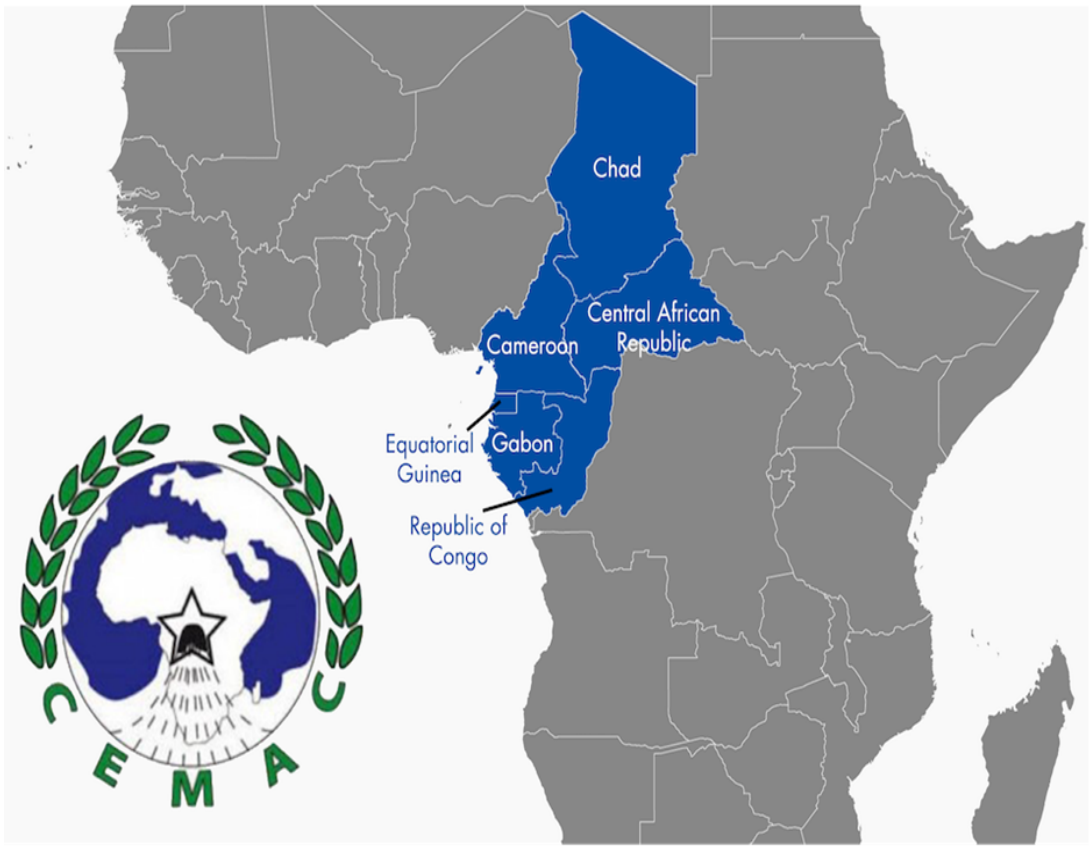
CEMAC-GLOBAL : Introducing a macroeconomic model for a small open monetary union of oil-exporting developing countries - by Patrick-Nelson D. ESSIANE (Bank of Central African States)

- **Aim of the paper :** To introduce a multi-country semi-structural macroeconomic model for policy analysis and forecasting in CEMAC called *CEMAC-Global*

- **Key features of the Model :**
  - (i) Hysteresis effect (for long run analysis of stabilization policies) ;
  - (ii) Real-financial linkages with CB liquidity management and credit cycle
  - (iii) Distinction between oil sector and non-oil sector
  - (iv) Explicit modelling of the unconventional exchange rate regime of CEMAC

Why focus on CEMAC Economies ?



