

Urban Labor Economics

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Part 3: Urban Ghettos and the Labor Market

Chapter 7: The Spatial Mismatch Hypothesis

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1. Introduction

In the United States, it is generally observed that unemployment is unevenly distributed both within and between metropolitan areas. In particular, in most cities, the unemployment rate is nearly twice as high downtown as in the suburbs (see Table 7.1) mainly because of the concentration of blacks in these areas (see Table 7.2), which are mainly unskilled (see Table 7.3). Indeed, because of massive migration of blacks from the rural south to the urban north after World War I and World War II and because of discrimination in the housing market, blacks had no choice but to live in the central city ghettos. While there has been substantial suburbanization of blacks in some cities, the legacy of that period remains in the form of inner-city ghettos. During the same period, there has been massive suburbanization of jobs (see Table 7.4). To what extent does this history explain the higher rates of unemployment among blacks than whites?

[Insert Tables 7.1, 7.2, 7.3 and 7.4 here]

Since the seminal work of Kain (1968), many economists contend that the spatial fragmentation of cities can entail adverse social and economic outcomes. These adverse effects typically include the poor labor market outcomes of ghetto dwellers (such as high unemployment and low income) and a fair amount of social ills (such as low educational attainment and high local criminality). Even though there is no general theory of ghetto formation, there has been a series of theoretical and empirical contributions, each giving a particular insight into some of the mechanisms at stake.

An interesting line of research revolves around the “spatial mismatch hypothesis”, which states that, because minorities are physically distant from job opportunities, they are more likely to be unemployed and to obtain low net incomes. Table 7.5 documents these features by using the Raphael’s and Stoll’s (2002) measure of spatial mismatch. The authors measure the spatial imbalance between jobs and residential locations using an index of dissimilarity, which ranges from 0 to 100, with higher values indicating a greater geographic mismatch between populations and jobs within a given metropolitan area. For instance, a dissimilarity index of 50 for blacks means that 50 percent of all blacks residing in the metropolitan area would have had to relocate to different neighborhoods within the metropolitan area in order to be spatially distributed in perfect proportion with jobs. Table 7.5 shows that, in the largest metropolitan areas in the US, the access to jobs for blacks is quite

bad (especially in Detroit and New York).

[Insert Table 7.5 here]

Surprisingly, the numerous empirical works which have tried to test the existence of a causal link between spatial mismatch and the bad labor-market outcomes of minorities (see the surveys by Holzer, 1991, Kain, 1992, Ihlanfeldt and Sjoquist, 1998, Ihlanfeldt, 2005, Zenou, 2005b) are not based on any theory. The typical approach is to look for a relationship between job accessibility and labor-market outcomes for blacks, using various level of aggregation of the data: Individual level, neighborhood level and metropolitan level. Most papers have shown that bad job accessibility worsens labor-market outcomes, confirming the spatial mismatch hypothesis. However, following three decades of empirical tests, it is only in the late 1990s that theoretical models of spatial mismatch have began to emerge. This is why most theoretical models have not yet inspired specific empirical tests (Gobillon et al. 2006, Zenou, 2005a).

How can we go about constructing a model consistent with the empirical regularities? One needs to develop theoretical models of urban labor markets in which unemployment is endogenous. The aim of this chapter is precisely to use the urban efficiency wage and the search models developed in the first two parts of this book to better understand these empirical features and to propose different policies aiming at fighting against high unemployment rates among black workers.

For the efficiency wage theory, we provide two different mechanisms. First, using the model of Chapter 5, section 5.2, which assumes that workers' effort negatively depends on distance to jobs, we show that, in equilibrium, firms draw a red line beyond which they will not hire workers. This is because, depending on their residential location, workers do not contribute to the same level of production, even though the wage cost is location-independent. As a result, the per-worker profit decreases with distance to jobs and firms stop recruiting workers residing too far away, i.e. when the per-worker profit becomes negative. This model offers an explanation of the spatial mismatch of black workers by focusing on the point of view of firms. If housing discrimination against blacks forces them to live far away from jobs, then, even though firms have no prejudices, they are reluctant to hire black workers because they have relatively lower productivity than whites.

Second, using the model of Chapter 6, section 6.4, we introduce two employment centers and high relocation costs so that workers do not change residence as soon as they change employment status. We show that housing

discrimination, by skewing black workers towards the city center, increases the number of applications for central jobs and decreases it for suburban jobs. As a result, blacks living in the central part of the city but working in the suburbs experience lower unemployment rate and earn higher wages than blacks living and working in the central part of the city.

For the search-matching theory, we will first adapt the models developed in chapter 4 to explain the spatial mismatch hypothesis. In this perspective, distance to jobs prevents black workers from obtaining job information, thus isolating them from employment centers. Indeed little information reaches the area where blacks live, which lowers their search efficiency and thus their probability of finding a job. Then, we will assume that the fixed entry cost of firms is greater in the CBD than in the SBD and that workers are heterogeneous in their disutility of transportation (or equivalently in their search costs). These two fundamental assumptions are sufficient to generate an equilibrium in which central city residents experience a higher rate of unemployment than suburban residents and suburban firms create more jobs than central firms (higher job vacancy rate). Finally, we will show that different transport modes between blacks and whites lead to different search intensities and thus probabilities to find a job. We will develop a theoretical model in which whites mainly use cars to commute whereas blacks use public transportation. We show that, for both blacks and whites, living in areas where employed workers' average commuting time is higher yield the unemployed to search more than in areas with lower commuting time. Because of different transport modes, we also show that white unemployed workers search more intensively than blacks even if both live in areas where employed workers have exactly the same average commuting time. This is because using a faster transportation mode allows unemployed whites to accept jobs that are located further away and thus to have a higher area of search than blacks.

