

Package Name: HDECOMP

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Add-in Type: VAR and Global

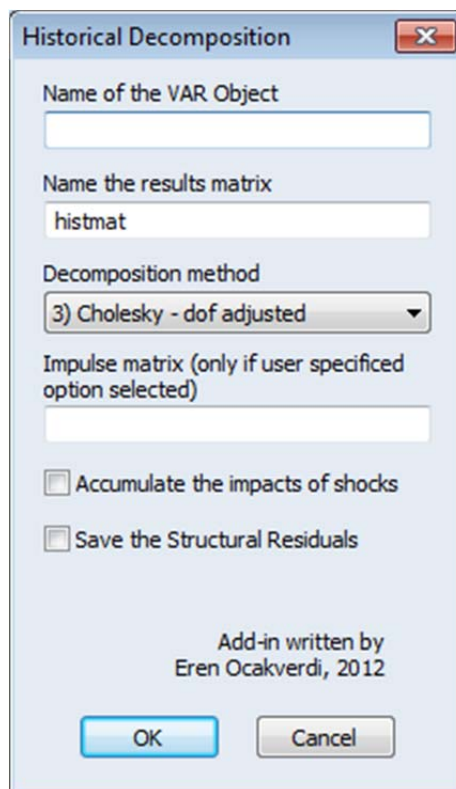
Default Proc Name: hdecomp

Default Menu Text: Historical Decomposition

Interface: Dialog and Command Line

Description: This add-in provides a procedure that decomposes the historical values of time series from a VAR estimation, which allows user to compute the contribution of current and past innovations.

Dialog: Upon running the add-in from the menus or command line, a dialog will appear:

A screenshot of a Windows-style dialog box titled "Historical Decomposition". The dialog has a standard title bar with a close button (X). It contains several input fields and checkboxes. The first field is labeled "Name of the VAR Object" and is empty. The second field is labeled "Name the results matrix" and contains the text "histmat". Below this is a dropdown menu labeled "Decomposition method" with the selected option being "3) Cholesky - dof adjusted". Underneath the dropdown is a label "Impulse matrix (only if user specified option selected)" followed by an empty text field. At the bottom, there are two checkboxes: "Accumulate the impacts of shocks" and "Save the Structural Residuals", both of which are currently unchecked. At the very bottom of the dialog, it says "Add-in written by Eren Ocakverdi, 2012". There are two buttons at the bottom: "OK" and "Cancel".

In the first box, you should enter the name of your VAR object. Since the results will be stored in a matrix object, you can provide its name in the second box (the default is *histmat*). There are 7 built-in decomposition methods available in EViews and you can find relevant information in the manual (*i.e. Users Guide II page 469*). If you select the “user specified” option (no 7), you should explicitly supply the impulse matrix.

Resulting matrix will have $(k*(k+1))$ columns, k being the number of variables. Columns $k*(i-1)+i$ will represent the base projections for i^{th} variable and k columns next to these

projections will include the impact of each shock to that variable. You can also accumulate these impacts via adding the base projections to all the shock effects.

Command Line:

Syntax-1: hdecomp

Syntax-2: VAR_name.hdecomp(options)

Options:

Argument	Type	Explanation
varname	<i>string</i>	Name of the VAR object
hist	<i>string</i>	Name of the resulting historical decomposition matrix
imp	<i>numeric</i>	Decomposition method (<i>see Users Guide II p. 469</i>)
fname	<i>string</i>	User specified impulse matrix (<i>optional</i>)
accum		Accumulate the impacts of shocks
sresids		Save the structural residuals
prompt		Open the GUI

Examples:

1) myvar.hdecomp(hist=histmat,imp=6)

2) myvar.hdecomp(hist=histmat,imp=7,fname=impmat,accum,sresids,prompt)

CASE STUDY: Estimation of Core Inflation for Turkey

Turkey has a long history of high inflation, which had dominated the behavior of economic aggregates back in 80s and 90s, when the average inflation was around 50% and 75%, respectively. In the aftermath of 2001 crisis, the most severe economic downturn in country's history, Central Bank of Republic of Turkey (CBRT) had left the Turkish lira to float and adopted an "implicit inflation targeting" framework. Since Turkey had failed to fulfill most of the stringent set of "preconditions", implementation of full-fledged inflation targeting had to wait until 2006 (Kara, 2006). As a result of decisive economic policies, Turkey has managed to bring down annual average inflation from 54% in 2001 to 6.5% in 2011.