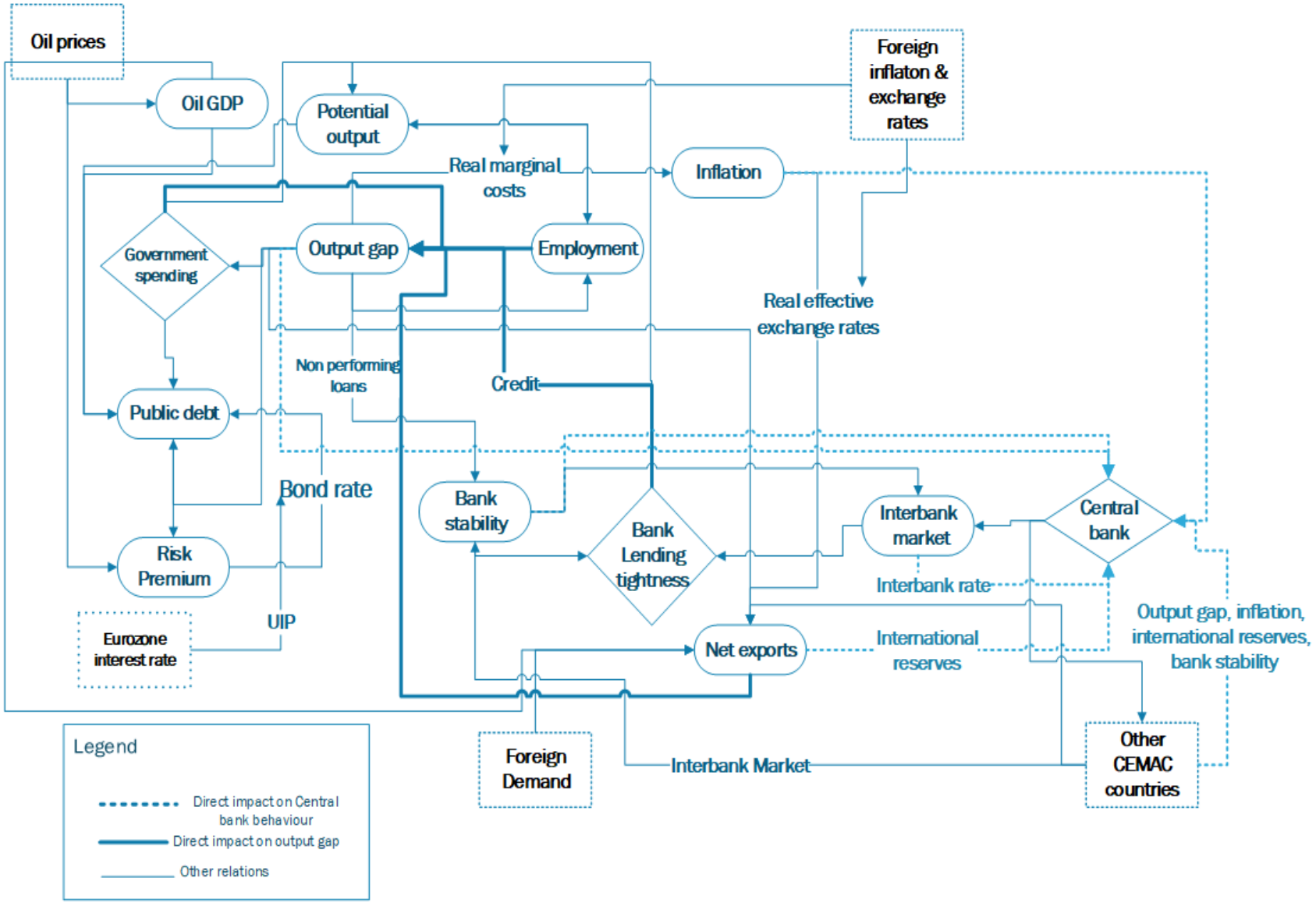
- **Small Open Monetary union of Developing Countries** (contrary to Eurozone)
- **Unconventional hard peg** with Euro (no exchange rate targeting by the Central Bank)
- CEMAC countries **are oil exporters** (except Central African Republic)
- **Low financial development** (Stock market capitalization = 0.4% of GDP) Credit channel more pertinent for MP transmission analysis
- **Poor fiscal policy management** (procyclicality, debt overhang, frequently in programs with the IMF...)

Key indicators on CEMAC economy									
(Values on 2010-2018)	Real GDP Growth (%)	Inflation (annual average, %)	Public debt (% of GDP)	Fiscal balance (% of GDP)	Net exports (% of GDP)	Industrial production (% of GDP)	Oil and Gas Exports (% of total exports)	GDP per capita (Constant USD)	Credit to private sector (% of GDP)
Mean	2,7	2,1	21,8	-1,9	3,9	8,6	79,7	1854,9	13,0
SD	2,6	1,0	9,6	4,0	8,4	1,2	7,3	283,4	2,9

Contribution and relevance of the paper

- First paper analysing the spillover effects of economic and policy shocks in a monetary union of developing countries with a general equilibrium framework
- Explicit modelling of the unconventional monetary policy regime of CEMAC
- Relevant for monetary policy analysis and forecasting toolkit of the CEMAC's Central Bank (BEAC) (now only based on time series and Financial Programming and Policies (FPP) framework).

