Inflation Dynamics: The Case of Egypt

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Abstract

Inflation as a phenomenon has witnessed remarkable changes starting from mid-eighties of the last century. Inflation rates have become less persistent, less responsive to supply side shocks. In addition, the relative importance of demand pull inflation as one of the major determinants of inflation has decreased due to efficient monetary policies that have been adopted by central banks all over the world to reduce inflation based on anchoring inflation expectations. Moreover, the slope of Phillips curve has flattened as many factors have appeared to be more influential on inflation rather than output gap, namely inflation expectations. These changes constitute in the new economic literature what so called "Inflation Dynamics".

In this context, this study focuses on analyzing inflation dynamics in Egypt in (1980-2009) in order to identify to what extent "Inflation Dynamics" in Egypt is different from or similar to those witnessed globally. The study applied a Vector Auto Regressive model (VAR) and other econometrics models to analyze "Inflation Dynamics" in Egypt in three sub periods: the 1980s, the 1990s and the first decade of the new millennium.

The study concluded that Inflation Dynamics in Egypt is completely different from those observed globally. Inflation rates in Egypt have become more persistent especially starting from 2000; Inflation shocks are now lasting longer and have a long-term impact on the future inflation paths.

On the other hand, demand bull inflation still considers one of the most important inflation determinants, as it is solely responsible for explaining 30% of the changes in inflation rates. In addition, the study confirmed that inflation rates in Egypt have become more responsive to supply side shocks starting from 2006. As for the slope of Phillips curve, the study confirmed that similar to the changes observed globally, the slope of Phillips Curve for the Egypt economy has flattened reflecting the increasing importance of other inflation determinants rather than output gap.

Key words

Inflation, Inflation dynamics, Inflation persistence, The Egyptian economy, Demand-pull inflation, Cost-push inflation, Inflation expectations, markets and prices rigidities, Phillips curve, Government debt, Monetary policies, Vector Auto Regression (VAR).

JEL Classifications: E31, E50

1. Introduction

Inflation as a phenomenon has witnessed remarkable changes starting from mid-eighties of the last century. Inflation rates have become less persistent, less responsive to supply side shocks. In addition, the relative importance of demand pull inflation as one of the major determinants of inflation has decreased due to efficient monetary policies that have been adopted all over the world to reduce inflation based on anchoring inflation expectations. Moreover, the slope of Phillips curve has flattened as many factors have appeared to be more influential on inflation rather than output gap, namely inflation expectations. These changes constitute in the new economic literature what so called "Inflation Dynamics".

In this context, this study focuses on analysing inflation dynamics in Egypt in (1980-2009) in order to identify to what extent "Inflation Dynamics" in Egypt is different from or similar to those witnessed globally. The study applied a Vector Auto Regressive model (VAR) and other econometrics models to analyze "Inflation Dynamics" in Egypt in three sub periods: the 1980s, the 1990s and the first decade of the new millennium.

The study is divided into four main sections in addition to this introduction. The second section highlights the concept and the determinants of inflation dynamics, while the third section analyzes the main developments related to inflation dynamics in Egypt during the period (1980-2009) through three sub periods; the eighties, the nineties of the last century and the first decade of the new century. Each period of these periods had witnessed different economic and inflation developments. In the fourth section; the study presents an econometric approach to analyse inflation dynamics in Egypt. The paper concludes in the fifth section with main findings and policy recommendations.

2. Inflation Dynamics: Concept and determinants

There are three main determinants of inflation in any country. They are: 1. Demand pull inflation; 2. Cost push inflation and; 3. Inflation driven by inflation expectations. The relative importance of these determinants is varying from country to another and is changing over time according to five main economic factors:[1]

1. Economic resource utilization which determines the level of output gap and hence the demand pull inflation;
2. Supply side shocks of major commodities like food and energy which cause cost push inflation.
3. Changes in exchange rates which passed to the general price level through pass through effect";
4. The credibility of the monetary policy and its ability to target inflation expectations and;
5. Past or lagged inflation as a proxy for backward looking inflation expectations and market rigidities.

[1] Davis, Joseph H. "Evolving Inflation Dynamics: Expectations and Investment Implications", Vanguard Investment consulting & Research, 2007.

While most economic studies were concerned mainly in the last century by studying the relationship between inflation and unemployment; the new economic literature is paying more attention to analysing the effects and the causes of changing of the relative importance of different inflation determinants over time in what so called "Inflation Dynamics". In this context and through surveying different economic literature available, this study defines "Inflation Dynamics" as "a non transitory change in the value, trend and the continuity of inflation over time due to changes in the relative importance of the factors motivating the inflationary process" [2].

The study of Mishkin 2007 considers one of the most important literatures available in this regard. In his study; Mishkin has analyzed inflation dynamics in USA during the period (1960-2004). The study referred to four major changes in inflation starting from the mid eighties in many economies. These changes are[3]:

1. Inflation has become less persistent:
Inflation has become less persistent because better monetary policy has anchored inflation expectations more solidly. This means that inflation tends to revert quickly to its initial level when any shock happens. Some other studies concluded the same findings in some other industrial countries[4].

2. Inflation has become less responsive to supply side shocks:
Empirical evidence suggests that inflation has also become less responsive to supply side shocks. The two oil price shocks in the 1970s were associated with large jumps in core inflation, whereas recent surges in energy prices have not had a similar effect. This change can be attributed to the efficiency of many economies in using resources especially oil resources and their efforts to develop alternatives to oil resources.

3. Inflation has become more responsive to inflation expectations:
Inflation expectations particularly long-run expectations consider a major driving force of inflation dynamics in many countries staring from the mid eighties. A de-anchoring of inflation expectations would surely lead to trend inflation becoming unanchored, whereas an anchoring of inflation expectations at a particular level would necessarily lead to a stabilization of trend inflation and hence a decline in inflation persistence.

4. The Phillips Curve has flattened:
In traditional Phillips-curve equations, inflation depends on past values of inflation, and unemployment gap or output gap. When researchers estimate these equations, they typically find that the coefficient on the unemployment gap has declined (in absolute value) since the 1980s, often by a marked amount[5]. In other words, the evidence suggests

[2] It is worth mentioning that there is no common or agreed upon definition for this phenomenon, Therefore, the study attempted to draw a precise definition of the phenomenon through reviewing various studies available in this regard.
[3] Mishkin, S. (2007) "Inflation dynamics", NBER Working Paper No. 13147, P: 1-5.
[4] Levin, T and Jeremy M. (2004). "**Is Inflation Persistence Intrinsic in Industrial Economies?,"** Working Paper Series 334, European Central Bank.
[5] Studies that present evidence of a marked decline in the sensitivity of U.S. inflation to unemployment and other measures of resource utilization include Roberts (2006) and Williams (2006). Unpublished work by

that the Phillips curve has flattened. This change means the increasing cost of reducing inflation by allowing unemployment rates to increase. Sacrifice ratio, which measures number of years that unemployment, has to be 1.0 percentage point greater than its natural rate to reduce the inflation rate 1.0 percentage point has become 40 percent larger than it was two decades ago.

In response, many studies attempted to define the factors contributing most to the observed change in inflation dynamics starting from the mid eighties. The main factors can be illustrated as follows:

1. The efficiency of monetary policies adopted by central banks in many countries. Many developed and developing countries tends to shift to inflation targeting[6] regimes starting from the nineties of the last century in order to maintain price stability.

2. The increasing flexibility of the production processes in many countries and the attempt of many countries to build up oil reserves to avoid sharp fluctuations in oil prices and to develop new alternatives to some raw materials.

3. The increasing importance of inflation expectations in many countries and the increasing interest of monetary policies in anchoring these expectations.

4. The reduction of the marginal cost and the profit margin in many industries due to the increasing competition as a result of the globalization of good, capital, and labor markets.

5. The relative reduction in the levels of prices and wages rigidities in many markets. Studies referred to the tendency of many firms to shorten the period of the price stability and to link the changes in wages with the productivity levels, and hence change their prices frequently [7].

6. The efficiency of fiscal policies in reducing the budget deficit, which give a space to the monetary policy to target price stability. This was clear in the countries in which the central banks have not the sufficient independency to refuse to finance the budget deficit by issuing money.

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staff at the Federal Reserve Board indicates that this result generally holds across a variety of regression specifications, estimation methods, and data definitions. Other studies find similar declines in many foreign industrial economies; see, among others, Borio and Filardo (2006) and Ihrig and others (forthcoming).

6 It worth mentioning that by 2006, one fourth of the world countries were adopting inflation targeting regimes. Of which there were 10 developing countries including Egypt.

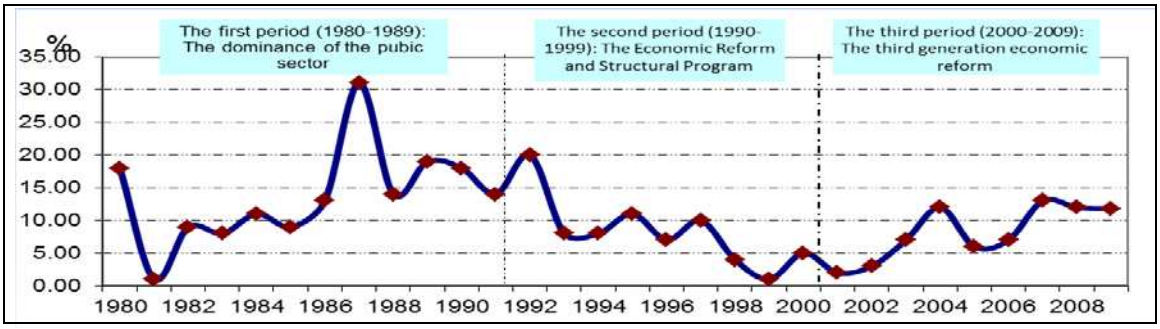
[7] Kuester, K. et. Al. (2008) . " **Is The New Phillips Curve Flat ?"**, Journal of Economic Literature, p: 4, and Eichenbaum, M. Fisher, J. (2005)." **Evaluating Calvo-Style Sticky Price Model",** Federal Reserve Bank of Chicago, Revised March, 2005 WP 2003-2.=p:22

3. Monitoring Inflation Dynamics in Egypt (1980-2009):

This section highlights inflation dynamics in Egypt in (1980-2009) after dividing this period into three sub main periods. The first period: (1980s), the second: (1990s) and the last period is the first decade of the new century (2000s).

Chart (1)

Inflation rates developments in Egypt measured by the changes in the GDP deflator (1980-2009)



Source: World Bank, World Development Indicators Database.

* Data for 2009 is from the database of Information and Decision Support Center, The Egyptian Cabinet.

1. The first period (1980s): The dominance of the government on economic activities:

The eighties of the last century were characterized by the government control on economic activity and the lack of efficiency in the distribution of economic resources as a result of the suspension of market mechanisms. These economic circumstances had led to many internal and external imbalances at the economic level and resulted in a continuous increase in the aggregate demand, which was not compatible with the levels of the aggregate supply. The above mentioned factors had increased the inflation rates significantly to record the highest levels during the period (1980-2009) as inflation rates had increased to reach 31% in 1987[8].

The adopted monetary policy in the eighties of the last century was characterized by its full subordination to the fiscal policy, as monetary instruments were directed to finance the continuing and growing budget deficit mainly through issuing money. As a result, the domestic liquidity had increased significantly, which in turn increased the aggregate demand levels and drove the inflation rates significantly high during the period[9]. Inflation dynamics in this period was mainly driven by demand pull inflation represented by the increases in the domestic liquidity. Demand pull inflation was solely responsible for explaining about 82% of the changes in inflation in that period.[10]

8 World Bank, World Development Indicators Database.

9 Abu El- Aion, M. "The Development of Monetary Policy in Egypt and the future trends", Egyptian Center for Economic Studies, Working Paper 78, available in Arabic, Feb., p: 3, 7, 8, 9, 10.

10 The study adopts a simple statistical approach to analyze inflation dynamics in Egypt in section 3 using some simple regression analysis to define the major factors that contributed most to the inflation developments in each period, while section 4 provides a more comprehensive approach to analyze inflation

2. The second period 1990s: The Economic reform and structural Adjustment Program:

On the contrary, inflation rates had witnessed their lowest levels during the second period in 1990s as a result of many economic reforms that have been adopted in line with the Economic Reform and Structural Adjustment Program (ERSAP) which was adopted in cooperation with the International Monetary Fund and the World Bank to combat aggregate demand and reduce inflation. This program had successfully reduced inflation rates to reach their lowest level in 1999 when it reached 1%[11].