2. The spatial mismatch hypothesis: An efficiency wage perspective

2.1. Adapting the benchmark urban efficiency wage model

In Chapter 4 of this book, we developed the benchmark model of the theory of urban efficiency wages. This model was constructed with the European situation in mind, where the unemployment rate is higher in the suburbs (like e.g. in Paris or London), and was introduced primarily to set out the method

of construction of models in urban labor economic theory. This model has obviously to be adapted to deal with the US spatial mismatch.

As in the benchmark model, the city is a line whose origin $x = 0$ consists of the Central Business District (CBD) where all firms are located and whose end point is the city-fringe denoted by x_f . Workers are uniformly distributed along this line and decide where to locate between $x = 0$ and $x = x_f$. The city is closed so that there is no relation with the outside world, which implies that the population is fixed. All land is owned by absentee landlords. There are no relocation costs, either in terms of time or money.

There are several ways this model can be adapted to account for the US spatial mismatch. The easiest way is to flip the city so that the CBD corresponds to a suburban business district (SBD) that concentrates all jobs. So, if all jobs are in the suburbs rather than the CBD, all we require for consistency is to define $x = 0$ to be the workplace location, which is in the suburbs. But in fact, jobs are more centralized than residences. Indeed, Glaeser and Kahn (2001) have shown that jobs have been suburbanizing faster than residences, so that, in the large US metropolitan areas the average job is now only one mile closer to the CBD than the average residence. So, even if we flip the city in the benchmark model of Chapter 4, there seems to be some inconsistency since the unemployment rate in US cities is higher at (central) locations that appear to have *better* access to jobs. However, since most blacks are unskilled, we need to differentiate between skilled and unskilled jobs. Using both the 1994 Multi-City Study of Urban Inequality (MCSUI) and the 1990 census, Table 7.3 displays the spatial distribution of recently filled low-skill jobs and of people by race and education. As pointed out by Stoll et al. (2000), this table shows that the distribution of low-skill jobs is similar to that of all jobs, except that *there is a greater share of low-skill jobs in general in white suburbs*. This implies that low-skill jobs are much more decentralized than high-skill jobs. If one compares jobs with people, then the situation is worse: 79.6 percent of the metropolitan areas' lowest skilled jobs, but only 23.6 percent of the least-educated black people (i.e. those with no high school degree) are located in the suburbs. The access to low-skill jobs is thus quite bad for unskilled black workers. Since unskilled jobs are further on average from the CBD than unskilled black workers' residences and since unemployment is a problem for the unskilled, then our basic model can be adapted to describe the situation for the *unskilled*, but with $x = 0$ corresponding to a location in the suburbs. But the phenomenon of spatial mismatch is made more complicated by the

presence of two modes of transportation - mass transit and the car - along with the relatively low incidence of car ownership among blacks, as well as the asymmetry between commuting inward and commuting outward. This in fact reinforces the spatial mismatch problem for blacks since they are not only far away from (low-skill) jobs but, because of the lack of good public transportation in large US metropolitan areas, they have a difficult access to these jobs, as confirmed by Table 7.5.

In this chapter, we will not focus on the transport issue but rather assume a unique transport mode for all workers (whether they are black or white) in the city. Instead, by adapting the benchmark model of Chapter 4 to the US spatial mismatch, we propose two different theories that can explain why distance to jobs can have adverse consequences in the labor market for black workers. In both theories, we generate a link between unemployment and a seemingly unrelated phenomenon: racial discrimination in the housing market.

2.2. Theory of spatial mismatch 1: The firms' perspective

In this section, we adapt the benchmark model (Chapter 4) as follows. First, we only focus on low-skill workers (black or white) and low-skill jobs and all workers use the same transport mode (mass transit). Second, $x = 0$ is now the SBD, i.e. the workplace located in the suburbs where all low-skill jobs are located, while $x = x_f$ is now the city center (there is no jobs there, only people). To be consistent with the basic model, we have normalized the SBD to zero. This means that we take the firms' perspective when calculating the distance to jobs, so that x_f , the city-center, is now the longest distance from the job center located at $x = 0$. See Figure 7.1 for an illustration of this city. Finally, there is housing discrimination against blacks,¹ which forces them to live downtown (i.e. close to the city-center x_f) and causes them to have poorer access to unskilled jobs than whites living in the suburbs.

[Insert Figure 7.1 here]

We focus on the firms' viewpoint to explain the spatial mismatch for black workers. We will show that, even though firms have no prejudices against black workers, it can be rational for them not to hire black workers if they live too far away from jobs (they live downtown while jobs are in the suburbs) because they are less productive than white workers who live closer to jobs.

¹Housing discrimination against blacks is a well-documented fact. See in particular Yinger (1986, 1997).

Based on the model developed in Chapter 5, section 5.2, let us show how we can provide a mechanism for the spatial mismatch. Apart of the modifications mentioned above, we use exactly the same benchmark model but we change only one aspect. There are still only two possible effort levels: either the worker shirks, exerting zero effort, $e = 0$, and contributing zero to production, or he/she does not shirk, providing full effort $e > 0$. However, the latter now depends on x , the distance to jobs, that is $e(x) > 0$, $\forall x \in [0, x_f]$, with $e(0) = e_0 > 0$ and $e(x)$ being the contribution to production. We assume that $e'(x) < 0$ and $e''(x) \geq 0$ so that the greater the distance to work, the lower the effort level and, for remote location, the marginal difference in effort is quite small.