Headline inflation figures in Turkey suffer from high volatility which in turn complicates interpretation of underlying trend in prices and undermines effective implementation of monetary policy. To alleviate the problem, TURKSTAT (Turkish Statistical Institute) reports nine different core price indices, each of which are constructed based on exclusion-type method, alongside the overall Consumer Price Index (CPI).

Mere exclusion of items that are insensitive to or irrelevant for monetary policy and/or items that are highly volatile components of the basket is not the optimal way of constructing a core price index. Core inflation should be able to isolate the prices that do not fluctuate frequently and thus should be able to capture the inflation inertia. Here, core inflation in the Turkish economy is estimated using the structural vector autoregressive (SVAR) approach developed by Quah and Vahey (1995).

Quah and Vahey (1995) follows an agnostic approach on the exact determinants of underlying inflation and defines core inflation as the component of measured inflation that has no medium or long term impact on real output. This is a theory-based definition which intends to get rid of the effect of goods and services that quickly change with respect to supply and demand imbalances.

One of the stylized facts of Turkish economy is that almost 70% of country's imports are due to intermediate goods. Turkey is a net importer of commodities, crude oil and natural gas being the most obvious. Therefore, impact of import prices should also be taken into account when measuring the core inflation.

The estimate of core inflation is obtained via Vector Autoregression (VAR) with dynamic constraints. Three types of disturbance is assumed to have an impact on the headline inflation: *i) the one that has an impact on all variables in the medium to long run, ii) the one that has an impact on both real output and inflation but not on import prices in the medium to long run, and iii) the one that has an impact only on inflation.*

Core inflation can be defined as the underlying movement in measured inflation associated only with the third kind of disturbance that has no impact on output and import prices after some fixed horizon. In order to extract this relevant component, the model is written in the trivariate moving average form:

$$\begin{bmatrix} \Delta imp_t \\ \Delta gdp_t \\ \Delta cpi_t \end{bmatrix} = \begin{bmatrix} C_{11}(L) & 0 & 0 \\ C_{21}(L) & C_{22}(L) & 0 \\ C_{31}(L) & C_{32}(L) & C_{33}(L) \end{bmatrix} * \begin{bmatrix} \epsilon_{1t} \\ \epsilon_{2t} \\ \epsilon_{3t} \end{bmatrix}$$

where, imp_t , ipi_t and cpi_t denote the logarithms of seasonally adjusted import price index (in terms of local currency), real gross domestic product (GDP) and consumer price index (CPI). $C_{ij}(L)$ are polynomials in the lag operator L such that the individual coefficients of $C_{ij}(L)$ are denoted by $c_{ij}(k)$. ϵ_{1t} , ϵ_{2t} and ϵ_{3t} are independent white noise disturbances, each having a unit variance.

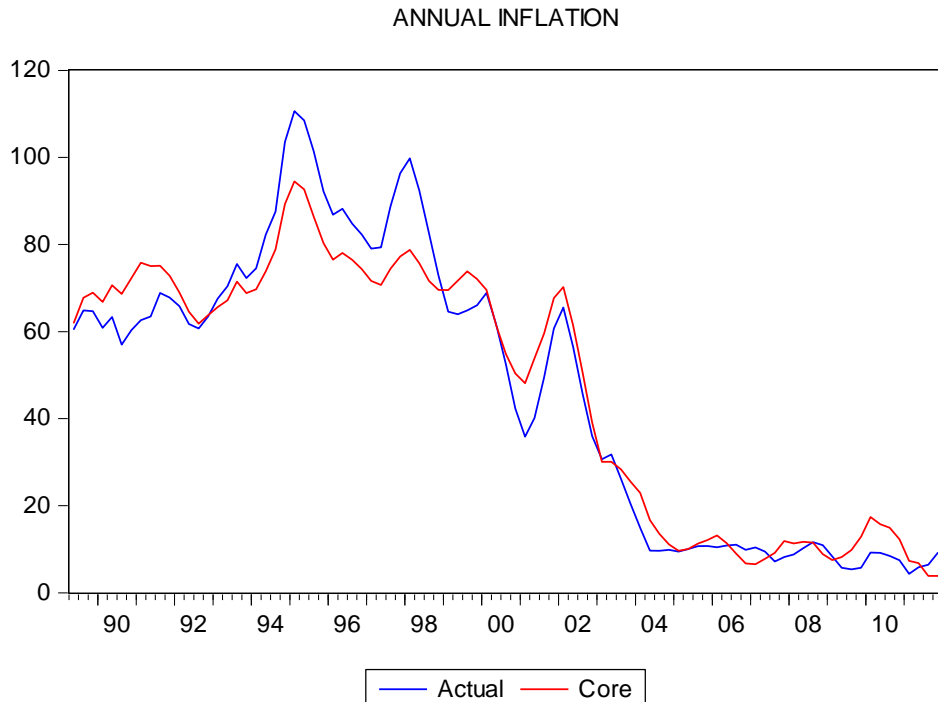
The time path of inflation can be decomposed as follows:

