



# The psychology of inflation, monetary policy and macroeconomic instability

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## ABSTRACT

This paper extends a stylized AD/AS macroeconomic model to a setting in which inflation dynamics impinges on the sentiment of the public toward the future course of the economy. As individuals are allowed to exchange information on their personal mood and to persuade each other through repeated interactions, waves of optimism and pessimism emerge endogenously. The model is then used to analyze the stabilizing effect of alternative monetary policy rules.

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## 1. Introduction

A large literature in cognitive psychology has shown that, outside one's areas of expertise, both private and social understanding of publicly debated issues are by and large superficial and inconsistent. In fact, this seems to be true also for economics. Results based on surveys of public attitudes and knowledge indicate that adult lay people exhibit significant faults in their understanding of major economic issues (Walstad and Rebeck, 2002); that basic economic knowledge and beliefs are affected by personal characteristics, such as age, gender, income, race, level of education and employment status (Caplan, 2002); that the public mood about expected future economic conditions is systematically biased (Amonlirdviman, 2007); that laypeople advocate in general different policy prescriptions than professional economists do (Blendon et al., 1997); and that the expectations of the public do not conform to the tenets of the *Rational Expectation Hypothesis* (REH) customarily employed by scholars (Souleles, 2004).

In fact, the general attitude towards inflation and output dynamics, and the mechanisms by which the public form expectations about them, play a key role in defining the effectiveness of actual macroeconomic stabilization policies, especially as regards the conduct of monetary policy. An exemplary case in point is the *instability problem* of the Wicksellian natural-rate model discussed by Howitt (1992, 2006). Simply stated, the argument runs as follows. Given the expected rate of inflation, if an interest-rate pegging central bank sets the nominal interest rate too low, the real interest rate

would end up below the natural one. This would in turn generate excess demand and, due to an expectation-augmented Phillips curve, actual inflation will be higher than expected. Any reasonable adaptive learning rule would press people to increase further their expectations. If – whatever the reason – the public cannot form rational expectations and try instead to learn from past mistakes, the economy would be thus forced by misleading signals to settle on a diverging path, characterized by an accelerating inflation and a cumulative departure from its full-employment equilibrium.

A much-debated solution is that of letting the nominal interest rate to respond more than one-to-one to the actual rate of inflation, that is to allow the central bank to adopt the so-called *Taylor principle* (Taylor, 1993; Woodford, 2001). In this case, the nominal interest rate should rise by enough to ensure that also the real rate increases. This in turn reduces the output gap and let the actual inflation rate falling below the expected one. As shown in Bullard and Mitra (2002) and Woodford (2003), under the assumption of homogeneous (a.k.a. *representative agent*) minimal deviations from rational expectations the Taylor principle assures the *expectational stability* (*E-stability*) of the dynamic system under recursive learning, so that the resulting determinate (i.e., locally unique) full-employment RE equilibrium is eventually *learnable*. The practical advice to a central banker who wants to avoid substantial volatility in inflation and output and to keep expectations well-anchored is simply that of responding sufficiently aggressively to inflation.

While a tight commitment to the Taylor principle has been repeatedly and triumphantly indicated as the weapon used by the Fed (and many other central banks all around the world) to conquer the inflation of the 1970s (see e.g. Clarida et al., 2000), some non-compliant voices have emerged calling for a more precautionary approach. Cochrane (2007), for instance, notes that in the empirical counterpart of the nowadays fashionable New-Keynesian model

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the estimated coefficients of the policy rule are not identified, so that they do not contain any information on the true policy-rule coefficients.<sup>1</sup> Furthermore, Fair (2002, 2005) presents results based on a structural macroeconomic model according to which a positive inflation shock is contractionary even when the nominal interest rate is held constant, a finding confirmed by Giordani (2003) with evidence from VAR models. In this case, the coefficient on inflation in the interest rate rule does not have to be greater than one for the economy to be stable. These arguments leave open the issue of what types of policy rule central banks actually employ, as well as whether policy rules not obeying the Taylor principle are in practice necessarily as disturbing as the received theory has taught us.

It cannot come as a surprise, therefore, that active research have been devoted to assess the effective E-stability and determinacy of the Taylor principle under less standard assumptions, in particular about market (in)completeness and expectations' formation. Galì et al. (2004), for instance, amend the New-Keynesian framework by forcing a subset of households to consume each period their current labour income instead of planning intertemporally. The presence of rule-of-thumb consumers<sup>2</sup> implies that a fraction of the economy is insulated from any change in the real interest rate, and this can affect the sufficiency of the Taylor principle in attaining the uniqueness of equilibrium. Galì et al. find that the size of the inflation coefficient in a contemporaneous Taylor-type rule must increase substantially above one when the fraction of rule-of-thumb consumers attains a certain threshold. When the Taylor rule is forward looking, on the contrary, for a sufficiently large share of rule-of-thumb consumers the determinacy of the RE equilibrium requires that the interest rate respond less than one-to-one to changes in expected inflation. Bilbiie (2008) shows that such a distinction between the contemporaneous and expected responses of the interest rate policy disappears when asset markets participation is restricted enough, since in both cases a passive (i.e., responsiveness less than one-to-one) Taylor rule becomes optimal. Finally, Arifovic et al. (2007) replace the assumption of individual recursive learning with that of evolutionary social learning, to show that the Taylor principle is not necessary for the convergence (at least to a small neighbourhood of the *minimal state variable* solution) of the system when people are allowed to learn from the others.