This assumption $e'(x) < 0$ aims at capturing the fact that workers who have longer commuting trips are more tired and are thus less able to provide higher levels of effort (or productivity) than those who reside closer to jobs. This implies that commuting costs include more than just money and time costs. They also include these negative effects of a longer commute such as non-work-related fatigue. Moreover, this assumption can also capture the fact that workers who reside further away from jobs have less flexible working hours. For example, in some jobs (e.g. working in a restaurant), there are long breaks during the day (typically between 2 p.m. and 6 p.m. in restaurants). The worker who lives next door can go back home and relax whereas the others, who live far away, cannot rest home. This obviously also affects workers' productivity.

One can question this assumption by arguing that one can take a nap on a train. Indeed, driving two hours is tiring but riding a train isn't. This is true if there is a very good public transport system, which implies for example that there is a direct train from home to the workplace. Remember that we are dealing with (low-educated) black workers who are forced to live far away from jobs (housing discrimination). It is well-documented that most blacks do not have access to cars and use public transportation.² It is also well-documented that, in large U.S. Metropolitan Statistical Areas, there is a lack of good public transportation, especially from the central city to the suburbs (see e.g. Pugh, 1998). For instance, the New York Times of May 26, 1998, was telling the

²Indeed, using data drawn from the 1995 Nationwide Personal Transportation Survey, Raphael and Stoll (2001) show that, in the US, 5.4 percent of white households have zero automobile while 24 percent of black households do not hold a single car. Even more striking, they show that 64 percent of black households have one or zero car whereas this number was 36 percent for white households.

story of Dorothy Johnson, a Detroit inner-city black female resident who had to commute to an evening job as a cleaning lady in a suburban office. By using public transportation, it took her two hours whereas, if she could afford a car, the commute would have taken only 25 minutes. This story illustrates the fact that blacks have relatively low productivity at suburban jobs because they arrive late at work due to the unreliability of the mass transit system that causes black workers to frequently miss transfers.

The worker's behavior can now be seen as a two-stage decision. First, each worker must decide to shirk or not, depending on their residential location. Since effort is costly, it is clear that the worker who lives the closest to jobs will be more inclined to shirk than those residing further away. Thus, contrary to the previous model, *the shirking behavior of workers is here locationally dependent*. Second, once the worker has decided not to shirk (this is the behavior that will emerge in equilibrium), he/she must decide how much effort he/she provides. This decision is also locationally dependent since we assume that workers who have longer commutes are more tired and provide less effort than those who live closer to jobs.

As before, let us first determine the urban land-use equilibrium and then the labor equilibrium. All the locational analysis is exactly the same as in section 2, the only difference being that now e negatively depends on x . This creates a new locational trade-off for the employed. They would like to be close to jobs (the SBD located at $x = 0$) to save on commuting costs but would also like to be far away from jobs to provide lower levels of effort (since effort is costly). However, by assuming that $t > -e'(L)/(1 - s)$, we can guarantee that the employed reside close to the SBD whereas the unemployed live close to the city-center (see Figure 7.1). The intuition of this result is as follows. An increase in distance x has offsetting effects on employed workers: they pay higher commuting costs but lower effort is exerted on the job. The net effect is thus less than the pure commuting cost effect, and the question is whether this net effect is stronger than the shrunken commuting cost effect for unemployed workers, which is smaller than that of the employed worker because $s < 1$. In this context, when the commuting cost t is high enough, the employed workers reside close to jobs by outbidding the unemployed.

Let us now solve the labor equilibrium. As in the model in Chapter 5, section 5.2, the utility of shirkers is not constant over locations whereas it is constant for non-shirkers. Because workers are heterogeneous in terms of location, it is clear that workers' residence matters in the process of wage

formation. We focus on the case when firms do not observe where workers live (because of housing discrimination, whites to live close to jobs while blacks reside further away from jobs).

It is easy to see that the utility of shirkers increases as x , the distance to the SBD, decreases. This implies, in particular, that the highest utility that a shirker can reach is at the $x = 0$ (the SBD) and the lowest is at L . As a result, because firms cannot discriminate in terms of location or race, the efficiency wage must be set such that workers are indifferent between shirking at location $x = 0$ and not shirking, since if the worker at $x = 0$ does not shirk, then all workers located further away will not shirk. In section 5.2 of Chapter 5, we have shown that the efficiency wage is given by:

$$w_L(L) = w_U + e(L) + \frac{e_0}{m} \left(\frac{\delta N}{N - L} + r \right) + (1 - s)\tau L \quad (2.1)$$

This setting thus implies that there is a fundamental *asymmetry* between workers and firms. All workers obtain the same efficiency wage whatever their location. However, they do *not* contribute to the same level of production because their effort decreases with distance to jobs. In other words, even though the wage-cost is location-independent, the contribution to production is not. This implies that the per-worker profit decreases with distance to jobs so that firms will determine a red line beyond which firms they will not hire workers, i.e. when the per-worker profit becomes negative. The interesting implication of this model is that it can explain why firms do not hire remote workers. Indeed, if firms *cannot* discriminate in terms of location (make wages location-dependent), they do anticipate that remote workers provide lower effort level. So they stop recruiting workers residing too far away.

To be more precise, all (identical) firms set the same red line $x_s = L$, above which they do not hire workers. The total production (or effort) level provided in each firm is given by: $e^{to} = \int_0^L e(x)dx$. By taking the efficiency wage as given, each firm maximizes its profit to choose the optimal size of the red line (recruitment area L). We obtain: $F'(e^{to}) = w_L/e(L)$. This equation states that the optimal recruitment area $x_s = L$ chosen by each firm is such that the marginal productivity of workers is equal to their cost per efficiency unit of labor. This determines the labor demand for each firm.

This model offers an explanation of the spatial mismatch of black workers by focusing on the point of view of firms. If firms cannot offer different wages for the same job, then they can discriminate on the basis of location by setting *higher job rejection rates for those residing far away from jobs*. Since there

is housing discrimination against blacks, which forces them to live downtown, they are far away from (low-skill) jobs, which are located at $x = 0$, the SBD. Because firms know that remote workers tend to work less and to be less productive than those residing closer to jobs, they prefer not to hire black workers. In other words, even though firms have no prejudices against black workers, it is rational for them not to hire them if they live too far away from jobs (i.e. beyond the recruitment area determined by firms).

