and Akaike Information Criterion (AIC)) suggest using 4 number of lag. Looking at this results it appears that the number of lags changes depending on the criteria chosen. In general, AIC is used in a small sample and HQ works better in large samples. However, before choosing the number of lag we control for serial correlation. By conducting Lagrange Multiplier (LM) serial correlation test the model has no serial autocorrelation, therefore the number of lags chosen based on LR, FPE and AIC are 4. Table 4 represents the VAR model t-statistic. T-statistic of this table represent the significance of the lagged values of the variables for all the equations. VAR models results indicate that real GDP of two quarters before, lag (-2) has a significant and positive impact on current GDP. However, looking at other variables and their lags, only interest rates at lag (-4) and LM2 (-1) is significant to explain GDP at 5% level.

Vector Autoregression Estimates
Included observations: 52

	Lgdpreal	LM2	Log remittance	Repo rates	Exchange rates
D(Lgdpreal(-1))	-0.010421	-0.540708	3.439743	-0.628456	-21.58289
	(0.18429)	(0.27035)	(2.99689)	(3.45371)	(29.1525)
	[-0.05655]	[-2.00004]	[1.14777]	[-0.18197]	[-0.74034]
D(LgdpreaL(-2))	-0.446337	-0.360470	1.159408	-2.557500	32.42133
	(0.18374)	(0.26955)	(2.98799)	(3.44345)	(29.0660)
	[-2.42918]	[-1.33733]	[0.38802]	[-0.74271]	[1.11544]
D(LgdpreaL(-3))	0.070222	0.050139	3.776546	1.536655	17.31945
	(0.17217)	(0.25257)	(2.79983)	(3.22661)	(27.2356)
	[0.40787]	[0.19851]	[1.34885]	[0.47624]	[0.63591]
D(LgdpreaL(-4))	0.229292	0.307399	3.304639	-0.034118	24.01929
	(0.16546)	(0.24273)	(2.69074)	(3.10089)	(26.1744)
	[1.38578]	[1.26642]	[1.22815]	[-0.01100]	[0.91766]
LM2(-1)	-0.214250	0.740223	-0.434673	-1.001392	33.60230
	(0.08044)	(0.11801)	(1.30816)	(1.50756)	(12.7252)
	[-2.66339]	[6.27263]	[-0.33228]	[-0.66425]	[2.64060]
LM2(-2)	0.038787	-0.018202	1.452236	-0.586817	-18.83276
	(0.11288)	(0.16559)	(1.83565)	(2.11546)	(17.8565)
	[0.34361]	[-0.10992]	[0.79113]	[-0.27739]	[-1.05467]
LM2(-3)	-0.045852	-0.646388	-2.194380	-0.921304	-17.50266
	(0.11250)	(0.16504)	(1.82955)	(2.10843)	(17.7971)
	[-0.40756]	[-3.91648]	[-1.19941]	[-0.43696]	[-0.98345]
LM2(-4)	0.109956	0.825276	0.852411	1.918632	10.44798
	(0.08926)	(0.13095)	(1.45162)	(1.67289)	(14.1208)
	[1.23181]	[6.30222]	[0.58721]	[1.14690]	[0.73990]
Logremitanca(-1)	0.005251	0.023242	-0.097367	0.542391	-0.676912
	(0.01155)	(0.01694)	(0.18775)	(0.21637)	(1.82635)
	[0.45482]	[1.37228]	[-0.51860]	[2.50679]	[-0.37064]

