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Vugar Rahimov, Shaig Adigozalov, Fuad Mammadov

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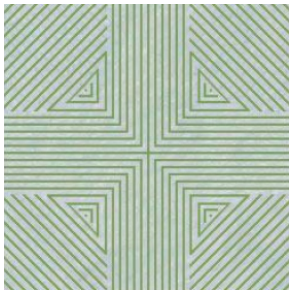

Determinants of Inflation in Azerbaijan[1]

Vugar Rahimov[2], Shaig Adigozalov[3] , Fuad Mammadov[4]

October 12, 2016

Abstract

This paper assesses the main determinants of inflation in Azerbaijan during 2003-2015 years. Using quarterly data on CPI, trade partner's CPI, nominal effective exchange rate (NEER), money supply (M2), real non-oil gross domestic product (NGDP) and credits we employ vector auto regression (VAR) analysis in order to conduct our study. Impulse response and variance decomposition analysis suggest that inflation is mostly explained by foreign inflation, fiscal policy, exchange rate and own shocks. Whereas monetary policy and supply shocks do not play any essential role in explaining inflation. Among these variables inflation expectations, foreign inflation and monetary policy (credit variable) have quick effect on domestic headline inflation, whereas the effect of fiscal variable is relatively slower: it takes two quarters to fully reflect on prices. We also find that appreciation of exchange rate has deflationary effect on domestic inflation.

JEL Classification: E31; E50

Keywords: consumer price index, inflation, determinants of inflation, historical decomposition, developing country, structural vector autoregression

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[2] Macroeconomic Research Department, Center for Research and Development, Central Bank of Azerbaijan, 90 Rashid Behbudov str., AZ1014 Baku, Azerbaijan, vugar_rahimov@cbar.az

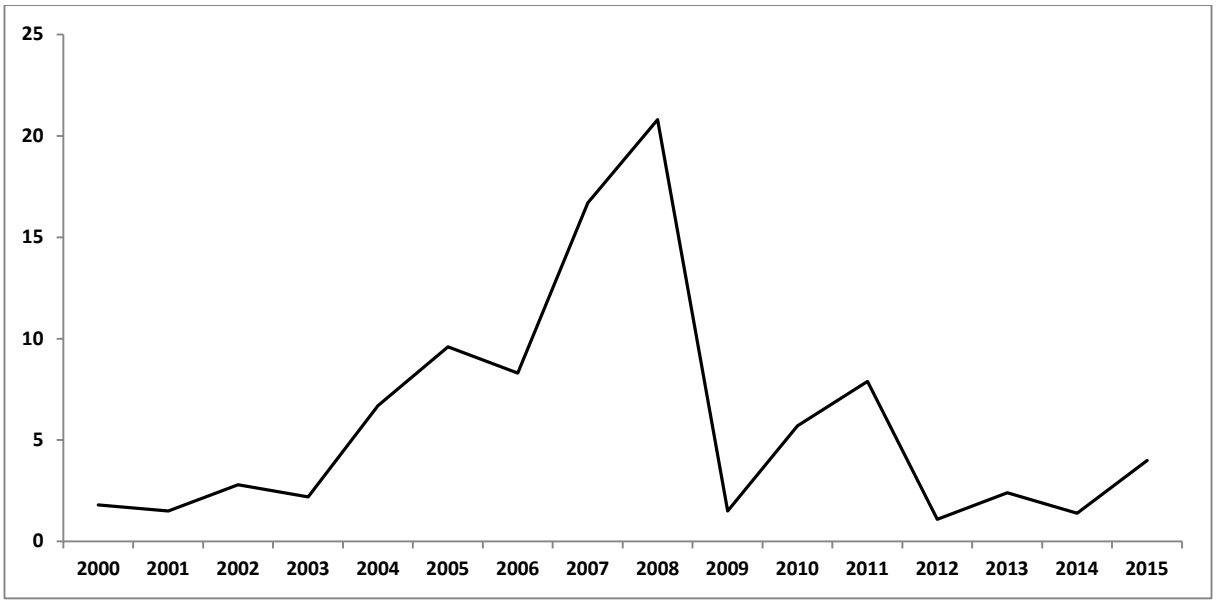
[3] Macroeconomic Research Department, Center for Research and Development, Central Bank of Azerbaijan, , 90 Rashid Behbudov str., AZ1014 Baku, Azerbaijan, shaig_adigozalov@cbar.az

[4] Macroeconomic Research Department, Center for Research and Development, Central Bank of Azerbaijan, , 90 Rashid Behbudov str., AZ1014 Baku, Azerbaijan, fuad_mammadov@cbar.az

Introduction

Azerbaijan is a small open economy and oil export is the major factor fueling the economic growth. As one might expect inflation in such economy mostly will be driven by terms of trade and foreign prices shocks and those factors that are affected by them. In particular, inflation in Azerbaijan have been affected by high domestic absorption, monetary expansion as a result of oil boom and therefore expansionary fiscal policy. Since 2004 Central Bank of the Republic of Azerbaijan (CBAR) adopted a fixed exchange rate regime to prevent appreciation of exchange rate and to curb inflation expectations. Though, inflation was rising up to 2008, it became stable over the six years ahead, despite the global financial crisis. However, inflation gathered a speed from 2015 in response to devaluations expectations and CBAR decision to move to a floating exchange rate regime in the face of falling oil prices. This paper intends to capture the key sources of inflationary pressure in Azerbaijan, in part relying on the exposition of the above mentioned stylized facts.

Figure 1: Annual (headline) inflation dynamics in Azerbaijan (2000-2015)



***Source*: State Statistical Committee of the Republic of Azerbaijan**

Azerbaijan has experienced volatile inflation till 2009 and since then enjoys low inflationary environment. Figure 1 plots annualized quarterly headline inflation dynamics between 2000 and 2015. Headline inflation in Azerbaijan has been volatile during first half of the examined period. The figure illustrates that inflation has reached double-digit level in 2006 and hits its peak in 2008 (at around 24 percent). But since 2009 inflation has been relatively stable. The period 2005-2008 is also characterized by huge inflows of petro dollars into the country and massive increase in government expenditures, which is fueled by oil revenues.

