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By

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Abstract: A substantial literature considers migration of the poor, mostly focusing on the relative importance of welfare programs versus labor market opportunities in the migration decisions of the poor. Likewise, a growing literature investigates the effect of changes in the minimum wage on U.S. poverty, focusing exclusively on the federal minimum wage. These two literatures have not intersected to examine how minimum wage laws influence migration decisions of the poor. Real federal minimum wages, minimum wage coverage, and state minimum wage laws all vary spatially. This research investigates the extent to which federal and state minimum wage laws affected migration choices of low-income households in the United States during the 1985-90 period. The study finds that the level of state minimum wages and the extent of federal minimum wage coverage both alter migration choices of the poor.

I. Introduction

There is a substantial literature on migration of the poor, mostly focusing on the relative importance of welfare programs versus labor market opportunities in the migration decisions of the poor. There is a growing literature regarding the effect of federal minimum wage laws on U.S. poverty, especially pertinent since poverty reduction has always been a major stated purpose of the federal minimum wage and an important reason for its continued popular support. To date, these two literatures have not been merged - no one seems to have considered how minimum wage laws might influence migration decisions of low-income people. This omission has occurred despite an intuitive supposition that, compared with the nonpoor, low-income individuals might have a relatively greater stake in spatial differences in the levels and coverage of the minimum wage.

Undoubtedly, the migration literature has ignored the minimum wage because, with only a few exceptions, the federal minimum wage has always been uniform throughout the United States. How could a spatially uniform minimum wage influence location choices? Three aspects of the minimum wage might affect location choices. All three relate to the minimum wage as a potentially important component of expected income.

First, the minimum wage's spatial uniformity might itself affect migration choices. Unlike wages for many other jobs, compensation for "minimum wage" jobs does not get adjusted to account for regional or local cost-of-living. Thus low-income households who currently or potentially depend on the minimum wage may be relatively sensitive to spatial cost-of-living differences, since these could significantly alter the real minimum wage.

Second, not all wage employment is covered under Federal minimum wage laws. Significant differences in coverage across locations may affect expected income across locations. Since coverage has increased substantially over time, this coverage effect may be diminishing in importance.

Third, we must consider state minimum wage laws. Some states have no separate minimum wage laws. Others basically mirror the federal minimum wage, but extend the law to cover some workers not covered by the federal law. Several states, however, have a minimum wage that exceeds the federal minimum wage, sometimes substantially. As federal minimum wage coverage has increased, the importance of state coverage differences should have declined. As federal coverage increases and approaches 100 percent, the federal minimum effectively becomes the state minimum. In this case, our focus would turn again to cost-of-living differences, as well as to the handful of states with a minimum wage exceeding the federal minimum.

This research investigates the extent to which minimum wage laws affect migration choices of low-income households in the United States. I consider the influence of spatial variation in the real federal minimum wage (cost-of-living differences), minimum wage coverage (proportion of employment covered by the federal minimum wage), and state-level minimum wages (focusing particularly on states whose minimum wage exceeds the U.S. standard). The study explores these in the context of place-to-place migration decisions within a conditional logit framework, using PUMS data from the 1990 *Census of Population and Housing*.

II. The Literature on Migration, Poverty, and Minimum Wages

A. Migration of the Poor

During the past 30 years, scholarly journals have published more than three-dozen empirical studies regarding migration decisions of the poor in the United States. A common overriding theme of this literature is their focus on how social welfare programs influence migration choices, particularly destination choices. Most studies focused on migration that occurred during the 1950s and 1960s.[1] The early literature suffered from several critical shortcomings, largely resulting from using highly aggregated data. Most importantly, aggregate data did not allow researchers to clearly identify the poverty population. Almost all studies used race as a proxy for poverty status, with blacks representing the poor and whites representing the nonpoor. In addition, most studies used relatively few variables to explain an inherently complex migration process, often omitting key measures of economic conditions or amenities that could characterize specific locations. A few studies used a single variable such as distance to account for spatial relationships among origins and/or destinations. Most had no accounting for space. For low-income households, which have limited resources and, often, limited information about other locations, space may critically influence migration decisions. Most early studies concluded that higher welfare benefits attracted the poor (blacks), but a variety of often-contradictory conclusions emerged.

[1] Cebula (1979), Moffitt (1992), and Charney (1993) review this literature.

Later studies avoided many pitfalls of the early research, primarily because of improved access to more disaggregated data, particularly microdata. Most importantly, they focused on the low-income population, rather than studying a crude proxy. Research during the 1980s [Blank (1988), Cebula and Koch (1989), Friedli (1986), Gramlich and Laren (1984), Peterson and Rom (1989), and Southwick (1981)] strongly supported existence of a welfare magnet effect. Overall however, these studies still omitted potentially important explanatory factors, had little or no accounting for space, and sometimes employed crude dependent variables.

More recently, Cushing (1993), Frey et al (1996), Enchautegui (1997), Levine and Zimmerman (1999), and Cushing (2002) modeled low-income migration. Using the *1980 Census* Public Use Microdata Sample (PUMS), Cushing (1993) conducted a binary logit analysis of the decision to outmigrate from and the likelihood of being an inmigrant to a metropolitan area (for all metropolitan area identified in the one percent PUMS file. He stratified by poverty status and sex and found only modest evidence that welfare benefits influenced migration decisions. Levine and Zimmerman (1999), using data from the National Longitudinal Survey of Youth (NLSY) and focusing on low-income single women with children, conducted a probit analysis of the decision to outmigrate from a state and the likelihood of being an inmigrant into a state. Welfare benefit variables were uniformly insignificant. Frey et al (1996) conducted a nested logit analysis of aggregate state-to-state migration flows using data from the *1990 Census of Population and Housing*. While they found some statistically significant "welfare magnet" effects, they concluded, "State welfare benefits exert similarly small effects on both the departure and destination selection of inter-State poverty migrants."[2] Enchautegui (1997) used a sample of women from the *1980 Census* Public Use Microdata Sample (PUMS). For movers, her binary probit model compared characteristics at the origin with those of the chosen destination, ignoring all other alternatives. Nonmovers compared origin characteristics with an average of characteristics of all potential destinations. Enchautegui more strongly supported a welfare magnet effect than did Cushing (1993), Frey et al (1996), or Zimmerman and Levine (1999), but in most cases found a relatively modest impact.[3] As discussed in Cushing (2002), with few exceptions such as Frey et al (1996), this literature had little or no accounting for space. None of the literature incorporated the spatial detail necessary to adequately model low-income

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[2] Frey et al (1996), p. 527.