The monetary policies which have been adopted in 1990s were mainly aim at achieving the highest levels of price stability and controlling the increases in domestic liquidity using indirect monetary instruments rather than direct monetary instruments. The changes in inflation dynamics in this period were mainly driven by the changes in the real exchange rate, which was capable of explaining around 70% of the changes in inflation rates during this period[12].

3. The third period 2000s: The Third Generation of Economic Reforms

In the first decade of the new millennium, the Government of Egypt was interested on continuing the economic reforms and moved to adopt the third generation of economic reforms which have focused mainly on the reform of tax, custom, and banking systems. These reforms have helped in strengthening the solidity of the Egyptian economy to grow at reasonable rates and to overcome the negative impacts of the international financial crisis (2007-2009).

On the contrary, the inflation rates have increased significantly during this period and especially 2007 when it recorded its highest level during this decade and reached 13% in spite of the official shifting of the central bank in 2003 towards a more flexible exchange rate regime to enable the monetary policy to shift gradually towards targeting inflation and achieving the required price stability. This shifting in the monetary policy mainly aimed at containing inflation pressures and availing more flexibility to the exchange rate regime to achieve the highest levels of price stability.

The first decade of the new millennium was characterized by the interaction between many inflation determinants. Overall, this period has witnessed a rise in the relative importance of three key inflation determinants, namely:

1. Supply side shocks due to the increases in food crop prices due to the world food crisis, the increases in prices of meat products as a result of the consequences of bird flu, and increases in oil domestic prices due to official adjustments of oil prices.

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dynamics. This section takes into account the consideration of the non-stationary nature of the included times series in this analysis by using VAR models to reach more accurate results.

[11] World Bank, World Development Indicators Database.

[12] Results of simple regression analysis uses the real effective exchange rate index of the EGP versus US$ calculated by the Egyptian Information and Decision Support Center (2000=100) and the monetary aggregate released by the Central Bank of Egypt as explanatory variables and the changes in the CPI as an independent variable.

2. Inflation expectations have played a significant role in explaining inflation dynamics in the first decade of the new century especially when the central bank abandoned the fixed exchange rate regime and shifted towards the managed floating regime[13].
3. Demand-pull inflation in the light of the increases in the domestic liquidity to foster the economic growth specially to avoid the negative impact of the world financial crisis.

It is worth mentioning that both supply side shocks and inflation expectations were capable of explaining around 80% of the changes in inflation changes during this period[14].

4. Inflation Dynamics in Egypt: An Econometric Approach

The previous section indicates how inflation dynamics in Egypt is different from those observed globally. In this section the study presents an econometric approach to analyze inflation dynamics in Egypt mainly by answering four main questions:

1. Has inflation become more persistent?
2. What are the major determinants of inflation dynamics in Egypt?
3. Has inflation become less responsive to supply side shocks?
4. Has Phillips Curve for the Egyptian economy flattened?

1. Has inflation become more persistent in Egypt?

To measure how long the effects of a shock to inflation will last, the study uses the time series of change in the consumer price index published by the IMF in its World Economic Outlook Database to analyze the persistency of inflation in Egypt through the period (1980-2009). The most obvious way of measuring inflation persistence is to regress inflation on several of its own lags and then calculate the sum of the coefficients on lagged inflation, to know whether inflation tends to revert quickly to its initial level, or whether the effects of the shock persist – that is, lead to a changed level of inflation for an extended period.

According to this methodology; if the sum of the coefficients is close to 1.0, then shocks to inflation have long-lived effects on inflation. In other words, inflation behaves like

a random walk, so that when inflation goes up, it stays up. If the sum of the coefficients drops well below 1.0, then a shock to inflation has only a temporary effect on inflation, and inflation soon reverts back to its trend level[15].

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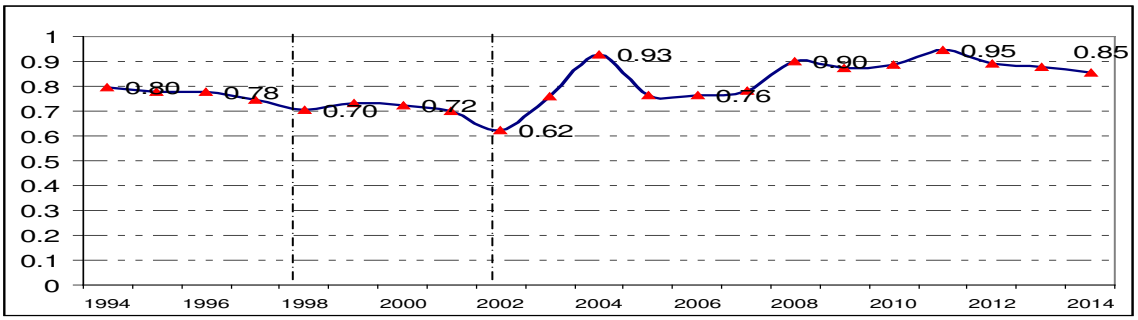
[13] Noureldin D. (2008). "Relative Price Adjustment and Inflation Dynamics: The Case of Egypt", The Egyptian Center for Economic Studies, Working paper No. 133, May

[14] Results of simple regression model uses monetary aggregates, fiscal deficit, inflation expectations index calculated based on the results of Business Barometer survey conducted by the Egyptian Center for Economic Study), prices of food and poultry products as explanatory variables and changes in the CPI as independent variable.

[15] Mishkin (2007). Op cit. p:1

Using rolling samples of 15 years each with lag length 4 years[16], the results reveals that the sum of the coefficients of lagged inflation reached 0.90 in 2009, which means that the inflation rates in Egypt became more persistent and hence, the shocks to inflation have long-lived effects on inflation future paths. It is worth mentioning that inflation was less persistent during the period (1998-2002) in which the sum of the coefficients reached 0.7 on average chart (2).

Figure (2)
The sum of the coefficients on lagged inflation (4 years) (1980-2014)



* The time series of changes in consumer price index contains some projected observations till 2014.
** Years in the x axis represent the end point of the rolling sample, each contains 15 observations starting from 1980s.
Source: Author's estimations.

2. What are the major determinants of inflation dynamics in Egypt?

In this section the study tries to identify the major determinants of inflation dynamics in Egypt in the above mentioned three sub periods, using a VAR model[17] based on monthly data for 9 groups of explanatory variables extracted from the International Financial Statistics Database Sep. 2009 to ensue the consistency of all the data. The data of

[16] Using Akiake Information criteria (AIC), the study finds that the optimal lag length is 4 years.
[17] This model was chosen for many reasons: 1. its ability to capture the dynamic relations between included variables, as many studies have confirmed that inflation is affected by changes in explanatory variables and it also affects them. 2. The ability of the model to indicate the effects of the lagged values of the independent variables on its future values. In this regard it was very important to define the effects of inflation inertia in the future inflation paths as it is represents the effect of both backward inflation expectations and markets rigidities. 3. By analyzing the Impulse Response Function IRF of the model we can investigate the effect of any shocks to the explanatory variables on inflation rates and how long do they last and when their effects go to the maximum point and when they fade away. 4. It was very crucial to use variance decomposition analysis included in the VAR model to quantify the relative importance of different inflation determinants during the period (1980-2009) to set for a reliable policy recommendations.

domestic oil price index was calculated based on the data of Egyptian Ministry of Petroleum[18].

The study tested the stationery of the included variables by using Augmented Dickey Fuller test. The test confirmed that all the included variables except for the world poultry price index are non stationary I(1) (integrated of order 1). Optimal Lag length was defined using Akaike Information Criteria (AIC). Three VAR model were estimated (1980s, 1990s, and 2000s) using the first difference time series except for poultry price index which was included in its own levels in the model. The study used Inverted AR Roots tests to ensure the stationary and the accuracy of the estimated VAR models. All the three models have successfully passed the AR Roots test which refers to the accuracy of the results.

The results confirmed that the major inflation determinants that can explain the inflation dynamics in Egypt in the three sub periods are as follows:

1. The first period (1980s):

- Domestic liquidity (lagged one month).
- Fiscal deficit (lagged one and two months).
- The World food prices (lagged one month).

2. The second period (1990s) [19]:

- Exchange rate (lagged five months).
- World oil price index (lagged six months).
- Domestic oil prices (lagged one and three months) [20].

3. The third period (2000s):

This period characterized by the interaction between different inflation determinants as follows:

- Lagged inflation (one month).

18 These variables are: 1. the changes in the CPI (2005=100) as the independent variables, 2. Lagged inflation (chosen based on the optimal lag length criteria in the model) this variable represents backward inflation expectations and markets rigidities. 3. Money aggregates M1, M2 in million, and lending interest rate represent demand pull inflation. 4. Exchange rate of EGP versus US$ represents the pass through effect namely after adopting managed floating regime. 5. Net government claims represents the inflationary pressures due to the fiscal deficit. 6. World oil price index (average of Brent, West Texas and Dubai oil prices 2005=100) represents world supply side shocks due to changes in energy prices. 7. Domestic oil price index (the simple average of petrol 80, petrol 90 and solar fuel prices) represents domestic supply side shocks due to changes in domestic energy prices. 8. World food price index (2005=100) and 9. World poultry price index (2005=100). Each to represent the world and domestic supply shocks resulted from the changes in food prices and the effects of bird flu on domestic meat prices.

19 It is worth noting that the second period was characterized by low inflation rates and a minimal impact of many inflation determinants due to the success of the Economic Reform and Structural Adjustment Program (ERSAP) in containing the increases in the local demand and lowering inflation. Therefore; the results of this model are different from those observed from the other two models.

20 The second period had witnessed six adjustments in domestic oil prices according to the Egyptian ministry of Petroleum.

- Domestic liquidity (lagged two month).
- Fiscal deficit (lagged one month).
- World food price index (lagged one and two months).
- World oil price index (lagged two months).
- Domestic oil prices (lagged two months) [21].

The detailed results of the models are represented in appendix.

According to the results, each increase in domestic liquidity by EGP 10 billion in 1980s led to an increase in the CPI in the consecutive month by 1.8 point, while each increase in the fiscal deficit by EGP 10 billion led to an increase in the CPI by 2.6 point in the consecutive month and 3 points in the second month. On the contrary, each increase in the world oil prices by 1 point in the 1990s led to increase the CPI by 0.14 point after six months, while the effect of the changes in the domestic prices of oil were much stronger as each increase in the domestic oil prices by 1 EGP led to an increase in the CPI by 6.5 points after only one month and an increase by 6.8 after three months.

In 2000s the effects of the backward inflation expectations were very clear in line with the tendency of the central bank to shift to a more flexible exchange rate regime (managed floating regime) in 2003 to give the required space to the monetary policy to shift gradually towards inflation targeting regime. So the economic agents for the first time lost their nominal anchor (fixed exchange rate regime) and start to build their own inflation expectations mainly depending on past inflation rates. Results referred that each increase in the past inflation by 1 point led to an increase in the future inflation rates by 0.27 point in the following month. In addition the effects of the supply side shocks were very clear in the third period as each increase in the domestic oil prices by 1 EGP led to an increase in the CPI by 12 points in the following two months.

Form the above mentioned results, it is very clear that the inflation pressures that the Egyptian economy had witnessed in the 1980s were mainly driven by the demand pull inflation due to the continuous increase in the domestic liquidity to finance the budget deficit, while the inflation pressures in the 1990s were mainly due to the pass through effects of the changes in the real exchange rate. In the 2000 many factors have appeared to influence the inflation rates in this period, mainly the backward inflation expectations, demand pull inflation, cost push inflation and the budget deficit.

In order to estimate the effects of explanatory variables shocks on inflation rates, the study estimated the Impulse Response Function (IRF) to capture these effects in the three sub periods.