Hence, developments of inflation in Azerbaijan can be examined into two subperiods: *high-trending (2000-2008)* and *low-stable (2009-2015)* regimes. Windfall of oil revenues due to realization of Baku-Tbilisi- Ceyhan oil pipeline project gave a great opportunity to finance budget

social and infrastructure projects. Increase in government spending indeed was huge between 2003 (0.8 bln. manats) and 2008 (11.0 bln. manats). Positive demand shocks accompanied by persistent increase in government budget spending (consumption as well as investment) and additionally sharp oil price hikes (from $56.75 pb in 2005 to $133.90 pb in August 2008) contributed to upward pressure on actual as well as inflation expectations. Moreover, increase in administrative prices on average by 17% and 57%[5] [6] in 2005 and 2007 accordingly ensured higher inflation. Aftermath, headline inflation jumped from 10% in 2005 to 20.8% by end of the 2008.

Since 2009 however, inflationary iceberg has been melt down despite the surge in world oil prices from 42$ per barrel (end of the 2008) to 111$ pb (June of 2014). This fact partly can be explained by the impact of disinflation program enacted by the December of 2007. In 1 April, 2007 CBAR for the first time started to implement interest rate corridor and increased policy rate from 9.5% to 12%, from 1 June of 2007 increased to 13%. CBAR also expanded its sterilization program by increasing short term notes reaching 153 mln. manats. On the other hand State Oil Fund of the Republic of Azerbaijan (SOFAZ) was also (probably) contributor to curbing inflation down, since it has accumulated substantial resources to mitigate the possible impact of adverse macro shocks on the inflation (IMF, 2013).

Though, inflation was rising up to 2008, it became stable over the six years ahead, despite the global financial crisis. However, inflation gathered a speed from 2015 in response to devaluations expectations and CBAR decision to move to a floating exchange rate regime in the face of falling oil prices. Indeed, during 2008-2014 the credible fixed exchange rate policy of the CBAR encouraged de-dollarization in the country and possibly one of the underlying factors behind the lower inflation of the post-oil boom years despite the significant expansion in the money supply Huseynov and Ahmadov (2012). Reversal took place when oil prices plummeted in 2014 and forced CBAR to devaluate the currency by 34% once in 21 February, 2015 and the second by 48% in 21 December, 2015 and abandon fixed exchange rate. The impact was immediate and transmitted to higher inflation.

We will employ structural VAR framework to come up with identified shocks to explain time profile of the inflation. This paper studies determinants of headline inflation in Azerbaijan over the 2003Q1 and 2015Q4.

Our analysis reveals that inflation inertia, trade partners' inflation, growth rates of nominal effective exchange rate and money supply are main determinants of inflation in Azerbaijan. We also found that the non-oil GDP growth rate and Central Bank's supplied to banks are of quite low importance in explaining Azerbaijan's headline inflation.

[5] On average administrative goods constitute 15% of consumer basket.
[6] Authors calculations.

The rest of the paper will be structured as follows. In section two we provide a literature review related to our study. The section three will be devoted to data and methodological issues. The fourth section contains the results and final remarks.

2. Literature review

Controlling inflation and achieving price stability is one of the main tasks of central banks (CBs). Why do CBs care about inflation and price stability? Indeed, there is a strong consensus that high inflation is harmful for the economic growth (Fischer, 1993; Barro, 1997, 2013; Khan and Senhadji, 2000; Fischer, Sahay and Vegh, 2002). The channels by which high inflation may impair long-run growth of economic activity are causing cost of living to rise, hindering effective distribution of resources (Tommasi, 1996) restricting development of financial intermediation (Boyd, Levine and Smith, 2000) and lowering competitiveness of economy. So, understanding causes of inflation is vital to effectively control inflation and impede unpleasant consequences to economic growth. In this regard, we attempt to assess the determinants of inflation in Azerbaijan.

Inflation can be shaped by two main factors: cost-push inflation and demand pull inflation. Cost-push inflation is determined by supply side factors, because it is directly linked to the cost of the production. The cost of production may increase subject to higher commodity/energy prices, higher wages, higher imported prices or tax increase. Contrary, demand-pull inflation can be triggered by demand factors such as changes in government spending, money growth or in inflation expectations. Conventional view is that while supply-side factors are the main driving force of long-run behavior, demand side factors are the cause of short-term inflation.

Ball (1993) states that inflation in the long run is determined mostly by money growth. In other words, if the money growth exceeds the output growth over time leads to increase in general price level. Particularly, it is long-believed that inflation is a cause of excess money supply in the market. If supply of money exceeds the amount of people wish to hold, than excess money will have upward pressure on the inflation. Most famous monetarist Milton Friedman famously stated that "inflation is always and everywhere a monetary phenomenon".

In short-run however, since the prices are sticky monetary authority may increase money supply to trigger demands on goods and services without any inflation concerns. With price rigidities increase in money supply will lower interest rates which causes demand on good and services to increase. Therefore excess money is a main culprit of inflation, not the money supply growth per se. Gerlach and Svensson (2003) found excess money, measured by deviations from the equilibrium demand for money, is important, not the growth rate for Euro are countries.

When prices become flexible over time, any shock triggering excess demand on goods and services, measured by output gap, generates upward on pressure inflation. Even if output gap variable is very successful in predicting inflation in some advanced (for instance, Claus (2000) in New Zealand, Turner (1995) in major seven economies, Watanabe (1997) in Japan, Jarociński,

and Lenza (2016) in Euro Area) countries, it doesn't seem that inclusion of this variable increase performance of the inflation model. Since, cycle is a trend in emerging and developing countries (Aguiar and Gopinath, 2007), it is reasonable that Loungani and Swagel (2001) didn't find any evidence to support usefulness of output gap in forecasting inflation in developing countries.

Time profile of inflation also depends on the monetary regime that is being adopted. In fixed exchange rate regimes central bank loose independent on monetary policy, so interest rates almost do not play a significant role in determining inflation. Whereas in floating exchange rate regime which in many cases countries also adopts inflation targeting regime interest rate plays a major role in anchoring inflation. For instance, in Caribbean countries, Greenidge and DaCosta (2009) show that exchange rate is one of the underlying factors affecting inflation in floating exchange rate regime countries. Loungani and Swagel (2001) examine 53 developing countries and find that monetary factors such as money growth and exchange rates play more important role in determination of inflation in countries with floating exchange rate regimes while in fixed exchange rate countries inertial factors are dominated factors.