This first model is consistent with the empirical regularities cited in the introduction. Most unskilled jobs are in the suburbs (Table 7.3) and because of housing discrimination most blacks live downtown (Table 7.2). This implies that blacks reside further away from jobs than whites (Table 7.5). As a result, they experience higher unemployment rate (Tables 7.1 and 7.5) since firms are reluctant to hire them because blacks have relatively lower productivity at suburban jobs than whites.

Let us now investigate the policy implications of this model (Figure 4.2 in Chapter 4 describes this labor equilibrium but for different values of parameters). We focus on unemployment benefit and transportation policies. A reduction in the unemployment benefit shifts downward the UNSC since, at each recruitment area level x_s (or equivalently employment level L), the efficiency wage must decrease to deter shirking. This is the standard outside option effect generated by the unemployment benefit. Because wages are lower, it is less costly for firms to hire new workers, so they increase their recruitment area, which is beneficial for black workers. Similarly, decreasing the unit commuting cost τ borne by workers or increasing the number of CBD-trips s increasing the recruitment area x_s . The intuition is exactly the same as for w_U but here the efficiency wage must decrease not for incentive reason but to spatially compensate employed workers (this is the compensation effect mentioned above).

As a result, this model strongly advocates a cut in unemployment benefit and subsidies in transportation costs since it increases the recruitment area of firms and reduces unemployment among black workers. In particular, these policies lower the negative effect of spatial mismatch since firms will be more willing to hire black workers living at remote locations.

2.3. Theory of spatial mismatch 2: The workers' perspective

In this section, to account for the US spatial mismatch, we adapt the basic model in a different way. First, there are N_B black workers and N_W white

workers (with $N = N_B + N_W$); all workers are *unskilled* and use the same public transport mode (mass transit). Second, there are two job centers, the CBD, located at $x = 0$, and the SBD located at $x = x_f$. To be consistent with Table 7.3, we assume that there are more firms and thus more unskilled jobs in the SBD than in the CBD. Finally, there is housing discrimination against blacks in such a way that they cannot live in the suburbs, that is between $x = x_{BW}$ and $x = x_f$ (where x_{BW} denotes the border between blacks and whites). They can only reside between $x = 0$ and x_{BW} .

Using the model of Chapter 6, section 6.4, we will show that distance to jobs can be harmful to black workers because they may refuse jobs that involve too long commutes.

Because of the changes made above, the basic model is now quite complicated. So we simplify it as follows. First, we assume that employed and unemployed workers have the same commuting cost, i.e. $s = 1$ but black workers consume less land than white workers (reflecting lower average black income). If h denotes the housing consumption for worker of type (h_B and h_W stand respectively for black's and white's housing consumption), then we assume that $h_B < h_W = 1$. Second, because we have now eight categories of workers (blacks and whites who can either be employed or unemployed and who can either work in the CBD or the SBD), we assume that relocation costs are so high that people are not mobile at all so that they are stuck in their location. As a result, people stay in the same location when they change their employment status. We also assume perfect capital markets with a zero interest rate, which enable workers to smooth their income over time as they enter and leave unemployment: workers save while employed and draw down on their savings when out of work. Consequently, there are only four categories of workers define by their race $i = B, W$ and their workplace $j = C, S$ (C if they work in the CBD and S in the SBD).

Here again, we first solve the urban equilibrium and then the labor market equilibrium. Since whites have flatter bid rents (blacks and whites have the same commuting costs but whites, because they consume more land, want to locate in remote locations where the price of land is lower), they reside further away from jobs than blacks. Because of housing discrimination that prevents blacks to reside in the suburbs, the location of workers in the city is as follows. Starting from the CBD, we have black working in the CBD (referred to as CBD-blacks), then blacks working in the SBD (referred to as SBD-blacks), whites working in the CBD (referred to as CBD-whites) and finally whites

working in the SBD (referred to as SBD-whites).

The equilibrium land rent is described in Figure 7.2 where x_B (x_W) is the border between CBD-blacks (whites) and SBD-blacks (whites) while x_{BW} is the border between SBD-blacks and CBD-whites. If there were no housing discrimination against blacks, then to obtain the urban equilibrium, one would have to juxtapose Figure 4.1 (Chapter 4) and Figure 7.1. In this new configuration, starting from the CBD, Figure 4.1 would locate first black and then white workers, while, starting from the SBD, Figure 7.1 would accommodate first black and then white workers. The border between CBD-whites and SBD-whites would have been at x_f and the urban configuration would have been perfectly symmetric around x_f . Now, because of housing discrimination, the urban equilibrium is depicted by Figure 7.2. To understand this pattern, observe that housing discrimination means that whites face no competition for suburban land. Blacks, however, must still outbid whites for land in the central part of the city. Therefore, the black bid rents in this area must be at least as large as the bids offered by CBD-whites. This, in turn, implies that the minimum point (which occurs at $x = x_B$) of the black bid-rent curves must lie on the extension of the CBD-whites' bid rents (depicted by the dotted line). Figure 7.2 also shows a dramatic bid-rent discontinuity at $x = x_{BW}$, with SBD-black workers offering much more for land in the white area than the white resident themselves. This discrepancy, which would be unsustainable in a competitive market, is a consequence of discrimination by suburban landlords against blacks.

[Insert Figure 7.2 here]

Thus, black workers are skewed towards the CBD and blacks' residences are thus remote from the SBD. For a black worker, working in the SBD involves high commuting costs, which may deter many of them from accepting SBD jobs. As a result, the black CBD labor pool is large relative to the black SBD pool, and the competition among blacks for central jobs is thus fiercer.

