PS3 2025 Questions (7 October 2025)

Due before class 14 October 2025

May 27, 2025

Question 1

This Problem Set concerns the SW2007 model covered extensively this week and last. Last week, you went to the AEA website, searched for "Wouters" and downloaded (under "Additional Materials") the "DataSet". You will use this material for this question. Now, go to the St. Louis Fed website for the database "FRED" and download for the earliest to the most recent possible dates the SW data as listed in the **Data read_me 2025.pdf** file attached. Unfortunately, FRED does not contain data for PRS85006103, which SW used; you will therefore have to obtain that data from the BLS. Note also that the data for CE16OV, CNP16OV and FEDFUNDS are **monthly** so you will need to convert to **quarterly** by **averaging over the corresponding 3 months**, for example by using *EViews (or another programme)*. Save the data thus obtained for the period 1955Q1 to 2025Q1 inclusive.

Using *Excel (or another programme)* and the attached **Data read_me 2025.pdf** file, carefully prepare this data to **replicate** the structure of the SW DataSet **usmodel_data.xls** file. **Do NOT cross-copy** from the original SW file which is out-of-date, but **instead use** the data you have downloaded to complete the file to 2025Q2, applying the transformations which SW used to get the new data in the difference format used by SW. Call the new data file **SW_Data4HW.xlsx**. Copy the dates and the transformed variables to a new sheet called **Obs**, which should start in 1965Q1 and have a single header line with the variable names (dy, dinve, etc). Thus, the actual data will start in cell B2, column A being for the dates.

Question 3

As you saw last week, the SW DataSet contains a file called "usmodel.mod" which is the original SW Dynare model. However, for this Problem Set, I have prepared a slightly modified version, **SW2007_PS3_2025.mod**. Estimate this version of the SW2007 model over the SW time period 1965Q1 - 2004Q4. If everything has been done correctly, the model should converge in around 80 iterations. Now compare your results to those obtained by SW. As I am a central bank person, I am especially interested in the monetary policy parameters, but you should also discuss the main deep parameters. You will find it useful for this and the later questions to prepare

a small table for comparison of your results.

Question 4

Repeat the estimation of **SW2007_PS3_2025.mod** for the period 1980Q1 to 2015Q4. Compare your results to those found in Q3 above. Note that setting "mode_compute = 1" as in Q3 above will continue to work for this and subsequent questions..

Question 5

Repeat the estimation of **SW2007_PS3_2025.mod** for the period 1967Q1 to 1991Q4. Compare your results to those found in Q3 above.

Question 6

Using **SW2007_PS3_2025.mod** and the SW estimation period, test the Kimball Aggregator vs. the Dixit-Stiglitz Aggregator and comment on your results.

Question 7

Using the original SW model **SW2007_PS3_2025.mod** and estimation period (1965Q1 to 2004Q4), test the effect of fixing the Calvo probabilities for both wages and prices at 0.5, whilst keeping the Dixit-Stiglitz aggregator. What is the meaning of this test? Comment on your results.

Question 8

In their paper, SW estimated their model for two subsamples: (A) the "Great Inflation" period from 1966Q2 to 1979Q2 (inclusive) and (B) the "Great Moderation" period from 1984Q1 to 2004Q4 (inclusive). They found that most of the structural parameters were stable over those two periods. The biggest difference concerns the variances of the structural shocks. In particular, the standard deviations of the productivity, monetary policy, and price mark-up shocks fell in the second subsample, explaining the fall in the volatility of output growth and inflation in this period. They also detected a fall in the monetary policy response to output developments in the second subperiod. Check whether SW's conclusions also hold using your model **SW2007_PS3_2025.mod**. Note that, for obscure technical reasons, you will have to use mode_compute=5 in part (A).

Question 9

In their recent (2016) book **Bayesian Estimation of DSGE Models**, Herbst and Schorfheide argue that Smets and Wouters tilted the tables by applying very specific and tight priors. They therefore suggest testing much "looser" priors. In particular, they suggest the use of "diffuse" priors as shown in the table below:

Table A-1: SW Model: Diffuse Prior

	Type	Para (1)	Para (2)		Type	Para (1)	Para (2)
φ	N	4.00	4.50	α	N	0.30	0.15
σ_c	N	1.50	1.11	ρ_a	U	0.00	1.00
h	U	0.00	1.00	ρ_b	U	0.00	1.00
ξ_w	U	0.00	1.00	ρ_g	U	0.00	1.00
σ_l	N	2.00	2.25	ρ_i	U	0.00	1.00
ξ_p	U	0.00	1.00	ρ_r	U	0.00	1.00
ι_w	U	0.00	1.00	ρ_p	U	0.00	1.00
ι_p	U	0.00	1.00	ρ_w	U	0.00	1.00
ψ	U	0.00	1.00	μ_p	U	0.00	1.00
Φ	N	1.25	0.36	μ_w	U	0.00	1.00
r_π	N	1.50	0.75	ρ_{ga}	U	0.00	1.00
ρ	U	0.00	1.00	σ_a	IG	0.10	2.00
r_y	N	0.12	0.15	σ_b	IG	0.10	2.00
$r_{\Delta y}$	N	0.12	0.15	σ_g	IG	0.10	2.00
π	G	0.62	0.30	σ_i	IG	0.10	2.00
$\bar{\beta}$	G	0.25	0.30	σ_r	IG	0.10	2.00
l	N	0.00	6.00	σ_p	IG	0.10	2.00
γ	N	0.40	0.30	σ_w	IG	0.10	2.00

[The notation should be obvious: U = Uniform; N = Normal; G = Gamma; IG = Inverse Gamma.] To implement these priors, all that is required is to change the last two elements in the corresponding line of the original SW priors. Note that for the second parameter of $\bar{\beta}$, you should use 0.1 and NOT the 0.3 shown in the table!

[**Key:** csadjcost φ csigma σ_c chabb h cprobw ξ_w csigl σ_l cprobp ξ_p cindw ι_w cindp ι_p czcap ψ cfc Φ crpi r_π crr ρ cry r_y crdy $r_{\Delta y}$ constepinf $\bar{\pi}$ constebeta $\bar{\beta}$ constelab $\bar{l}$ ctrend $\bar{\gamma}$ calfa α crhoa ρ_a crhob ρ_b crhog ρ_g crhoqs ρ_i crhoms ρ_r crhopinf ρ_p crhow ρ_w cmap μ_p cmaw μ_w cgy ρ_{ga} clandaw ϕ_w ctou δ curvw ε_w curvp ε_p .]

Using these priors in your model, re-estimate the original SW model **SW2007_PS3_2025.mod** for the SW period 1965Q1 to 2004Q4. Note that, for obscure technical reasons, you will have to use mode_compute=2 for this estimation. Re-run your estimation using RWMH and **mh_replic=20000**. Compare your results to those obtained from the unmodified model in Q3 above.