The Effect of Internal Migration on Local Labor Markets: American Cities During the Great Depression

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Debates over U.S. immigration policy have prompted numerous studies of the impact of immigrant arrivals on local labor markets in the United States. Yet immigration from abroad comprises a small share of total flows into local labor markets. Since 1940, new foreign entry has accounted for less than 11 percent of cross-county moves and less than 20 percent of moves across state lines.

To capture this central feature of competition in local labor markets, we examine the impact of internal migration on annual earnings and employment in major U.S. cities in the late 1930s.[1] We also explore the effect of these labor supply shocks on the out-migration of existing workers and the in-migration of firms. These worker-firm adjustments, which often go unobserved, may account for the limited relationship between immigration and wages found in previous studies.

The 1930s are a unique laboratory for exploring the causal impact of immigration on the labor market. Due both to the imposition of immigration quotas in 1924 and the relative severity of the Great Depression, immigration to the US was at its nadir in the 1930s.[2] Internal migration therefore represented the vast majority of population flows to and from local labor markets.[3] Because internal migrants originate their moves from within the US, we have access to a wealth of information about the economic environment in their home market. We use data on these "push" factors – including weather conditions and the generosity of New Deal policies – in sending areas to develop an instrument for in-migration to our sample of large US cities.[4] With this approach, we can address the endogenous location choices of migrants, who tend to be

attracted to cities with high wages or strong wage growth, thus obscuring any negative relationship between in-migration and wages.

I. Searching for the Economic Effects of Immigration in the Data

As with international arrivals today, the internal migration of the 1930s prompted complaints in migrant-receiving areas. An extreme example was California, where the influx of the Dust Bowl "Okies" led to outcries and occasional violence (Gregory, 1989).[5] Although we focus on internal migration in this paper, most of the modern research on the impact of inflows of new workers focuses on immigrants. The results of this literature offer some insights into the anticipated effects of inflows of migrants from the rest of the country.

The economic underpinnings of anti-migrant sentiment is often the fear that new arrivals drive wages down (and the local cost of housing and living up), lowering the standard of living for the existing population. A standard model of the labor market certainly supports this claim. In this framework, internal migration flows into a city represent an outward shift in the supply function of labor. This would lead to an unambiguous decrease in the wages, unless the in-flow of workers 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.

The empirical reality of this proposition has been tested for international immigrants in a variety of settings (Altonji and Card, 1991; Borjas, 1987; Carter and Sutch, 1999; Friedberg and Hunt, 1995; Goldin, 1994; Hatton and Williamson 1995). The typical analysis examines the

impact of the flow of migrants from abroad to a labor market on local wage levels or wage growth.

Overall, it appears that the effect of immigration on wages has changed over time. Goldin (1994) and Hatton and Williamson (1995) document that the mass migration from Europe at the turn of the 20th century (1890 to 1915) led to a large reduction in wages (5 to 7 percent). Few studies using modern data – with the exception of Altonji and Card (1991) – have detected a wage response of this magnitude.

The weak observed relationship between immigration and wages in the port-of-entry labor market has prompted an on-going discussion about other margins of local adjustment. Borjas, Freeman and Katz (1997) point out that, if immigrants displace members of the existing workforce, these out-migrants will spreads the economic costs of immigration to other local markets. Thus, the downward pressure of immigration on wages at the national level might be much larger than city-based studies would suggest (Borjas, 2003). 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 workers or the in-migration of firms (Blanchard and Katz, 1992).

The empirical evidence on these long-run responses to immigration is mixed. Filer (1992) found that immigrants crowded out existing workers from port-of-entry cities one-for-one between 1975-80. However, in more recent data, neither Card (2001) nor Wright, Ellis, and Reibel (1997) detect an appreciable out-migration response to international arrivals. On the firm side, Lewis (2003, 2004) proposes that Miami's adjustment to the 1980 Mariel boatlift, which added over 100,000 low-skilled Cubans to the local labor force, occurred through the

endogenous investment decisions of local firms – in particular, the slower adoption of labor-saving computer technology (see also: Card, 1990).

To provide a comprehensive picture of local adjustments to internal migration, we examine not only changes in annual earnings and employment rates, but also the out-migration of workers already in the city. In future drafts, we plan to examine the impact of migration flows on the growth of local industry.

