AFC ASSOCIATION FRANÇAISE DE CLIOMÉTRIE

WORKING PAPERS

Nr. 4, 2012

Monetary Credibility Effects on Inflation Dynamics: A Macrohistorical Case Study

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Abstract: This paper examines the role of monetary credibility applied on Poland's inflation dynamics by using a new hybrid Phillips curve with time-varying coefficients. We specify our model under State space form and estimate by using a Kalman filter approach. The main finding is that Poland's inflation dynamics is well described by lagged and future expected inflation with an important forward-looking behaviour predominance. Thus, monetary credibility appears to play a role in Poland's disinflation process.

JEL Classification: C22, E31, E58. E65.

Keywords: Empirical macroeconomics, Credibility, Inflation, Poland.

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1. Introduction

In this paper, we study the disinflation process in Poland. We focus on the role of monetary credibility to consolidate the achievement of this process.

Poland's macroeconomic stabilization policy started with the adoption of a currency peg in 1990. Then it moved to a crawling peg system in 1991 and to free float in 2000, after widening the band from ±7% in 1996 to ±15% in 1999. The National Bank of Poland (NBP) adopted a direct inflation targeting framework during 1998. This new strategy was in fact successful in generating sustainable price levels because it was devoted solely to lowering inflation in the early 2000s. Monetary credibility seemed to play an important role during this disinflation process.

In this context, we assess empirically the effects of monetary credibility on Poland's inflation dynamics. The concept of monetary credibility refers directly to the private sector expectations. In this sense, Blinder [2000] provides a very short and intuitive definition of credibility: "*a central bank is credible if people believe it will do what it says*". In turn, Cukierman and Meltzer [1986] define the credibility as "*absolute value of the difference between policy-makers plans and the public's beliefs about those plans.*"

In order to assess monetary credibility effects on Poland's inflation dynamics, we define a new hybrid Phillips curve (as in Gali and Gertler [1999], Smets and Wouters [2003] or Christiano *et al.* [2005]). We consider Calvo's [1983] basic price setting model and we modify it by introducing passive prices adjustments (Christiano *et al.* [2005] and Céspedes *et al.* [2005]). From a Cobb-Douglas production technology, we determine that the real marginal cost depends on real wage and real exchange rates in reason of the openness characterizing the Polish economy (McCallum and Nelson [1999]; Lendvai [2005]). Moreover, from our new hybrid Phillips specification, we show that the inertia of all inflation determinants depends on the monetary credibility indicator.

Although the monetary credibility is relatively easy to define, it seems difficult to measure because there is no commonly accepted and used indicator of this concept. Hutchison and Walsh [1998], Cecchetti and Krause [2002] and Lyziak *et al.* [2007] refer to the gap between inflation expectations of economic agents and the central bank's inflation target to measure the credibility. On the contrary, Bomfim and Rudebusch [2000] take the weight attached to the central bank target in the formation of the private sector's long-term inflation expectations as a proxy for monetary credibility indicator.

In line with Hutchison and Walsh [1998], Cecchetti and Krause [2002] and Lyziak *et al.* [2007], we retain here the differential between inflation expectations of economic agents and the central bank's inflation target as an indicator of the monetary policy credibility.

Our empirical analysis focuses on two scenarios: for the first, we specify a new hybrid Phillips equation without the monetary credibility indicator. For the second scenario, according to the theoretical model, we state that the inertia of all coefficients (which are assumed to be time-varying) is affected by the monetary credibility indicator.

Our estimations indicate that Poland's inflation dynamics is well described by lagged and future expected inflation. They point also to ambiguous effects of real marginal cost components. Therefore, the monetary credibility appears to play a role in Poland's inflation dynamics probably due to the commitment of the National Bank for implementing the inflation targeting strategy since October 1998. Monetary credibility effects seem thereby to make Poland's inflation dynamics more forward-looking.

Our paper is among the prior studies for assessing the backward-looking and forward-looking inflation inertia by considering a new hybrid Phillips curve with time-varying parameters in the case of central and eastern European countries (CEEC's).

The reminder of the paper is structured as follows: Section 2 presents briefly monetary and exchange rates policies over the last two decades. Section 3 sets up the theoretical model for explaining how we determine the new hybrid Phillips curve in a small open economy. In Section 4, we describe our empirical analysis and present some findings using two different scenarios. Finally, Section 5 concludes.

