



# Job-search and foreign capital inflow – A three-sector general equilibrium analysis<sup>☆</sup>



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## ABSTRACT

The purpose of this paper is to extend the Fields' (1989) multi-sector job-search model in a three-sector general equilibrium framework by introducing international trade and capital as input. The three sectors are the rural sector, the urban informal sector and the urban formal sector. The rural sector and the urban informal sector use one type of mobile capital while the urban formal sector uses a sector-specific capital. We find that the effects of an inflow of foreign capital in the urban formal sector on unemployment and social welfare crucially hinge on the relative factor intensities of the rural sector and the urban informal sector. We show that there is a possibility of trade-off between the government's twin objectives of improvement in social welfare and mitigation of the urban unemployment problem. These results are extremely crucial from the view point of policymaking in an unemployment plagued, low-income developing economy.

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## 1. Introduction

Job search is an essential part of the labor market in all economies whether developed or developing. It is often apprehended that the search process is most efficient when the worker is unemployed. Here, the cost of search is the income forgone from employment. Search unemployment exists because both jobs and workers are heterogeneous, and a mismatch can result between the characteristics of supply and demand. Originally, the search theory was formulated to analyze unemployment and later, it was extended to highlight many things like unemployment duration, job matching, on-the-job search, etc. The idea of job search has been incorporated in many theoretical models and the most important of which are those of McCall (1970), Fields (1975, 1989), Majumder (1975), Stark (1982), Adam and Cletus (1995), Postel-Vinay and Robin (2002), Juan et al. (2009), Hussey (2005), Sheng and Xu (2007), Flinn and Mabli (2008), Arseneau and Chugh (2009), Macit (2010), etc.

McCall (1970) first used the job search theory to analyze the decision making process of a jobseeker. Fields (1975) introduced on-the-job search from the agricultural sector into a two-sector Harris and Todaro (1970) type model with constant rural wage. In this model, he showed that the urban unemployment rate would be lower than what was predicted by the Harris and Todaro (1970) model. Fields (1989) distinguished between ex-ante and ex-post allocation of labor. This is justified when people who are searching jobs stay at a sector and get jobs in the other sector. Such distinction is the unique feature of Fields (1989) model. On the other hand, Majumder (1975) shows that the 'graduation theory'<sup>1</sup> fails if the urban formal sector directly recruits from the rural sector.

Sheng and Xu (2007) develop a simple two-sector search model to examine the impact of the terms-of-trade (TOT) shocks on unemployment and show that an improvement of TOT reduces unemployment. Flinn and Mabli (2008) analyze the impact of binding minimum wage on labor market outcomes and welfare in a partial equilibrium model of matching and bargaining in the presence of on-the-job search. Arseneau and Chugh (2009) introduce general equilibrium efficiency in the standard labor search and matching framework. Macit (2010) develops a New-Keynesian model in search and matching structure

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<sup>1</sup> According to the 'graduation theory' it is beneficial to remain in the urban informal sector and search part time for a highly paid job in the urban formal sector.

with firing costs and shows how labor market institutions affect the wage and inflation dynamics.

It is worth noting that the theoretical literature on search unemployment has not been adequately dealt with liberalized economic policies and their consequences on the developing economies. A notable exception is [Bandopadhyay and Chaudhuri \(2011\)](#) ([BC \(2011\)](#) hereafter) that has examined the effects of foreign capital inflows on unemployment and welfare in a developing economy by extending the search unemployment model of [Fields \(1989\)](#) to include international trade and capital as a separate input of production. But this is a two-sector general equilibrium model that includes a rural sector and an urban formal sector only.

However, it is beyond any doubt that the informal sector plays a very significant role in employment in developing countries constituting at least 70% of total employment of the working population ([Agenor, 1996](#)) and that in most cases the informal sector mainly produces non-traded intermediate goods for the formal sector on a sub-contract basis.<sup>2</sup> The ongoing process of economic reforms has increased significantly the role played by the informal sector in determining the pattern of employment in the developing countries. Reformatory policies contract the formal manufacturing sector and drive workers out to the informal segment of the labor market. Empirical studies e.g., [Bhalotra \(2002\)](#), [Dev \(2000\)](#), [International Labour Organisation \(2006\)](#) and [Leite et al. \(2006\)](#) have reported that the size of the informal sector in the developing countries has increased considerably in the post-reform period. But the expanding informal sector has not been able to absorb the huge number of retrenched workers from the formal sector. The consequence has been a steep rise in the level of open unemployment in many of the developing economies.

