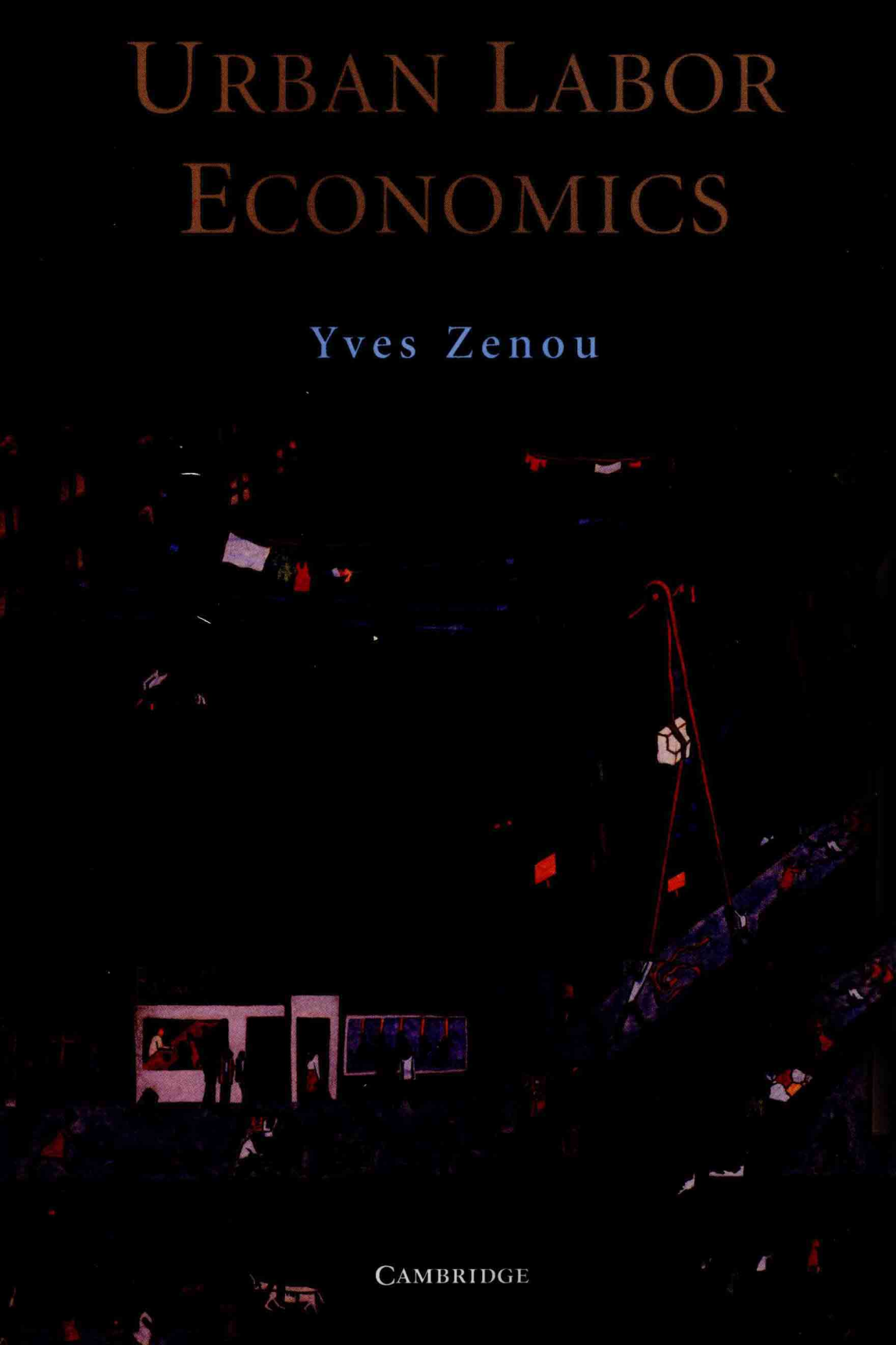
URBAN LABOR ECONOMICS

Yves Zenou



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Preface and Acknowledgments

The intended reader of this text is typically a last-year undergraduate, a graduate student in economics, or a researcher. People in connected fields (sociology, geography, urban planning, regional science, transportation, etc.) as well as policy makers with some background in economics should also be interested, especially in the last part of the book. Indeed, the techniques used in this book are not complicated and are now quite standard, and the main requirement is to be interested in the issues and have a good ability to use simple models and algebraic manipulations. I have homogenized the different models and the different chapters of this book by using the same notations and the same type of approach throughout. So the reading should be quite smooth. I have also included various appendices, which should help the reader understand the different chapters.

This book is the outcome of my research, which started twenty years ago. It has thus been a long time in the making. In August 1987, when I finished my master's degree in economics and econometrics at Université de Paris 10 (Nanterre), I was looking for a possible dissertation topic for a PhD. I had the chance to meet Gerard Ballot, professor at Université Pantheon-Assas (Paris 2), who suggested that the analysis of spatial labor markets could be an interesting and challenging topic. I decided to embark on this journey, having for sole reference the seminal paper of Harris and Todaro published in *American Economic Review* in 1970. In my dissertation, I studied the spatial aspects of labor markets, from both a theoretical and empirical perspective. I then met Jacques Thisse, professor at CORE in Belgium, who really taught me how to do research. My intellectual debt to him is immense. We wrote several articles together on the theory of local labor markets, some of which are included in this book. Jacques introduced me to Masahisa Fujita and

Tony E. Smith, the leaders of the regional science group at the University of Pennsylvania. As a junior researcher, working in 1995 with Masa and Jacques, two well-established urban economists, was a very challenging experience for me. I learned a great deal from this collaboration. My meeting with Tony E. Smith was also decisive. He taught me about the rigor of mathematics and how to prove theorems. Simplicity, kindness, and complexity are certainly