2. Monetary and exchange rate policies in Poland

Poland started its macroeconomic stabilization program when the zloty[4] was pegged to a basket of currencies in 1990. This fixed anchor did not lead to a rapid decline of inflation. In addition, it induced real appreciation and erosion of competitiveness. Therefore, a preannounced crawling peg was introduced in October 1991. Capital account liberalization led in 1994 and 1995 to large capital inflows, which forced the authorities to widen the crawling exchange rate band in May 1996 (±7%). Upward pressure on the domestic currency continued and in the early 1998, the National Bank of Poland (NBP) began to widen the band again.[5] The main reason for the gradual widening of the band was the effort of monetary authorities to accommodate large capital inflows.

The implementation of the inflation targeting regime in Poland began during 1998. The monetary authorities still maintained an exchange rate band which was widened.[6] The primary goal of the monetary policy was maintaining price stability.[7] Since the early 1999, the direct inflation target strategy had been used in order to break through the inflation expectations, which were perceived as one of the main obstacles for the disinflation process. In this context, monetary authorities needed to establish their credibility. Actually, the stronger the impact of policy announcement on expectations, the easier it is for policy-makers to control inflation and to accommodate shocks in order to reach the objective of price stability. To make the disinflation process effective, Poland abandoned the exchange rate band and switched to a managed float in April 2000. Monetary authorities did not aim to set predetermined zloty exchange rates against other currencies. They reserved however the right to intervene if necessary to achieve the inflation target.

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[4]Literally meaning "golden" is the domestic currency of Poland.

[5]±10% in February 1998, to ±12.5% in October 1998, and finally to ±15% in March 1999.

[6]±10% to ±12.5%, and later to ±15%.

[7]To make solid foundations for long-term economic growth and for adopting the euro as domestic currency.

Since the early 2004, the National Bank of Poland (NBP) has pursued a continuous inflation target at the level 2.5% with a tolerance band of ±1%. It has maintained interest rates at a level consistent with the adopted inflation target by influencing the level of nominal short-term interest rates on the money market and the demand within the economy and the inflation rate.

As mentioned above, we consider that the monetary credibility is playing an important role for implementing the inflation targeting policy. Through our empirical studies, we tend to evaluate the contribution of the monetary credibility to consolidate the impact of the monetary policy on Poland's inflation dynamics.

3. Theoretical model

This section outlines a closed economy new hybrid Phillips curve and its extension to an open economy. We deduce the open economy extension by assuming that firms use imported goods as intermediate consumption goods.

3.1. Closed economy model

Our new Keynesian Phillips curve is based on individual firms' price setting. The model is a derivated version of the Calvo [1983] staggered price setting model extended to incorporate backward-looking price setting by a fraction of firms [Gali and Gertler, 1999].

There is a continuum of monopolistically competing firms in the economy. Each firm faces a probability θ of not being able to readjust its prices in a given period. This probability is constant across firms and over time. As in Gali and Gertler [1999], we assume two types of firms: a fraction $1-\omega$ who adjust their prices in a forward-looking way and a fraction ω which follow instead some passive updating rule in their price readjustment (backward-looking firms). These assumptions imply that the average price level, p_t can be expressed as:

$$p_t = \theta p_{t-1} + (1-\theta)\tilde{p}_i \tag{1}$$

where $\tilde{p}_t$ is a weighted average of prices readjusted in a forward-looking way, p_t^f and following the passive updating rule, p_t^b:

$$\tilde{p}_t = (1-\omega)p_t^f + \omega p_t^b \tag{2}$$

Forward-looking firms set their prices to maximize their future flows of profits subject to the price setting rules. Denoting nominal marginal costs by mc_t^n and the time discount factor by β, the optimally readjusted price is:

$$p_t^f = (1-\beta\theta)\sum_{k=0}^{\infty}(\beta\theta)^k E_t(mc_{t+k}^n) \tag{3}$$

Backward-looking firms follow the updating rule based on the formulation by Christiano *et al.* [2005] and Céspedes *et al.* [2005].

We assume that backward-looking updating rule for those firms that can not optimally adjust prices is given by:

$$p_t^b = p_{t-1} + \rho\pi_t^* + (1-\rho)\pi_{t-1} \tag{4}$$

where π_t^* is the inflation target and ρ is a measure of monetary credibility. When $\rho = 1$, i.e., the central bank is fully credible, firms fix their prices by taking into account the previous price and the inflation target. The new hybrid Phillips curve can be expressed as:

$$\pi_t = \gamma^\pi + \gamma^b \pi_{t-1} + \gamma^f E_t \pi_{t-1} + \gamma^{mc} mc_t \tag{5}$$

The coefficients γ^π, γ^b, γ^f and γ^{mc} depend on structural parameters θ, β, ρ and ω.

