Conquering Credibility for Monetary Policy under Sticky Confidence

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Abstract: We derive a best-reply monetary policy when the confidence by price setters on the monetary authority's commitment to price level targeting is incomplete and sticky. We find that complete confidence (or full credibility) is not a necessary condition for reaching a price level target. In fact, it is the reaching of a price level target for long enough that rather ensures the conquering of the greatest possible confidence. Evidently, this result has relevant implications for the conduct of monetary policy in pursuit of price stability. One such implication is that setting a price level target matters more as a way to give monetary policy a sharper focus on price stability than as a device to conquer credibility. As regards the conquering of credibility, it turns out that actions speak louder than words.

Key-words: price level targeting; best-reply monetary policy; evolutionary dynamics; sticky confidence.

JEL Codes: C73; E31; E52.

1. Introduction

The issue of time inconsistency has been extensively studied in the monetary policy literature following Kydland and Prescott (1977) and Barro and Gordon (1983). A central result emerging from these studies is that monetary policy will be more effective if it is both transparent and credible. Meanwhile, a credible monetary policy is believed to feature pursuit of an explicit target, and authors such as Svensson (1999) and Ball, Mankiw and Reis (2005) claim that price level targeting is the optimal monetary policy. However, although several empirical studies find that an explicit target leads to superior monetary policy outcomes, it is still an unsettled issue whether it is targeting per se or a sharper focus of monetary policy on price stability that is commendable.

In this context, this paper derives a best-reply monetary policy when price-setters' confidence on the commitment of the monetary authority to price level targeting is both incomplete and sticky. As the optimal price of an individual firm depends positively upon the other firms' prices, there is therefore strategic complementarity in price setting. While the corresponding foresight problem can be solved for sure by paying an optimization cost, a rule-of-thumb, costless but unsure strategy is to confidently use the price level target periodically announced by the monetary authority in seeking to set the optimal individual price. As a result, strategic complementarity in price setting generates strategic complementarity in confidence holding by price setters.

The distribution of foresight strategies across firms (or the state of confidence in the price level targeting) follows an evolutionary dynamic, with finite-horizon firms periodically revising their strategies in response to the payoffs they earn. Meanwhile, the infinite-horizon monetary authority uses best-reply monetary policy to manage the confidence held by price setters. As it turns out, when such an evolutionary game of conquering confidence is subject to exogenous perturbations analogous to mutations in a biological system, confidence is not fully conquered but the price level target is nonetheless continuously reached. Absent such exogenous perturbations, however, the continuous reaching of the price level target ensures that complete confidence (or full credibility) is eventually conquered. Therefore, our central analytical result, which carries significant policy implications, is that complete confidence is not a necessary condition for the reaching of a price level target. Indeed, it is the reaching of a price level target for long enough that rather ensures the conquering of the greatest possible confidence.

2. Structure of the model

Consider a monopolistically competitive economy populated by a *continuum* of firms as in Ball and Romer (1991). In their model money is introduced by assuming that it is a means of exchange required for transactions, which allows taking the money supply as a proxy for the nominal aggregate demand. We draw on the model developed in Ball and Romer (1991) due to its focus on the product market (the economy is populated by yeoman farmers who sell differentiated goods produced with their own labor and purchase the products of all other farmers) and its assumption of a *continuum* of firms, which is a more convenient structure for the game-theoretic modeling developed in what follows.

As in this monopolistically competitive economy the optimal individual price depends positively upon the other firms' prices, there is strategic complementarity in price setting. A fraction $\lambda \in [0,1] \subset \mathbb{R}$ of price setters trust the commitment of the monetary authority to price level targeting and solve their foresight problem by taking the target as the expected aggregate price level needed to set the optimal individual price conditional on this information (we call them confident firms). What we are suggesting here is that: (a) in general, by specifying transparent policy rules, policy makers can perform an intrinsically useful function by creating conventional anchors for expectations formation; and (b) price level target – the pursuit of desirable inflation enshrined in a clearly announced target that policy makers credibly and accountably commit to achieve – exemplifies the creation of a conventional anchor for expectations by policy makers. The remaining fraction $1-\lambda$ of price setters, by not trusting the monetary authority's commitment to price level targeting, rather solves the same foresight problem by paying a cost to perfectly predict the aggregate price level and, accordingly, set the optimal individual price (we call them non-confident firms).

