



Search and matching frictions and optimal monetary policy[☆]

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ABSTRACT

A recent literature has merged the New Keynesian and the search and matching frameworks, which has allowed the former to analyze the joint dynamics of unemployment and inflation. This paper analyzes optimal monetary policy in this kind of hybrid framework. I show that zero inflation is optimal when all wages are Nash bargained in every period and the economy's steady state is efficient. In the more realistic case in which nominal wage bargaining is staggered, a case against price stability arises: in response to real shocks, the central bank should use price inflation so as to avoid excessive unemployment volatility and excessive dispersion in hiring rates. For a plausible calibration, the welfare loss under the zero inflation policy is about three times as large as under the optimal policy.

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1. Introduction

The search and matching paradigm has become a powerful tool for the analysis of unemployment and the labor market.¹ It is able to accommodate a wide range of labor market policies and analyze their long-run effect on unemployment and wages. When incorporated into otherwise standard real business cycle (RBC) models, it has been shown to improve significantly their empirical performance.² More importantly, it allows to analyze the cyclical behavior of unemployment, vacancies and job flows, important phenomena which general equilibrium models based on Walrasian labor markets are not designed to address.

Parallel to this literature, the New Keynesian model has emerged as the standard model of the monetary transmission mechanism. In its simplest version, the New Keynesian model incorporates monopolistic competition and staggered price setting into the standard RBC model. Because it is based on optimizing behavior, it allows for rigorous welfare analysis of alternative monetary policy rules. This, together with its simplicity, has allowed the model to become the workhorse for the analysis of optimal monetary policy.³ However, its assumption of Walrasian labor markets (inherited from the RBC

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¹ For a simple analysis of the search and matching model, see Pissarides (2000, Chapter 1).

² See Merz (1995), Andolfatto (1996), Den Haan et al. (2000) and Gertler and Trigari (2006).

³ See Clarida et al. (1999), Goodfriend and King (2001) and Woodford (2003) for extensive analyses of optimal monetary policy in New Keynesian models.

model) means that it is unable to say anything about unemployment. This is somewhat surprising, given that central banks have traditionally been concerned with the joint dynamics of unemployment and inflation, i.e. the Phillips curve.

The last few years have witnessed the integration of both frameworks.⁴ This literature, however, has focused on the positive implications of this integration, i.e. how search and matching frictions affect the empirical performance of the New Keynesian model. In this paper, I address a different but equally important question within this hybrid framework: the analysis of optimal monetary policy.

With this aim, I construct a model economy where the presence of search frictions in the labor market prevents some unemployed workers from finding jobs and some vacancies from being filled. The flow of meetings between job-seekers and vacancies is given by the so-called matching function. Aggregate hiring by firms determines the dynamics of unemployment. Inside each firm, the management and the workers bargain over wages and hours per worker. Finally, prices are set in a staggered fashion.

First I analyze the benchmark case in which all wages in the economy are Nash-bargained in every period. I refer to this as the flexible-wage equilibrium. In this case, and provided the economy's steady state is efficient, the central bank can implement the efficient equilibrium by keeping the price level constant. This way, it can eliminate the distortionary effects of price staggering, because those firms that cannot reset prices would not want to change them anyway. This result can be thought of as a 'case for price stability', in the sense that it requires price level constancy even in response to real shocks.⁵

Perfect wage flexibility, however, is not a realistic assumption. In most industrialized economies, nominal wages typically remain fixed for several periods and adjust in a staggered fashion.⁶ Therefore, I also analyze the more relevant case of staggered nominal wage bargaining, i.e. in each period only a fraction of firms renegotiate nominal wages with their employees.⁷ In response to real shocks, the failure of some nominal wages to adjust creates two kinds of distortions. First, the resulting rigidity in average real wages translates into inefficient job creation and therefore inefficient unemployment fluctuations. Second, the ensuing wage dispersion across firms leads to inefficient dispersion in hiring rates. The zero inflation policy is no longer optimal for the following reason. By controlling the inflation rate, the central bank has leverage over the real value of nominal wages. Under the optimal policy commitment, the central bank uses price inflation so as to bring real wages closer to their flexible-wage levels. This reduces the two distortions arising from nominal wage staggering. First, the greater flexibility in real wages reduces the distortion in the unemployment path. Second, since actual wages are closer to their flexible-wage targets, nominal wages in renegotiating firms adjust by less, which reduces wage dispersion. For a plausible calibration of the model, the welfare loss under the zero inflation policy is approximately three times as large as under the optimal commitment. This result suggests the existence of a case *against* strict price stability as the only goal of monetary policy.

Previous research in the New Keynesian tradition emphasized the existence of a similar case against price stability in the presence of both price and wage staggering (see Erceg et al., 2000). Relative to this line of research, the current framework offers an important theoretical advantage. As is well known, (New) Keynesian models of wage stickiness are subject to the following criticism due to Barro (1977). Given the ongoing nature of most employment relationships, we would expect employers and employees to neutralize any distortionary effects of wage stickiness. Therefore, the case against price stability motivated by wage stickiness would be based on the imposition of arbitrary inefficiencies on existing jobs. By introducing search frictions, I can analyze the distortionary effects of nominal wage staggering in a way that respects the private efficiency of employment relationships. On the one hand, search frictions create a bargaining set between employer and employee; even if the nominal wage is sticky, as long as it remains inside this bargaining set it does not affect the continuity of the match.⁸ On the other hand, hours per employee are determined efficiently, i.e. by maximizing the joint surplus of the match, which is itself independent of the wage. Therefore, while nominal wage staggering distorts the rate at which employment relationships are formed, it does not distort existing relationships. In other words, the case against price stability presented here is immune to Barro's critique.

Search frictions and the efficiency of employment relationships also have important policy implications that differ from the standard New Keynesian analysis. In the Erceg et al. (2000) model of monopolistic competition in both labor and goods markets, closing the output gap (i.e. the gap between actual output and its flexible-price-and-wage level) is nearly optimal for any degree of price and wage staggering.⁹ This result stems from the symmetry between labor and goods markets, and the existence of similar inefficiencies in both markets. Search frictions introduce an explicit distinction between employment and hours per employee. The same frictions imply that in the short run firms adjust output by adjusting hours per employee; therefore, conditional on the employment stock, closing the output gap is equivalent to stabilizing hours per worker. Under bilateral efficiency, hours per worker may be distorted by price staggering but *not* by wage staggering. As a

⁴ See Cheron and Langot (2000), Walsh (2003b, 2005), Trigari (2005, 2006), Moyen and Sahuc (2005), Christoffel and Linzert (2005), Domenech et al. (2006) and Krause and Lubik (2007). Cooley and Quadrini (1999) used a limited participation model of money, rather than a model of price rigidities.

⁵ Goodfriend and King (2001) and Woodford (2003, Chapter 6) emphasized the existence of a case for price stability in the presence of perfectly competitive labor markets.

⁶ See Taylor (1999) and the references therein.

⁷ Gertler and Trigari (2006) have introduced staggered bargaining of real wages in a RBC framework with search and matching frictions, with the aim of reconciling the smooth cyclical behavior of real wages with the high volatility of labor market activity in the US.

⁸ Hall (2005) first emphasized the privately efficient nature of wage stickiness in this framework.

⁹ Woodford (2003, Chapter 6) first noticed this implication of the Erceg et al. (2000) model.

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