



Multi-region job search with moving costs

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ABSTRACT

We develop a competitive search model involving multiple regions, geographically mobile workers, and moving costs. Equilibrium mobility patterns are analyzed and characterized, and the results indicate that shocks to a particular region, such as a productivity shock, can propagate to other regions through workers' mobility. Moreover, equilibrium mobility patterns are inefficient due to the existence of moving costs.

1. Introduction

This study analyzes the possible impacts of inter-regional moving costs on labor markets as well as social welfare. In many countries, non-negligible levels of internal migration can be found, and such migration has been shown to be sensitive to local labor market conditions.¹ We then naturally expect that migration should eventually eliminate regional differences in labor market conditions, such as those in wages and unemployment rates. However, contrary to this expectation, we observe persistent and significant differences in such labor market outcomes. For instance, Lkhagvasuren (2012) showed that the magnitude of cross-state unemployment differences is approximately identical to the cyclical variation occurring in the national unemployment rate.²

Migration sensitivity to labor market conditions together with persistent regional differences in labor market outcomes imply that regional labor markets are only imperfectly integrated. This attribute

can be primarily ascribed to the existence of moving costs in general. Such moving costs include those of moving, selling, and finding houses, which may depend on transportation and communication technologies, as well as those incurred in adjusting to a new environment and reconstructing social networks, and those related to job turnover, which depends on institutions and regulations affecting labor markets, such as mutual recognition of professional degrees across different regions and occupational license requirements. Thus, these costs can constitute a substantial barrier to labor mobility.³ This paper aims to characterize the effects of moving costs on labor markets.⁴

We develop a competitive search model involving multiple regions and moving costs. As modeled in Acemoglu and Shimer (1999a), Acemoglu and Shimer (1999b) and Moen (1997), firms post wages when opening their vacancies, and job searches are directed.⁵ Search is off-the-job and only unemployed workers can move between regions. Although job seekers can search for jobs (i.e., can access information on vacancies)

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¹ For earlier contributions on this issue, see Blanchard and Katz (1992), Borjas et al. (1992), and Topel (1986) among others. Recent contributions include Hatton and Tani (2005), Kennan and Walker (2011), and Rabe and Taylor (2012).

² The same holds true for Japanese prefectures. A population census of Japan reports prefectural unemployment rates every five years. The coefficients of variation for cross-prefecture unemployment in 1985, 1995, and 2005 are approximately 0.35, 0.31, and 0.23, respectively, while that of time-series unemployment from 1985 to 2005 is 0.27.

³ Nakajima and Tabuchi (2011) showed that Japanese residents engage inter-prefectural migration only 2.3 times in their entire life. Such paucity of moves is indirect evidence of the existence of a substantial barrier to labor mobility. More specifically, in the case that a family of four moves 500km (the distance between Tokyo and Osaka, which are the two largest cities in Japan), it costs 3000 USD in a high-season to use a standard moving service (<http://www.hikkoshi.suumo.jp/soba/>). Furthermore, when newly renting a house, one needs to pay three or four months deposit in Japan. If housing rent costs 1500 USD, a move requires over 7500 USD for a deposit. These moving service costs and deposits constitute a lower bound of moving costs. Moreover, movers need to bear various administrative and psychological costs, implying that overall moving costs would be substantial.

⁴ In the international context, the degree of labor market integration also depends on the formation of political and economic unions such as the European Union. Although our arguments in this study are based on domestic migration, our framework is applicable to such unions as well.

⁵ See, among others, Rogerson et al. (2005) for recent developments in the literature on job search models that include a competitive search model.

both within and outside their places of residence, a new job in a region different from the initial places of residence incurs moving costs.

Our analysis first examines the qualitative effects of moving costs on migration patterns. We find that a change in moving costs alters migration patterns, resulting in counter-intuitive outcomes: for instance, consider a particular region (source region) and migration flows associated with job settlements from it to multiple destination regions. Then, an improvement in access from the source region to a destination region having better economic conditions such as higher productivity might negatively affect the source region's employment. It increases job settlements from the source region to the better destination region, decreasing the source region's unemployment rate. However, it also decreases job settlements to other destination regions than the better one, increasing the source region's unemployment rate. Hence, when the latter effect dominates the former, it results in a higher unemployment rate in the source region, which implies that improved access between two regions might heighten the difference in labor market conditions between the two regions.

Second, equilibrium of the model is shown to be inefficient: a migration flow is inefficiently small when the destination (resp. source) region offers a relatively high (resp. low) asset value of an unemployed worker. A high asset value of an unemployed worker in the destination region implies that inward migration by job seekers to the region is socially beneficial. However, firms in the destination region ignore such migration benefits when opening their vacancies, which result in insufficient job settlements and migration. When the asset value of an unemployed worker in the source region is low, outward migration of job seekers from the region is socially beneficial. Again, firms in the destination region ignore such benefits when opening vacancies, resulting in insufficient migration. Thus, migration costs reduce social welfare not only because they decrease social surplus when migration occurs but also because they distort the equilibrium allocation.

Finally, we briefly demonstrate by numerical analysis to quantify losses from moving costs, and show that moving costs can potentially have a significant impact on unemployment and welfare.