In fact, Diron and Mojon (2005) use data for seven inflation targeting countries to provide evidence that the forecast error incurred when assuming that future inflation will be equal to the inflation target announced by the central bank is typically at least as small as (and often smaller than) the forecast errors of model-based and published inflation forecasts. Meanwhile, Brazier et al. (2008) develop a model in which agents use two heuristics to forecast inflation: one is based on one-period lagged inflation, the other on an inflation target announced by the central bank (which is the steady-state value of inflation). Agents switch between these heuristics based on an imperfect assessment of how each has performed in the past. Agents observe such performance with some noise, but the better the true past performance of a heuristic, the greater chance there is that an agent uses it to make the next period's forecast. The authors find that, on average, the majority of agents use the inflation-target heuristic, even though there are times when everyone does, and times when no one does. While Brazier et al. (2008) embed those two forecasting heuristics in a monetary overlapping-generations model and heuristic switching is described by a discrete choice model, in this paper a different pair of forecasting heuristics is embedded in a macroeconomic model featuring a monetary authority that conducts a best-reply monetary policy and private decision makers switch between heuristics based on evolutionary dynamics with and without exogenous perturbations analogous to mutations in a biological system. De Grauwe (2011) develops a macro model in which agents have cognitive limitations and use simple but biased heuristics to forecast future inflation. The author follows Brazier et al. (2008) in allowing for two inflation forecasting rules. One heuristic is based on the announced inflation target, while the other heuristic uses last period's inflation to forecast next period's inflation. The market forecast is a weighted average of these two forecasts, with these weights being subject to predictor selection dynamics based on discrete choice theory. While De Grauwe (2011) formulates an extended three-equation model generating endogenous and self-fulfilling waves of optimism and pessimism, the model of this paper explores whether there is convergence towards an equilibrium consistent with the price level targeted by policy makers when private decision makers switch between forecasting heuristics based on evolutionary dynamics.

This paper is also related to Arifovic et al. (2010), who investigate the role of announcements by policy makers as a means to sustain a Pareto superior macroeconomic outcome. Each private agent can choose in any period between two strategies: believe, that is, act as if the policy announcement was true; or not believe, and compute the best possible forecast of the policy maker's next action. In each period, word of mouth information exchange allows a fraction of the agents to compare their last-period payoffs with the ones obtained by agents who followed the other strategy, with each agent then adopting the strategy that provided the highest payoff. Therefore, the proportion of believers may change over time and can be interpreted as a measure of the policy maker's credibility. However, while in Arifovic et al. (2010) the policy maker has limited abilities for dynamic optimization and forecasting, and uses individual evolutionary learning to improve his strategy, in this paper the policy maker performs dynamic optimization knowing the evolutionary dynamics that governs the distribution of forecasting strategies in the population of agents. Moreover, in this paper a slightly different pair of forecasting strategies is embedded in a macroeconomic model featuring a monetary authority that computes the best-reply monetary policy and private agents switch between strategies based on evolutionary dynamics with and without mutation. Also, while the dynamic extension set forth in Arifovic et al. (2010) is an agent-based model of a more complex environment whose results have to be derived through simulation, in the model below all results are derived analytically.

The optimal individual price, P_n, which is the price set by non-confident firms at a cost, is given as in Ball and Romer (1991, p. 542, eq. 11), varying positively with the actual aggregate price level P and the (publicly known) nominal stock of money, M:

(1) $$p_n = \phi p + (1-\phi)m,$$

where $p_n \equiv \ln P_n$, $p \equiv \ln P$, $m \equiv \ln M$ and $\phi \in (0,1) \subset \mathbb{R}$ is a constant denoting the elasticity of each individual price with respect to the actual aggregate price level. Given the functional form of the utility function adopted by Ball and Romer (1991, p. 540, eq. 1), the parameter ϕ depends positively on the elasticity of substitution between any two goods and negatively on the rate of change of the marginal disutility of labor.

Meanwhile, confident firms follow the costless but unsure strategy of using the price level target periodically announced by the monetary authority, P^T, to predict the optimal individual price P_c:

(2) $$p_c = \phi p^T + (1-\phi)m,$$

where $p_c \equiv \ln P_c$ and $p^T \equiv \ln P^T$. Therefore, while in Ball and Romer (1991) the alternative strategy to paying an exogenously fixed cost of adjusting prices is to keep prices unchanged, here the corresponding strategy is to set prices using the other publicly announced policy variable, p^T (whose reach, however, unlike any implicit target for the publicly known m, can be confirmed only after all prices have been set).