Some studies incorporates Taylor rule and Fisher equation to inflation models where interest rates plays a crucial role to stabilize inflation. For instance Golinelli and Orsi (2002) found significant effect on interest rate on inflation for the Czech Republic, Hungary and Poland, Vizek (2007) found it for Croatian; Phan (2014) for Vietnam and many others. Considering weak monetary transmission mechanism (Mammadov and Adigozalov, 2014) and underdeveloped money and financial market (Adigozalov and Huseynov, 2015) we do not expect that monetary indicators such as central bank policy rate or interbank rate will have any significant importance on explaining inflation. Nevertheless, considering the fact that Mammadov and Adigozalov (2014) found marginally significant and small impact of credit channel we include supplied credits of central bank to commercial bank to the system in order to identify monetary shocks.

Additional pressure to inflation comes from dollarization of the economy. Albeit it is believed that dollarization pulls down inflation by eliminating the inflation-bias problem of discretionary monetary policy (Alesina and Barro, 2001 p.382), in countries with bi-currency regimes any (un)expected shocks to exchange rate may significantly generate inflationary pressure, unless the country has sufficient international reserves to sustain stable exchange rate.

Investigating potential causes of chronic-high inflation in Turkey, Saatcioglu nad Korap (2006/7) find that supply-side factors, such as exchange rate, wage indexation and interest rates play major role in Turkish inflation. Similarly, assessing the determinants of inflation in 14 emerging market economies, Mohanty and Klau (2001) conclude that in emerging market economies foreign variables, i.e., exchange rates and import prices are dominant in explaining inflation dynamics. Especially, changes in drive inflation in these countries. Vizek and Broz (2007) results suggest that mark-up and excess money relationships, as well as GDP gap and NEER determine inflation dynamics in Croatia.

Kandil and Morsy (2009) assess the drivers of inflation in GCC (Gulf Cooperation Council) countries over the period 1970-2007. Employing error correction technique, they find that lagged inflation, trade partners' inflation, exchange rate depreciation, money growth and increase of government spending are major determinants of inflation in this region. Ben Ali and Ben Mim (2011) examine monetary and non-monetary determinants of inflation in oil-rich MENA (Middle East and North Africa) countries. They also reveal that inflation expectations (lagged inflation) and world prices have positive effect on inflation dynamics.

A number of papers have assessed inflation determinants in the case of Azerbaijan as well. Using data on both real oil and non-oil GDP, M3, NEER, loan and deposit rates, Adigozalov (2009) employed a cointegration approach. Surprisingly, he found deposit rates as positive contributor to headline inflation. Chubrik et al. (2012) propose two econometric models for inflation process in Azerbaijan: monthly model and quarterly models. Both models suggest that money growth (M3 growth) is the main determinant of Azeri inflation. Hence, the authors show that inflation is "monetary phenomenon" in Azerbaijan. By contrast, Hasanov and Hasanli (2011) conclude that since Azerbaijan is a small open resource-dependent economy, money market approach is not relevant for explaining Azerbaijan's inflation. They show that exchange rate and money supply growth, which is accelerated by oil revenues, are main drivers of inflation process of Azerbaijan.

In a recent paper, Karimli et al. (2016) analyze oil price pass-through to Azeri CPI and confirm that fiscal channel is of great power in shaping of Azeri inflation. They also show cost channel, namely trade partners' CPI, as one of the determinants of inflation. Hasanov (2012) examined different approaches such as Vector Equilibrium Correction Model of markup approach, a simple dynamic Monetary Model, a New Keynesian Phillips Curve and Autoregressive model in forecasting inflation. Study concluded that Vector Equilibrium Correction Model outperforms alternative models for forecasting dynamics of the Azerbaijani inflation. In contrast, Huseynov et. al. (2014) tested a bulk of unstructural models and found that none of the model could bit naïve (random walk) model. Study concluded that failure of the models probably stems from the fact that volatility of the inflation declined dramatically that caused inflation to behave like white noise.

We believe that our study will also shed light and address the question raised by Huseynov et. al. (2014). By employing structural VAR we will try to dig into the time profile of the inflation. Therefore, we believe that our paper will contribute to the existing literature in the following directions: we will explore historical contribution of particular shocks to time profile of inflation, which will serve to better understating nature of inflation on way of adopting inflation targeting in the spirit of Rahmanov et. al. (2013). Moreover, in our study growth of money supply served as an indicator to identify fiscal shock rather than monetary shock what other studies such as in contrast with Adigozalov (2009), Hasanov and Hasanli (2011), Chubrik et al. (2012) in fact did. Instead we include *supplied central bank loans* variable to capture the effects of monetary shock.

3. Data and methodology

3.1. Data

We use quarterly data over the period 2003Q1 and 2015Q4. Inflation defined as a growth rate of CPI and taken from The State Statistical Committee of the Republic of Azerbaijan (SSCRA). Real non-oil GDP is constructed by excluding mining sector and net taxes from the total real GDP. Real GDP itself is taken from the SSCRA and calculated by the average constant 2005 prices on quarterly basis. It is important to note, this indicator is different from the monthly real GDP growth rates which is being published on monthly basis by SSCRA. Moreover, other conceptual methodological difference is that SSCRA considers manufacturing of oil products within the oil sector, in contrast we considered it within the non-oil sector. Our motivation was that even if oil extraction ends, manufacturing sector may import oil and produce oil products.

Credit variable, which is the amount of supplied loans from CBAR to commercial banks, taken from the CBAR. Publicly available statistics on credits published by CBAR have some drawbacks. First, this indicator includes not only supplied loans to commercial banks but also loans to commercial firms. So we excluded latter one to better fit to our purposes. The second issue is that, provided volumes of credit amounts reflects outstanding amount. Since, some part of these loans unrelated to current interest rates, newly supplied loans are much more informative about current state of the economy.

