# Monetary Policy in an Unbalanced Global Economy

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# SUMMARY

- Optimal policy in a two-sector, multi-country model with financial integration.
- Global reallocation shock a source of tradable good scarcity and high inflation.
- Coordination failure due to a tradability externality.
- A theory of competitive appreciations and the “race to the top”.

# Model Mechanism

Switch to sequence-space notation (Auclert-Bardóczy-Rognlie-Straub, 2021).

Denote $C = \mathcal{C}_t\left(\{R_s, Y_s\}_{s\geq 0}\right)$ the home country's consumption function of sequences of real interest rates and aggregate demand.

Denote $\boldsymbol{M}$ and $\boldsymbol{M}^R$ the Jacobian matrices with entries $M_{ts} = \frac{\partial \mathcal{C}}{\partial Y}$ and $M^R_{ts} = \frac{\partial \mathcal{C}}{\partial R}$.

Suppose the monetary policy rule is $d\boldsymbol{R} = \phi_Y d\boldsymbol{Y}$, no government spending, no transfers, $d\boldsymbol{Y} = d\boldsymbol{C}$, $C^{NT} = L^{NT}$. Share of tradables is $\omega$.

# Model Mechanism

Linearized general equilibrium in S-S.

$$
\begin{aligned}
d\boldsymbol{L} &= (1-\omega)d\boldsymbol{L}_{NT} + \omega d\boldsymbol{L}_{T} \\
d\boldsymbol{L} &= (1-\omega)(\boldsymbol{M}^{R}d\boldsymbol{R} + \boldsymbol{M}d\boldsymbol{Y}) + \omega d\boldsymbol{C}^{T} + \kappa\omega(d\boldsymbol{L} - d\boldsymbol{C}^{T}) \\
d\boldsymbol{L} &= (1-\omega)(\boldsymbol{M}^{R}\phi_{Y}d\boldsymbol{Y} + \boldsymbol{M}d\boldsymbol{Y}) + \omega d\boldsymbol{C}^{T} + \kappa\omega(d\boldsymbol{L} - d\boldsymbol{C}^{T})
\end{aligned}
$$

with $\kappa$ the expenditure switching parameter determined by elasticities of substitution across countries and sectors. Rewrite:

$$
\left(\boldsymbol{I} - (1-\omega)(\boldsymbol{M} + \phi_{Y}\boldsymbol{M}^{R})\right) d\boldsymbol{L} = \omega\boldsymbol{C}^{T} + \kappa\omega(d\boldsymbol{L} - d\boldsymbol{C}^{T})
$$

# Model Mechanism

$$d\boldsymbol{L} = \underbrace{\left(\boldsymbol{I} - (1-\omega)(\boldsymbol{M} + \phi_Y \boldsymbol{M}^R)\right)^{-1}}_{\text{NK Multiplier}} \left[ \underbrace{\omega \boldsymbol{C}^T}_{\text{International Effect}} + \underbrace{\kappa\omega(d\boldsymbol{L} - d\boldsymbol{C}^T)}_{\text{Expenditure Switching}} \right]$$

Similar to the "Regional Keynesian Cross" (Bellifemine-Coututier-Jamilov, 2023) who study monetary policy in a spatial HANK model.

Special case: real interest rate shock, closed economy:

$$d\boldsymbol{L} = (\boldsymbol{I} - \boldsymbol{M})^{-1} \boldsymbol{M}^R d\boldsymbol{R}$$

This is the standard intertemporal Keynesian cross in Auclert-Rognlie-Straub.

# Model Mechanism

$$d\boldsymbol{L} = \underbrace{\Big(\boldsymbol{I} - (1-\omega)(\boldsymbol{M} + \phi_Y \boldsymbol{M}^R)\Big)^{-1}}_{\text{NK Multiplier}} \Bigg[ \underbrace{\omega \boldsymbol{C}^T}_{\text{International Effect}} + \underbrace{\kappa\omega(d\boldsymbol{L} - d\boldsymbol{C}^T)}_{\text{Expenditure Switching}} \Bigg]$$

Direct effect: sufficiently large reallocation shock $\omega \uparrow$ raises demand for tradables relative to non-tradables. $L^{NT}$ falls. Inflation.

Higher $\omega$ also causes expenditure switching away from tradables which sustains $L^{NT}$.