It should be noted that backward-looking price setting leads to inflation rate inertia. When there is a positive fraction of backward-looking firms in the economy, the coefficient of lagged inflation rate is positive. For the case where all firms are forward-looking, the hybrid Phillips curve (5) reduces to standard pure forward-looking new Phillips curve. In addition, according to equation (5), the nature of our Phillips curve depends on monetary credibility indicator, ρ (or indexing parameter). Indeed, when $\rho = 1$, the backward-looking firms adjust their prices especially with regard to the inflation target. In this case, the hybrid Phillips equation (5) reduces to standard pure forward-looking process. When $\rho = 0$, we obtain the specification of Lendvai [2005], while the case $0 < \rho < 1$ corresponds to the new hybrid Phillips curve.

3.2. Open economy extension

We follow McCallum and Nelson [1999] and we assume that imported goods are considered as intermediate consumption goods while all final goods are produced domestically. These hypotheses are motivated by several reasons: (i) the exchange rate pass-through on the general price level is incomplete in Poland; (ii) the production process of Poland's firms is dominated by imported factors with high capitalistic intensity.

To take into account the impact of the exchange rate on imported goods, we modify the definition of the real marginal cost in the new hybrid Phillips equation by considering a Cobb-Douglas production technology with two inputs (Lendvai, [2005]).[8]

$$y_t = \alpha l_t + (1-\alpha) y_t^m \tag{6}$$

Where l_t corresponds to labour and y_t^m is an index of imported differentiated intermediate production goods. It should be noted that y_t stands here for gross output and the parameter α is therefore the labour share in gross output.

By assuming the price of one unit of the imported composite good is $p_t^m + e_t$, the real marginal cost can be expressed as:

$$mc_t = \alpha w_t + (1-\alpha) q_t \tag{7}$$

[8]However, our Cobb-Douglas specification is a bit different from Lendvai's [2005] because we assume here that the labour augmenting technology shock is equal to one.

where w_t stands for real unit labor cost and q_t is the real cost of a unit of the imported good. By substituting this expression into the closed economy hybrid Phillips curve (5), we obtain:

$$\pi_t = \gamma^{\pi} + \gamma^{b}\pi_{t-1} + \gamma^{f}E_t\pi_{t+1} + \gamma^{l}w_t + \gamma^{m}q_t \tag{8}$$

The expressions linking γ^{π}, γ^{b} and γ^{f} to the structural parameters are as in expressions (5). Beyond of previous structural parameters, γ^{l} and γ^{m} depend also on α. According to the theoretical model, except γ^{b} all coefficients depend directly on monetary credibility indicator ρ.

4. Empirical Analysis

4.1. Data

In our empirical analysis, quarterly data are used. The sample period is from 1994q1 to 2010q4. It covers periods of inflation targeting regime implementation, which started in the late 1990s. Hence, it allows us to avoid the beginning of the transition process in the early 1990s, characterized by movements and turbulences, which came from the liberalization strategy.

The real exchange rate is deduced from the nominal exchange rate and the ratio of prices between Poland and euro zone. In line with Hutchison and Walsh [1998], Cecchetti and Krause [2002] and Lyziak *et al.* [2007], the differential between inflation expectations of economic agents and the central bank's inflation target is used as an indicator of the monetary policy credibility.

The inflation rate series corresponds to annualized consumer price index (basis 2005=100)[9] of all items. The real unit labor cost is derived from the unit labor cost index seasonally adjusted (basis 2005=100). Consumer price index (basis 2005=100) is retained to represent the domestic general price level. The previous series are collected from the Organisation for Economic Co-operation and Development Database.

Ipsos survey data from National Bank of Poland (NBP) are used as inflation expectations data. They correspond to the annualized inflation expectations of private individuals. The data for inflation target have been collected in turn from the National Bank of Poland (NBP) and the Central Statistical Office.

4.2. State space specification

Our empirical analysis focuses on two key features. First, the equation (8) shows that inflation dynamics is described by the new hybrid Phillips curve and depends on lagged inflation (backward-looking expectations), future expected inflation (forward-looking expectations) and real marginal cost components.[10] However, coefficients of these variables seem to depend in turn on the monetary credibility indicator, ρ. This latter is proxied by the

[9]Corresponding to overall index excluding alcohol and tobacco.

[10]i.e., The real unit wage cost and the real exchange rate.

differential between inflation expectations of economic agents and the central bank's inflation target. Second, since the monetary credibility indicator is time-varying, then all coefficients of our new hybrid Phillips equation become time-varying too.

To perform our analysis, we distinguish through the State space specification two scenarios in order to show clearly the role of monetary credibility in Poland's inflation dynamics during the last fifteen years. In the first scenario, we do not include the monetary credibility indicator in our specification. While in the second one, the new hybrid Phillips equation is enriched by introducing the monetary credibility indicator. The specifications of both scenarios are estimated by means of a Kalman filter. The Kalman [1960, 1963] filter technique is extremely useful. It is adopted to estimate regression models with time-varying coefficients.[11] This class of models consists of two equations: the transition equation, describing the evolution of unobserved states variables and the measurement equation, describing how the observed data are generated from the states variables.