II. Migration and Labor Markets in the 1930s

The Joads journey from Oklahoma to California, immortalized in John Steinbeck's *The Grapes of Wrath*, paints a picture of a footloose population during the 1930s. In an absolute sense this is true, as at least 5.4 percent of the population changed their state of residence between 1935 and 1940 and another 5.8 percent or more moved across counties within the same state.

Relative to other periods in American history, however, the Great Depression imposed a substantial drag on migration. Estimates of 5-year migration rates by Rosenbloom and Sundstrom (2003, Table 1 and Figures 9 and 10), suggest interstate migration rates in the 1930s were low by historical standards, akin to the migration trough in the late 1890s and far below levels in the post-war era.

Nevertheless, our interest is in examining how the *variation* in migration flows into different cities influenced wages and other measures of labor market activity. Variation in migration rates across cities was substantial. In-migration between 1935 and 1940 as a percentage of the 1935 population ranged from roughly 1 percent to as high as 18.5 percent (see Figures 1a, 1b, and 1c). The mean in-migration rate for these cities was 5.1 percent with a

standard deviation of 3.5 percent. Net-migration between 1935 and 1940 ranged from -5.9 percent to 12 percent of the 1935 population, with a mean of -1.2 percent and a standard deviation of 2.5 percent (see Figures 2a, 2b, and 2c).

The scatter plots in Figures 1 and 2 offer a quick look at the relationships between in-migration and net-migration respectively and the growth rates in annual earnings between 1935 and 1939 in three sectors: manufacturing, retail trade, and wholesale trade. Simple linear regressions suggest negative correlations between the earnings growth and migration measures, but the relationships are only statistically significant at the 10 percent level in three of the graphs.[6] One explanation for the weakness of these negative relationships is that migration flows were themselves influenced by changing conditions in these markets. Because in-migrants are likely to be attracted to areas experiencing higher wage growth, we expect these endogenous location choices to mitigate any true negative effect of the labor supply shock on wage growth. Our instrumental variable approach, discussed below, is designed to address this concern.

III. Data and Definitions

The 1940 Census was the first to gather data about recent mobility in the US population, asking individuals about the current location and their place of residence five years ago. This information is reported in a matrix of population flows between 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 our notion of local labor markets. We use the mobility data to reconstruct the number of migrants arriving in and leaving each labor market. We also exploit the full matrix, which identifies the set of source areas contributing to each local migrant flow, in constructing our instrument.

Of the 86 cities in our sample, we consider 23 of them to be part of a larger labor market (for example, Dallas-Fort Worth and Minneapolis-St. Paul).[7] In the current draft, we use only data from the largest of the paired cities, though our plan is to aggregate information for these city-pairs to have complete coverage of a labor market area. We match the migration flows into the resulting 76 cities with information on annual earnings and employment for the county in which the city is located.

A key advantage of the Census data on internal migration is that it contains full counts of people moving into and out of an area. In contrast, immigration studies typically use changes in the percentage of the population that is foreign-born to approximate the net flow of migrants to an area. However, the share foreign-born can increase either with new in-migration to an area or with the departure of the existing native-born population, each of which is associated with a very different set of predicted labor market effects.

A disadvantage of our data is that the migration flows include males of all ages and thus include some men too young or too old to participate in the labor market.[8] Furthermore, the current draft of the paper focuses entirely on the impact of white male migration. Eventually we plan to consider the migration of black men as well. Black migrants, fewer than 6 percent of whom finished high school, may be closer substitutes to production workers in the manufacturing sector, as 17.1 of workers on the production line held a high school degree in 1940, compared to 38.3 percent in retail trade and 43.4 percent of workers in wholesale.[9] White male migrants to central cities matched the high school graduation rates of the average wholesale worker.

We match the city migration flows with county-level data reported by the Department of Commerce on the average annual earnings and the number of employees in the manufacturing,

retail sales, and wholesale sales sectors in 1935 and 1939. The geographic mismatch between the migration data (city) and labor market data (county) is of some concern. Some individuals classified as in-migrants from the balance of a city's own state might in fact have moved within the county, and thus will have no effect on total local labor supply. We plan to load city-level labor market data to check the robustness of our results.

Summary statistics for the city-level migration data and the county-level labor market data are presented in Appendix Table 1.

