1 Question 1: Structural VAR for the US

1. Estimate a VAR(6) model for the US using unemployment inflation money growth and the Federal Funds rate using the data stored in **Question1.wf1**. (**use the sample period 1970m1-2008m12**)

2. Identify the monetary policy scheme using a Choleski decomposition and compute the impulse responses.

3. How do the results for impulse responses compare to a Choleski decomposition when the following identification scheme is used?

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ \tilde{A}_{12} & 1 & 0 & 0 \\ \tilde{A}_{13} & \tilde{A}_{23} & 1 & \tilde{A}_{43} \\ 0 & 0 & \tilde{A}_{34} & 1 \end{pmatrix} \begin{pmatrix} e_{\pi_t} \\ e_{y_t} \\ e_{M_t} \\ e_{R_t} \end{pmatrix} = \begin{pmatrix} b_1 & 0 & 0 & 0 \\ 0 & b_2 & 0 & 0 \\ 0 & 0 & b_3 & 0 \\ 0 & 0 & 0 & b_4 \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \\ u_{MD} \\ u_{MS} \end{pmatrix}$$

4. Estimate a bi-variateVAR using unemployment change and (monthly) money growth (**use the sample period 1990m1-2008m12**). Impose the long run restriction that only supply shocks have permanent effects on unemployment and estimate the impulse response functions in this scheme. Calculate the historical decomposition of the change in unemployment in terms of the two shocks.

2 Answer to Question 1

1 and 2 Go to quick–>estimate–>estimate VAR-> Fill in the dialog box as shown in 1. Type in all the endogenous variables unrate inf dm2 ffr In the VAR menu go to view–> impulse response–>In the impulses box type in FFR. This the variable we want to shock. In the responses box, leave the names of all

In the impulse definition widow, choose Choleski DF adjusted and use the ordering unrate inf dm2 ffr. This implies that the monetary policy shock is one that does not affect the other variables contemporaneously (see 3). The results are provided in figure 4.

3. In Eviews, this identification scheme is expressed as

$$\underbrace{\begin{pmatrix} 1 & 0 & 0 & 0 \\ \tilde{A}_{12} & 1 & 0 & 0 \\ \tilde{A}_{13} & \tilde{A}_{23} & 1 & \tilde{A}_{43} \\ 0 & 0 & \tilde{A}_{34} & 1 \end{pmatrix}}_{B} \underbrace{\begin{pmatrix} e_{\pi_t} \\ e_{y_t} \\ e_{M_t} \\ e_{R_t} \end{pmatrix}}_{e_t} = \underbrace{\begin{pmatrix} b_1 & 0 & 0 & 0 \\ 0 & b_2 & 0 & 0 \\ 0 & 0 & b_3 & 0 \\ 0 & 0 & 0 & b_4 \end{pmatrix}}_{DD} \underbrace{\begin{pmatrix} u_1 \\ u_2 \\ u_{MD} \\ u_{MS} \end{pmatrix}}_{u_t}$$

We need to create the matrices B and DD and then tell Eviews to estimate the elements of these matrices. To do this goto–>object–>new object–>matrix–>4 rows 4 columns. Type in NA for unknown elements, Figure 5. Once you have created B and DD . Go back to the VAR–>Proc–>Estimate structural factorisation–>specify by matrix–>type in B and DD as shown in figure 6. Click on OK to estimate the element of matrices B and DD. Then goto–>impulse–>impulse definition–>structural decomposition to get the impulse responses in figure 7

4. First estimate a VAR(6) using the first difference of unemployment and monthly money growth. Then create the long run impact matrix

$$C = \begin{pmatrix} c1 & 0 \\ c2 & c3 \end{pmatrix}$$

The 0 in the top implies that the second shock is restricted to have a zero impact on the level of unemployment in the long run (unemployment is the first variable in the VAR), but can affect the level of money supply in the long run. The first shock can affect both unemployment and money in the long run. Hence the first shock is the supply shock. Got to->object->new object–>matrix, create a 2 by 2 matrix and type in NA in non-zero elements as in figure 8 As before, go to impulse–>impulse definition–>choose structural factorisation–>specify by matrix and under Long run pattern type in the name of the matrix just created. Choose accumulated impulse responses (under impulse menu) as we are interested in the level of the variables. The historical decomposition can be carried out using the historical decomposition addin. This add-in is found under the Proc-addin sub-menu in the VAR menu. (see http://forums.eviews.com/viewtopic.php?f=23&t=5901) Clicking on this add-in produces the historical decomposition.

5.