[3] The only strong welfare benefit effect was for the subsample that received welfare benefits at the end of the period. This result is not surprising and may have been preordained by the sample selection.

migration. Cushing (2002) developed an array of variables that added a substantial spatial component to the analysis, with particular emphasis on measures of distance and the spatial distribution of population agglomerations. The empirical results do not support the existence of a general welfare magnet effect, which concurs with the more recent studies, but seems at odds with perceptions of many state government officials. In contrast, the analysis strongly supports the hypothesis of a more limited welfare magnet effect related to a combination of welfare differences and nearby large population agglomerations. Specifically, if a state has a substantial population agglomeration (presumably including a large poverty population) close to the border of a nearby state **and** the nearby state offers noticeably more generous welfare benefits, we can expect significant migration of the poor from the low-benefit state to the higher-benefit state. This second finding reconciles the largely weak empirical support for a welfare magnet effect with the strong perceptions of policy makers.

All of the literature on migration of the poor either explicitly or implicitly considered welfare benefits as an alternative source of income for low-income households in the utility maximization process. An individual's economic opportunities at a particular location were represented by welfare benefit opportunities and some combination of employment and other income opportunities. A general measure, such as per capita income or average hourly wage, generally served as proxies for the latter. This literature has given no thought to how minimum wage laws might affect low-income migration, though, intuitively, we should expect minimum wage laws to be relatively important for these predominantly low-skilled workers.

B. Minimum Wage Laws

The federal minimum wage was established by the Fair Labor Standards Act (FLSA) of 1938 as a remedy for the depression and as a tool for reducing poverty. Initially, the minimum wage was set at $0.25 per hour and only covered workers engaged in interstate commerce or in the production of goods for interstate commerce. Through a series of amendments, the minimum wage and its coverage have increased dramatically. By 1985, the beginning of the study period for this paper, the minimum wage stood at $3.35 per hour and covered 87 percent of the nonsupervisory civilian workforce. At a subnational level, Federal minimum wage coverage ranged from 78 percent in South Dakota to 93 percent in Washington, DC (Table 1). Major groups not subject to the minimum wage include supervisory workers (executive, administrative, and professional personnel), employees in some small firms, and, obviously, the self-employed.

The research literature on the federal minimum wage has primarily focused on two main issues: (1) disemployment effects and (2) anti-poverty effects. The bulk of the research on disemployment effects concludes that increases in the minimum wage result in reduced employment as would be suggested by standard analysis of a price floor – a wage floor above the equilibrium wage reduces the quantity demanded and increases the quantity supplied of labor (see Neumark, 2001 and Brown, Gilroy, and Cohen, 1982). The main debate among these studies regards the magnitude of the disemployment effect, though most have found a moderate effect, with the largest impact on teenagers. A few studies, however, have found positive, sometimes large, employment effects (for example Card and Krueger, 1994 and Card, Katz, and Krueger, 1994).

While not as extensive, the literature on anti-poverty effects of the minimum wage has grown rapidly in recent years. While some early studies, such as Mincy (1990), concluded that minimum wage increases reduce poverty, more recent research (Vedder and Galloway, 2002 and Neumark and Wascher, 2002) conclude that, at best, minimum wage increases have a neutral effect on poverty, and may have a detrimental effect. Neumark and Wascher (2002) conclude that a higher minimum wage increases the probability that poor families escape poverty, increases the probability that the near-poor fall into poverty (due to disemployment effects), and boosts the income of the poor who remain below the poverty line.

The literature on state minimum wage laws is sparse. Using panel data on state minimum wage laws and economic conditions for the years 1973-89, Neumark and Wascher (1992) reconsidered disemployment effects of the minimum wage. They found the same moderate disemployment effects that many have found with respect to changes in the federal minimum wage.

III. Migration of the Poor: Minimum Wages and Space

Though the literature has not reached a consensus regarding the direction or magnitude of minimum wage effects, clearly, minimum wage laws could significantly impact low-income people. With low wages, they stand to gain the most from minimum wage increases or increased coverage. As generally low-skilled workers, they also stand to lose the most from any disemployment effects.

These potential gains and losses from minimum wage laws vary over space as illustrated at the state level in Table 1. First, a spatially uniform federal minimum wage, combined with spatial variation in cost-of-living means that the real federal minimum wage varies spatially. Second, since occupational mix varies spatially, federal minimum wage coverage also varies spatially which translates into spatial variation in the likelihood of gains or losses from federal minimum wage laws. Finally, state minimum wage laws differ, which adds a third component of spatial variation to potential minimum wage effects.

Spatial variation in potential minimum wage effects suggests that minimum wage laws could play a role in migration decisions of low-income households as they seek to maximize utility. In fact, the influence of minimum wage laws on location decisions of low-income households might provide a unique "revealed preference" perspective to the debate regarding employment and poverty effects of minimum wage laws. If higher minimum wages and more complete coverage attract low-income people, then low-income people would appear to perceive net benefits from minimum wage laws. In contrast, if they move away from or avoid moving to states with higher minimum wages and better coverage, then they apparently expect net losses from minimum wage laws.

As discussed in Cushing (2002) with respect to spatial variation in welfare benefits, distance (space) may play a vital role in how low-income households respond to minimum wage law differences. If distance correlates with the monetary and psychic costs of migration, as well as with information about alternative locations, it may disproportionately inhibit migration of low-income people. It may discourage long distance moves and make such moves more risky, i.e., more likely to result in failure. This may prove critical when looking for a minimum wage effect.

Nominal state minimum wage levels exhibit regional clustering. The 13 locations with a state-minimum wage that exceeded the federal minimum in 1989 include all three west coast states (California, Oregon, and Washington), all six New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont), Minnesota and Connecticut (adjacent), and Pennsylvania and Washington, DC (nearly adjacent). Considering nominal wages, the inhibiting effects of distance could well cover up much of the minimum wage effect.

