Flexible inflation targeting and labor market inefficiencies ☆

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A B S T R A C T

Do congestion externalities offer a reason to depart from complete price stability as the only goal of monetary policy in a New Keynesian model featuring search frictions, and under what conditions is the welfare cost of labor-market distortions sizable? This paper tries to answer these questions by deriving a linear quadratic framework for optimal monetary policy analysis – ala Benigno and Woodford (2005) – that is consistent with a Pareto inefficient labor market allocation, where the Hosios (1990) condition is not satisfied, and as a consequence, the flexible-price steady state of the model is distorted. The results indicate that maximization of expected utility of the representative household is equivalent to minimizing a quadratic loss function that consists of inflation, and two appropriately defined gaps involving unemployment and labor market tightness; and that search externalities give rise to an endogenous cost-push term in the New Keynesian Phillips Curve. Hence, full stabilization of both inflation and the welfare relevant unemployment gap is not feasible and deviation from complete price stability is welfare improving (because it allows to contain inefficient unemployment fluctuations). The inflation-unemployment trade-off and the welfare cost of search externalities are shown to be quantitatively sizable in response to shocks when steady state distortions are large and thereby the cost-push term is more volatile over the business cycle. Finally, a monetary policy rule that responds to unemployment growth rate is presented to be more efficient than a rule responding to unemployment gap.

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1. Introduction

What are the consequences of labor market inefficiencies for the conduct of optimal monetary policy in New Keynesian (NK) models featuring non-Walrasian labor markets? Do search frictions (in the absence of other labor market distortions) suggest a case against full inflation stabilization, and under what conditions is the welfare cost of labor-market distortions sizable? This paper tries to answer these questions in a New Keynesian framework featuring search frictions: by deriving a linear quadratic model for optimal policy analysis that is consistent with a Pareto inefficient labor market allocation where the Hosios (1990) condition is not satisfied, hence, the wage setting is inefficient, and as a consequence, the flexible price steady state of the model is distorted.[1] As a result, derivation of the quadratic approximation to welfare follows the approach of Benigno and Woodford (2005).

Most of the existing papers in the literature (surveyed in Section 2) maintain the Hosios parameter configuration and conduct the optimal monetary policy analysis by coupling search frictions with other labor market distortions – such as nominal wage stickiness, Thomas (2008), real wage rigidity, Blanchard and Galí (2010), and distorted allocation between market and home produced goods, Ravenna and Walsh, (2011) – making it difficult to assess whether and why deviations from price stability are desirable in the presence of search frictions. In contrast, this paper entirely and exclusively focuses on the implications for optimal monetary policy of search externalities. It also contributes to the literature by offering a route by which monetary policy might optimally respond to the unemployment rate, and more importantly the conditions that would make the welfare costs of a departure from complete price stability appealing. Finally, it uses a methodology – a Linear Quadratic (LQ) approach – that has the potential to make the analysis transparent, by explicitly tying the policy trade-offs to the distortions affecting the model economy, via structural parameters.

The main results of the paper can be summarized as follows: (i) the quadratic welfare objective can be written as a function of inflation and appropriately defined gaps in unemployment and labor market tightness; (ii) distortion in the wage setting mechanism results in an additional term in the inflation equation, which plays the same role as a cost-push shock in New Keynesian models with Walrasian labor markets; (iii) the endogenously-driven cost-push shock (which is also correlated with productivity disturbances and/or bargaining shocks) plays a different role for welfare when the steady state efficiency of

[1] Hosios (1990) shows that search externalities are balanced, and thereby labor market allocations (market tightness and unemployment) are Pareto efficient, when the bargaining power of workers equals the elasticity of the matching function with respect to vacancies.

the flexible price allocation is largely distorted. More specifically, congestion externalities suggest a case against complete price stability as the only goal of monetary policy and generate a trade-off between stabilizing inflation and reducing inefficient unemployment fluctuations.

To provide further intuition, when the bargaining power of workers is lower than the vacancy elasticity of the matching function (search inefficiencies exist), the stochastic *flexible price* equilibrium level of unemployment is larger than its *efficient* allocation, and there exists a cost-push term in the New Keynesian Phillips curve (even with zero random fluctuations in the relative bargaining power of firms). Productivity and/or bargaining shocks create a gap between the actual unemployment and its flexible price equilibrium as well as its social planner's allocation (first best). The policy maker can employ a zero inflation policy to achieve the flexible price equilibrium level of unemployment but not the first best (as complete price stability cannot ensure an efficient labor market allocation). The benevolent policy maker faces an unemployment-inflation trade-off because it can only steer firms' incentives to post vacancies toward the efficient level and reduce the inefficiently-high unemployment gap when there is some positive inflation. The optimal unemployment-inflation trade-off involves a welfare-relevant unemployment target that falls between the *flexible price* equilibrium and the *efficient* allocation — depending on the degree of steady state distortions.[2] Moreover, the cost-push shock, affected by productivity or bargaining shocks, can generate sizable welfare costs compared to the optimal policy under an efficient allocation, if deviations from the Hosios condition are large.