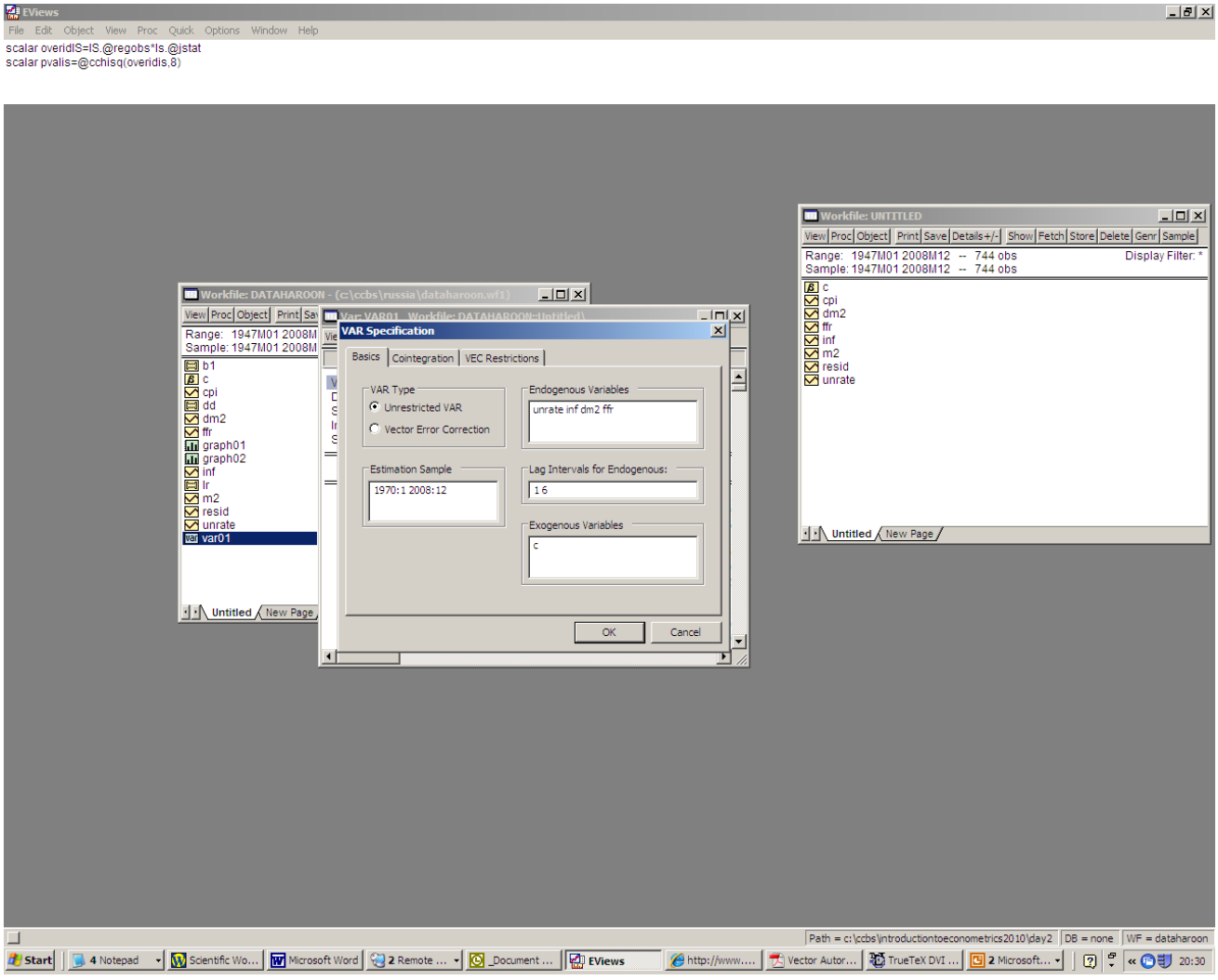


Figure 1: VAR estimation

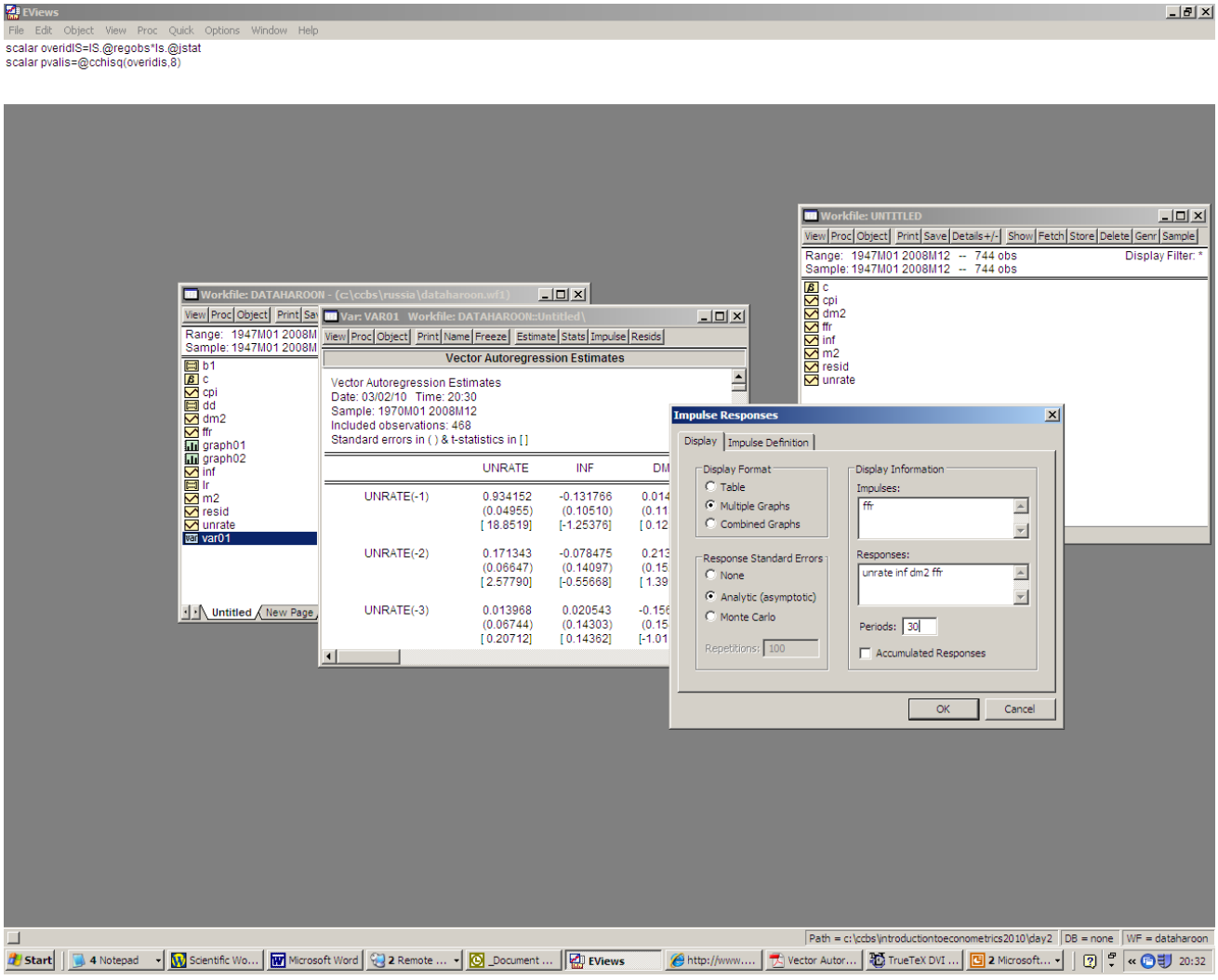