For most origins, the costs and risks would be high for the long-distance moves necessary to reap any significant minimum wage benefit. Likewise, if minimum wage laws impose net costs on low-income people, migrants do not need to make long distance moves to avoid high minimum wages, and most short-distance moves will yield little or no difference in minimum wages. In short, we are unlikely to find much of an overall state minimum wage effect for the low-income population.

If we focus on real minimum wages (adjusted for cost-of-living differences), however, spatial clustering appears to be less of an issue for state minimum wages.[4] After adjusting for cost-of-living differences, 25 of the 49 locations considered have a minimum wage that exceeds the federal minimum wage. These states are scattered throughout the United States (see Table 1).

I investigate the importance of spatial patterns of minimum wages using the same method used to investigate welfare benefits (see Cushing, 2002). If these spatial patterns are important, then the effect of minimum wage laws is most likely to show up where we have a combination of spatial proximity and differences, especially large differences, in state minimum wages. For a state-level analysis, we can capture the effect of proximity by pinpointing significant concentrations of population near the border of contiguous states. For example, even if higher minimum wages attract the poor, we should expect little migration of poor people from Idaho to Washington State, despite contiguity and a 51 percent real minimum wage premium in Washington relative to Idaho. Few people reside in Idaho close to the Washington border, making it unlikely that a migration path would be established. With only a moderate-size city (Spokane) in Washington close to the border with Idaho, Washington has relatively little to attract poor migrants from Idaho. On the other hand, consider the potential for low-income migration between New York and Connecticut. New York City lies on the western border of Connecticut, several Connecticut cities lie just east of New York City. In real terms, Connecticut's minimum wage was 18 percent higher than New York's in 1989. Thus, if space influences the response of low-income people to differences in minimum wage laws, we should expect it to impact migration between New York and Connecticut.

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[4] Adjusting for cost-of-living differences does not significantly alter the spatial pattern of welfare benefit differentials.

IV. Methodology

The analysis considers state-to-state migration. Some key characteristics of the underlying migration model ultimately lead to the choice of the econometric methodology. First, this study employs microdata to focus on individuals' decisions. Use of microdata calls for a discrete-choice framework such as logit or probit analysis. Second, unlike most microdata analyses of migration, I do not just consider individual migration decisions in a binary choice framework, e.g., "move" versus "don't move." Instead, the model incorporates each individual's choice from among 49 potential locations – remain in the initial home state or move to any of the other 48 contiguous states (with Washington, DC considered as if it were a separate state). The model relates migration choice to the location-specific characteristics of each of these 49 locations.

Choice of econometric methodology depends critically on assumptions regarding how individuals make migration decisions. Migration may be a sequential decision-making process. For example, an individual may first make the decision whether to move, followed by the choice of destination (for those who do move). This assumption underlies models considering the decision to move, separately from destination choice (for example Herzog and Schlottmann, 1986; Cushing, 1993; Clark, Knapp, and White, 1996; and Levine and Zimmerman, 1999), as well as models focusing only on destination choice of movers (Blank, 1988; Bartel, 1989). In the context of jointly modeling the decision to move and destination choice, an assumption of sequential decision-making leads to a nested logit framework, employed by Frey et al (1996).

Alternatively, Davies, Greenwood, and Li (2001) argued that the decision to move and choice of destination cannot be separated. Their logic leads to a conditional logit model. In practice, some individuals likely jointly make the decision to move and destination choice, while others follow a more sequential process. For now, however, I accept the perspective of Davies, Greenwood, and Li (2001) and apply a conditional logit model.

A random utility model motivates the conditional logit model.[5] For an individual initially in area *i* faced with *j* location choices, including remaining at the current location, suppose that the utility of choosing location *j* is

$$U_{ij} = \beta' x_{ij} + \varepsilon_{ij} \,,$$

[5] See Greene (2000), Chapter 19 for a more complete description of the conditional logit model.

where x_{ij} is a vector of choice-specific attributes. If the individual chooses destination j, then we assume that U_{ij} is the maximum among the J locational choices. Thus, the statistical model is driven by the probability that an individual from i chooses location j, which is

$$\text{Prob}(U_{ij} > U_{ik}) \text{ for all other } k \neq j$$

The model is made operational by a particular choice of distribution for the disturbances. Let Y_i be a random variable that indicates the choice made. Based on McFadden (1973), if and only if the J disturbances are independent and identically distributed with the Weibull distribution, then the probability of an individual from i choosing area j (where $j = i$ for nonmovers) is

$$\text{Prob}(Y_i = j) = \frac{e^{\beta' x_{ij}}}{\sum_k e^{\beta' x_{ik}}}$$

With 49 possible locational choices, the log-likelihood function generated by the above model is

$$\log L = \sum_{i=1}^{49} \sum_{j=1}^{49} d_{ij} \log \text{Prob}(Y_i = j) ,$$

where $d_{ij} = 1$ if $Y_i = j$ and 0 otherwise.

The x_{ij} vector includes choice-specific characteristics that influence individuals' migration decisions. These include economic and amenity characteristics, as well as variables reflecting the spatial relationship between locations. The nature of a conditional logit model requires some compromises in the variables included in this vector. The conditional logit model can only identify choice-specific attributes (those that vary across choices for a given individual), which eliminates characteristics of individuals, as well as origin-specific characteristics. The model could incorporate individual characteristics through a series of dummy variables and interaction terms. The coefficients of these terms would show whether an individual's personal characteristics affect his response to each choice specific attribute. Likewise, interacting origin characteristics with destination characteristics would indicate whether origin characteristics influence the effect of destination characteristics. Unfortunately, this would cause explosive growth in the number of parameters and computational complexity of an already large, computationally complex model.

Like Davies, Greenwood, and Li (2001), I retain the influence of most origin characteristics by entering choice-specific attributes as a ratio of the destination attribute relative to the corresponding origin attribute. While a restrictive formulation, this captures the concept that individuals compare alternatives with their current situation.[6] For a small number of variables, I use destination-origin differences instead of ratios in order to reduce multicollinearity. Many studies have shown that personal characteristics greatly influence the decision to move, e.g., DaVanzo (1978). To capture this effect, I interact some personal characteristics with a dummy variable related to the "don't move"/"move choice," i.e., choosing to remain at the origin versus choosing one of the other 48 locations.

