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ABSTRACT

During the Great Depression, as in the modern era, in-migrants were accused of taking jobs and crowding relief rolls. Unlike today, the targets of protest during the Depression were typically American citizens from other parts of the country, rather than the foreign born. Using aggregate data on internal migration flows matched to individual records from the 1940 Census, we analyze the impact of internal migration on various labor market outcomes. To control for the likely endogeneity bias that would arise if migrants were attracted to areas with high wages or plentiful work opportunities, we instrument for migration flows. The instrument predicts out-migration from local areas using extreme weather events and variations in the generosity of New Deal programs and assigns these flows to destinations based on geographic distance. As in many contemporary studies of immigration, our results indicate that residents of metropolitan areas with high in-migration rates did not experience a drop in hourly earnings. Instead, longer term residents of high in-migration areas experienced three types of economic dislocation. A significant number moved away. Many of those who stayed experienced either a drop in annual weeks of work and/or reductions in access to work relief jobs. During a Depression with extraordinary unemployment and an extensive amount of job sharing, these lost work opportunities were costly to existing residents.

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The large flow of immigrants to the United States during the past three decades has renewed public debate over the economic costs and benefits of immigration. Do immigrants depress the wages of native workers? Do they use more public resources – including transfer payments, public schooling and emergency medical care – than they pay in taxes? Similar debates swept the nation during the Great Depression, although the primary concern at that time was not with foreign arrivals, as strict quotas had effectively closed the border in 1924, but rather with internal migrants. The hostility of Californians toward Dust Bowl migrants vividly portrayed in John Steinbeck's novel *The Grapes of Wrath* is a clear illustration of this social anxiety.[1]

Our analysis of the effect of internal migration on the annual earnings and employment of existing residents in major American cities in the 1930s suggests that Californian's concerns were not unfounded. Residents of cities that experienced positive net flows of internal migration earned less, primarily due to fewer weeks worked during the year rather than to lower weekly or hourly wages. They were also less likely to hold a public relief job, conditional on being out of work. That local labor markets responded to migration supply shocks through reductions in employment rather than through lowered wages is consistent with the aggregate combination of sticky wages, job sharing, and high unemployment that was present throughout the 1930s (Bernanke, 1986; Margo, 1993; Hanes, 1996). [2]

The 1930s are a unique laboratory for exploring the causal impact of migration on the labor market. A major empirical hurdle facing the literature is that immigrant locations are not randomly assigned. Rather, immigrants are attracted to cities with relatively high wages or strong wage growth. Thus, immigrants' location choices have the potential to obscure the effect of heightened competition in the labor market. During the Depression, many internal moves were

motivated by negative shocks to a migrant's home economy. Because these moves occurred within the United States, we have a wealth of information about the economic conditions in sending areas. We use data on these "push" factors – including weather conditions and the generosity of New Deal policies – to predict out-flows from major US markets, which we then assign to destinations based on the geographic proximity between source-destination pairs.[3]

Another benefit of using internal population flows to study labor market adjustment is that they are far less geographically concentrated than international migration is today. In 2000, for example, 38.4 percent of immigrant households resided in the four top destinations (New York, Los Angeles, Chicago, and San Francisco). In contrast, the four largest destinations in the late 1930s housed only 4.4 percent of internal migrants. The clustering of immigrants in a few gateway cities has complicated the interpretation of modern results, confounding the effect of immigration with general economic trends on the coasts.

I. Searching for the Economic Effects of Immigration

One of the underpinnings of anti-migrant sentiment is the fear that new arrivals drive wages down (and the local cost of living up), lowering the standard of living for the existing population. In a basic model of the labor market, migration flows into a city represent an outward shift in the supply function of labor. This would lead to an unambiguous decrease in wages, unless the new population increased the demand for locally-produced goods and services – and thus labor demand – sufficiently to offset the increase in labor supply. Because American cities are tied to integrated national market for products, it is likely that the supply effect dominates the increase in derived labor demand.

This proposition has been tested in the United States in a variety of historical periods. Goldin (1994) documents that the mass migration from Europe at the turn of the 20th century led to a large reduction in the wages of native-born workers.[4] Few studies using modern data – with the exception of Altonji and Card (1991) – have detected a wage response of this magnitude, and many find no effect on wages at all (for a survey of this literature, see Friedberg and Hunt, 1995). This disparity could reflect a true change over time in the response to a local shock – for example, a nationally integrated labor market may allow a local disturbance to dissipate more rapidly – or may simply be the result of differences in available measures and research design.

The weak relationship between immigration and wages in port-of-entry labor markets has prompted an on-going discussion about other margins along which local areas may adjust. Borjas, Freeman and Katz (1997) point out that if new arrivals induce some of the existing workforce to relocate, then these out-migrants will spread the economic costs of immigration to other areas. More generally, with the free flow of factors between cities, the initial wage and/or employment response to a labor supply shock might be tempered in the long-run by the out-migration of labor or the in-migration of capital (Blanchard and Katz, 1992). Thus, the downward pressure of immigration on wages at the national level might be much larger than comparisons of local labor markets would suggest (Borjas, 2003; Ottaviano and Peri, 2006).[5]

The empirical evidence on such factor mobility is mixed. Filer (1992) finds that immigrants crowd out existing workers on a one-for-one basis. However, more recent studies have not detected an appreciable out-migration response to international arrivals (see Card, 2001; Wright, Ellis and Reibel, 1997; and Kritz and Gurak (2001).[6] On the capital side, Lewis (2003, 2004) proposes that local labor markets have adjusted to low-skilled immigrants today through slower adoption of skill-biased computer and information technology.

Building on this recent work, we attempt to provide a comprehensive picture of local adjustment to internal migration during the Great Depression. To that end, we examine not only the wages and employment rates of local workers, but also the out-migration of existing residents and the creation of new establishments.

II. Data on Internal Migration and Labor Market Outcomes in the 1930s

A. Internal Migration

The 1940 Census was the first to gather systematic information on the medium-term mobility of the US population. Respondents were asked to report both their current location and their place of residence in 1935. Aggregate data on the population flows between each market pair are published in a 134-by-134 matrix. Areas are broken down into the 86 cities with more than 100,000 residents in 1940 and 48 balance-of-state areas. For our primary analysis, we focus on the city-level data, which better conforms to the notion of a local labor market. Whenever possible, we further aggregate the city data to match Standard Metropolitan Areas (SMA). Because some SMAs have multiple central cities – for example, Oakland and San Francisco anchor a single SMA – we are left with 73 metropolitan areas, 69 of which have complete data.[7] While we use the SMA concept to guide our aggregation decisions, our data captures *only* those migrants who settle in the central cities of these areas, rather than the surrounding suburban counties. In fact, some individuals who are classified as in-migrants from the balance of a city's own state might have moved to the city from the suburban ring, thus having no net effect on local labor supply. Mis-measurement of this type will attenuate our OLS estimates, providing an additional motivation for our instrumental variables analysis.

From this mobility table, we calculate the total number of migrants arriving in (as well as the number leaving) each labor market. Our variables of interest are five-year migration *rates*, or the number of migrants to arrive in (leave) the city between 1935 and 1940 as a share of the existing population in 1935.[8] We exploit the full matrix to construct our instrument, which requires knowing the source area for all in-migrants and the destination for all out-migrants.

One benefit of the aggregate Census data is that it contains full counts of people moving into and out of an area. In contrast, existing studies typically use changes in the percentage of the population that is foreign-born, a measure that does not account for any induced out-migration of natives that might mitigate the measured labor supply shock.

While migration counts are available by gender and race, black migration is highly skewed towards a few large cities during this period and is otherwise of negligible magnitude. Thus, we combine data on blacks and whites into a single flow. We focus only on men, with our migration rates capturing men of all ages, some of whom may have been too young or too old to participate in the labor market.