Figure 2: Impulse Response

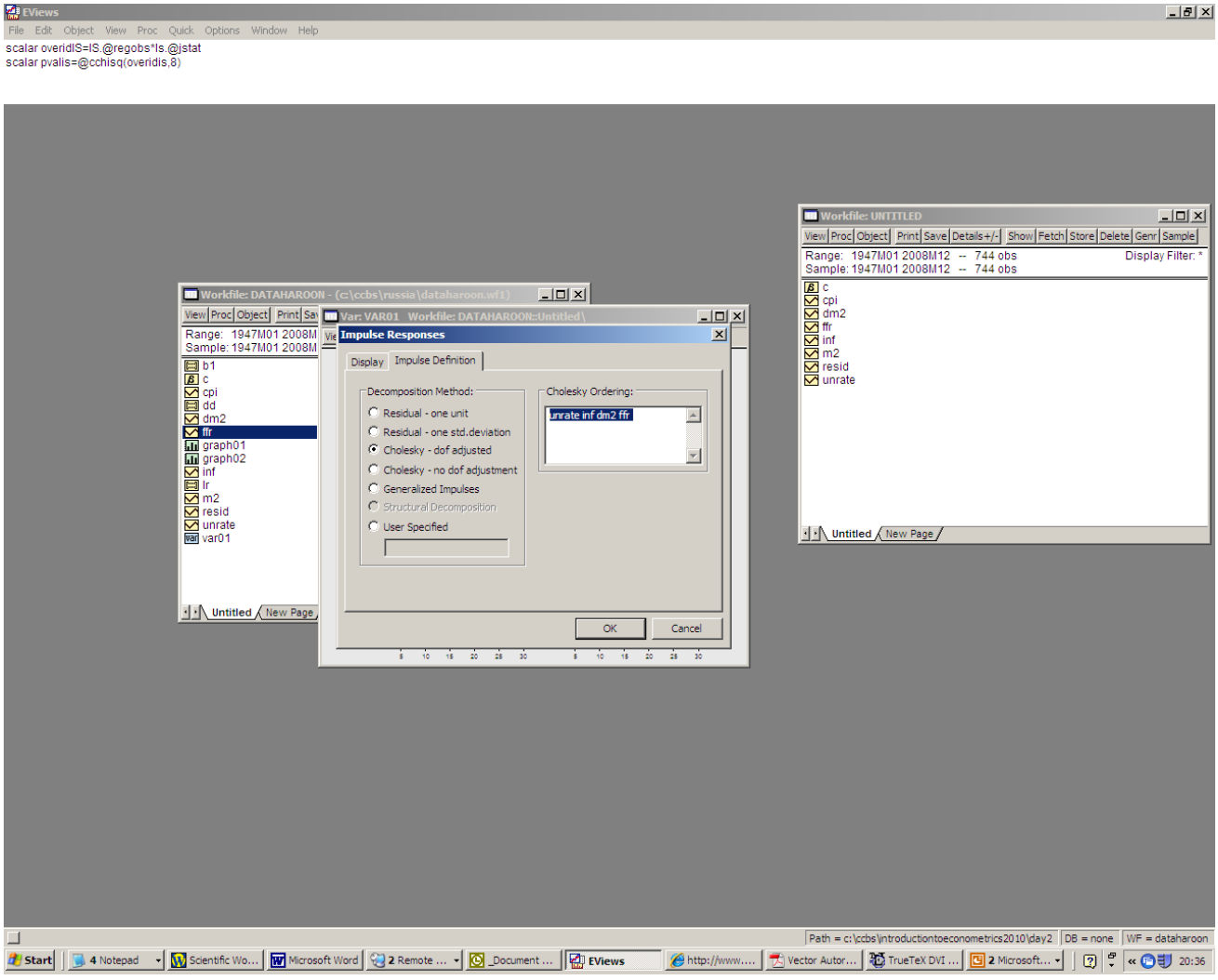


Figure 3: Ordering

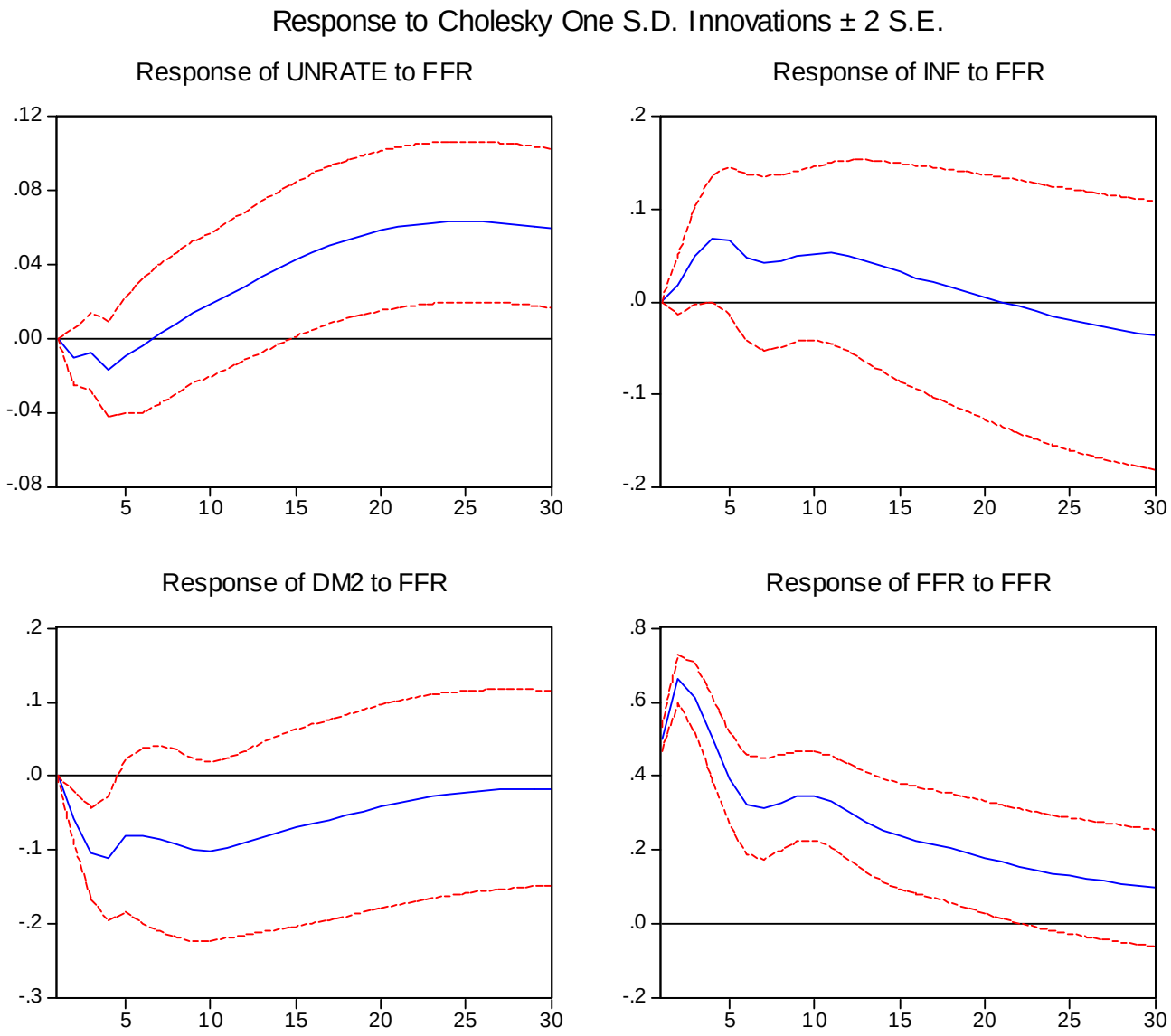


