



## Monetary policy and labor market frictions: A tax interpretation

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### ABSTRACT

Replicating the flexible price allocation in models with nominal rigidities and labor market frictions that lead to an inefficient matching of unemployed workers with job vacancies, even if feasible, is generally not desirable. We characterize the tax instruments that implement the first best allocation and examine the trade-offs faced by monetary policy if these tax instruments are unavailable. Our tax interpretation helps explain why the welfare cost of inefficient labor market search can be large while the incentive to deviate from price stability is small. Gains from deviating from price stability are larger in economies with more volatile labor flows.

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### 1. Introduction

The existence of real distortions in models with nominal rigidities – such as markup shocks in the baseline new Keynesian model – implies that even if replicating the flexible price allocation is feasible, doing so is generally not desirable. In a model with search and matching in the labor market, [Ravenna and Walsh \(2011\)](#) show that random deviations from efficient wage setting play the same role as markup shocks in standard new Keynesian models with Walrasian labor markets. Thus, search frictions endogenously generate a trade-off between using monetary policy to address the inefficiency due to staggered price adjustment and using it to offset deviations from efficient wage setting. Yet in several calibrated versions of the basic search and matching new Keynesian model (e.g., [Ravenna and Walsh, 2011](#); [Faia, 2008](#); [Thomas, 2008](#)), the level of welfare attained by optimal monetary policy appears to deviate very little from the level achieved under a policy of price stability.

Why is price stability close to optimal even when labor market distortions are present? This is a question the existing literature has failed to answer clearly, yet the answer is important for understanding whether monetary policy should attempt to correct inefficient labor outcomes, and if so, under what circumstances it should.

We address this question in the present paper by employing a model characterized by sticky prices and search and matching frictions in the labor market, where distortions in wage and price setting result in wedges between the first order conditions in the distorted economy and the corresponding conditions in the efficient competitive equilibrium. Each wedge can be corrected by an appropriately designed tax, but with multiple distortions, multiple tax instruments are needed to implement the first best allocation. It is not surprising therefore that the single instrument of monetary policy is unable to replicate the first best allocation. However, understanding how tax instruments would need to move to achieve the first best allocation gives insight into how the different distortions affect the trade-offs faced by the monetary authority.

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By deviating from price stability, monetary policy moves markups, which in turn simultaneously affect *all* the efficiency wedges in the economy. The markup in the final-goods producing sector affects the incentive for firms to post job vacancies, the equilibrium choice of hours per employed worker, and the marginal cost of firms setting retail prices. If labor matching is inefficient, monetary policy can move markups to eliminate the efficiency wedge in the vacancy posting condition but doing so distorts the choice of hours per employed worker. Thus, deviating from price stability can lessen one distortion but it simultaneously introduces a new distortion.

Nevertheless, price stability is found to deliver a level of welfare close to the level achieved under an optimal monetary policy. This is true, not because the search and matching inefficiency causes negligible welfare losses, but because monetary policy is not the appropriate instrument to address this inefficiency. For reasonable model parameterizations, the welfare gap between the first best and the flexible price allocations is large, so there is ample potential to improve on the flexible price allocation. However, monetary policy is able to close only a small fraction of this welfare gap by deviating from price stability.

This outcome depends on the nature of the distortion in the wage-setting process. When wages are Nash-bargained but do not satisfy the Hosios (1990) condition for efficiency, the optimal tax that corrects for inefficient hiring by firms is large in the steady state but displays very little volatility over the business cycle. This finding is basically a reflection of the Shimer puzzle (Shimer, 2005); Nash bargaining generates small volatility of labor market variables. The low volatility of the optimal tax implies that, if monetary policy is used to replicate the effects of the optimal tax policy to correct inefficiencies in hiring decisions, deviations from price stability would be small. In contrast, when wages are fixed at a wage norm, the optimal tax that corrects inefficiencies in hiring is small in the steady state but very volatile over the business cycle. A monetary policy that attempts to address hiring inefficiencies would, in this case, need to let markups fluctuate significantly to replicate the optimal tax policy. Such a policy would widen the inefficiency wedge in the choice of hours worked as well as increase relative price dispersion. Thus the monetary authority faces a very unfavorable trade-off, and a policy of price stability does nearly as well as the optimal policy.

We investigate the sensitivity of our conclusions to the parameterization of labor market flows. In our parameterization based on US data, the improvement achieved under optimal monetary policy when the wage is fixed at a wage norm far from the efficient steady state represents only a small fraction of the welfare loss due to labor market inefficiencies. Yet this improvement is not negligible in absolute terms, amounting to about two tenths of a percentage point of the representative household's expected consumption stream. Under an alternative parameterization that yields a higher unemployment duration and smaller gross labor flows, in line with empirical evidence from some EU countries, the welfare improvement from optimal monetary policy relative to price stability is negligible, both as a share of the loss due to labor market inefficiencies and in absolute terms. Thus, when the matching efficiency is lower and hiring costs higher as under the EU calibration, there is virtually no incentive for the monetary authority to focus on the labor market and deviate from price stability. This result has implications for the role of unemployment in monetary policy design in the US and Europe and suggests that price stability is closer to optimal with less flexible labor markets.

Our paper is related to several important contributions in the literature. Khan et al. (2003) discuss optimal monetary policy in an economy with staggered price setting and multiple distortions, finding that the optimal policy does not result in large deviations from the flexible price allocation, but they do not investigate the tax policy that replicates the first best. Our approach is closer to the one used in Chari et al. (2007), who discuss how to represent deviations from a prototype growth model caused by inefficient frictions as wedges in the first order conditions. A growing number of papers have incorporated search and matching frictions into new Keynesian models.<sup>1</sup> Blanchard and Galí (2010), like Ravenna and Walsh (2008, 2011), derive a linear Phillips curve relating unemployment and inflation in models with labor frictions. These papers explore the implications of labor frictions for optimal monetary policy. However, they both restrict their attention to a linear-quadratic framework in which the steady state is efficient. In a related model, Faia (2008) finds that the welfare gains from deviating from price stability are small regardless of whether the steady state is efficient. Compared to Ravenna and Walsh (2011), our model allows for both an extensive employment and an intensive hours margin and maps the objectives the monetary authority has to trade off into a set of taxes that would replicate the first best, with each tax correcting a specific inefficiency.

The paper is organized as follows. Section 2 develops the basic model. Section 3 describes the tax policy that would achieve the efficient equilibrium, and relates taxes and markups to identify the trade-offs for the monetary authority. The welfare consequences of monetary policy are explored in Section 4, while conclusions are summarized in the final section.

## 2. The economy

The model consists of households whose utility depends on leisure and the consumption of market and home produced goods. As in Mortensen and Pissarides (1994) household members are either employed (in a match) or searching for a new match. Households are employed by firms producing intermediate goods that are sold in a competitive market.

<sup>1</sup> See, for example, Walsh (2003, 2005), Thomas (2008), Faia (2008, 2009), Gertler and Trigari (2009), Blanchard and Galí (2010), and Ravenna and Walsh (2011).

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