Model Structure



Policy rules I : Monetary Policy

Central Bank sets **nominal interest rate** according to 3 objectives : (i) Non-oil sector Output stabilization ($\widehat{Y}_t^{noil}$), (ii) Inflation stabilization ($\widetilde{\pi}_t$), (iii) Foreign assets to short-term liabilities ratio (TCE_t) targeting (augmented Taylor Rule following Dieppe and al., 2017)

$$I_t^{POLICY} = \alpha_1 I_{t-1}^{POLICY} + (1-\alpha_1)[\alpha_0 \widetilde{\pi}_{t+8} + \alpha_2(\widetilde{\pi}_t - \bar{\pi}) + \alpha_3(\widetilde{\pi}_t - \widetilde{\pi}_{t-1})$$
$$\alpha_4 \widehat{Y}_t^{noil} + \alpha_5(\widehat{Y}_t^{noil} - \widehat{Y}_{t-1}^{noil}) - \alpha_6(TCE_t^{CEMAC} - \overline{TCE}^{CEMAC}) -$$
$$\alpha_7 \Delta TCE_t^{CEMAC}] + \sigma^{I^{POL}} \varepsilon_t^{I^{POL}}$$

CB sets its **liquidity injections** $INBCR_t$ in order to : (i) minimize the interbank spread and (ii) address bank stability issues.

$$INBCR_t = \tau_0 INBCR_{t-1} + (1-\tau_0)[\tau_1(I_t^{INTERBANK} - I_t^{POLICY})$$
$$- \tau_2 DL(STAB^{CEMAC})_t] + \sigma^{INBCR} \varepsilon_t^{INBCR}$$

Policy Rules II : Fiscal Policy

- **Fiscal policy rule** : (i) Countercyclical non-oil output stabilization (ii) Public debt gap minimization (following Dieppe and al. (2017)+ Expectations about future debt dynamic)

$$F_{it} = -[f_{1,i}^{ygap}\widehat{Y}_{i,t}^{noil} + f_{2,i}^{ygap}DGAP_{i,t+1} + f_{3,i}^{ygap}DGAP_{i,t-1}] + \sigma_i^F \varepsilon_{i,t}^F$$

- **Public debt gap** dynamic depends on : (i) Fiscal margin (growth/real bond interest rate gap) (ii) Lagged fiscal impulse (inspired by Blanchard (1990))