Central bank reacts endogenously because of $\phi_Y > 0$ and deflates the economy, lowering employment, depressing aggregate demand and income which - through $\boldsymbol{M}^R < 0$ - lowers consumption of both goods. Endogenous NK multiplier.

# Financial Integration

Optimal policy under full international cooperation is identical to optimal policy under autarky.

Non-cooperative situation: a global reallocation shock in the RoW leads to all countries running a trade deficit, raising the world interest rate.

A higher world interest rate induces local capital outflows, an exchange rate depreciation, and inflation.

Suppose every central bank reacts with a monetary contraction. Global deflation and drop of $Y^T$ raises the global interest rate which, again, leads to local inflation.

Raise to the top: inefficient competitive appreciations.

# Deflationary Spirals

"Monetary Policy in Interdependent Economies: a Game-Theoretic Approach" by Canzoneri and Henderson (1991).

Competitive appreciations with and without international cooperation.

Each non-cooperative country has an incentive to contract given that the others are at Nash, exporting inflation onto others and causing others to contract, etc.

A coalition can solve the problem if externalities are symmetric.

Is the focus on *global* symmetric reallocation shocks a key novelty?

# SYMMETRY

Assumptions of symmetry and homogeneity seem important for the results on international cooperation.

When externalities are of the same sign for all, all members of the non-cooperative setup over-react to the same aggregate shock. In this case, cooperation yields the same action (leaning back) for all and countries commit to the cooperative Nash.

But if countries are ex-ante heterogeneous and/or if externalities are asymmetric, then gains from cooperation may be overwhelmed by the loss from internalizing the externality by the RoW.

# Relationship to Comin-Johnson-Jones (2023)

Occasionally-binding capacity constraint on production in CJJ:

$$Y_t \leq \bar{Y}_t$$

This paper, constraint on labor inputs:

$$L \leq (1-\alpha)\bar{Y}$$

The two specifications are isomorphic. Both generate upward-sloped supply curves if constraints bind. Non-linear Phillips curve and the size of the shock matters.

Have you considered *shocks* to $\bar{Y}$ for a given $\omega$? Would be interesting to also look at optimal monetary policy, coordination gains, etc. in response to a global supply chain shock.

# Alternative Instruments

Is monetary policy the correct instrument?

Old optimum currency area literature: targeted fiscal transfers are more efficient at stabilizing (a)symmetric shocks - such as the traded-biased demand shift - especially if individual countries are more closed, i.e. the world is more fragmented.

Also, isn't the *optimal* policy response just capital controls? Dilemma, not trilemma? (Rey, 2015)

The fundamental problem is not coordination failures. The fundamental problem is capital mobility. The multi-country model with financial integration but capital controls, by design, reduces to the autarky case with higher employment. Even if capital controls are costly, the race to the top is probably costlier than imposing collective capital controls.

# PERSISTENCE

It is well-known that the potency of stabilization policies (monetary, fiscal) in response to (a)symmetric shocks depends on the persistence of underlying shocks.

The $\omega$ shock is not persistent, i.e. occurs in period 0 and reverts back to steady state at t=1. Meaning that local consumption and demand responses are heavily front-loaded for the Euler consumer.

This is important because (a) persistence impacts the stabilizing properties of MP which (b) impacts the gains from cooperation. For very persistent shocks, local MP may be potent enough that the world does not need intl cooperation at all. Unraveling in the non-cooperative equilibrium could be slower as the multiplier for a given reduction in prices given employment is higher: thus less disinflation is required.

# Minor Comments

- More on the OCA literature: openness to international trade, i.e. capital mobility, may worsen or improve the ability of single countries to mitigate asymmetric aggregate demand shocks (Mckinnon 1963). This depends on the elasticity of non-tradable employment to the endogenous monetary policy response. Can show that if that elasticity is positive, then proximity to autarky makes monetary policy more powerful. Similar logic: capital mobility worsens the potency of country-level stabilization policies in response to symmetric shocks. In this paper, the channel works through the steepening of the PC and a disinflationary bias.

- Can labor not move across regions? Especially with equilibrium under-employment. Cross-industry labor reallocation is allowed. Would this not solve all short-run problems?

# Concluding Remarks

- Elegant, superbly written, internally consistent theoretical paper on an important topic.
- Unlike much of the literature, paper studies general situations when demand is strong and inflation is high.
- Timely and very policy-relevant.