Inflation dynamics in Yemen: an empirical analysis

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ABSTRACT

Yemen has had a high and volatile rate of inflation in recent years. This paper studies the underlying determinants of inflation dynamics in Yemen using three different approaches: (i) a single equation model, (ii) a Structural Vector Autoregression Model, and (iii) a Vector Error Correction Model. The outcomes suggest that inflation dynamics in Yemen are driven by international price shocks, exchange rate depreciation, domestic demand shocks, and monetary innovations. The impact of international prices and exchange rate depreciation indicate a significant pass-through of import prices. In the short run, external shocks of international prices and the exchange rate account for most variations in inflation, but domestic shocks to money supply and domestic demand explain larger variations in the medium term.

Keywords: Inflation, international prices, pass-through, domestic demand, and money supply

I. INTRODUCTION

Inflation in Yemen has been high and volatile in recent years. From 2002 to 2007, for example, twelve-month headline inflation averaged 11 percent and annual food inflation averaged 15 percent. As a net commodity importer, Yemen is vulnerable to external price shocks, especially food price hikes. Food constitutes a major category in the CPI basket with a weight of 43.8 percent. High prices of food imports pass through to domestic prices and fuel inflation. However, domestic demand and monetary innovations can also cause demand-pull inflation. High and volatile inflation threatens macroeconomic and social stability, and understanding its dynamics can help policymakers formulate appropriate policy responses.

This paper explains inflation dynamics in Yemen during 1995–2007. To this end, it uses three distinct models: OLS single equation regressions, a Structural Vector Autoregressive Model (SVAR), and a Vector Error Correction Model (VECM). The SVAR model assumes a recursive relation among the disturbances of the variables, whereas the VECM assumes the existence of integrating vectors in the data. The models test the following hypotheses in the short run: (i) developments in international prices directly affect Yemen since it is a net commodity importer; (ii) exchange rate deprecation in Yemen raises the domestic price of imported goods, thereby fueling domestic inflation (pass-though); and (iii) higher domestic demand and monetary innovations in Yemen put upward pressure on domestic prices.

The empirical outcomes affirm the study's hypotheses. Accumulated impulse responses show that external shocks (i.e., those of international prices and exchange rate) have an increasing impact on inflation, which stabilizes mostly over two years. The derived elasticities indicate a significant pass-though of international prices. Domestic shocks associated with money supply and demand have an increasing impact on inflation over the medium term. Apart from inflation shocks, imported inflation and the pass-through of international prices account for most of inflation dynamics in the short run (e.g., the first year). In the medium term, however, domestic shocks to money supply and GDP explain larger variations in inflation.

Part II of this paper provides the empirical methodology and results for the single equation model, the SVAR model and the VECM, respectively. Part III concludes and provides some policy implications.

II. EMPIRICAL ANALYSIS

Data

The empirical analysis uses quarterly data (described in appendix A) from 1995 to 2007 and controls for exogenous shocks The choice of the period eliminates major events that took place before 1995 including the 1990 country unification, the 1990 Gulf War, the 1994 Civil War, and the new constitution in 1994.[1] However, exogenous shocks that did take place within the study's time-frame include the exchange rate unification (1996: Q2), subsidy reductions/fuel price increases (1995: Q2, 1996: Q1, 1997: Q4, 1998: Q3, and 2005: Q3, and Q4), and drought in the first three quarters of 1999. [2] All these shocks are cited to have contributed to inflation

[1] Enders et al (2002).

[2] Enders et al (2002).

and, therefore, need to be accounted for empirically. To capture their impact, the paper uses three dummy variables: exchange rate unification; subsidy reduction/fuel price increases; and drought. The data are described in Appendix A.

The study develops an import-weighted average of the nominal exchange rate (TrdX) to estimate the pass-through of foreign inflation. As suggested by Moriyama (2008), the nominal effective exchange rate (NEER), which is a trade-weighted average of the nominal exchange rate, may not be a good proxy for import prices because it contains export data. Therefore, an import-weighted average of the nominal exchange rate is developed to assess the extent of imported inflation. To check the robustness of the finding, the paper uses the NEER and simple exchange rate relative to the US dollar alternatives.

A simple plot of all original variables reveals that all series are non-stationary. Some data show smoothly upward trend (e.g., Yemen CPI and World CPI) and others have downward trends with some fluctuations (e.g., the import-weighted exchange rate and the nominal effective exchange rates, NEER). Unit root tests were carried out for these variables, and they were all found to have unit roots. Taking logs of these variables, carrying out unit root tests again, and plotting them also shows the series are still non-stationary (see Figure B1 in the appendix).

Transforming the data from natural logarithms to their first-differences yields stationary series. Carrying out unit root tests after the transformation and plotting all variables results in a stationary series except for non-oil GDP, which still exhibits patterns of non-stationarity. A second-difference transformation was then applied for the log of non-oil GDP to smooth data, and the data become stationary. Thus all variables are found to be I (1) except for non-oil GDP, which is I (2). Following the transformation, all data revert around their respective means in a stationary way. Table B1 in the appendix shows the outcomes of the unit root tests and the plots of the transformed data appear in Figure B2 in the appendix.

Methodology and Results

To explain inflation dynamics, the study estimates a single-equation OLS model, followed by a structural (recursive) SVAR model and a VECM model. In the single-equation model, various regressions were performed to reach the benchmark regression, with the best fit and predictability. The SVAR model assumes a recursive relation among the disturbances of the variables where past shocks affect the current rate of inflation. The VECM assumes integrating vectors in the data (e.g., inflation and money supply) where the dynamics of inflation are directly cointegrated with the dynamics of the determining factors. The single equation model uses data in first differences. However, cointegration testing shows cointegration in the data (see Table B5 in the appendix). When data are I(1) and cointegrated, one can estimate a VAR/SVAR model in levels or a Vector Error Correction Model (Martin, 2007).

A. Single-Equation Model: OLS Regressions

Using OLS regressions, the study relates inflation to a set of independent variables as follows:

$$\Delta p = \alpha + \beta\, \Delta xt + \phi\, z + \varepsilon_t \qquad (1)$$

Where Δp is the first difference of the CPI, x is a vector of independent time-varying variables, z is a set of binary variables controlling for exogenous shocks and a time trend, and ε is the error term.

Various regressions reveal that some factors have insignificant effects on inflation. The World Oil Spot Price and dummy variable drought are insignificant determinants of inflation in Yemen. The outcome of oil prices is not surprising in Yemen since domestic fuel prices are administered. Experimenting with the various proxies for foreign prices indicates that, among the world price indices, the World Consumer Price Index is the only variable that affects inflation in Yemen significantly. The World GDP Deflator and World Commodity Price Index, while having the correct sign in the regressions, were shown to be insignificant. The model retains only the factors with significant effects on inflation. Consequently, equation (1) becomes

$$\Delta p_t = \alpha + \beta\, \Delta p^*_t + \beta\, \Delta y_t + \beta\, \Delta m_t + \beta\, \Delta e_t + \phi\, z_t + \varepsilon_t \qquad (2)$$

Equation (2) states that inflation is driven by international inflation (p^*), growth of real non-oil GDP (y), growth of money supply (m), and exchange rate (e) depreciation/appreciation.

The results of the single equation model appear in Table B2 in the appendix. The coefficients are interpreted as elasticities and the probabilities appear in parenthesis. The standard errors are white-heteroskedasticity consistent.