We define a linear State space specification from the new hybrid Phillips curve (8) by the following system of equations:

The measurement equation is:

$$\pi_t = \Gamma_t^{'}\Pi_t + \varepsilon_t; \quad \varepsilon_t \to N(0, \sigma_\varepsilon^2) \tag{9}$$

The states equation without monetary credibility effects are:

$$\Gamma_{t+1} = \mathrm{I}\Gamma_t + v_t^1; \quad v_t^1 \to N(0, \sigma_{v^1}^2) \tag{10}$$

By introducing the monetary credibility effects, the states equation becomes:

$$\Gamma_{t+1} = \Phi\Gamma_t + v_t^2; \quad v_t^2 \to N(0, \sigma_{v^2}^2) \tag{11}$$

With:

$$\Gamma_t^{'} = \begin{bmatrix} \gamma^\pi & \gamma^b & \gamma^f & \gamma^l & \gamma^m \end{bmatrix}; \ \mathrm{I} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}; \ \Phi = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & \varphi_{16} \\ 0 & 1 & 0 & 0 & 0 & \varphi_{26} \\ 0 & 0 & 1 & 0 & 0 & \varphi_{36} \\ 0 & 0 & 0 & 1 & 0 & \varphi_{46} \\ 0 & 0 & 0 & 0 & 1 & \varphi_{56} \end{bmatrix}.$$

π_t is driven by an ARX(1) process and time-varying coefficients, Γ_t is the matrix of the coefficients which follow in turn a random walk process. ρ_t is the monetary credibility indicator. The relation (9) is deduced from (8), i.e., the new hybrid Phillips curve and represents the measurement equation in the State space specification. The relation (10) and (11) are transition equations without and with the monetary credibility indicator respectively. These equations specify the dynamics of time-varying coefficients. ρ_t and v_t^i are vectors of mean zero. These disturbance vectors are assumed to be serially independent.

[11]For more details on Kalman filter, see Harvey [1991] or Cuthbertson *et al.* [1992].

According to equation (11), the higher the monetary credibility indicator, the lower the backward-looking time-varying coefficient. This means that φ_{26} is expected to be negative. On the other hand, the higher the monetary credibility indicator the higher the forward-looking time-varying coefficient and φ_{36} is expected to be positive. In addition, the monetary credibility indicator seems to affect directly all others time-varying coefficients, i.e., real marginal cost components (real unit wage cost and real exchange rate).

4.3. Empirical results

This subsection reports results from the two scenarios previously presented in the State space specification. We do not calibrate the structural parameters to fix values of initial states or initial conditions.

4.3.1. Inflation dynamics without monetary credibility effects

Table 1 reports estimation results of equations (9) and (10), i.e., the new hybrid Phillips curve without monetary credibility effects. We report means and finals values of states variables. γ^{π} can be interpreted as changes in the steady-state inflation. According to Kozicki and Tinsey (2002), if we ignore changes in the steady-state inflation when they exist, the changes will be spuriously captured by lagged terms of inflation in the new Keynesian Phillips curve specification even with the intercept term. γ^{b}, γ^{f}, γ^{l} and γ^{m} represent the lagged inflation, expected future inflation, real unit labor cost and real exchange rate estimated time-varying coefficients respectively.

According to our empirical results, Poland's inflation dynamics can be described by the new hybrid Phillips curve. Overall final states values are significant at 1% level except that of the real unit labor cost. About the means values, only the coefficients of backward-looking and forward-looking components are significant. The future expected inflation coefficient seems to be the more important, with 0.523 (final value) and 0.497 (mean value), while the lagged inflation coefficient values are 0.306 and 0.262 respectively. Poland's inflation dynamics is therefore predominated by the expected future inflation giving birth to forward-looking behaviours predominance. Indeed, during the transition process, Polish economic agents do pay attention to the inflation target by forming their expectations regarding the future movements of prices. Accordingly, the monetary policy seems to be credible among Polish economic agents in the 2000s. These results seem not to be in line with Lyziak *et al.* [2007] main findings.