The conditional logit formulation inherently assumes independence of irrelevant alternatives (IIA). IIA follows from the underlying assumption that the stochastic terms in the utility functions are independent. Intuitively, this assumption requires that the relative probabilities between choices must be independent of other alternatives, e.g., the relative probability of a Connecticut resident moving to New Jersey vs. Pennsylvania must be independent of the alternative of choosing New York. Undoubtedly, some individuals make migration choices in a way that satisfies the IIA assumption. As a general proposition, however, IIA is untenable. A complete test of IIA in a model with 49 choices is impractical. Davies, Greenwood, and Li (2001), undertook some limited testing of the IIA assumption, using the test proposed by Hausman and McFadden (1984). In turn, omitting Florida and Colorado, they could not reject IIA for their sample. I tested IIA for the same two cases. As often occurs, the Hausman-McFadden test could not be applied due to a nonpositive definite matrix. Instead, I applied an alternative test proposed by Small and Hsiao (1985) that avoids this problem. When omitting either Florida or Colorado, this test rejects the IIA assumption at the one percent significance level. The difference in conclusions regarding IIA compared with those of Davies, Greenwood, and Li (2001) may result from the different tests, levels of aggregation, or, most likely, sample sizes. The sample size for this study is large enough that almost any difference between models would be statistically significant. Ultimately, comparing empirical results from different modeling methods would better reveal the true importance (or cost) of maintaining the IIA assumption. For this paper, I accept the arguments presented by Davies, Greenwood, and Li (2001) in support of the conditional logit formulation and defer thorough consideration of the statistical and practical importance of the IIA assumption for a separate paper.

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[6] This formulation assumes symmetric responses for changes in an origin state characteristic and the corresponding destination characteristic.

V. The Data and Hypotheses

The migration data come from the five percent Public Use Microdata Sample (PUMS) from the *1990 Census of Population and Housing*. The PUMS data provide information on place of residence in April 1985 (beginning of period) and April 1990 (end of period). PUMS supplies a very large sample size and good geographic detail. This study restricts the sample to low-income (below the official poverty level) householders, aged 25 to 60 years old in 1990 (aged 20 to 55 at the beginning of the migration period). It excludes those serving in the military or attending school. The restrictions help the study focus on those making migration decisions (excludes children), those who might be attracted to higher welfare benefits or minimum wages (low-income working age people), and those making "normal" migration choices (not dominated by a prior choice to serve in the military or attend school). The full sample consists of 16,603 individuals. Of these, 1,499 (9.0 percent) resided in a different state at the end of the period then at the beginning (movers) and 15,104 (91.0 percent) resided in the same state at the end of the period as at the beginning (nonmovers). In this conditional logit model, with 49 choices, the data include 49 rows for each of the 16,603 individuals in the sample (one row per state) – 813,547 rows of data. The dependent variable, d_{ij}, equals 1 for the state of residence at the end of the period (1990) and equals zero otherwise.

To explain migration choices, I primarily employ an array of place characteristics that should affect the utility of residing in any particular location. Dummy variables and interaction terms capture effects of some personal characteristics. The place characteristics come from a variety of (mostly government) sources and cover four key categories of explanatory factors: (1) measures of economic opportunity, (2) demographics, (3) amenities/disamenities, and (4) spatial relationships. Migrants should prefer locations with better opportunities, all else equal. Economic opportunity measures include (with expected sign in parentheses) 1980-1988 growth of nonagricultural employment (+), average annual unemployment rate between 1984 and 1988 (-), 1985 per capita income (+), maximum AFDC benefit for a family of three (average of 1985 and 1990 levels) (+), 1985 cost-of-living (+/-), 1985 percentage of the nonsupervisory civilian workers *not covered* (100 percent minus the percentage covered as shown in Table 1) by the federal minimum wage (+/-), and the state's 1989 effective minimum wage (+/-).[7,8] Consistent

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[7] All economic opportunity and demographic variables come from standard Federal Government sources. The family of three for the welfare benefit variable includes one adult and two children with no other source of income.
[8] Interstate cost-of-living differences come from McMahon and Chang (1991).

with the literature's mixed results regarding minimum wage effects on employment and poverty, I do not hypothesize any particular sign for the coefficients of cost-of-living and the two minimum wage variables. On the whole, I expect lower cost-of-living to attract low-income migrants, however, a substantial disemployment effect for higher real minimum wages could offset this. Since higher cost-of-living locations typically have a higher overall wage structure, disemployment effects of the fixed federal minimum wage should be less in higher cost locations.

Demographic variables include 1985 population (+/-) and 1985 population density (+/-). These likely capture some advantages (more diverse opportunities, stronger support network, better information, better public transportation, larger population of similar people) and some costs (higher crime, more congestion, greater likelihood of a slum) of larger, more densely populated locations. Previous research suggests that population size will tend to reflect advantages of large agglomerations and density will reflect more of the disadvantages. The model includes three location-specific amenities/characteristics: average January temperature (+), type of terrain, and coastal/noncoastal location.[9] Numerous studies have found evidence that more pleasant climates exert a significant, often large, attractive effect on location decisions. I hypothesize that individuals prefer terrain and coastal characteristics similar to those at the origin. This assumes that, at a given point in time, individuals will tend to have sorted themselves by preferences for terrain and coastal location. Presumably, these measures capture not only preference for landscape, but also other factors such as types of outdoor recreational activities. The coastal measure equals 1 if the coastal characteristics of a potential destination differ from the origin, i.e., coastal origin with noncoastal destination or noncoastal origin with coastal destination; equals zero otherwise. I expect a negative sign on the coefficient. The underlying measure of terrain is an index that varies from 1 (completely flat) to 9 (extreme variation in the gradient of the land within a state). Thus, the measure of absolute change in terrain varies from zero (no difference between origin and potential destination) to 8 (completely flat origin with extremely mountainous destination or extremely mountainous origin with completely flat destination).[10] I expect a negative sign on the coefficient. Intuitively, one

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[9] For each state, temperature data are a weighted average of cities >100,000 (or principal city if no cities >100,000). Data are 30-year means from the National Oceanic and Atmospheric Administration.