Several diagnostic tests were performed to check the validity of the estimates. First, joint-significance Wald Tests were performed to test the significance of all variables jointly in the model. The score indicates that all coefficients are significantly different from zero and are jointly significant. The residuals look well behaved and mean-reverting around zero as shown in Figure B3 in the appendix. Second, serial correlation tests of the residuals were conducted with two lags and showed no presence of autocorrelation in the residuals. The null hypothesis for this test is that of no autocorrelation. The P-values indicate failing to reject the null hypothesis of no autocorrelation. A final diagnostic test for multicollinearity was done by taking correlations across variables, and it indicates no presence of multicollinearity among the independent variables.

As indicated in Table B2 in the appendix, the outcomes of the single equation model show Yemen's inflation is driven mostly by international prices and exchange rate depreciation (pass-through). Empirically, a 1 percent increase in the World CPI amplifies domestic prices by about 10-13 percent. The impact of international prices is further evident in the significant pass-through of the import-weighted exchange rate (DLNIMPX), the NEER, and nominal USD/YR exchange rate in the regressions. The variable DLNIMPX is constructed in such a way that higher values indicate nominal appreciation in line with the logic of NEER. The significant negative coefficients in the regressions indicate that a 1 percent appreciation of the nominal exchange rate yields between 0.31 and 0.44 percent decline in Yemen's inflation. To check the robustness of the result on the import-weighted exchange rate, the study uses the NEER and the USD/YR as alternatives. Their outcomes confirm the finding on the import-weighted exchange rate with very close elasticities. The exchange rate pass-through is indeed significant and robust to alternative specifications.

The impact of domestic demand on inflation is less than that of external factors. Empirically, a 1 percent increase in non-oil GDP adds 0.29 percent to inflation. The low response of inflation to higher demand suggests that demand-pull inflation is relatively small in

Yemen. Money supply is shown to be an insignificant determinant of inflation in Yemen, when using OLS regressions.

Fuel subsidy reduction and exchange rate regime changes (1996) have a modest positive effect on inflation. Headline inflation increases by 0.04 percent more when fuel prices edge upwards, as a result of fuel subsidy reduction, than otherwise. Similarly, the period of exchange rate regime change (1996) shows a 0.048 percent higher inflation than periods of no exchange rate regime change. This finding is supported by the fact that the unification of the exchange rate in 1996 led to some nominal depreciation, which contributed to higher domestic prices.

B. Structural Vector Autoregression Model (SVAR)

A SVAR model with a recursive structure helps explain short term dynamics in Yemen's inflation. The short-run recursive relationship among the variables in the SVAR model can be described in a linear system of equations. Following Moriyama (2008) and McCarthy (2000), the recursive structure of the economy assumes that (i) foreign inflation is exogenous to the system (equation 3 below) and thus affects all disturbances of real GDP growth, money supply, nominal exchange rate, and domestic inflation (ii) demand shocks to GDP affect all variables in the system other than foreign inflation (iii) money supply shocks affect the disturbances of the nominal exchange rate and inflation, and (iv) the exchange rate does not affect the stock of money supply, considering that the central bank sets money growth as a policy variable.

Accordingly, the SVAR model is specified in the following way:

$$p^*_t = E_{t-1}\ p^*_t + \varepsilon_t^{p^*} \quad (3)$$

$$y_t = E_{t-1}\, y_t + \lambda 1\, \varepsilon_t^{p^*} + \varepsilon_t^{y} \quad (4)$$

$$m_t = E_{t-1}\, m_t + \lambda 2\, \varepsilon_t^{p^*} + \lambda 3\, \varepsilon_t^{y} + \varepsilon_t^{m} \quad (5)$$

$$e_t = E_{t-1}\, e_t + \lambda 4\, \varepsilon_t^{p^*} + \lambda 6\, \varepsilon_t^{y} + \lambda 5\, \varepsilon_t^{m} + \varepsilon_t^{e} \quad (6)$$

$$p_t = E_{t-1}\, p_t + \lambda 7\, \varepsilon_t^{p^*} + \lambda 8\, \varepsilon_t^{y} + \lambda 9\, \varepsilon_t^{m} + \lambda 10\, \varepsilon_t^{e} + \varepsilon_t^{p} \quad (7)$$

Where the data are in logs, $E_{t-1\ is}$ the conditional expectations operator, and λ is the impulse response coefficients. The conditional expectations operator is represented by linear projections of lags for the five variables in the system, and the choice of the lag is based on the Hannan-Quinn information criterion. Inflation dynamics in this model are explained in equation (7) by past shocks of foreign prices, money supply, domestic demand and the exchange rate. Recursive shocks feed into domestic inflation and lead to the following recursive structural VAR system:

$$Y_t = A\,Y_{t-1} + B\,\varepsilon_t \qquad (8)$$

Where $Y = (p^*, m, y, e, p)$, $\varepsilon = (\varepsilon^{p^*}, \varepsilon^{m}, \varepsilon^{y}, \varepsilon^{e}, \varepsilon^{p})$, and

$$B = \begin{pmatrix} \mathbf{1} & \mathbf{0} & \mathbf{0} & \mathbf{0} & \mathbf{0} \\ \lambda 1 & 1 & 0 & 0 & 0 \\ \lambda 2 & \lambda 3 & 1 & 0 & 0 \\ \lambda 4 & \lambda 5 & \lambda 6 & 1 & 0 \\ \lambda 7 & \lambda 8 & \lambda 9 & \lambda 10 & 1 \end{pmatrix}$$

Inflation dynamics are assessed by impulse responses to various shocks, short term eleasticities, and variance decompositions. Impulse response functions trace the impact of a shock emanating from an endogenous variable to other variables (including inflation) through the dynamic structure of the VAR. Variance decompositions provide the percentage of the forecast variance of inflation that is attributed to various shocks in the system. The impulse responses are presented in Figure B4, followed by the derived inflation elasticities in Table B3 in the appendix. The short and medium term elasticities are obtained by dividing the cumulative impulse response of CPI inflation after j quarters by the cumulative responses of other variables in the system during the same period (Moriyama, 2008). The variance decomposition of inflation appears in Figure B8 and Table B4. The models' residuals are shown in Figure B6 in the appendix.

The impulse response of inflation to shocks in international prices shows an immediate and sustained impact. Empirically, a 1 percent increase in international prices yields a 1.83 percent pickup in domestic inflation by the first year (i.e., the fourth quarter). This suggests a contemporaneous relationship between prices in Yemen and prices in the international market. As a major commodity importer, Yemen is vulnerable to spikes in international prices. Food prices are a major determinant of international commodity prices, and food constitutes a major category in Yemen's CPI. The impact of higher international food prices may be transmitted directly through food import prices or indirectly through traders requesting higher mark-up prices and therefore leading to cost-push inflation. Because of the limited water supply and the widespread growing of qat, which makes less land available for food production, Yemen is not able to expand agricultural production to mitigate the impact of higher food prices. As a result, and as stated in the earlier findings, international price shocks translate into higher domestic prices in Yemen, suggesting that some of Yemen's inflation is imported. A simple plot depicting the relationship between international prices and Yemen prices underscores their correlation.

The impact of domestic demand shocks on inflation is delayed and relatively weak. Innovations in non-oil GDP do not show any positive impact on inflation until the second year following the shock. The magnitude of the inflation response is negative in the first year. This confirms the earlier findings that, in the short run, cost-push factors dominate demand-pull factors in driving inflation in Yemen. Since food has a large weight (43.8 percent) in the CPI basket, and since the demand for food is relatively stable, domestic prices do not have a significant or immediate response to demand-pull factors. The impulse response comes later and may be related to non-tradable services in the CPI basket such as services and housing and related items.