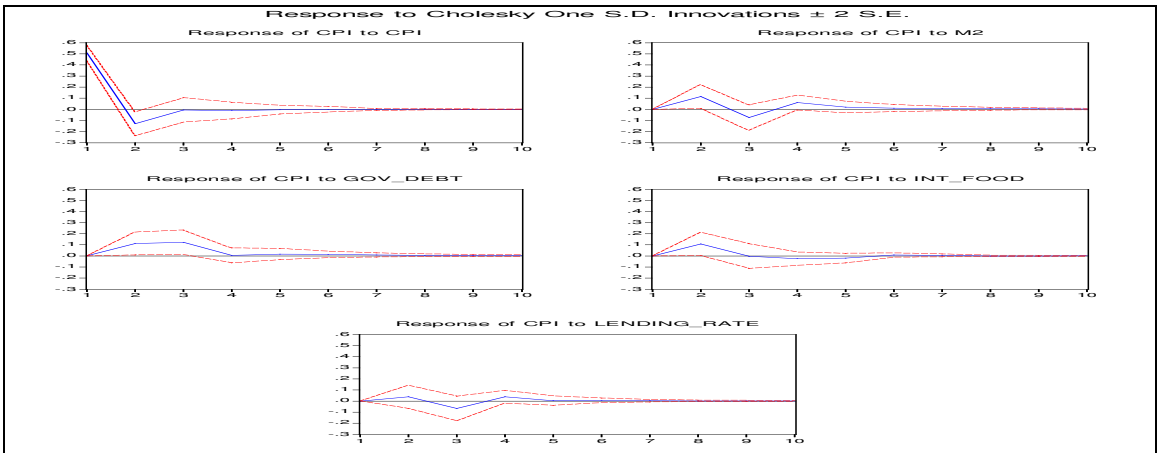
1. The IRF for first period (1980s):

The impulse response function of the first period confirmed that the shocks that were exposed to the inflation rate in the eighties have been overlooked or faded in a short

21 The third period has witnessed 4 adjustments in domestic oil prices according to the Egyptian ministry of Petroleum.

period does not exceed six months. The shocks of demand pull inflation represented by changes of domestic liquidity had the highest levels of impact on inflation rates in the second month of its occurrence and then faded after five months. As for the shocks of government debt it were lasting for five months and had the highest levels of impact on inflation rates during the third month of its occurrence, on the other hand; world food prices shocks had its highest level of impact on inflation rates in the second month of its occurrence and faded quickly after three months, Chart (3)

Chart (3)
The Impulse Response Function of 1980s

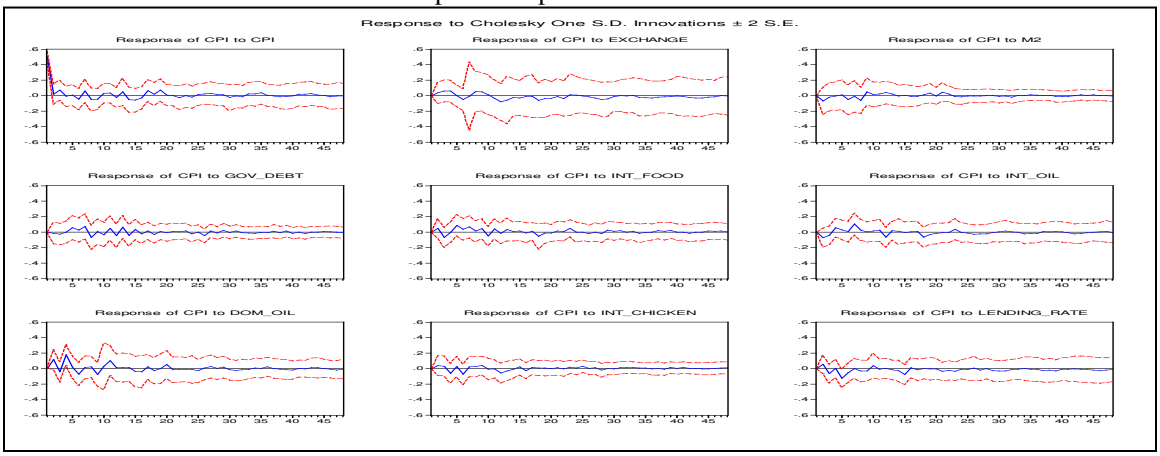


Source: Author's estimations based on the results of VAR model for 1980s.

2. The IRF for second period (1990s):

The impulse response function for the nineties it differs significantly from those for the first and third period due to the specificity of inflation dynamic in this period, where the inflation rates recorded their lower levels and there was no clear effects or significant impact of the explanatory variables during that period due to the success of the economic reform program in reducing inflation, especially demand pull inflation Chart (4).

Chart (4)
The Impulse Response Function of 1990s



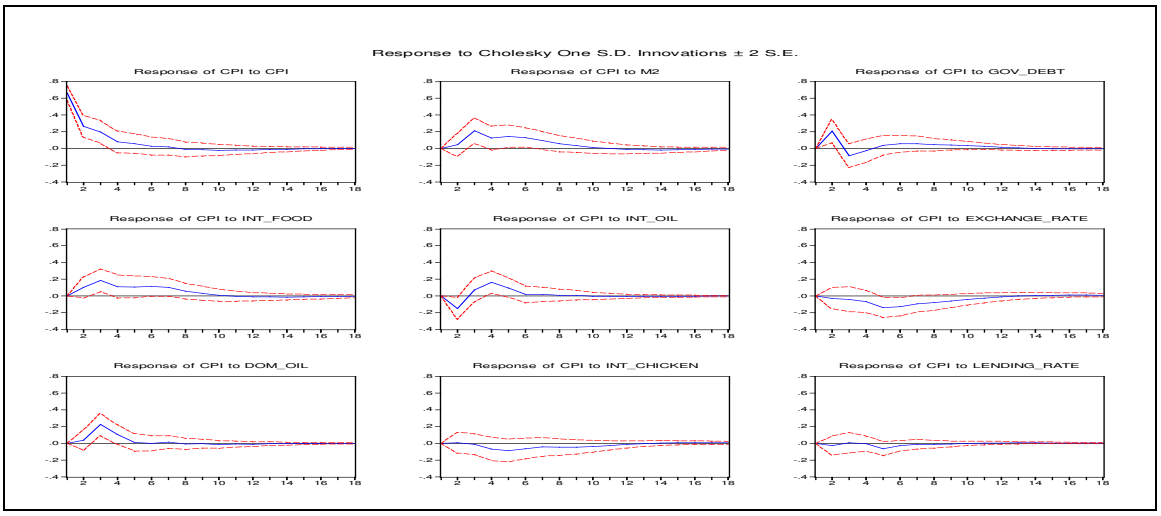
Source: Author's estimations based on the results of VAR model for 1990s.

It is clear from the previous function that inflation shocks due to changes in the explanatory variables in the nineties were mostly weak shocks, but it were lasting longer in terms of continuity, for instance, shocks to the inflation rate were lasting for 20 months before fading away.

3. The IRF for third period (2000s):

The impulse response function of the third period (2000-2009) indicates that the inflation shocks were to continue for a period of nearly eight months before their impact fading. The main shocks in terms of impact on inflation rates were: demand-pull inflation; fiscal deficit; cost-push inflation driven by both world and domestic factors. For example, results indicate that shocks of the demand side represented by the increase in domestic liquidity were up to the peak of their influence on the rate of inflation during the third month of the occurrence and continued for nearly a year until the impact fully faded, while the shocks of increase in government debt reached the peak of its influence on inflation rate within two months and also lasted for almost a year and then faded. As for supply shocks, they were lasting for a shorter period. The shocks in world prices of food reached the peak of its impact on the inflation rate within three months of their occurrence and then faded away after ten months, while the shock of the world price of oil recorded the highest levels of influence on inflation rate in the fourth month and faded within six months. On the other hand shocks of domestic oil prices reached the peak of their impact on inflation rate within three month and faded after five months. Chart (5).

Chart (5)
The Impulse Response Function of 2000s



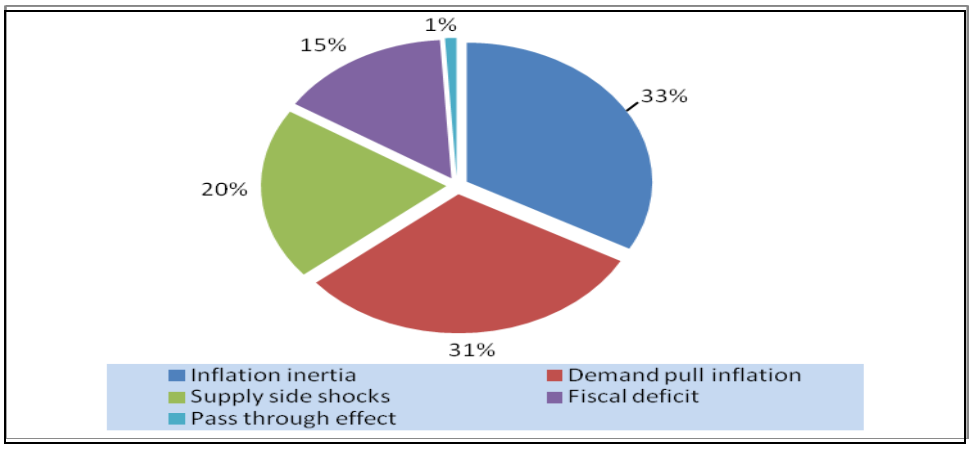
Source: Author's estimations based on the results of VAR model for 2000s.

Up to this point, it was very crucial to quantify the relative importance of different explanatory variables in explaining the changes in inflation dynamics during the whole period of the study (1980-2009) as the long period (30 years) and short periodicity (quarterly data) enable us to get more accurate results. The study used Variance Decomposition Analysis to identify the relative importance of different inflation

determinant in the Egyptian economy during the whole period (1980-2009). The results confirmed that they are as follow, chart (5):

1. Inflation inertia (lagged inflation values represents backward inflation and markets rigidities) 33 %.
2. Demand pull inflation 31 %.
3. Supply side shocks 20 %.
4. Fiscal deficit 15 %.
5. Pass Through Effect 1%.

Chart (5)
The relative importance of different inflation determinants (1980-2009)



Source: Author's estimations based on the results of VAR model for (1980-2009).

It is worth mentioning that the above mentioned results are relatively similar with those estimated by the IMF, as it referred that both demand pull inflation and supply side shocks are responsible for explaining around 24 % and 39 % of the changes in inflation rate consequently in Egypt[22]. While noting that the IMF model did not include government debt as one of the factors that explain the dynamics of inflation, this may explains the differences in estimations between the two models.

3. Has inflation become less responsive to supply side shocks?

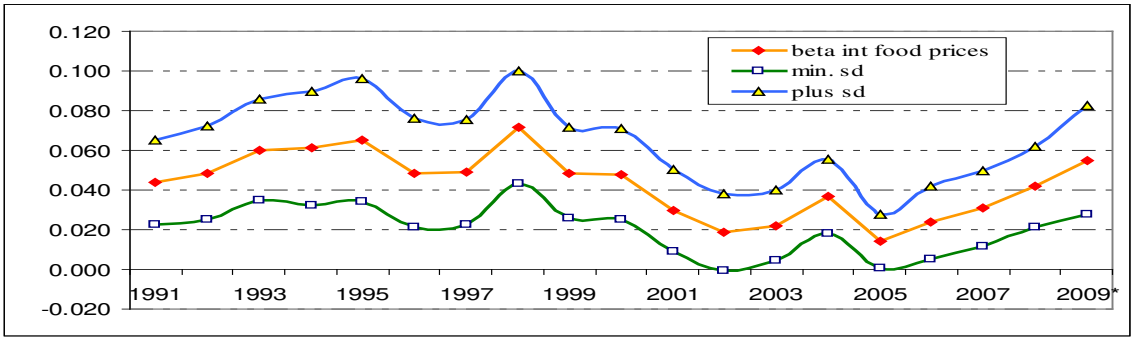
To analyze the responsiveness of inflation rates in Egypt to supply side shocks, the study conducted a Vector Auto Regressive (VAR) model for the period (1980-2009) using monthly data including all the explanatory nine variables mentioned before with rolling ten year sample. In this context the study used the world food price index released by the IMF as a proxy for the supply side shocks during the period[23]. Through monitoring the evolution of the value of the world food price index coefficient, it is clear that inflation in

[22] International Monetary Fund, (2008). "Arab Republic of Egypt: Staff Report for the 2008 Article IV Consultation", November, P:8.
[23] Joseph D. (2007), op cit, p: 8.

Egypt has become more responsive to supply side shocks unlike the developments observes in the global economy.

Inflation has become more vulnerable to supply-side shocks, during the first era of the new millennium, especially starting from 2006, where inflation rates were affected by many supply side shocks such as the increase in the food prices due to the world food crisis (2008-2010), the effects of bird flu on the prices of meat products in Egypt. These factors have increased the value of regression coefficient of world food prices form only 0.014 in 2005 to 0.055 in 2009 Figure (6).