Let us now determine the labor equilibrium by first calculating the efficiency wage for a worker of type ij ($i = B, W, j = C, S$). The unemployment rate of non-shirkers is given by:

$$u_{ij} \equiv u_{ij}^{NS} = \frac{\delta}{a_{ij} + \delta}$$

while the one of shirkers is equal to:

$$u_{ij}^S = \frac{\delta + m}{a_{ij} + \delta + m}$$

with $u_{ij}^S > u_{ij}^{NS}$, $\forall a_{ij}, \delta, \theta > 0$. Since the unemployment rate correspond to the time workers spend unemployed over their lifetime, the expected utility of workers is simply the weighted average of their net incomes, the weights being the unemployment and employment rates. Since firms know that workers have a zero discount rate, to calculate the efficiency wage, they equate the average incomes over time of a non shirker and a shirker. By doing so, we easily obtain the following efficiency wage for a worker of type ij ($i = B, W, j = C, S$):

$$w_{ij}^m(L_{ij}) = w_U + e + \frac{e}{m} \frac{\delta N}{N - L_{ij}} \quad (2.2)$$

As stated above, there are more “unskilled” firms in the SBD than in the CBD. To determine their labor demand, each firm maximizes its profit and the labor market equilibrium in each center for each type of labor is depicted by Figure 4.2 in Chapter 4 (for different parameter values). Because of housing discrimination and because there are more unskilled jobs in the SBD, it is then easy to show that, compared to whites, the unemployment rate is higher and wages are lower for black workers, which is consistent with the US spatial mismatch. The intuition is straightforward. Because of housing discrimination, blacks are forced to live in the central part of the city. Because there are more unskilled jobs in the SBD, most blacks have a poor access to unskilled jobs and the ones who accept to work in the SBD support long and costly commuting costs. As a result, few blacks will accept a job in the SBD and most of them will seek a CBD-job. This leads to a high unemployment rate for CBD-black workers (which encompasses most blacks) and, because in an efficiency wage framework, unemployment acts as a worker discipline device, CBD-firms can set low wages to black workers without fearing shirking behavior. So, even if all workers (black or white) are ex ante totally identical, mainly because of housing discrimination, white workers end up with higher wages and lower unemployment rates.

This model is also consistent with the empirical regularities mentioned in the introduction. The unemployment rate is higher downtown than in the suburbs (Table 7.1) because blacks, who are mainly unskilled (Table 7.3), are forced to live around the city-center (Tables 7.2 and 7.3) far away from the suburbs where most unskilled jobs are located (Tables 7.3 and 7.5).

Let us now show another interesting result by focusing only on black workers. It has been observed that blacks working downtown tend to have higher unemployment rates and lower wages than blacks working in the suburbs (see for example Table 3 in Brueckner and Zenou, 2003). In other words, let us

show that: $u_{BS} < u_{BC}$ and $w_{BS} > w_{BC}$, i.e. blacks living in the central part of the city but working in the SBD experience lower unemployment rate and earn higher wages than blacks living in the central part of the city but working in the CBD. The argument is as follows. Since, in equilibrium, it must be that all blacks wherever they work (in the CBD or the SBD) must reach the same utility level, then there must be some compensation for those who commute to the SBD. Indeed, because blacks are discriminated against in the housing market, they are forced to live in the central part of the city. Because blacks are forced to live in the central part of the city, the ones who work in the SBD support long and costly commuting costs. So in order for blacks to obtain the same utility level wherever they work, the SBD workers have to be compensated. Because for blacks competition in the land market is quite fierce, land rent does not totally compensate them (see Figure 4) and thus unemployment rates and the resulting expected income must be higher for the SBD black workers compared to the CBD black workers. In other words, *housing discrimination by skewing blacks towards the city center, increases the number of job applications of blacks for central jobs and decreases this number for suburban jobs.*

In this context, using for example Figure 4.2 (Chapter 4) to determine the equilibrium in each center $j = C, S$, it is easy to see that the unemployment rate of blacks is higher and their wage lower when they work in the CBD than in the SBD. This is because, unemployment acting as a worker discipline device, enables employers to pay low wages when unemployment is high. So the main argument of this model is that suburban housing discrimination skews black workers towards the CBD and thus keeps black residences remote from the suburbs. Since black workers who work in the SBD have more costly commutes, few of them will accept SBD jobs, which makes the black CBD labor pool large relative to the SBD pool. Under an efficiency wage model, this enlargement of the CBD pool leads to a high unemployment rate among CBD workers.

Even though the mechanism is totally different, this model has similar implications in terms of policy than the redlining model of the previous section. Both a policy that reduces unemployment benefit and a policy that subsidizes commuting costs will reduce unemployment for blacks. However, it is not because the recruitment area (the red line) increases. Indeed, in the first policy, wages are reduced so that labor demand increases in both employment centers. In the second policy, SBD-black workers are more willing to accept

longer-distant jobs so that it increases their labor supply. Both policies, though different, reduce the negative consequences of blacks' spatial mismatch on their labor market outcomes.

3. Concluding remarks on the efficiency wage theory

Based on urban efficiency wage theory, this section has proposed two models that provide theoretical foundations of the spatial mismatch of black workers. In both theories, there is no labor discrimination or racial prejudices and it is assumed that, because of housing discrimination, black workers are constrained to reside in remote location far away from jobs. The impact of the latter assumption on labor-outcomes is quite different in each model. In the first model, firms may not want to hire some black workers because they may provide less effort on the job since workers who have longer commuting trips are more tired and are thus less able to provide higher levels of effort (or productivity) than those who reside closer to jobs. This is particularly true in large U.S. Metropolitan Statistical Areas where there is a lack of good public transportation, especially from the central city to the suburbs. In the second model, housing discrimination by skewing blacks towards the city center, increases the number of applications for central jobs and decreases it for suburban jobs. As a result, unemployment increases for black workers who work in the city-center. In both models, policies that decrease unemployment benefits and/or that subsidize commuting costs will reduce black unemployment.