Money supply innovations have an increasing impact on inflation in the two years following such shocks. In the second year, a 1 percent increase in money supply causes 0.85 percent upturn in inflation. Although the immediate impulse response of inflation to money supply shocks is close to that of other shocks, the ripple effects heighten substantially in the third year (twelfth quarter) after monetary innovations. This relationship between money and prices has been established well in both theory and practice. For example, the Quantity Theory of Money (MV=PY), assuming constant velocity of money and long-run output, suggests that monetary innovations feed directly and positively into domestic inflation. In the case of Yemen, however, the relationship is less obvious in the short run but becomes more pronounced in the medium term. Given the recursive structure of the system, the domestic demand impact on money supply compounds the ultimate impact of monetary innovations on inflation. By the second year following money supply shocks, a 1 percent rise in money supply raises inflation by 0.036 percent.

Shocks to the import-weighted exchange rate suggest that nominal appreciation reduces the pass-through of international prices to inflation. The import-weighted exchange rate is constructed to indicate that a higher value means an appreciation. Since it is weighted by prices of import from Yemen's trading partners, it combines the exchange rate channel with that of import prices. Exchange rate shocks (i.e., an appreciation) translate into domestic deflation or less pass-through of international prices to Yemen's inflation. By the first year (i.e., the fourth quarter), a 1 percent nominal appreciation curtails inflation by 2 percent. By the second year, the elasticity of pass-through recedes to 1.48 percent. The magnitude of this pass-through is higher than that obtained from the single equation model. The inflation response to appreciation is immediate and sustained since nominal appreciation changes relative prices in Yemen's favor (i.e., it reduces the domestic price per unit of imports).

Domestic inflation is also vulnerable to its own shocks. As shown in the chart of impulse responses in Figure B4 in the appendix, domestic price shocks lead to more inflation. This implies a secondary ripple effect of price hikes on prices of goods and services in the CPI basket. Given the recursive structure of the system, these price shocks include the impact of other shocks in the system (e.g., monetary innovations and international prices), which compounds the impact of inflation shocks. In addition, the monopolistically competitive nature of the retail sector allows merchants, who exploit market power, to pass through upward changes in prices, and this helps explain why inflation begets inflation. Figure B7 in the appendix depicts the behavior of headline inflation, core inflation (excludes qat) and food inflation in recent years to illustrate price hikes and their correlations.

The variance decomposition of inflation indicates that short run dynamics in inflation are explained mostly by its own fluctuations, followed by international prices and money supply. International price shocks account for about 10 percent of variations in inflation within the first year (i.e., the fourth quarter). Innovations in money supply and domestic demand account for 8 percent each within the same period, whereas exchange rate changes explain 6.5 percent. In the medium term (e.g., the twelfth quarter), money supply shocks account for about 30 percent of the variance inflation and becomes the most significant explanatory factor after inflation shocks. Within a five-year interval, shocks to international prices, exchange rate, money supply, and domestic demand explain about 60 percent of inflation dynamics in Yemen.

C. Vector Error Correction Model (VECM)

Cointegration in the data allows for VECM analysis that suggests long-run correlations. The Johansen Test for cointegration suggests four cointegrating vectors in the original data (in logs). The outcome of the test is provided in Table B5 in the appendix. The lag length is determined based on the Hannan-Quinn information criterion, which suggests that the appropriate number of lags is four. In the VECM, all variables are endogenous, and, provided there is cointegration, they correct in the long-run (i.e., converge to a regression line or relationship) from short term deviations. For example, if inflation and money supply are cointegrated, they do not deviate continually from their long-run relationship. The equation of the VECM system is specified as follows:

$$x = \phi(L)\, x_t + x'_t\, \partial + \varepsilon_t \qquad (9)$$

where $x = (p^*_t, m_t, y_t, e_t, p_t)$, $\phi(L)$ is the coefficient matrices for lag operators L, and ∂ is the cointegrating vectors capturing the long-run relation among the variables in the system. The impulse responses of inflation to the shocks using VECM analysis are presented in Figure B9, followed by the variance decomposition of inflation in Figure B10.

The impulse responses from the VECM imply similar relationships between inflation and the other variables in the system but yield inconsistent elasticities. In addition, the long run estimates of the VECM suggest weak and insignificant association (e.g., cointegration) between the variables in the system. Surprisingly, the shocks of money supply and domestic demand affect inflation negatively for the first two years and three years, respectively, before the shocks add to inflation. These shortcomings of the VECM raise concerns about the validity of its outcomes.

The variance decomposition of inflation, using the VECM, shows that domestic shocks to money supply and domestic demand dominate variations of inflation in the short and medium term. However, as in previous findings, much of inflation variation is explained by its own dynamics. Within a five-year interval, shocks to money supply, domestic demand, international prices and exchange the rate explain about 50 percent of variations in inflation compared 60 percent in the SVAR analysis. Given the small elasticities in the VECM and the weak implied short run and long run relations between inflation and the other variables in the system, the study relies more on the outcomes of the SVAR and the single equation models.

III. CONCLUSIONS AND POLICY IMPLICATIONS

Inflation in Yemen is driven mostly by its own dynamics and by changes in international prices, the exchange rate, money supply and domestic demand. Accumulated impulse responses show that external shocks (i.e., movements in international prices and exchange rate) have an increasing impact that mostly stabilizes over two years. Domestic shocks associated with money supply and demand have an increasing impact on inflation over the medium term. Apart from inflation shocks, imported inflation and the pass-through of international prices account for most of inflation dynamics in the short run (e.g., the first year). In the medium term, however, domestic shocks to money supply and GDP explain most variations in inflation. By the fifth year following all shocks, domestic and external factors in the system explain between about 50 and 60 percent of inflation in the different models.

Two key implications emerge for policymakers:

(i) Limiting exchange rate depreciation stabilizes prices in the short run. The findings imply that the authorities should remain vigilant in assessing the potential impact of foreign prices on the dynamics of inflation in Yemen. Despite the fact that inflation has exogenous determinants such as foreign inflation, there is scope for the Central Bank of Yemen (CBY) to limit the impact of such shocks on inflation. In this regard, slowing the rate of depreciation would help limit the extent of imported inflation in the short run. In the long run, however, loss of international reserves, in light of lower expected oil exports and likely depletion of oil reserves, will make it difficult to maintain a stable exchange rate.

(ii) Over the medium term, close coordination between monetary policy and fiscal policy is important to alleviate inflationary pressures. The medium term impacts of money supply and domestic demand shocks are significant and call for policy cooperation between the CBY and the ministry of finance. In such a small open economy, expansionary fiscal and monetary policies can cause demand-pull inflation, which if combined with cost-push inflation can threaten macro and social stability. Close coordination will be necessary to enable an appropriate balance between economic growth and price stability. The ministry of finance is advised to assess, over the medium term, the areas in which discretionary spending contributes to inflation. The CBY is advised to expand on the use of monetary instruments to control liquidity in the market and to slow the rate of depreciation over the medium term.