Chart (6)
The evolution of coefficient of the world food price index in the VAR model for (1980-2009)



Source: Author's estimations based on the results of VAR model for (1980-2009) using monthly data, rolling sample of 10 years with lag period (one month) except for 2009, (two months lag).

4. Has Phillips Curve for the Egyptian economy flattened?

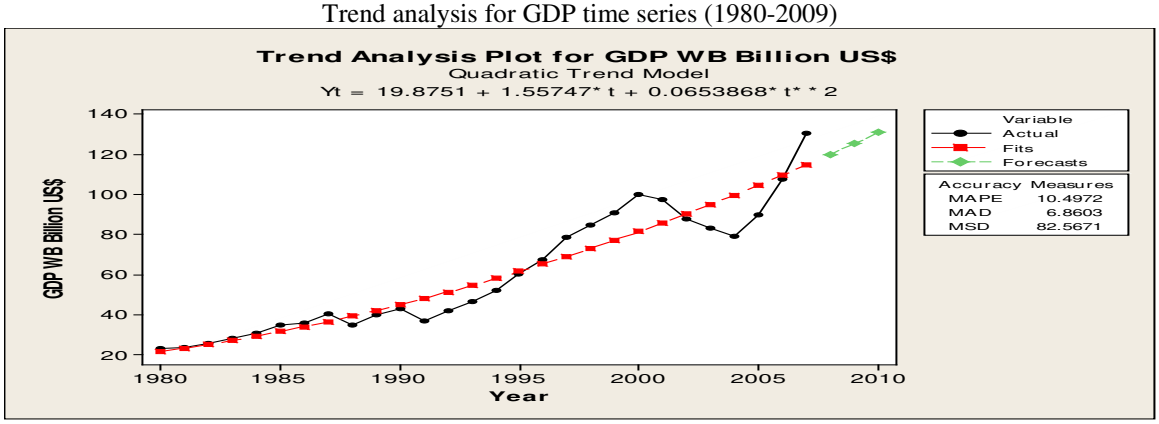
Different studies all over the world confirmed the change of the slope of Phillips Curve in many countries, as a result of the decreasing of the relative importance of output gap and the increasing importance of other determinants, namely inflation expectations. As a result of all of these factors, Phillips curve has flattened. This section of the study tries to estimate Phillips Curve for the Egyptian economy during the period (1980-2009).

The study followed the methodology adopted by many central banks[24] to divide GDP time series into two components, one for the trend and the other for the stochastic changes, then using the trend time series to estimate the potential output and hence the output gap.

Based on the time series of gross domestic product of the Egyptian economy in U.S. dollars extracted from the database of World Development Indicators from the World Bank, the study used trend analysis techniques (Quadratic Model) to estimate the potential output chart (7), and then output gap.

[24] Central Bank of Iceland, **"Calculating The Output Gap"**, Economic And Monetary Developments And Prospects. (2005), Monetary bulletin, P:1-4,

Chart (7)
Trend analysis for GDP time series (1980-2009)



Source: Author's estimations using trend analysis quadratic technique.

Regression analysis was conducted to estimate Phillips Curve using the output gap as an explanatory variable and the changes in the CPI as an independent variables. The following equation represents the results:

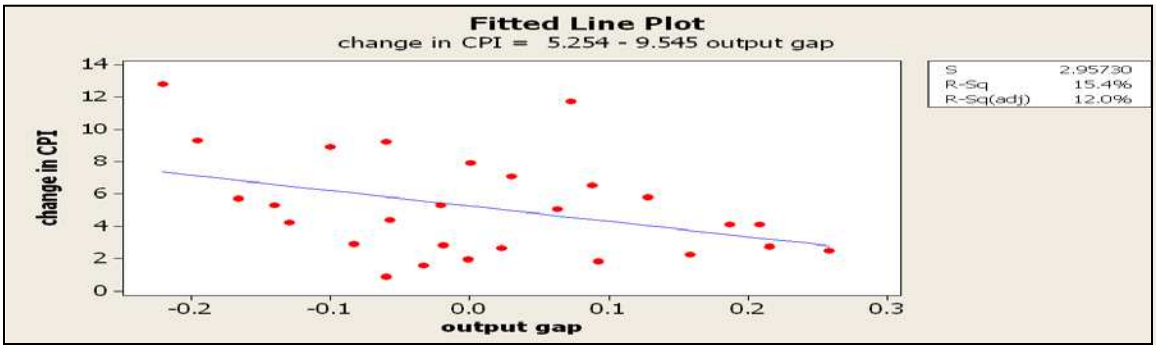
Annual change in CPI = 5.25 – 9.55 annual change in output gap

The previous equation referred to an inverse relationship between the inflation rates and output gap as expected. When the gap is positive (the actual output is greater than potential output), the increase in output tends to lower inflation rates as far as the economy is working under full employment. This result is consistent with the results of many studies that indicated that an increase in GDP growth rates lead to lower rates of inflation because of the existence of idle capacity in the Egyptian economy[25]. On the contrary, when output gap is negative (actual output is less than potential output) this leads to high rates of inflation as the economic agents will compete to buy the relatively limited number of goods and services compared with the actual demand.

As for the shape of the Phillips Curve, the following chart presents the Phillips curve for the Egyptian economy; it is clear the curve has flattened which is consistent with the changes observed globally. The output gap explains a limited portion of the changes in the inflation rate does not exceed 15 percent, this smaller coefficient is similar to those estimated in some other countries like USA where coefficient explains 16 percent of the changes in the rate of inflation[26], which underlines the emergence of other explanatory variables of great impact on inflation rates rather output gap starting from mid eighties.

[25] Metwally, Mokhtar, M., and Saif, Al-Sowaidi. (2004), "The main determinants of inflation in Egypt". The Middle East Business and Economics Review, vol. 16, no. 1, June.
[26] Davis, Joseph H. "Evolving Inflation Dynamics: Expectations and Investment Implications", Vanguard Investment consulting & Research, 2007, p: 7.

Chart (8)
Phillips Curve for the Egyptian Economy (1980-2010)



Source: Author's estimations.

5. Conclusion and policy implications:

This study focuses on analysing the inflation dynamics in Egypt during the period (1980-2009), by testing a fundamental assumption, namely: "The presence of a significant shift in "Inflation Dynamics" in the Egyptian economy which is significantly different from the inflation dynamics observed globally starting from the mid eighties. The study has conducted a VAR model to investigate the changes in inflation dynamics in Egypt during the above mentioned period after dividing it into three sub periods.

The results of this study confirmed that inflation in Egypt has become more persistent especially starting from 2000, which means that the inflation shocks are now lasting longer and have a long term impact on the future inflation paths. Therefore, inflation rates did not move rapidly towards their previous equilibrium levels, but instead they are raising steadily to record new higher equilibrium levels in contrast to the changes that have been witnessed in many other countries.

As for the main determinants of inflation dynamics in Egypt throughout the period (1980-2009), the study pointed out that the 1980s inflation pressures were mainly driven by the demand pull inflation due to the continuous increase in the domestic liquidity to finance the budget deficit, while the inflation pressures in the 1990s were mainly due to the pass through effect of the changes in the real exchange rate. In the 2000 many factors have appeared to influence the inflation rates in this period, mainly the inflation inertia, demand pull inflation, cost push inflation and the budget deficit.

Along the whole period (1980-2009), the major inflation determinants were: inflation inertia which represents the backward inflation expectations and market rigidities which is capable of explaining around 33% of the changes in inflation rates, followed by demand-pull inflation 31%, supply side shocks 20%, fiscal deficit 15%, and finally pass through effect with a minor relative importance doesn't exceed 1%.

Unlike the changes observed globally, the study confirmed that inflation becomes more responsive to supply side shocks especially starting from 2006. Concerning the slope of

Phillips Curve for the Egyptian economy, the study confirmed that Phillips Curve for the Egyptian economy has flattened as a result of increasing importance of other inflation determinants rather than output gap.

Of course, the above mentioned changes in inflation dynamics have many implications on the level of policy-making process. Egypt's Central Bank needs to focus more on availing the required prerequisites for the success of inflation targeting regime. Despite the central bank announcement in 2003 to shift to a more flexible exchange rate regime to gradually targeting inflation, the achievements so far refer to the limited results of this shift in the ultimate objective of monetary policy in Egypt.

The necessary prerequisites for the success of inflation targeting in Egypt includes: the announcement of targeted inflation rate, a transparent monetary framework through which the central bank continuously inform economic agents what has been achieved and what is missing in this regard and the reasons for the success or failure of the central bank in targeting inflation. This transparency in monetary policy will increase the credibility of the central bank and will help reducing inflation expectations and hence reaching the targeted level of inflation. In addition to the above mentioned prerequisites it is the crucial for the central bank to continue its efforts to develop accurate indicators capable of measuring core Inflation. These measurements of core inflation will help the central bank to fine tune the changes in the domestic liquidity to reduce demand pull inflation.

As inflation expectations have a great impact on inflation now, the monetary policy should focus on anchoring inflation expectation, which will require accurate measurements of inflation expectations either in the professional level (economic experts) or in the economic agents' level.

In addition, there is a crucial need to control the growing budget deficit to ensure the indecency of the monetary policy required for price stabilization. It should mentioned here that the Egyptian government was intending before the financial crisis to decrease the budget deficit to GDP by 1% annually to contain the inflationary pressures resulted from the growing public debt, but these efforts were abandoned due to the consequences of the financial crisis and the Egyptian revolution 2011, which enforced the government to increase public expenditure continuously to contain social and political instability.

At the structural level, there is crucial need to adopt many policies aim at decreasing markets rigidities and increasing the flexibility of prices and wages and link the changes in wages with the productivity levels to ensure the efficient distribution of the economic resources and controlling price increases.

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Appendix (1)

Results of VAR models for the significant coefficients which are consistent with the economic theory

Variables	lagged periods	Coefficients and t test
Domestic liquidity	one month	0.000189
		-0.00011
		[1.75085]**
Fiscal deficit	one month	0.000266
		-0.00011
		[2.40433]*
	months two	0.000304
		-0.00011
		[2.68946]*
World food prices	one month	0.039088
		-0.0199
		[1.96397]
Exchange rate	five months	-0.02105
		-0.00971
		[-2.16740]**
World oil prices	six months	0.144318
		-0.06433
		[2.24331]**
Domestic oil prices	one month	6.553547
		-3.2665
		**[2.00629]
	months three	6.822092
		-3.49036
		[1.95455]**
lagged inflation values	one month	0.27672
		-0.09518
		[2.90736*
Domestic liquidity	two months	3.86
		-1.4
		[2.78519]*
Fiscal deficit	one month	5.03
		-1.5
		[3.32981]*
World food prices	one month	0.051019
		-0.02332
		**[2.18733]
	month one	0.053896
		-0.0261
		[2.06461]**
World oil prices	Two months	0.038408
		-0.01743
		[2.20323]**
Domestic oil prices	Two months	12.09403
		-2.52268
		*[4.79412

* Significant at 1 percent critical value (2.33). ** Significant at 5 percent critical value (1.64).

Source: Author's calculations using Eviews-4 package.