Figure 4: Impulse responses

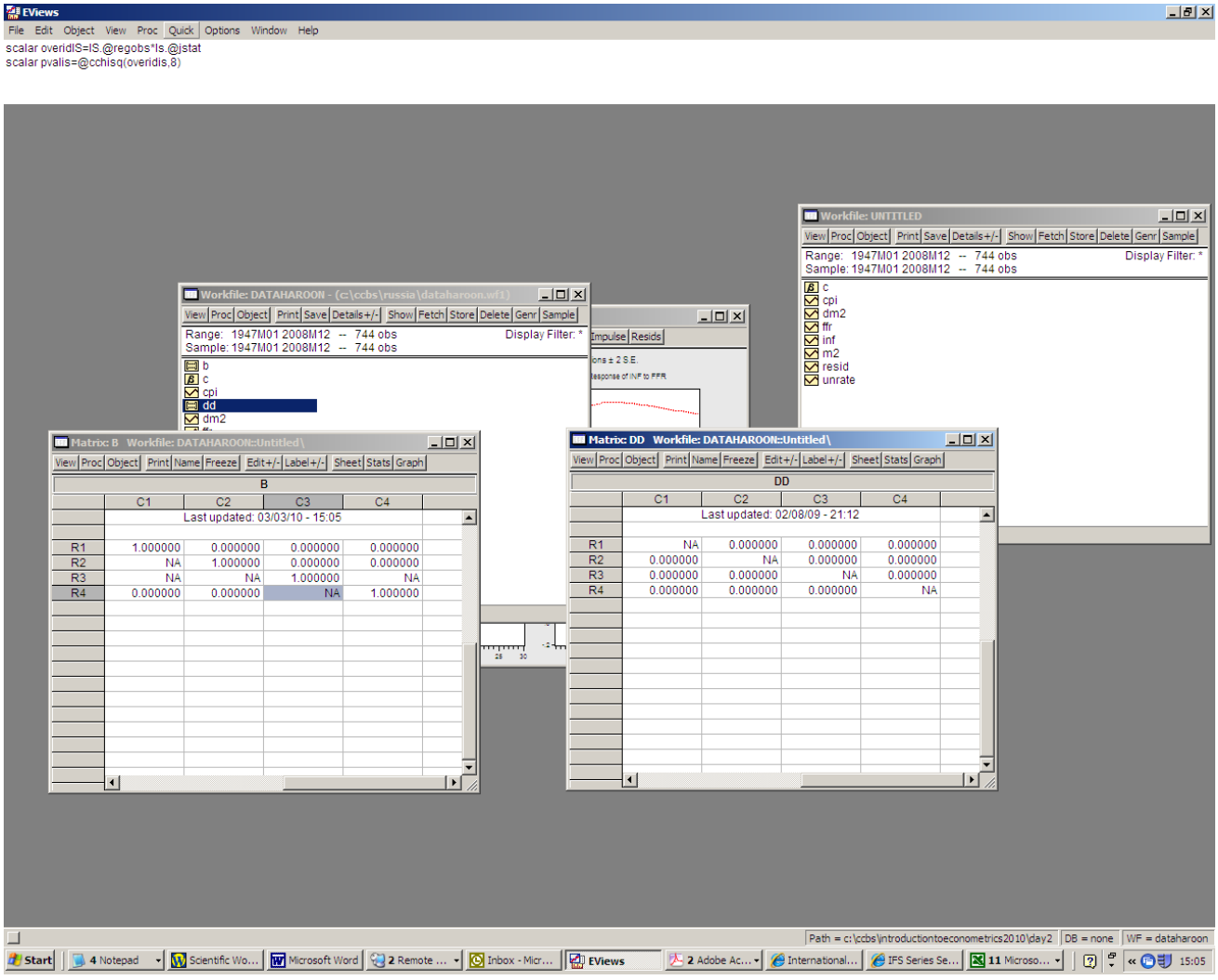


Figure 5: non recursive

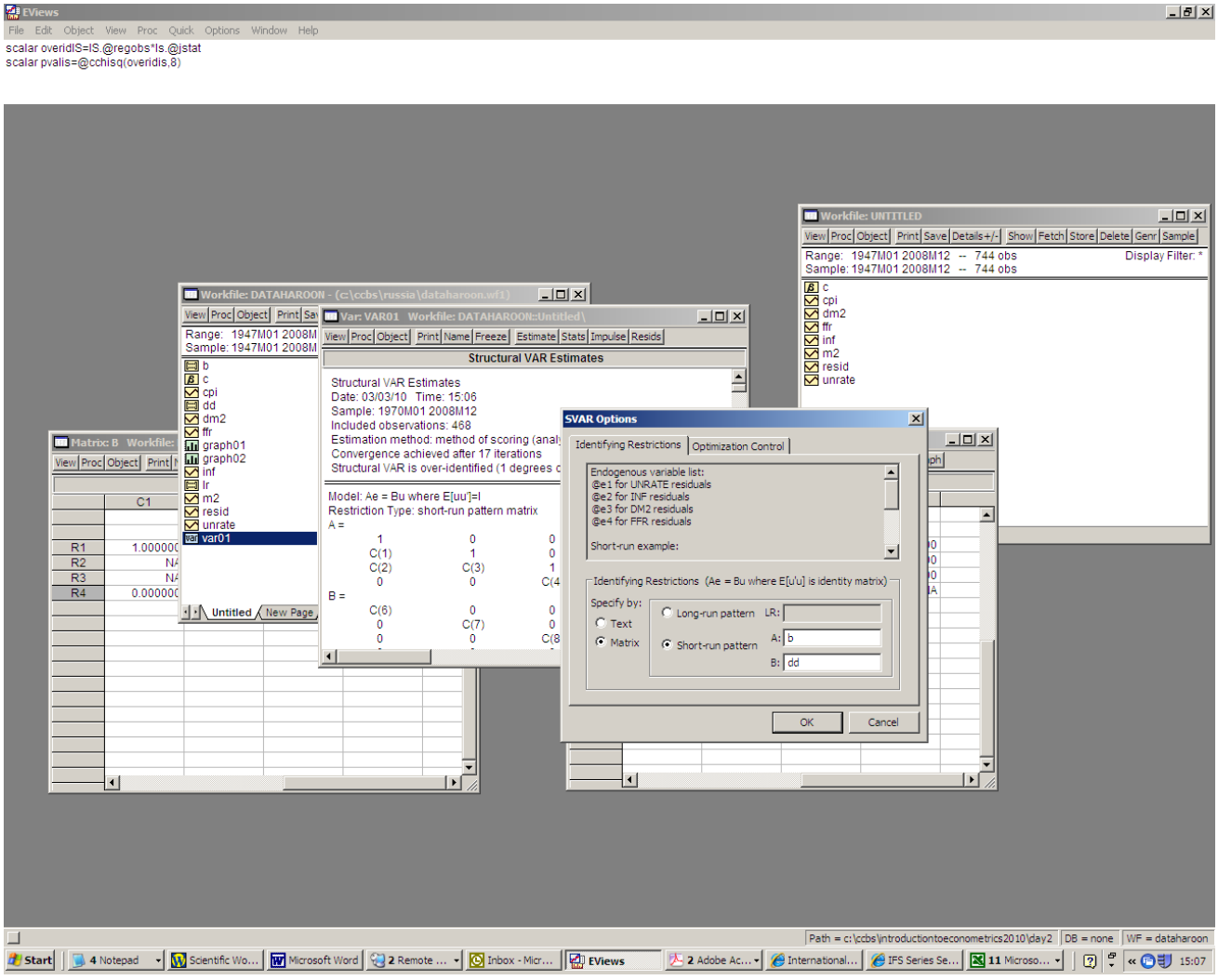


