

Discussion of
'Exchange Rate Policy
and Endogenous Price
Flexibility'
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5th Bundesbank Spring Conference
May 2-3, 2003

- Extremely elegant, stimulating paper on a crucial topic.
- It was a pleasure to read it, and we are delighted to have the possibility to offer our comments.
- Key question: Does pegging the exchange rate lead to more flexible prices?
- The thought that it does so is behind arguments in favor of pegs or the creation of monetary unions.
- Mick addresses the question in a two-country model with monopolistic competition and state-dependent, one-period price rigidity.
- Firms can choose to adjust prices after observing shocks, but they pay menu costs if they do so. (Related to Ball and Romer, AER 1991).

- Mick finds that there may be multiple, self-fulfilling equilibria in the degree of price flexibility.
- A unilateral peg causes more price flexibility when the equilibrium is unique.
- A bilateral peg may reduce price flexibility.
- A peg may induce a large increase in price flexibility when there are multiple equilibria.
- We begin this discussion from the second result.

1 ER Pegs and Aggregate Demand Volatility

- Focus on unique equilibrium case, unilateral peg.
- Peg causes larger fraction of firms to choose price flexibility: $z \uparrow$.
- Intuition: AD facing price setters is more volatile under peg, which eliminates home velocity shocks, but implies exposure to foreign velocity shocks and more volatility from offsetting consumption preference shocks.
- More firms choose flexibility to protect profits from AD volatility.

But

- More volatile AD after peg does not square with standard intuition for why countries peg: to import monetary stability and thus less AD volatility.
- Is it really the case that AD is more volatile under peg in Mick's model?
- Indeed, firms care about the variance of *nominal* AD, $m - \hat{\chi} = p_h + x$ (equation (2.2)).
- But going deeper into the intuition for what happens to *real* AD helps understand the model.

- AD:

$$X = \frac{M}{\chi P_h} \implies x = m - \hat{\chi} - p_h. \quad (1)$$

- But:

$$p_h = \frac{\frac{z}{\lambda}(m - \hat{\chi})}{1 - z\frac{\lambda-1}{\lambda}} = \frac{z(m - \hat{\chi})}{\lambda - z(\lambda - 1)}.$$

- Let $m = -\mu s$ and substitute into (1):

$$x = -(\mu s + \hat{\chi}) \frac{\lambda(1 - z)}{\lambda - z(\lambda - 1)}. \quad (2)$$

- OBS1: If $z = 1$ (all prices are flexible)
 $\implies x = 0$: AD is perfectly stable.

- Now use $s = \frac{\hat{\chi}^* - \hat{\chi} - 2\hat{\gamma}}{1 + \mu}$:

$$x = -\frac{\mu A}{1 + \mu} (\hat{\chi}^* - 2\hat{\gamma}) - \frac{A}{1 + \mu} \hat{\chi}, \quad (3)$$

where I defined $A \equiv \frac{\lambda(1-z)}{\lambda-z(\lambda-1)}$. A is a strictly decreasing, strictly convex function of z , such that $A(0) = 1$, $A(1) = 0$. Thus, $A > 0$ unless $z = 1$.

- OBS2: If $\mu \rightarrow \infty$ (peg), the effect of $\hat{\chi}$ disappears.
- OBS3: *Holding z constant* (so that A is constant), the effect of $\hat{\chi}^* - 2\hat{\gamma} \uparrow$ as $\mu \uparrow$.

- Consider σ_x^2 . z is not random: It is chosen *ex ante*.

$$\sigma_x^2 = \frac{A^2}{(1 + \mu)^2} \left[\mu^2 \left(\sigma_{\hat{\chi}^*}^2 + 4\sigma_{\hat{\gamma}}^2 \right) + \sigma_{\hat{\chi}}^2 \right],$$

or, using $\sigma_{\hat{\chi}^*}^2 = \sigma_{\hat{\chi}}^2$,

$$\sigma_x^2 = \frac{A^2}{(1 + \mu)^2} \left[(1 + \mu^2) \sigma_{\hat{\chi}}^2 + 4\mu^2 \sigma_{\hat{\gamma}}^2 \right]. \quad (4)$$

- Now, as μ changes, z changes, and so does A .
- Let us compare peg ($\mu \rightarrow \infty$) to float ($\mu = 0$).
- We know from Mick's result that $z^{PEG} > z^{FLOAT}$.
- This implies $A^{PEG} < A^{FLOAT}$.
- From (4):

$$\sigma_x^{2^{FLOAT}} = (A^{FLOAT})^2 \sigma_{\hat{\chi}}^2,$$

$$\sigma_x^{2^{PEG}} = (A^{PEG})^2 (\sigma_{\hat{\chi}}^2 + 4\sigma_{\hat{\gamma}}^2).$$

- Is it $\sigma_x^{2^{PEG}} > \sigma_x^{2^{FLOAT}}$?

-

$$\sigma_x^{2^{PEG}} > \sigma_x^{2^{FLOAT}}$$

$$\Leftrightarrow$$

$$-\frac{4\sigma_{\hat{\gamma}}^2}{\sigma_{\hat{\chi}}^2} < \frac{(A^{PEG} - A^{FLOAT})(A^{PEG} + A^{FLOAT})}{(A^{PEG})^2}.$$

- But we have just observed that $z^{PEG} > z^{FLOAT} \Rightarrow A^{PEG} < A^{FLOAT}$.
- Therefore, it may well be that $\sigma_x^{2^{PEG}} < \sigma_x^{2^{FLOAT}}$, *i.e.*, moving to a peg stabilizes AD in equilibrium relative to the float.
- This would be ensured in the absence of shocks to consumption preferences, *i.e.*, if it were $\sigma_{\hat{\gamma}}^2 = 0$.
- What is going on?