[10] Cushing (1987) developed the underlying index, which is based on measures of "local topographical relief" provided in the *National Atlas of the United States of America* (U.S. Geological Survey).

expects low-income individuals to give greater weight to economic opportunities than to amenities such as climate. If so, then these location-specific amenities will influence destination choices less strongly than economic opportunities.

Several variables model the spatial relationship or connection between origins and potential destinations. This study employs the standard measure of distance: highway mileage between principal cities of the origin and each destination state (-). Greater distance imposes monetary, informational, and psychic costs on potential migrants. The model includes a migrant stock variable (+) similar to that used by Greenwood (1969) and others. It is the number of persons born in origin state *i* but residing in destination state *j* in April 1985, as a percentage of the 1985 population of state *i*. Scholars have debated whether a positive migrant stock impact represents a family, friends, and information effect or whether it simply reflects temporal stability in migration patterns, thus diminishing the estimated effects of other variables. Since this may be a relatively more important source of information for low-income, poorly educated individuals, I retain migrant stock. A return migration variable captures another aspect of the relationship between origins and destinations. The importance of return migration is well documented. For this study, 38 percent of the sample resided outside of their state of birth in 1985. Of these "nonnatives," 17 percent (6.5 percent of the full sample) resided in a different state in 1990 than in 1985 (movers). Of these movers, 40 percent returned to their state of birth. I include a binary dummy variable, Movehome (+), which equals 1 when the origin state differs from the state of birth ***and*** the potential destination state is the state of birth.

AFDC benefits tend to cluster by region, i.e., low-benefit states tend to be surrounded by similarly low-benefit states. On the other hand, low-income people are less able to afford migration costs (monetary, information, and psychic), so that distance may be too great a barrier to take advantage of higher AFDC benefits in a far-off state. Welfare-induced migration more likely occurs when a potential migrant resides close to a state that offers significantly higher welfare benefits. The combination of higher welfare benefits in a potential destination state and proximity to that state's border should yield more information and lower monetary and psychic costs of taking advantage of the higher benefits, thus leading to greater likelihood of migration. The PUMS data only provides information on location at the level of the Public Use Microdata Area (PUMA) – areas that include at least 100,000 individuals. Since a PUMA often covers a large area, sometimes even noncontiguous areas, knowing the PUMA of origin does not always tell us whether a person resides close to a bordering state. I approximate proximity with a measure of origin population agglomeration within 50 miles of the destination state – the larger the population concentration near the border, the more likely that a given individual resides near the border.[11,12] Using this, I interact the AFDC Benefit Ratio and Origin Cluster variables.

The model also includes a variable that interacts this AFDC-Cluster interaction with a measure of destination population agglomeration within 50 miles of the origin state. The combination of higher destination welfare benefits and the advantages of a nearby, large population, such as better employment opportunities and more support services, may enhance the effect of the initial AFDC-Cluster interaction.

For similar reasons, I interact the state minimum wage variable with the same cluster variables. Whether state minimum wages have a positive or a negative effect, the cluster variables should enhance that effect if spatial patterns of minimum wages affect the minimum wage response.

Ultimately, I test the following minimum wage hypotheses for low-income movers:

(1) lower cost-of-living changes (probably increases) the likelihood of choosing a state;

(2) lower coverage by the federal minimum wage law or a higher state minimum wage change the likelihood of choosing a state, with the direction of the effect ambiguous

(3) the state-minimum-wage effect is stronger for destinations that have substantial origin population concentrations just across the border – where potential migrants likely live near the border;

(3) this interaction effect is stronger for destinations that have own population concentrations just across the border from an origin – near to potential migrants.

Finally, the empirical model includes a binary dummy variable for the potential choice of remaining at the origin (STAY = 1 for the choice of remaining at the origin), as well as three interactions with this dummy variable. As discussed in Davies, Greenwood, and Li (2001), the choice not to move (remain in the origin) differs greatly from all other choices. The decision to remain at the current location avoids the presumably substantial, unobserved costs of moving.

[11] Data are tabulated at the census tract level. If any part of a census tract is within 50 miles of a particular state's border, then the entire census tract population is counted as being within 50 miles of that nearby state.

[12] The wide range of the population concentration variable (from zero to several million people) hampered convergence of the conditional logit model. The analysis employed a multi-level dummy in place of the population concentration data. The dummy variable equals 3 for a concentration exceeding one million people; 2 for a population between 500,000 and 999,999; 1 for a population between 250,000 and 499,999; equals zero otherwise.

This bias toward inertia should result in a positive coefficient for STAY. Like return migration, repeat migration, i.e., the higher propensity to migrate for those who have already migrated at least once, has been well documented. In the data used here, of those who resided in their state of birth in 1985, just 4.1 percent resided in a different state in 1990. As noted above, of those who resided outside of their state of birth in 1985, 18.1 percent resided in a different state in 1990. The model includes an interaction between STAY and a binary dummy for potential repeat migration (Repeat = 1 if the origin state differed from the state of birth). A negative coefficient for the STAY*Repeat coefficient would indicate a lower likelihood of remaining at the origin (greater mobility) for those not born in the origin. Strong theoretical and empirical bases support the proposition that age and educational level influence mobility. The STAY*College variable interacts STAY with a binary dummy variable that equals 1 for a person with a bachelor's degree. A negative coefficient would indicate a lower likelihood of remaining at the origin for the highly educated. STAY*Age interacts STAY with an individual's age. A positive coefficient would indicate that likelihood of remaining at the origin increases with age.

VI. Empirical Results

Table 2 presents empirical results for the conditional logit estimation. Most (16 of 23) estimated coefficients have the expected sign and are statistically significant at the five-percent level or better. Coefficients for employment growth, the unemployment rate, welfare benefits, cost-of-living, and three cluster interaction variables are statistically insignificant.