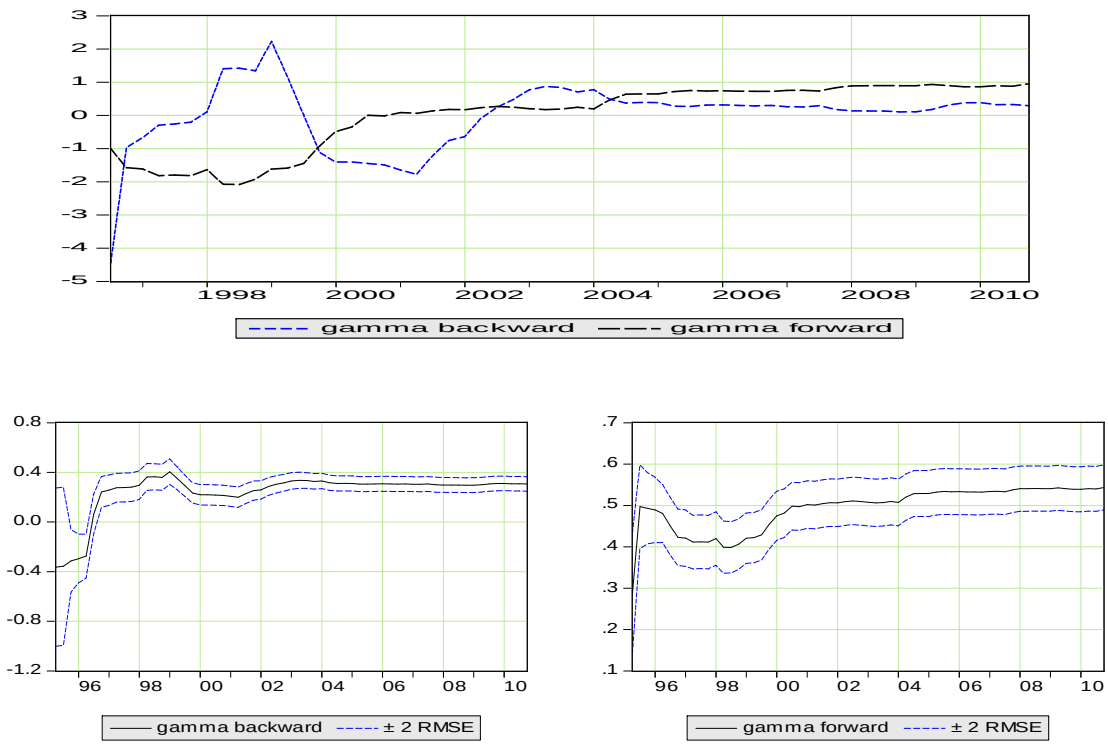
The estimated new hybrid Phillips curve is somewhat unrelevant. The time-varying slope coefficient γ^{l} is not significant and its sign is inconsistent with theoretical predictions. For the real exchange rate, it appears that exchange rate depreciation induces therefore a rise in current inflation rate probably because of the importance in economy of the intermediate imported goods. However, its impact seems to be relatively low.

Table 1: Estimation results 1994-2010

Phillips curve without credibility indicator					
Coefficients	γ^{π}	γ^{b}	γ^{f}	γ^{l}	γ^{m}
Final values	0.241 *(0.056)****	0.306 *(0.029)****	0.543 *(0.027)****	-0.966 *(0.587)*	0.045 *(0.007)****
Mean values	1.064 *(1.759)*	0.262 *(0.137)**	0.497 *(0.046)****	-6.713 *(18.89)*	0.103 *(0.123)*
AIC=7.109		*SCHW=7.109*		*HQC=7.109*	

Figure 1 displays linear backward-looking *versus* forward-looking time-varying coefficients dynamics generated from the Kalman filter algorithm. The dynamics of these coefficients are statistically different from zero. The increase of the one is often associated with the decrease of the other. Several episodes can be clearly distinguished. The mid-1990s is characterized by the backward-looking component predominance. The early 2000s (just after adopting inflation targeting regime) seems to be marked by an unstable behaviours of private agents. From May 2004, corresponding to European Union (EU) accession, the forward-looking time-varying coefficient tends to rise slowly before becoming more predominant in the inflation dynamic. This forward-looking dominance stems probably from the monetary credibility gain from the new policy orientation adopted later 1999. These findings conduct us to ripen our analysis by taking into account the effects of monetary credibility in the inflation dynamic.

Figure 1: Backward-looking *versus* forward-looking time-varying coefficients dynamics



4.3.2. Inflation dynamics with monetary credibility effects

We estimate now the equations (9) and (11) to show how the monetary credibility affects the disinflation policy in Poland, before and after its accession to the European Union (2004). Table 2 reports estimation results. On the one hand, we have the estimation of the new hybrid Phillips curve (equation 9) and on the other hand, we report the estimated effects of monetary credibility on time-varying coefficients or states variables (equation 11).