Logremitanca(-2)	-0.006531	0.003987	-0.126088	0.235765	0.483686
	(0.01175)	(0.01724)	(0.19112)	(0.22025)	(1.85915)
	[-0.55568]	[0.23124]	[-0.65973]	[1.07042]	[0.26017]
Logremitanca(-3)	-0.003523	-0.013113	-0.260088	0.417496	-2.442181
	(0.01174)	(0.01722)	(0.19084)	(0.21993)	(1.85640)
	[-0.30022]	[-0.76169]	[-1.36287]	[1.89833]	[-1.31555]
Logremitanca(-4)	-0.002009	0.017667	0.293221	0.355431	1.888181
	(0.01131)	(0.01658)	(0.18385)	(0.21187)	(1.78838)
	[-0.17771]	[1.06528]	[1.59493]	[1.67759]	[1.05581]
Repo rates(-1)	-0.006069	-0.033308	0.019874	0.662180	-0.279769
	(0.00854)	(0.01252)	(0.13882)	(0.15998)	(1.35040)
	[-0.71099]	[-2.65977]	[0.14316]	[4.13909]	[-0.20718]
Repo rates (-2)	0.012493	0.034129	0.254120	0.432972	2.201337
	(0.01034)	(0.01517)	(0.16817)	(0.19381)	(1.63591)
	[1.20807]	[2.24965]	[1.51107]	[2.23403]	[1.34563]
Repo rates (-3)	0.007129	0.025797	-0.251261	-0.087795	-2.493651
	(0.01066)	(0.01564)	(0.17333)	(0.19975)	(1.68609)
	[0.66886]	[1.64983]	[-1.44961]	[-0.43952]	[-1.47896]
Repo rates(-4)	-0.016522	-0.024897	-0.024530	-0.104010	0.891851
	(0.00838)	(0.01230)	(0.13630)	(0.15707)	(1.32583)
	[-1.97132]	[-2.02496]	[-0.17997]	[-0.66218]	[0.67267]
D(Exchange rates(-1))	-0.000244	-0.002633	0.003415	0.006238	0.257989
	(0.00122)	(0.00178)	(0.01978)	(0.02280)	(0.19241)
	[-0.20049]	[-1.47586]	[0.17263]	[0.27363]	[1.34080]
D(Exchange rates2))	0.001954	0.003610	0.007172	0.016881	-0.028372
	(0.00123)	(0.00181)	(0.02008)	(0.02314)	(0.19532)
	[1.58227]	[1.99274]	[0.35718]	[0.72953]	[-0.14526]
D(Exchange rate (-3))	0.000997	0.003274	0.022804	-0.013469	0.131583
	(0.00119)	(0.00175)	(0.01937)	(0.02232)	(0.18841)
	[0.83710]	[1.87379]	[1.17737]	[-0.60342]	[0.69838]
D(Exchange rate (-4))	-0.000189	-0.007064	-0.016671	0.005516	-0.119605
	(0.00113)	(0.00166)	(0.01845)	(0.02126)	(0.17946)
	[-0.16636]	[-4.24476]	[-0.90368]	[0.25946]	[-0.66649]
C	1.572538	1.007314	16.21984	-7.406122	-96.71028
	(0.50380)	(0.73907)	(8.19285)	(9.44169)	(79.6967)
	[3.12135]	[1.36294]	[1.97976]	[-0.78441]	[-1.21348]

After estimating VAR in EViews in order to receive a better intuition of the model dynamics impulse response functions are obtained. These functions provide reaction of one response variable to one-time shock in an impulsive variable in a system that involves a number of other variables as well. For this model, we shock the system to obtain impulse response functions. For each depended variable it is checked how shock in these variables will affect GDP. The horizontal axis shows the number of quarters since the shock of monetary policy. Therefore, Figure 2 shows that an increase in interest rates has a negative impact on real GDP unit second quarter and becomes positive from second to a third quarter. Afterward, it becomes again negative till six quarter and then continues fluctuating this pattern.

Figure2: Interest rates effect on GDP growth in Albania

Response to Cholesky One S.D. (d.f. adjusted) Innovations

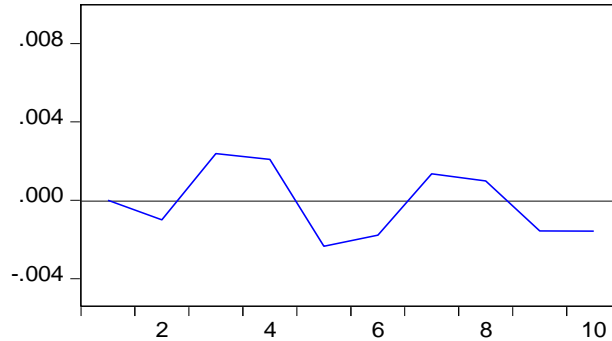Response of D(LGDPREAL) to MONETARY_POLICY_RELATED_INTEREST_RATES__REPO_

Figure 3 represents the result of exchange rates. The VAR analysis indicates that the exchange rate channel of monetary policy does not have a significant impact on GDP. Analyzing the graph of impulse response function a shock in exchange rates it is firstly negative and afterward becomes positive.

Figure3: Exchange rates effect on GDP growth in Albania

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of D(LGDPREAL) to D(EXCHANGE_RATE_LEKE_EURO_AVERAGE_PER_PERIOD)
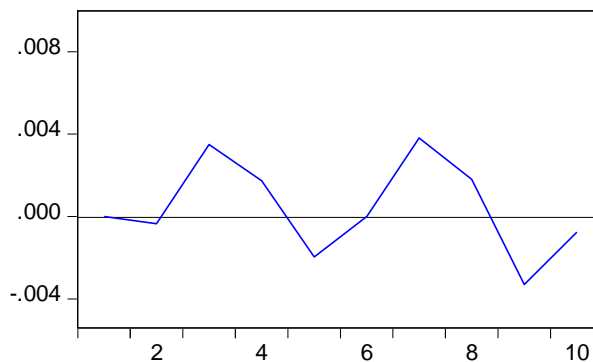
Figure 4 reports the results of an increase in the money supply on GDP. An unexpected increase in money supply has a negative impact on output only for 3 quarters and afterward, this impact disappears and the effect is negative but for all periods, the impact appears to be significant only at first lag. According to standard economic theory, an increase in the money supply would have a positive impact on GDP by lowering interest rates and therefore leading to more consumption and borrowing.

