Discussion of

"Optimal Inflation and the Natural Rate of Interest"

(Jordi Gali with P. Andrade, H. Le Bihan and J.Matheron)

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*The views expressed here are personal and do not necessarily reflect those of the Banco de Portugal.

- We get used to the statement the the natural real rate of interest has been declining during the last decades

- Even eliminating the last decade and going through all the questions raised by measuring this concept it is quite consensual the qualitative statement

- Trying to understand the importance of this change to the conduct of monetary policy is key namely when policy is conducted by a nominal interest rate rule

- This paper proposes an elegant way of describing the trade-off faced by the benevolent poicy maker that is in charge of monetary policy, namely conventional monetary policy!

- Since elegance not always coincide with simplicity let me start by describing in a very simple way the tensions faced by the policy maker in this paper

- It is not clear that the neo-keynesian models are the best labs to answer to this question: the optimal target inflation rate π^* as a function of r

- Therefore the interest of this paper is how the auhors use this environment to answer that question.

- As usually the model is a non-monetary model: namely there is no well defined demand for outside (or inside) money and therefore no monetary distortions created or corrected by the conduct of monetary policy

- Monetary policy is transmitted to the real economy through goods prices because it is a unit of account and by assumption the policy instrument is a short run nominal interest rate

  - The reason why policy has efficacy is this economy is the imposed infrequent opportunities on firms and labor unions to determine firm level prices and nominal wages requested for each type of labor type. Both rigidities are time dependent à la Calvo

- To both both price and wage setters, in addition to the Calvo sign, it is imposed an exogenous indexation rule when it is not their time to revise the price/wage. Then their price/wage is addapted from last period by

$$P_t(f) = \pi_{t-1}^{\iota_p} P_{t-1}(f)$$

and a similar one for $W_t(h)$.

- If we try to understand the role of the steady state inflation chosen in this economy it is very clear from this equation that whenever $\pi^* \neq 1$ price dispersion will characterize the steady state and will create a very persistent productive inneficiency

- If $\pi^* = 1$, we will have

$$i^* = r^* \equiv \rho + \mu_z$$

$$\widehat{i}_t \equiv i_t - i^*$$

and

$$i_t \geq 0 \iff \widehat{i}_t \geq -(\rho + \mu_z)$$

- For a given distribution of shocks this constrain will be bidding with a give probability

- So it is clear why $\pi^* > 1$ without monetary costs:

$$i_t \geq 0 \iff \widehat{i}_t \geq -\left(\pi^* + \rho + \mu_z\right)$$

- Without price distortions at the steady state π^* (and i^*) will be high enough to avoid ZLB

- Comparing the distortions caused by $\pi^* \neq 1$ with the costs of the ZLB the optimal π^* is determined

- The effect of a decline of $\rho + \mu_z$ will lead to a decline of i^* by the same ammount to maintain π^*. But clearly for the same distribution will increase the probability of reaching the LB. So the decline will be smaller than the decline in $\rho + \mu_z$

- By how much? This is the advantage of the exercise developed in the article: quantitatively the deviation of the interest rate that support the new inflation target is small!

- The main results could be stated as the results for the estimation period:
  - for the sample period used 1985/2009 the natural real rate was higher for the EA when compared with the US
  - for that period the optimal inflation target π^* is lower for the EA (1.5%) when compared with the US (2%). Notice the asymetry of the loss function as a function of the inflation target: a positive deviation has a smaller loss relative to a negative deviation
  - The optimal i^* is higher for the US when compared with the EA
  - The exercise reports the probability of reaching the ZLB **at the optimum:** is higher in the EA when compared with US

- And the optimal reaction of the target to a change of the SS natural real interest rate, to a decline of r^*
  - For values of r^* smaller than 4% the slope of the relation between r^* and the optimal target π^* is smaller than 1 but not far from it
  - For a decline in r^*, the reason behind it is irrelevant on this range
  - In the EA the decline in r^* implies an increase of π^* sligtly below the one that would maintain i^*, $i^* \downarrow$, while in the US i^* is maintained. Lower degrees of indexation and lower probability of reaching the ZLB in the US when compared with the EA

- As the authors report there can be some bias from using the great moderation to estimate the distribution of shocks. An exercise was perfomed with a larger standard error on demand shocks. As a result optimal target inflation would increase by more than $100b.p.$ both for the US and EA

- If both higher volatility and a decline of the natural real interest rate comes togheter the change would be to move to a higher optimal target that **could significately increase** from the baseline scenario. New regime?