Figure 6: non recursive

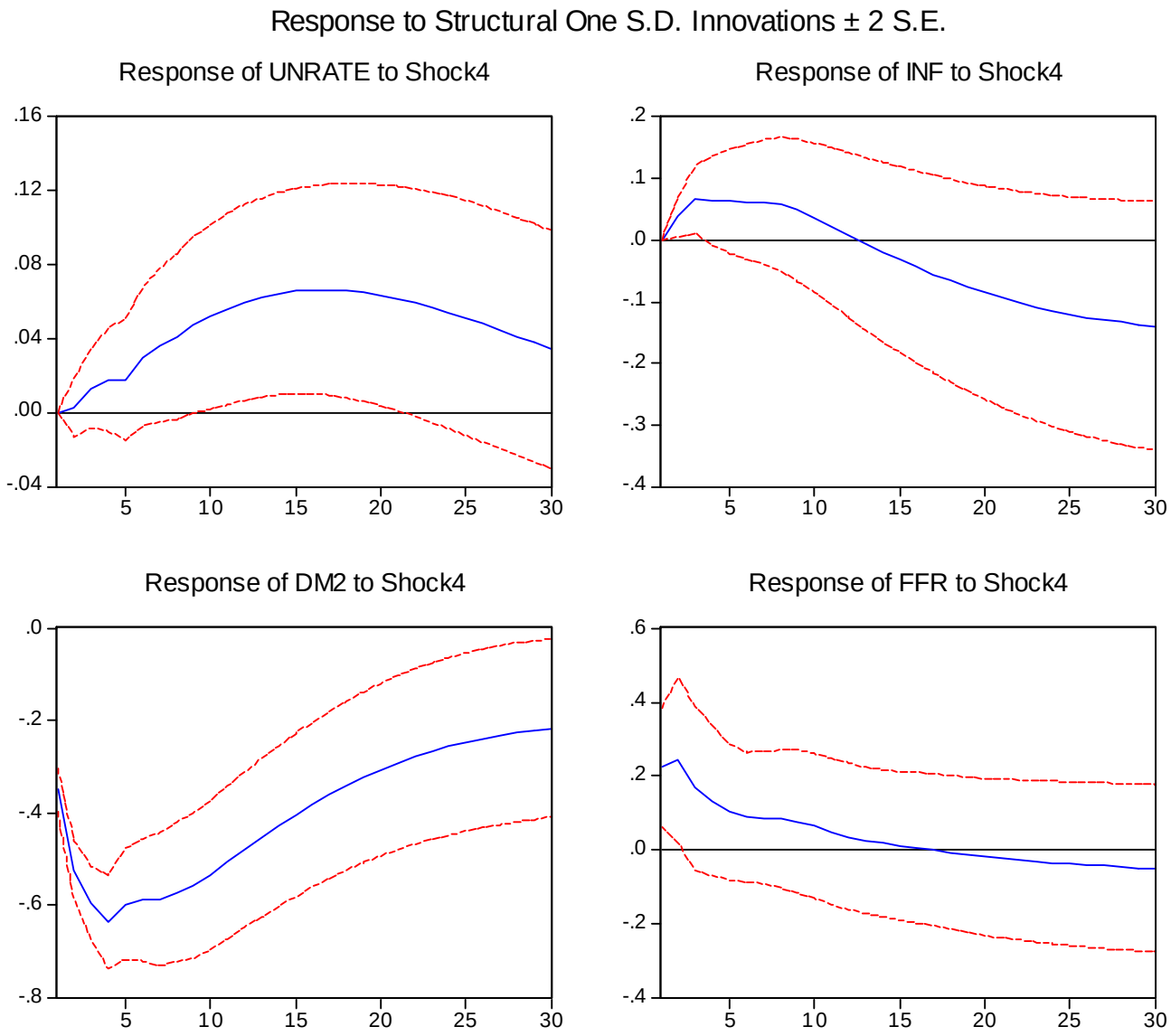


Figure 7: non recursive

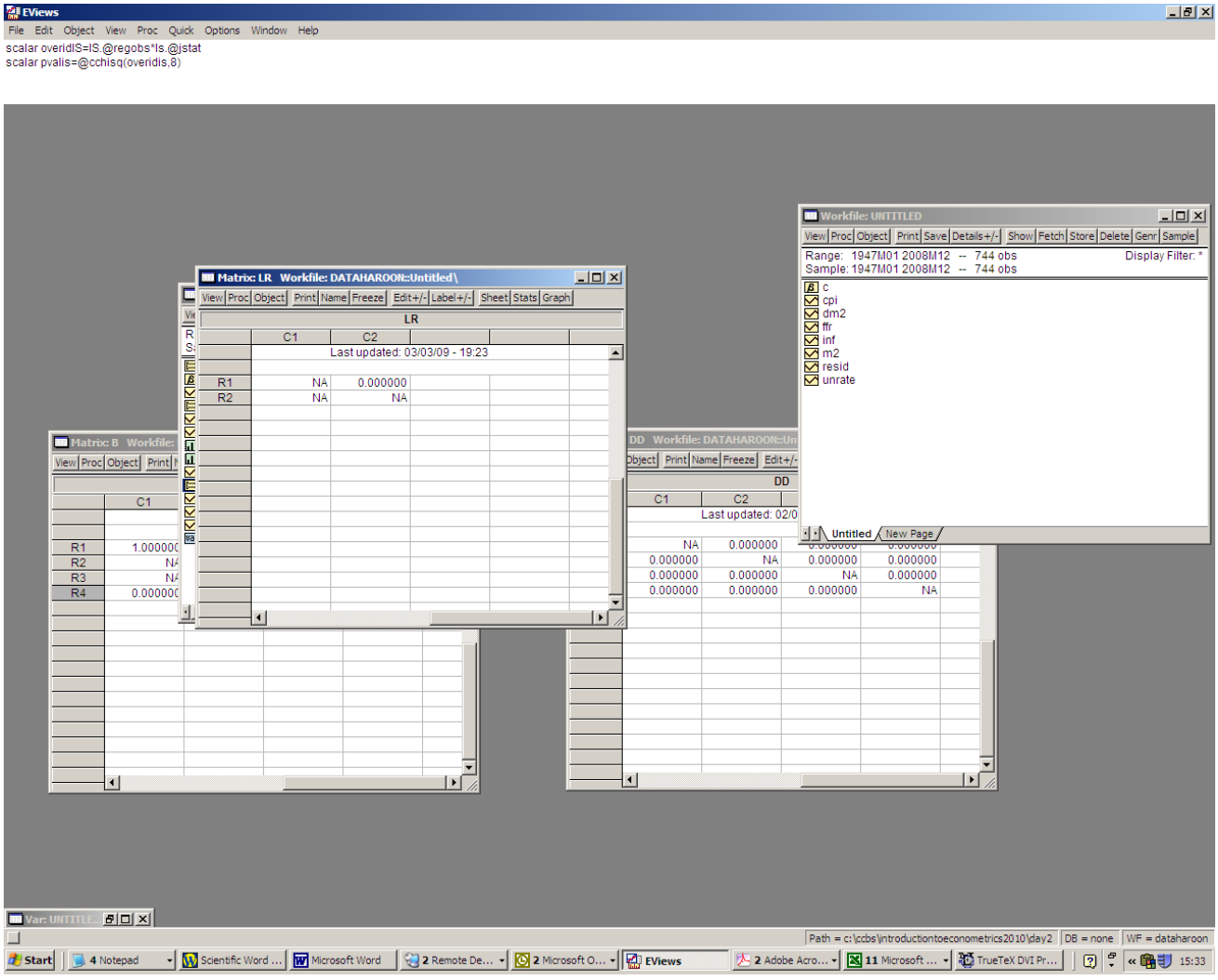