By taking into account the monetary credibility indicator, the final values of all time-varying coefficients seem to be statistically significant except that of the real exchange rate. About the mean values, only backward-looking and forward-looking coefficients are significant. The final weight of lagged inflation in the model passes from 0.306 to 0.129 that of future expected inflation increases from 0.543 to 0.737. Accordingly, introduction of monetary credibility indicator in the model tends to reinforce the weight of the future expected inflation with the forward-looking behaviour predominance. According to these findings, the Polish authorities seem to establish their monetary credibility during the period of study, i.e., from 1994 to 2010, especially from the early 2000s. When monetary policies become credible, the stronger the impact of policy announcement on expectations, the easier it is for policy-makers to control inflation and to accommodate shocks to meet easily the objective of low inflation.

Table 2: Estimation results 1994-2010

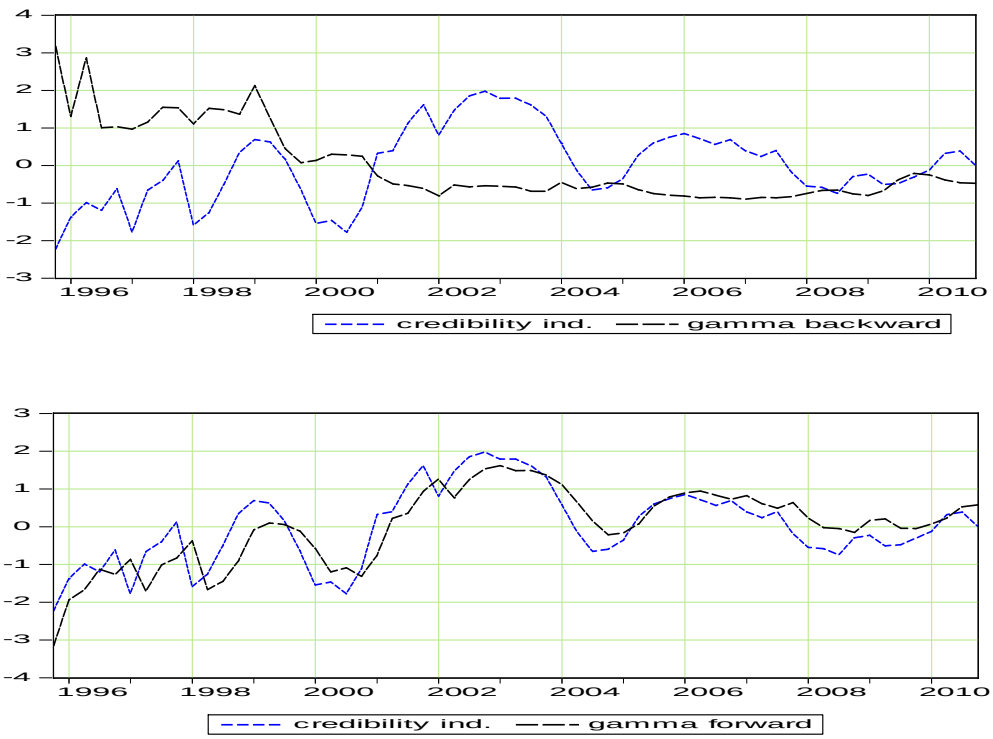
Phillips curve with credibility indicator					
Coefficients	γ^{π}	γ^{b}	γ^{f}	γ^{l}	γ^{m}
Final values	.498 *(.020)****	.129 *(.009)****	.736 *(.008)****	.354 *(.155)****	-.002 *(.002)*
Mean values	.417 *(.355)*	.145 *(.039)*	.709 *(.088)*	-.501 *(3.362)*	.002 *(.030)*
Effects of credibility indicator changes					
Coefficients	φ_{16}	φ_{26}	φ_{36}	φ_{46}	φ_{56}
Estimates	-.041 *(.005)****	-.002 *(.000)****	.027 *(.000)****	1.231 *(.017)****	-.011 *(.002)****
AIC=47.474		*SCHW=47.638*		*HQC=47.539*	

In contrast to the first scenario, the second one is characterized by inconsistent effects of one state variable which is associated with the real unit labor cost. However, only the final value is significant. It affects directly the inflation dynamics in Poland. We can not focus on the effect of the real exchange rate because of its non significance. By taking in account the monetary credibility indicator, the evidence is that a real exchange rate depreciation do not affect the current inflation dynamics. In this case, Poland inflation dynamic does not seem to be supported by the evolution of prices of import intermediate goods. By making comparisons between the two scenarios, the coefficient γ^{m} value changes the sign and remains non significant only in the second specification. In contrast, the coefficient γ^{l} keeps positive and significant values for final states.