B. Economic Outcomes

We use individual records from the IPUMS to measure a set of economic outcomes for non-migrants residing in one of the 69 metropolitan areas in our sample in 1940 (Ruggles and Sobek, 2003). Our attention is limited to men between the ages of 18 and 65, who were not self-employed, living in group quarters, in the armed forces, or currently enrolled in school.[9]

We explore the effect of net migrant arrivals on three spheres of economic activity: earnings, employment and out-migration. Annual earnings and its subcomponents – weekly wages and weeks worked during the past year – are computed for men who report being

employed at the time of the Census, working a positive number of hours, and earning a positive income in the past year.[10] We also measure hourly wages, but these results are particularly subject to measurement error given that hours are only reported for the Census week. Following the practice of Depression-era statistics, we only consider men holding a private sector or non-relief public sector job to be employed (Lebergott, 1964; Darby, 1976). We investigate the impact of migrant arrivals on two forms of non-employment: holding a relief job and being idle (that is, being unemployed or out of the labor force). To examine the mobility response of existing residents to new arrivals, we consider the sample of men who were living in one of the 69 metropolitan areas in 1935, and define an indicator equal to one for those who had left by 1940.

The micro data has three key advantages over local area aggregates. First, aggregate earnings data are only available at the local level for three sectors – manufacturing, retail and wholesale trade – whereas the micro data encompasses the whole labor market. Second, we can control for key determinants of wage and employment outcomes at the individual level, including age, education and race. This adjustment might prove important if selective out-migration changes the composition of the remaining labor force, or if migrants are attracted to cities with certain labor force characteristics. Finally, we can directly exclude in-migrants from the sample. Our estimates can then be interpreted as a treatment effect of migration on the existing workforce, rather than a compositional change in the labor force as new workers arrived.[11]

Summary statistics, including migration rates and mean economic outcomes, for the 69 metropolitan areas in the sample are presented in Appendix Table 1. The mean in-migration rate of 5.1 percent is low by historical standards. The Depression dampened geographic mobility.

Interstate migration rates in the 1930s were akin to the migration trough in the late 1890s and far below levels after World War II (Rosenbloom and Sundstrom, 2003). The weak economic outcomes are characteristic of the period at the tail end of the Depression. Men in the average metropolitan area exhibited an employment rate of 78.5 percent, compared to 84.7 percent for a similar sample in 1950. 24.1 percent of men who were out of work held a government relief job.

Before turning to a more formal analysis, the scatter plots in Figures 1a-1c offer a quick look at the relationship between in-migration rates and the change in aggregate annual earnings in the manufacturing, wholesale, and retail sectors. In-migration is negatively associated with the change in annual earnings in manufacturing and wholesale trade from 1935-40, but has no relationship with earnings in the retail sector.[12] Miami and San Diego are obvious outliers, with in-migration rates of 18.4 and 16.3 percent, respectively. Without these two areas, the strong relationship between migration and earnings in wholesale trade is weakened, but does not disappear.

Because over 50 percent of employed men in our sample metropolitan areas worked in one of these three sectors, these figures provide a useful glimpse at the total impact of internal migration. In our estimations below, we will take a broader view, examining earnings and employment in the labor market as a whole.

III. Estimating the Relationship between Internal Migration and Economic Outcomes

The first part of this section introduces our basic estimating equation, which relates the net flow of internal migrants to changes in local labor market outcomes. This specification does not account for the fact that migrants tend to be attracted to areas with high wages and strong employment performance. To address this concern, we then design an instrument for in-

migration to a metropolitan area (likewise, for out-migration) that is assembled from two pieces: the number of out-migrants predicted to leave each source area due to local "push" factors, and the predicted probability of a move occurring between each source-destination pair based on geographic distance.

A. Basic Specification

For each of the labor market outcomes available in the 1940 Census ($DV_{ij\ 40}$), we estimate the following equation:

$$DV_{ij\ 40} = \alpha + \beta\ (\text{in-migration rate})_{j,\ 40\text{-}35} + \gamma\ (\text{out-migration rate})_{j,\ 40\text{-}35} + \Psi'\ (\text{controls})_{i,40} + \Phi'\ (\text{controls})_{j,30\ or\ 35} + \Omega'\ (\text{region dummies}) + \varepsilon_{ij,\ 40} \quad \textbf{(1)}$$

for a non-migrant *i* who lives in metropolitan area *j* in 1940. The most flexible specification, presented here, allows in- and out-migration to have distinct effects on labor market outcomes. For parsimony, we often restrict arrivals and departures to exert equal and opposite effects by estimating the effect of the net migration rate alone.

The vector of individual controls includes a race indicator equal to one for non-whites, a cubic polynomial of age, and a set of education dummies for each year of completed schooling. We further control for the age distribution of the city's population and the percent of the population that is black, foreign-born, or illiterate in 1930.[13] Because the extent of the downturn during the Depression varied geographically, we compare the economic performance of cities within regions (Wallis, 1989; Rosenbloom and Sundstrom, 1999).

Errors are clustered at the metropolitan area to allow for correlation in economic shocks faced by individuals in the same labor market. Although we are using individual-level data, our goal is to examine the impact of mobility on a local labor market. To count each metropolitan

area equally, individual observations from metropolitan area *j* are weighted by the inverse of the area's total number of observations.

Most importantly, we include wage or employment measures from 1935 in the vector of city controls, allowing the equation to be interpreted as a quasi first-difference. The equilibrium wage *level* is a function of the total labor supply, which may be a function of the *stock* of internal migrants in an area. However, our migration variables measure the *flow* of new arrivals (expressed as rates) over a five year period. Theory predicts that this shock to labor supply may lead to changes in wages or employment rates, but has little to say about levels. The downside of using the rich 1940 micro-data is that we do not have comparable measures in 1935 from which to construct first-differences. Rather, for our wage and earnings regressions, we control for the logarithm of annual earnings per employee in manufacturing, retail and wholesale trade in 1935. Our employment regressions are augmented with the share of the city's population that was on relief in October 1933 and that was unemployed in 1937; these measures are drawn from the Federal Emergency Relief Administration's Unemployment Relief Census for October 1933 and the Census of Partial Employment, Unemployment and Occupations (1938), respectively.[14]

B. Constructing the Instrument

We are concerned that migrants may have been attracted to cities with relatively vibrant local economies, thus confounding the measured effect of migration on economic outcomes. The goal of our instrument is to locate a stream of migrants to a metropolitan area whose arrival is uncorrelated with local economic conditions. In standard human capital theory, the decision to migrate entails a comparison between expected lifetime earnings in one's home market relative to all other possible destinations (Sjaastad, 1962). A move is more likely to take place if (1)

expected earnings in the home market falls, or (2) expected earnings in another market increases. In this schematic fashion, we can think of internal migrants as being pushed from their home markets by deteriorating economic conditions and pulled to new destinations by economic opportunities. Thus, our instrument for in-migration to a particular city is derived from a weighted average of push factors from usual sending areas. While we base the following discussion on in-migration, the same arguments apply, in reverse, for out-migration.

In conceptualizing the problem, we find it helpful to denote in-migration to city *j* (N_{Aj}) as a weighted sum of the number of migrants leaving other areas *k* (N_{Lk}, $k \neq j$) with the weights being the probability that, conditional on leaving area *k*, a migrant settles in city *j* (p_{kj}). We can write as the number of arrivals to city *j* as:

$$N_{Aj} = \Sigma_{k = 1....n\ (k \neq j)}\ p_{kj} N_{Lk} \qquad \textbf{(2)}$$

Let ε_k be the average economic shock experienced by residents of area *k*. N_{Lk} is a positive function of the whole vector of non-home market shocks (ε_j where $j \neq k$). That is, a greater absolute number of migrants are likely to leave *k w*hen conditions in any other market *j* improve. p_{kj} will also be a positive function of market *j*'s shock; as conditions in market *j* improve, a larger share of migrants from *k* will settle in *j*. However, p_{kj} is likely a negative function of shocks to other markets, which act as substitutes for area *j*. These relationships illustrate the two sources of endogeneity – both the size of the migration flow out of *k* and the settlement pattern of those who leave are positively related to economic conditions in area *j*. In constructing the instrument for in-migration, we consider each of these factors in turn.