Several previous studies have investigated the role of migration in determining labor market outcomes. [Lkhagvasuren \(2012\)](#) extended the island model of [Lucas and Prescott \(1974\)](#) by introducing job search frictions in each island as modeled in the Mortensen-Pissarides model.⁶ In Lkhagvasuren's model, a worker's productivity is subject to a shock specific to the worker-location match. Therefore, a job seeker hit by a negative productivity shock may have incentive to move to other islands even if her/his current location offers a high probability of finding a job, leading to the possibility of simultaneous in- and out-migration. Using this framework, he showed that regional differences in unemployment rates may persist, regardless of high labor mobility between regions, and that labor mobility is procyclical. Although our model is similar to that developed in [Lkhagvasuren \(2012\)](#) in the sense that both consider multiple regions and moving costs in order to demonstrate labor mobility and regional unemployment differences simultaneously, they are different in focus: We focus on moving costs: we allow moving costs to vary depending on the source and destination regions, uncover the possible role of moving costs in determining migration patterns, and show the distortion caused by moving costs. By contrast, [Lkhagvasuren \(2012\)](#) assumed a moving cost common to all migration patterns and examined the role of productivity shocks in determining migration patterns, but is silent regarding the various effects and distortion attributable to moving costs.⁷

⁶ For details on the Mortensen-Pissarides model, see, among others, [Mortensen and Pissarides \(1999\)](#) and [Pissarides \(2000\)](#).

⁷ Another related study, [Lutgen and Van der Linden \(2015\)](#), by using a static, two-region job search model, showed that multi-region job search with location-specific preference results in inefficient equilibrium. However, inefficiency in their model comes from the assumptions of multi-region search under random search and difference in job search intensity between local and global search, rather than from the existence of

In the immigration literature, [Ortega \(2000\)](#) developed a two-country job search model in which workers could decide where to search for jobs.⁸ Workers need to incur moving costs if they search for jobs abroad. Differences in the job separation rate may incentivize workers in the high job separation country to migrate to the low job separation country. Because wages are determined by Nash bargaining, firms expect to make low wage payments to immigrants who have high search costs, thereby incentivizing them to increase vacancies. Thus, workers' incentives to migrate and firms' incentives to increase vacancies reinforce each other, resulting in Pareto-ranked multiple equilibria. In contrast, we employ a competitive search model in which wages are posted and searches are directed. This modeling strategy results in a unique equilibrium, enabling us to focus on the analysis of geographical mobility patterns.

The following studies highlight the positive effects of falling inter-regional moving costs on human capital accumulation and specialization. [Miyagiwa \(1991\)](#), in the context of immigration between countries, showed that if economies of scale exist in education, skilled worker migration benefits the host region by increasing the skilled labor ratio, whereas it negatively influences the source region by discouraging skill formation. In such an environment, lower moving costs induce people in the host region to invest more in human capital whereas it discourages people in the source region from investing in it. [Wildasin \(2000\)](#) presented a multi-region model in which human capital investment increases specialization but exposes skilled workers to region specific earnings risk. [Wildasin \(2000\)](#) then showed that skilled workers' mobility across regions mitigates such risk and improves efficiency, and examined how ways of financing investments, such as local taxes, affect efficiency. However, the simple treatment of migration decisions in these studies fails to provide a substantive and detailed analysis of migration patterns and their efficiency properties, which forms the focus of this paper.

The remainder of this paper is organized as follows. [Section 2](#) presents the basic setups. [Section 3](#) analyzes the equilibrium geographical mobility patterns. [Section 4](#) presents the efficiency property of equilibrium. [Section 5](#) quantifies the effects of moving costs. [Section 6](#) concludes.

2. General settings

Consider a continuous time competitive search model involving H regions (region 1, 2, ..., H). In our economy, there is a continuum of risk-neutral workers of size N . Workers are either employed or unemployed. While employed, workers can not move between regions. In contrast, unemployed workers can move but must bear moving costs t_{ij} . They can seek employment opportunities both beyond and within their region of residence, however, they incur moving costs t_{ij} in case they become employed outside their region of residence.⁹ Alternatively, we can assume that workers are only able to search for local employment opportunities, referred to as the “move then search” regime. In our framework, workers can move between regions while searching for jobs, so this regime does apply. In addition, workers can search for jobs outside of their current region of residence, implying that the “search then move” regime is also possible. However, as shown later, only the “search then move” regime emerges in equilibrium. See [Molho \(2001\)](#) for a comparison of equilibrium unemployment rates between the “move then search” regime and the “search then move” regime.

We employ the following standard assumptions regarding moving costs: (i) finding a job in the current region of residence incurs no moving

(footnote continued)

location-specific preferences.

⁸ [Bucher and Montero Ledezma \(2014\)](#) developed a duocentric city model wherein job searchers decide where to search for jobs and whether to relocate. Although their relocation costs can potentially have similar effects as our moving costs, they focus on the interactions between commuting and relocation, which is different from our focus.

⁹ We later show that an unemployed worker may move only once she/he becomes employed. While being unemployed, the worker has no incentive to move.

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