**Universidad de San Andrés - Master in Economics**
**Macroeconometrics (J. García-Cicco)**
**Problem Set 3**

## SVAR Analysis with Long-Run Restrictions

**1.** Retrieve with R the series $er$ and $p^c$ from the previous problem set. Then construct a third time series called $rer = er/p^c$.

**2.** Set $y_t = (rer_t, er_t)'$ and estimate a VAR for $\Delta \log y_t$. Choose the lag length using information criteria. Trim all series and use only an effective sample starting in January 2004 and ending in December 2019.

**3.** Using the Blachard-Quah identification scheme, estimate the parameters of the structural VAR based on the reduced form in **2**. Assume that there is a shock that has no long-run impact on $rer$. Label this shock as the "nominal" shock and the other as the "real" shock. Recover the instantaneous as well as the long-run impact matrices.

**4.** Compute the responses of the system to all shocks, along with the FEVDs and historical decompositions. Provide bootstrap confidence bands when possible.

**5.** Recover the exchange rate pass-through to consumer prices implicit in the system with the formula in the **problem set 2**. Produce bootstrap confidence intervals for your estimates. Keep in mind that you now have two distinct ERPT.

## Estimating Local Projections

**1.** Load the dataset provided containing the following variables

- $g^c$, government spending (public consumption in constant pesos).
- $G^s$, government spending (public welfare expenditures in nominal pesos).
- $y$, real GDP.
- $p$, GDP deflator.

**2.** Define $\Delta x_t = (\Delta g_t^c, \Delta y_t)$ and estimate the response of real GDP to a government spending shock using the local projection methodology. Assume that $g_t^c$ is ordered first. Use only observations from 2004Q1 to 2019Q4. Provide confidence bands and comment on the results.

**3.** Now the define a binary variable $D$ that takes on the value 1 if $\Delta g_t < 0$, and 0 otherwise. Then compute the response of a spending shock conditional the state of indicated by $D_t$ and compare the results. Modify the local projection methodology accordingly to accommodate this non linearity.

**4.** Replace $\Delta g^c$ with $\Delta g^s$ and re do the analysis in **1** and **2**. To construct $g^s$, first deflate $G^S$ using $p$ and then seasonally adjust the resulting series.

**5.** Compute a the fiscal multiplier for either measure of government spending and comment on your findings. Construct a series of potential output[1] and divide both by this new series. Then proceed with the analysis with the transformed variables.

[1] For example, assume a quadratic trend for real output and estimate

$$\log y_t = \beta_0 + \beta_1 t + \beta_2 t^2 + \varepsilon_t.$$

Therefore $y_t^P \equiv \exp\left(\beta_0 + \beta_1 t + \beta_2 t^2\right)$.