Number of migrants leaving area *k* (N_{Lk}): To isolate the stream of migrants pushed from its home market by local economic conditions, we regress the out-migration rate from area *k* on a

set of local factors, including spending on New Deal programs and weather conditions. Fishback and Kantor originally collected the explanatory variables as part of their larger New Deal project. We aggregated their county-level data to match our sample of metropolitan areas and balance-of-state locations.[15]

We estimated the following regression on the full sample of 117 source areas (69 metropolitan areas + 48 balance-of-states).

$$\text{Out-migration rate}_k \ (\text{OMR}_k) = \alpha + \Phi'(\text{push factors})_k \ + \ \Omega' \ (\text{region dummies}) + \varepsilon_k \qquad \textbf{(3)}$$

The predicted number of migrants leaving area *k* is the product of the predicted out-migration rate and the population of area *k* in 1935 "at risk" to leave. That is:

$$\text{Predicted\_N}_{Lk} = \text{Predicted\_OMR}_k \cdot (\text{Population in 1935})_k \qquad \textbf{(4)}$$

If economic shocks in source and destination areas are uncorrelated ($\varepsilon_j \perp \varepsilon_k$), then the flow of migrants who are "pushed" from their home area *k* by local conditions should be uncorrelated with economic conditions in the destination city *j*. This assumption will be violated in practice because the majority of internal migrants relocate over short distances.[16] If a bad shock in destination city *j* is correlated with a shock that prompts migrants to leave a nearby market *k*, city *j* could receive large inflows from *k* precisely when it is doing poorly, leading to a spurious negative correlation between migration and economic outcomes. To address this concern, we instrument for total in-migration to city *j* using the predicted flows arriving *from out-of-state*. We also test the sensitivity of our results to using the predicted number of migrants from outside the Census region instead.

Probability that a migrant leaving area *k* settles in city *j* (p_{kj}): While location choices are influenced, at the margin by current economic conditions, geographic distance is one of the most important and persistent determinants of settlement patterns (Borjas, 2001; Levy and Wadycki, 1974; Schwartz, 1976). Simply put, internal migrants are unlikely to move far from their current place of residence. Because the geographic distance between each local labor market is immutable, we aim to "partial out" the component of the migration flow that is determined by distance alone.

We create a matrix of distances in miles from each area *k* in our sample to every other area *j*.[17] We then estimate a set of regressions (117 in all), for which the dependent variable is the share of people leaving area *k* who settled in one of the 69 sample cities *j* ($j \neq k$), and the explanatory variables are the distance between areas *j* and *k* and that distance squared.

$$p_{kj} = \alpha + \beta(\text{distance from } j \text{ to } k) + \gamma(\text{distance from } j \text{ to } k)^2 + \mu_k \qquad \textbf{(5)}$$

We use the estimates of β and γ to calculate the predicted probability that a migrant who leaves area *k* will arrive in city *j*.[18]

The instrument for actual in-migration to city *j* is thus the product of the predicted out-flow from area *k* (equation 4) and the predicted probability that a migrant who leaves area *k* ends up in city *j* (equation 5) summed over all areas ($k \neq j$).

$$\text{Predicted\_}N_{Aj} = \Sigma_{k = 1\ldots n\,(k \neq j)} [\text{Predicted\_}N_{Lk} \cdot \text{Predicted\_ } p_{kj}] \qquad \textbf{(6)}$$

The instrument for out-migration flows from city *j* is developed in a similar way. Namely, we predict the number of *in*-migrants to each area *k* as a function of local pull factors.

We then predict the share of in-migrants to area *k* that would hail from city *j* based on distance alone (p'_{kj}). The predictions emerge from regressions that are analogous to equations (3) and (5).

$$\text{In-migration rate}_k \text{ (IMR}_k) = \alpha' + \Phi''(\text{pull factors})_k + \Omega''(\text{region dummies}) + \eta_k \quad \textbf{(3a)}$$

$$p'_{kj} = \alpha' + \beta'(\text{distance from } j \text{ to } k) + \gamma'(\text{distance from } j \text{ to } k)^2 + \mu_j \quad \textbf{(5a)}$$

The instrument for actual out-migration from city *j* is the product of the predicted in-flow to area *k* and the predicted probability that a migrant who settles in area *k* hailed from city *j*.

$$\text{Predicted\_N}_{Lj} = \Sigma_{k = 1....n\ (k \neq j)} [\text{Predicted\_N}_{Ak} \cdot \text{Predicted\_ } p'_{kj}] \quad \textbf{(6a)}$$

C. Building Blocks of the Instrument and First Stage Results

The probability that a migrant from area *k* settled in destination *j* is strongly related to the geographic distance between the two markets. In 113 out of the 117 linear probability models, the coefficients on both the linear and quadratic distance terms were significantly different from zero at the five percent level. The exceptions are San Diego, CA; Miami and Tampa, FL; and Norfolk, VA. Increasing the pair-wise distance by 1,000 miles decreases the share of migrants from area *k* settling in destination *j* by 2.8 percentage points.

Table 1 presents results from the symmetric regressions (equations 3 and 3a) predicting out-migration rates from source areas and in-migration rates to destinations using a set of local economic and environmental factors. Because we aim to maximize power, we include only those variables that prove to be significant determinants of mobility. Some factors increase both in- and out-migration. We interpret these as being associated with higher turnover and mobility in

general; the difference between the in-migration and out-migration coefficients indicates the effect of such factors on *net* arrivals in an area.

Migration flowed into cities during the Depression, but at a much lower rate than in other decades (Heim, 2000). Consistent with Fishback, Horrace, and Kantor's (2006) estimates for net-migration between 1930 and 1940 at the county level, we find that higher spending on New Deal public works projects is associated with net in-migration. Severe rain generated higher mobility rates in balance-of-state areas, though not in cities, with an overall positive effect on inflows. Higher average temperatures stimulated net in-migration everywhere.

Socioeconomic conditions had the anticipated effects on mobility. Outside major cities, a larger share of families with radios in 1930 led to a higher out-migration rate. One explanation might be that radio spreads information about economic opportunities outside of one's immediate area (Stromberg, 2004). Higher shares of church membership slowed out-migration rates, perhaps because church members had relatively strong community ties. Finally, the presence of manufacturing industries attracted in-migrants to non-urban areas.

We use the regressions underlying Table 1 to predict in-migration rates to each destination and out-migration rates from every source. Applying these predicted rates to the population at risk to migrate in 1935, we derive predicted migration flows, which we then assign to destination/source areas. Table 2 contains the results from first-stage regressions, which estimate the relationship between predicted in- and out-migration rates and actual net migration. Our preferred specification relies on predicted out-of-state migration to minimize concerns about the spatial correlation of economic shocks. For comparison, we also show results using all migrants or only out-of-region migrants.

In each case, predicted in- (out-)migration is positively (negatively) related to actual net migration. While the coefficients increase as we restrict the scope of the migration to out-of-state or out-of-region arrivals, the implied response to a one standard deviation increase in predicted migration is similar across the columns. A one standard deviation increase in the predicted in-migration rate is associated with a one standard deviation increase in actual net migration (compare estimated net migration rates of 0.017-0.025 to the actual standard deviation of 0.021). The initial results will use instruments based on out-of-state migration. For comparison, Table 5 contains results from the other two sets of instruments.

