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Article

The impact of risk and mobility in dualistic models: Migration under random shocks☆

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ABSTRACT

In this paper we present and confront the expected outcome of an increase in risk on the regional or sectoral allocation of labor force and employment. The basic frameworks are the benchmark dualistic scenarios. A single-input analysis of a homogeneous product economy is provided. Uncertainty is modeled as localized Bernoulli random experiments, additively affecting either labor demand or labor productivity, unilaterally, or in a perfectly (positive and negative) correlated fashion in both regions providing a stage from which conclusions on the expected consequences of random shocks (or of changes in workers' heterogeneity) to the economy can be drawn. A (deterministic) differentiated natural appeal of —an intrinsic imbalance between, a compensating income differential required by affiliates of one sector— the two regions is allowed to interact with equilibrium formation.

We report the main effects on equilibrium local expected wages, supply, employment and aggregate welfare surplus of a unilateral as well as a simultaneous increase of labor demand dispersion in the (a) basic two-sector model in four different scenarios: free market; partial (one-sector) coverage with perfect inter-sector mobility; partial (one-sector) coverage with imperfect mobility (Harris-Todaro); multiple (two-sector) coverage with imperfect mobility (Bhagwati-Hamada).

Importance of convexity of local labor demands was invariably recognized. A localized increase in risk does not always repel the labor force in the long-run. This statement would hold even if individuals were not risk-neutral, as assumed in the research.

El impacto del riesgo y la movilidad en los modelos dualísticos: migración bajo *shocks* aleatorios

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RESUMEN

En este documento presentamos y confrontamos los resultados esperados del incremento del riesgo de la distribución sectorial de la mano de obra y el empleo. Los marcos básicos son los escenarios dualísticos de referencia. Se aporta el análisis con un solo *input* de una economía de producto homogéneo. La incertidumbre se modela como experimento localizado y aleatorio de Bernoulli, afectando en forma acumulada a la demanda de mano de obra o a la productividad laboral de modo unilateral, o de manera perfectamente correlacionada (positiva o negativamente) en ambas regiones, proporcionando un escenario desde el que pueden extraerse conclusiones sobre las consecuencias que se esperan de los *shocks* aleatorios (o de los cambios de heterogeneidad de los trabajadores) para la economía. Se permite la interacción, entre las dos regiones, del llamamiento natural diferenciado (determinista), el desequilibrio intrínseco y la compensación del diferencial de los ingresos requerida por los afiliados de un sector, con formación de equilibrio.

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Reportamos los principales efectos sobre los salarios locales previstos en equilibrio, el suministro, el empleo y el excedente del bienestar acumulado de un incremento unilateral y simultáneo de la dispersión de la demanda de mano de obra en el (a) modelo básico bi-sectorial en cuatro escenarios diferentes: mercado libre; cobertura parcial (unisectorial) con movilidad perfecta intersectorial; cobertura parcial (unisectorial) con movilidad imperfecta (Harris-Todaro); cobertura múltiple (bi-sectorial) con movilidad imperfecta (Bhagwati-Hamada).
Invariablemente, se reconoció la importancia de la convexidad de las demandas locales de mano de obra. El incremento localizado del riesgo no siempre ahuyenta a la mano de obra a largo plazo. Esta aseveración se mantendría incluso cuando los individuos no fueran neutros al riesgo, según los supuestos de la investigación.

1. Introduction

The aim of this research is to contrast the expected long-run impact of exogenous uncertainty on labor force flows and expected wages under alternative scenarios of institutional wage setting and barriers to mobility. The study of the matter would be a-temporally relevant; to the extent that migration issues are being discussed among the EU member states, and given the recent enlargement to new economies with different market rules on the one hand, and security profiles on the other, the layout of theoretical foundations for the understanding of those effects would appear as a timely exercise.

The basic structures chosen to replicate the effects of uncertainty were simple dualistic models in the tradition of Harris-Todaro (1970) rural-urban migration analysis. A good survey of theoretical literature can be found in Bhattacharya (1993). The principles behind its workings became widespread in the study of labor market regional as also sector —occupation, profession— allocation and under minimum or other wage legislation or restrictions. Examples of these can be found in Mincer (1976), McDonald and Solow (1985), Fields (1989), Brown, Gilroy and Kohen (1982). A survey of segmented labor markets can be seen in McNabb and Ryan (1990); and the applications of the theory with microfoundations for several dualistic structures can be found in Saint-Paul (1996).

