



# Sectoral labor adjustment and monetary policy in a small open economy

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## ABSTRACT

This paper studies the welfare implications of sectoral labor adjustment cost in a two-sector small open economy model with sticky prices. We find that, when the economy faces external shocks, if monetary policy can stabilize the real economy, then sectoral labor market adjustment cost will lead to welfare loss. However, if monetary policy such as fixed exchange rates cannot stabilize real variables, then some degree of labor market friction will improve welfare instead and the gain will be significant. As a result, the welfare gap between flexible exchange rates and fixed exchange rates decreases with sectoral labor market friction. This is because the friction can offset some of the nominal rigidity and become a substitute for monetary policy to stabilize the real economy.

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## 1. Introduction

Recently, the framework of two-sector small open economy model has been extensively used to study monetary policy and welfare for small open economies. For example, [Devereux et al. \(2006\)](#) compare alternative monetary policies for an emerging market economy that experiences external shocks in a two-sector small open economy. [Ortega and Rebei \(2006\)](#) investigate the welfare properties of different monetary rules in an estimated two-sector small open economy, and find that a substantial welfare gain is made from targeting sectoral rather than aggregate inflation.

However, the literature of two-sector small open economy model usually assumes domestic resource allocation is costless. That is, labor or capital is perfectly mobile across sectors. This prevalent assumption overlooks some important consequences of the friction in sectoral resource reallocation. For instance, [Morshed and Turnovsky \(2004\)](#) develop a two-sector model with sectoral capital adjustment cost. They show that the cost has important consequences for the dynamics of capital accumulation, particularly for real exchange rate dynamics. Nevertheless, the impact of sectoral labor market friction,<sup>1</sup> especially its welfare implications, are not well studied in the literature. As pointed out by [García-Cebro and Varela-Santamaria \(2009\)](#), there are many factors which may result in imperfect mobility between sectors. If the spatial distribution of sectors is considered, then the physical process of labor reallocation may absorb resource; also, human capital or skill of workers may be sector-specific. Thus, training(or learning) cost may occur when the workers switch to a new sector. For example, when a worker switches from an auto company in Detroit to an IT company in Los Angeles, he/she needs to pay moving cost, learning cost, and other costs due to the changes in the nature of work. To explore this issue, we construct a two-sector model of a small

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<sup>1</sup> [Ju and Wei \(2007\)](#) argue that the domestic labor market friction is important for the current account adjustment in a multiple tradeable sectors model.

open economy, which is closely related to [Devereux et al. \(2006\)](#). The main feature of our model is that we assume that sectoral labor reallocation involves adjustment cost, expressed as resource lost in the adjustment process.<sup>2</sup>

Our model shows that the presence of sectoral labor adjustment cost does not affect the welfare ranking of monetary policies. However, the welfare consequence of labor market friction depends critically on the nature of monetary policy rules. For example, if a monetary rule that can stabilize real economy is chosen, such as a non-traded goods price targeting (NTP) rule, then there is a small welfare loss caused by the presence of sectoral adjustment cost. However, if a policy rule that cannot stabilize the real economy is given, such as a fixed exchange rate rule, then the presence of labor market friction will lead to welfare gain instead and this gain will be significant, approximately 0.15% steady state consumption.