*F*igure4: Money supply effect on GDP growth in Albania

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of D(LGDPREAL) to LM2
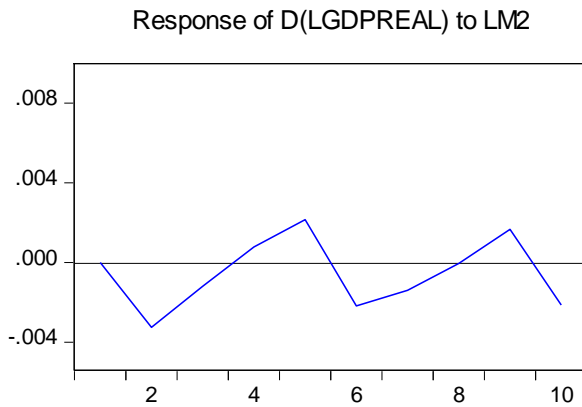
Remittances of Albanian economy represent an important source of finance but according to our findings, they do not show a significant impact. In the figure, number 5 an unexpected shock of this variable has a positive impact in the beginning for approximately 2 quarters and afterward this impact is negative continuing with this pattern. However, in the whole period, this impact appears to be very small and not statistically significant.

Figure 5: Remittances effect on GDP growth in Albania

Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of D(LGDPREAL) to LOGREMITANCA
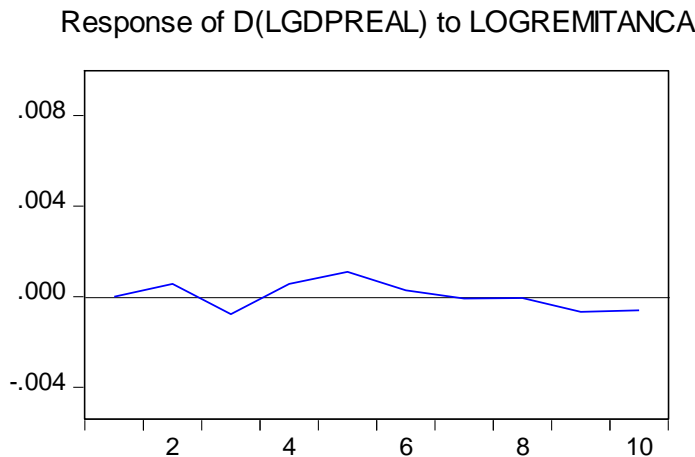
To test the stability between the monetary transmission mechanism and real GDP, CUSUM and CUSUMSQ test are used. In order for the regression to be stable at 5% significance, CUSUM and CUSUMSQ need to be between the two red lines, which show the confidence interval of the two tests. Brown, Durbin & Evans (1975) CUSUM stability test in figure 6 and CUSUMSQ in figure 7 show that blue line lies within a 95% confidence interval between the red lines.
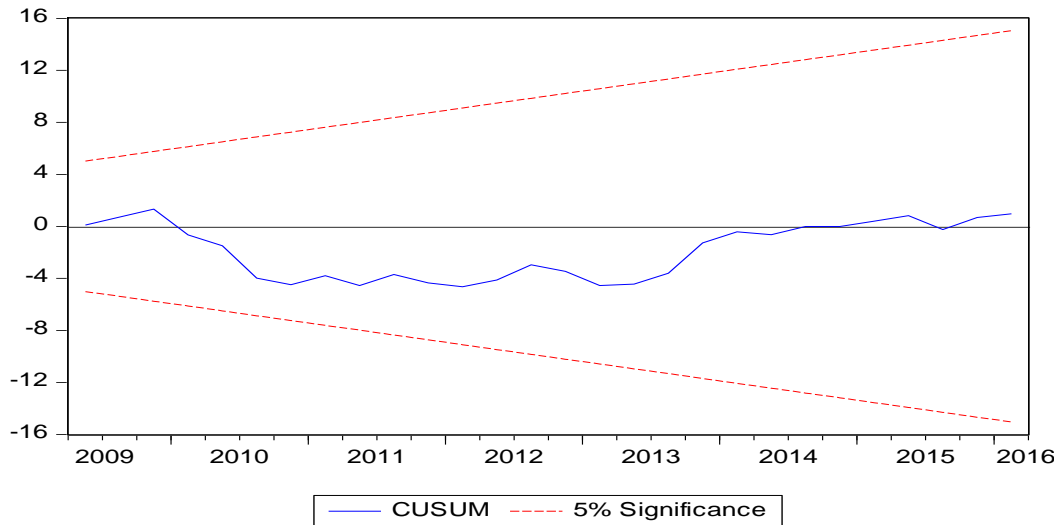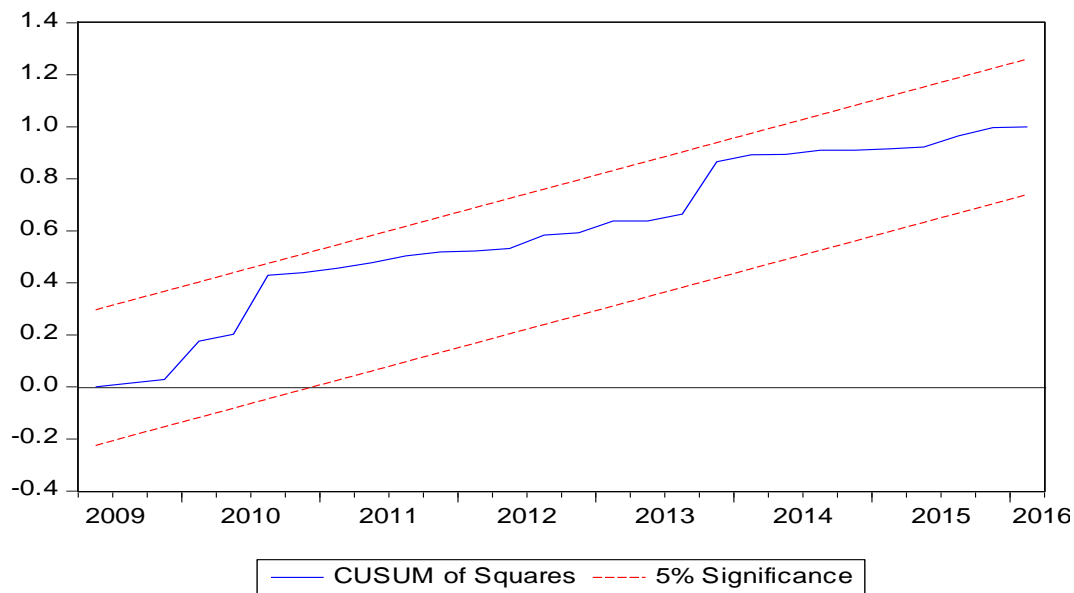
Figure 6: Cusum test