So how relevant are these models? Interestingly, Zax and Kain (1996) have in some sense illustrated the model of section 2.3 by studying a 'natural experiment' (the case of a large firm in the service industry which relocated from the center of Detroit to the suburb Dearborn in 1974). They show that, among workers whose commuting time was increased, black workers were over-represented, and not all could follow the firm. This had two consequences: first, as in our model, segregation forced some blacks to quit their jobs. Second, the share of black workers applying for jobs to the firm drastically decreased (53% to 25% in 5 years before and after the relocation), and the share of black workers in hires also fell from 39% to 27%.

It would be interesting to test the redlining model of section 2.2. The popular press often relates stories about firms that do not want to hire workers living in 'bad' neighborhoods, which are in general not well-connected to job centers. In his book, based on the Urban Poverty and Family Life Study's survey of a representative sample of Chicago-area employers, Wilson (1996,

ch. 5) indicates that many employers consider inner-city workers – especially young black males – to be uneducated, unstable, uncooperative, and dishonest. Some employers pointed out that certain areas of the inner city were to be avoided. For example, one stated: “Before I took this job there were an area of Chicago on the West Side that we’d hired, you know, some groups of employees from ... and our black management people, who do know the area, they’d say, “No, stay away from area. That’s a bad area. Anybody who comes from that area.” The president of an inner-city manufacturing firm also expressed a concern about employing residents from certain inner-city neighborhoods: “If somebody gave me their address, uh, Cabrini Green, I might unavoidably have some concerns. ... That the poor guy probably would be frequently unable to get to work and that ... I probably would watch him more carefully even if it wasn’t fair, than I would with somebody else.” A welfare mother who lives in a large public housing project put it this way: “Honestly, I believe they look at the address and the – your attitudes, your address, your surround – you know, your environment has a lot to do with your employment status. The people with the best addresses have the best chances, I feel so, I feel so.” Another welfare mother of two children from a South Side neighborhood expressed a similar view: “I think that a lot of peoples don’t get jobs over here because they lives – they live in the projects. ... I think a lot of people might judge a person because you out – because they got a project address. You know, when you put it on an application, they might not even hire you because you live over here.” A 34-year-old single and unemployed black man put it this way: “If you’re from a nice neighborhood I believe it’s easier for you to get a job and stuff. I have been on jobs and such and gotten looks from folks and such, ‘I wonder if he is the type who do those things that happen in that neighborhood.’ ”

4. The spatial mismatch hypothesis: A search-matching approach

[To be completed]

4.1. Adapting the benchmark urban search model: Access to job information and different search intensities

4.2. Different entry costs and search frictions

4.3. Different transport modes and search frictions

5. Non-technical summary and notes on the literature

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Figure 7.1: Spatial mismatch in the redlining model