IV. The Impact of In-Migration on Local Labor Markets

A. Earnings and Wage Outcomes

Table 3 considers the relationship between the rate of net internal migration to a metropolitan area and five earnings and work opportunity outcomes for existing residents – annual earnings, weekly wages, weeks worked in the previous year, hourly wages, and hours worked during the previous week. The first column presents coefficients from an OLS specification, while the second column contains the corresponding IV results. In the OLS specification, net migration has a *positive*, but not statistically significant, relationship with weekly and hourly wages. Migrants' location choices may generate a positive upward bias in the OLS estimation because higher wages are likely to attract migrants to an area. Once we instrument for net migration rates, the coefficients in the wage regressions become negative although they are not statistically significantly different from zero.

In contrast, residents of metropolitan areas that experienced relatively more net in-migration worked significantly fewer weeks over the year. As a result, they enjoyed lower annual

earnings. Again, we anticipated a positive bias in the OLS coefficients for both annual weeks worked and annual earnings because greater opportunities for working time during the Depression likely would have attracted more migrants. Consistent with this expection, the coefficients in the IV regressions for the log of weeks worked and for annual earnings are both substantially more negative than the OLS coefficients. According to the preferred IV estimates, a one standard deviation increase in net migration would have reduced average weeks worked during the year by 0.6 of a standard deviation, leading to a small associated decline in annual earnings (0.2 of a standard deviation).

B. Employment, Relief and Unemployment Outcomes

Our earnings results suggest that in the 1930s labor markets were more likely to react to supply shocks by adjusting work opportunities, at least for employed workers, rather than by cutting wages. In Table 4, we investigate whether migration also affected the probability of being employed. During the Depression, workers were defined as "employed" if they held a private sector or non-relief public sector job. Jobs offered through the Works Progress Administration or other government programs were considered emergency relief jobs. Correspondingly, we consider three states of labor force attachment: employed, on work relief, or idle (unemployed or out of the workforce).

Net in-migration to a metropolitan area decreased the probability that existing residents were on work relief and increased the probability that they remained idle, though the t-statistic for the second relationship is only -1.55. This pattern suggests that migration led to a shift in the daily activities of men who were not regularly employed, rather than influencing the probability of becoming regularly employed. Correspondingly, living in a high migration area reduced the

likelihood that a man had secured a relief job, conditional on being out of work (row 3).[19] A one standard deviation increase in the net migration rate reduced the unconditional probability of being on work relief by 1.2 percentage points and the probability conditional on lacking regular employment by 5.4 percentage points (one-half of a standard deviation).

While many states restricted relief to long-term residents, qualification usually required only a single year of residency. Many migrants captured in our five-year migration rates would have had ample time to register. Our results imply that the public outcry against migrants' squeezing local relief budgets was not unfounded. However, the local disparities in relief levels made such "welfare seeking" migration all but inevitable during the Depression and highlights the inefficiency (in terms of excess mobility) of managing what amounted to a national relief effort at the local level.[20]

C. Robustness Checks: Migration and Work Opportunities

Thus far, we have implicitly assumed that in- and out-migration have equal and opposite effects on the local labor market. We allow each to have a separate effect in the first and second column of Table 5. In all cases, in-migration diminished the work opportunities of existing residents, while out-migration buoyed them. We cannot reject the hypothesis that the in-migration and out-migration coefficients are equal in absolute value for each work opportunity measure.

To address spatial correlation in economic shocks, the main results use predicted out-of-state migration to generate an instrument for actual net migration. The third and fourth column of Table 5 present results using either predicted total migration or predicted out-of-region migration instead. Spatial correlation could lead to a spurious negative relationship between net migration

and economic outcomes if cities receive more migrants when their own economy is doing poorly (because a neighboring economy is doing worse). This problem is more likely to arise when we include all migrants, including those from neighboring counties, in the instrument. In the presence of spatial correlations, then, we would expect the coefficients to be larger in absolute value when we use all migrants rather than only out-of-state or out-of-region migrants to construct the instrument. Instead, all three instruments produce similar coefficients. It does not appear that spatially correlated shocks are driving the results.

As a specification check, Table 6 allows the effect of in-migration to vary based on a resident's education level. Depression-era migrants were better educated than non-movers during the period. 16.3 percent of men who moved between 1935 and 1940 had graduated from high school, compared to 7.1 percent of non-migrants. If migrants are more likely to compete with similarly-skilled workers, we should observe larger effects of net migration on high school graduates during this period. This should be particularly true in the non-relief sector, in which a worker's skill is more likely to determine his pool of competitors. The evidence corresponds to these predictions. The effect of net in-migration on the number of weeks worked during the year is twice as large for high school graduates than for non-graduates and the difference is statistically significant. On the other hand, living in a city with relatively more net migration reduces the likelihood of holding a relief job, conditional on lacking regularly employment, and we cannot reject that the impact is the same for graduates and non-graduates.

D. Other Forms of Local Adjustment

By focusing on *net* migration, the estimation implicitly accounts for the possibility that new arrivals encouraged existing residents to seek work elsewhere. Table 7 examines this

adjustment mechanism directly by estimating the effect of in-migration on the probability that a man who lived in a metropolitan area in 1935 had moved elsewhere by 1940. While modern evidence on this question is mixed, we find unequivocal support for the idea that in-migration to a city stimulated outflow during this period.

The sign of the endogeneity potential bias is uncertain. For a given level of labor demand, in-migrants will be attracted to areas with recent departures, imparting an upward bias. On the other hand, a negative labor demand shock might simultaneously induce out-migration and repel new arrivals, generating a negative bias. Empirically, we find that the IV coefficient is slightly smaller than OLS, suggesting that the former effect dominates.

The IV coefficient implies that a one standard deviation increase in the in-migration rate to a metropolitan area would have increased the probability of out-migration among its existing residents by one-half of a standard deviation, or by 2.5 percentage points. To translate this probability into a displacement rate, consider the average city in our sample, which had 325,000 male residents in 1935, 10.2 percent of which would have left by 1940. A one standard deviation increase in in-migration (equivalent to 21,400 new male entrants) would have been associated with nearly 8,000 departures (= 325,000 male residents · 0.025 estimated increase in the out-migration rate). In other words, four men would have been prompted to leave their 1935 residence for every ten in-migrants that arrived.

If, by shifting out the labor supply, in-migration caused wages to fall, firms might have been attracted to the relatively cheap labor available in migrant destinations. Given that we do not observe wages falling with in-migration, we do not expect firms producing for the national market to have been attracted to high migration areas. However, by expanding the population, in-migration also increased the local demand for services and other non-traded products. We might

expect the number of firms serving the local population (for example, retail establishments) to have expanded.

We investigate the relationship between net migration and the net creation of retail, wholesale, and manufacturing establishments. We use the change in the number of firms from 1935 to 1939 per 1935 resident as the dependent variable. As expected, we find no response to net in-migration in the two sectors – wholesale trade and manufacturing – that primarily serve the national market. While the relationship between migration and the number of retail stores is positive, the effect is not statistically significant at the 10 percent level in two-tailed t-tests.[21]

E. Magnitudes in the Context of the Dust Bowl Migration

The most well-known migration of the Depression era is the escape from the dust storms that wreaked havoc on agricultural production in the southern Great Plains (Hansen and Libecap, 2004). Many of the former residents of the Dust Bowl areas settled in California. We can use our estimates to assess the impact of this migration on California's economy.

While collectively – and pejoratively – referred to as "Okies," the Dust Bowl migrants hailed not only from Oklahoma but also from Texas, Arkansas and Missouri. Gregory (1989) reports that 315,000 individuals from these four states settled in California between 1930 and 1940, compared to 243,000 in the previous decade. A conservative estimate would place the number of additional migrants contributed by the Dust Bowl at 72,000 for the period 1930 to 1940.[22] Men made up 51 percent of the stock of migrants from these four states living in California in 1940. To conform to our estimates, we consider the flow of 37,000 new *men* into the state. Male Dust Bowl migrants represented a 1.8 percent increase in the state's population.

