Economic Modelling 48 (2015) 83–92

Contents lists available at ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

The conduct of monetary policy in the Eurozone before and after the financial crisis☆

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ARTICLE INFO

Article history:
Accepted 7 November 2014
Available online 8 December 2014

Keywords:
Financial crisis
Monetary policy
Inflation targeting
Taylor rule
Structural breaks
Markov-Switching VAR model

ABSTRACT

The recent financial crisis of 2007–2009 raises several issues related to the conduct of monetary policy during the last two decades. Inflation targeting monetary strategy has been pointed as a potential source of the crisis, as its main objective of inflation stabilization might have diverted central banks from financial stability. We consider the case of European Central Bank (ECB) inflation targeting monetary policy since its inception in order to provide evidence of possible changes in its implementation after the collapse of Lehman Brothers in September 15, 2008. To this end we take into consideration the existence of nonlinearities that may be present in the estimated Taylor rule specification. We contribute to the recent line of research by estimating Taylor rule models with endogenous structural breaks as well as a Markov-Switching VAR model with endogenous coefficients using quarterly data for the ECB for the period 2001:Q1 to 2013:Q4. The main findings of our analysis show that there is a structural break in the implementation of the monetary policy of ECB during the peak of the financial crisis. Furthermore, we show that the ECB monetary policy followed the Taylor principle during the period before the crisis but did not follow the Taylor rule in the post-crisis period. During the post-crisis the ECB acted less inertially, putting a smaller weight on the inflation gap and shifted its focus on output gap to some extent.

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1. Introduction

The financial crisis of 2007–2009 has brought into attention again the role of monetary policy in amplifying or dampening the effects of the crisis (Bullard, 2009; Frappa and Mesonnier, 2010; Taylor, 2009). These urgent events have left aside the discussion on the inflation targeting policy as the appropriate monetary policy framework. However, inflation targeting has been adopted by ECB from its establishment as well as by the Bank of England, Bank of Canada and Bank of Sweden and it has also been advocated by the former Chairman of the FED, Ben Bernanke (see Bernanke et al., 1999). The Taylor principle implies that the ECB and other central banks should increase the nominal interest rate more than point-for-point with inflation, so that the real interest rate increases when inflation rises. To this end the basic idea is that Central Banks which adopt inflation targeting could emphasize the inflation objective in the conduct of monetary policy at the expense of other monetary policy goals (Friedman, 2004; King, 1997; and Walsh, 2009).

There are three approaches to this direction. The first approach argues that in order to comply with its inflation target, the central bank must put more weight on inflation. We follow Creel and Hubert (forthcoming) and we separate the inflation targeting paradigm, which amounts to strong response to price developments to reach low and stable inflation, eventually leading to stable macroeconomic conditions from the inflation targeting *framework* which amounts to a commitment to a numerical target, publication of forecasts and increased transparency. The second approach argues that inflation developments do not always depend on internal factors to an economy; hence any automatic adjustment of interest rates to inflation might prove an inefficient tool. Finally, inflation targeting adoption may be sensitive to the self-selection issue, implying that what has led actually to low inflation in countries that adopt inflation targeting was their decision to aim specifically at lower inflation than in earlier pre-inflation targeting

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☆ An earlier version was presented at the 18th International Conference on Macroeconomic Analysis and International Finance, Department of Economics, University of Crete, Rethymno, 29–31 May 2014 and thanks are due to conference participants for many helpful comments and discussions. The paper has also benefited from comments and discussions by seminar participants at working seminar at Athens University of Economics and Business, University of Piraeus and University of Crete. Kouretas acknowledges financial support from a Marie Curie Transfer of Knowledge Fellowship of the European Community's Sixth Framework Programme under contract number MTKD-CT-014288, as well as from the Research Committee of the University of Crete under research grant #2257. We thank Cinzia Alcidi, Michael Argyrou, Ansgar Belke, Stelios Bekiros, Efrem Castelnuovo, Jerome Creel, Manthos Delis, Dimitris Georgoutsos, Heather Gibson, Paul Hubert, Alexandros Kontonikas, Minoas Koukouritakis, Mika Nieminen, Frank Smets, Christos Tsoumas and Peter Wierts for many helpful comments and discussions. Theodoros Bratis and Evangelos Salachas provided superb research assistance. We also thank two anonymous referees whose comments have improved the paper substantially. The usual caveat applies.

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http://dx.doi.org/10.1016/j.econmod.2014.11.010
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periods. However, it is argued that the central bank's commitment to low and stable inflation may not necessarily lead to a stronger response to inflation.

Following the seminal paper by Taylor (1993) a voluminous literature emerged focusing on the derivation and estimation of linear monetary policy reaction functions in many economies. Although, the derived policy rules are simple in their nature they fit the data relatively well. Recently, researchers focus their analysis to examine whether monetary policy reacts in a nonlinear manner to economic activity and inflation. There are several factors that may lead to the existence of nonlinearities. First, as Svensson (1997), Ball and Sheridan (2003) and Clarida et al. (1999) among others argue the nonlinearity is the result of deviations from the conventional minimization of quadratic loss functions subject to linear Phillips curves and aggregate demand schedule. Furthermore, it is possible that the Phillips curve may reflect more complex price-setting mechanisms than those aggregated in a linear specification (Dolado et al., 2005; Schaling, 2004). Finally, it is argued that the loss function of the central bank may not be quadratic because of asymmetries in the response of monetary policy to inflation in different stages of the business cycle and/or the size of deviations of actual inflation from explicit or implicit targets (Cukierman and Muscatelli, 2008; Dolado et al., 2005; Taylor and Davradakis, 2006).