APPENDIX A: Data Description

Variable	Definition	Source
CPI	Consumer Price Index for Yemen	INS Working Database
FCPI	Foreign (World) CPI	WEO, GEE
Deflator	World GDP deflator	GEE
Comd	World Commodity Price Index	WEO
MS	Money and Quasi Money	IFS Database
Impx	Import-weighted average of the exchange rate	Calculated using DOTS and INS databases
NEER	Nominal Effective Exchange Rate	INS Working Database
NONGDP	Non-Oil GDP	IMF Staff estimates
Oil	World Spot Oil Price Index, average of 3 prices	WEO
Comon	Non-Fuel World Commodity Price Index	WEO
USD	USD-Yemeni Rial Exchange Rate	INS Working database
DumSub	Dummy variable for subsidy reduction /fuel price increases for periods (derived from Enders et al)	
DumXuni	Dummy variable for exchange rate unification in 1996 Q2 (derived from Enders et al)	
Drought	Dummy variable for drought periods during the first three quarters of 1999 (derived from Enders et al)	

APPENDIX B: Tables

Table B1: Augmented Dicky-Fuller Unit Root Test 1 / 2 / 3 /

Variable	Level	1st difference	2nd difference
CPI	0.650	0.000	Not needed
FCPI	0.999	0.002	Not needed
Deflator	0.997	0.005	Not needed
Comd	0.992	0.002	Not needed
MS	0.900	0.000	Not needed
Impx	0.168	0.000	Not needed
NEER	0.240	0.000	Not needed
NOGDP	0.954	0.323	0.000
Oil	0.982	0.000	Not needed
Comon	0.950	0.000	Not needed
USD	0.863	0.000	Not needed

1/ All variables are in natural logarithms.
2/ P-values are reported for the Null hypothesis: Ho: series have a unit root.
3/ All tests include intercept and the number of lags is based on Schwartz Information Criterion.

Table B2: Single Equation Model Regressions

	Dependent Variable: DCPI			
Variable	**1**	**2**	**3**	**4**
INTERCEPT	-0.018	-0.028	-0.035	-0.041
	(0.458)	(0.287)	(0.184)	(0.169)
DFCPI	5.896	9.998*	12.013**	13.17**
	(0.296)	(0.075)	(0.040)	(0.041)
DLNIMPX	-0.356***	-0.435***		
	(0.002)	(0.000)		
DMS	0.208			
	(0.225)			
DDLNGDP	0.291*			
	(0.054)			
DUMSUB	0.044*	0.048**	0.046**	0.039**
	(0.082)	(0.030)	(0.021)	(0.048)
DUMXUNI	0.048***	0.030**	0.015	0.01
	(0.001)	(0.029)	(0.311)	(0.497)
DLNNEER			-0.311***	
			(0.005)	
DLNUSD				-0.337**
				(0.014)
Adjusted R2	0.27	0.48	0.49	0.48
F-Stat	4.12	12.9	13.36	12.56
DW	1.93	1.7	1.51	1.46
Obs.	50	51	51	51
S.E of Regression	0.03	0.04	0.04	0.04
AIC	-3.8	-3.74	-3.57	-3.73
SC	-3.53	-3.55	-3.69	-3.54
H-Q C	-3.69	-3.67	-3.69	-3.65

Table B3: Inflation Elasticities to Various Shocks (SVAR analysis)

Period	LNFCPI	LNNONGDP	LNMS	LNIMPX
4	1.83	-7.05	2.22	-2.01
8	1.10	12.60	0.85	-1.48
12	1.17	3.84	0.51	-1.27
16	0.92	1.74	0.37	-1.23
20	0.77	1.15	0.30	-1.25

Table B4: Variance Decomposition of Inflation: SVAR Analysis

Period	LNFCPI	LNNONGDP	LNMS	LNIMPX	LNCPI
4	9.68	8.00	8.03	6.50	67.79
8	9.89	8.66	17.82	5.71	57.92
12	8.15	9.23	29.90	5.59	47.14
16	7.94	10.59	32.74	5.28	43.46
20	7.99	11.68	34.94	5.14	40.25

Table B5: Johansan Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.730585	128.9836	69.81889	0
At most 1 *	0.454819	67.34305	47.85613	0.0003
At most 2 *	0.366404	38.83113	29.79707	0.0035
At most 3 *	0.260766	17.38298	15.49471	0.0257
At most 4	0.065469	3.18238	3.841466	0.0744

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Table B6: Variance Decomposition of Inflation: VECM Analysis

Period	LNFCPI	LNNONGDP	LNMS	LNIMPX	LNCPI
4	2.30	6.08	6.43	2.10	83.09
8	2.51	7.70	11.63	4.24	73.91
12	2.40	10.90	20.05	4.11	62.55
16	2.33	14.47	24.20	4.08	54.92
20	3.67	16.40	25.43	4.31	50.19