IV. Estimation

We begin by establishing the correlations between flows of internal migrants and changes in local labor market outcomes. Implicitly, this experiment assumes that migration flows are unrelated to differential economic opportunities in destination areas. However, it is reasonable to believe that migrants sought out cities experiencing rising wages, a trend that would induce a positive correlation between a city's wage growth and the size of its in-migration. To address this concern, we develop an instrument for in-migration that combines the predicted number of out-migrants from each source area, based on local "push" factors, and the predicted probability of moves between each source-destination pair given geographic distance.

IV.A. Basic Specification

Ignoring, for the moment, the issue of endogenous location choice, consider the following equation:

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

where $\Delta DV_{j, 35\text{-}40}$ is the change in a labor market outcome for city *j* between 1935 and 1940. The evolution of labor market conditions in city *j* is a function of the change in the labor supply over the period, which is, in turn, determined by the rate of both in- and out-migration. The most flexible specification, presented here, allows in- and out-migration to have distinct effects on labor market outcomes. Later, we restrict arrivers and leavers to have equal effects (in absolute value) by estimating the total effect of net-migration.

We include a vector of controls for each city, as of 1930, including the age distribution of the population, the initial industrial composition of employment, and the percent of the population that is black, foreign-born, or illiterate. The extent of the downturn during the Depression varied by region (Wallis, 1989; Fishback, Horrace, Kantor, 2005). Adding region dummies allows us to compare the relative migration patterns and economic performance of geographically-proximate cities within each region. The errors are clustered at the state level to allow for spatial correlation in economic shocks.

Local labor markets can respond to migration shocks along several margins: First, migrants might bid down the wages of substitutable workers. In the absence of a summary wage for the entire economy, we investigate the change in average annual earnings between 1935 and 1939 for three large sectors; manufacturing, retail trade, and wholesale trade.[10]

Second, if wages are slow to adjust, in-migration might lead to increased unemployment. Alternatively, if wages do fall, existing workers might choose to leave the labor force. Either of these channels would generate a negative correlation between in-migration and employment rates. To avoid problems in comparing measured unemployment during the 1930s, we focus on the employment-to-population ratio, which we calculate as the number of workers employed in

manufacturing (production only), retail trade, or wholesale trade divided by the population aged 21 and over.[11] However, if new arrivals are more likely than existing workers to be employed – perhaps because they are willing to accept a lower-paying job – this compositional change could dampen, and even overwhelm, any true negative relationship between in-migration and employment.

In the longer run, the lower wages associated with in-migration might encourage the existing workforce to leave the city, or might attract new employers to the area. We address the first possibility by estimating the effect of in-migration on the local out-migration rate. For the latter, we plan (in future work) to examine the relationship between in-migration and the net creation of new establishments in the retail, manufacturing, and wholesale sectors between 1935 and 1939.

IV.B. Construction of Migration Instruments

To address the potential correlation between migrant flows and local economic conditions, we have developed instruments that isolate the exogenous component of in- and out-migration flows. The choice to migrate entails a comparison between one's home market and all other possible destinations. It is useful to think of internal migrants as being both pushed from their home markets by deteriorating economic conditions, and pulled to their new destination by economic opportunities there. Our instrument for in-migration to a particular city is based on *push factors* from common sending areas, while our instrument for out-migration is based on *pull factors* to common destinations.

Actual in-migration to city *j* can be written as a weighted sum of the number of migrants leaving each area *i* ($i \neq j$), with the weights being the probability that a migrant settles in city *j*, conditional on leaving area *i*.

migrants arriving in *j* =

$$\Sigma_{i = 1....n\ (i \neq j)} \text{pr(migrant arrives in } j \text{ | leaves } i) \text{ x (\# migrants leaving } i) \qquad (2)$$

This expression helps to illustrate the two sources of endogeneity in the actual flow of in-migrants. First, if city *j* is a common destination for migrants from area *i*, the total number of migrants leaving area *i* might be a function of economic conditions in city *j*. In addition, if city *j* experiences a positive economic shock, the probability that a migrant from area *i* settles in city *j* might increase. In constructing the instrument for in-migration, we consider each of these factors in turn.