A second factor of potential nonlinearity in monetary policy is the existence of uncertainty in the economic environment. Therefore, as Gnabo and Moccero (forthcoming) underline several sources of uncertainty affect the implementation of monetary policy in real time. Such sources of uncertainty that may lead to nonlinearities in the conduct of monetary policy are due to: (a) the uncertainty that policy makers face about the state of the economy as a result of data uncertainty. This is a realistic argument since measures of economic activity and inflation are subject to substantial revisions following the quarter of their release; and the same holds for potential output and the NAIRU which are often reported with measurement errors. Therefore, it is argued that these potential data measurement errors policy makers should be less aggressive with respect to incorrectly measured targets.[1]

Parameter uncertainty is also an important element of the presence of nonlinearity since this is related to the uncertainty with respect to the impact of monetary policy on the economy as well as about the structure of the economy. Svensson (1999) argued that uncertainty about the quantitative impact of monetary policy on the economy should lead to less aggressiveness in monetary policy. By contrast, Peersman and Smets (1999) among others found that parameter uncertainty has very limited quantitative effects on the feedback parameters. Finally, Flamini and Milas (2011) show that when the exogenous volatility related to a particular state variable increases, the optimal monetary policy should also have an increasing response with respect to this variable. It is argued that such a response will reduce the risk of large deviations of the economy from the steady state that would deteriorate the distribution forecasts of the output gap and inflation. Giannoni (2007) also shows that in the presence of parameter uncertainty in the model and about the shock process, policymakers adopt an optimal monetary rule that requires the interest rate to respond stronger to fluctuations in inflation and in changes in the output gap.

The final source of uncertainty for policy makers is related to the distribution of disturbances to the economy. As Gnabo and Moccero (forthcoming) point out, optimal monetary policy in a linear-framework with only shock uncertainty exhibits certainty equivalence. Therefore, given that the optimal policy depends only on the expected value of the target variables the degree of uncertainty does not affect the effectiveness of this policy implying that the central bank acts as it would be in a non-stochastic economy. Essentially this is the linearity hypothesis underlying the modeling and estimation of Taylor rule. The “robust control” approach to monetary policy criticizes the implications of linearity on the grounds that the costs of being wrong is independent of whether the expected value of inflation is over or under estimated. It argues that a “risk management approach” to monetary policy should be adopted which implies that central banks choose the policy that minimizes the loss over the complete distribution of values for a given parameter within a given range. The risk management approach could lead to a more aggressive response of monetary policy to macroeconomic conditions. Mishkin (2008) is an advocate of this approach arguing that when financial markets are in strain, risk management is crucial in formulating the appropriate response of monetary policy. Bernanke and Reinhart (2004) also claim that in order to implement the monetary policy effectively at very low interest rates when the economy faces deflation, it is crucial that policymakers should act preemptively and aggressively to avoid facing the complications raised by the zero lower bound.

Seyfried and Bremmer (2003) have analyzed six countries which adopted inflation targeting and they found a break in the monetary policy reaction function which leads them to conclude that the respective central banks focus primarily to inflationary pressures than to current inflation. Trecroci and Vassali (2010) estimated a TVP model and found a higher response to inflation across time by the central banks. Assenmacher-Wesche (2006) estimated a two regime MS-VAR model and they found that there was no significant response to the inflation by the central bank before the adoption of inflation targeting but it becomes significant after its adoption. Taylor and Davradakis (2006) studied the response of the Bank of England to the inflation and it is shown that it responded since inflation targeting adopted in case that inflation rate was above target. Baxa et al. (2014) have shown that the response to inflation has decreased after inflation targeting in five countries based on the estimation of a TVP model. Creel and Hubert (forthcoming) analyze the case of monetary policy response using data from the inflation targeting economies, Canada, Sweden and the UK and they conclude that the adoption of inflation targeting has not led to a stronger response to inflation. Finally, Fouejieu (2013) analyze the issue, using data for emerging markets, whether inflation targeting has been a potential source of the recent financial crisis. His findings hardly support the main hypothesis but do call for further macroprudential policies to tackle the issue of financial stability.[2]

Recently, Belke and Klose (2013) proposed an alternative approach of estimating Taylor reaction functions if the zero-lower-bound on nominal interest rates is binding. This approach amounts to focusing on the real rather than the nominal interest rate. Their model generates a time series of potential output and the equilibrium real interest rate which are both time-varying and thus needed to estimate Taylor reaction functions precisely. In addition, based on McCulley and Toloui (2008) and Tucker (2008) they also argue that there is a break in the equilibrium real interest rate at the beginning of the financial crisis. Furthermore, Belke and Klose (2013) argue that during the recent financial crisis one could adjust the Taylor rule and still use the inflation and output gap variables as the target variables. Alternatively, we could add additional variables to the standard Taylor rule that describe much of the interest setting behavior of the ECB and the Fed. Their analysis provides evidence that there is substantial difference between the estimated reaction coefficients in the pre- and crisis era for both central banks. Murray et al. (forthcoming) estimate Markov Switching models in order to identify periods of adoption of monetary policy inflation targeting in the US over the last 60 years. They find that the Fed did not adhere to the Taylor rule during most of Paul Volcker's tenure.[3]

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[1] See for example Estrella and Minskin (1999), Peersman and Smets (1999), Orphanides (2001) and Aoki (2003).

[2] Creel and Hubert (forthcoming) cover sufficiently large number of studies which could be a good reference for more details.

[3] Taylor (1999), Clarida et al. (2000) and Orphanides (2004) also conduct their analysis by dividing the sample by the tenure of the FED Chairmen. Taylor (1999) finds that the Taylor principle holds during Volker–Greenspan period a result which was also confirmed by Clarida et al. (2000). In contrast, Orphanides (2004) using real-time data found no evidence of significant difference in the interest rate response to inflation between the pre-Volcker–Greenspan periods.

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