How did this influx affect California's one million men? Our results suggest that, to begin with, a number of male residents who lived in California in 1935 would have left the state. An in-migration of this size would have encouraged 1.3 percent (= 0.745 · 0.018 in-migration rate; see column 2, row 1 of Table 7 for 0.745 coefficient estimate) of the state's existing male population, or 13,000 Californians, to relocate elsewhere. This responsive out-migration would have reduced California's migration burden to 24,000 net arrivals, the equivalent of 1.2 percent of the 1930 population. For men who were employed in a non-relief job, a net in-migration of this size would have reduced the number of weeks worked during the year by an average of one half-week (= -0.996 · 0.012 net migration rate · 45.7 average weeks worked per year; see column 2, row 1 of Table 3 for -0.996 coefficient estimate), thereby decreasing annual earnings by $160 per worker (in $2000). While this effect seems small when spread across the entire employed population, it is more likely that the burden was concentrated among some percentage *p* of male workers. *p* would be two percent if the effect was concentrated among men who lost 25 weeks of work (½ = 25*p*). In that case, 15,600 of California's employed men would have borne a half-year reduction in work opportunities through job sharing (= 1 million men · 0.78 share employed · 0.02 share who lost work weeks).

What of the unemployed? A 1.2 percent Dust Bowl-induced net increase in population would have reduced the share of out-of-work men holding a relief job by 3.1 percentage points (=-2.583 · 0.012 net migration rate; see column 2, row 3 of Table 4 for -2.583 estimate), a decline from 24.1 to 21.0 percent at the sample mean. Absent the Dust Bowl migration, 53,000 men would have been on relief in California (=1 million men · 0.22 share out of work · 0.24 share on relief, conditional on being out of work). The crowding-out due to migration would

have reduced this figure by 6,800 men (= 53,000 men on relief · 0.031 share estimated to lose relief work).

Under the assumption that the reductions in weeks worked were concentrated among a subset of the working population, our estimates imply that the 37,000 male Dust Bowl migrants likely would have caused substantial economic change for a total of 35,400 California men, 13,000 out-migrants, 15,600 men who saw their weeks worked cut sharply through job sharing, and 6,800 who were crowded out of relief. In other words, for every Dust Bowl male migrant, almost one Californian male experienced some sort of economic displacement.

V. Conclusion

Throughout American history there has been extensive debate about the impact of immigrants on the economic status of native-born workers. The conversation has become particularly heated recently as the nation considers immigration reform. Economists working with modern data have not reached a consensus about the impact of immigrants on wages and work opportunities.

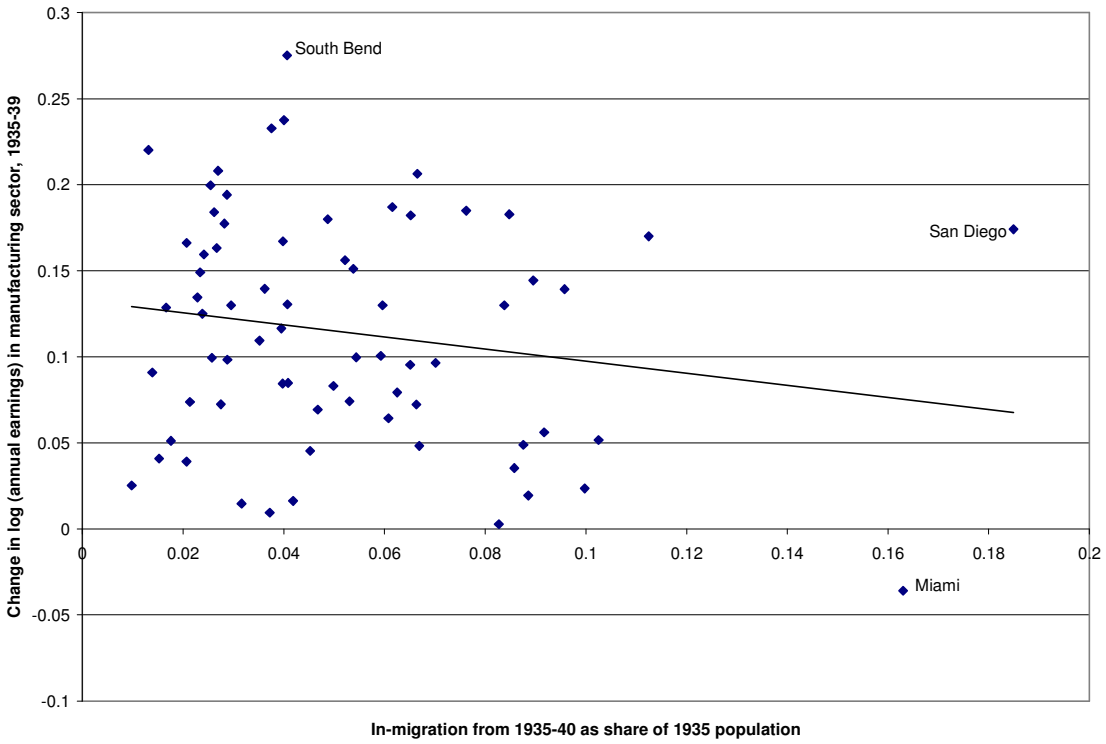
During the Depression, immigration from abroad was dampened by the combination of a massive economic downturn and strict immigration quotas. Even so, residents in areas where the Depression was less severe protested influxes of migrants from other parts of the country. The most famous example was the outcry in California against the Dust Bowl migrants, but the same debates occurred throughout the country. The new arrivals were accused of taking jobs, lowering wages, and crowding relief rolls. Using aggregate data on internal migration flows matched to individual records from the 1940 Census, we examine the impact of positive net migration on the economic welfare of workers along a variety of dimensions.

As is often the case in the modern literature, we find that the impact of in-migration on hourly earnings was small and not statistically significant in the 1930s. However, in-migrants threatened the economic prospects of longer-term residents in other ways. During a decade in which unemployment rates stayed above 10 percent and many workers were unable to find jobs that offered 40 hours of work per week, work hours and access to work relief were highly valued. Residents of metropolitan areas that experienced high in-migration during the Depression decade worked fewer weeks during the year and thus experienced a significant drop in their annual earnings. Although the probability of obtaining a regular job was not reduced, those who were out of work faced greater difficulty in securing a work relief position. Finally, as has been found in the modern era, greater in-migration stimulated out-migration by longer term residents.

The experiences in the Great Depression help to understand why the anticipated economic disruption of in-migration causes resident workers to oppose newcomers to their areas. Workers in cities protested the in-migration of fellow citizens, arguing that all the newcomers could do was make things worse for the existing population. Our findings, which are from an historical period when international immigration fell to a trickle, suggest that localized protests against in-migration would likely still occur today even if our borders were completely sealed. What opponents of immigration today often fail to recognize is that disparities in labor markets across geographic areas causes people to migrate internally, thus affecting labor market outcomes. While the vehemence of the protests might be lessened to some degree if the newcomers happened to be similar in race, ethnicity, and citizenship to the longer-term residents, the economic impact of the migration would still be felt.

Figure 1a

In-Migration Rates and Earnings Growth for Manufacturing Workers by Metropolitan Area, 1935-1940



Notes: Each dot represents one of the 69 metropolitan areas with complete data in the sample. The average annual earnings for wholesale, retail, and manufacturing workers in 1935 are constructed from data on wages paid and wage earners from Bureau of Foreign and Domestic Commerce. The 1939 earnings data are from the 1940 Census and can be found in Michael Haines' compilation of county, city, and state level data sets in ICPSR 2896 on *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000.* The numbers of male in- and out-migration rates were constructed from the 1940 Census volume on Internal migration (U.S. Bureau of the Census, 1943).