good ways of describing Tony. At that time, I also worked with Marcus Berliant, who taught me mathematical tools I had never heard of before, such as differential topology. Diving into the world of general equilibrium, with its infinite dimensions and manifolds, was a very important experience. It helped me understand how a general equilibrium is calculated and how one proves its existence and uniqueness. I then collaborated with Jan K. Brueckner, who helped me fathom how to write simple models in order to capture complex economic situations. After having had these different mentors, I was able to work on my own and collaborate with younger researchers.

One of these researchers was particularly important to me: Antoni Calvó-Armengol. I met him in 1998, when we were both researchers at Centre d'Enseignement et de Recherche en Analyse Socio-Economique (CERAS) in Paris. Even though Toni was very young (nine years younger than me), I was extremely impressed by his energy, curiosity, creativity, and way of solving complicated mathematical problems. He taught me how to use the "right" model for the "right" question. He also introduced me to graph and social network theory, which is an important part of my research today. We published eight papers together, and we still have papers in progress. I was very close to him. Unfortunately, he tragically died at the age of 37 on November 3, 2007. I will miss him immensely. Two younger researchers have also influenced me: Etienne Wasmer and Eleonora Patacchini. Etienne has basically introduced me to search-matching theory. Thanks to Eleonora I am now writing a lot of empirical papers. Our endless discussions on how to write a model that can be tested have helped me think differently about theory.

I have also gained enormously from research collaborations with (in alphabetic order): Olof Åslund, Coralio Ballester, Gérard Ballot, Philippe Batifoulier, Harminder Battu, Marcus Berliant, Alberto Bisin, Nicolas Boccard, Jan K. Brueckner, Antonio Cabrales, Antoni Calvó-Armengol, Joan de Martí, Chengri Ding, Louis Eeckhoudt, Masahisa Fujita, Frédéric Gannon, Pieter Gautier, Laurent Gobillon, Florence Gofette-Nagot, Jonathan Hamilton, Mohamed Jellal, Maurice Kugler, John Östh, Eleonora Patacchini, Stephen Ross, Maria Saez-Marti, Paul Seaman, Harris Selod, Anna Sjögren, Tony

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E. Smith, Yan Song, Sebastien Steinmetz, Jacques Thisse, Isabelle Thomas, Thierry Verdier, Jackline Wahba, Etienne Wasmer, and Xavier Wauthy.