Figure 7: Cusum of square test

Monetary transmission mechanism can be described as the process through which monetary policy decision affect real economic activity and price levels. It is important to know the effectiveness of the monetary transmission mechanism in Albania and which one is the most important channel. The empirical findings of the VAR model in this paper suggest that there is little evidence of the monetary transmission mechanism in Albania which is in accordions with the finding of literature.

The VAR model results reported in table 4 show a significant effect of interest rates variable in the first (-4) and LM2 (-1) at 5% level. They indicate that interest rates have a significant effect on real GDP, which means an increase in interest rates, decreases real GDP after twelve months. In other words, an increase in the interest rates will show its negative effect on real GDP after twelve months. An increase in money supply according to the theory causes a decrease in interest rates, which decreases lending and therefore bust investments and GDP, but in the first

lag the impact of this variable according to our model is negative. Exchange rates and remittances, on the other hand, do not have a significant impact on real GDP. In conclusion, our findings appear to be in accordance with the theory and literature finding in Albania. Not very strong evidence is found regarding the effectiveness of this mechanism in Albania. It is important to mention that Albania is a county in transition with a not very developed financial system, inexistent capital market, a high degree of informality. Therefore, reforms in decreasing the degree of informality, reforms which will lead to a more developed financial system might lead to a more effective monetary transmission mechanism.

4. Conclusion

This paper has been studying the monetary transmission mechanism in Albania under inflation targeting regime from 2002 to 2016 by using quarterly data. The study uses a VAR model to analysis main monetary transmission channels such as interest rates, exchange rates, and money supply. An unrestricted VAR model is conducted continuing with impulse response function estimation. While analyzing the impact of these channels it also includes in the research remittances. The GDP impulse response functions are obtained to study how a sudden shock in monetary transmission mechanism channels affects real GDP. Very small evidence is found regarding the real effects of monetary policy in Albania. Only interest rates have a small impact on real GDP. For the Albanian economy, the monetary transmission mechanism is based on the traditional channels of interest rates and according to our findings; this channel appears to be the most important channel. A sudden shock in interest rates has a significant negative impact in real GDP, in accordance with what literature suggest after twelve months. Our findings suggest that interest rates and money supply have an important and significant impact on output while for exchange rate no evidence is found. These findings might indicate a weakness of monetary policy in transition countries such as Albania. Albanian economy is still facing a transition period; institutions are still in the face of being constructed. Therefore, there are many challenges faced such and the effectiveness of the monetary transmission mechanism is not at the same level as developed countries.

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