In any case, this literature rests firmly on the assumption that agents behave optimally given their endowments, beliefs and constraints, and it asks if and how a RE could come about in the presence of alternative monetary policies. In addressing the instability problem, this paper takes a different route inspired by the Psychology and Economics literature cited at the beginning. We have already seen that the argument in favour of the Taylor principle is that in the absence of such a policy device individuals updating their expectations on future inflation receive the wrong signal and, as a consequence, a cumulative process inevitably starts. The inescapability of such a diverging dynamics rests however on an implicit assumption, namely that as the people systematically underestimate an exploding inflation rate, their psychological attitude towards relevant economic decisions like spending, saving and investment remain totally unaffected or, if it changes, it does not sensibly affect the convergence to the RE equilibrium.

Our contentions are that this assumption is too strong, that it is not corroborated by laboratory and field experiments, and that its relaxation could add interesting insights to our understanding of the relationship between macroeconomic instability and monetary policy. Thus, in what follows we develop a simple model in which the dynamics of inflation is associated to the endogenous arising of waves of optimism and pessimism on the part of the public, since

lay individuals use simple heuristics to solve complex cognitive problems regarding macroeconomic causation. In particular, the behavioural hypothesis we exploit is that a rise of inflation is likely to make individuals more pessimistic about their future economic prospects, while a decrease of inflation has the opposite effect. As the pessimism triggered by rising inflation affects negatively the aggregate demand by restraining both consumption and investment, confidence changes – let us call them *animal spirits*<sup>3</sup> – can in principle provide a sort of self-fulfilling stabilizing mechanism even when the central bank adopts a monetary policy rule that makes the nominal interest rate respond less than point-to-point to the rate of inflation.

As we will see, the destabilizing potential of interest-rate pegging and the stabilizing potential of the Taylor principle depend in interesting ways on the strength of the animal spirits in driving the aggregate demand. In particular, a monetary authority which applies aggressively the Taylor principle incurs a risk of destabilizing the system which increases with the volatility of the public's sentiment towards the future course of the economy. In addition to the specific predictions one can draw from the model, a key broad message we would like to convey is an urge to exploit findings from behavioural economics in assessing the effectiveness of alternative monetary policy actions.<sup>4</sup>

The remaining of the paper is organized as follows. Section 2 discusses the psychological rationale for a negative association between rising expected inflation and consumers' and businessmen's sentiment on the future path of the economy, and presents some aggregate time-series evidence corroborating previous survey-based results. Section 3 introduces a stylized macro model, in which the relationship between endogenous animal spirits and the conduct of monetary policy can be systematically addressed. The model is solved by means of simulations, and results are presented and discussed in Section 4. Section 5 concludes.

## 2. Aggregate evidence on the *good-begets-good* heuristic

Several studies based on opinion surveys (see e.g. Di Tella et al., 2001; Scheve, 2001; Shiller, 1997) have highlighted three key facts regarding public attitudes about inflation. First, ordinary people think inflation is a major phenomenon in their everyday lives and an important national policy issue. Second, respondents significantly dislike inflation – even when it is relatively low – for several reasons. While the main concern is that inflation tends to lower personal living standards,<sup>5</sup> the perceived costs associated to a sustained increase in the price level also involve issues as diverse as the threat that opportunist greedy people might use inflation to exploit others, or that the devaluation of the national currency causes loss of morale and harm to national prestige. Third, the general public tends to associate inflation with negative aggregate consequences like higher political instability and lower economic growth.

A fairly simple interpretative framework – one from which it follows an interesting prediction to be discussed momentarily – is the following. Leiser and Aroch (2009) document that individuals (either trained and untrained in economics) use a particular mental strategy – the so-called *good-begets-good* (GBG) heuristic –

<sup>3</sup> See De Grawe (2008) for a paper very close in spirit to this one.

<sup>4</sup> The papers contained in Foote et al. (2009) testify that the Fed is already aware of the importance of such a change of perspective.

<sup>5</sup> Such a common concern hides large differences among economic groups as regards motivations. For instance, Leiser and Drori (2005) report that individuals operating as price-setters (e.g., shopkeepers) tend to associate the notion of inflation to increases in their operating costs (mainly to higher interest payments on debt) and to lower demand. On the contrary, people receiving a salary (e.g., state-employed teachers) believe that in an inflationary episode updates of nominal wages tend to lag behind increases of the consumer price index.

<sup>1</sup> See also Minford et al. (2002) for a related identification point.

<sup>2</sup> That is, as one assumes incompleteness of credit markets.

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