Figure 8: Long run

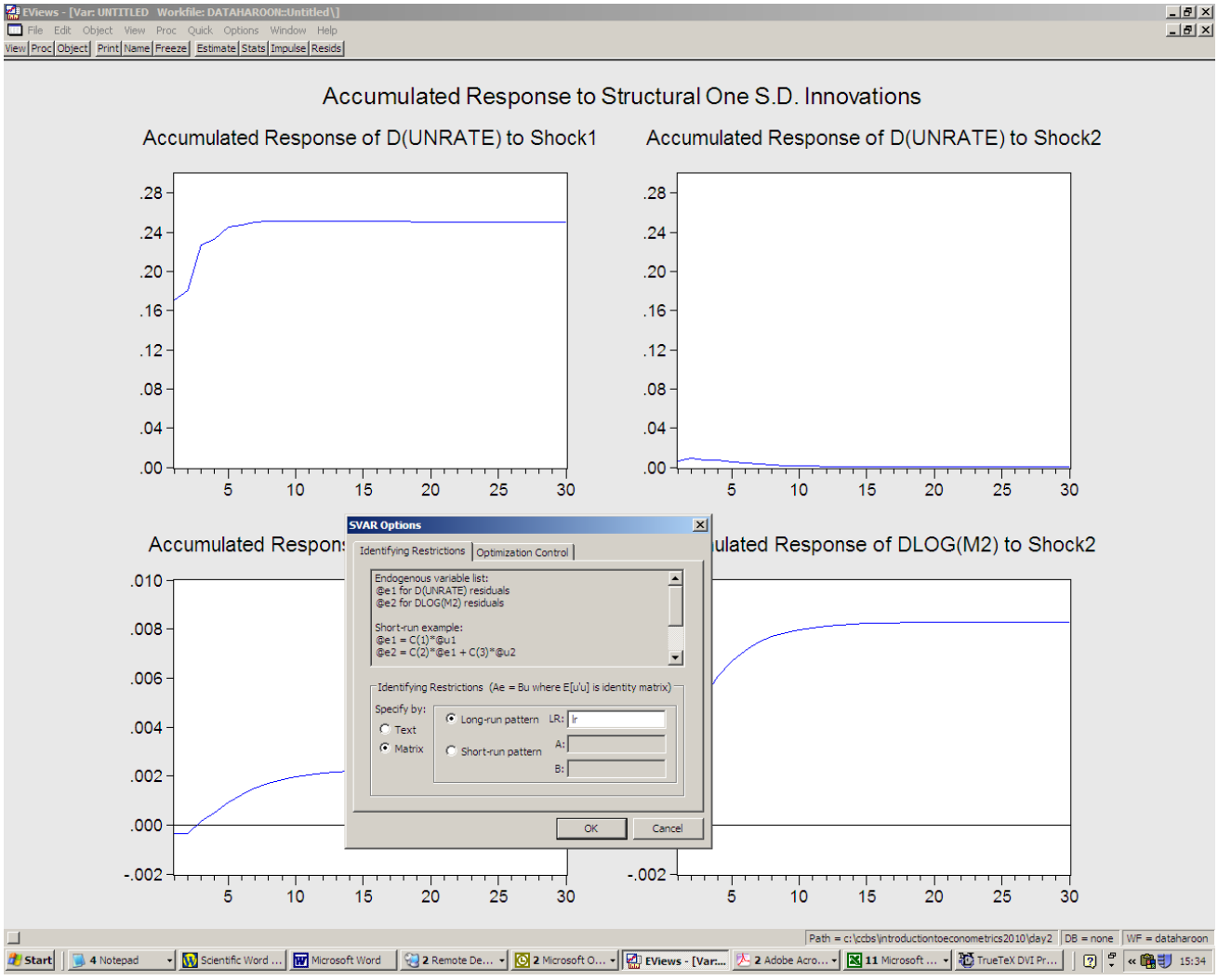
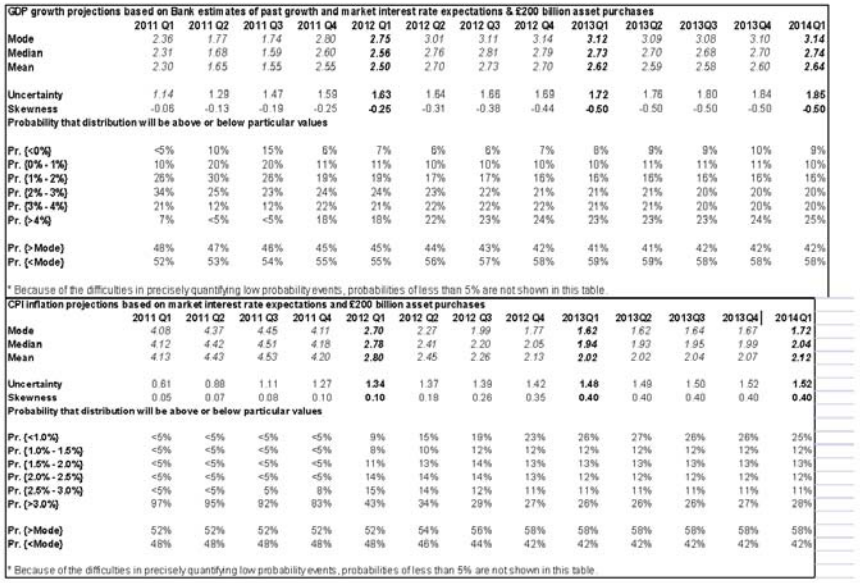