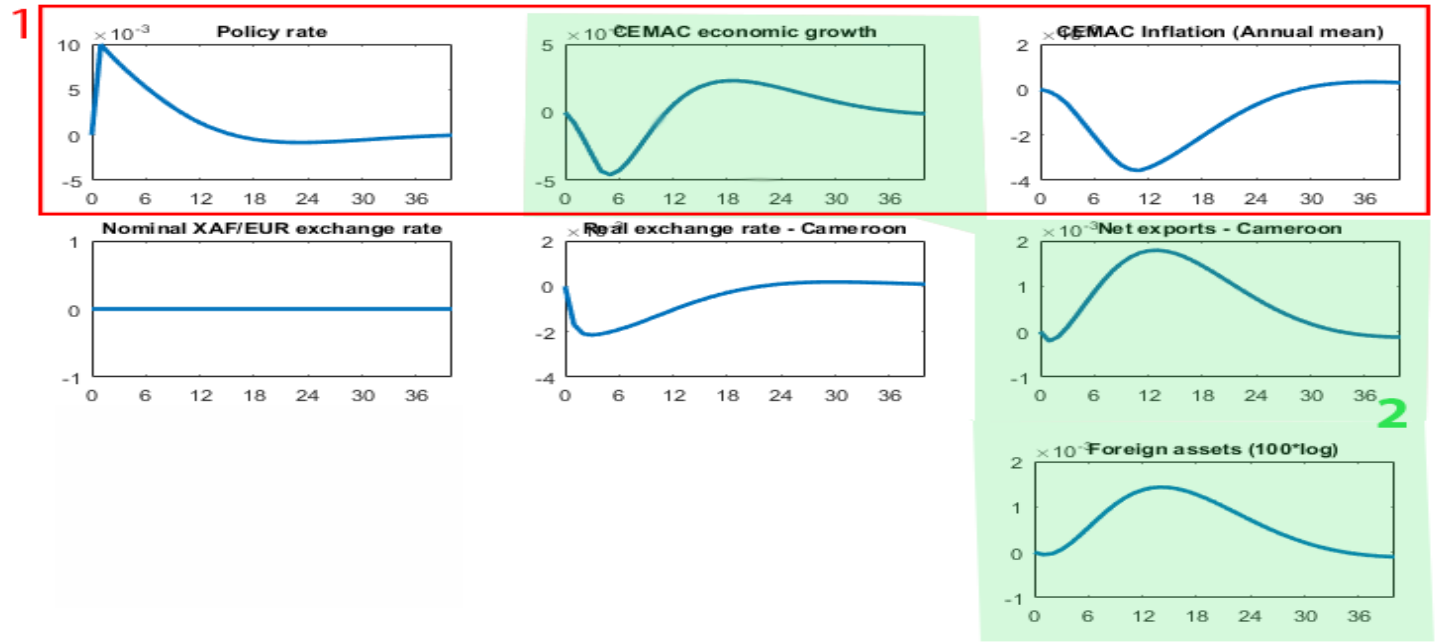
$$DGAP_{i,t} = DGAP_{i,t-1} - d_i^{dgap}\Delta^4 DMARG_{i,t} + d_i^f(F_{it-1}) + \sigma_i^{DGAP}\varepsilon_{i,t}^{DGAP}$$

with

$$DMARG_{i,t} = \Delta^4 Y_{i,t} - R_{i,t}^{bond} \text{ , and } \Delta^4 X_{i,t} = X_{i,t} - X_{i,t-4}$$

Selected results I : Monetary Policy tightening

Monetary Policy still effective even with a hard peg regime (contrary to conventional results (Mundell, 1963 ; Swoboda, 1973 ; Frankel et al., 2004 ; Obstfeld et al., 2005 ; Rose, 2011 ; Bénassy-Quéré et al., 2012 ; Obstfeld et al. 2019)).

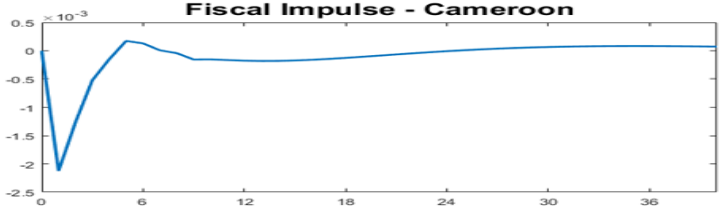


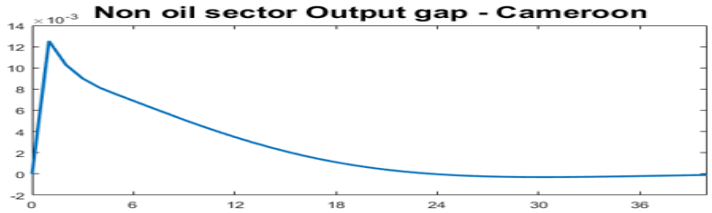
↗ Policy rate
⇒ **(1)** ↘ Domestic demand ⇒ ↘ Inflation
(2) ↘ Domestic imports ⇒ ↗ net exports ⇒ ↗ Foreign assets

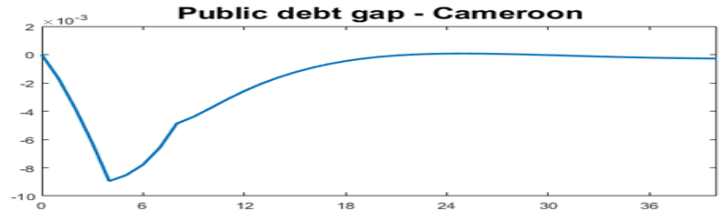
Effectiveness of MP with hard peg (No need to sterilize monetary policy interventions on the Forex.)

Selected results II : Asymetric reaction of Fiscal Policy

(1) Demand shock (Cameroon)







Countercyclical Fiscal policy with a demand shock...

and procyclical with oil prices shock.

(2) Oil prices Shock