Figures

Figure B1: Plot of Original Data in Logs

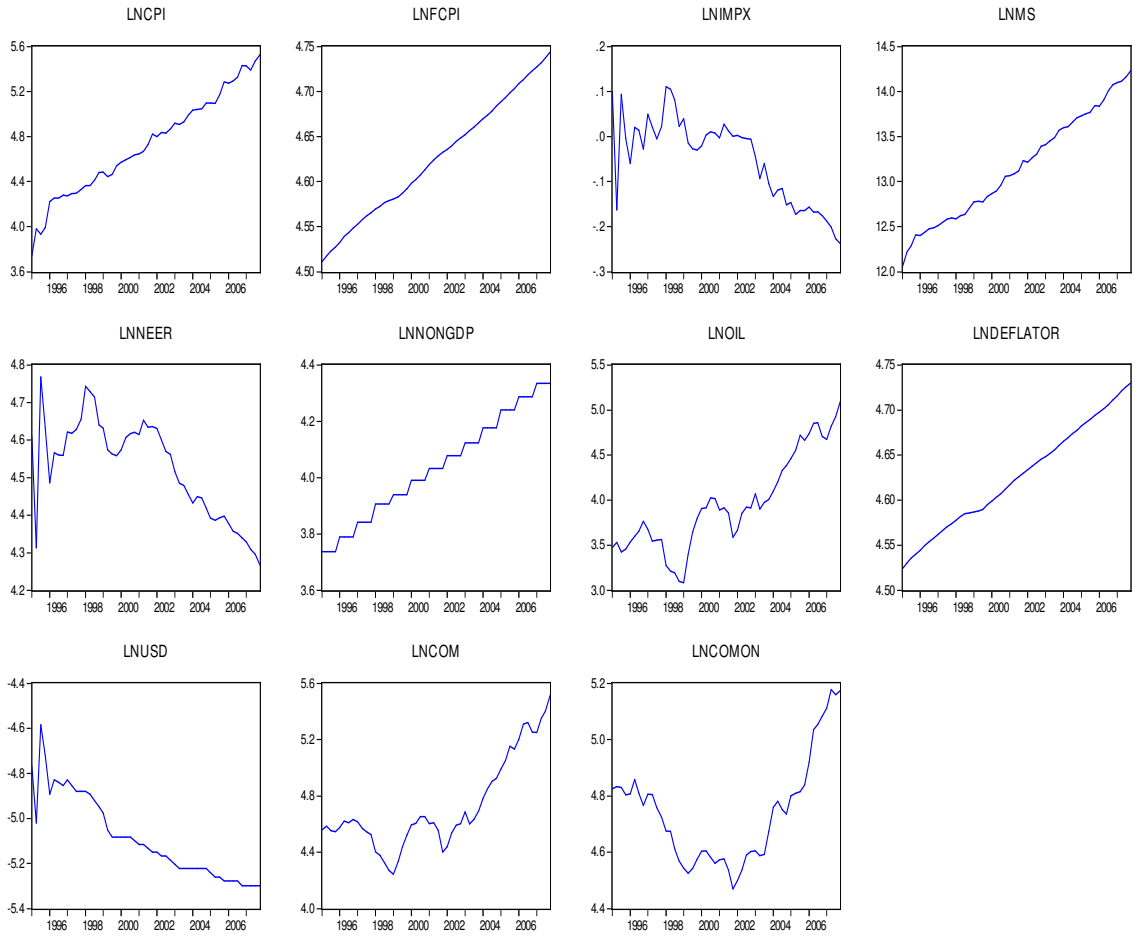


Figure B2: Plot of Transformed Data

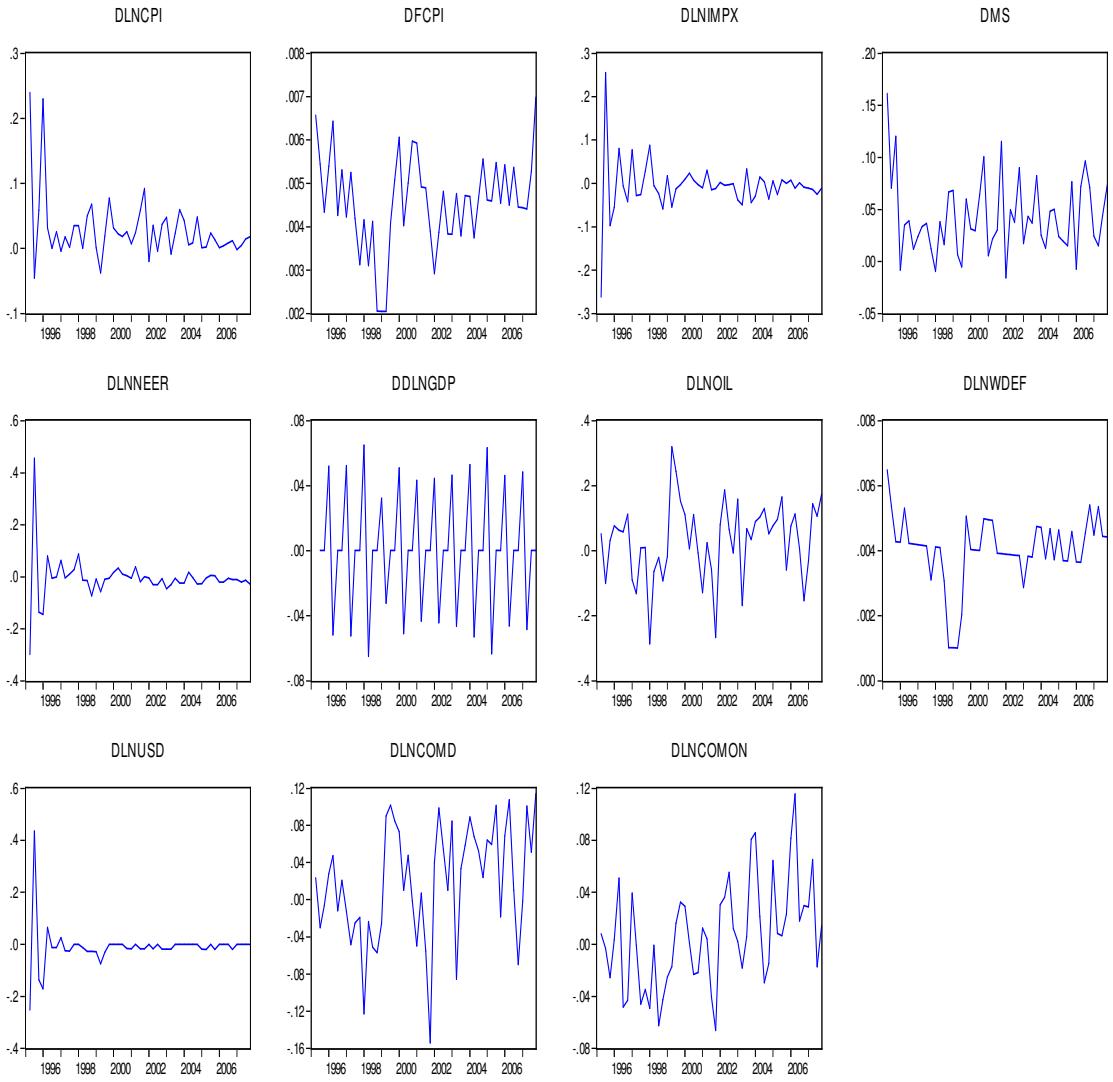


Figure B3: OLS Regressions Residuals and Fitted Values

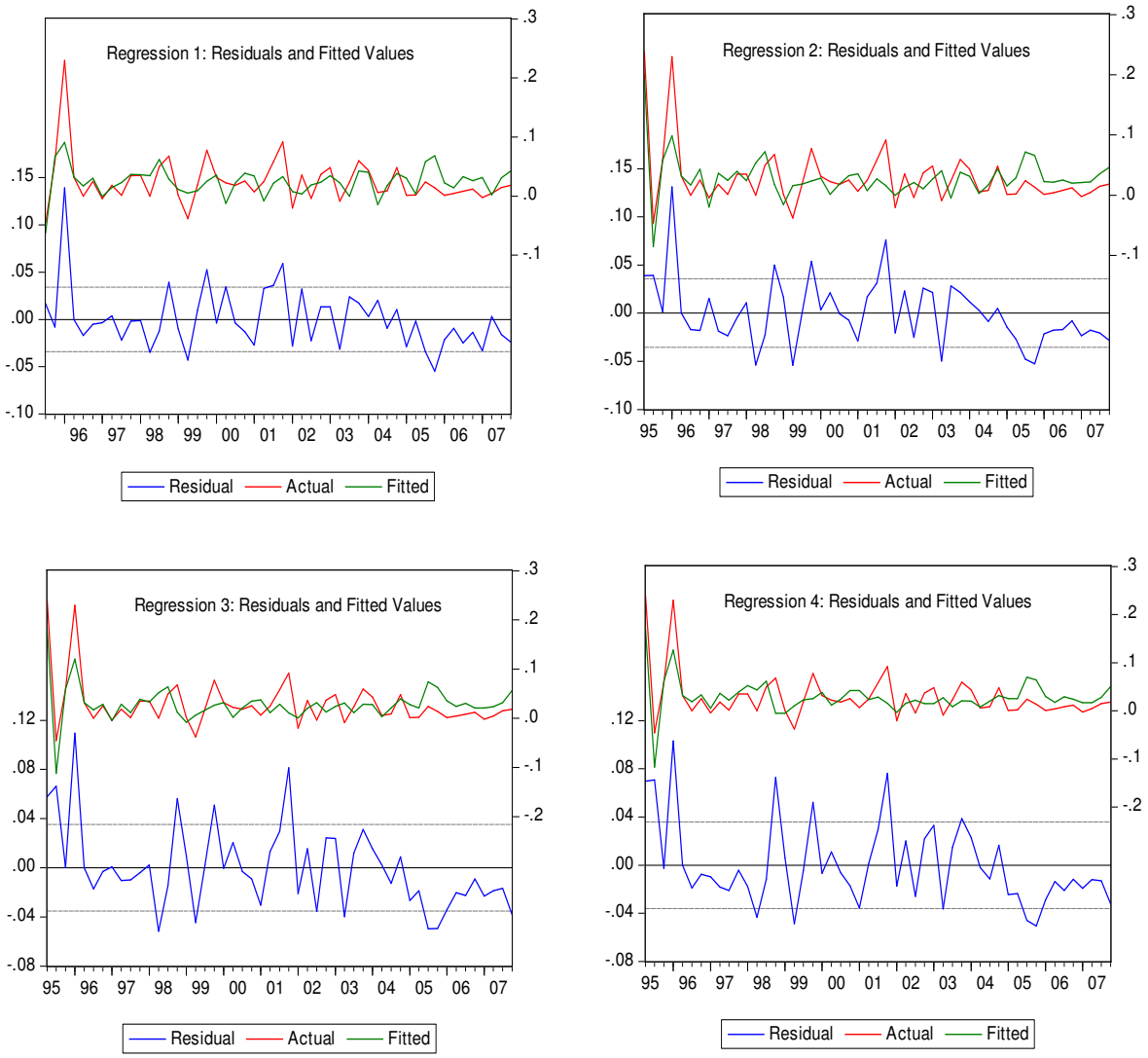