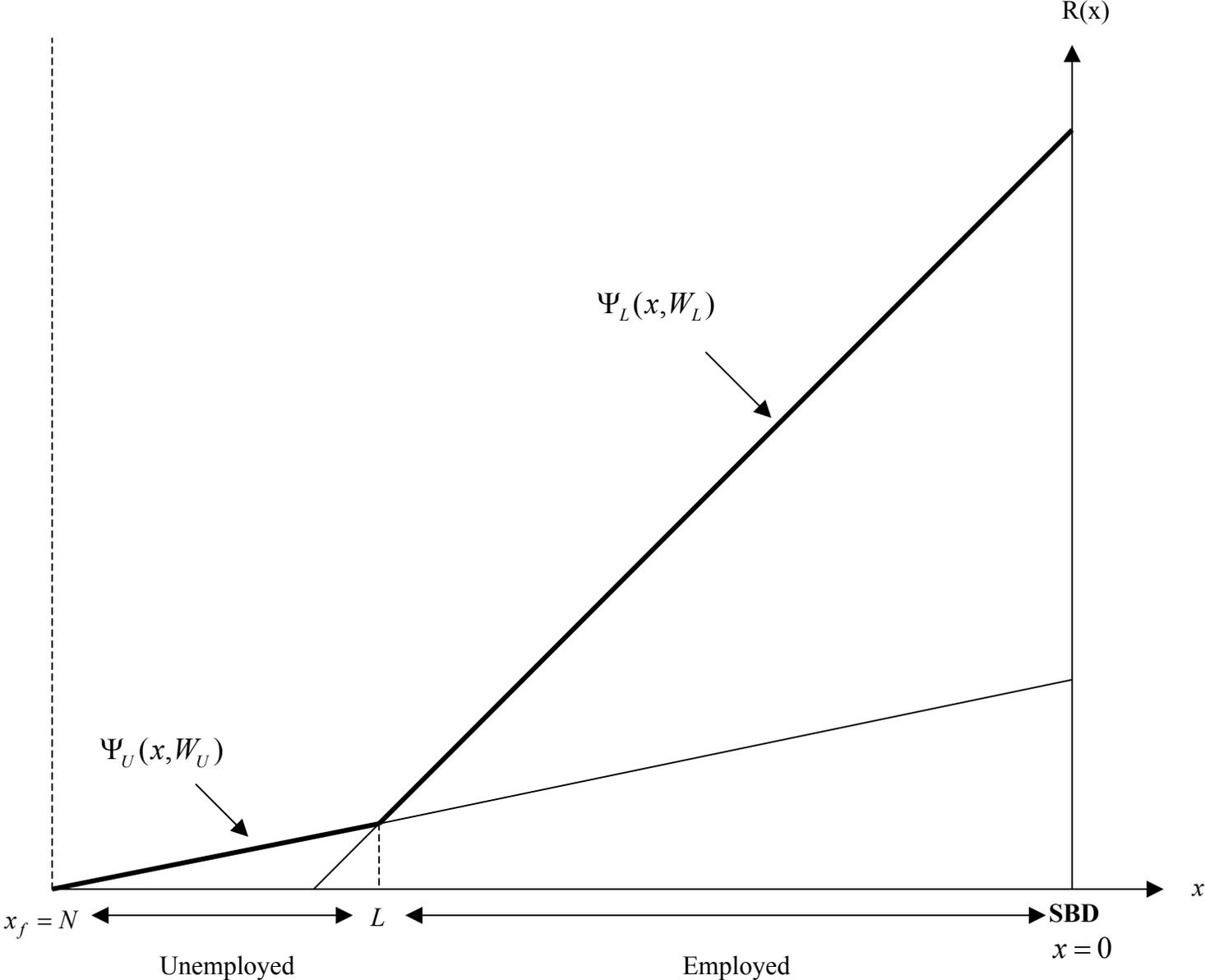


Figure 7.2: Spatial Mismatch in the two-center model

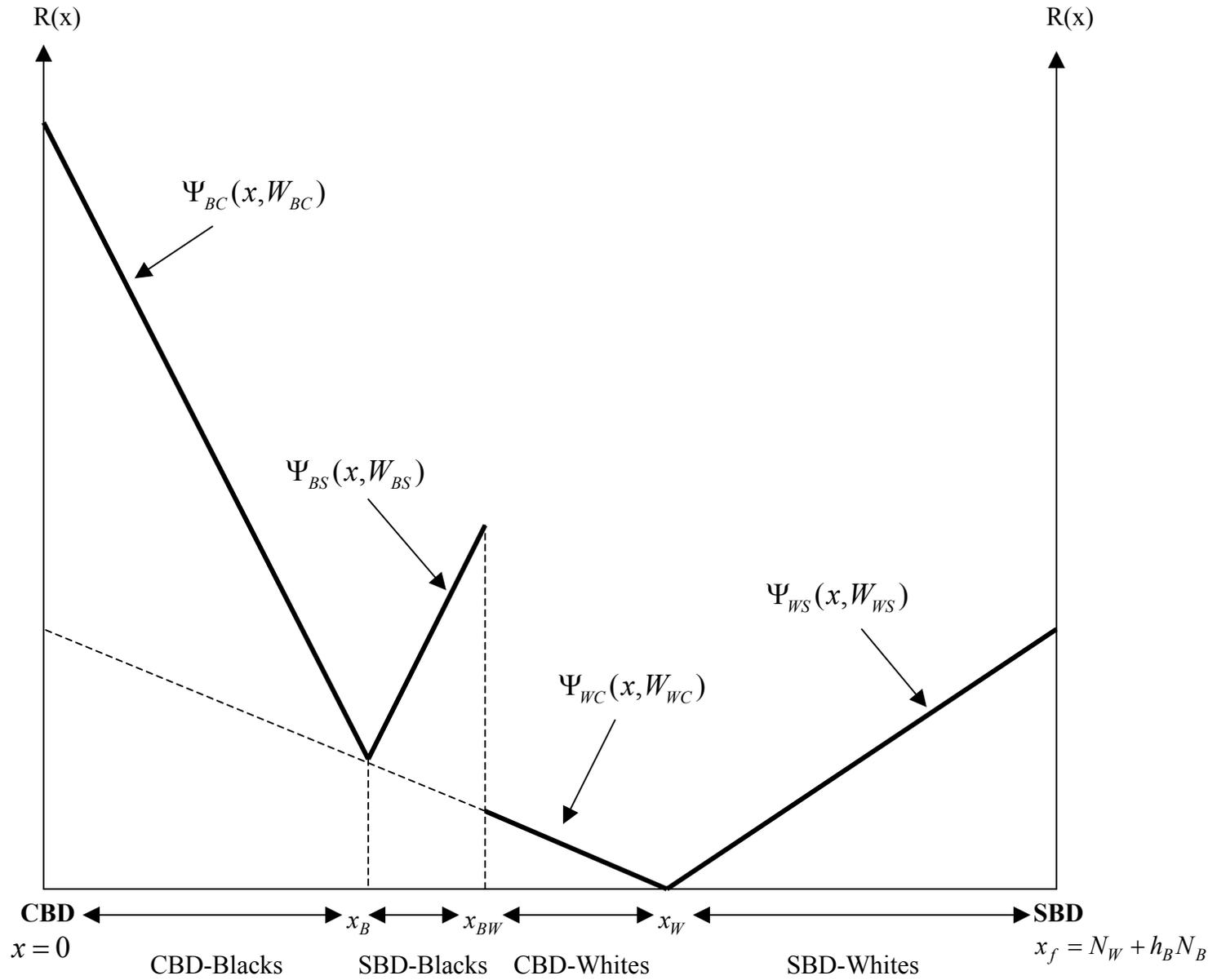


Table 7.1: Unemployment Rates (%) in 2000

	<i>Central City</i>	<i>Suburbs</i>
<i>Los Angeles–Long Beach</i>	5.9	4.9
<i>New York</i>	5.7	3.0
<i>Chicago</i>	5.5	3.4
<i>Boston</i>	2.7	2.1
<i>Philadelphia</i>	6.4	3.1
<i>Washington</i>	4.3	2.0
<i>Detroit</i>	6.1	2.5
<i>Houston</i>	5.0	3.2
<i>Atlanta</i>	4.7	2.6
<i>Dallas</i>	3.8	2.5
Ten Largest MSAs	5.4	3.0