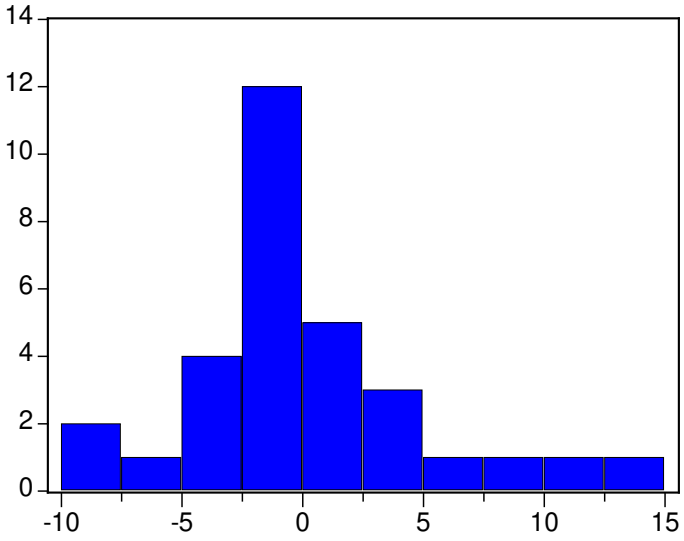
Appendix (2)

Inflation persistency test

Dependent Variable: INFLA4
Method: Least Squares
Date: 06/26/10 Time: 01:22
Sample (adjusted): 5 35
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLA4(-1)	0.323879	0.183123	1.768643	0.0883
INFLA4(-2)	0.103504	0.187992	0.550576	0.5865
INFLA4(-3)	0.202362	0.18193	1.112307	0.2758
INFLA4(-4)	0.284685	0.172236	1.652876	0.1099

R-squared	0.444736	Mean dependent var	10.44448
Adjusted R-squared	0.38304	S.D. dependent var	6.992328
S.E. of regression	5.492252	Akaike info criterion	6.364468
Sum squared resid	814.4504	Schwarz criterion	6.549499
Log likelihood	-94.64925	Durbin-Watson stat	1.843269



Series: Residuals
Sample 5 35
Observations 31

Mean	0.259441
Median	-0.719083
Maximum	14.40526
Minimum	-9.735787
Std. Dev.	5.203729
Skewness	0.804821
Kurtosis	4.153517
Jarque-Bera	5.065332
Probability	0.079447

Appendix (3)

Results of the VAR model for the first period (1980-1989)

1980-1989

Vector Autoregression Estimates
Date: 08/15/10 Time: 00:35
Sample(adjusted): 1981:04 1989:12
Included observations: 105 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

	CPI	M2	GOV_DEBT	INT_FOOD	LENDING_RATE
CPI(-1)	-0.279096	-27.27879	-8.897501	0.079962	0.178545
	(0.10345)	(99.0684)	(93.4415)	(0.53708)	(0.05508)
	[-2.69783]	[-0.27535]	[-0.09522]	[0.14888]	[3.24143]
CPI(-2)	-0.135581	-58.45849	-107.4165	0.502238	0.069808
	(0.10551)	(101.036)	(95.2973)	(0.54775)	(0.05618)
	[-1.28505]	[-0.57859]	[-1.12717]	[0.91692]	[1.24267]
M2(-1)	0.000189	0.028705	0.003228	-0.000117	-1.77E-05
	(0.00011)	(0.10326)	(0.09739)	(0.00056)	(5.7E-05)
	[1.75085]	[0.27800]	[0.03315]	[-0.20880]	[-0.30785]
M2(-2)	-0.000131	0.160939	0.185349	0.000190	-2.52E-05
	(0.00011)	(0.10384)	(0.09794)	(0.00056)	(5.8E-05)
	[-1.20444]	[1.54987]	[1.89242]	[0.33804]	[-0.43599]
GOV_DEBT(-1)	0.000266	0.147019	0.092698	-7.17E-05	-4.10E-05
	(0.00011)	(0.10577)	(0.09976)	(0.00057)	(5.9E-05)
	[2.40433]	[1.38999]	[0.92919]	[-0.12503]	[-0.69663]
GOV_DEBT(-2)	0.000304	0.184230	0.254341	-0.000297	2.44E-06
	(0.00011)	(0.10810)	(0.10196)	(0.00059)	(6.0E-05)
	[2.68946]	[1.70425]	[2.49450]	[-0.50735]	[0.04052]
INT_FOOD(-1)	0.039088	18.17415	-8.950574	0.170241	-0.003864
	(0.01990)	(19.0591)	(17.9765)	(0.10332)	(0.01060)
	[1.96397]	[0.95357]	[-0.49790]	[1.64762]	[-0.36468]
INT_FOOD(-2)	0.007003	14.38568	-8.788619	-0.142194	0.003353
	(0.02008)	(19.2322)	(18.1398)	(0.10426)	(0.01069)
	[0.34868]	[0.74800]	[-0.48449]	[-1.36379]	[0.31353]
LENDING_RATE(-1)	0.147515	15.71939	203.2844	-0.896468	0.060228
	(0.20268)	(194.091)	(183.067)	(1.05223)	(0.10791)
	[0.72782]	[0.08099]	[1.11044]	[-0.85197]	[0.55811]
LENDING_RATE(-2)	-0.254163	172.9182	26.53520	0.363294	-0.022134
	(0.19774)	(189.364)	(178.608)	(1.02660)	(0.10529)
	[-1.28532]	[0.91315]	[0.14857]	[0.35388]	[-0.21023]
C	0.158249	340.9936	105.8505	-0.288554	0.011389

	(0.08625) [1.83486]	(82.5910) [4.12870]	(77.8999) [1.35880]	(0.44775) [-0.64445]	(0.04592) [0.24802]
R-squared*	0.257719	0.132330	0.165014	0.053007	0.122686
Adj. R-squared	0.178753	0.040025	0.076185	-0.047737	0.029354
Sum sq. resids	24.28576	22271218	19813123	654.5624	6.884829
S.E. equation	0.508290	486.7523	459.1055	2.638831	0.270634
F-statistic	3.263667	1.433615	1.857668	0.526157	1.314518
Log likelihood	-72.12486	-792.8929	-786.7530	-245.0639	-5.944937
Akaike AIC	1.583331	15.31225	15.19530	4.877407	0.322761
Schwarz SC	1.861365	15.59028	15.47333	5.155441	0.600795
Mean dependent	0.234643	507.4581	284.7494	-0.239429	0.038095
S.D. dependent	0.560887	496.7960	477.6613	2.578015	0.274696
Determinant Residual Covariance		5.44E+09			
Log Likelihood (d.f. adjusted)		-1921.791			
Akaike Information Criteria		37.65316			
Schwarz Criteria		39.04333			

Roots of Characteristic Polynomial**
Endogenous variables: CPI M2 GOV_DEBT INT_FOOD LENDING_RATE
Exogenous variables: C
Lag specification: 1 2
Date: 08/15/10 Time: 00:36

Root	Modulus
0.670341	0.670341
-0.563531	0.563531
-0.004510 + 0.446470i	0.446492
-0.004510 - 0.446470i	0.446492
-0.351967 - 0.213465i	0.411641
-0.351967 + 0.213465i	0.411641
0.257282 - 0.287447i	0.385772
0.257282 + 0.287447i	0.385772
0.082178 + 0.248292i	0.261538
0.082178 - 0.248292i	0.261538

No root lies outside the unit circle.

VAR satisfies the stability condition.

* It is worth mentioning that the R^2 for VAR models that uses the first difference values always smaller than those for other models that depend on the values on its levels.

Appendix (4)

Results of the VAR model for the second period (1990-1999)

1990-1999

Vector Autoregression Estimates
Date: 08/14/10 Time: 17:43
Sample: 1990:01 1999:12
Included observations: 109
Excluded observations: 11
Standard errors in ( ) & t-statistics in [ ]

	CPI	EXCHANGE	M2	GOV_DEBT
CPI(-1)	0.053743	-1.936024	217.0378	-666.4472
	(0.12825)	(2.09680)	(378.355)	(602.977)
	[0.41906]	[-0.92332]	[0.57364]	[-1.10526]
CPI(-2)	0.098680	-0.561099	-41.45125	-31.98999
	(0.12576)	(2.05618)	(371.025)	(591.297)
	[0.78464]	[-0.27288]	[-0.11172]	[-0.05410]
CPI(-3)	0.051650	1.770527	-92.05401	15.44991
	(0.11040)	(1.80505)	(325.709)	(519.077)
	[0.46783]	[0.98088]	[-0.28263]	[0.02976]
CPI(-4)	0.104467	-1.788452	-211.3718	-202.2231
	(0.12736)	(2.08233)	(375.744)	(598.817)
	[0.82023]	[-0.85887]	[-0.56254]	[-0.33770]
CPI(-5)	-0.080665	-2.322355	122.7764	-668.7269
	(0.12565)	(2.05433)	(370.692)	(590.765)
	[-0.64198]	[-1.13047]	[0.33121]	[-1.13197]
CPI(-6)	0.165536	-2.181687	226.2211	-172.0632
	(0.11991)	(1.96053)	(353.765)	(563.788)
	[1.38046]	[-1.11281]	[0.63947]	[-0.30519]
EXCHANGE(-1)	0.004282	0.136366	-21.79116	43.26421
	(0.00951)	(0.15547)	(28.0537)	(44.7087)
	[0.45029]	[0.87712]	[-0.77677]	[0.96769]
EXCHANGE(-2)	0.013288	0.151942	31.58885	11.39716
	(0.01043)	(0.17054)	(30.7738)	(49.0436)
	[1.27385]	[0.89092]	[1.02649]	[0.23239]
EXCHANGE(-3)	0.008364	0.021948	-40.26986	14.92458
	(0.01092)	(0.17853)	(32.2144)	(51.3395)
	[0.76599]	[0.12294]	[-1.25006]	[0.29070]
EXCHANGE(-4)	-0.012474	0.239218	11.37233	0.834987
	(0.00965)	(0.15783)	(28.4787)	(45.3860)
	[-1.29224]	[1.51571]	[0.39933]	[0.01840]
EXCHANGE(-5)	-0.021050	-0.161203	36.05962	-34.99499

	(0.00971)	(0.15879)	(28.6527)	(45.6633)
	[-2.16740]	[-1.01520]	[1.25851]	[-0.76637]
EXCHANGE(-6)	-0.008760	0.332406	-27.35883	160.6075
	(0.02511)	(0.41052)	(74.0755)	(118.053)
	[-0.34890]	[0.80972]	[-0.36934]	[1.36047]
M2(-1)	-4.44E-05	0.000318	0.225729	0.092530
	(6.0E-05)	(0.00099)	(0.17815)	(0.28391)
	[-0.73515]	[0.32251]	[1.26708]	[0.32591]
M2(-2)	-2.89E-06	-0.001306	0.155162	0.090427
	(6.1E-05)	(0.00099)	(0.17895)	(0.28518)
	[-0.04757]	[-1.31744]	[0.86709]	[0.31708]
M2(-3)	5.26E-05	0.001031	-0.095004	0.587808
	(6.3E-05)	(0.00103)	(0.18590)	(0.29626)
	[0.83522]	[1.00087]	[-0.51106]	[1.98407]
M2(-4)	1.66E-05	-0.000309	0.104425	0.105529
	(6.5E-05)	(0.00106)	(0.19203)	(0.30604)
	[0.25426]	[-0.29057]	[0.54378]	[0.34482]
M2(-5)	-1.06E-05	0.000492	-0.105823	0.222969
	(6.6E-05)	(0.00108)	(0.19434)	(0.30972)
	[-0.16079]	[0.45693]	[-0.54452]	[0.71991]
M2(-6)	-2.30E-05	7.28E-05	-0.029624	0.074107
	(6.3E-05)	(0.00103)	(0.18665)	(0.29747)
	[-0.36389]	[0.07037]	[-0.15871]	[0.24913]
GOV_DEBT(-1)	-7.69E-06	-3.20E-05	0.053540	-0.222800
	(3.4E-05)	(0.00055)	(0.09955)	(0.15865)
	[-0.22785]	[-0.05792]	[0.53784]	[-1.40439]
GOV_DEBT(-2)	-1.70E-05	-0.000601	-0.111967	-0.139073
	(3.5E-05)	(0.00058)	(0.10403)	(0.16579)
	[-0.48341]	[-1.04301]	[-1.07632]	[-0.83886]
GOV_DEBT(-3)	1.22E-05	2.93E-05	-0.019256	-0.107192
	(3.5E-05)	(0.00057)	(0.10345)	(0.16487)
	[0.34704]	[0.05106]	[-0.18613]	[-0.65016]
GOV_DEBT(-4)	6.16E-06	-0.001049	-0.045814	-0.178832
	(3.9E-05)	(0.00063)	(0.11378)	(0.18132)
	[0.15963]	[-1.66378]	[-0.40267]	[-0.98627]
GOV_DEBT(-5)	1.86E-05	-0.000149	-0.168689	-0.098777
	(3.7E-05)	(0.00060)	(0.10863)	(0.17313)
	[0.50445]	[-0.24759]	[-1.55280]	[-0.57054]
GOV_DEBT(-6)	5.26E-05	6.07E-05	0.279746	-0.086127
	(4.0E-05)	(0.00066)	(0.11856)	(0.18894)
	[1.30803]	[0.09238]	[2.35958]	[-0.45584]
INT_FOOD(-1)	0.039140	-0.349269	-47.71974	18.55270