We follow the cases contrasted in Martins (1996), inspecting the consequences of introducing a local stochastic noise of various nature in each of the scenarios, these differing according to the degree of mobility across the two sectors —of whether there is immediate access to the other region jobs or not—, and to whether any or both regions or sectors are subject to an (also exogenous) institutional wage floor.

Total —national, worldwide according to context we may wish to simulate— labor force supply is assumed perfectly inelastic. Workers choose location, or sector affiliation, maximizing the expected wage —risk-neutrality allows us to concentrate on how technology characteristics rather than risk-aversion of the individuals (the role of individual's risk-aversion on migration decisions has been studied before and was surveyed by Stark (1991). It was our purpose to generate, thus, other type of conclusions) of the population affect the market equilibrium responses—.

Exogenous uncertainty itself may interplay with the underlying local technologies in different ways. Two environments were always simulated: when uncertainty works as an (null expected mean) added noise to local labor demand —quantity uncertainty; and added to the inverse labor demand— that is, to labor productivity. For simplicity, such noise was modeled as a binary random shock —conclusions shouldn't change qualitatively if we assumed a general distribution— and we inspected the effect of an increase in its variance maintaining the mean constant. (That is a general conclusion in the inspection of the effects of uncertainty on the risk-premium (Martins, 2004)).

As the prototype economy has two regions or sectors, perfectly (positively and negatively) correlated increases in local risks were also simulated. Changes in uncertainty can also mimic changes in the degree of heterogeneity of the labor force —or local productive ability to cope with them—.

Being mobility of major concern in the analysis, two extreme cases of "barriers to adjustment" were also thought to be important in the inquiry: either adjustment to uncertainty is assumed to be immediate to the random shock. Then, the long-run equilibrium differs according to which, and is formed after the, exogenous impulse is observed —ex-post flexibility—. Or binding location/sector affiliation decisions are taken before the actual risk realization —ex-ante location choices—. (See Aiginger (1987) and Martins (2004a) for a survey and appraisal of the effects of uncertainty on production outcomes under the two contexts). Obviously, the latter stages wage dispersion more appropriately if the local wage is left as market determined rather than institutionally fixed.

After notation is briefly settled in Section II, we depart from the benchmark case —free market with perfect mobility across regions or sectors—, outlined in Section III. In Section IV, partial coverage with perfect mobility —i.e., people not employed in the primary sector can immediately get a job in the secondary sector and wait there for an opportunity to switch, and thus, there is (again) no unemployment generation— is introduced. In Section V, a version of the Harris-Todaro model —with imperfect mobility and institutionally fixed wage in one of the sectors— is inspected. In Section VII, the Bhagwati-Hamada economy —with two covered regions or sectors— is forwarded. The exposition ends with a concluding appraisal in Section VII.

2. Notation

There are two regions —or two sectors— and a fixed exogenous labor supply, $L;^{-}$. This total labor supply decides whether to locate in region (or affiliate to sector) 1 or 2. Denote by $L;^{-}_{i}$ local/industry supply in region/sector i. Then:

$$L;^{-}_{1} + L;^{-}_{2} = L;^{-} \tag{1}$$

In region i, the baseline deterministic aggregate demand function is given by:

$$L_i = L^i(W_i), \quad i = 1, 2 \tag{2}$$

A non-positive slope – that is, $dL_i/dW_i = L^i(W_i)' \leq 0$ – is always assumed. Denote the corresponding inverse demand function by:

$$W_i = W_i(L_i), \quad i = 1, 2 \tag{3}$$

There are no cross effects, i.e., $dL^i/dW_j = 0$ for $i \neq j$. The wage elasticity of demand of region i at a particular point of labor demand will be denoted by

$$\varepsilon^i = L^i(W_i)'W_i/L^i(W_i) = W^i(L_i)/[W^i(L_i)'L_i]. \tag{4}$$