I have taught urban economics for a number a years. I am therefore grateful for all constructive comments received over the years from students at Southampton University, UK; Université du Maine, France; Uppsala University, Sweden; and Beijing University, China. I also thank Marcus Berliant, Antoni Calvó-Armengol, and Joan de Martí for extensive comments on earlier drafts.

I have been extremely privileged in the support, funding, and hospitality I received from the Research Institute of Industrial Economics (IFN), where most of this book has been written. I am also indebted to the Department of Economics at Stockholm University for the stimulating environment provided when the last part of this book was written.

Scott Parris at Cambridge University Press has been a supporter of this book since the very beginning. I thank him for his constant encouragement. I am also very grateful to the four anonymous readers who made extensive and very helpful comments on an early draft of the book.

This book has been a long journey, and I am not sure it would have ended without the support and love of my family. My wife, Tina, was always by my side. Her critical mind helped me phrase my research questions in a simpler way. My children, Julie, Emma, and Oliver, helped me focus on other things than research. This is the best motivation for writing a book.

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Introduction

It is commonly observed in OECD (Organisation for Economic Co-operation and Development) countries that unemployment is unevenly distributed among cities. The incidence of unemployment varies between the regions of a country (Isserman, Taylor, Gerking, and Schubert, 1986; Gordon, 1987; Blanchflower and Oswald, 1994), cities of different sizes and functions (Marston, 1985), inner and outer areas of cities, and between urban and rural areas. There are also stark spatial differences in incomes. For example, in the United States, the median income of central city residents is 40 percent lower than that of suburban residents. This has renewed interest in the spatial dimension of unemployment and, more generally, of the labor market.

According to the U.S. Bureau of the Census, in large U.S. cities, the unemployment rate is much higher in the city center than in the suburbs. This is, in particular, due to the fact that U.S. city centers are generally characterized by ghettos and poverty. Even if the European situation is more complex and less uniform, the general tendency is similar – but opposite. Indeed, poor and unemployed workers tend to reside on the outskirts of the city while rich workers tend to live close to the city center. The spatial concentration of unemployment and poverty makes the workings of urban labor markets a vital concern for urban residents.

The labor market is therefore *not* a global market in which the labor force is homogeneous. Quite the opposite. There is an increasing heterogeneity of the labor force as well as a thinner segmentation of this market into submarkets characterized by a fairly weak mobility between segments. For example, the existence of regional/urban labor markets is a well-established fact. Workers and firms only interact in local labor markets whose size is much smaller than that of the national market, and few people move from one market to another (Armstrong and Taylor, 1993; Bartik, 1996; Hughes

and McCormick, 1994; Topel, 1986). Yet, in the standard neoclassical model, economic agents do not choose with whom they exchange goods or labor. They are supposed to operate in an impersonal market where nobody needs to know the identity of the other party in the transaction. Therefore, explaining the existence of local labor markets is beyond the reach of the standard paradigm. A new approach is thus required that explicitly accounts for the possibility of local markets pulling subgroups of agents together. Such an extension should also allow for the determination of the size of these markets, since it is precisely their geographical extension that limits the reality of the global market.

Very few theoretical attempts have, in fact, been made to better understand the workings of urban labor markets. Indeed, traditionally, labor economists do not directly incorporate space into their studies (see, e.g., Layard, Nickell, and Jackman, 1991; Pissarides, 2000; Cahuc and Zylberberg, 2004), even though there are some well-known empirical studies of local labor markets (see, e.g., Holzer, 1989; Eberts and Stone, 1992). Similarly, despite numerous empirical studies, the theory of urban labor economics has been relatively neglected in urban economics. In most advanced urban textbooks (see, in particular, Fujita, 1989; Fujita, Krugman, and Venables, 1999; Fujita and Thisse, 2002), it is mainly assumed that there is perfect competition in the labor market and the issue of urban unemployment is not even discussed. One of the aims of this book is to bring labor economics to urban economists and urban economics to labor economists.