	(0.03116)	(0.50939)	(91.9162)	(146.485)
	[1.25624]	[-0.68566]	[-0.51917]	[0.12665]
INT_FOOD(-2)	-0.049195	-0.203087	63.70353	-4.261289
	(0.03048)	(0.49838)	(89.9300)	(143.320)
	[-1.61386]	[-0.40749]	[0.70837]	[-0.02973]
INT_FOOD(-3)	0.000132	0.434030	44.41984	117.1304
	(0.02931)	(0.47917)	(86.4636)	(137.796)
	[0.00450]	[0.90579]	[0.51374]	[0.85003]
INT_FOOD(-4)	0.024333	-0.329299	-151.5012	96.13770
	(0.02976)	(0.48653)	(87.7909)	(139.911)
	[0.81770]	[-0.67683]	[-1.72571]	[0.68714]
INT_FOOD(-5)	-0.017953	-0.151941	134.2555	-42.47195
	(0.03071)	(0.50212)	(90.6047)	(144.395)
	[-0.58456]	[-0.30260]	[1.48177]	[-0.29414]
INT_FOOD(-6)	0.023791	0.518960	-147.4492	189.9808
	(0.03239)	(0.52949)	(95.5439)	(152.267)
	[0.73460]	[0.98010]	[-1.54326]	[1.24768]
INT_OIL(-1)	-0.076285	-0.239275	29.85522	-201.2818
	(0.05940)	(0.97124)	(175.253)	(279.298)
	[-1.28416]	[-0.24636]	[0.17035]	[-0.72067]
INT_OIL(-2)	7.92E-05	0.251597	360.8494	-64.24662
	(0.06202)	(1.01393)	(182.958)	(291.577)
	[0.00128]	[0.24814]	[1.97231]	[-0.22034]
INT_OIL(-3)	0.066119	-1.560004	-288.6156	-141.3251
	(0.05634)	(0.92109)	(166.204)	(264.877)
	[1.17363]	[-1.69366]	[-1.73651]	[-0.53355]
INT_OIL(-4)	0.075168	1.253853	-127.8251	331.5504
	(0.06445)	(1.05370)	(190.133)	(303.012)
	[1.16634]	[1.18996]	[-0.67229]	[1.09418]
INT_OIL(-5)	-0.087706	-0.319992	-265.0688	-593.6045
	(0.06370)	(1.04148)	(187.929)	(299.499)
	[-1.37684]	[-0.30725]	[-1.41047]	[-1.98199]
INT_OIL(-6)	0.144318	1.302913	0.371485	181.0005
	(0.06433)	(1.05181)	(189.793)	(302.469)
	[2.24331]	[1.23873]	[0.00196]	[0.59841]
DOM_OIL(-1)	6.553547	18.37377	12712.50	15594.26
	(3.26650)	(53.4058)	(9636.73)	(15357.9)
	[2.00629]	[0.34404]	[1.31917]	[1.01539]
DOM_OIL(-2)	-2.160076	-22.94964	-4990.497	6219.448
	(3.34849)	(54.7462)	(9878.62)	(15743.4)
	[-0.64509]	[-0.41920]	[-0.50518]	[0.39505]
DOM_OIL(-3)	6.822092	283.2924	-821.7373	14782.64

	(3.49036)	(57.0657)	(10297.1)	(16410.4)
	[1.95455]	[4.96432]	[-0.07980]	[0.90081]
DOM_OIL(-4)	-0.138769	-53.62933	10923.81	-10054.46
	(4.22665)	(69.1037)	(12469.3)	(19872.2)
	[-0.03283]	[-0.77607]	[0.87605]	[-0.50596]
DOM_OIL(-5)	-4.440365	-39.84890	-11060.00	1196.397
	(4.22131)	(69.0165)	(12453.6)	(19847.1)
	[-1.05189]	[-0.57738]	[-0.88810]	[0.06028]
DOM_OIL(-6)	-2.487263	13.93187	4239.697	-8525.162
	(3.75914)	(61.4602)	(11090.1)	(17674.1)
	[-0.66166]	[0.22668]	[0.38230]	[-0.48235]
INT_CHICKEN(-1)	0.043138	1.101399	-99.83938	51.19108
	(0.05329)	(0.87124)	(157.210)	(250.543)
	[0.80952]	[1.26417]	[-0.63507]	[0.20432]
INT_CHICKEN(-2)	-0.017555	-0.633150	108.0951	-74.79398
	(0.06232)	(1.01892)	(183.858)	(293.011)
	[-0.28169]	[-0.62139]	[0.58793]	[-0.25526]
INT_CHICKEN(-3)	-0.024740	-1.311236	3.960101	-126.2696
	(0.05986)	(0.97876)	(176.612)	(281.463)
	[-0.41327]	[-1.33969]	[0.02242]	[-0.44862]
INT_CHICKEN(-4)	0.024353	1.466443	21.38688	290.2428
	(0.05847)	(0.95599)	(172.503)	(274.915)
	[0.41649]	[1.53395]	[0.12398]	[1.05575]
INT_CHICKEN(-5)	-0.037163	-0.478801	117.4321	116.9360
	(0.05700)	(0.93198)	(168.169)	(268.008)
	[-0.65194]	[-0.51375]	[0.69830]	[0.43631]
INT_CHICKEN(-6)	0.031674	0.484419	-55.91739	-139.6268
	(0.04901)	(0.80134)	(144.596)	(230.441)
	[0.64623]	[0.60451]	[-0.38671]	[-0.60591]
LENDING_RATE(-1)	0.175814	5.085349	53.47450	1627.176
	(0.18762)	(3.06744)	(553.500)	(882.104)
	[0.93709]	[1.65785]	[0.09661]	[1.84465]
LENDING_RATE(-2)	-0.139555	3.736809	216.1202	1236.631
	(0.19211)	(3.14087)	(566.751)	(903.221)
	[-0.72644]	[1.18974]	[0.38133]	[1.36913]
LENDING_RATE(-3)	-0.038993	5.304302	-250.2223	1209.414
	(0.18055)	(2.95191)	(532.654)	(848.882)
	[-0.21597]	[1.79690]	[-0.46976]	[1.42471]
LENDING_RATE(-4)	-0.359024	2.654670	-368.3359	135.5668

	(0.17155)	(2.80479)	(506.107)	(806.573)
	[-2.09280]	[0.94648]	[-0.72778]	[0.16808]
LENDING_RATE(-5)	-0.475533	-0.617586	17.32339	-330.9161
	(0.17622)	(2.88119)	(519.893)	(828.544)
	[-2.69845]	[-0.21435]	[0.03332]	[-0.39939]
LENDING_RATE(-6)	-0.092157	-1.389638	436.5739	-3.117380
	(0.18117)	(2.96205)	(534.484)	(851.797)
	[-0.50868]	[-0.46915]	[0.81681]	[-0.00366]
C	0.143233	3.634455	916.2691	-429.8258
	(0.25796)	(4.21749)	(761.020)	(1212.82)
	[0.55526]	[0.86176]	[1.20400]	[-0.35440]
R-squared	0.500186	0.542412	0.451736	0.395790
Adj. R-squared	0.000373	0.084825	-0.096527	-0.208421
Sum sq. resids	13.74326	3673.674	1.20E+08	3.04E+08
S.E. equation	0.504485	8.248091	1488.316	2371.903
F-statistic	1.000746	1.185374	0.823940	0.655053
Log likelihood	-41.80575	-346.3735	-912.6742	-963.4733
Akaike AIC	1.776252	7.364651	17.75549	18.68758
Schwarz SC	3.134272	8.722671	19.11351	20.04560
Mean dependent	0.332574	0.896147	1418.941	247.7073
S.D. dependent	0.504579	8.621867	1421.299	2157.684
Determinant Residual Covariance		4.05E+10		
Log Likelihood (d.f. adjusted)		-2723.109		
Akaike Information Criteria		59.04787		
Schwarz Criteria		71.27005		

Roots of Characteristic Polynomial
Endogenous variables: CPI EXCHANGE M2 GOV_DEBT INT_FOOD INT_OIL DOM_OIL INT_CHICKEN LENDING_RATE
Exogenous variables: C
Lag specification: 1 6
Date: 08/15/10 Time: 00:38

Root	Modulus
0.997317	0.997317
0.679368 + 0.697696i	0.973818
0.679368 - 0.697696i	0.973818
-0.845016 + 0.462851i	0.963475
-0.845016 - 0.462851i	0.963475
-0.946853	0.946853
0.040974 - 0.941224i	0.942115
0.040974 + 0.941224i	0.942115
-0.483778 - 0.801529i	0.936210
-0.483778 + 0.801529i	0.936210
-0.262582 - 0.895544i	0.933246
-0.262582 + 0.895544i	0.933246
0.809909 + 0.463599i	0.933208
0.809909 - 0.463599i	0.933208
0.340019 + 0.860607i	0.925341
0.340019 - 0.860607i	0.925341

-0.908152 - 0.152723i	0.920904
-0.908152 + 0.152723i	0.920904
-0.408903 - 0.797424i	0.896150
-0.408903 + 0.797424i	0.896150
0.887969	0.887969
0.376841 - 0.803299i	0.887299
0.376841 + 0.803299i	0.887299
-0.823375 + 0.329830i	0.886981
-0.823375 - 0.329830i	0.886981
0.863124 - 0.182480i	0.882203
0.863124 + 0.182480i	0.882203
0.786161 + 0.379124i	0.872802
0.786161 - 0.379124i	0.872802
-0.106178 - 0.863550i	0.870053
-0.106178 + 0.863550i	0.870053
-0.521508 - 0.672521i	0.851032
-0.521508 + 0.672521i	0.851032
0.582826 - 0.617530i	0.849135
0.582826 + 0.617530i	0.849135
0.245146 - 0.778149i	0.815850
0.245146 + 0.778149i	0.815850
-0.641878 - 0.465968i	0.793179
-0.641878 + 0.465968i	0.793179
-0.742269 - 0.231606i	0.777563
-0.742269 + 0.231606i	0.777563
0.596752 + 0.481390i	0.766713
0.596752 - 0.481390i	0.766713
-0.215844 + 0.730675i	0.761889
-0.215844 - 0.730675i	0.761889
0.090957 - 0.691434i	0.697391
0.090957 + 0.691434i	0.697391
-0.656334	0.656334
-0.292100 - 0.576860i	0.646599
-0.292100 + 0.576860i	0.646599
0.621095 - 0.136074i	0.635827
0.621095 + 0.136074i	0.635827
0.423045 + 0.316163i	0.528134
0.423045 - 0.316163i	0.528134

No root lies outside the unit circle.

VAR satisfies the stability condition.

Appendix (4)

Results of the VAR model for the third period (2000-2009)

2000-2009

Vector Autoregression Estimates
Date: 08/14/10 Time: 17:09
Sample: 2000:01 2009:06
Included observations: 114
Standard errors in ( ) & t-statistics in [ ]