Figure 9: Long run

3 Question 2: Conditional forecasts from a VAR model

The file question4.wf1 contains quaterly data on UK GDP growth (DGDP), UK inflation (INF), the bank rate (BANKRATE) and house price inflation (DHP)

1. Estimate a VAR(2) model using GDP growth, inflation and the bank rate over using the full sample until 2010Q4. Construct a forecast for the three variables until 2011Q4.
2. Assume that the bank rate will be fixed at 0.5% over 2011. Re-calculate the forecast using this conditioning assumption
3. Repeat 2 by use a stochastic simulation and calculate the confidence intervals to the forecast



GDP growth projections based on Bank estimates of past growth and market interest rate expectations & £200 billion asset purchases

	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1
Mode	2.36	1.77	1.74	2.80	**2.75**	3.01	3.11	3.14	**3.12**	3.09	3.08	3.10	**3.14**
Median	2.31	1.68	1.59	2.60	**2.56**	2.76	2.81	2.79	**2.73**	2.70	2.68	2.70	**2.74**
Mean	2.30	1.65	1.55	2.55	**2.50**	2.70	2.73	2.70	**2.62**	2.59	2.58	2.60	**2.64**
Uncertainty	1.14	1.29	1.47	1.59	**1.63**	1.64	1.66	1.69	**1.72**	1.76	1.80	1.84	**1.86**
Skewness	-0.06	-0.13	-0.19	-0.25	**-0.25**	-0.31	-0.38	-0.44	**-0.50**	-0.50	-0.50	-0.50	**-0.50**
Probability that distribution will be above or below particular values													
Pr. (<0%)	<5%	10%	15%	6%	7%	6%	6%	7%	8%	9%	9%	10%	9%
Pr. (0% - 1%)	10%	20%	20%	11%	11%	10%	10%	10%	10%	11%	11%	11%	10%
Pr. (1% - 2%)	26%	30%	26%	18%	18%	17%	17%	16%	16%	16%	16%	16%	16%
Pr. (2% - 3%)	34%	25%	23%	24%	24%	23%	22%	21%	21%	21%	20%	20%	20%
Pr. (3% - 4%)	21%	12%	12%	22%	21%	22%	22%	22%	21%	21%	20%	20%	20%
Pr. (>4%)	7%	<5%	<5%	18%	18%	22%	23%	24%	23%	23%	23%	24%	25%
Pr. (>Mode)	48%	47%	46%	45%	45%	44%	43%	42%	41%	41%	42%	42%	42%
Pr. (<Mode)	52%	53%	54%	55%	55%	56%	57%	58%	59%	59%	58%	58%	58%

* Because of the difficulties in precisely quantifying low probability events, probabilities of less than 5% are not shown in this table.

CPI inflation projections based on market interest rate expectations and £200 billion asset purchases

	2011 Q1	2011 Q2	2011 Q3	2011 Q4	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013Q1	2013Q2	2013Q3	2013Q4	2014Q1
Mode	4.08	4.37	4.45	4.11	**2.70**	2.27	1.99	1.77	**1.62**	1.62	1.64	1.67	**1.72**
Median	4.12	4.42	4.51	4.18	**2.78**	2.41	2.20	2.05	**1.94**	1.93	1.95	1.99	**2.04**
Mean	4.13	4.43	4.53	4.20	**2.80**	2.45	2.26	2.13	**2.02**	2.02	2.04	2.07	**2.12**
Uncertainty	0.81	0.88	1.11	1.27	**1.34**	1.37	1.39	1.42	**1.48**	1.49	1.50	1.52	**1.52**
Skewness	0.05	0.07	0.08	0.10	**0.10**	0.18	0.26	0.35	**0.40**	0.40	0.40	0.40	**0.40**
Probability that distribution will be above or below particular values													
Pr. (<1.0%)	<5%	<5%	<5%	<5%	9%	15%	19%	23%	26%	27%	26%	26%	25%
Pr. (1.0% - 1.5%)	<5%	<5%	<5%	<5%	8%	10%	12%	12%	12%	12%	12%	12%	12%
Pr. (1.5% - 2.0%)	<5%	<5%	<5%	<5%	11%	13%	14%	13%	13%	13%	13%	13%	13%
Pr. (2.0% - 2.5%)	<5%	<5%	<5%	<5%	14%	14%	14%	13%	12%	12%	12%	12%	12%
Pr. (2.5% - 3.0%)	<5%	<5%	5%	8%	15%	14%	12%	11%	11%	11%	11%	11%	11%
Pr. (>3.0%)	97%	95%	92%	83%	43%	34%	29%	27%	26%	26%	26%	27%	28%
Pr. (>Mode)	52%	52%	52%	52%	52%	54%	56%	58%	58%	58%	58%	58%	58%
Pr. (<Mode)	48%	48%	48%	48%	48%	46%	44%	42%	42%	42%	42%	42%	42%

* Because of the difficulties in precisely quantifying low probability events, probabilities of less than 5% are not shown in this table.

4. Re-estimate the VAR model GDP growth, inflation, the bank rate and house price inflation. Assume that the future path of inflation and GDP growth is given by the inflation report (mode) forecast for GDP growth and inflation given in the figure above. What is the conditional forecast for house price growth in 2011.