Figure 1b
In-Migration Rates and Earnings Growth for Retail Workers by Metropolitan Area, 1935-1940

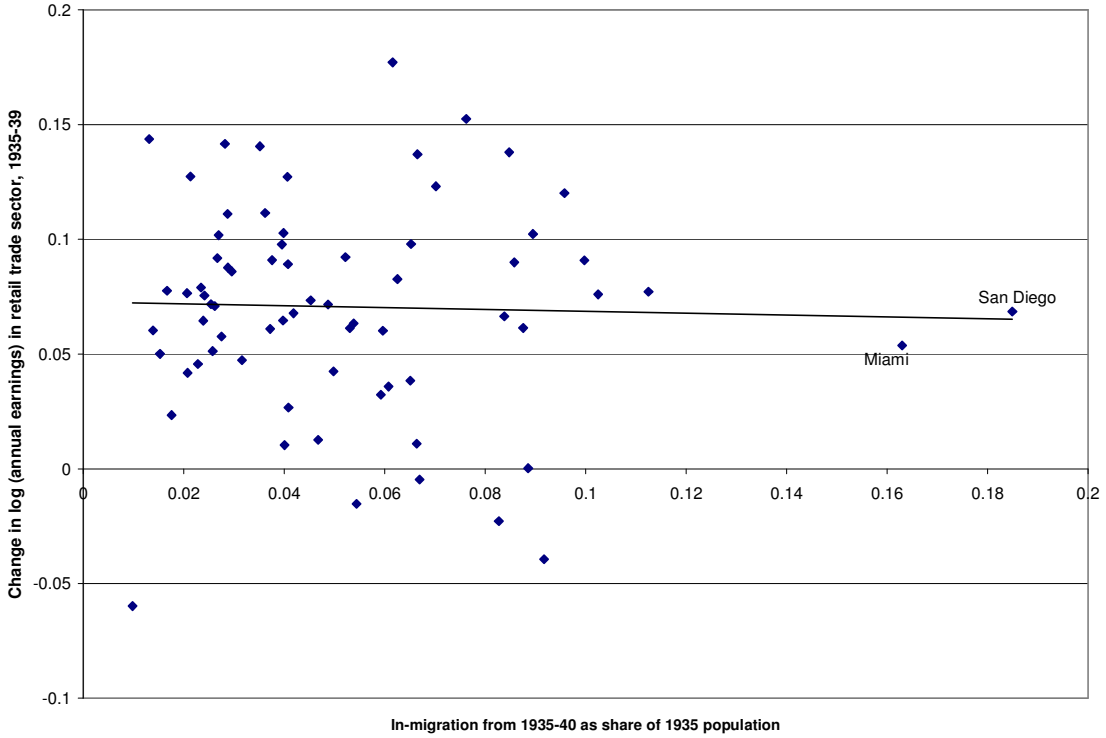


Figure 1c
In-Migration Rates and Earnings Growth for Wholesale Workers by Metropolitan Area, 1935-1940

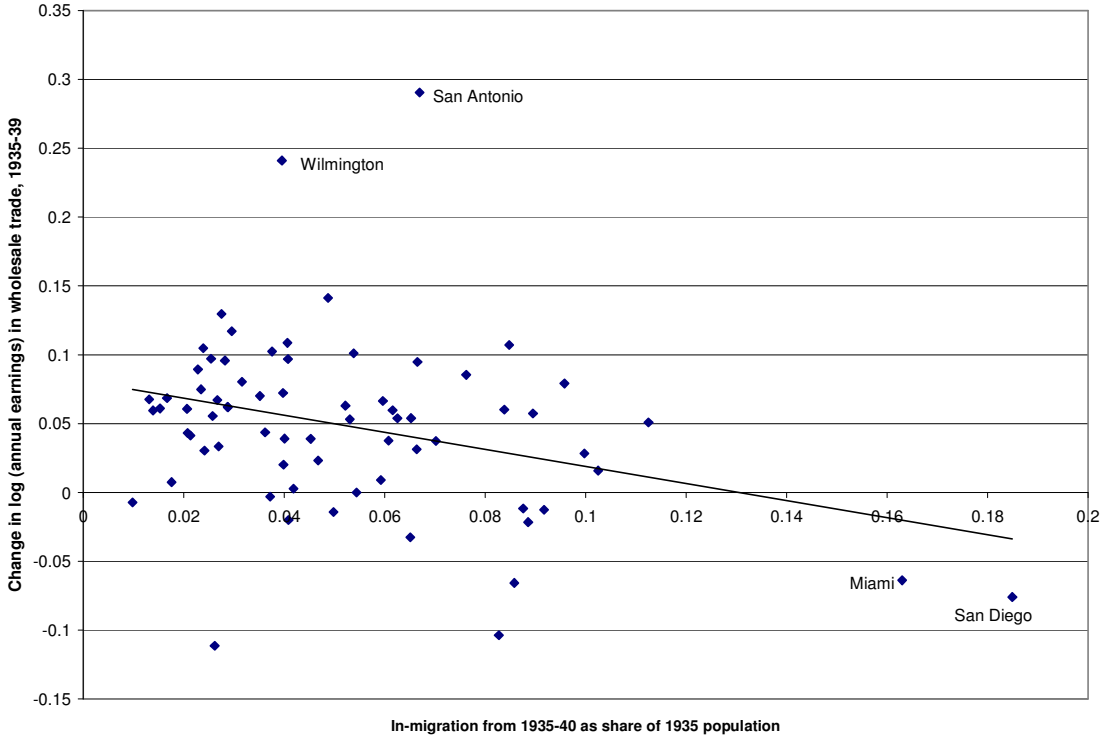


Table 1
Determinants of male in- and out-migration, 70 cities and 48 balance of state areas, 1935-40

	Dependent variables	
RHS variables	In-migration rate	Out-migration rate
=1 if central city	0.032	0.025
	(0.021)	(0.020)
New Deal $ per cap, in $100s		
Public works, 1933-39	0.046	0.014
	(0.012)	(0.008)
Weather		
Months of Severe or Extreme	0.016	0.004
Wetness, 1935-39	(0.002)	(0.002)
Wet months x City Dummy	-0.016	-0.007
	(0.003)	(0.002)
Average temperature, 1935-39	0.005	0.003
	(0.001)	(0.001)
Other conditions		
Share families with radio, 1930	---	0.178
		(0.048)
Share with radio x City Dummy	---	-0.160
		(0.045)
Church membership in 1926 as	---	-0.065
share of 1930 population		(0.022)
Manuf. employ per cap, 1929	0.945	---
	(0.312)	
Manuf. employ x City Dummy	-1.068	---
	(0.283)	
Region dummies?	Y	Y
N	118	118

Notes: Standard errors are in parentheses and are clustered by state. Observations include 70 cities and 48 balance of state areas. The District of Columbia is missing information on temperature and public works, and is thus excluded. The numbers of male in- and out-migration rates and the city dummy were constructed from the 1940 Census volume on Internal migration (U.S. Bureau of the Census, 1943). The remaining variables were aggregated to the 72 cities and 48 balance of state areas using the New Deal dataset compiled by Price Fishback and Shawn Kantor. The original sources for the variables are the following. New Deal spending information on Public Works is from the

U.S. Office of Government Reports (1940). The share of families with radios is from the 1930 Census volume on Families (1933). Church membership data are from the U.S. Bureau of Census, Census of Religious Bodies, 1926. The number of manufacturing workers was reported in the 1929 Census of Manufacturing. All per capita adjustments are based on the 1930 population. All the variables except the New Deal expenditures came from the Census files for the 1930s in Michael Haines' compilation of county, city, and state level data sets in ICPSR 2896 on *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000.* The climate information is available from the National Climatic Data Center (NCDR). Text files of the data were accessed from ftp://ftp.ncdc.noaa.gov/pub/data/cirs/ (August 2003). The full New Deal dataset can be found on Price Fishback's website at the University of Arizona (http://econ.arizona.edu/faculty/Fishback.aspx under datasets for published research).