Hence, data on CPI, NEER, trade partners' CPI, Credit and M2 are obtained from CBAR database, while non-oil GDP data is collected from SSCRA bulletins. While data on NEER easily accessible from the CBAR web-site, trade partners' CPI is not publicly available. All variables are seasonally adjusted. In *figure 2.a* and *figure 2.b*, we present all variables in log levels and log differenced forms, respectively.

Figure 2.a : Variables in log levels

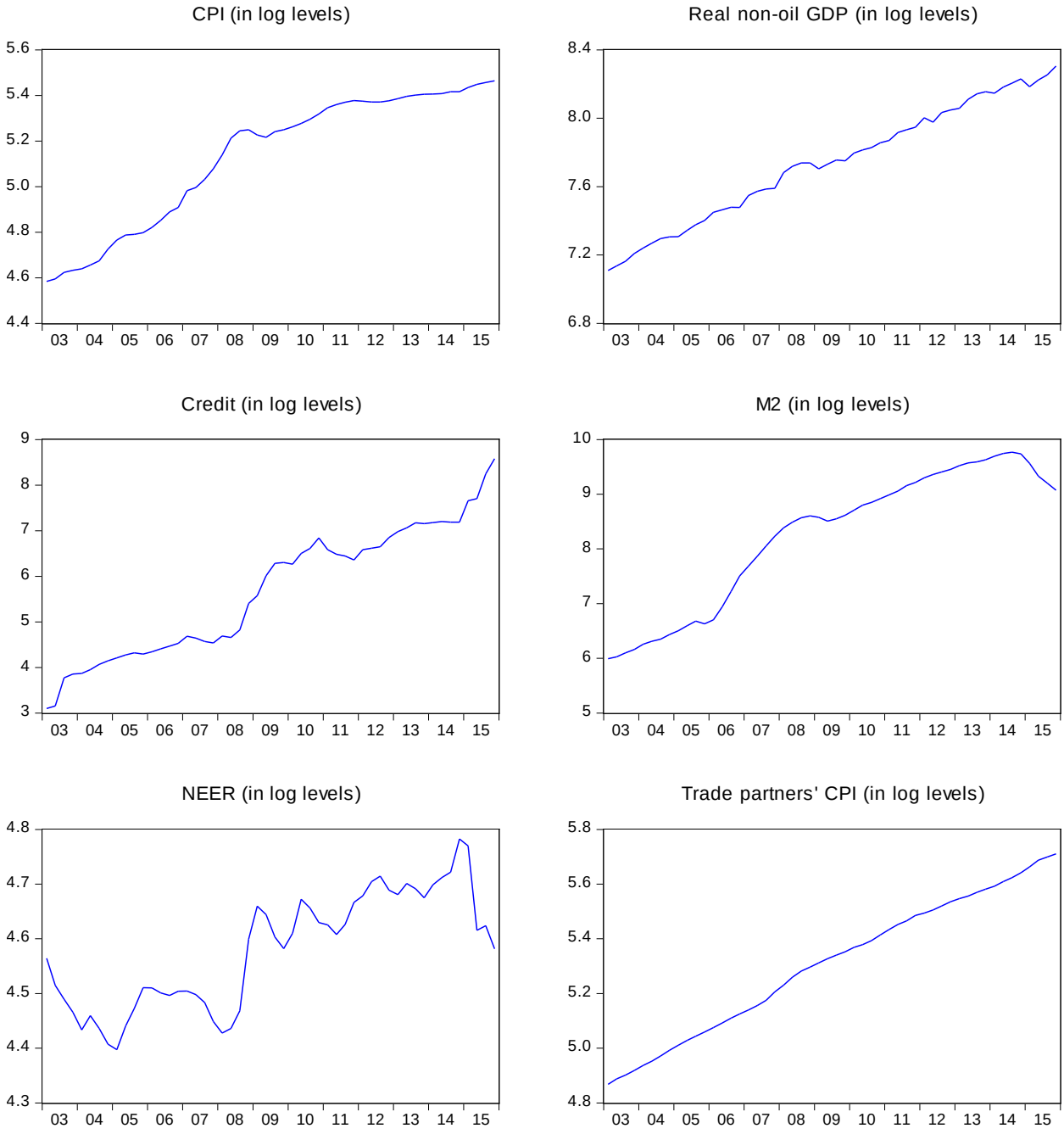
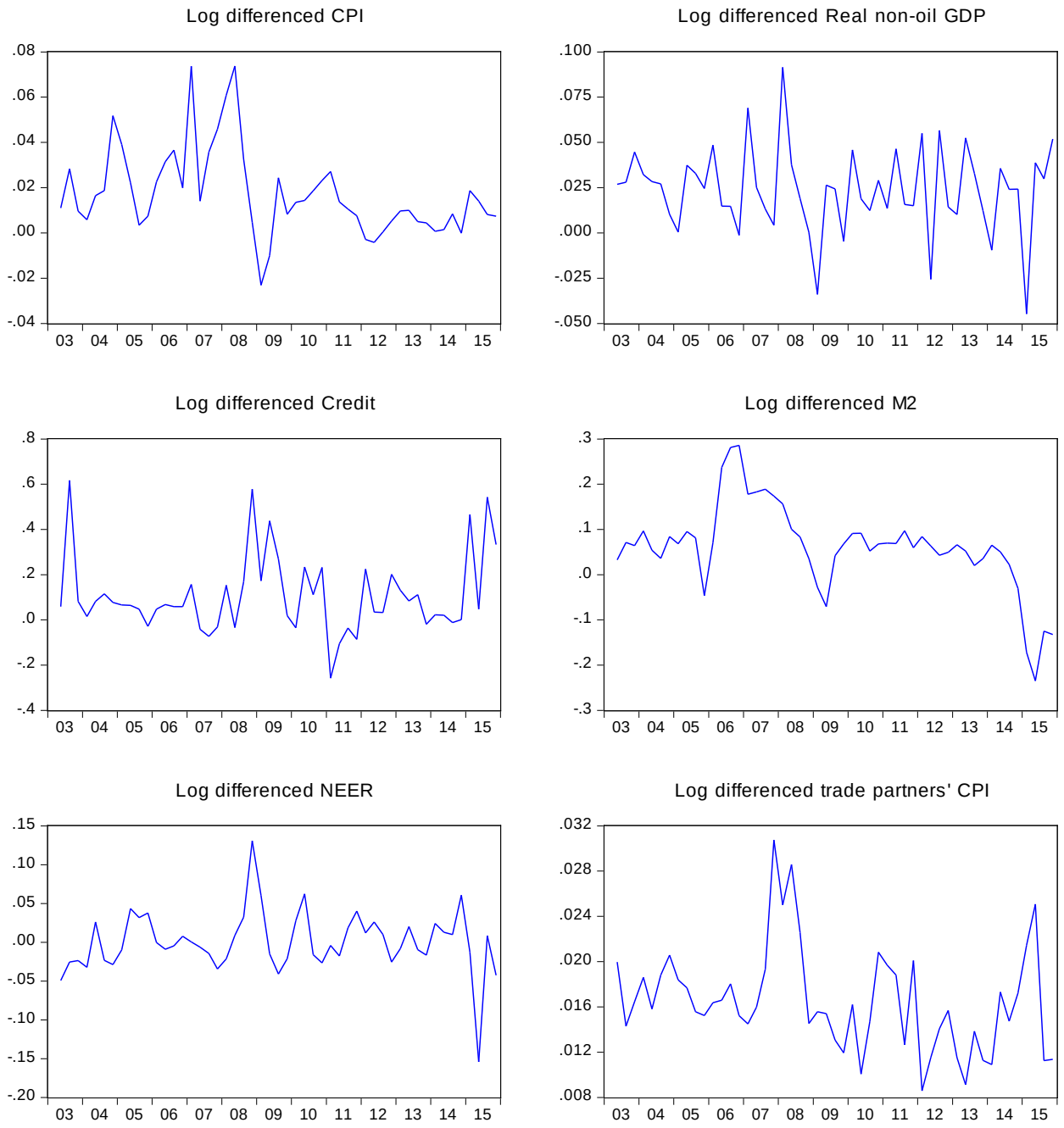


