

Discussion of :  
EXCHANGE RATE UNDERSHOOTING: EVIDENCE AND  
THEORY

by G. Muller, M. Wolf and T. Hettig

Francesco Pappadà  
*Banque de France*

Workshop on International Macroeconomics - AMSE BdF

July 5, 2019

# Exchange rate undershooting

## Dornbusch (1976) vs. empirical evidence

- ▶ Dornbusch (1976): in response to a contractionary monetary policy shock, the exchange rate responds immediately by overshooting (appreciation on impact)
- ▶ Empirical evidence: the exchange rate rather undershoots and appreciates in the long run

What could explain the observed dynamics of the exchange rate in response to a contractionary monetary policy shock?

Maybe Dornbusch is not wrong: what is key is the trigger of the interest rate hike and the information that agents have about that.

# Exchange rate undershooting

Dornbusch (1976) vs. empirical evidence

- ▶ Dornbusch (1976): in response to a contractionary monetary policy shock, the exchange rate responds immediately by overshooting (appreciation on impact)
- ▶ Empirical evidence: the exchange rate rather undershoots and appreciates in the long run

What could explain the observed dynamics of the exchange rate in response to a contractionary monetary policy shock?

Maybe Dornbusch is not wrong: what is key is the trigger of the interest rate hike and the information that agents have about that.

# Exchange rate undershooting

Dornbusch (1976) vs. empirical evidence

- ▶ Dornbusch (1976): in response to a contractionary monetary policy shock, the exchange rate responds immediately by overshooting (appreciation on impact)
- ▶ Empirical evidence: the exchange rate rather undershoots and appreciates in the long run

What could explain the observed dynamics of the exchange rate in response to a contractionary monetary policy shock?

Maybe Dornbusch is not wrong: what is key is the trigger of the interest rate hike and the information that agents have about that.

# Exchange rate undershooting

Dornbusch (1976) vs. empirical evidence

- ▶ Dornbusch (1976): in response to a contractionary monetary policy shock, the exchange rate responds immediately by overshooting (appreciation on impact)
- ▶ Empirical evidence: the exchange rate rather undershoots and appreciates in the long run

What could explain the observed dynamics of the exchange rate in response to a contractionary monetary policy shock?

Maybe Dornbusch is not wrong: what is key is the trigger of the interest rate hike and the information that agents have about that.

# Exchange rate undershooting

Dornbusch (1976) vs. empirical evidence

- ▶ Dornbusch (1976): in response to a contractionary monetary policy shock, the exchange rate responds immediately by overshooting (appreciation on impact)
- ▶ Empirical evidence: the exchange rate rather undershoots and appreciates in the long run

What could explain the observed dynamics of the exchange rate in response to a contractionary monetary policy shock?

Maybe Dornbusch is not wrong: what is key is the trigger of the interest rate hike and the information that agents have about that.

# Summary

This paper does the following :

1. it provides new evidence on the response of exchange rate (both spot and forward) to monetary policy shocks: the high-interest rate currency keeps appreciating after the shock (*undershooting*)
2. it gives a rationale for this empirical evidence by building a model where informational frictions do not allow agents to fully disentangle monetary policy from natural rate shocks
3. the estimated model is able to reproduce the dynamics of the spot and forward exchange rates, thus also addressing the issue of the *forward premium*

# Summary

This paper does the following :

1. it provides new evidence on the response of exchange rate (both spot and forward) to monetary policy shocks: the high-interest rate currency keeps appreciating after the shock (*undershooting*)
2. it gives a rationale for this empirical evidence by building a model where informational frictions do not allow agents to fully disentangle monetary policy from natural rate shocks
3. the estimated model is able to reproduce the dynamics of the spot and forward exchange rates, thus also addressing the issue of the *forward premium*



# Summary

This paper does the following :

1. it provides new evidence on the response of exchange rate (both spot and forward) to monetary policy shocks: the high-interest rate currency keeps appreciating after the shock (*undershooting*)
2. it gives a rationale for this empirical evidence by building a model where informational frictions do not allow agents to fully disentangle monetary policy from natural rate shocks
3. the estimated model is able to reproduce the dynamics of the spot and forward exchange rates, thus also addressing the issue of the *forward premium*

# Summary

This paper does the following :