Based on Ball and Romer (1991, p. 541, eq. (6)), the aggregate price level, P, is approximated by the geometric average of the price set by confident firms, P_c, and the price set by non-confident firms, P_n, that is:[1]

(3) $$p = \lambda p_c + (1-\lambda) p_n ,$$

Substituting (1) and (2) in (3), we obtain:

(4) $$p = \frac{\phi\lambda}{1-\phi(1-\lambda)} p^T + \frac{1-\phi}{1-\phi(1-\lambda)} m .$$

Therefore, the aggregate price level is a weighted average between p^T and m. Note that as λ converges to one, the aggregate price level converges to $p = \phi p^T + (1-\phi)m$ (or,

[1] In fact, consider the expression for the general price level adopted by Ball & Romer (1991, p. 541, eq. 6):

$$P = \left[\int_0^1 P_j^{1-\varepsilon} dj \right]^{1/(1-\varepsilon)} ,$$

where $\varepsilon > 1$ is the elasticity of substitution between any two goods. As in a point in time there is a fraction λ of confident firms and a fraction $1-\lambda$ of non-confident firms, the expression above can be used to express the general price level as follows:

$$P = \left[\int_0^\lambda P_c^{1-\varepsilon} dj + \int_\lambda^1 P_n^{1-\varepsilon} dj \right]^{\frac{1}{1-\varepsilon}} = \left[\lambda P_c^{1-\varepsilon} + (1-\lambda) P_n^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} .$$

Note that:

$$\lim_{\varepsilon \to 1^+} P = Exp \left\{ \lim_{\varepsilon \to 1^+} \frac{\ln\left[\lambda P_c^{1-\varepsilon} + (1-\lambda) P_n^{1-\varepsilon} \right]}{1-\varepsilon} \right\} .$$

By applying the L'Hôpital rule, we get:

$$\lim_{\varepsilon \to 1^+} P = Exp \left\{ \frac{\lim_{\varepsilon \to 1^+} \left[\left(-\lambda P_c^{1-\varepsilon} (\ln P_c) - (1-\lambda) P_n^{1-\varepsilon} (\ln P_n) \right) \Big/ \left(\lambda P_c^{1-\varepsilon} + (1-\lambda) P_n^{1-\varepsilon} \right) \right]}{\lim_{\varepsilon \to 1^+} (-1)} \right\} = P_c^\lambda P_n^{1-\lambda} .$$

For ε sufficiently close to one, which we assume, it follows that $P \cong P_c^\lambda P_n^{1-\lambda}$. A similar approximation is rather assumed in Blanchard and Fischer (1989, section 8.2) in a simplified version of the monopolistically competitive model set forth in Blanchard and Kiyotaki (1987).

equivalently, $P = (P^T)^{\phi} M^{1-\phi}$). Meanwhile, as λ converges to zero, the aggregate price level converges to $p = m$ (or, equivalently, $P = M$), which is (per (1)) the symmetric Nash equilibrium price. Consequently, when all firms confidently follow the price level target announced by the monetary authority in seeking to establish the optimal individual price ($\lambda = 1$), the monetary authority has to set $p^T = m$ for the symmetric Nash equilibrium price to obtain.

While the distribution of foresight strategies $(\lambda, 1-\lambda)$ is given in the short run, it varies over time according to an evolutionary dynamic, with firms periodically revising their strategies in response to changes in expected payoffs. A non-confident firm, by setting the actual optimal individual price, does not suffer any loss caused by foresight errors. However, as a non-confident firm faces a fixed cost $c > 0$ to perfectly predict the aggregate price level, it suffers a loss given by:

(5) $$L_n = -c \, .$$

Meanwhile, a confident firm is subject to a quadratic loss by using the official aggregate price level target to predict the optimal individual price. Using (1), (2) and (4), the loss of a confident firm can be expressed as follows:

(6) $$L_c \equiv -\beta \left(p_c - p_n \right)^2 = -\beta [\phi (p^T - p)]^2 = -\beta \phi^2 (p^T - m)^2 f(\lambda) \, ,$$

where $f(\lambda) \equiv \left[\dfrac{1-\phi}{1-\phi(1-\lambda)} \right]^2$.