What causes the difference? Intuitively, this is due to the nature of monetary policy rules. In general, if there is no sectoral labor adjustment cost and no output-stabilizing policy, then sectoral output, employment, and capital could be very volatile. As a result, the aggregate output, consumption, and employment will be volatile. The over-fluctuation of real variables is inefficient. Therefore, the presence of labor adjustment cost will hinder this inefficient labor movement across sectors, which leads to welfare gain. In a sense, sectoral adjustment cost actually plays a substitute role in stabilizing the real economy when there is lack of output-stabilizing monetary policies. This is because the labor market friction can offset the friction caused by nominal rigidities. However, if an output-stabilizing rule exists, such as the NTP rule, then the economy responds in a manner equivalent to that of a fully flexible price economy. The fluctuation of real variables is small, so is the labor movement across sectors. This means that the benefit of stabilizing the sectoral output will be small. Due to the resource loss, the welfare cost of introducing labor adjustment cost will still exist. In such a case, nominal rigidities are fully eliminated by monetary policy and the benefit of labor market friction disappears. This finding has very important policy implication for small open economies under fixed exchange rate regimes. Under a fixed exchange rate regime, the economy cannot be insulated from external shocks. With perfect labor mobility, all real variables will be volatile, which reduces welfare. However, if we introduce a friction, such as sectoral labor adjustment cost or policies that can restrict domestic labor mobility, then the response of real sectoral variables to external shocks will be limited. This may improve welfare. Therefore, a policy that can reduce domestic mobility might be desirable for the developing economies, especially when the economy is constrained by fixed exchange rates.

Our paper is a variant of [Devereux et al. \(2006\)](#) with the introduction of sectoral labor adjustment cost. With respect to sectoral labor market friction, [Ju et al. \(2010\)](#) also use the same sectoral labor adjustment cost to model the labor market friction and study how it affects the current account adjustment in a multiple tradeable sectors model. In addition, [Kang \(2009\)](#) introduces the labor adjustment cost in a two-country model, and investigate the leading and lagging relationships in international business cycles. However, the labor adjustment cost occurs in the aggregate level, not in the adjustment process of the sectoral level. [Garcia-Cebro and Varela-Santamaria \(2009\)](#) study the role of imperfect intersectional labor mobility in the transmission mechanism of an unanticipated expansion to aggregate variables of a small open economy. In their model, the imperfect labor mobility is modeled as the imperfect substitution between sectoral labors, which leads to disutility when the households change the labor supply from one sector to another. [Cook and Xu \(2010\)](#) examine the regional labor mobility in a monetary union model. They also assume that labor is an imperfect substitute across regions and the household can develop a labor habit associated with working in a particular region.

This paper is organized as follows. Section 2 presents the basic model. Section 3 examines the dynamics of the economy. Section 4 analyzes the welfare implications of the presence of sectoral labor adjustment cost under different monetary rules. Section 5 concludes.

## 2. A two-sector sticky price model

In this section, we develop a two-sector sticky price small open economy model that builds on [Devereux et al. \(2006\)](#). There are three agents in the model: consumers, firms, and monetary authority. Firms in two sectors produce goods using labor and capital, and sell goods to domestic residents or foreign markets. The monetary authority sets nominal interest rates.

### 2.1. Household

The representative consumer has preferences given by

$$U = E_0 \sum_{t=0}^{\infty} \beta^t \left( \frac{C_t^{1-\sigma}}{1-\sigma} - \eta \frac{L_t^{1+\psi}}{1+\psi} \right), \quad (2.1)$$

where  $C_t$  is consumption, and  $L_t$  is labor supply. Consumption is a Cobb-Douglas function of consumption of non-traded goods and an import good, where  $C_t = \frac{1}{a^a(1-a)^{1-a}} C_{Nt}^a C_{Ft}^{1-a}$ . Hence, consumer price index is  $P_t = P_{Nt}^a P_{Ft}^{1-a}$ , with  $P_{Nt}$  ( $P_{Ft}$ ) defined

<sup>2</sup> The use of sectoral labor adjustment cost does not affect steady state. It only affects the dynamics of economy. However, if we model the intersectoral labor mobility as the imperfect substitution of sector labors as in [Garcia-Cebro and Varela-Santamaria \(2009\)](#), then the steady state is affected by the elasticity of substitution between labors, so is the welfare. Therefore, it is more difficult to do welfare comparison. Another advantage of using labor adjustment cost is that we can choose the parameters of labor adjustment cost to match the elasticity of substitution between sector labors.

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