I believe that we need to fathom the way labor markets work in cities, in particular the way wages and unemployment are locally determined. This will eventually help us better understand urban ghettos and design adequate policies aiming at fighting against these urban problems.

This book is mainly based on my own research over the last twenty years, even though I discuss other related urban labor models. It must be clear that this book is focusing on *urban* labor economic theory, that is, papers that explicitly model both the land/housing market (where both the location of workers and the price of land/housing are endogenous) and the labor market (where both wages and unemployment are endogenous) and analyze their interactions. There are also regional models (for instance, in the migration and economic geography literatures) that deal with regional labor markets, where a city/region is a point in space. That is not what this book is about.

This book is about urban labor market theory and, as such, it deals with two different markets. This is a difficult task because it brings together two different branches of economics, labor economics and urban economics.

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This is why it is crucial for the reader to master the modeling of these two markets. This takes a large part of the book, namely the first two parts. Indeed, in Parts 1 and 2, we focus on search-matching and efficiency wage models, respectively, which are the main theories in labor economics, because they have the strongest empirical support. Each part has the same structure. We start with the standard urban framework of monocentric cities and see how the labor market affects (and is affected by) this urban structure. Both Chapters 1 and 4 describe the standard models of urban labor economics, focusing on search-matching (Chapter 1) or efficiency wages (Chapter 4). Then, in Chapters 2 and 5, we expose the different possible extensions of these benchmark models, keeping the same spatial monocentric city structure. Finally, in the last chapter of each part (Chapters 3 and 6), we deal with non-monocentric (or polycentric) cities. In particular, we show how this polycentric structure, which is increasingly common in modern cities (e.g., Los Angeles), affects the labor market outcomes of workers, which, in turn, affects the spatial structure of the city. In these chapters, we also deal with agglomeration economics and, in particular, with the endogenous formation of a monocentric city with endogenous wages and unemployment.

After these first two parts, the reader should be able to master the main tools and have a clear understanding of the way urban labor economic models work. It is only then that we deal with applied and policy-relevant issues. Indeed, as already noted, (big) cities are characterized by uneven distributions of unemployment and poverty. In particular, some areas (inner cities in the United States) accumulate poverty, low-skilled workers, few jobs, and a high proportion of ethnic workers. This is particularly true in most American cities, which exhibit a high level of racial segregation and stark socioeconomic disparities between neighborhoods. In general, white city dwellers experience much better labor-market outcomes than inner-city black workers. An important debate has focused on the existence of a possible link between residential segregation and the adverse labor market outcomes of racial minorities. Empirical studies have shown that such a link exists (see, for instance, Cutler and Glaeser, 1997). However, it remains unclear which economic mechanisms account for the link. It is thus crucial for policy makers to understand the causes and consequences of these poverty pockets and how they can be dealt with appropriately. For this purpose, we need a proper theoretical approach that incorporates both land and labor markets. Indeed, it is because they are located in specific areas that these groups of workers (minorities) experience adverse labor market outcomes. Moreover, it is because they experience high unemployment rates

(and earn low wages when employed) that they are "forced" to live in these rundown areas. So any policy that would like to address these issues should be based on urban labor economic models. Therefore, we will use the tools and models exposed in the first two parts of this book to address the issues of poverty and adverse labor market outcomes of ethnic minority workers in ghettos.