By taking (5) and (6) as the expected payoffs of the existing foresight strategies, we obtain the following replicator dynamic: [2]

(7) $$\dot{\lambda} = \lambda (1-\lambda) \left[c - \beta \phi^2 (p^T - m)^2 f(\lambda) \right].$$

The intuition underlying the above expression is the following. In every revision period, each firm with probability one (for simplicity) learns the payoff to another randomly chosen other firm and changes to the other's foresight strategy if it perceives that the other's payoff is higher. As the expression between brackets in (7) is the difference given

[2] The replicator dynamic can be derived from a model of (social or individual) learning as in Weibull (1995, sec. 4.4).

by $L_c - L_n$, the proportion of confident firms increases (decreases) if the module of the expected loss of confident firms is smaller (larger) than the cost to perfectly predict the aggregate price level. Under the replicator dynamic (7), to put it alternatively, the frequency of a foresight strategy increases exactly when it has above-average payoff.

Moreover, we assume that the evolutionary dynamics (7) operates in the presence of disturbances analogous to mutations in natural environments. In a biological setting, mutation is interpreted literally, consisting of random changes in genetic codes. In economic settings, as pointed out by Samuelson (1997, ch. 7), mutation refers to a situation in which a player refrains from comparing payoffs and changes strategy at random. Hence the present model features mutation as an exogenous disturbance in the evolutionary selection mechanism (7) leading some firms to choose a foresight strategy at random. This disturbance component is intended to capture the effect, for instance, of exogenous institutional factors such as changes of administration in the monetary authority or other changes in the policy-making framework (which nonetheless do not involve an abandonment of the price level targeting regime).[3] A question that then arises is whether the occurrence of such an exogenous disturbance (or noise) precludes the continuous reaching of the price level target. As shown shortly, the answer is no. Yet the long-run equilibrium distribution of foresight strategies does depend on whether the evolutionary dynamics is so perturbed.

Drawing on Gale, Binmore and Samuelson (1995), mutation can be incorporated into the selection mechanism (7) as follows. Let $\theta \in (0,1) \subset \mathbb{R}$ be the number (measure) of mutant firms that choose a foresight strategy in a given revision period independently of the related payoffs. Therefore, there are $\theta\lambda$ confident firms and $\theta(1-\lambda)$ non-confident firms acting as mutants. We assume that mutant firms choose one of the two foresight strategies with the same probability, so that there are $\theta\lambda\frac{1}{2}$ confident mutant firms and $\theta(1-\lambda)\frac{1}{2}$ non-confident mutant firms changing strategies. The net flow of mutant firms

[3] Now as in Kandori, Mailath and Rob (1993), two other rationale for such a random choice is that a firm exits the market with some (fixed) probability and is replaced with a new firm which knows nothing about the game, or that each firm “experiments” every once in a while with exogenously fixed probability.

becoming confident firms in a given revision period, which can be either positive or negative, is the following:

(8) $$\theta(1-\lambda)\frac{1}{2}-\theta\lambda\frac{1}{2}-=\theta\left(\frac{1}{2}-\lambda\right).$$

This noise can be incorporated to the evolutionary selection mechanism (7) to yield the following noisy (perturbed) replicator dynamic:

(9) $$\dot{\lambda}=(1-\theta)\lambda(1-\lambda)\left[c-\beta\phi^2(p^T-m)^2 f(\lambda)\right]+\theta\left(\frac{1}{2}-\lambda\right).$$

Therefore, for given values of p^T and *m*, the state transition of the economy is determined by the dynamic system (9), whose state space is $[0,1]\subset\mathbb{R}$.

3. Best-reply monetary policy and equilibrium distribution of foresight strategies

The monetary authority is assumed to aim to minimize $\int_0^\tau (p-p^T)^2 e^{-\theta t}dt$, where $\tau>0$ is the terminal planning time and $\theta>0$ is a constant and exogenously given intertemporal discount rate. Using (4), the monetary authority's objective functional can be expressed as:

(10) $$Min\int_0^\tau (m-p^T)^2 f(\lambda)e^{-\theta t}dt.$$

Therefore, the best-reply monetary policy is derived as the path of control variable *m* that minimizes the objective functional (10) subject to the noisy replicator dynamic (9), given the initial proportion of confident firms, denoted by $\lambda_0\equiv\lambda(0)$, and the terminal time τ.

