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Optimal monetary policy with imperfect unemployment insurance

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ABSTRACT

We consider an efficiency-wage model with the Calvo-type sticky prices and analyze the optimal monetary policy when the unemployment insurance is not perfect. With imperfect risk sharing, the strict zero-inflation policy is no longer optimal even when the zero-inflation steady-state equilibrium is made (conditionally) efficient. Quantitative results depend on how the idiosyncratic earning loss due to unemployment varies over business cycles. If the idiosyncratic income loss is acyclical, the optimal policy differs very little from the zero-inflation policy. However, if it varies countercyclically, as evidence suggests, the deviation of the optimal policy from the complete price-level stabilization becomes quantitatively significant. Furthermore, the optimal policy in such a case involves stabilization of output to a much larger extent.

1. Introduction

There is a growing literature on optimal monetary policy based on the dynamic stochastic general equilibrium framework with imperfect competition and staggered price-setting. Its simplest version has two types of distortions: relative-price distortions due to staggered price-setting and distortions associated with imperfect competition (market power). As discussed by Goodfriend and King (1997), Rotemberg and Woodford (1997) and Woodford (2003), if fiscal policy is used to offset the distortions caused by market power, then the optimal monetary policy is characterized as complete stabilization of the price level. Intuition is very simple: without distortions due to market power, the flexible-price equilibrium becomes efficient, which, in turn, can be attained by the zero-inflation policy.[1] It is the price level that has to be stabilized, but not the level of output.[2] As long as the inflation rate is kept at zero, any fluctuations in output would be efficient.

The basic model has been extended in several directions. For instance, Benigno and Woodford (2003, 2005) and Khan et al. (2003) consider the case where distortions due to market power are present. Schmitt-Grohé and Uribe (2005) extend the analysis further, by studying a even richer model, based on Christiano et al. (2005). The existing research on this literature, however, has restricted attention to complete-markets (representative-agent) models. In this paper we are interested to see the extent to which the nature of optimal monetary policy is affected by the presence of unemployment

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[1] Note that this argument assumes that initial price dispersion is nil (or "small" if we are interested in a first-order approximation of optimal monetary policy). See Yun (2005) on this point.

[2] What is stabilized is the "output gap," which is defined as the difference between the actual level of output and the efficient level of output.

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when unemployment insurance is not perfect. In particular, we would like to examine whether or not the existence of imperfectly insured unemployed workers calls for more output stabilization.

For this purpose, we bring unemployment into the basic sticky-price model, building on the efficiency-wage model of Alexopoulos (2004). The model has a representative household with a continuum of individual members. In each period, each member is either employed or unemployed. An employed worker may or may not shirk. A detected shirker will be punished by an exogenous reduction in the wage payment.[3] Firms determine the wage rate so that no workers would shirk in equilibrium. An important assumption that makes the model tractable is that individual members of a household are not allowed to participate in the asset market; it is the household that makes all the decisions related to savings. Due to this assumption, we are able to use the representative-household framework even though the unemployment insurance is not perfect. The rest of the model is similar to the basic sticky-price model of Woodford (2003).

We analyze optimal monetary policy using the linear-quadratic approach developed by Rotemberg and Woodford (1997), Woodford (2003), and Benigno and Woodford (2003, 2005). To focus on the effect of imperfect unemployment insurance on stabilization policy, we mostly assume that fiscal policy is used to make the zero-inflation steady-state conditionally efficient. It follows that with perfect insurance the flexible-price equilibrium is efficient so that the complete price-level stabilization is the optimal policy. This is not true with imperfect insurance, so that the optimal policy would involve some fluctuations in the inflation rate. Our qualitative analysis shows that a government-purchase shock is a negative cost-push shock, while a productivity shock is a positive one. That is, optimal policy should generate some deflation (inflation) when there is an exogenous increase in government purchases (productivity).

But, quantitatively, how large is the deviation of the optimal policy from the complete price-level stabilization? The answer crucially depends on how idiosyncratic income shocks vary over business cycles. Specifically, what matters is how the relative income of the unemployed to that of the employed varies over business cycle. We say that idiosyncratic income losses are acyclical if the relative income of the unemployed is constant over business cycles and countercyclical if it varies procyclically. We begin with the case where the relative income of the unemployed is constant over business cycles. In this case, although the complete price-level stabilization is not exactly optimal with imperfect insurance, the optimal policy differs very little from it. Thus, as long as idiosyncratic income losses are acyclical, the optimal policy essentially takes the form of the complete price-level stabilization. This is so even though the unemployment rate goes up in a recession.

Evidence seems to suggest, however, that idiosyncratic shocks are countercyclical. In particular, earning losses of unemployed or displaced workers are found to be countercyclical (e.g., Jacobson et al., 1993). To take it into account, our second numerical exercise assumes that the relative income of the unemployed varies procyclically over business cycles. In this case, the deviation of the optimal policy from the zero-inflation policy becomes much larger. Furthermore, the optimal policy under countercyclical idiosyncratic income losses involves stabilization of the level of output, much more so compared to the case where idiosyncratic income losses are acyclical. Intuition is simple: if a bad shock to the economy worsens uninsured idiosyncratic shocks and makes the unemployed more miserable, policy should respond to reduce the number of unemployment, which is to increase the level of output.

Our numerical exercise suggests that the mere existence of imperfectly insured unemployed workers may not justify output stabilization, for which there need to be systematic variation in the idiosyncratic risk over business cycles. An important limitation of our model is that idiosyncratic shocks are purely transitory. Evidence such as Storesletten et al. (2004) suggests, however, that idiosyncratic shocks are highly persistent as well as countercyclical. Based on a non-monetary growth model, Krebs (2007) demonstrates that the welfare cost of business cycles can be sizable with such idiosyncratic shocks. Analyzing optimal policy with persistent idiosyncratic shocks is left for future research.

This paper is organized as follows. In Section 2 the model economy is described. In Section 3 the efficient allocation and the flexible-price equilibrium are discussed. In Section 4 a linear-quadratic approximation of the model is derived. In Section 5 optimal monetary policy is examined in the case where the degree of risk sharing is constant over business cycles. Section 6 considers the case where the degree of risk sharing fluctuates cyclically. There, we also extend our analysis to the case where the non-stochastic steady state is inefficient. Concluding remarks are in Section 7.

2. The model economy

In this section we describe our model economy. Its key features are staggered price setting and unemployment. Our model builds on Woodford (2003) for the former and the efficiency-wage model of Alexopoulos (2004) for the latter. Alexopoulos's model differs from the well known model of Shapiro and Stiglitz (1984) in that a detected shirker is punished by a reduction in the wage rate, rather than by getting fired. Nevertheless, as discussed in Appendix, it becomes observationally equivalent to the Shapiro–Stiglitz model with a particular unemployment insurance program. Indeed, we find it very convenient that Alexopoulos's model can be made observationally equivalent to the standard indivisible-labor model of Hansen (1985) and Rogerson (1988), or to the Shapiro–Stiglitz model, depending on the assumed unemployment insurance program.

[3] A relation with the model of Shapiro and Stiglitz (1984) is discussed in Appendix.