Figure B4: Impulse Response of Inflation to structural shocks: SVAR analysis

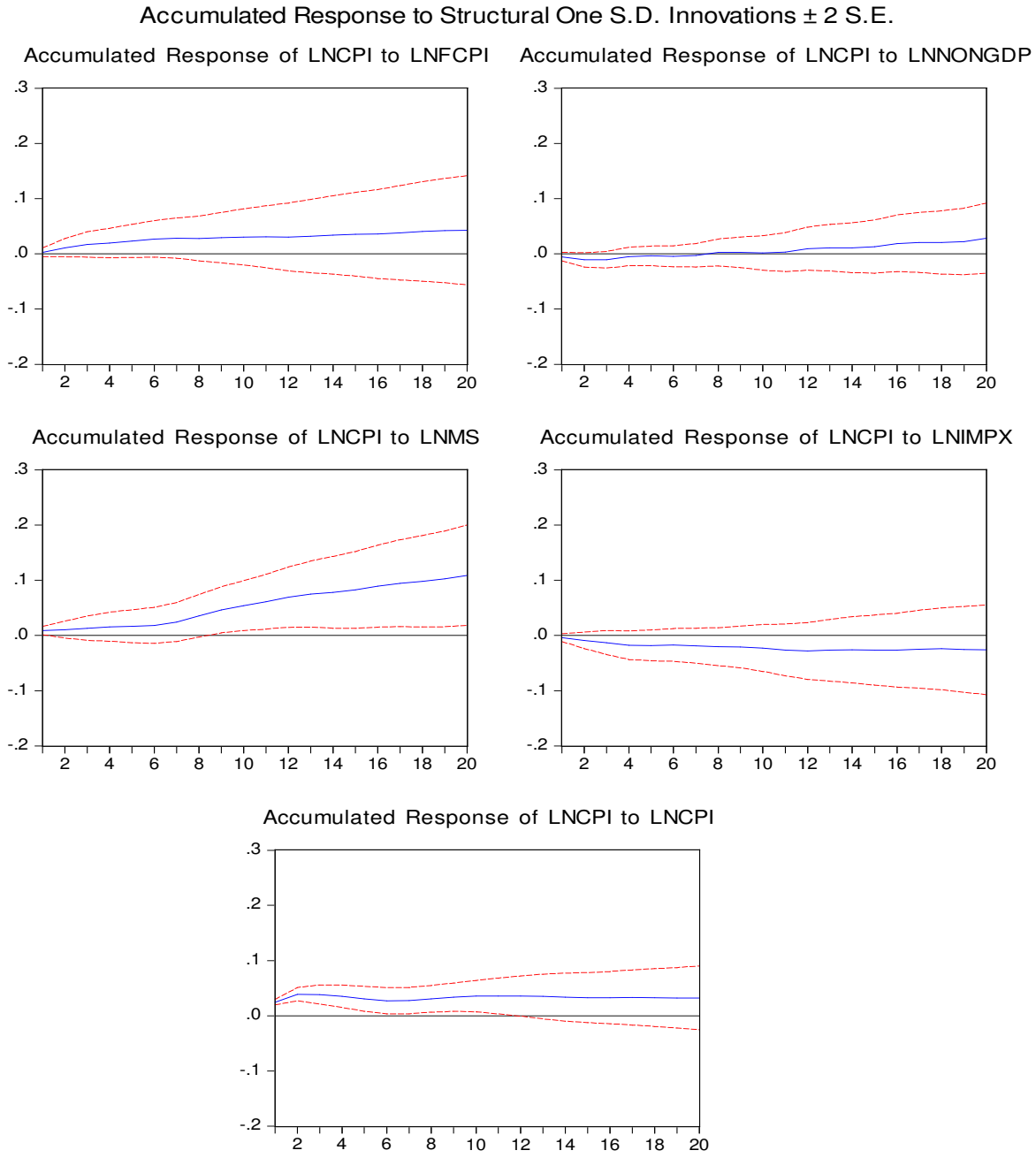


Figure B5: Yemen Prices and International Prices: 2000-2007

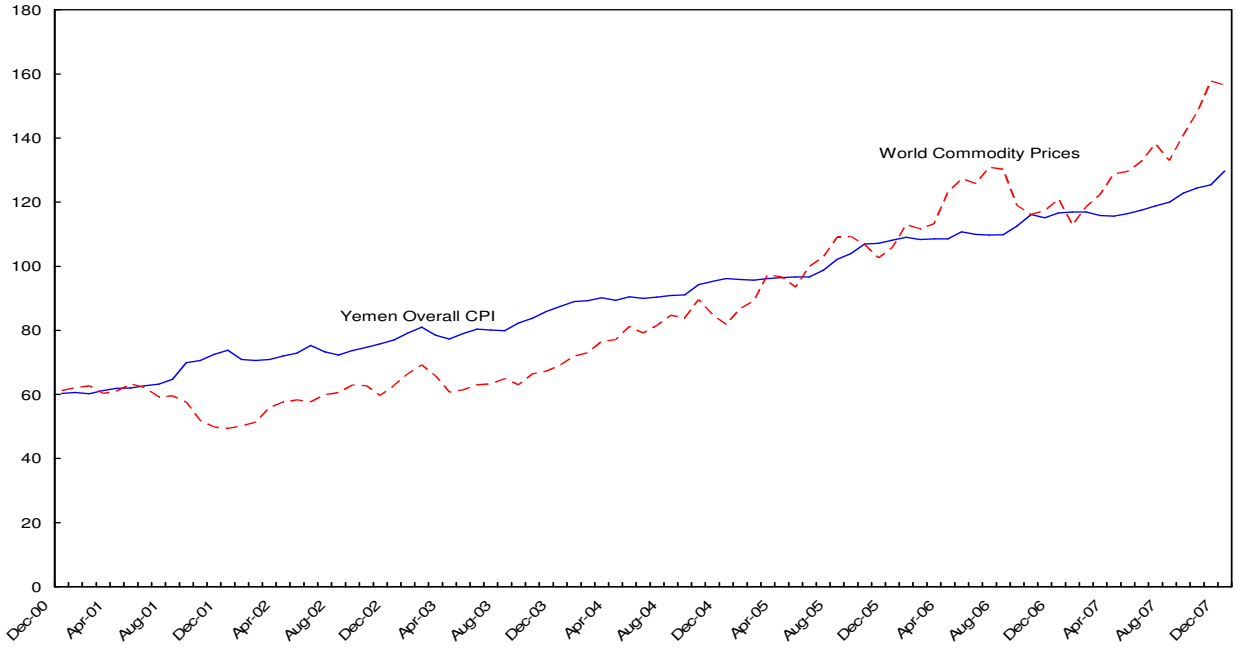


Figure B6: SVAR Model Residuals