Table 2
First-stage regressions:
Relationship between predicted and actual migration, Men 1935-40

Dependent variable = Net migrant as share of 1935 population

	Migrant sample		
	All	Out of state	Out of region
Predicted in-migration rate	2.589	5.632	8.352
	(0.317)	(0.739)	(1.173)
Predicted out-migration rate	-2.879	-4.400	-7.392
	(0.450)	(0.537)	(1.753)
N	131,006	131,006	131,006

Notes: Standard errors are in parentheses and are clustered by metropolitan area. Regressions are estimated at the individual level using data from the 1940 IPUMS (Ruggles and Sobek 2003), but are weighted by the inverse of the number of observations in the metropolitan area. The regressions include region dummies and full set of controls. See Table 3 notes for complete list of city-level and individual controls.

Table 3
The effect of net migration on earnings, wages, and work time in 1940

Coefficients on net number of migrants between 1935 and 40 as a percentage of 1935 population

Dependent variable	OLS	IV
ln(annual earnings)	-0.218	-1.004
	(0.578)	(0.615)
ln(weekly wage)	0.561	-0.007
	(0.379)	(0.547)
ln(weeks worked)	-0.779	-0.996
	(0.325)	(0.306)
ln(hourly wage)	0.471	-0.478
	(0.545)	(0.746)
ln(hours worked)	0.089	0.471
	(0.267)	(0.301)
N	96,070	96,070

Notes: Standard errors are in parentheses and are clustered by metropolitan area. Regressions are estimated at the individual level using data from the 1940 IPUMS (Ruggles and Sobek, 2003), but are weighted by the inverse of the number of observations in the metropolitan area. The sample includes only men employed during the Census week who report positive earnings. The weekly wage is annual earnings in 1939 divided by weeks worked in 1939. The hourly wage is the weekly wage divided by the hours worked in the week prior to the Census survey in March 1940. Individual controls include an indicator for being non-white, a cubic polynomial in age, and a dummy for each year of completed school. The instruments are described in section III of the text.
Sources: The county-level aggregates for the age distribution and share of the population that is black, foreign-born, or illiterate in 1930 were constructed using the New Deal datasets compiled by Price Fishback and Shawn Kantor. These are matched to the metropolitan areas in the sample. The age distribution information came from Gardner and Cohen, 1992. The shares black, foreign born, and illiterate in 1930 are from the 1930 population census and can be found in Michael Haines' compilation of county, city, and state level data sets in ICPSR 2896 on *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000.* The average annual earnings for wholesale, retail, and manufacturing workers in 1935 are constructed from data on wages paid and wage earners from Bureau of Foreign and Domestic Commerce.

Table 4
The effect of net migration on employment and work relief

Coefficients on net number of migrants between 1935 and 40 as a percentage of 1935 population

Dependent variable	OLS	IV
=1 if unemployed or out of labor force	0.220	0.402
	(0.171)	(0.259)
=1 if on work relief	-0.413	-0.576
	(0.129)	(0.269)
=1 if on work relief, conditional on being out of work	-1.695	-2.583
	(0.505)	(0.854)
N	131,006/29,121	131,006/29,121

Notes: Standard errors are in parentheses and are clustered by metropolitan area. Regressions are estimated at the individual level using data from the 1940 IPUMS, but are weighted by the inverse of the number of observations in the metropolitan area. In the first two columns, Rows 1 and 2 includes all men who meet the sample criteria (131,006), whereas row 3 includes only those men who are currently unemployed or out of the labor force (29,121). See the notes to Table 3 for the set of individual- and city-level control variables and their sources. The relief and unemployment sources are respectively, Federal Emergency Relief Administration 1934 and U.S. Census of Partial Employment 1938. The 1937 information is also available in the 1940 Census files from Haines in ICPSR 2896. The instruments are described in section III of the text.

Table 5
Robustness checks: The relationship between migration and work opportunities

Coefficients on number of migrants between 1935 and 40 as a percentage of 1935 population

	Out of state		All	Out of region
	In migration	Out migration	Net migration	Net migration
=1 if unemployed or	0.398	-0.272	0.256	0.465
out of labor force	(0.251)	(0.355)	(0.239)	(0.282)
=1 if on work relief, conditional	-2.558	1.768	-2.475	-2.826
on being out of work	(0.834)	(1.139)	(0.979)	(0.919)
ln(weeks worked)	-0.996	1.136	-0.731	-1.099
	(0.313)	(0.624)	(0.329)	(0.344)

Notes: Standard errors are in parentheses and are clustered by metropolitan area. Regressions are estimated at the individual level and weighted by the inverse of the number of observations in the metropolitan area. The first row includes all men in the sample regardless of employment status (131,066), the second row includes only those who are out of work (29,121) and the third includes only those who were employed in the Census week (96,070). See the notes to Tables 3 and 4 for a list of the individual- and city-level control variables and a discussion of the samples underlying each regression.

Table 6
The effect of net migration on work opportunities by education level

Coefficients on net number of migrants between 1935 and 40 as a percentage of 1935 population

	Net migration	Net migration x High school graduate
=1 if unemployed or out of labor force	0.258	0.283
	(0.314)	(0.197)
=1 if on work relief, conditional on being out of work	-2.352	-0.619
	(0.888)	(0.827)
ln(weeks worked)	-0.661	-0.642
	(0.289)	(0.333)

Notes: Standard errors are in parentheses and are clustered by metropolitan area. Regressions are estimated at the individual level and weighted by the inverse of the number of observations in the metropolitan area. The first row includes all men in the sample regardless of employment status (131,066), the second row includes only those who are out of work (29,121) and the third includes only those who were employed in the Census week (96,070). See the notes to Tables 3 and 4 for a list of the individual- and city-level control variables and a discussion of the samples underlying each regression. The set of completed schooling dummy variables absorb the main effect of being a high school graduate.

Table 7
Migration and labor market adjustments: The relationship between in-migration and the out-migration of existing workers and between net migration and the creation of new establishments, 1935-1940

Dependent variable	OLS	IV
=1 if left SMSA, 1935-40	0.880	0.745
	(0.276)	(0.322)
N	142,327	142,327
Change from 1935-39		
# retail est. per 1000	12.892	11.243
	(8.585)	(9.051)
# wholesale est. per 1000	1.128	0.874
	(1.158)	(1.493)
# manufacturing est. per 1000	-0.151	0.979
	(1.204)	(1.867)
N	71	71

Notes: Coefficients on gross number of in-migrants (row 1) or net number of migrants (row 2-4) between 1935 and 40 as a percentage of 1935 population. Standard errors are in parentheses and are clustered by metropolitan area. Regressions in the first row are estimated at the individual level and weighted by the inverse of the number of observations in the metropolitan area. Regressions in rows 2-4 are estimated at the city level using data from the 1935 and 1939 Censuses of Manufactures, and Wholesale and Retail Trade. Controls in the city-level regressions include region dummies, the age distribution, and the share of the population that was black, foreign-born or illiterate in 1930. Sources for the control variables are listed in the notes to Table 3. The information on establishments in 1935 is reported in U.S. Bureau of Foreign and Domestic Commerce, 1935. The 1939 earnings data are from the 1940 Census and can be found in Michael Haines' compilation of county, city, and state level data sets in ICPSR 2896 on *Historical, Demographic, Economic, and Social Data: The United States, 1790-2000.* The instruments are described in section III of the text.