Figure 4.b: Variables in log differenced form



3.2. Methodology

We employ vector autoregression (VAR) methodology to check impulse response functions and to analyze historical contribution of each shock to inflation in Azerbaijan. Ordering of variables is very important in Cholesky decomposition. For identification of the shocks we list the variables in the following lower triangular matrix:

$$\begin{pmatrix} \mu_t^{tp\_cpi} \\ \mu_t^{neer} \\ \mu_t^{rgdpn} \\ \mu_t^{credit} \\ \mu_t^{m2} \\ \mu_t^{cpi} \end{pmatrix} = \begin{pmatrix} a_{11} & 0 & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} & 0 \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & a_{66} \end{pmatrix} \begin{pmatrix} \varepsilon_t^{fprice} \\ \varepsilon_t^{er} \\ \varepsilon_t^{supply} \\ \varepsilon_t^{monetary} \\ \varepsilon_t^{fiscal} \\ \varepsilon_t^{inflation} \end{pmatrix}$$

where, $\mu_t^{tp\_cpi}$, μ_t^{neer}, μ_t^{rgdpn}, μ_t^{credit}, μ_t^{m2}, μ_t^{cpi} stand growth rate innovations to trade partners' consumer prices, NEER, real non-oil GDP, loans to banking sector, M2 and CPI respectively, while ε_t^{fprice}, ε_t^{er}, ε_t^{supply}, $\varepsilon_t^{monetary}$, ε_t^{fiscal}, $\varepsilon_t^{inflation}$ are structural shocks of foreign inflation, exchange rate, supply (cost-push), monetary, fiscal and domestic inflation, respectively.

Considering Azerbaijan as a small open economy and its huge dependence on import, foreign shocks play an important role in determination of Azerbaijan's CPI. Since, the activity in rest of the world is exogenous to Azerbaijan, we can incorporate relevant facts in our identification scheme. In our identification scheme, *trade partners' CPI* is ordered as the first variable. It means, trade partners' CPI does not contemporaneously respond to structural shocks of other variables. Since trade partners' CPI is determined abroad, only foreign price shocks can affect this variable. This variable allows us to capture the effects of foreign prices shocks. On the other hand, by setting trade partner's CPI first in lower triangular matrix will (probably) help us to identify bilateral exchange rate shocks. Also, findings of Karimli et al. (2016) and Hasanov (2010) imply that oil price movements could be helpful to identify exchange rate shocks to inflation, since higher oil prices trigger inflation via import channel by pushing domestic absorption. One can argue that import inflation could be more suitable variable in this context, but as far as import inflation index is not available, we use trade partners' CPI.

Nominal effective exchange rate *(NEER)* comes second in the identification scheme, presuming that it does not contemporaneously respond to supply, monetary, fiscal and domestic inflation shocks. Considering Azerbaijan's import dependence exchange rate shock is exogenous shock for Azerbaijan. So, this variable allows us to capture the effects of exchange rate shock of Manat against main trade partners' currency.

Our third variable is real non-oil GDP (*rgdpn*). Real non-oil GDP growth is expected to identify cost-push shocks to the inflation. It is assumed that the only factors affecting contemporaneously real non-oil activity are foreign prices, exchange rate and supply shocks whereas monetary, fiscal and inflation shocks assumed not affecting at the same time. Reason behind assuming foreign prices and exchange rate shock do effect real non-oil activity is that those unexpected shocks in the short-run may effect relative prices by causing agents to confuse between relative and general price changes. For robustness check we also considered non-oil output gap in the system. Thus, use of output gap is consistent with mark-up approach of inflation. According to this theory long-

run level of price level is set as a markup on some combination of input prices, than any adjustment towards the long-run level understood as an inflation (de Brouwer and Ericsson, 1998).