Source: Calculated by Gobillon et al. (2004) from the Current Labor Force Survey

Table 7.2: *Percentage of Blacks by Location in 2000*

	<i>Central City</i>	<i>Suburbs</i>
<i>Los Angeles–Long Beach</i>	11	8
<i>New York</i>	24	12
<i>Chicago</i>	33	8
<i>Boston</i>	11	2
<i>Philadelphia</i>	43	9
<i>Washington</i>	44	22
<i>Detroit</i>	70	6
<i>Houston</i>	24	10
<i>Atlanta</i>	61	25
<i>Dallas</i>	23	9
Ten Largest MSAs	27	11

Source: Calculated by Gobillon et al. (2004) from the Census

Table 7.3: Distribution of Jobs and People in 1994 (in %): Pooled Sample of MSAs

	<i>Central City</i>			<i>Suburbs</i>			
	<i>Total Central City</i>	Black Central City	White Central City	<i>Total Suburbs</i>	Black Suburbs	Integrated Suburbs	White Suburbs
<i>All Jobs</i>	25.2	7.6	6.2	74.8	3.0	7.0	64.8
<i>Low-skill Jobs*</i>	20.4	10.2	2.7	79.6	2.7	7.5	69.4
<i>People (25 years and older)</i> <i>All people</i>	27.2	10.1	6.9	72.8	2.5	11.2	59.1
<i>Black</i>	65.3	57.1	5.3	34.8	10.4	6.6	17.8
<i>White</i>	13.1	2.5	6.3	86.9	1.8	8.7	76.4
<i>H.S. dropouts</i> <i>Black</i>	76.3	67.5	5.0	23.6	7.1	4.2	12.3
<i>H.S. dropouts</i> <i>White</i>	22.2	4.4	10.0	77.9	2.1	10.2	65.6
<i>H.S. dropouts</i> <i>Total</i>	44.8	15.6	7.7	55.2	2.1	12.5	40.6

Source: Stoll, Holzer and Ihlandfeldt (2000)

*No High School (H.S.) diploma, no experience of training, no reading, writing, math.

The black (white) central city is defined as that area within the central area with contiguous census tracts of blacks (whites) representing 50 percent or more of the population. The black (white) suburbs is defined as that area within the suburbs with contiguous census tracts of blacks (whites) representing 30 (80) percent or more of the population. The remaining suburban census tracts are defined as integrated suburban areas.

Table 7.4: *Percentage Jobs in Central City and Average Annual Growth Rates of Jobs by Workplace, 1980-1990*

	<i>% Job (Central City) 1980</i>	<i>% Job (Central City) 1990</i>	<i>Growth Rate (Central City) 1980-1990</i>	<i>Growth Rate (Suburbs) 1980-1990</i>
<i>Los Angeles – Long Beach</i>	51	51	1.9	2.1
<i>New York</i>	91	89	1.1	3.3
<i>Chicago</i>	50	44	-0.2	2.3
<i>Boston</i>	46	41	0.6	2.4
<i>Philadelphia</i>	41	35	-0.0	2.4
<i>Washington</i>	46	38	1.4	4.5
<i>Detroit</i>	38	28	-2.1	2.5
<i>Houston</i>	78	72	1.0	3.9
<i>Atlanta</i>	35	25	0.9	5.6
<i>Dallas</i>	69	60	1.4	5.6
<i>Ten Largest MSAs</i>	57	51	0.8	3.0

Source: Calculated by Gobillon et al. (2004) from the Census

Table 7.5: American MSAs with the worse spatial mismatch for blacks in 2000

	<i>Blacks</i>			<i>Whites</i>			<i>Total Population</i>
	<i>% Pop</i>	<i>SM</i>	<i>% Un</i>	<i>% Pop</i>	<i>SM</i>	<i>% Un</i>	
<i>Atlanta, GA MSA</i>	29	54	8.98	63	40	3.09	4,112,198
<i>Baltimore, MD, PMSA</i>	27	52	11.69	67	37	3.05	2,552,994
<i>Chicago, IL PMSA</i>	19	69	17.27	66	34	4.18	8,272,768
<i>Cleveland-Lorain-Elyria, OH, PMSA</i>	19	62	14.09	77	31	4.17	2,250,871
<i>Detroit, MI, PMSA</i>	23	71	14.89	71	36	4.27	4,441,551
<i>Houston, TX, PMSA</i>	17	57	10.85	61	40	4.46	4,117,646
<i>Los Angeles-Long Beach, CA, PMSA</i>	10	62	15.57	49	37	6.64	9,519,338
<i>Miami, FL, PMSA</i>	20	65	13.44	66	36	6.23	2,253,362
<i>New York, NY, PMSA</i>	25	70	14.63	49	44	5.61	9,314,235
<i>Newark, NJ, PMSA</i>	22	65	13.90	66	34	3.96	2,032,989
<i>Oakland, CA, PMSA</i>	13	55	12.08	55	37	3.95	2,392,557
<i>Philadelphia, PA-NJ, PMSA</i>	20	64	13.93	72	34	4.47	5,100,931
<i>Saint Louis, MO-IL, MSA</i>	18	63	14.21	78	38	4.11	2,603,607
<i>Washington, DC-MD-VA-WV, PMSA</i>	26	56	8.64	60	42	2.63	4,923,153

Source: Raphael and Stoll (2002) and Census (2000), calculations from Selod and Zenou (2005).

% Pop: Percentage of (black or white) individuals in the population in the MSA or PMSA.

SM: Measure of the Spatial Mismatch (for black or white) between people and jobs using the Raphael's and Stoll's (2002) dissimilarity index.

% Un: Percentage of (black or white) male unemployed in the MSA or PMSA.