Appendix Table 1: Summary statistics at the metropolitan area level, 69 areas with 100,000 or more residents, 1940

Variable	Mean	Standard Deviation
Dependent Variables		
Wages		
Annual earnings, $2000	16,215	1924.12
Weekly wage, $2000	391.22	71.99
Weeks worked	45.76	1.55
Hourly wage, $2000	10.10	2.39
Hours worked	43.52	2.18
Employment		
=1 if unemployed or out of the labor force	0.164	0.036
=1 if on work relief	0.056	0.027
=1 if on work relief (conditional on being out of work)	0.248	0.098
=1 if left SMSA, 1935-40	0.102	0.049
Establishment creation		
# establishments per 1000 people, Level in 1935/ change, 1935-40		
- Retail	10.56/0.276	2.47/1.289
- Wholesale	1.56/0.204	0.622/0.169
- Manufacturing	1.28/0.094	0.480/0.139
Explanatory Variables		
In-migration rate, 1935-40	0.053	0.033
Out-migration rate, 1935-40	0.067	0.027
Net migration rate, 1935-40	-0.014	0.021

(continued on next page)

Appendix Table 1, continued		
Instruments		
Predicted in-migration rate, all	0.014	0.010
Predicted out-migration rate, all	0.015	0.007
Pred. in-mig. rate, out of state	0.005	0.004
Pred. out-mig. rate, out of state	0.006	0.004
Pred. in-mig. rate, out of region	0.003	0.002
Pred. out-mig. rate, out of region	0.003	0.002

Note: Individual-level wage and employment information presented as metropolitan area-level averages. Each row has 69 underlying observations.

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ENDNOTES

[1] The California Indigent Act of 1933 made it a crime to bring anyone likely to become a public charge into the state. While the law was rarely enforced, it was used to prosecute some Dust Bowl migrants who helped their relatives enter the state until it was invalidated by the Supreme Court in 1941 (*Edwards* v. *California*). Californians also tried to intimidate possible migrants, posting, for example, the following message on a billboard in Oklahoma: "NO JOBS in California/If YOU are looking for work – KEEP OUT/6 men for every job/No state relief available for non-residents." For more on the politics of migration control in California, see Gregory (1989).

[2] For contemporary policy statements on job sharing, see Walker (1933) and Moulton (1936).

[3] See Boustan (2006) for use of a similar method to examine the impact of black in-migration into the North on white flight to the suburbs.

[4] Hatton and Williamson (1995) use a national time series of immigrant arrivals to estimate the impact of immigration on native wages. Carter and Sutch (1999) survey the historical literature. See also Ferrie (1996).

[5] Borjas (2005) demonstrates that state-based estimates are only half as large as their national equivalents; metropolitan area estimates are even smaller. Between 40 and 60 percent of this reduction is due to native out-migration.

[6] Exceptions include Frey (1995), Frey, et al. (1996), and White and Liang (1998).

[7] We aggregate data from the following cities: Boston, Cambridge, Lowell, Somerville, MA; Camden, NJ and Philadelphia, PA; Elizabeth and Newark, NJ; Fall River, MA, New Bedford, MA and Providence, RI; Fort Worth and Dallas, TX; Kansas City, MO and Kansas City, KS; Los Angeles and Long Beach, CA; Yonkers and New York City, NY; Oakland and San Francisco, CA; and St. Paul and Minneapolis, MN. Sacramento, CA and Charlotte, NC are missing migration data, and Washington, DC and Flint, MI are missing Census of Manufacturing earnings data in 1935.

[8] The analysis includes only internal migrants. Foreign arrivals constituted only two percent of total cross-county moves both nationwide and in our sample of large metropolitan areas during this period. We have estimated models that include foreign arrivals, but, not surprisingly, the results never qualitatively change.

[9] The Census collected detailed information on wages and salaries only, and not on self-employment income in 1940.

[10] Following Goldin and Margo (1992), we replace top-coded incomes with 1.4 times the top-code.

[11] Migrants were, on average, three years younger than men who remained in the same county between 1935 and 1940, but had completed two more years of education. For men who were at least five years old in 1940, migrants were, on average, 31.2 year old, compared to 34.0 years for non-migrants. For men who were not currently enrolled in school, migrants had a mean of 9.4 years of schooling, compared to 7.2 years for non-migrants (Ruggles and Sobek, 2003).

[12] The negative relationship between in-migration and the change in wholesale earnings is statistically significant at conventional levels; the other two associations are not. The OLS coefficient for a regression of changes in wholesale earnings on in-migration rates is -0.608 (s.e. = 0.223).

[13] City-level variables are taken from published Census data and aggregated to the metropolitan area level.

[14] We have also estimated the model using the first difference of the logarithm of average annual earnings per employee in the manufacturing, retail and wholesale sectors between 1935 and 1939.. A description of the raw relationships are depicted graphically in Figure 1. While the direction of the relationship is comparable in the aggregate and individual data, the magnitude is highly sensitive to the inclusion of individual characteristics. Furthermore, the aggregate data do not allow us to distinguish between wages and work opportunities, a distinction that turns out to be important.

[15] See Fishback, Horrace, and Kantor (2006) and Fishback, Haines and Kantor (2001, 2007) for descriptions of the data. Those interested in examining the data more carefully can find the datasets at Price Fishback's website at the Department of Economics at the University of Arizona (http://econ.arizona.edu/faculty/Fishback.aspx) or by going directly to http://www.u.arizona.edu/~fishback/.

[16] 59 percent of migrants in the late 1930s moved within the same state (U.S. Bureau of the Census, 1943).

[17] We thank Trent Alexander and David Van Riper at the Minnesota Population Center for providing measures of distances in miles between every county group in the United States. We calculate the distance between balance-of-state areas as the average distance from every non-metropolitan county group in state A to every corresponding county group in state B. A preferred measure may be the distance between the population-weighted centroids of each balance-of-state area. While this measure is feasible, it would be extremely time-intensive to produce and would correspond closely to our current method.

[18] We also tried a specification in which the probability of a migrant from *j* settling in *k* depended on the logarithm of the distance between *j* and *k*. The results did not change.

[19] Table 4 reports results from linear probability models. While we prefer OLS to probit or logit here for the ease of interpreting the coefficients, the standard concerns remain. Horrace and Oaxaca (2006) argue that trimming observations that generate predictions outside of the unit

interval can reduce the bias associated with OLS. In our case, only 334 of the 131,066 observations have this property (0.25 percent of the sample). Dropping these observations has no demonstrable effect on the results. In an alternative specification, we also ran a multinomial logit with idleness as the base category (not shown). The odds of being on work relief relative to being idle significantly decreased with in-migration, while the odds of being employed were unchanged. A one standard deviation increase in net migration reduced the odds of being on work relief relative to being idle by 20 percent.

[20]The WPA had different monthly payments for urban and rural areas and across regions. The actual variation in hourly earnings was larger and was based on the number of hours relief workers worked per month. The availability of relief jobs also varied across geographic districts. At the same time relief payments to people who were not on work relief varied substantially across states and local districts because they were determined at that level after 1935.

[21] The average city had 10.5 retail stores per 1,000 residents. The magnitude of the coefficient estimate implies that the retail sector expanded with new arrivals, but that it added fewer than 10.5 stores per 1,000 newcomers. A one standard deviation increase in net migration would have added 13,650 new men to the population of the average city. If each man is accompanied by one woman on average, the total population would have increased by 27,300. The associated increase in retail stores is 0.235 per 1,000 *existing* residents (=11.243 · 0.021; see column 2, row 2 of Table 7 for the 11.243 estimate), or 152.7 new stores in the average city with 650,000 residents (= 650 residents in 1,000s · 0.235 estimate). This translates in 5.6 stores per new arrival (= 152.7 stores/27,300 new migrants).

[22] We consider this number to be a conservative estimate because it assumes that the migration flow of the 1920s would have continued unabated in the 1930s if not for the Dust Bowl, a likely overstatement given that migration rates fell nationwide during the Depression.