- But back to the *Why?*

- As said initially the trade-off come from not heaving full indexation, namely at the SS, and the costs of the ZLB

- On the first one it is difficult to mantain that once we change regime the indexation parameter, as well as the degree of styckiness, will not adjust. If this happens there would be no costs of having inflation in the SS and we could avoid the ZLB. **The optimal target inflation will be higher...**.

- If we can have learned with the past experience that having a limit on the ZLB can have costs (over the ones decribed in this model)

- Toghether with a more volatile environment the proposals to alleviate these costs should be taken seriouly: from unconventional monetary policy to a more direct fiscal policy that the authors propose in the model: sales tax could be used in a reaction to a large shock. This tax could decline today relative to tomorrow (and be compensate with an opposite reaction of the average labor tax)

- If the cost of the LB is eliminated by complementary policy **the optimal target could will be lower...**

- Maybe we need to have some deeper understanding of the monetary friction, on the antecipated permanent inflation rate, to be able to say more on a change of regime caracterized by higher volatility and lower SS natural real interest rate

- Until now focus on $Why?$

- But as important is the *How?*

- How to conduct monetary policy to achieve the (new) target with an interest rate instrument?

- Neo-keynesian DSGE models do not help much on the conduct of policy to determine target inflation (to anchor expectations...)

- Let´s assume that the economy **is below target**. Due to the policy trap or due to an increase of the target

- How to conduct monetary policy with an interest rate instrument?

The change of the target would be associated with a permanent change of interest rate. In this example would be a small one if just driven by the real interest rate

- Martin Uribe The Neo-Fisher Effect in the United States and Japan(2018)

Table 1: Effect of an Increase in the Nominal Interest Rate on Inflation

	Long Run Effect	Short Run Effect
Transitory shock	0	$\Downarrow$
Permanent shock	$\Uparrow$	$\uparrow$?

Note. Entry (2,1): The Fisher effect. Entry (2,2) : The Neo-Fisher effect

- *Estimate an SVAR model with temporary and permanent monetary shocks using U.S. and Japanese data.*

- *The estimated model produces dynamics consistent with the neo-Fisherian prediction that a credible and gradual increase of nominal interest rates to normal levels can generate a quick reflation of the economy with ow real interest rates and no output loss.*

- *By assumption, in response to a permanent interest-rate shock both the nominal interest rate and inflation increase by 1 percent in the long run.*

- *The main result ...is that inflation reaches its higher long-run value in the short run.*

– *In fact, inflation adjusts faster than the nominal interest rate, so the real interest rate falls on impact and converges from below.*

- Using SVAR with LR restriction finds that for the US a permanent shock 1 year turns positive

- Let´s assume that the economy **is below target**. Due to the policy trap!

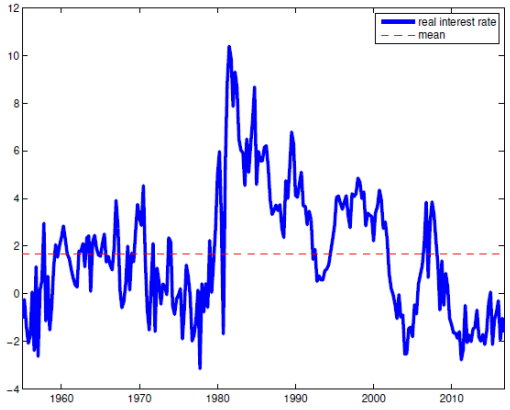
- How to conduct monetary policy with an interest rate instrument?

- Uribe´s results points to a permanent increase of the policy rate

- How to conduct monetary policy with an interest rate instrument due to an increase of the target?

- The policy interest rate in the SS should be approximately maintained
- It should be announce that the same interest rate would support a higher inflation target
- Due to the permanent change of natural real interest rate the short interest rate will be maintained
- **Communication challenge!**

The Real Interest Rate: United States 1954:4 to 2016:4



Notes. The figure plots the realized real interest rate, defined as $i_t - \pi_{t+1}$ and expressed in percent per year. Quarterly frequency.