Other authors have used money supply in order to capture monetary shocks. Instead, in our identification scheme *money supply* is included to capture fiscal shocks, and particularly we use broad money supply (M2) to serve for our purpose. In a DSGE model constructed for Azerbaijan's economy, Huseynov and Ahmadov (2013) show that some 90% of money supply dynamics is caused by fiscal shocks and hence only 10% percent of money supply dynamics is controlled by monetary authority. This imply that most of variations in the money supply probably can't be explained by monetary shocks. Due to this reason and the issues related to government spending data quality (Mehdiyev et al., 2015 and Karimli et al., 2016), we think that money supply is more appropriate indicator to identify fiscal shocks. Instead, to hook monetary shocks we intended to include credit variable. This can be justified from the study of Mammadov and Ahmadov (2014) where they found credit channel to be only significant channel of monetary policy do operates. Since fiscal policy is dominant in Azerbaijan's economy (Ahmadov and Huseynov, 2013), we expect monetary shock to have relatively lower impact on headline inflation.

Commonly unit labor cost, import and administrative prices also considered to be important factor affecting inflation. Unfortunately, time series on those indicators are not available, therefore we are not able to analyze contribution of these indices to inflation dynamics.

4. Empirical Results

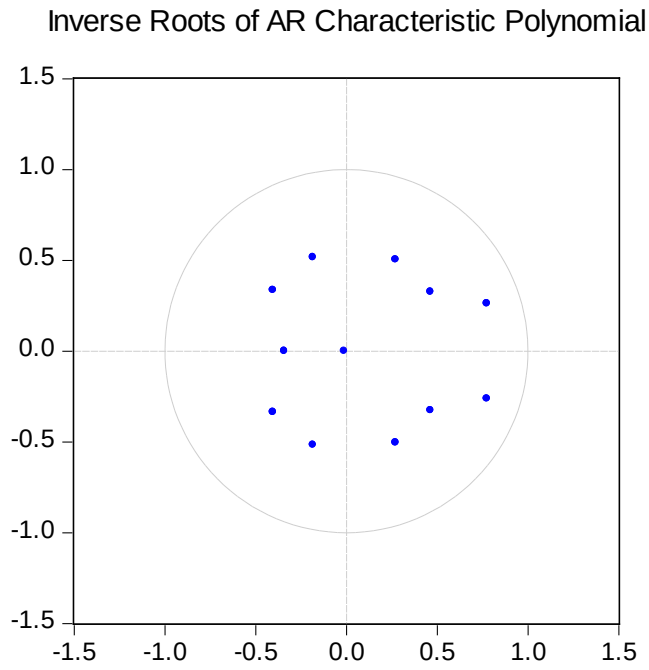
I. Impulse response functions

In this section we report the results of the impulse response analysis. VAR model is estimated in the log first differences with two lags. To test the stability of the VAR model we apply diagnostics test. The test result is presented in figure 3 and it suggests that VAR (2) satisfies stability condition as the inverted roots of the model lie inside the unit circle.

Figure 4 reports the impulse responses of the inflation to trade partners' inflation, growth of NEER, real non-oil GDP, Credit and M2 to one standard deviation confidence intervals, respectively. The results suggest that trade partners' inflation has significant effect on domestic headline inflation. Particularly, initial effects are quite high and positive. One standard deviation increase in foreign inflation leads to 0.6-0.8 standard deviation increase in domestic inflation. This positive impact persists about one year (4 quarters) and then dies off. This result is in consistent with general theory and with the results obtained by other studies for developing countries (for example, Mohanty and Klau (2001), Kandil and Morsy (2009)).

By contrast, appreciation of NEER has negative effect on domestic inflation. Transmission of change in NEER to inflation is fast and significant. From third quarter on the shock loses its significance and response turns zero. This result is also in line with the theory. Since import products have a large share in the consumer basket of Azerbaijan, import prices become cheaper as manat strengthening against trade partners' currency.

Figure 3: VAR (2) stability test



Response of inflation to non-oil output growth, which is used as a proxy for cost-push shocks, is in line with theoretical expectations, however, impact lasts only for one quarter. This result is similar to the results of Ben Ali and Ben Mim (2011) for oil-rich MENA countries.

Positive monetary shock exerts an inflationary pressure on domestic consumer prices, but it turns zero in the second quarter. It indicates to weak transmission mechanism of monetary policy, which is actually consistent with Mammadov and Adigozalov (2014) findings.

We discussed above the relevance of money supply to identify fiscal shocks in explaining inflation dynamics. Line of reasoning can be formulated in this way. The oil revenues of the country flow to the State Oil Fund. Then to finance government expenditures significant part of these revenues are transferred to the State Budget. Thus, to fulfill government budget expansionary policy monetary authority is obliged to be expansionary by printing money, which in turn expected to transmit to the higher inflation. Impulse response analysis justifies our discussion. Thus, impulse responses indicate that fiscal shocks transmits to inflation after two and effect lasts up to 6th quarter.

Inflation shock seems to have highly significant impact on itself. 1 standard deviation inflation shock is characterized by 1 standard deviation increase in inflation in the next quarter. Positive effect is remains over two quarters and then the effect dies out.

