Real wage rigidities and optimal monetary policy in a small open economy ☆,☆☆

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A B S T R A C T

The main objective of the study is to provide a theoretical analysis of optimal monetary policy in a small open economy where households set real wage in a staggered fashion. The introduction of real wage rigidities plays a important role to resolve main shortcomings of the standard new Keynesian small open economy model. The main findings regarding the issue of monetary policy design can be summarized as three fold. First, the optimal policy is to seek to minimize variance of domestic price inflation, real wage inflation, and the output gap if both domestic price and real wage are sticky. Second, controlling CPI inflation directly or indirectly induces relatively large volatility in output gap and other inflations. Therefore, both CPI inflation-based Taylor rule and nominal wage-inflation based Taylor rule are suboptimal. Last, a policy that responds to a real wage inflation is most desirable.

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1. Introduction

The dynamic stochastic general equilibrium (DSGE) model with sticky prices and monopolistic competition has become the workhorse for analysis of monetary policy in both the closed and open economy set up. The model, known as new Keynesian (NK), however, has been subject to several criticisms. One of the criticisms advanced against the NK model is its inability to generate inflation persistence beyond that inherited from the output gap, property which has been called 'persistence puzzle'. Another criticism is that the NK model produces unrealistic trade-off between stabilizing inflation and output gap. In the NK model, stabilizing inflation is equivalent to stabilizing the welfare-relevant output gap. Blanchard and Galí (2007) refers to this property as 'the divine coincidence'. The recent studies argue that the average price durations implied by the estimated new Keynesian Phillips curve is relatively higher than the estimated average frequencies of price adjustment based on micro data (Blis and Klenow, 2004; Klenow and Kryvtsov, 2008). Altig et al. (2011) refer to this divergence as the 'micro-macro pricing conflict'.

In an insightful paper, Blanchard and Galí (2007) suggest that the introduction of real wage rigidities overcomes an empirical weakness of the standard NK model, its lack of inflation inertia and restores realistic non-trivial trade-off between

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stabilizing inflation and stabilizing output gap. Woodford (2005) and Altig et al. (2011) also point out that the 'micro-macro pricing conflict' is mainly due to the absence of the real rigidities in standard the NK model. Therefore, the introduction of real wage rigidities may be useful to overcome shortcomings of the standard NK model.

The sizable body of literature identifies the existence of real wage rigidities in different countries. This work employs microeconomic date from surveys on individual wages to measure the frequency with which wages adjust. The increasing availability of individual and firm–level data with relatively accurate information on individual wages induces a flourishing of empirical literature assessing the extent of downward wage rigidities in different countries and periods. The International Wage Flexibility Project (IWFP), a consortium of over 40 researchers with access to individual workers earnings data for 15 European countries and the United state, showed that in many (mostly European) wage change distributions there are asymmetries around the expected rate of inflation, rather than at zero wage changes (Dickens et al., 2007). This was interpreted as evidence of downward real wage rigidity. Other studies also have found evidence for considerable downward real wage rigidities for job stayers in a number of OECD countries. Barwell and Schweitzer (2007) show that real rigidities in wage setting are more prevalent than nominal rigidities in Great Britain during 1978–1998. Bauer et al. (2007) using individual level data for the period 1975–2001 from West Germany argue that 60% of wage changes are affected by real wage rigidity.

The small open economy version of the NK model (Clarida et al., 2002; Galí and Monacelli, 2005) also leads to a controversial policy recommendation. The staggered price-setting in the small open economy NK model makes CPI inflation disappear from any of the structural equations. Therefore, monetary policy targeting CPI inflation is not optimal for a small open economy. But all real world inflation targeting countries, which are open economies, target CPI inflation (Svensson, 2000). Therefore, it is necessary to reconsider the description of the inflation dynamics and policy implications of the standard NK small open economy model. We believe that the staggered real wage-setting can relates CPI inflation directly to other relevant inflation dynamics. Therefore, CPI inflation reappears in the model's structural equations.

The main objective of the study is to provide a theoretical analysis of optimal monetary policy in a small open economy within a model that incorporates real wage rigidities. The introduction of real wage rigidities into the standard NK small open economy model become key to resolving the shortcomings of the model addressed above.

There is a large and growing literature of optimal monetary policy in a small open economy under the dynamic stochastic general equilibrium (DSGE) model with sticky prices and monopolistic competition.[2] While some studies show that optimal policy in a small open economy can be "isomorphic" to the one in a closed economy, and suggest that central bank should react to solely to fluctuations in domestic output and inflation (Benigno and Benigno, 2006; Clarida et al., 2002; Galí and Monacelli, 2005; Kollmann, 2002), other contributions argue that in the presence of incomplete pass-through, arising from local currency pricing, optimal monetary policy should consider the stabilization of exchange rate and CPI inflation (Corsetti and Pesenti, 2005; Devereux and Engel, 2003). Other studies have stressed that in a stochastic two-country environment, the terms of trade externality crucial role in the welfare and policy evaluation (see, for example, Benigno and Benigno, 2003; Obstfeld and Rogoff, 1998; Corsetti and Pesenti, 2001). De Paoli (2009) shows that in the presence of terms of trade externality, optimal policy leads to stabilization of domestic inflation, output gap and real exchange rate. In a voluminous literature on optimal monetary policy in open economies, little of that analysis pays attention to the existence of real rigidities, and does not consider the implication of real rigidities in monetary policy design.

The goal of this paper is to analyze the role of the real wage rigidities in the design of optimal monetary policy rule for a small open economy. On the theoretical front, we want to provide a microfoundation for real wage rigidity, and their implications for optimal monetary policy in a small open economy. In order to that, we employ the Calvo specification to incorporate real wage rigidities into the standard new Keynesian small open economy model. The goods market side of the model is similar in structure to the one developed in Galí and Monacelli (2005). We, however, modify the labor market following Erceg et al. (2000) where monopolistically competitive households set real wages in staggered fashion. We also derive a second-order approximation to the average welfare losses experienced by households with real wage rigidity. The resulting welfare function can be expressed in terms of the unconditional variances of the output gap, domestic price inflation, and real wage inflation. Then the optimal policy should seek to minimize a weighted average of these variances. As a result, a fully stabilizing domestic price inflation, which is optimal for the standard new Keynesian small open economy model, is no longer an optimal policy. Instead, the central bank should stabilize both domestic inflation and real wage inflation in addition to the output gap.

On the practical front, we discuss how the presence of real wage rigidity influences the economy's response to a monetary policy shock. In order to explore the role of real wage rigidities, we consider three alternative cases. The first case corresponds to an economy in which real wage is sticky due to a staggered contract. The nominal wage rigidity is considered in the second case. In the last case, we consider the economy with fully flexible wages. Surprisingly, we find that the dynamic responses are similar between three cases. Especially, the movement of key variables are very close under the two forms of wage rigidities (nominal and real). The critical element that distinguishes real wage rigidity from nominal wage rigidity (or from flexible wage) is the behavior of the real wage rate.

We also employ our framework to analyze welfare implications of alternative policy rules. In addition to the optimal rule, four different simple rules are studied. The first rule, which is referred to as a domestic inflation-based Taylor rule, requires that the domestic interest rate responds systematically to domestic inflation, whereas the second assumes that the domestic

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