Nevertheless, price stability is found to deliver a level of welfare close to the one achieved under an optimal monetary policy in response to either productivity or bargaining shocks if steady state distortions are small. Furthermore, this paper shows that the welfare costs of policies that are optimal for a mis-specified objective function – used in some of the existing literature – could be as large as 0.05–0.08% of steady state consumption equivalents (conditional on a relatively volatile cost-push shock due to a largely distorted steady state). In line with the findings of Orphanides and Williams (2002), it is shown here that the so-called "difference rules" perform substantially better than an unemployment-gap rule or an inflation targeting rule in replicating the optimal monetary policy. When the labor market is subject to search frictions, the uncertainty about the target level of unemployment and its mismeasurement is higher, and as a consequence a rule that responds to the unemployment difference is superior to an unemployment gap rule.

The remainder of the paper is organized as follows: Section 2 provides a short literature review and discusses the contributions of this paper. Section 3 presents the basic model. Sections 4 describes the first best allocation as well as the flexible price equilibrium. The linear quadratic model is derived in Section 5. The main findings of the paper are presented in Section 6, where policy analysis is conducted under alternative parameterization. Finally, Section 7 summarizes the results, concludes, and proposes some possible extensions.

2. Literature review

Given the attractiveness of the non-Walrasian search and matching model of equilibrium unemployment, a growing number of papers have incorporated it into the standard New Keynesian framework to explore its implications for macro dynamics and/or optimal monetary policy. Examples include Blanchard and Galí (2010), Gertler et al. (2008), Gertler and Trigari (2009), Ravenna and Walsh (2011), Ravenna and Walsh (2012), Sala et al. (2008), Thomas (2008), Trigari (2009), Walsh (2003), and Walsh (2005). The NK model featuring search frictions consists mainly of three distortions: (i) monopolistic competition, (ii) staggered price setting, and (iii) congestion externalities which create inefficient labor market allocations under the flexible price equilibrium. The first two are present in a canonical NK approach to monetary policy analysis but the third one is absent due to the assumption of Walrasian labor markets. In a simple NK model without unemployment, it is possible to show that under certain assumptions,[3] an optimizing policy maker can implement the efficient (i.e., flexible price) allocation through a zero inflation (optimal) policy and does not face a trade-off between stabilization of inflation and reducing the gap between actual output and the flexible price level of output.

Blanchard and Galí (2010), Ravenna and Walsh (2011), and Thomas (2008) extend the monetary policy analysis to NK models featuring search and matching frictions. They abstract from congestion externalities (by imposing the Hosios parameter configuration), and focus on policy implications of other labor market distortions that render the wage setting process inefficient, notably real wage rigidity, inefficient allocation of time between market and home production of goods, and nominal wage stickiness, respectively. Because of the wage adjustment constraints, strict inflation stabilization is shown to be sub-optimal as it leads to inefficient unemployment fluctuations in response to exogenous shocks. The optimal policies in these papers are obtained using the linear quadratic (LQ) method of Benigno and Woodford (2003) and Woodford (2003), which consists of linear structural equations and quadratic loss functions. However, for the LQ approach to provide correct welfare ranking, all of them assume an efficient flexible price steady state by maintaining the Hosios condition.[4] Ravenna and Walsh (2011) move a step further, and show that random deviations from efficient wage setting (the Hosios condition) in the form of bargaining shocks can generate policy trade-offs between stabilizing inflation and real activity.

In contrast, this paper focuses on the implications for optimal monetary policy of search externalities (implying a distorted flexible price steady state) even in the absence of other labor market distortions maintained in the literature. Benigno and Woodford (2005) show that the Linear Quadratic (LQ) approach to the optimal policy problem can preserve correct welfare ranking even when the flexible price steady state is distorted to an arbitrary extent if second order approximations are taken to the model structural relations (specifically, to the New Keynesian Phillips Curve). Making use of such a general approach, this paper obtains a welfare-theoretic loss function that consists of inflation, and two appropriately defined gaps involving unemployment and labor market tightness as well as a simple and intuitive log-linear representation of the model's equilibrium dynamics in these three variables. The resulting model-driven welfare criterion differs significantly from those obtained in Ravenna and Walsh (2011), and Thomas (2008) because the degree of distortion of the flexible price steady state, owing to search externalities, affects the weights on the stabilization objectives of the policy maker in the loss function as well as the policy targets. The coefficients in the quadratic approximation depend on the underlying structural parameters of the model that govern preferences, the degree of nominal price rigidity, and the search and bargaining processes in the labor market. They also depend on the steady state values of the variables under the flexible price equilibrium and the first-best allocation. Furthermore, the policy targets are linear combinations of flexible price equilibrium and Pareto efficient allocation, and depend critically on the strength of steady state distortions. As inefficiencies in labor market rises, inflation volatility cost of achieving the first-best equilibrium unemployment becomes much larger (as monetary policy is required to loosen significantly) and hence the welfare-relevant policy targets will be chosen between the flexible

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[2] Note that bargaining shocks can always create an unemployment-inflation trade-off (no matter whether the Hosios condition is satisfied or not) but the welfare criterion is different when the steady state of the model is distorted; in which case the policy maker chooses to significantly exploit that trade-off.

[3] The existence of an output subsidy that offsets the distortion due to the market power of monopolistically competitive price-setters is essential. With this assumption, the steady state under a zero-inflation policy involves an efficient level of output.

[4] Labor market efficiency ensures that the flexible price equilibrium is exactly the same as the social planner's allocation.