Figure 4: Impulse response functions

Figure 4.1: Response of inflation to foreign inflation shock

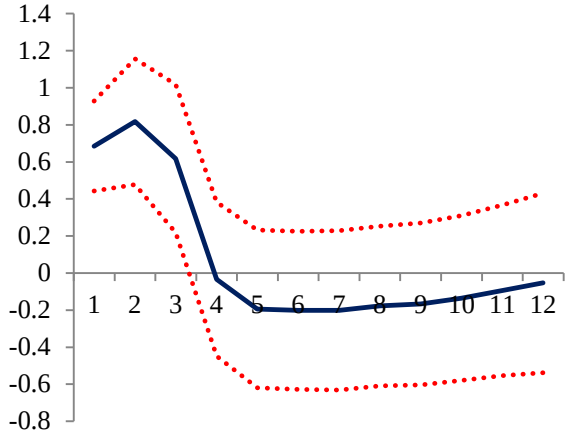


Figure 4.2: Response of inflation to exchange rate shock

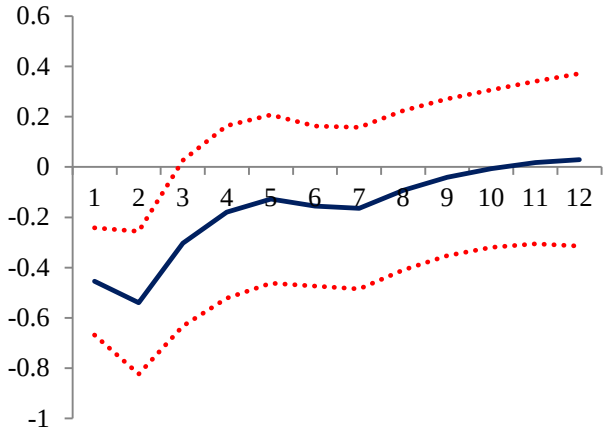


Figure 4.3: Response of inflation to supply shock

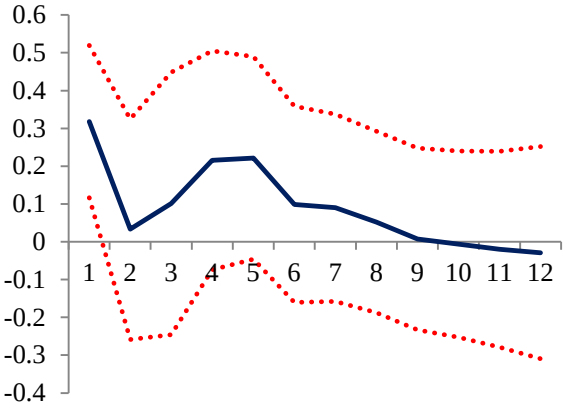


Figure 4.4: Response of inflation to monetary shock

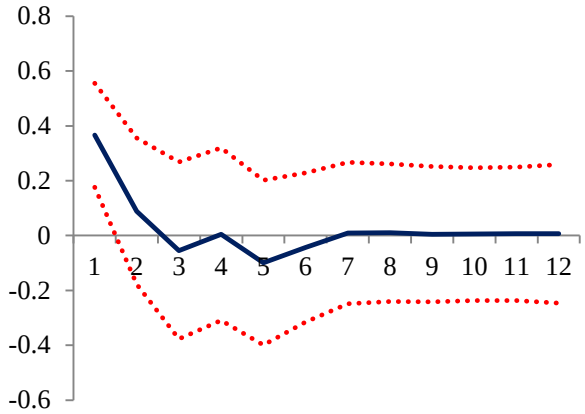


Figure 4.5: Response of inflation to fiscal shock

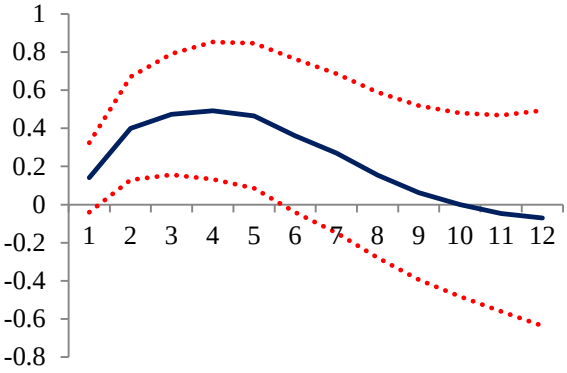
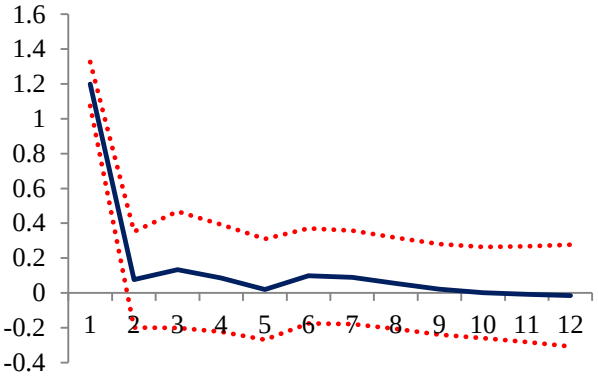


Figure 4.6: Response of inflation to inflation shock



II. Variance decomposition

Variance decomposition analysis is undertaken to determine the percentage of changes in each of the variables that are attributable to variations or shocks to all variables in the system (Table 1). According to the table, the largest part of consumer price variance is explained by its own innovations. The contribution of lagged inflation is 61% within the first quarter. However, the contribution decreases gradually and from the third quarter on it makes up only one third of variation in the consumer prices.

The result indicates that inflation of trade partners has also quite high importance in explaining headline inflation variance. Starting from the second period about one third of domestic consumer prices are explained by trade partners' inflation.

The contribution of NEER to inflation is about 12-13%, while M2 accounts for 15-20% after third quarter. Real non-oil GDP and Credit variables are less important factors in explaining inflation, which are about 3-4% of variation.

Table 1: Variance decomposition of the shocks

Period	TP_CPI	NEER	RGDPN	Credit	M2	Inflation
1	19.81	8.73	4.26	5.65	0.84	60.71
2	32.46	14.20	2.92	4.05	5.13	41.24
3	35.90	13.93	2.66	3.43	9.54	34.54
4	33.33	13.62	3.48	3.18	14.16	32.23
5	31.85	13.03	4.25	3.16	17.63	30.08
6	31.30	12.96	4.26	3.07	19.44	28.97
7	31.14	13.08	4.29	2.98	20.24	28.27
8	31.32	13.07	4.28	2.94	20.43	27.96
9	31.64	13.02	4.26	2.92	20.37	27.79
10	31.87	12.98	4.24	2.91	20.30	27.70
11	31.97	12.96	4.24	2.91	20.30	27.62
12	31.96	12.95	4.25	2.90	20.35	27.59
Cholesky ordering: TP_CPI NEER RGDPN (non-oil GDP) Credit M2 CPI						

III. Historical Decomposition

In this section we decompose inflation historically and present the results in Figure 5.[7] Historical decomposition successfully identified stylized facts those we discussed above. Indeed, in the first 20 quarters domestic inflation, fiscal, foreign inflation and ER shocks exert significant impact on headline inflation. In 2005 however, inflation shock itself, was a main cause of higher inflation, which happened due to increase in administrative prices by 17%. Same scenario happened in 2007, when administrative prices have gone up by 57%.