The insignificance of the cost-of-living coefficient does not support the first of the four minimum wage hypotheses for low-income movers, i.e., this variable does not appear to affect migration through its effect on the real federal minimum wage. Having a relatively greater percent of employment not covered by the federal minimum wage reduces the likelihood of inmigration. A higher state minimum wage (locations with a state minimum greater than the federal minimum) attracts low-income migrants. The results for the coverage and state minimum wage variables support the hypotheses that low-income adults are attracted to locations with better minimum wage support. This suggests that low-income individuals perceive that they benefit from stronger minimum wage laws and higher minimum wage levels. If low-income people suffer disemployment effects from minimum wage laws, apparently, they see this cost as less than the benefits of better minimum wages. Statistical insignificance of the two interaction terms indicates that distance and spatial patterns of minimum wage levels do not play a role in migration decisions. The wide distribution of real state minimum wages that exceed the federal minimum wage appears to provide ample nearby opportunities to take advantage of better minimum wage support.

To aid in interpreting results for welfare benefits and other variables, Table 3 presents the estimated direct probability elasticities (column 2), values for the explanatory variables (column 3), estimated effects on the probability of migration, i.e., the proportional change in predicted migration (column 4), and estimated effects on predicted migration (column 5) from New York to Connecticut.[13,14] The elasticities are computed as

$$\frac{\partial log\ P_j}{\partial log\ x_{jm}} = \beta_m x_{jm}(\text{-}P_j),$$

where x_{jm} is attribute *m* of choice *j*. For an individual initially residing in New York, the model estimates a base probability of moving to Connecticut equal to 0.0062. Using the U.S. Bureau of the Census' *Consumer Population Survey* estimate that 2,796,000 poor people resided in New York in 1985, the model predicts that 17,319 poor people migrated from New York to Connecticut between 1985 and 1990.[15] Several explanatory variables have a value of zero for this specific case and must be considered in a more general context.

Table 3 shows that the minimum wage noncoverage and state minimum wage variables have modest elasticities, 0.04 and 0.17 respectively (column 2). If Connecticut's level of noncoverage was as high as New York's, i.e., about 1.17 percentage points higher (column 3), the model predicts that migration of low-income people from New York to Connecticut would decline by about 4 percent (column 4), or by about 747 people. Likewise, if Connecticut's real state minimum wage was as low as New York's, i.e., about 55 cents lower in real terms (column 3), the model predicts that migration of low-income people from New York to Connecticut would decline by about 15 percent (column 4), or by about 2,638 people.

Results for the AFDC variables are also particularly pertinent for a study of low-income migration. Since the AFDC*Origin-Cluster interaction variable has a value of zero for

[13] These elasticities relate to an individual not born in Connecticut, i.e., MOVEHOME=0.

[14] For each state, the conditional logit estimation also can provide estimated cross probability elasticities with every other state. A change in the probability of moving from state *i* to state *j* must affect the probability of moving from *i* to at least one other state (since probabilities must sum to 1.0). The large number of choices leads to very small cross elasticities.

[15] The CPS data refer to the total poverty population, while the regression focuses on the working-age poverty population. Thus, the estimated effects on predicted migration in column 5 should be viewed as ballpark estimates provided for illustrative purposes. The values in column 4 of Table 3, however, come from the regression results, thus are valid,

93 percent of the observations, its mean is very low, yielding a deceptively small average elasticity for the full sample – approximately 0.034. As Table 3 shows, however, this variable can be important for adjacent states, having the second largest elasticity (0.90) for the origin-destination pair of New York-Connecticut. If the AFDC*Origin-Cluster variable is set equal to zero, the model predicts that migration would fall by 10,274, a 59 percent drop. This decline has two components, an AFDC component and a cluster component. If we retain the population cluster, but set the AFDC Benefit Ratio equal to 1.0 for this variable (maximum benefits in New York exactly equal those in Connecticut), the AFDC component yields a 1,045 (6 percent) decline in predicted migration.[16] Doing away with the cluster component yields an additional 9,229 (53 percent) decline in predicted migration. The total effect and the cluster component, by itself, far exceed every other change shown in Table 3. Together, the two components of the second AFDC interaction variable also yield a fairly large change in predicted migration, but the estimated coefficient and elasticity are statistically insignificant. The effect of the AFDC benefit ratio is very small and statistically insignificant. For most migration alternatives, welfare benefit differentials have little influence on migration decisions of low-income individuals. The combination, however, of noticeable welfare benefit differences between two states and proximity, as measured in this model by large origin population agglomerations near the border of the two states, may have a significant attractive effect, resulting in a large amount of welfare-induced migration between some proximate states.

The other three variables that capture spatial relationships and connections between states also have significant explanatory power regarding migration of the poor, with the return migration variable playing a particularly important role. Given the proximity of the major population centers of New York and Connecticut, distance, with an elasticity of -0.03, has a very modest influence on New York-Connecticut migration. Migration would be about three percent greater if their primary population centers were immediately adjacent. Distance becomes a much greater barrier for more distant states. Considering all origin-destination pairs, the mean elasticity is about –0.5. Using this mean elasticity, increasing the sample average distance of 1.170 (1,170 miles) by 50 percent (585 miles) would reduce migration by 25 percent. Distance

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regardless of the base poverty population used for the illustration.

[16] For the discussion of Table 2, most of the effects on predicted migration can be reasonably approximated using the information in columns 2 and 3. Since the elasticities are not constant, however, this simple method is not exact and, for large percentage changes in X, may give results substantially different from the precise results presented in the last two columns.

elasticities tend to be much higher for the larger, more spatially isolated western states. Though it has a larger (but still very small) elasticity, Migrant Stock has a slightly smaller effect than Distance for the New York-Connecticut example. Predicted migration would be two percent lower without a migrant stock effect. Migrant Stock's influence remains modest for most state pairings. A more precise family-friends measure would likely draw out this factor more effectively. Movehome only applies to those who resided outside their state of birth in 1985 and moved during the 1985-1990 period. For the New York-Connecticut case, the model predicts that a low-income individual born in Connecticut had a 15.4 percent probability of residing in Connecticut in 1990 – 24 times more likely to move to Connecticut than other poor people residing in New York in 1985, all else equal.[17] As other studies have concluded for the population in general, return migration is a potentially powerful factor for explaining migration of the poor.