$$\Delta cpi_t = \sum_{k=0}^{\infty} c_{31}(k) * \epsilon_{1t-k} + \sum_{k=0}^{\infty} c_{32}(k) * \epsilon_{2t-k} + \sum_{k=0}^{\infty} c_{33}(k) * \epsilon_{3t-k}$$

The third term in the right hand side corresponds to changes in the core (or underlying) inflation process and can be considered as the permanent component that is neutral to both import prices and output. This representation can be recovered via Blanchard and Quah (1989) method.

Although formal tests indicate a shorter lag length, it is preferable to use 4 quarters to avoid the possibility of omitting important dynamics and to include at least a year-long period (Enders, 2004). Moreover, such a choice will also increase the explanatory power of the model and minimize the effect of temporary component or noise.

An EViews program (casestudy.prg) is written to carry out the analysis and is available in the add-in's folder along with a workfile that contains the data (casestudy.wf1). Below is the graphic output from the analysis, and impulse response analysis and variance decomposition results can be found in the Appendix.



As depicted in the chart above, actual inflation tends to stay above the core inflation from time to time, which can be attributed to the rise in international prices and high volatility in exchange rates. The difference between actual and core inflation has reached to 5.3% as of end-2011, which is a serious complication for monetary policy since CBRT's medium term inflation target (http://www.tcmb.gov.tr/yeni/ppyeni_eng/inflation_table.html) is 5% for the headline figure.

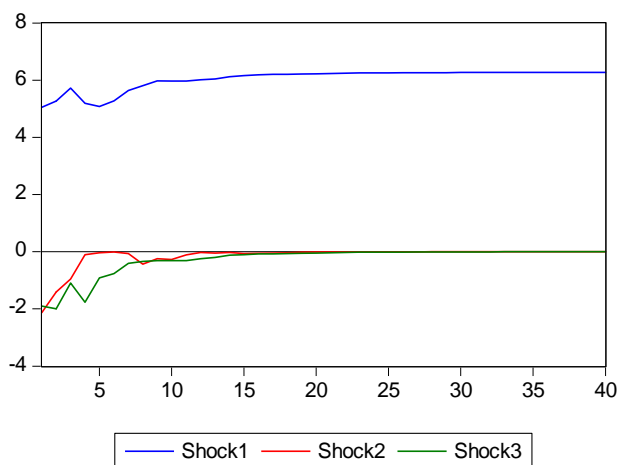
Yigit and Gokce (2012) has estimated a very similar model, but the results reported in their paper are quite different than those obtained from this case study. The discrepancy stems largely from the data preparation stage, where they take additional steps to increase the compatibility of data sets with different base year (e.g. GDP). The time series properties of the data used in the analysis is quite problematic due not only to existence of structural breaks and outliers, but also to comprehensive changes in concepts, definitions and classifications. Although a complex preliminary data analysis is required, results of the SVAR model (i.e. historical decomposition) are still not conclusive and vary according to changes in the data set or the sample taken. This case study is performed only for demonstration purposes.

References:

