Routines used in Chang and Fernandez (2010)

This note summarizes the MATLAB routines written to solve and estimate the encompassing model presented in Chang and Fernandez (2010) On the Sources of Aggregate Fluctuations in Emerging Economies. NBER WP 15938.

- **Routines to solve the model**

The following routines are used to solve the encompassing model:

- **encompassing_run.m**: this is the only routine needed to run. It takes values for the key parameters that are estimated in the next exercise. The user can change the values for these parameters. The model is analyzed via the computation of second moments and impulse response functions. Second moments are compared to those in the Mexican data computed using the data provided by Aguiar and Gopinath (2007) (see Gita Gopinath's web page).
- **AGDataMEX**: This file has the Aguiar and Gopinath (2007) data.
- **encompassing.m**: This code is called by **encompassing_run.m**. It builds the dynamic system of equations using the MATLAB symbolic toolbox.
- **encompassing_ss.m**: This code is called by **encompassing.m**. It computes the steady state according to the parameters defined by the user in **encompassing_run.m**.
- **ir.m** and **mom.m**: these two routines compute the impulse response functions and second moments respectively. They are provided by Stephanie Schmitt-Grohe and Martin Uribe.
- **anal_deriv.m**; **gx_hx.m** and **num_eval**: these three routines are used to solve the model in **encompassing.m**. They are provided by Stephanie Schmitt-Grohe and Martin Uribe.

- **Routines to estimate the model**

The following routines are used to estimate the encompassing model:

- **encompassing_estimation_run.m**: this is the only routine needed to run. It takes the Mexican data in **AGDataMEX**, runs the RWMH algorithm and plots the MCMC chains.
- **encompassing_estimation.m**: This routine is called by **encompassing_estimation_run.m** and it is the one that runs the RWMH algorithm. To do so it starts by computing the priors. Then it computes the posterior by using the Kalman filter for which it needs to repeatedly solve the model for each parameter draw. The algorithm requires a random walk step for the transition kernel that uses a multivariate random normal with variance V.
- **logprcalc.m**: this routine is called by **encompassing_estimation.m** to compute the priors.

- **LLcalc_constant3_me.m**: this routine, called by **encompassing_estimation.m**, computes the Kalman filter. It was adapted from a code first written by Prof. John Landon-Lane at Rutgers University. It also uses the routine **vec.m** for the initialization of the filter.
- **modelsolve.m**: this routine is called by **encompassing_estimation.m** when it is needed to repeatedly solve the model for each parameter draw. It uses the matrices computed when solving the model in **encompassing_run.m**. It also uses the routines **gx_hx_modif.m** and **encompassing_ss_est.m**.
- **rwstep.m**: this routine makes the random walk step in the RWMH algorithm by first transforming all parameters to the real line.
- **V_vec** is the file containing the Variance used in the random walk step. This was computed using the inverse Hessian of the mode found by maximizing the posterior distribution. This maximization was implemented using standard optimization routines in MATLAB and the presence of local modes was assessed starting the maximization at random values in the prior support.