The current-value Hamiltonian of this optimal control problem is given by:

(11) $$H_c=(m-p^T)^2 f(\lambda)+\mu\left\{(1-\theta)\lambda(1-\lambda)\left[c-\beta\phi^2(p^T-m)^2 f(\lambda)\right]+\theta\left(\frac{1}{2}-\lambda\right)\right\},$$

where μ is the current-value costate variable.

Using the Maximum Principle (MP), we can determine the path of m that minimizes H_c at each moment of time. Given that $m \in \mathbb{R}_{++}$, we can use the first-order condition for an interior minimum:

(12) $$\frac{\partial H_c}{\partial m} = 2(m - p^T) f(\lambda)\left[1 - \mu(1-\theta)\lambda(1-\lambda)\beta\phi^2\right] = 0.$$

The above condition excludes $m \neq p^T$ for all $t \in [0,\tau] \subset \mathbb{R}$. Indeed, given that $f'(\lambda) = \dfrac{-2\phi f(\lambda)}{1-\phi(1-\lambda)} < 0$ for all $\phi \in (0,1) \subset \mathbb{R}$ and $\lambda \in [0,1] \subset \mathbb{R}$, if $m \neq p^T$ for all $t \in [0,\tau] \subset \mathbb{R}$, the signal of the derivative of the integrand in (10) with respect to the state variable is strictly negative. In sum,

(13) $$(m - p^T)^2 f'(\lambda) e^{-\theta t} < 0 \text{ if } m \neq p^T \text{ for all } t \in [0,\tau] \subset \mathbb{R}.$$

Based on Lemma 3.1 stated in Caputo (2005, p. 56), it follows from (13) that $\mu(t) < 0$ for all $t \in [0,\tau) \subset \mathbb{R}$. Considering this fact and the transversality condition given by $\mu(\tau) = 0$, it then follows that $1 - \mu(1-\theta)\lambda(1-\lambda)\beta\phi^2 > 0$ for all $\beta > 0$, $\phi \in (0,1) \subset \mathbb{R}$, $\lambda \in [0,1] \subset \mathbb{R}$, and $t \in [0,\tau] \subset \mathbb{R}$. Therefore, the inequality given by $m \neq p^T$ for all $t \in [0,\tau] \subset \mathbb{R}$ implies that $\dfrac{\partial H_c}{\partial m} = 2(m - p^T) f(\lambda)\left[1 - \mu(1-\theta)\lambda(1-\lambda)\beta\phi^2\right] > 0$. To put it another way, with $m \neq p^T$ along the optimal path of the control variable the first-order condition (12) would not be satisfied.

Meanwhile, if

(14) $$m = p^T \text{ for all } t \in [0,\tau] \subset \mathbb{R},$$

the inequalities in (13) become equalities for all $t \in [0,\tau] \subset \mathbb{R}$. Thus, it follows from the Lemma 3.1 recalled above that

(15) $$\mu(t) = 0 \text{ for all } t \in [0,\tau] \subset \mathbb{R}.$$

Given (15), the control-variable path (14) satisfies the necessary condition (12).

Indeed, the control-variable path (14) minimizes (11) given that:

(16) $$\left.\frac{\partial^2 H_c}{\partial m^2}\right|_{\mu=0} = 2f(\lambda) > 0 \text{ for all } t \in [0,\tau] \subset \mathbb{R}.$$

Substituting (14) into (4), it follows that the aggregate price level is given by:

(17) $$p = p^T \text{ for all } t \in [0,\tau] \subset \mathbb{R}.$$

The equation of motion for the state variable λ is obtained from the following MP's condition:

$$\dot{\lambda} = \frac{\partial H_c}{\partial \mu},$$

which is the noisy replicator dynamic (9). Given the optimal path of the control variable (14), equation (9) becomes:

(18) $$\dot{\lambda} = -(1-\theta)c\lambda^2 + [(1-\theta)c - \theta]\lambda + \frac{\theta}{2} \equiv g(\lambda).$$

The above expression implies that there is a unique equilibrium value for λ, given by:

(19) $$\lambda^* = \frac{(1-\theta)c - \theta + \sqrt{[(1-\theta)c]^2 + \theta^2}}{2(1-\theta)c} \in (0,1) \subset \mathbb{R}.$$

The path of the costate variable, given by (15), satisfies the transversality condition for an optimal control problem with finite-horizon planning and free terminal state, given by $\mu(\tau) = 0$. Moreover, if the path (15) obtains for all $t \in \mathbb{R}_+$, the transversality condition for an infinite-horizon planning and free terminal state, given by $\lim_{t\to\infty} \mu(t)e^{-\theta t} = 0$, is satisfied as well. And the other corresponding transversality condition given by $\lim_{t\to\infty} H(t) = 0$ is also satisfied. In fact, the present-value Hamiltonian can be alternatively expressed as $H = H_c e^{-\theta t}$. Given that $m = p^T$, $\mu(t) = 0$, and $\lambda \in [0,1] \subset \mathbb{R}$ for all $t \in \mathbb{R}_+$, it then follows from (11) that $H_c = 0$ for all $t \in \mathbb{R}_+$, so that $\lim_{t\to\infty} H(t) = \lim_{t\to\infty} H_c e^{-\theta t} = 0$.

The graph of the function $g(\lambda)$, given by (18), is a concave-down parabola with intercept given by $g(0) = \theta/2 > 0$. This quadratic function has two distinct real roots, one of them being $\frac{(1-\theta)c-\theta-\sqrt{[(1-\theta)c]^2+\theta^2}}{2(1-\theta)c}<0$ and the other one being given by (19). Therefore, for all $\lambda\in[0,\lambda^*)\subset\mathbb{R}$ it follows that $\dot{\lambda}=g(\lambda)>0$, while for all $\lambda\in(\lambda^*,1]\subset\mathbb{R}$ it follows that $\dot{\lambda}=g(\lambda)<0$, so that the equilibrium point $\lambda^*\in(0,1)\subset\mathbb{R}$ is asymptotically stable.

4. Conclusions

The best-reply monetary policy is to set $m=p^T$ at each moment of the planning horizon, which ensures $p=p^T$ all along. Therefore, we can interpret the best-reply policy-making in two alternative ways, according to which variable is assigned the role of policy instrument (or control variable). First, for an exogenously given aggregate price level target, the best-reply monetary policy is to set $m=p^T$ throughout. Second, for an exogenously given nominal money supply, the best-reply policy-making is to set $p^T=m$ all along.

When the evolutionary dynamics governing the distribution of foresight strategies in the population of price setters is subject to exogenous perturbations, the unique equilibrium point $\lambda^*\in(0,1)\subset\mathbb{R}$ is asymptotically stable. Although confidence is never fully conquered, the price level target is nonetheless continuously reached. Meanwhile, absent perturbations, which is equivalent to setting $\theta=0$, the equation of motion (18) yields two equilibrium points, $\lambda^{**}=0$ and $\lambda^{***}=1$. As the graph of the function $g(\lambda)$ under $\theta=0$ is a concave-down parabola, it follows that the equilibrium point $\lambda^{**}=0$ is unstable, while the equilibrium point $\lambda^{***}=1$ is asymptotically stable. Therefore, when the evolutionary selection dynamics is not perturbed by mutations, the continuous reaching of the price level target does ensure that complete confidence (or full credibility) is eventually conquered. Paraphrasing how Samuelson (1997, p. 3) describes an equilibrium emerging from rule-of-thumb behavior through an evolutionary dynamics:[4] an equilibrium solution with the aggregate price level target being reached does not appear because all

[4] "The behavior that persists in equilibrium then looks as if it is rational, even though the motivations behind it may be quite different. An equilibrium does not appear because agents are rational, but rather agents appear rational because an equilibrium has been reached".

price setters are fully confident, but rather price setters eventually become fully confident because a best-reply monetary policy ensuring the reach of that target as an equilibrium solution has been followed for long enough. Though derived in a specific macroeconomic setting, this analytical result has broader implications for the design of monetary policy in pursuit of price stability. One such implication is that setting a price target matters more as a way to provide monetary policy with a sharper focus on price stability than as a device to conquer credibility. As regards the conquering of credibility, it turns out that actions speak louder than words, and the achievement of price stability is what ultimately matters most as a confidence-building device.

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