1. it provides new evidence on the response of exchange rate (both spot and forward) to monetary policy shocks: the high-interest rate currency keeps appreciating after the shock (*undershooting*)
2. it gives a rationale for this empirical evidence by building a model where informational frictions do not allow agents to fully disentangle monetary policy from natural rate shocks
3. the estimated model is able to reproduce the dynamics of the spot and forward exchange rates, thus also addressing the issue of the *forward premium*

## Main comments - Evidence

$$x_{t+h} - x_{t-1} = c^{(h)} + \sum_{j=1}^J \alpha_j^{(h)} (x_{t-j} - x_{t-j-1}) + \sum_{k=0}^{K-1} \beta_k^{(h)} u_{t-k} + \epsilon_{t+h}$$

- ▶ In your preferred empirical specification, you control for past shocks and past values of the endogenous variable during the year preceding the shocks, i.e.  $J=K=4$
- ▶ Does the sign and series of shocks matter for the results? Does this explain why results are partly affected by the time period used? E.g. post-Volcker (1988M01-2007M07): depreciation then appreciation
- ▶ Narrow nominal effective exchange rate BIS: 15 countries, which ones? What if broad? Currencies pegged or semi-pegged to dollar?

## Main comments - Evidence

$$x_{t+h} - x_{t-1} = c^{(h)} + \sum_{j=1}^J \alpha_j^{(h)} (x_{t-j} - x_{t-j-1}) + \sum_{k=0}^{K-1} \beta_k^{(h)} u_{t-k} + \epsilon_{t+h}$$

- ▶ In your preferred empirical specification, you control for past shocks and past values of the endogenous variable during the year preceding the shocks, i.e.  $J=K=4$
- ▶ Does the sign and series of shocks matter for the results? Does this explain why results are partly affected by the time period used? E.g. post-Volcker (1988M01-2007M07): depreciation then appreciation
- ▶ Narrow nominal effective exchange rate BIS: 15 countries, which ones? What if broad? Currencies pegged or semi-pegged to dollar?

## Main comments - Evidence

$$x_{t+h} - x_{t-1} = c^{(h)} + \sum_{j=1}^J \alpha_j^{(h)} (x_{t-j} - x_{t-j-1}) + \sum_{k=0}^{K-1} \beta_k^{(h)} u_{t-k} + \epsilon_{t+h}$$

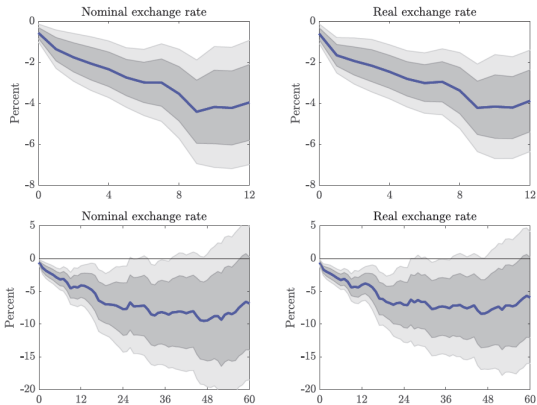
- ▶ In your preferred empirical specification, you control for past shocks and past values of the endogenous variable during the year preceding the shocks, i.e.  $J=K=4$
- ▶ Does the sign and series of shocks matter for the results? Does this explain why results are partly affected by the time period used? E.g. post-Volcker (1988M01-2007M07): depreciation then appreciation
- ▶ Narrow nominal effective exchange rate BIS: 15 countries, which ones? What if broad? Currencies pegged or semi-pegged to dollar?

## Main comments - Evidence

$$x_{t+h} - x_{t-1} = c^{(h)} + \sum_{j=1}^J \alpha_j^{(h)} (x_{t-j} - x_{t-j-1}) + \sum_{k=0}^{K-1} \beta_k^{(h)} u_{t-k} + \epsilon_{t+h}$$

- ▶ In your preferred empirical specification, you control for past shocks and past values of the endogenous variable during the year preceding the shocks, i.e.  $J=K=4$
- ▶ Does the sign and series of shocks matter for the results? Does this explain why results are partly affected by the time period used? E.g. post-Volcker (1988M01-2007M07): depreciation then appreciation
- ▶ Narrow nominal effective exchange rate BIS: 15 countries, which ones? What if broad? Currencies pegged or semi-pegged to dollar?