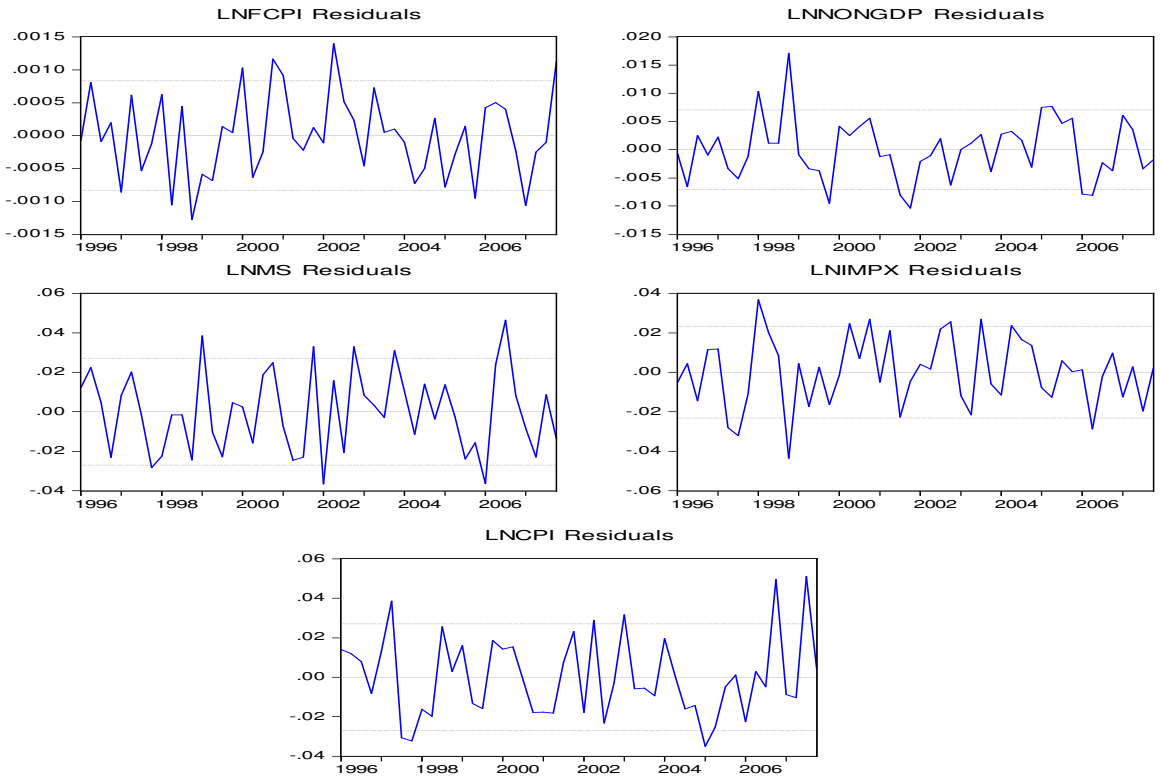


Figure B7: Annual Inflation in Yemen: 2000-2007

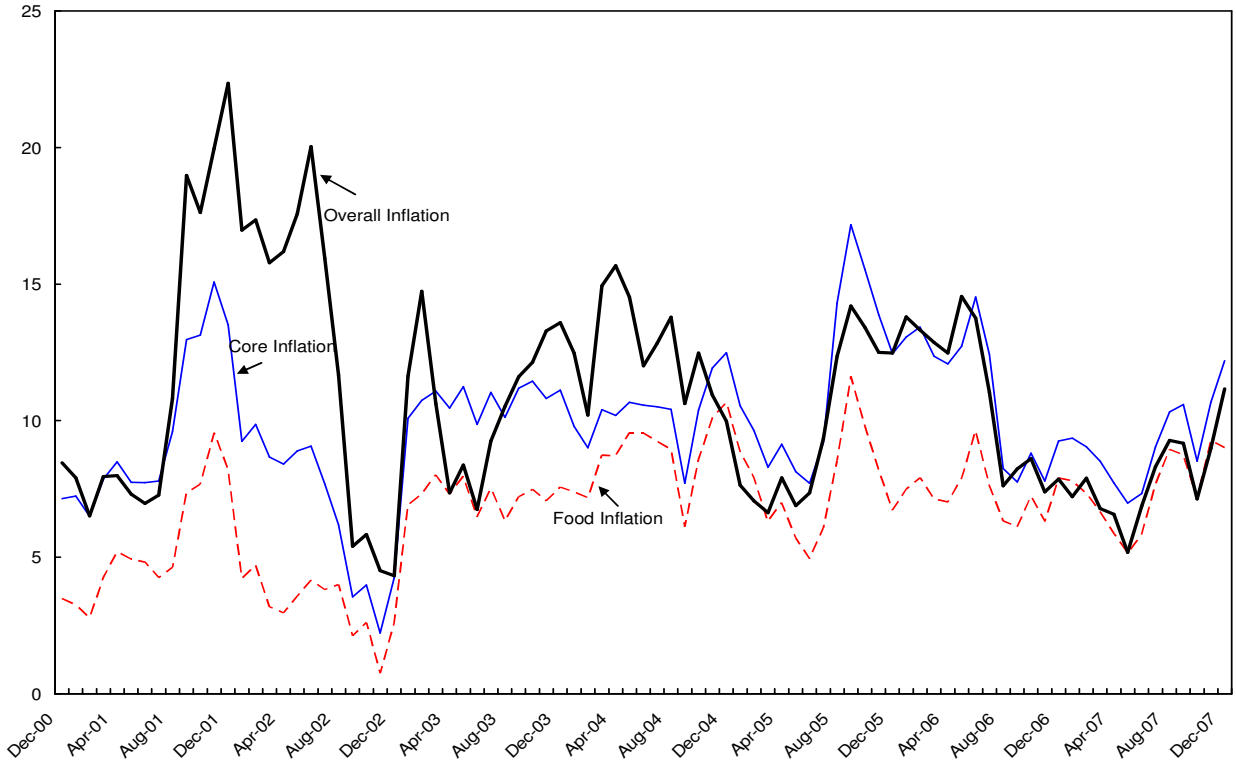


Figure B8: Variance Structural Decomposition of Inflation: SVAR analysis

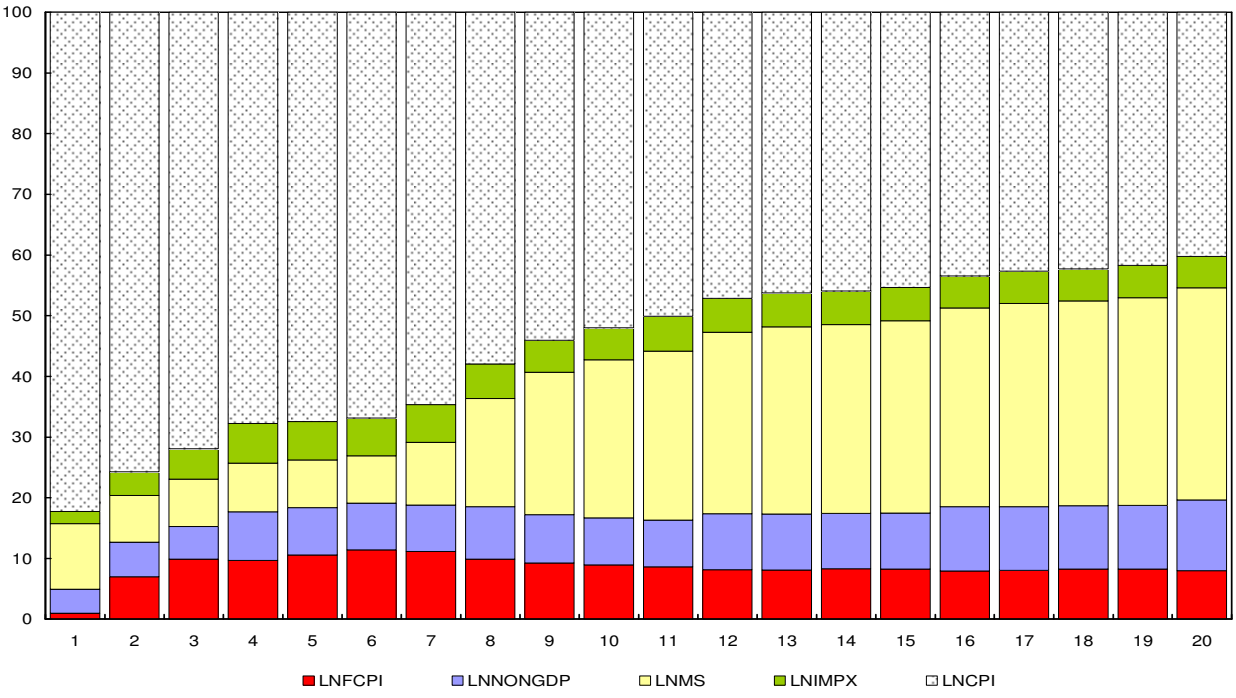