Of the economic opportunity variables, only Per Capita Income strongly affected migration. As for almost all origin-destination pairs, its elasticity greatly exceeds all others. For the New York-Connecticut case, the model predicts that migration to Connecticut would have been 18 percent lower had Connecticut's income level been lowered to match that of New York. Employment Growth and the Unemployment Rate had no statistical effect on low-income migration. These results may simply indicate information and mobility constraints, as well as greater reliance on spatial, family, and other connections to potential destinations. Climate (Mean January Temperature) had a fairly large elasticity in this case, but ultimately only a small impact on migration from New York to Connecticut – not surprising since their climates are not much different.

Population exerted a very small positive effect on migration choices – matching New York's population would have increased migration to Connecticut by just two percent. Despite its small elasticity for most state pairs, Population's wide range of values suggests potential for substantial effects for some pairs of states. Population Density's negative effect varied widely across the states. Despite the very high density in New York City, Connecticut's population density is 76 percent higher than New York State's density. Though its elasticity is very small

[17] The proportional difference in probability is [P(evaluated for person born in the destination state)-P(evaluated for person not born in the destination state)]/ P(evaluated for person not born in the destination state). This can be approximated by $e^a - 1$, where a is the coefficient of MOVEHOME (not exact since it only applies to part of the sample in this case). I use a similar computation to interpret the influence of the other discrete variables.

for this case, reducing Connecticut's density to the level in New York State, as a whole, would increase low-income migration from New York to Connecticut by nearly six percent. Like Population, Population Density's wide range of values indicates potentially large impacts on some migration choices.

As hypothesized, people appear to prefer topography similar to their origin state. For this sample, a change in coastal characteristics reduced predicted migration by 22 percent. For ΔTerrain, which varies from zero (origin and destination have similar terrain) to eight (origin and destination have opposite terrains – one very mountainous, the other flat), a one-category change reduces predicted migration by about three percent. The maximum change (from 0 → 8 or 8 → 0) reduces predicted migration by 24 percent, roughly the same magnitude as the effect of a change in coastal characteristics. These two location-specific characteristics may capture a more general preference to remain in a familiar region or setting.[18]

Finally, we consider the dummy variable for the potential choice of remaining at the origin and its interaction with personal characteristics. Based on the coefficient of STAY, unobservable costs associated with moving make the probability of moving 95 percent lower than the probability of not moving, i.e., about 18 times more likely to remain at the origin than to move. As expected, those not residing in their state of birth in 1985 (potential repeat migrants) were more mobile, only about 5 times more likely to remain at the origin than to move. Those holding a bachelor's degree also had greater mobility, about 9 times more likely to remain at the origin than to move. Age increases the likelihood of staying at the origin. For example, an additional ten years of age yields a probability of moving 96 percent lower than the probability of not moving, i.e., about 27 times more likely to remain at the origin than to move.

VII. Conclusion

There is a substantial literature on migration of the poor, spanning more than three decades. Mostly, this literature has focused on the relative importance of welfare programs versus labor market opportunities in the migration decisions of the poor. In modeling labor market opportunities, this migration literature has not considered the minimum wage, even though intuition suggests that, compared with the nonpoor, low-income individuals might have a

[18] For the Terrain variable, the analysis described in footnote 20 is extended. The proportional change in probability = $e^{a(\Delta x)} - 1$, where Δx can vary from zero to eight.

relatively greater interest in the levels and coverage of the minimum wage and how these vary over space. Parallel to the migration literature, a still rapidly growing literature has developed regarding the effect of minimum wage laws on U.S. poverty. Much of this minimum wage literature has focused either directly or indirectly on disemployment effects of minimum wage laws. In trying to determine whether minimum wage laws, in net, help or hurt the poor, no one seems to have considered how the poor respond to minimum wage laws, in particular, how they "vote with their feet" in response to spatial differences in minimum wage coverage or levels.

At first glance, a minimum wage that is spatially uniform does not seem like a good candidate to influence migration decisions. Three aspects of the minimum wage, however, might alter migration choices: (1) a fixed nominal minimum wage combined with spatially varying cost-of-living means that real minimum wages vary spatially; (2) minimum wage coverage varies spatially since occupational mix varies; (3) nominal and real state minimum wages vary widely over space.

This research has investigated the extent to which minimum wage laws affected migration choices of low-income households in the United States during the 1985-1990 period. I have considered all three of the aspects noted above. I find strong evidence that minimum wage laws influence migration decisions of the poor. The extent of federal minimum wage coverage has a modest, but significant effect on low-income migration. The level of a state's minimum wage has a much larger effect on migration. For the example used to illustrate the logit results, migration from New York to Connecticut, if Connecticut's real state minimum wage and federal minimum wage coverage were reduced to the levels in New York, the model predicts about a 20 percent reduction in migration of the poor, about 3,400 fewer migrants in this case. This provides further evidence that poor people respond to income/labor market incentives - in the New York- Connecticut case, per capita income, welfare benefits, and the level of the state minimum wage yielded the three largest impacts on low-income migration. The minimum wage results suggest that poor people perceive net benefits from higher minimum wages and more complete minimum wage coverage, which should be of interest for those investigating how minimum wage laws affect the poor.

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Table 1: Minimum Wages and Coverage by State, 1985-1989