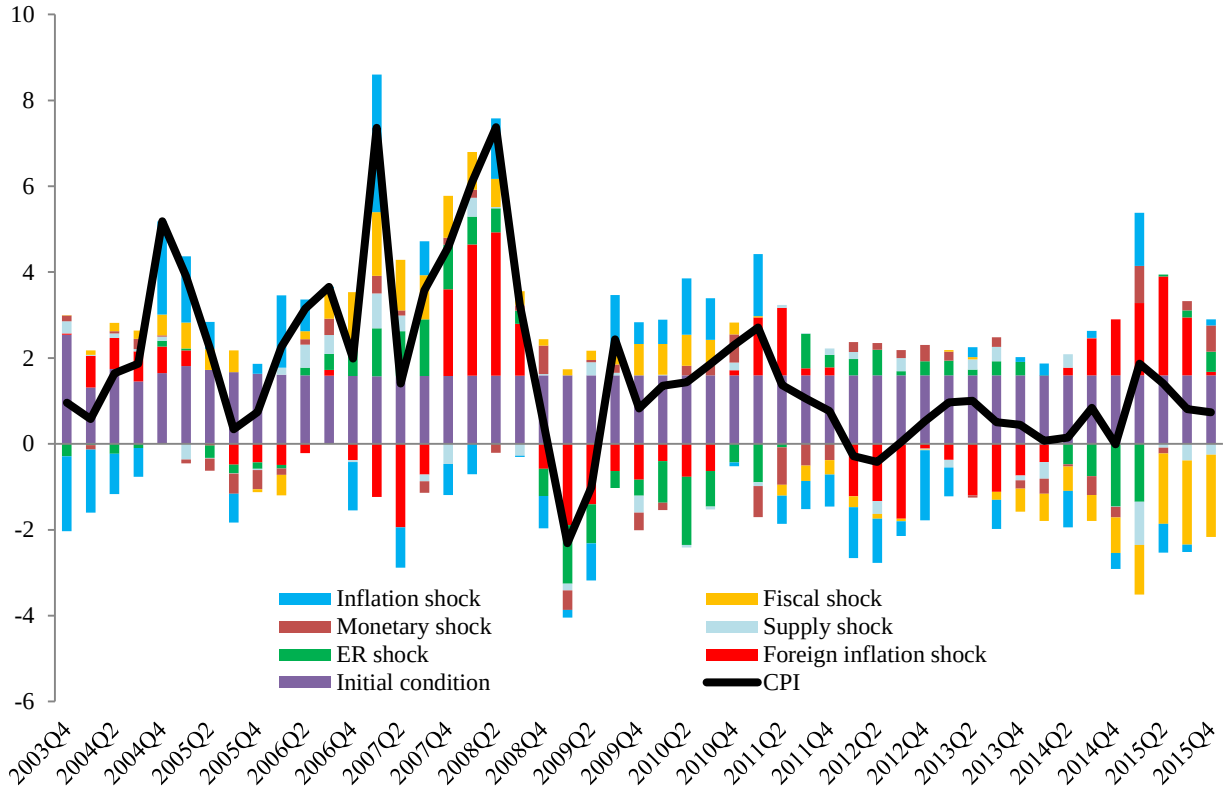
Positive contribution of foreign inflation is more apparent during 2008 and 2014, whereas in rest of the sample effect is negative and slightly moderate. Although it is hard to attribute those changes

[7] Initial condition can be interpreted as a steady state level of inflation over the covered period

to any particular event, but it is obvious that unexpected changes in 2008 and 20014 related to world economic swings in world economy.

Among variables fiscal shocks seems to exert positive significant impact on inflation up to 2014 and negative since then. Negative impact is obvious at the end of the sample, since government persuaded contractionary fiscal policy by decreasing government expenditures 2.11% and 5% in 2014 and 2015 accordingly. In contrast monetary policy shocks have negligible effect on inflation due to lack of transmission mechanism of monetary policy. It is also reasonable result, because from 2004 to 2014 CBAR pegged domestic currency (manat) to US dollar, which means tying its hands to carry independent monetary policy.

Figure 5: Historical decomposition of CPI



The role of exchange rate is consistent with our expectations. Since exchange rate correlates positively with oil prices in the long-run, our expectation was that when oil prices drops it will coincides with exchange rate depreciation transmitting to higher inflation. For instance, during 2005-2008 years nominal effective exchange rate depicted depreciation tendency which caused inflation to be higher, whereas from aftermath of appreciation starting from 2008 transmitted to lower inflation environment. Though, we do not observe higher inflation in a response to double depreciation of the currency in 2015. It has only negligible impact on it.

Nevertheless, we may conclude that particularly exchange rate management may be main contributor to lower inflationary environment after 2008. Beside of it foreign inflation and fiscal policy also depressed inflation to some extent. We couldn't identify any significant effect of monetary policy and supply shocks in covered sample period. Even tough, we think that our results may subject to identification scheme and needs to further detailed scrutiny in the future.

IV. Robustness check

For robustness check, we slightly make changes in the identification scheme. We omit supplied of loans variable from the VAR analysis and estimate the model. The results do not change significantly. To test whether mark-up approach works or not we included non-oil output gap to system, but it found to be statistically insignificant. We also re-estimated the model for subsamples, again the results are robust, with some increase in uncertainties. In general, it can be concluded from these results that our model and variables are probably valid.

5. Conclusion

The paper empirically assesses main determinants of headline inflation of Azerbaijan. Using quarterly data over the period 2003Q1-2015Q4, we employed VAR methodology in order to undertake our study. We show that the responses of domestic inflation to foreign inflation, fiscal policy, exchange rate and own shocks are significant. Among these variables inflation expectations, foreign inflation and monetary policy (credit variable) have quick effect on domestic headline inflation, whereas the effect of fiscal variable is relatively slower: it takes two quarters to fully reflect on prices. We also find that appreciation of exchange rate has deflationary effect on domestic inflation. The response of inflation to real non-oil output variable (supply shock) is slightly positive.

Variance decomposition table also suggests that the variations in the domestic inflation is mostly explained by foreign inflation, fiscal policy, exchange rate and own shocks. Whereas monetary policy and supply shocks do not play any essential role in explaining inflation.

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