What about different implications of monetary credibility effects on Poland's inflation dynamics time-varying coefficients? From the equation (11), constant coefficients φ_{16}, φ_{26}, φ_{36}, φ_{46} and φ_{56} represent the estimated effects of monetary credibility on the changes in the steady state inflation, lagged inflation, future expected inflation, real unit labor cost and real exchange rate time-varying coefficients respectively. In Table 2, we can observe that all coefficients are statistically significant at 1% level. Furthermore, most coefficient signs are consistent with the theoretical predictions, except that of the real exchange rate.

Results show that the monetary credibility effects on lagged inflation, i.e., backward-looking behaviour are negative and significant (φ_{26}=-0.002). Figure 2 confirms the existence of a negative correlation between the monetary credibility indicator and the backward-looking coefficient. The evidence is that, when the monetary credibility increases the degree of inflationary process persistence (inflation inertia) decreases, though weakly (Figure 2). These results confirm therefore our theoretical predictions. According to Calvo and Végh [1999] and Ball [1995], a well-known explanation for inflation inertia during disinflation is lack of monetary credibility.

Figure 2: Backward-looking and forward-looking time-varying coefficients *versus* monetary credibility indicator



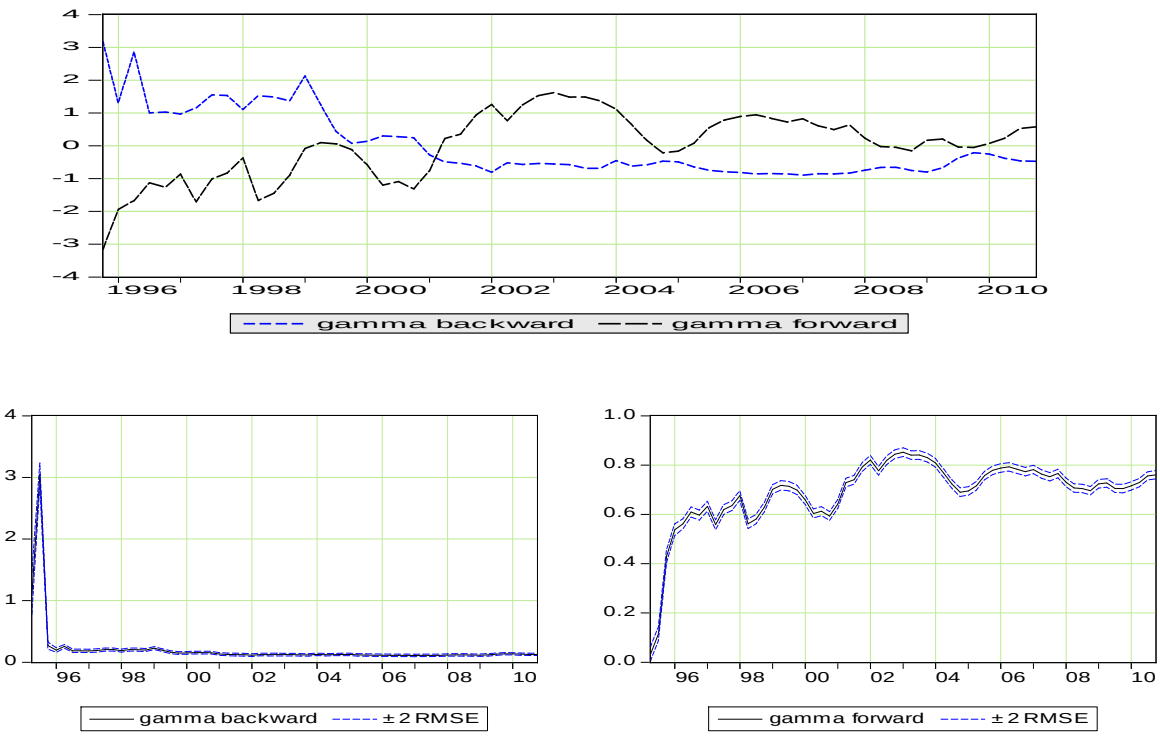
Our results show also that the monetary credibility seems to affect the inflation expectations (φ_{36}=0.027) in a direct and significant manner. However, these effects seem to be rather weak but more than the backward-looking one. The improvement of monetary credibility leads economic agents to pay more attention to authorities' announcements while forming their expectations regarding the future movements of prices (Figure 2). In the case of Poland, the evidence about the monetary credibility improvement in the early 2000s comes probably from the inflation targeting regime adopted two years before, associated with managed float exchange rate regime (April 2000). Therefore, this disinflation program seems to reinforce commitment to contain inflation volatility in spite of international capital inflows

(Mamoudou, T. *et al.* [2009]). Figure 2 displays the positive correlation between the monetary credibility indicator and the forward-looking coefficient dynamics.