State	Cost-0f-Living 1985[a]	Real Federal Minimum Wage 1985 ($)[b]	Percent Coverage 1985[c]	Nominal State Minimum Wage 1989 ($)	Real State Minimum Wage 1989 ($)[b]	State Minimum/ Federal Minimum 1989
US	100.00	3.35	87.4	3.35	3.35	1.00
AL	93.35	3.59	87.6			
AZ	94.40	3.55	89.8			
AR	93.81	3.57	86.9	3.30	3.52	1.05
CA	110.86	3.02	87.1	4.25	3.83	1.14
CO	101.90	3.29	88.6	3.00	2.94	0.88
CT	116.70	2.87	88.4	4.25	3.64	1.09
DE	106.02	3.16	88.1	3.35	3.16	0.94
DC	117.59	2.85	92.6	3.50	2.98	0.89
FL	96.14	3.48	87.2			
GA	95.96	3.49	87.5	3.25	3.39	1.01
ID	90.81	3.69	80.1	2.30	2.53	0.76
IL	103.86	3.23	89.3	3.35	3.23	0.96
IN	98.14	3.41	87.7	2.00	2.04	0.61
IO	98.82	3.39	80.6	3.35	3.39	1.01
KS	99.61	3.36	85.0	2.65	2.66	0.79
KY	93.22	3.59	84.3	3.35	3.59	1.07
LA	95.93	3.49	87.5			
ME	97.44	3.44	85.7	3.75	3.85	1.15
MD	106.13	3.16	88.0	3.35	3.16	0.94
MA	113.23	2.96	88.6	3.75	3.31	0.99
MI	101.50	3.30	89.1	3.35	3.30	0.99
MN	103.81	3.23	86.7	3.85	3.71	1.11
MS	93.07	3.60	87.8			
MO	100.57	3.33	88.2			
MT	91.91	3.64	79.7	3.35	3.64	1.09
NE	98.85	3.39	82.5	3.35	3.39	1.01
NV	97.68	3.43	91.3	3.35	3.43	1.02
NH	102.18	3.28	87.2	3.65	3.57	1.07
NJ	113.32	2.96	87.0	3.35	2.96	0.88
NM	93.53	3.58	86.4	3.35	3.58	1.07
NY	108.19	3.10	87.2	3.35	3.10	0.92
NC	98.12	3.41	87.0	3.35	3.41	1.02
ND	94.36	3.55	80.1	3.10	3.29	0.98
OH	100.62	3.33	88.4	2.30	2.29	0.68
OK	94.65	3.54	87.5	3.35	3.54	1.06
OR	98.74	3.39	85.4	3.85	3.90	1.16
PA	102.06	3.28	87.8	3.70	3.63	1.08
RI	102.15	3.28	88.3	4.00	3.92	1.17
SC	92.89	3.61	87.3			
SD	93.57	3.58	78.1	3.35	3.58	1.07
TN	95.67	3.50	87.2			
TX	95.86	3.49	88.1	3.35	3.49	1.04
UT	90.41	3.71	86.8	3.35	3.71	1.11
VT	97.44	3.44	84.5	3.75	3.85	1.15
VA	104.83	3.20	88.8	2.65	2.53	0.75
WA	99.98	3.35	85.2	3.85	3.85	1.15
WV	92.93	3.60	88.1	3.35	3.60	1.08
WI	100.04	3.35	85.8	3.65	3.65	1.09
WY	94.28	3.55	83.8	1.60	1.70	0.51

[a] Normalized to U.S. = 100.0; McMahon and Chang (1991), Table 3.
[b] Adjusted for cost-of-living, using McMahon and Chang (1991), Table 3.
[c] Percentage of nonsupervisory employees covered by the federal minimum wage; Employment Standards Administration (1986), Table 10.

Table 2 - Empirical Results for Conditional Logit Estimation of a Poor Person's Migration Decision

Variable	Coefficient Estimates	t-ratio
Employment Growth Ratio	0.005	0.83
Unemployment Rate Ratio	-0.009	-0.09
Per Capita Income Ratio	2.782	7.72***
Mean January Temperature Ratio	0.513	10.17***
Population Ratio	0.024	2.43**
Population Density Ratio	-0.073	-6.44***
ΔTerrain	-0.034	-2.07**
ΔCoast	-0.253	-4.47***
Distance (ooo^s miles)	-0.447	-7.37***
Migrant Stock	0.035	14.31***
AFDC Benefit Ratio	-0.045	-0.59
AFDC*Origin-Cluster	0.280	4.12***
AFDC*Origin-Cluster *Destination-Cluster	-0.019	-0.72
STAY	2.960	14.82***
STAY*Age	0.036	11.86***
STAY*Repeat	-1.100	-16.11***
STAY*College	-0.646	-6.54***
Movehome	3.372	49.92***
Cost-of-Living Difference	-0.008	-1.38
Minimum Wage Non-Coverage Difference	-0.038	-3.13***
State Minimum Wage Difference	0.305	2.47**
State Minimum Wage *Origin-Cluster	-0.033	-0.13
State Minimum Wage *Origin-Cluster *Destination-Cluster	-0.010	-0.10

Table 3 – Direct Probability Elasticities and Predicted Migration Effects for Origin=New York and Destination=Connecticut[a]

Variable	Direct Probability Elasticity	Sample Value of X	Proportional Δ in Probability of Migration	Effect on Predicted Migration
Employment Growth Ratio	0.01	1.279	-0.001	-22
Unemployment Rate Ratio	-0.01	0.674	-0.003	-49
Per Capita Income Ratio	**2.96**	**1.072**	**-0.180**	**-3113**
Mean January Temperature Ratio	**0.53**	**1.046**	**-0.023**	**-399**
Population Ratio	**0.00**	**0.179**	**0.020**	**344**
Population Density Ratio	**-0.13**	**1.759**	**0.056**	**974**
ΔTerrain		**1.000**		**600**
ΔCoast		0.000		
Distance (ooo^s miles)	**-0.03**	**0.059**	**0.027**	**460**
Migrant Stock	**0.06**	**1.583**	**-0.020**	**-350**
AFDC Benefit Ratio	-0.05	1.074	0.003	58
AFDC*Origin-Cluster	**0.90**	**3.223**	**-0.06 (AFDC)** **-0.53 (Cluster)**	**-1045** **-9229**
AFDC*Origin-Cluster *Destination-Cluster	-0.18	9.670	0.01 (AFDC) 0.18 (Cluster)	216 3172
STAY		0.000		
STAY*Age		0.000		
STAY*Repeat		0.000		
STAY*College		0.000		
Movehome		0.000		
Cost-of-Living Difference	-0.07	8.500	0.069	1187
Minimum Wage Non-Coverage Difference	**0.04**	**-1.167**	**-0.043**	**-747**
State Minimum Wage Difference	**0.17**	**0.546**	**-0.152**	**-2638**
State Minimum Wage *Origin-Cluster	-0.05	1.637	-0.04 (MinWage) 0.10 (Cluster)	-762 1723
State Minimum Wage *Origin-Cluster *Destination-Cluster	-0.05	4.912	-0.04 (MinWage) 0.09 (Cluster)	-658 1483

[a] For ratio variables, setting Connecticut equal to New York means setting X=1.0. For Distance and Migrant Stock, X is set equal to zero. Effects for statistically significant coefficients are in **bold**.