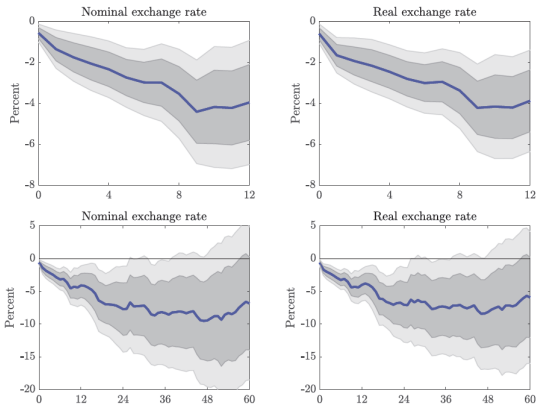
# Main comments - Evidence



Why do nominal and real exchange rates move so close to each other? This is consistent with the sluggish adjustment of CPI over the first 18 months past the shock, but why is it the case at longer horizons too?

Are foreign CPIs moving hand in hand with domestic one? Evidence on the CPIs of the 15 countries used for the effective exchange rate?

# Main comments - Evidence

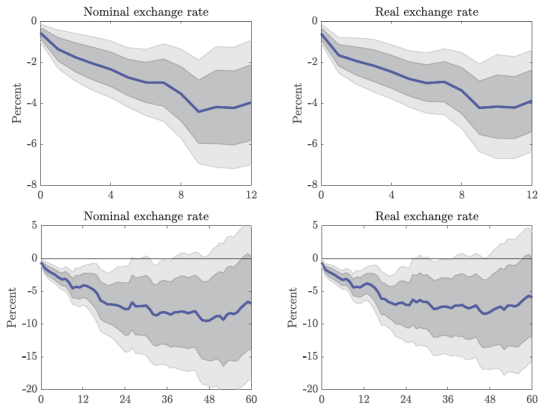


Why do nominal and real exchange rates move so close to each other? This is consistent with the sluggish adjustment of CPI over the first 18 months past the shock, but why is it the case at longer horizons too?

Are foreign CPIs moving hand in hand with domestic one? Evidence on the CPIs of the 15 countries used for the effective exchange rate?



# Main comments - Evidence



Why do nominal and real exchange rates move so close to each other? This is consistent with the sluggish adjustment of CPI over the first 18 months past the shock, but why is it the case at longer horizons too?

Are foreign CPIs moving hand in hand with domestic one? Evidence on the CPIs of the 15 countries used for the effective exchange rate?

## Main comments - Theory

- ▶ The response of the exchange rate to a TFP shock (depreciation) is crucial for the mechanisms of your model: shouldn't you put this more upfront? (now in External validity - Fig. 11)
- ▶ The role of the interest rate rule (in response to shocks to the natural interest rate): what if you had discretionary monetary policy or an alternative rule?
- ▶ The estimated variances of the shocks:  $\sigma_y = 0.063$  and  $\sigma_\eta = 0.007$ : quite close to full information as  $\sigma_\eta$  is close to zero.

Does the relative size of the variance of shocks matter for the results?

## Main comments - Theory

- ▶ The response of the exchange rate to a TFP shock (depreciation) is crucial for the mechanisms of your model: shouldn't you put this more upfront? (now in External validity - Fig. 11)
- ▶ The role of the interest rate rule (in response to shocks to the natural interest rate): what if you had discretionary monetary policy or an alternative rule?
- ▶ The estimated variances of the shocks:  $\sigma_y = 0.063$  and  $\sigma_\eta = 0.007$ : quite close to full information as  $\sigma_\eta$  is close to zero.

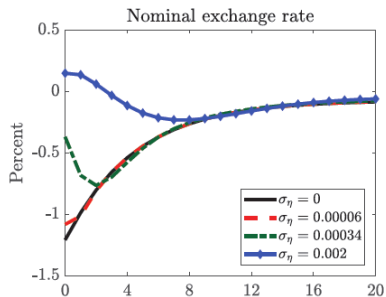
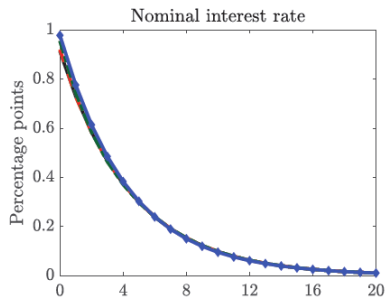
Does the relative size of the variance of shocks matter for the results?