In addition, the effects of monetary credibility on real marginal cost components provide interesting results. The credibility effects on real unit labor cost is positive and significant at 1% level with 1.231. In contrast, its effects is negative and significant on the real exchange rate with -0.011. These findings are in line with theoretical predictions for the real unit labor cost. For the real exchange rate coefficient which translates external shocks, the improvement of monetary credibility leads to reduce pressure on the real depreciation of domestic currency.

From the results of the above-mentioned two scenarios, it seems that the monetary credibility plays a role in Poland's disinflation process through the inflation dynamics time-varying coefficients behaviours. Empirical results appear interesting in both scenarios. The monetary credibility affects significantly Poland's inflation dynamics, but its effects seem to be rather weak for backward-looking and forward-looking time-varying coefficients.

Figure 3: Backward-looking *versus* forward-looking time-varying coefficients dynamics



Figures 3 displays linear backward-looking versus forward-looking time-varying coefficients changes in the scenario 2, i.e. with monetary credibility effects. We can observe that these are slightly different from Figure 1. In the case with monetary credibility effects, the forward-looking time-varying coefficient dynamics is more important than that without monetary credibility effects. Furthermore, it occurs clearly that these differences are less significant. More precisely, we remark that when the backward-looking time-varying coefficient decreases, the forward-looking one increases in turn. Since Poland joined the European Union (EU) in May 2004, the two coefficients appear to be almost stabilized over time, i.e., from the mid-2004 to later 2010. The main features of Figure 3 are that, backward-looking and forward-looking coefficients dynamics appear to be less smoothed, probably because of monetary credibility effects.

Figure 4: One-step-ahead inflation dynamics

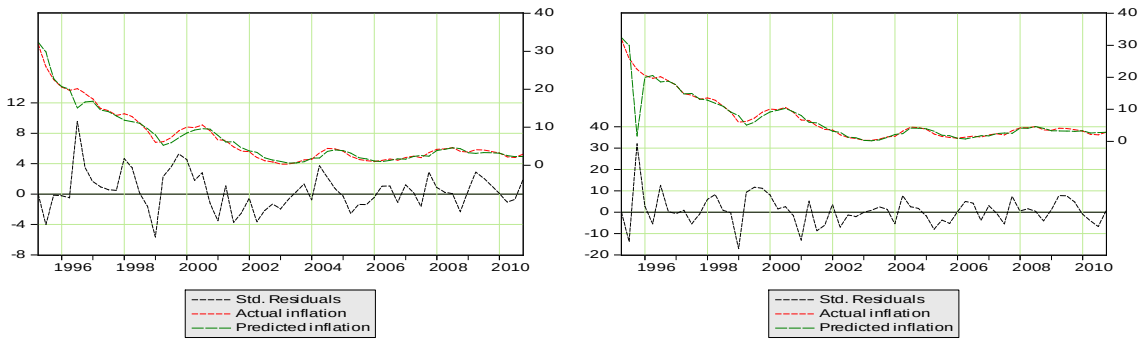


Figure 4 allows comparisons about the relevance of both scenario to account for the Poland inflation dynamics during the last fifteen years. Accoding to Figure 4, the prediction provided by the second specification, i.e. with the monetary policy credibility is interesting than that from the first one.

5. Conclusion

In this paper, we have investigated monetary credibility effects with Poland's inflation dynamics, as an orginal macrohistorical cas study, by using a new hybrid Phillips curve. The open economy extension of McCallum and Nelson [1999] that incorporates imported goods as intermediate inputs is also considered. The primary focus of the paper is to show that coefficients of new hybrid Phillips curve are time-varying because they depend on monetary credibility indicator, proxied by the the differential between inflation expectations of economic agents and the central bank's inflation target.

We specify our new hybrid Phillips curve under State space model with time-varying coefficients and estimate it by using a Kalman filter approach. We implement two different scenarios. First, we estimate a simple new hybrid Phillips curve with time-varying coefficients but without monetary credibility effects. Results show that Poland's inflation dynamics is well described by lagged and future expected inflation. However, the forward-looking behaviour remains predominant over time. Empirical estimates point also to some ambiguous effects of real marginal cost components in determining Poland's inflation dynamics. Second, by including the monetary credibility indicator as affecting the inflation dynamics through the time-varying coefficients, results suggest that monetary credibility play a role in Poland's disinflation process. Monetary credibility effects on backward-looking, forward-looking and real unit labor cost coefficients are consistent with our theoretical predictions. These effects seem to make Poland's inflation dynamics more forward-looking. It can be inferred that Poland's disinflation process of the last decade has been probably generated by the National Bank monetary policy credibility, consolidated by the domestic factors such as the demand dynamics. Moreover, the disinflation process has been also supported by a number of reforms designed to enhance the product market competition, to improve financial market liberalisation and to make the labour market more flexible.

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