	CPI	M2	GOV_DEBT	INT_FOOD	INT_OIL	EXCHANGE_RATE	DOM_OIL	INT_CHICKEN	LENDING_RATE
CPI(-1)	0.276720	-179.9721	113.2149	-0.022899	-0.767773	-0.006411	0.002206	0.015915	0.019103
	(0.09518)	(714.408)	(695.302)	(0.47299)	(0.59427)	(0.01589)	(0.00519)	(0.10201)	(0.02779)
	[2.90736]	[-0.25192]	[0.16283]	[-0.04841]	[-1.29196]	[-0.40351]	[0.42488]	[0.15601]	[0.68730]
CPI(-2)	-2.82E-05	871.8402	-163.6806	-0.964853	-0.369175	0.007765	0.010052	0.103167	-0.008110
	(0.08668)	(650.623)	(633.224)	(0.43076)	(0.54121)	(0.01447)	(0.00473)	(0.09291)	(0.02531)
	[-0.00033]	[1.34001]	[-0.25849]	[-2.23987]	[-0.68213]	[0.53670]	[2.12622]	[1.11045]	[-0.32039]
M2(-1)	8.02E-06	0.197903	0.165444	9.35E-05	7.29E-05	-4.30E-06	-8.73E-07	3.62E-06	-3.65E-06
	(1.3E-05)	(0.09976)	(0.09709)	(6.6E-05)	(8.3E-05)	(2.2E-06)	(7.2E-07)	(1.4E-05)	(3.9E-06)
	[0.60315]	[1.98377]	[1.70397]	[1.41518]	[0.87841]	[-1.93643]	[-1.20458]	[0.25385]	[-0.94102]
M2(-2)	3.86E-05	0.146548	0.066230	3.47E-05	5.04E-05	7.87E-06	1.78E-06	1.28E-05	-4.80E-06
	(1.4E-05)	(0.10391)	(0.10113)	(6.9E-05)	(8.6E-05)	(2.3E-06)	(7.6E-07)	(1.5E-05)	(4.0E-06)
	[2.78519]	[1.41037]	[0.65491]	[0.50507]	[0.58318]	[3.40448]	[2.36402]	[0.86491]	[-1.18755]
GOV_DEBT(-1)	5.03E-05	-0.136609	-0.119786	0.000104	1.53E-05	-1.94E-06	4.65E-08	-2.72E-05	-8.67E-07
	(1.5E-05)	(0.11333)	(0.11030)	(7.5E-05)	(9.4E-05)	(2.5E-06)	(8.2E-07)	(1.6E-05)	(4.4E-06)
	[3.32981]	[-1.20546]	[-1.08605]	[1.38148]	[0.16188]	[-0.77048]	[0.05653]	[-1.67855]	[-0.19676]
GOV_DEBT(-2)	1.58E-06	-0.011246	0.127164	0.000178	0.000236	-2.23E-06	8.06E-07	1.01E-05	-1.31E-05
	(1.1E-05)	(0.08298)	(0.08076)	(5.5E-05)	(6.9E-05)	(1.8E-06)	(6.0E-07)	(1.2E-05)	(3.2E-06)
	[0.14260]	[-0.13553]	[1.57466]	[3.23598]	[3.42064]	[-1.20586]	[1.33743]	[0.85009]	[-4.06055]
INT_FOOD(-1)	0.051019	18.40590	-189.4327	0.454415	0.531199	-0.005571	-0.003026	-0.001173	0.002195
	(0.02332)	(175.074)	(170.392)	(0.11591)	(0.14563)	(0.00389)	(0.00127)	(0.02500)	(0.00681)
	[2.18733]	[0.10513]	[-1.11174]	[3.92032]	[3.64752]	[-1.43096]	[-2.37872]	[-0.04691]	[0.32221]
INT_FOOD(-2)	0.053896	-132.8694	-9.238765	0.135939	0.318605	-0.001546	-0.000278	0.021184	-0.009879
	(0.02610)	(195.940)	(190.700)	(0.12973)	(0.16299)	(0.00436)	(0.00142)	(0.02798)	(0.00762)
	[2.06461]	[-0.67811]	[-0.04845]	[1.04788]	[1.95475]	[-0.35489]	[-0.19520]	[0.75713]	[-1.29590]
INT_OIL(-1)	-0.042400	186.2619	-320.4122	-0.023469	0.180240	0.003290	0.002527	0.009340	0.004106
	(0.01836)	(137.836)	(134.150)	(0.09126)	(0.11466)	(0.00307)	(0.00100)	(0.01968)	(0.00536)
	[-2.30892]	[1.35133]	[-2.38846]	[-0.25717]	[1.57200]	[1.07329]	[2.52266]	[0.47455]	[0.76562]
INT_OIL(-2)	0.038408	-57.38716	95.38658	0.096779	0.028113	-0.000156	0.000508	-0.026771	-0.003918
	(0.01743)	(130.848)	(127.349)	(0.08663)	(0.10884)	(0.00291)	(0.00095)	(0.01868)	(0.00509)
	[2.20323]	[-0.43858]	[0.74902]	[1.11713]	[0.25829]	[-0.05370]	[0.53410]	[-1.43278]	[-0.76965]
EXCHANGE_RATE(-1)	-0.370264	-1896.831	-5339.216	-3.564664	-2.134980	0.180473	-0.009426	0.107750	0.118012
	(0.62240)	(4671.70)	(4546.76)	(3.09303)	(3.88608)	(0.10389)	(0.03395)	(0.66709)	(0.18175)
	[-0.59490]	[-0.40603]	[-1.17429]	[-1.15248]	[-0.54939]	[1.73718]	[-0.27766]	[0.16152]	[0.64931]
EXCHANGE_RATE(-2)	-0.410735	-3801.102	-1059.196	-0.927218	-2.771389	0.040251	-0.042184	0.356531	-0.250509

	(0.61613)	(4624.65)	(4500.97)	(3.06188)	(3.84695)	(0.10284)	(0.03361)	(0.66038)	(0.17992)
	[-0.66663]	[-0.82192]	[-0.23533]	[-0.30283]	[-0.72041]	[0.39138]	[-1.25527]	[0.53989]	[-1.39233]
DOM_OIL(-1)	1.306921	-7844.953	-106717.2	18.79763	16.28255	-1.353953	-0.186209	1.359099	-0.478095
	(2.06835)	(15524.9)	(15109.7)	(10.2787)	(12.9141)	(0.34524)	(0.11281)	(2.21687)	(0.60399)
	[0.63187]	[-0.50532]	[-7.06284]	[1.82880]	[1.26083]	[-3.92177]	[-1.65060]	[0.61307]	[-0.79156]
DOM_OIL(-2)	12.09403	-12947.44	12455.22	12.78512	-1.285188	-0.240564	-0.060394	-2.361993	0.372330
	(2.52268)	(18935.0)	(18428.6)	(12.5365)	(15.7508)	(0.42108)	(0.13759)	(2.70382)	(0.73666)
	[4.79412]	[-0.68378]	[0.67586]	[1.01983]	[-0.08159]	[-0.57131]	[-0.43893]	[-0.87358]	[0.50543]
INT_CHICKEN(-1)	0.014088	45.59195	58.30693	-0.131179	-0.201510	-0.001901	-0.002799	0.926826	0.019583
	(0.09420)	(707.022)	(688.114)	(0.46810)	(0.58813)	(0.01572)	(0.00514)	(0.10096)	(0.02751)
	[0.14956]	[0.06448]	[0.08473]	[-0.28023]	[-0.34263]	[-0.12093]	[-0.54479]	[9.18021]	[0.71193]
INT_CHICKEN(-2)	-0.035401	-222.5947	-96.34549	-0.770533	0.293707	0.000480	0.005158	-0.342108	-0.013125
	(0.09465)	(710.469)	(691.469)	(0.47039)	(0.59099)	(0.01580)	(0.00516)	(0.10145)	(0.02764)
	[-0.37401]	[-0.31331]	[-0.13933]	[-1.63809]	[0.49697]	[0.03038]	[0.99911]	[-3.37214]	[-0.47483]
LENDING_RATE(-1)	-0.149573	-1920.927	1157.453	0.375768	0.375332	0.042514	0.000766	0.242956	-0.268243
	(0.30174)	(2264.84)	(2204.27)	(1.49950)	(1.88397)	(0.05037)	(0.01646)	(0.32341)	(0.08811)
	[-0.49570]	[-0.84815]	[0.52510]	[0.25060]	[0.19922]	[0.84412]	[0.04652]	[0.75124]	[-3.04431]
LENDING_RATE(-2)	-0.005256	-4062.320	2682.901	-2.766620	-2.305053	-0.070960	0.000170	-0.361472	-0.183039
	(0.29236)	(2194.42)	(2135.74)	(1.45288)	(1.82540)	(0.04880)	(0.01595)	(0.31335)	(0.08537)
	[-0.01798]	[-1.85120]	[1.25619]	[-1.90423]	[-1.26277]	[-1.45411]	[0.01064]	[-1.15356]	[-2.14398]
C	0.061004	3541.210	1324.647	-0.113248	-0.408768	0.015324	-0.005950	-0.030385	0.050204
	(0.10851)	(814.460)	(792.679)	(0.53924)	(0.67750)	(0.01811)	(0.00592)	(0.11630)	(0.03169)
	[0.56220]	[4.34792]	[1.67110]	[-0.21002]	[-0.60335]	[0.84606]	[-1.00537]	[-0.26126]	[1.58440]
R-squared	0.594108	0.198936	0.577162	0.494216	0.530844	0.281822	0.266845	0.632403	0.344066
Adj. R-squared	0.517202	0.047155	0.497045	0.398383	0.441952	0.145746	0.127931	0.562753	0.219784
Sum sq. resids	41.45815	2.34E+09	2.21E+09	1023.847	1616.188	1.155061	0.123332	47.62580	3.535257
S.E. equation	0.660607	4958.460	4825.856	3.282886	4.124621	0.110266	0.036031	0.708043	0.192907
F-statistic	7.725128	1.310678	7.204018	5.157061	5.971743	2.071062	1.920941	9.079718	2.768429
Log likelihood	-104.1027	-1121.376	-1118.285	-286.8811	-312.9017	99.98760	227.4980	-112.0080	36.22552
Akaike AIC	2.159696	20.00659	19.95238	5.366335	5.822837	-1.420835	-3.657859	2.298387	-0.302202
Schwarz SC	2.615729	20.46262	20.40841	5.822368	6.278870	-0.964802	-3.201826	2.754420	0.153831
Mean dependent	0.667241	5239.487	1664.939	0.563596	0.387018	0.019123	0.005234	0.260263	-0.010614
S.D. dependent	0.950737	5079.672	6804.715	4.232488	5.521386	0.119302	0.038583	1.070769	0.218394

Determinant Residual Covariance	4.90E+09
Log Likelihood (d.f. adjusted)	-2727.635
Akaike Information Criteria	50.85324
Schwarz Criteria	54.95754

Roots of Characteristic Polynomial
Endogenous variables: CPI M2 GOV_DEBT INT_FOOD INT_OIL EXCHANGE_RATE DOM_OIL INT_CHICKEN LENDING_RATE
Exogenous variables: C
Lag specification: 1 2

Date: 08/15/10 Time: 00:39

Root	Modulus
0.749846 + 0.241132i	0.787663
0.749846 - 0.241132i	0.787663
-0.746087	0.746087
0.546251 + 0.400986i	0.677628
0.546251 - 0.400986i	0.677628
0.137262 - 0.614379i	0.629526
0.137262 + 0.614379i	0.629526
-0.187424 + 0.509069i	0.542475
-0.187424 - 0.509069i	0.542475
0.487843 - 0.022772i	0.488374
0.487843 + 0.022772i	0.488374
-0.421353 - 0.178810i	0.457724
-0.421353 + 0.178810i	0.457724
0.104599 + 0.444536i	0.456676
0.104599 - 0.444536i	0.456676
-0.448836	0.448836
0.001608 + 0.153529i	0.153537
0.001608 - 0.153529i	0.153537

No root lies outside the unit circle.
VAR satisfies the stability condition.

Appendix (5)

Results of the VAR model for the whole period (1980-2009)

1980-2009

VAR Lag Order Selection Criteria
Endogenous variables: CPI M1 GOV_DEBT INT_OIL DOM_OIL FOOD LENDING_RATE CHICKEN EXCHANGE_RATE
Exogenous variables: C
Date: 08/12/10 Time: 16:03
Sample: 1980:1 2009:4
Included observations: 28

Lag	LogL	LR	FPE
0	-875.8307	NA	2.27E+16
1	-789.9909	110.3654	2.16E+16
2	-619.3855	109.6749*	3.82E+14*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Vector Autoregression Estimates
Date: 08/12/10 Time: 16:03
Sample(adjusted): 2002:3 2009:2
Included observations: 28 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

