Development of MEGA-D: 
A DSGE Model for Policy Analysis - Perú

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MEGA-D Project - Perú

Objectives

- Replicate empirical regularities (unconditional moments, time series).
- Perform policy exercises (i.e. monetary policy analysis).
- Forecast main macroeconomic variables.
- Estimate unobservable variables (natural interest rate, potential output, equilibrium real exchange rate).
- Analyse optimal monetary policy (from a welfare point of view).
- Perform additional policy exercises: free-trade agreements, tax rates, etc.
Motivation

Peru is one of the most highly dollarised economies + IT

Other LA countries: Bolivia, Nicaragua, Paraguay and Uruguay.
Motivation

Why Dollarisation is important for policy makers?

- Limitations of the Central Bank in stabilising inflation and output
- Transmission mechanism of monetary policy: Demand and supply side effects of dollarization.
- Affects objectives of the central bank: Exchange-rate smoothing versus interest rate smoothing.
- Regulatory and prudential issues: currency mismatches and balance-sheet effects.
The MEGA-D (2005-...)
General Equilibrium Model with Dollarization

- 2006: First model, estimation, working paper.
- 2008: Forecast, re-estimation, policy analysis.
The model
Diagram of flows

- 2 main economic agents:
  - Households.
  - Firms (final goods, intermediate goods, importers, commodity sector, capital and entrepreneurs).

- Government: fiscal and monetary policy.
- External economy.
- Domestic financial market.
The model

Main ingredients

- Small open economy (limiting case of a two country model)
- Baseline model includes:
  - 2 types of tradable goods (home produced and imported goods) + 1 commodity good.
  - External habit formation in consumption.
  - Slow adjustment in real wages (real rigidities).
  - Capital accumulation with adjustment cost to investment and financial accelerator.
  - Incomplete financial markets.
  - Incomplete pass-through of exchange rate to imported prices.
  - Local currency pricing for exports (non-commodities).
- Include three types of dollarisation (transactions, prices, financial).
Dollarisation: Some Related Literature


- **Exchange rate intervention**: Bofinger y Wollmershäuser (2003), Adolfson et.al. (2007, Riskbank), Florian, Salas and Vega (2007): Intervention affects risk premium in the UIP.
Estimation: Some problems
Change of policy Regime in 2002 (IT + Interest rate): interest rate is less volatile, inflation has decreased.
Estimation: Some problems

Instability of "parameters" (dollarisation, openness)
Estimation: Some problems
More than a unit root (i.e. productivity, terms of trade)
Estimation
Methodology

- Bayesian Methods to estimate the model (Dynare)
- Quarterly data from 1995 to 2006 (estimation by sub-samples).
- Non-stationary observable variables in differences (consistency between data and model).
- Include a common stochastic trend.
- De-trend inflation and interest rate by "target" of inflation.
- Observable variables: output, core inflation, interest rate, exchange rate, consumption, investment, terms of trade, foreign output, foreign interest rate and foreign inflation.
Estimation

Some results

- Real frictions are important in all models.
- Price are not that sticky. Firms change prices every 2 quarters.
- Price indexation is relevant.
- Relative large standard deviations of shocks (compared to developed economies).
- Taylor Rule has changed after 2002: (higher response to inflation, less to output and exchange rate).
- Model that includes three types of dollarisation dominates (base on Bayes Factor)
- Some parameters cannot be well identified (i.e. different stickyness for prices in soles and US$).
Results: Transmission mechanism, contractive monetary policy shock.

Dollarisation increases exchange rate pass-through and reduces impact on output gap. Exchange rate Intervention reduces the effect through exchange rate.
Results: Transmission mechanisms, increase in the foreign interest rate.
Depreciation expands demand and increases inflation.
Forecasting
The agenda

- Implementation:
  - Use of two toolboxes (Dynare + Iris).
  - Main task is to complete the initial point of forecasting: Observed and Unobserved variables.
  - The Initial point of forecast: Estimation of unobservable variables using the Kalman Filter.
  - Model exogenous variables as AR process (i.e. foreign output, government expenditure, etc).
  - But include forecasts associated to observable exogenous variables.
  - Perform the forecasting exercise.
Conclusions

- Dollarisation reduces the effect of monetary policy on the output gap: Weakens the interest rate channel.
- Dollarisation increases the importance of the exchange rate channel.
- Dollarisation increases the vulnerability of the economy to external shocks and can make depreciations contractionary.
- Eliminating dollarisation will increase the efficiency of monetary policy.
Future plans

- Present forecast to the monetary policy committee.
- Analyse shocks decomposition (historical and forecast).
- Analyse unobservable variables (i.e. natural interest rate).
- Re-estimate the model.
- Optimal monetary policy in dollarised economies.

"THANK YOU"