Keeping in view the importance of the urban informal sector the present paper develops a three-sector general equilibrium model with an urban informal sector in the line of [Fields' \(1989\)](#) analysis of search unemployment. In the line of [Fields \(1989\)](#) we have distinguished between ex-ante and ex-post allocation of the labor force. However, our model is an improvement over [Fields' \(1989\)](#) work in a number of ways. First, while in [Fields \(1989\)](#) the rural sector wage is fixed in the present case this wage rate is flexible and market determined. Secondly, [Fields \(1989\)](#) considers a closed economy while in ours there is international trade. Third, we have introduced capital as an input but [Fields \(1989\)](#) has considered labor as the only input of production. The inclusion of capital in the production structure has made the [Fields' model](#) in the ex-post case to work very nearly like a [Harris and Todaro \(1970\)](#) ([HT hereafter](#)) model of rural–urban migration. Fourth, unlike [Fields \(1989\)](#) we have considered non-traded intermediate good in our model. Finally, owing to the presence of international trade and capital as an input the preset model is quite handy for analyzing the consequences of external shocks and intersectoral capital mobility/immobility on the endogenous variables. Accordingly, while the rural sector (sector 1) and the urban informal sector (sector 2) use capital of type 1 the urban formal sector (sector 3) uses capital of type 2. So, capital of type 1 is perfectly mobile between the first two sectors of the economy while capital of type 2 is specific to sector 3. Besides, sector 2 produces a non-traded input for sector 3. We also assume two concepts of factor intensities – ex-ante and ex-post. We examine the impact of an inflow of foreign capital on unemployment and social welfare. Our analysis finds that inflows of foreign capital may lower the urban unemployment level but worsens social welfare when the urban informal sector is more capital-intensive relative to the rural sector. Quite interestingly in the case when the rural sector is capital-intensive we may obtain exactly the opposite results on urban unemployment and national welfare. Our analysis, therefore, suggests the possibility of a trade-off between the government's twin

objectives of growth with foreign capital and mitigation of the urban unemployment problem.<sup>3</sup> These results are extremely crucial from the viewpoint of policymaking in an unemployment plagued, low-income developing economy.

## 2. The model

The paper builds up a three-sector job-search model for a small open economy. The three sectors are the rural sector (sector 1), the urban informal sector (sector 2) and the urban formal sector (sector 3).  $X_1$  is the export good which is produced in sector 1.  $X_2$  is the non-traded good which is produced in sector 2 and is used as input in sector 3. Both sector 1 and sector 2 use labor and capital of type 1 as their inputs. Finally, sector 3 produces the import good,  $X_3$  by means of labor, capital 2 and the non-traded input produced by sector 2. The assumption of small open economy gives constant product prices for the two internationally traded goods, whereas the price of the non-traded good is determined in the domestic market.

We make a simplifying assumption that capital of type 2 is entirely owned by foreign capitalists. However, this can be relaxed to include both domestic capital and foreign capital if these are perfect substitutes.<sup>4</sup> The production function of all the sectors is subject to the Law of constant return to scale and diminishing marginal productivity to each input. All the markets except the urban formal labor market are competitive and in the long run equilibrium, product price is matched exactly by the unit cost of production in each sector. So according to our assumption, foreign capital is specific to the formal sector. However, capital of type 1 is perfectly mobile between the rural sector and the urban informal sector. So, we have different rentals on the two types of capital in the economy. As both sector 1 and sector 2 use the same two inputs they together form a Heckscher–Ohlin subsystem (HOSS) and can therefore be classified in terms of factor intensities in value sense.<sup>5</sup> However, at this stage we do not want to make any specific factor intensity classification. We would rather consider both the cases one by one and see how our results change depending on different factor intensity conditions.

The urban formal sector's wage rate is institutionally given.<sup>6</sup> Urban unemployment exists in our stylized economy as urban job seekers devote full time for searching urban jobs and all of them do not get high paid urban jobs. The unsuccessful urban job seekers either get absorbed in the urban informal sector at a low wage or remain unemployed.

The following notations are used in the model:  $X_i$  = level of output produced in the  $i$ th where  $i = 1, 2, 3$ ;  $a_{ji}$  = amount of the  $j$ th input required to produce 1 unit of the  $i$ th commodity;  $L^k$  = ex-ante amount of labor in the  $k$ th job-search strategy,  $k = 1, 2, 3$ ;  $L_i$  = ex-post level of employment in  $i$ th sector;  $P_1 = 1$  (commodity 1 is the numeraire);  $P_2$  = price of commodity 2;  $P_3^* = (1 + t)P_3$  = tariff-inclusive domestic price of commodity 3;  $t$  = ad-valorem rate of tariff on the import of commodity 3;  $W_1$  = rural wage rate;  $W_2$  = urban informal sector wage rate;  $W_3^*$  = the exogenously given wage in the unionized sector

<sup>3</sup> In the [BC \(2011\)](#) paper there are two sectors – rural and urban (formal). Apart from labor market distortion there is also tariff distortion. In their immobile capital case the same trade-off result goes through despite tariff. However, in the mobile capital case which resembles the [Corden and Findlay \(1975\)](#) model the trade-off result is altered. As the protected urban sector grows the volume of unemployment rises. Besides, the deadweight loss to the society due to tariff distortion increases. Hence the national income falls and the trade-off result does no longer remain valid. Nonetheless, the present three-sector model is an improvement over the analysis of [BC \(2011\)](#) as it includes the urban informal sector which is closer to reality and explains the simultaneous existence of urban unemployment and the urban informal sector.

<sup>4</sup> See [Gupta \(1994, 1997\)](#), [Khan \(1982\)](#), [Chandra and Khan \(1993\)](#), [Chaudhuri \(2003, 2005\)](#), [Chaudhuri and Mukhopadhyay \(2009\)](#), [Chaudhuri et al. \(2006\)](#) among others.

<sup>5</sup> This is due to the fact that the wage rates in the rural sector and the urban informal sector differ.

<sup>6</sup> The workers in the urban formal sector are unionized and are able to wrest a higher unionized wage which may be determined as a Nash bargaining game between the representative labour union and the representative firm. See in this context, [Chaudhuri \(2003\)](#) and [Chaudhuri and Mukhopadhyay \(2009\)](#).

<sup>2</sup> See [Papola \(1981\)](#), [Romatet \(1983\)](#) and [Bose \(1978\)](#) among others.

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