Indeed, as expressed by Eberts (1994): "Urban labor markets are characterized by the spatial proximity of households and businesses, which offers firms and workers advantages that lead to more efficient markets, enhanced productivity, and greater economic success." But, by offering the greatest opportunity for economic success, cities attract both the most talented and successful individuals and the most disadvantaged (Glaeser, Kahn, and Rappaport, 2008). This is the paradox of cities since they stand as a stark dichotomy between those who have succeeded and those who have not. This is particularly true for ethnic minorities, like blacks and Hispanics in the United States, Indians, Pakistanis, and Bangladeshis in the UK; North Africans in France, etc., whose earning gap to whites is quite large (for example, in the United States, in 1991, black household median income was 60 percent of white household income). One popular explanation is that, for minorities and low-skill workers, access to the urban labor market is impeded by physical barriers of spatial isolation. This is what we investigate in the first two chapters of Part 3 (Chapters 7 and 8) by analyzing the so-called spatial mismatch hypothesis, initiated by Kain (1968). It stipulates that residing in urban segregated areas distant from (and poorly connected to) major centers of employment growth, minority workers face strong geographical barriers to finding and keeping well-paid jobs. In the U.S. context, where jobs have been decentralized and blacks have remained in the central part of cities, the main conclusion of the spatial mismatch hypothesis is putting forward distance to jobs as the main reason for the high unemployment rates and low earnings among blacks. Since the study of Kain, hundreds of studies have been carried out trying to test the spatial mismatch hypothesis (see, in particular, the literature surveys by Holzer, 1991; Kain, 1992; Ihlanfeldt and Sjoquist, 1998). The weight of the evidence suggests that bad job access indeed deteriorates labor market outcomes, especially for ethnic minorities, thus confirming the spatial mismatch hypothesis.

In Chapter 7, we use the search framework developed in Part 1 to give some microeconomic foundation for the spatial mismatch theory. In particular, we show that workers' job search efficiency may decrease with the distance to jobs and, in particular, workers residing far away from jobs may have few incentives to search intensively. In that case, distance to jobs can

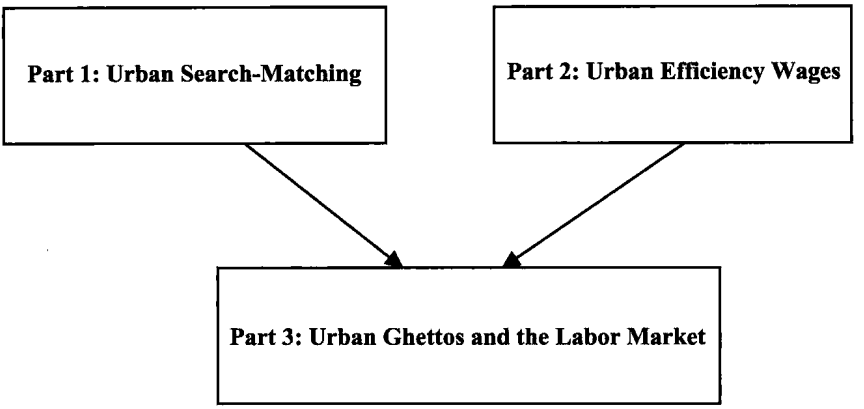

Figure I.1. Outline of the book.

be harmful because it implies low search intensities. In Chapter 8, using the efficiency wage approach exposed in Part 2, we show that workers may refuse jobs that involve commutes that are too long because commuting to that job would be too costly in view of the proposed wage. We also show that if workers' productivity negatively depends on distance to jobs, employers may discriminate against residentially segregated workers because of the stigma or prejudice associated with their residential location.

Clearly, distance to jobs is crucial for understanding why ethnic minorities experience adverse labor market outcomes. But this is not the whole story. There are other elements at stake since even when black workers live close to jobs (like in New York City), they still have problems finding a job. Social networks are obviously an important part of the story and are not always related to the distance to jobs. There is indeed strong empirical evidence showing that social networks play an important role in the job search and job finding processes. Individuals seeking jobs read newspapers, go to employment agencies, browse on the Web, and mobilize their local networks of friends and relatives. In Chapter 9, we focus on the relationship between non-market interactions (or peer effects and social networks) and urban economics through the labor market. In particular, we study how residential location determines social interactions, which, in turn, affect labor market outcomes.