- Suppose we hold z constant.
- In that case, $\sigma_x^{2^{PEG}} > \sigma_x^{2^{FLOAT}}$.
- But firms react to the prospect of more volatile aggregate demand and profits. So, peg causes z to \uparrow and A^{PEG} to \downarrow below A^{FLOAT} .
- In turn, this may end up generating *less volatile* AD in equilibrium!
- We find this plausible. It would reconcile Mick's result with the intuition that countries peg their exchange rate also in an effort to stabilize AD.

2 Welfare

- The result above may have interesting welfare implications.
- Mick does not focus on welfare issues in this paper.
- But they are lurking in the background.
- Some key assumptions: Unitary elasticity of substitution between home and foreign goods, log utility from consumption, LOP.
- These are all assumptions that show up in papers that conclude that optimal monetary policy is to mimic flex price equilibrium in each country and let the exchange rate fluctuate. (Example: Galí and Monacelli, 2002. See also the discussion in Benigno and Benigno, 2003, forthcoming, ReStud.)
- Price stickiness is given in those papers.

- Mick's result could weaken the case for a float when the other assumptions would make it strongest!
- By pegging the exchange rate, the central bank causes the economy to move closer to the flex price equilibrium because more firms choose price flexibility.
- We think that our observation above (if correct) would strengthen the appeal of this result.
- However, it will be important to address welfare issues more explicitly: Even if more firms choose price flexibility, this entails costs.
- A particularly interesting exercise would be to readdress the Giavazzi-Pagano (EER 1988) question: Is commitment to a peg better than discretion in a model in which the degree of price stickiness is endogenous?

3 Multiple Equilibria

- Multiplicity of equilibria raises issues that cannot be addressed in Mick's model.
- The notion of using the “trembling hand” argument to rule out certain equilibria because slight deviations around them are unstable is unsettling.
- First such arguments are inherently dynamic and cannot be answered in a static model.
- Second, and just as important, the notion of saddle-point stability rests on the notion that endogenous variables are only pinned down if their paths *are* explosive.¹

¹ We are grateful to Chuck Carlstrom for suggesting this observation to us.

4 Inflation and Dynamics

- Suppose we put inflation more explicitly in the picture and we allow for relative price dispersion as a consequence of inflation.
- Countries like Argentina peg the exchange rate to achieve lower average inflation.
- But, if steady-state inflation \downarrow , firms' incentive to adjust prices frequently should \downarrow as the relative price dispersion problem is ameliorated.
- Firms would face a tradeoff between moving to a low-frequency of price-change environment in reaction to lower average inflation and staying in a high-frequency of price-change state to better respond to the AD volatility that Mick puts at the center of the effects of a peg.
- It may well happen that the peg results in firms being less willing to pay the menu cost of *ex post* price change.

- It would be important to understand what happens in a more dynamic, quantitatively appealing setup.
- Hernandez (2003, in progress) proposes a framework that incorporates state-dependent frequency of price revisions in a Calvo-type model.
- Firms revise prices in a time-dependent fashion as in Calvo, but, when they get the opportunity to change their price, they can also increase their *expected frequency* of price revisions by incurring in a cost associated to the additional revisions.
- Thus, there are two types of firms in the model: Firms that revise prices with probability $1 - \alpha_L$ in each period, and firms that revise with probability $1 - \alpha_H > 1 - \alpha_L$.

- The cost of increasing the frequency of price revisions from $1 - \alpha_L$ to $1 - \alpha_H$ is random. Its realization is observed when a firm has the opportunity to revise its price.
- If the firm does not pay the random cost, it remains subject to the lower probability of price change, but can revise the price at no cost when it has the opportunity to do so.
- A firm that pays the cost is subject to the new probability $1 - \alpha_H$ until it receives a new price-change signal. When this happens, the firm chooses either to pay the cost again and remain in the high-frequency of price-change state or not to pay the cost and reset the probability of future price changes to $1 - \alpha_L$.
- A firm that starts its life in the high-frequency of price-change state has no incentive to choose a lower probability of price adjustment, since it can remain in the high-frequency state at no cost.

- The model shares features with the two-sector setup in Carlstrom, Fuerst, and Ghironi's work.
- Sectors are now defined by the respective frequency of price change.
- An important difference is that the allocation of firms to one sector or the other is now endogenous.
- The net mass of firms accelerating price revisions is a new, endogenous, state variable, in addition to the terms of trade between the two sectors as in Ca-Fu-Ghi.
- This has implications for the dynamics of the model and endogenous persistence in response to shocks, as well as for the properties of different monetary regimes.

- The model is analytically simpler than Dotsey, King, and Wolman's (QJE 1999). It delivers an intuitive, generalized, New Keynesian Phillips Curve with an explicit role for endogenous frequency of price revisions in the inflation-output relation.
- It would be very interesting to analyze the questions that Mick addresses in his paper, or hints to, in a two-country version of Hernandez' setup.

5 Conclusions

- Mick's paper is very, very nice.
- It stimulated us to think about a number of issues and provides an ideal starting point for renewed analysis of the pros and cons of different exchange rate regimes.
- In future work, we hope to see more explicit treatment of welfare issues, a richer analysis of monetary policy (possibly including endogenous interest rate setting), and a more dynamic model suitable for quantitative as well as qualitative analysis.