	CPI	M1	GOV_DEBT	INT_OIL	DOM_OIL	FOOD	LENDING_RATE	CHICKEN	EXCHANGE_RATE
CPI(-1)	0.592335	1879.848	-16904.80	3.423759	0.028525	0.398297	-0.014456	0.748641	-0.108616
	(0.24617)	(1992.57)	(7536.67)	(3.32300)	(0.00997)	(1.89096)	(0.05204)	(0.70920)	(0.07998)
	[2.40618]	[0.94343]	[-2.24301]	[1.03032]	[2.86235]	[0.21063]	[-0.27781]	[1.05562]	[-1.35807]
CPI(-2)	0.267009	235.3812	-344.3611	6.169046	0.010865	1.962165	0.067235	0.156798	-0.089612
	(0.25626)	(2074.22)	(7845.49)	(3.45917)	(0.01037)	(1.96845)	(0.05417)	(0.73826)	(0.08326)
	[1.04195]	[0.11348]	[-0.04389]	[1.78339]	[1.04733]	[0.99681]	[1.24123]	[0.21239]	[-1.07635]
M1(-1)	8.10E-05	0.314933	-0.643095	0.000276	2.37E-06	0.000219	-5.15E-06	-9.63E-05	6.47E-06
	(3.6E-05)	(0.29042)	(1.09847)	(0.00048)	(1.5E-06)	(0.00028)	(7.6E-06)	(0.00010)	(1.2E-05)
	[2.25716]	[1.08441]	[-0.58544]	[0.56925]	[1.63427]	[0.79438]	[-0.67839]	[-0.93202]	[0.55545]
M1(-2)	0.000170	-0.013244	-0.973150	0.000302	1.29E-06	0.000628	-9.74E-06	-6.03E-05	-1.36E-05
	(4.1E-05)	(0.33302)	(1.25962)	(0.00056)	(1.7E-06)	(0.00032)	(8.7E-06)	(0.00012)	(1.3E-05)
	[4.12148]	[-0.03977]	[-0.77257]	[0.54433]	[0.77365]	[1.98721]	[-1.11981]	[-0.50847]	[-1.01790]
GOV_DEBT(-1)	1.94E-05	0.021648	0.383310	-0.000257	1.83E-08	-3.89E-05	-2.77E-07	-7.53E-05	4.74E-06
	(1.3E-05)	(0.10552)	(0.39913)	(0.00018)	(5.3E-07)	(0.00010)	(2.8E-06)	(3.8E-05)	(4.2E-06)
	[1.48446]	[0.20515]	[0.96036]	[-1.45881]	[0.03462]	[-0.38842]	[-0.10056]	[-2.00358]	[1.11951]

GOV_DEBT(-2)	4.56E-05	-0.151570	0.517101	-0.000339	-2.08E-07	-4.77E-05	-7.42E-07	2.68E-05	1.80E-06
	(1.5E-05)	(0.11973)	(0.45288)	(0.00020)	(6.0E-07)	(0.00011)	(3.1E-06)	(4.3E-05)	(4.8E-06)
	[3.07929]	[-1.26590]	[1.14181]	[-1.69765]	[-0.34787]	[-0.41984]	[-0.23746]	[0.62976]	[0.37484]
INT_OIL(-1)	0.021610	65.92966	632.4303	-0.431058	-0.000620	-0.093249	-0.000715	-0.028218	-0.008257
	(0.02327)	(188.321)	(712.302)	(0.31406)	(0.00094)	(0.17872)	(0.00492)	(0.06703)	(0.00756)
	[0.92881]	[0.35009]	[0.88787]	[-1.37253]	[-0.65776]	[-0.52177]	[-0.14535]	[-0.42099]	[-1.09237]
INT_OIL(-2)	-0.058632	-268.1595	-308.8444	-0.192976	0.000647	-0.244833	0.001034	-0.109119	-0.012448
	(0.02138)	(173.060)	(654.582)	(0.28861)	(0.00087)	(0.16424)	(0.00452)	(0.06160)	(0.00695)
	[-2.74225]	[-1.54951]	[-0.47182]	[-0.66864]	[0.74774]	[-1.49074]	[0.22870]	[-1.77154]	[-1.79206]
DOM_OIL(-1)	-11.97270	-47382.82	560833.3	-307.6255	-0.487540	-112.1565	1.866588	-45.14093	4.741223
	(9.62707)	(77923.4)	(294737.)	(129.953)	(0.38972)	(73.9498)	(2.03496)	(27.7346)	(3.12770)
	[-1.24365]	[-0.60807]	[1.90283]	[-2.36721]	[-1.25100]	[-1.51666]	[0.91726]	[-1.62760]	[1.51588]
DOM_OIL(-2)	-9.124481	-50161.26	758303.8	-607.8539	-1.216018	-153.3850	-1.222830	42.63330	5.572741
	(11.1061)	(89895.2)	(340018.)	(149.918)	(0.44960)	(85.3111)	(2.34761)	(31.9956)	(3.60822)
	[-0.82157]	[-0.55800]	[2.23019]	[-4.05458]	[-2.70469]	[-1.79795]	[-0.52088]	[1.33247]	[1.54446]
FOOD(-1)	0.013469	-349.5269	982.4463	0.748864	-0.001423	0.337247	0.005909	0.186075	0.022680
	(0.06137)	(496.728)	(1878.82)	(0.82839)	(0.00248)	(0.47140)	(0.01297)	(0.17680)	(0.01994)
	[0.21948]	[-0.70366]	[0.52291]	[0.90400]	[-0.57285]	[0.71542]	[0.45555]	[1.05249]	[1.13756]
FOOD(-2)	0.107780	314.7957	1613.894	-0.575521	-0.001634	0.180051	0.000807	0.267605	0.051325
	(0.05641)	(456.597)	(1727.02)	(0.76146)	(0.00228)	(0.43331)	(0.01192)	(0.16251)	(0.01833)
	[1.91065]	[0.68944]	[0.93449]	[-0.75581]	[-0.71548]	[0.41552]	[0.06766]	[1.64667]	[2.80052]
LENDING_RATE(-1)	1.224181	-12443.83	-72744.92	15.10313	0.084480	-1.627291	-0.082834	2.496146	-0.608936
	(1.93777)	(15684.7)	(59325.8)	(26.1574)	(0.07844)	(14.8849)	(0.40961)	(5.58253)	(0.62956)
	[0.63175]	[-0.79337]	[-1.22619]	[0.57739]	[1.07694]	[-0.10932]	[-0.20223]	[0.44714]	[-0.96725]
LENDING_RATE(-2)	-2.871016	6729.523	-7592.768	11.22152	-0.000454	8.340543	0.167653	2.872625	-0.041464
	(1.26537)	(10242.1)	(38739.7)	(17.0808)	(0.05122)	(9.71984)	(0.26747)	(3.64539)	(0.41110)
	[-2.26892]	[0.65704]	[-0.19599]	[0.65697]	[-0.00886]	[0.85809]	[0.62680]	[0.78802]	[-0.10086]
CHICKEN(-1)	-0.021885	-80.94181	99.28868	-1.767118	0.000521	-1.081737	-0.017132	-0.111276	-0.021681
	(0.09030)	(730.935)	(2764.68)	(1.21898)	(0.00366)	(0.69366)	(0.01909)	(0.26016)	(0.02934)
	[-0.24235]	[-0.11074]	[0.03591]	[-1.44967]	[0.14256]	[-1.55946]	[-0.89753]	[-0.42773]	[-0.73900]
CHICKEN(-2)	0.039210	-802.4941	3021.040	0.478685	-0.005398	0.436457	-0.006991	-0.135813	0.003124
	(0.05959)	(482.362)	(1824.48)	(0.80443)	(0.00241)	(0.45776)	(0.01260)	(0.17168)	(0.01936)

	[0.65796]	[-1.66368]	[1.65584]	[0.59506]	[-2.23773]	[0.95345]	[-0.55497]	[-0.79107]	[0.16133]
EXCHANGE_RATE(-1)	-0.927990	-3404.806	-4377.674	-7.800538	-0.009915	-1.409668	0.073421	2.431679	0.147467
	(0.81615)	(6606.05)	(24986.6)	(11.0169)	(0.03304)	(6.26918)	(0.17252)	(2.35123)	(0.26515)
	[-1.13704]	[-0.51541]	[-0.17520]	[-0.70805]	[-0.30011]	[-0.22486]	[0.42559]	[1.03421]	[0.55616]
EXCHANGE_RATE(-2)	-0.147767	2110.088	39526.40	-7.654585	-0.015923	-1.419569	0.171370	4.651436	0.174791
	(0.82597)	(6685.57)	(25287.4)	(11.1495)	(0.03344)	(6.34464)	(0.17459)	(2.37953)	(0.26835)
	[-0.17890]	[0.31562]	[1.56309]	[-0.68654]	[-0.47620]	[-0.22374]	[0.98154]	[1.95477]	[0.65136]
C	-0.710433	2435.772	7614.433	6.881810	-0.032323	0.702390	-0.122783	-0.056483	0.144365
	(0.48962)	(3963.10)	(14990.0)	(6.60925)	(0.01982)	(3.76101)	(0.10350)	(1.41055)	(0.15907)
	[-1.45098]	[0.61461]	[0.50797]	[1.04124]	[-1.63075]	[0.18676]	[-1.18636]	[-0.04004]	[0.90755]
R-squared	0.952606	0.549245	0.770624	0.933942	0.867544	0.875679	0.686923	0.853595	0.596228
Adj. R-squared	0.857818	-0.352264	0.311871	0.801827	0.602631	0.627036	0.060769	0.560785	-0.211315
Sum sq. resids	6.794887	4.45E+08	6.37E+09	1238.125	0.011135	400.9300	0.303604	56.39467	0.717206
S.E. equation	0.868900	7033.055	26601.74	11.72900	0.035175	6.674412	0.183668	2.503213	0.282293
F-statistic	10.04988	0.609251	1.679824	7.069163	3.274825	3.521837	1.097050	2.915182	0.738324
Log likelihood	-19.90580	-271.8751	-309.1250	-92.77837	69.88744	-76.99243	23.60900	-49.53266	11.57407
Akaike AIC	2.778986	20.77679	23.43750	7.984169	-3.634817	6.856602	-0.329215	4.895190	0.530424
Schwarz SC	3.682982	21.68079	24.34150	8.888165	-2.730821	7.760598	0.574781	5.799186	1.434420
Mean dependent	2.515357	3908.332	10646.57	2.273571	0.021071	2.098929	-0.058571	1.141429	0.038929
S.D. dependent	2.304348	6048.021	32068.24	26.34750	0.055800	10.92898	0.189516	3.777105	0.256491

Determinant Residual Covariance	3.61E+12
Log Likelihood (d.f. adjusted)	-762.3930
Akaike Information Criteria	66.67093
Schwarz Criteria	74.80689

Roots of Characteristic Polynomial
Endogenous variables: CPI M1 GOV_DEBT INT_OIL DOM_OIL FOOD LENDING_RATE CHICKEN EXCHANGE_RATE
Exogenous variables: C
Lag specification: 1 2
Date: 08/12/10 Time: 16:07

Root	Modulus

-0.948786	0.948786
-0.511796 - 0.787147i	0.938902
-0.511796 + 0.787147i	0.938902
0.520728 + 0.734110i	0.900042
0.520728 - 0.734110i	0.900042
0.882644	0.882644
0.209859 + 0.815378i	0.841951
0.209859 - 0.815378i	0.841951
0.754325 + 0.317570i	0.818448
0.754325 - 0.317570i	0.818448
-0.288846 - 0.689374i	0.747442
-0.288846 + 0.689374i	0.747442
-0.710159	0.710159
0.087581 - 0.529392i	0.536588
0.087581 + 0.529392i	0.536588
0.516856	0.516856
-0.310835 + 0.398965i	0.505758
-0.310835 - 0.398965i	0.505758

No root lies outside the unit circle.

VAR satisfies the stability condition.

Variance Decomposition of CPI:

Period	S.E.	CPI	M1	GOV_DEBT	INT_OIL	DOM_OIL	FOOD	LENDING_RATE	CHICKEN	EXCHANGE_RATE
1	0.868900	100.0000	0.000000	0.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	1.629485	50.70587	17.83907	14.63947	0.763704	11.44750	3.784529	0.087569	0.005437	0.726859
3	2.899771	45.71621	21.55601	14.84962	1.724916	12.52053	1.195256	1.804706	0.002011	0.630741
4	3.268334	38.90187	27.28715	12.80001	1.538967	9.871404	5.024707	3.623038	0.303916	0.648939
5	3.392635	36.38967	27.34098	12.28783	1.485915	12.23657	4.781460	3.492647	1.325427	0.659495
6	3.477605	34.67264	26.76844	13.04237	1.695509	13.17245	4.974378	3.407070	1.341986	0.925163
7	3.583279	33.13302	25.94218	12.56248	1.708725	13.99423	5.164902	3.893064	2.207709	1.393685
8	3.952617	30.29190	25.22573	16.23149	2.648649	14.19580	4.244778	3.264714	2.750654	1.146275
9	4.432599	27.57222	29.75783	17.90579	2.868264	11.29471	3.943156	3.331224	2.195420	1.131388
10	4.684530	24.76056	34.12327	16.39014	2.611356	10.16775	5.019073	3.692978	2.047108	1.187761
11	4.723544	24.45440	34.08702	16.56762	2.737146	10.03338	5.125478	3.685986	2.140124	1.168842
12	4.753622	24.14594	33.68431	17.02146	2.952071	9.952907	5.298300	3.649404	2.132229	1.163370