In a nutshell, the way this book has been written can be described by Figure I.1.

In Parts 1 (urban search-matching models) and 2 (urban efficiency wage models), I give the main theoretical ingredients for understanding the way

urban economic theory works. Once the reader has mastered these theoretical tools, we show in Part 3 how these tools can be used to address the issue of urban ghettos. In Chapters 7 and 8, using both the efficiency wage and the search-matching approaches, I give some theoretical foundations for a well-established empirical fact: spatial mismatch between ethnic minorities' residence and job locations. Finally, in the last chapter of the book, I highlight the role of labor market networks in cities.

PART 1

URBAN SEARCH-MATCHING

Introduction of Part 1

There is a vast amount of literature on search and matching theory that emphasizes the importance of flows in the labor markets (Mortensen and Pissarides, 1999; Pissarides, 2000). These models, now widely used in labor economics and macroeconomics, have greatly enriched research on unemployment as an equilibrium phenomenon, labor market dynamics, and cyclical adjustment. The starting point of the analysis is to recognize that labor markets are characterized by search frictions. This means that it takes time for workers to find a job and for firms to fill up a vacancy so that unemployed workers and vacant jobs can coexist in equilibrium, a feature not possible in a standard Walrasian world (i.e., a frictionless world where workers and firms can move costlessly and instantaneously between working and not working). Because of these search frictions, the contacts between workers and firms depend on the market variables and the arrival rate of contacts for workers increases with the number of unemployed searchers, while the arrival rate of contacts for firms increases with the number of vacant firms. A constant-return to scale function is a convenient way of capturing these properties, which is referred to as the "matching function" (Pissarides, 1979). Indeed, the matching function relates job creation to the number of unemployed, the number of job vacancies, and the intensities with which workers search and firms recruit. It successfully captures the key

implications of frictions that prevent an instantaneous encounter of trading partners.[1,2]

However, the spatial dimension is absent in all these models, even if it has been recognized for a long time that distance interacts with the diffusion of information. For example, in his seminal contribution to search, Stigler (1961) puts geographical dispersion as one of the four immediate determinants of price ignorance. The reason is simply that distance affects various costs associated with search. In most search models, say for example Diamond (1982), distance between agents or units implies a fixed cost of making another draw in the distribution. In other words, a spatial dispersion of agents creates more frictions and thus, more unemployment. This is a weakness of the analysis since empirical evidence supports the idea of a clear *spatial dimension of labor markets* (see, for example, the survey by Crampton, 1999).

The interaction between space and labor markets is complex, however. The aim of this part is to capture some of the phenomena at work and, in particular, account for the spatial dimension of search.

The first search paper that (implicitly) introduces space is the famous island model of Lucas and Prescott (1974). This model formalizes the idea of search frictions through space by introducing a large number of separated labor markets (islands) where one firm is located in each island subject to productivity shocks. The authors refer to the locations as "islands" populated at any moment by firms that cannot move among islands while workers can. The wage is competitively determined on each island. Consequently, the distribution of wage offers represents productivity differentials across different islands (or locations) at a given point in time. As productivity on each island is subject to idiosyncratic shocks, workers need to spend some effort in locating better matching opportunities and eventually relocating across islands in their pursuit of wage gains. This is because communication among islands is imperfect in the sense that each worker only knows the current wage on his or her own island, that these differences exist, and their extent as described by the wage offer distribution function. This knowledge motivates investment in search as a means of finding an island where labor is more highly rewarded than on the island currently occupied. The main

[1] For theoretical surveys of search-matching models, see Mortensen (1986, 1988), Mortensen and Pissarides (1999a,b); Pissarides (2000); Rogerson, Shimer, and Wright (2005); and Postel-Vinay and Robin (2007).

[2] Empirical evidence of search and matching models is well-documented. See, in particular, the surveys by Devine and Kieffer (1991); Davis, Haltiwanger, and Schuh (1996); Petrongolo and Pissarides (2001); Eckstein and Van den Berg (2007); and Yashiv (2007).

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