Figure B9: Impulse Response of Inflation to shocks: VECM Analysis

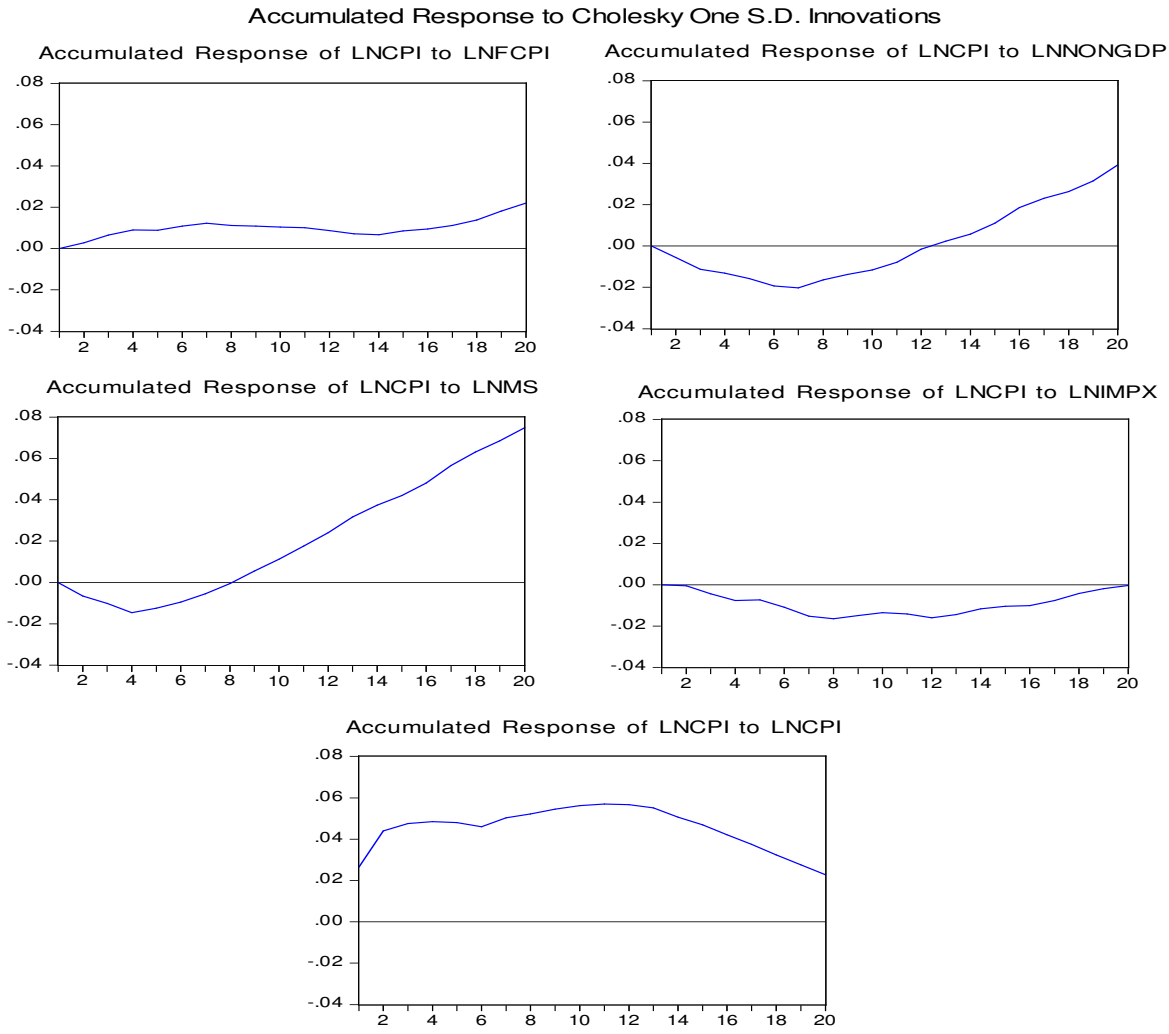
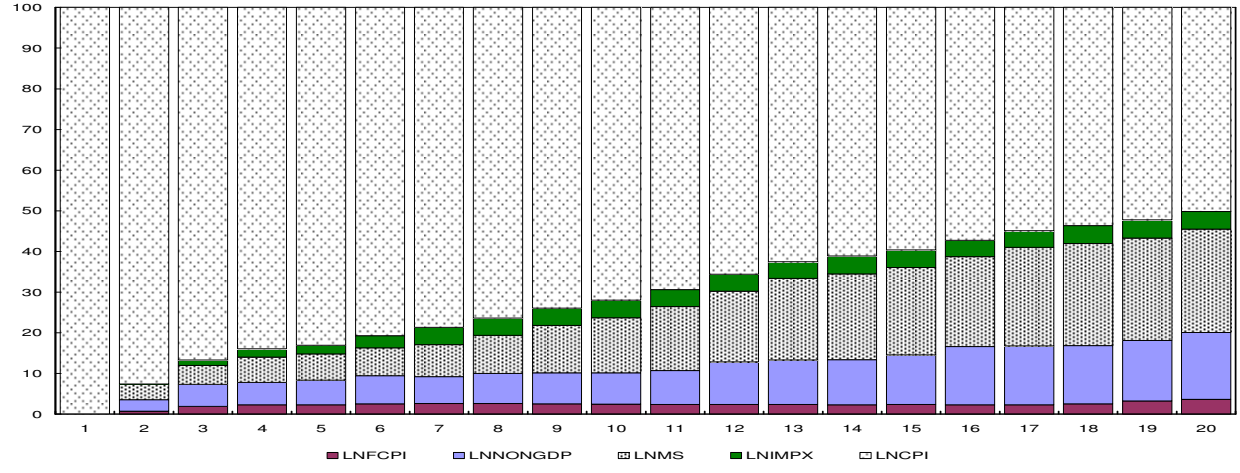


Figure B10: Variance Decomposition of Inflation: VECM Analysis



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