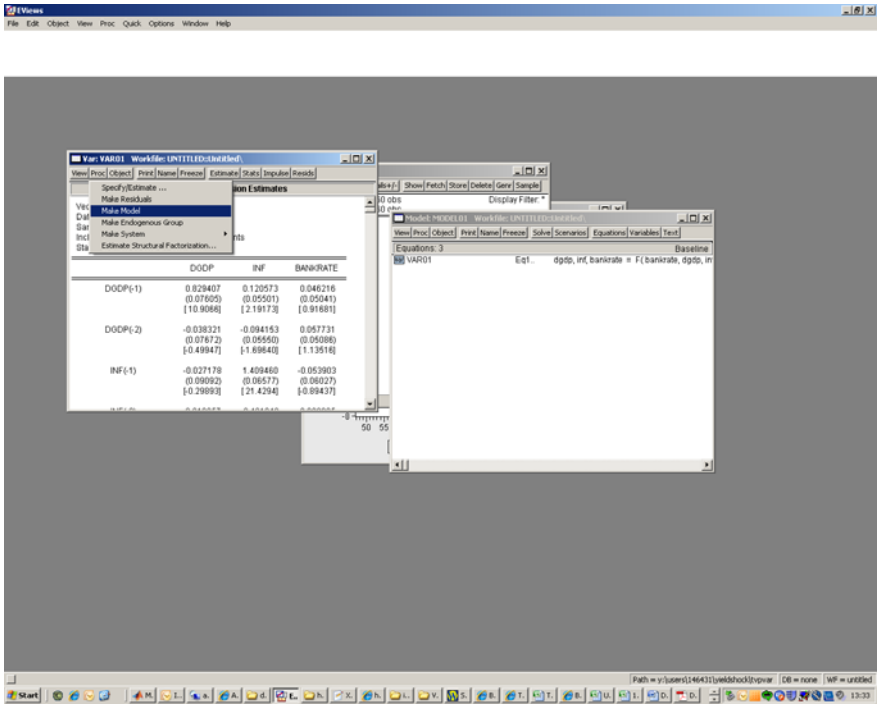


Figure 10: Forecasting

4 Answer to question 2

1. Once the VAR(2) is estimated goto proc–>make model to obtain the model in the figure 10. To construct an unconditional forecast (in the model object) goto proc->solve model and choose the options shown in figure 11 Clicking on OK will produce new variables bankrate_0, dgdp_0 and inf_0 in your file which contain the forecasts from the baseline scenario.

2. To condition on bank rate staying at 0.5: Step 1 manually change the value of bankrate to 0.5 over 2011. Then in the model goto->scenario and choose scenario1. Then click on excludes and type bankrate in the menu. This keeps the bankrate fixed exogenously at actual data values over 2011. Then solve the model under scenario 1 by going to proc->solve model and choosing scenario1 under active scenario (figure 12). This creates variables inf_1, dgdp_1 and bankrate_1 are forecasts under this scenario.

3. Do a stochastic simulation goto proc->solve model-> choose stochastic under simulation type and tick the box called bounds (to save confidence intervals). Under innovation generation under stochastic options we can choose bootstrap if we like. Note there is also an option to add coefficient uncertainty

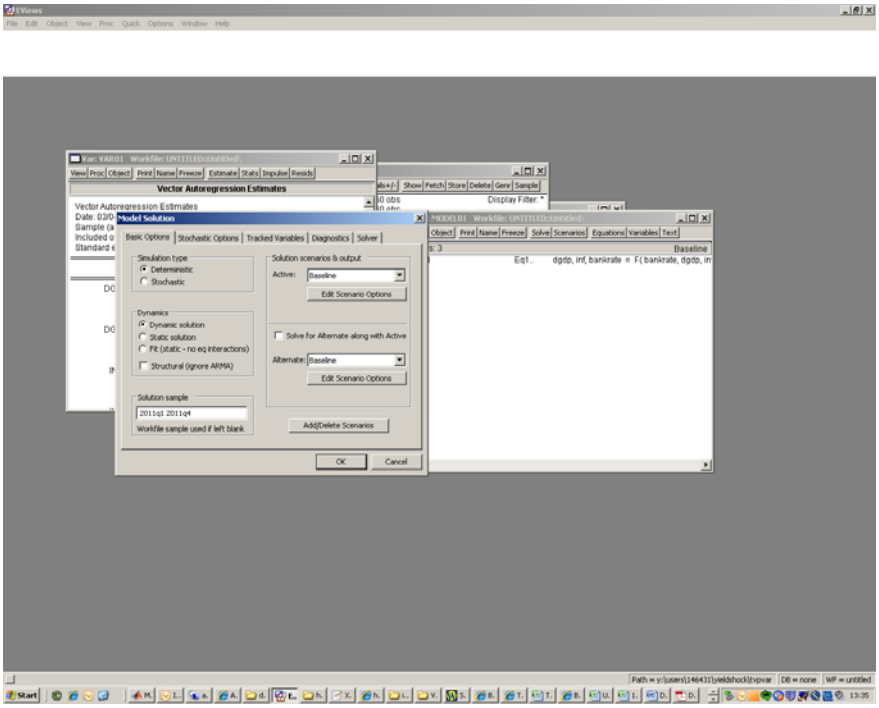


Figure 11: Forecasting

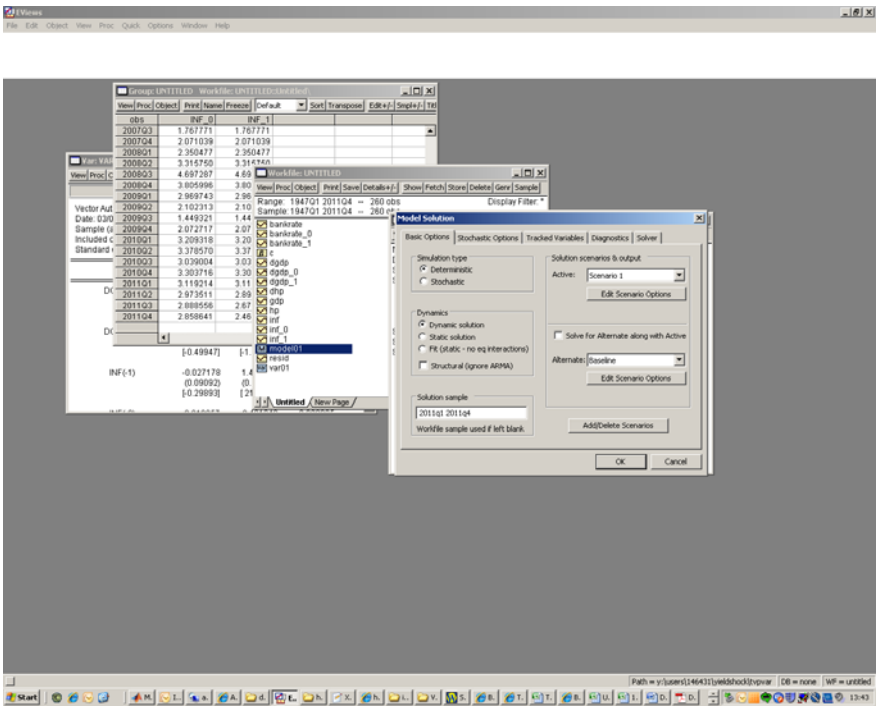


Figure 12: Forecasting