## Main comments - Theory

- ▶ The response of the exchange rate to a TFP shock (depreciation) is crucial for the mechanisms of your model: shouldn't you put this more upfront? (now in External validity - Fig. 11)
- ▶ The role of the interest rate rule (in response to shocks to the natural interest rate): what if you had discretionary monetary policy or an alternative rule?
- ▶ The estimated variances of the shocks:  $\sigma_y = 0.063$  and  $\sigma_\eta = 0.007$ : quite close to full information as  $\sigma_\eta$  is close to zero.

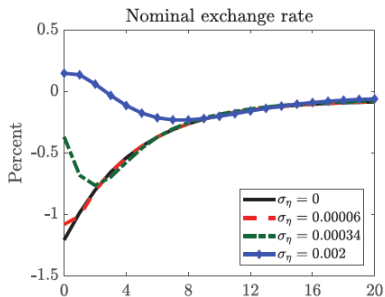
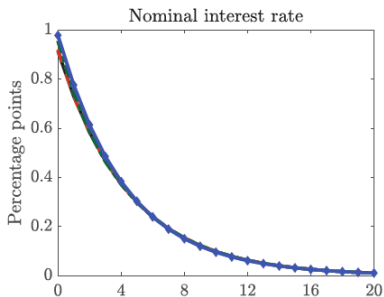
Does the relative size of the variance of shocks matter for the results?

# Main comments - Theory



The response of the nominal exchange rate to a monetary policy shock is extremely sensitive to the variance of  $\eta$ , going from overshooting to delayed overshooting to undershooting as  $\sigma_\eta \uparrow$

# Main comments - Theory



The response of the nominal exchange rate to a monetary policy shock is extremely sensitive to the variance of  $\eta$ , going from overshooting to delayed overshooting to undershooting as  $\sigma_\eta \uparrow$

## Main comments - Open questions

- ▶ What about the effects of the US monetary policy that spill over on foreign interest rates (here fixed at its steady state  $i^* = \bar{r}$ )?
- ▶ Learning from the history of observed monetary policy vs. natural rate: what is the frequency of each of the shock?
- ▶ Symmetry: would you observe an undershooting *depreciation* of the exchange rate after an expansionary monetary policy shock?

## Main comments - Open questions

- ▶ What about the effects of the US monetary policy that spill over on foreign interest rates (here fixed at its steady state  $i^* = \bar{r}$ )?
- ▶ Learning from the history of observed monetary policy vs. natural rate: what is the frequency of each of the shock?
- ▶ Symmetry: would you observe an undershooting *depreciation* of the exchange rate after an expansionary monetary policy shock?



## Main comments - Open questions

- ▶ What about the effects of the US monetary policy that spill over on foreign interest rates (here fixed at its steady state  $i^* = \bar{r}$ )?
- ▶ Learning from the history of observed monetary policy vs. natural rate: what is the frequency of each of the shock?
- ▶ Symmetry: would you observe an undershooting *depreciation* of the exchange rate after an expansionary monetary policy shock?

## Main comments - Open questions

- ▶ In your model, the disconnect between *forward premium* and actual change in spot exchange rates is due to monetary policy and natural rate shocks being tangled up
- ▶ Is there a way to select subsamples in your data where the disconnect is larger or smaller? If yes, it would then be interesting to see whether the variance of  $\eta_t$  and  $u_t$  changes in the subsamples
- ▶ You could then provide an history for the quality of central bank communication about their policy vs. higher/lower frequency of natural rate shocks.

## Main comments - Open questions

- ▶ In your model, the disconnect between *forward premium* and actual change in spot exchange rates is due to monetary policy and natural rate shocks being tangled up
- ▶ Is there a way to select subsamples in your data where the disconnect is larger or smaller? If yes, it would then be interesting to see whether the variance of  $\eta_t$  and  $u_t$  changes in the subsamples
- ▶ You could then provide an history for the quality of central bank communication about their policy vs. higher/lower frequency of natural rate shocks.

## Main comments - Open questions

- ▶ In your model, the disconnect between *forward premium* and actual change in spot exchange rates is due to monetary policy and natural rate shocks being tangled up
- ▶ Is there a way to select subsamples in your data where the disconnect is larger or smaller? If yes, it would then be interesting to see whether the variance of  $\eta_t$  and  $u_t$  changes in the subsamples
- ▶ You could then provide an history for the quality of central bank communication about their policy vs. higher/lower frequency of natural rate shocks.