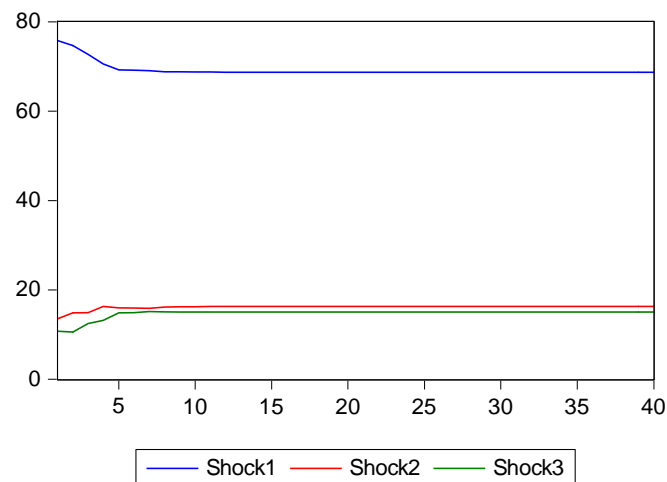
- Blanchard, O. J. and Quah, D. (1989). "The Dynamic Effects of Aggregate Demand and Supply Disturbances". *The American Economic Review*, 79(4), 655-673.
- Enders, W. (2004). *Applied Economic Time Series*, Second Edition. John Wiley & Sons.
- Kara, A. H. (2006). "Turkish Experience with Implicit Inflation Targeting", Research Department Working Paper, No: 06/03, Central Bank of Republic Turkey.
- Quah, D. and Vahey, S. P. (1995). "Measuring Core Inflation". *The Economic Journal*, 105, 1130-1144.
- Yigit, O. and Gokce, A. (2012). "Core Inflation in Turkey: An Econometric Approach (in Turkish)". *Central Bank Review*, 12(1), 37-51.

APPENDIX: Impulse Responses and Variance Decomposition

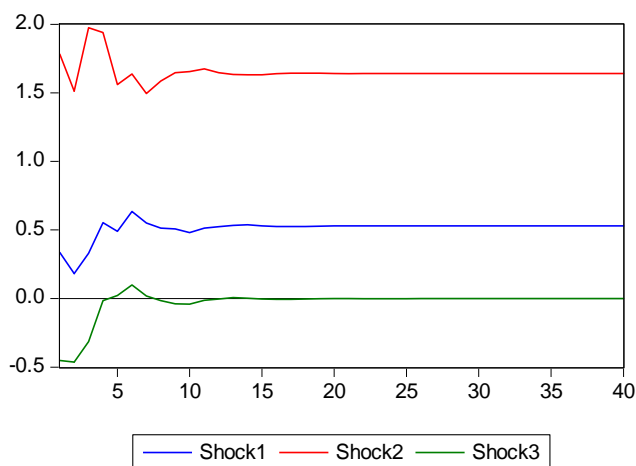
Accumulated Response of PINF to Structural One S.D. Innovations



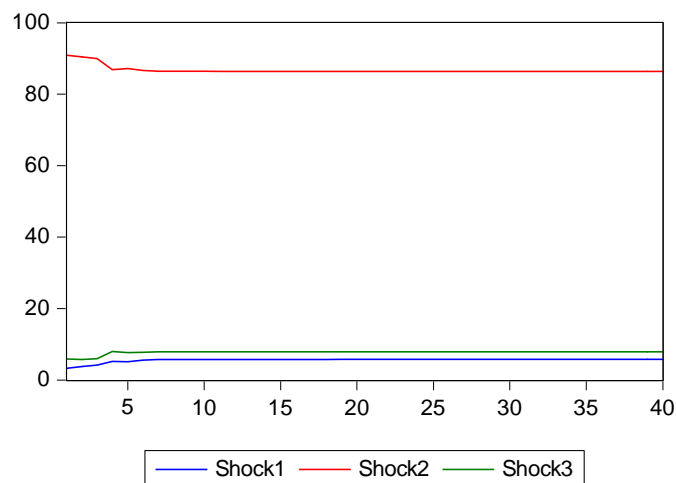
Variance Decomposition of PINF



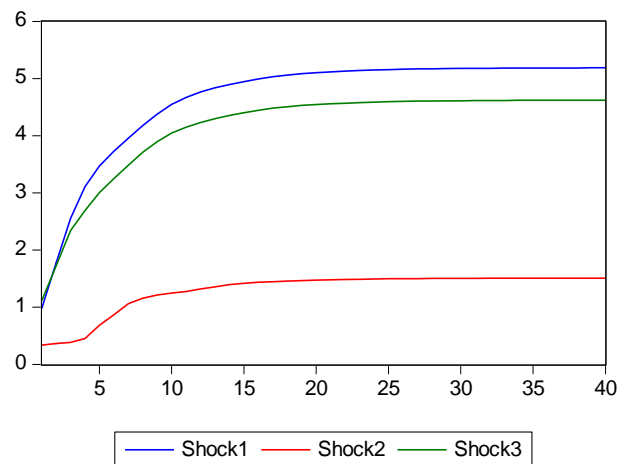
Accumulated Response of GROWTH to Structural One S.D. Innovations



Variance Decomposition of GROWTH



Accumulated Response of INF to Structural One S.D. Innovations



Variance Decomposition of INF