The number of migrants leaving area *i:* Economic shocks in the source market are arguably uncorrelated with those in destination areas, except through the channel of induced migration. To isolate the stream of migration pushed from their home markets by local economic conditions, we regress the out-migration rate on a set of local factors, including spending on New Deal programs and weather conditions, and use the predicted out-migration rate to generate a counterfactual migration flow. Data on these factors were initially collected at the county level by Fishback and Kantor as part of their New Deal project, and were aggregated to the match with our sample of cities and "balance of state" areas.[12]

In particular, we estimate for the sample of 124 areas:

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

The predicted number of migrants leaving area *i* is then the product of the predicted out-migration rate and the population of area *i* in 1935.

$$\text{Predicted\_\# migrants leaving } i = \text{Predicted\_OMR}_i \text{ x } (\text{population in 1935})_i \qquad (4)$$

The probability that a migrant from area *i* goes to city *j*: From the mobility data, we can calculate the actual share of migrants leaving area *i* who settled in city *j* between 1935 and 1940. However, because these shares were generated by migration activity in the late 1930s, they will be partially determined by contemporaneous and endogenous economic conditions. While migrants' location choices are influenced, at the margin, by relative economic shocks (Borjas, 2001), numerous studies show that migration patterns are consistently sensitive to geographic distance (Levy and Wadycki, 1974; Schwartz, 1976). Because geographic distance is an immutable characteristic, we aim to "partial out" that component of the settlement patterns determined by distance alone.

To that end, we create a matrix of distances in miles from each area *i* to every other area *j*. We then estimate a set of regressions (76 in all), for which the dependent variables are the share of people leaving area *i* who settled in one of the 76 sample cities *j*, and the explanatory variables are the distance between areas *i* and *j*.

$$\text{pr(migrant arrives in } j \mid \text{leaves } i)_j \ = \alpha + \beta \ln(\text{distance from } i \text{ to } j) + \varepsilon_j \qquad (5)$$

We use the estimates of β to calculate the predicted probability that a migrant who leaves area *i* will arrive in city *j*.

The instrument for actual in-migration to city *j* is thus the product of the predicted out-flow from area *i* and the predicted probability that a migrant who leaves area *i* ends up in city *j* summed over all areas. For city *j* the

Instrument for in-migration = (6)

$\Sigma_{i = 1....n\ (i \neq j)}$ predicted pr(migrant arrives in *j* | leaves *i*) x (predicted_# migrants leaving *i*)

Because the majority of internal migrants relocate over short distances, the assumption that economic conditions in sending areas are uncorrelated with those in destinations might be violated. Indeed, 59 percent of migrants in the late 1930s moved within the same state (U.S. Bureau of the Census 1943, p. 8). Therefore, we instrument for total in-migration using the predicted migration *from out-of-state*. In other words, we restrict our set of source areas in the regression above to all areas *i* not destination *j and* not in destination *j*'s home state.

The instrument for out-migration flows from city *j* is developed in a similar way. We develop predictions of the number of in-migrants to each area *i* as a function of pull factors in those areas (the analog of equations (3) and (4)). We then predict the share of out-migrants from *j* that would settle in *i* based on distance alone (as in equation (5)). For city *j* the

Instrument for out-migration = (7)

$\Sigma_{i = 1....n\ (i \neq j)}$ predicted pr(migrant leaves *j* | moves to *i*) x (predicted # migrants move to *i*).

As before, to avoid spatial correlation in local economic shocks, we base the instrument for total out-migration on predicted migration to out-of-state areas.

The probability that a migrant from area *i* settles in destination *j* is strongly related to the geographic distance between the two markets. In 119 out of the 124 linear probability models, the coefficient on log distance was statistically significant at the 5 percent level. On average, a one standard deviation increase in the source-to-destination distance around the source area's sample mean decreases the share of migrants settling in a destination by roughly one standard deviation.

Table 1 presents the regression coefficients that we used to predict the in- and out-migration rates from source and destination areas. We include only those factors that proved to be statistically significant. The main purpose of these estimates is to serve as building blocks in our migration instruments. We show the coefficients here merely to demonstrate that they are sensible.

Both the rates of in- and out-migration were higher for central cities than for areas outside major cities. On balance, cities seem to have attracted population during the late 1930s. Consistent with Fishback, Horrace, and Kantor (2006), we find that higher New Deal public works spending is associated with net in-migration. The presence of New Deal loans dampened out-migration outside the major cities, but had a negligible effect in urban areas.

The number of months of severe or extreme rain outside cities stimulated both in- and out-migration, with an overall positive effect on net migration. Fishback, Horrace, and Kantor (2006, p. 35) find a similar pattern for rural counties. The effects of extreme and severe wetness were negligible in cities. Meanwhile, higher average temperatures throughout the year stimulated net in-migration.

Socio-economic conditions had the anticipated effects on mobility. Outside major cities, the higher the shares of families with radios, the greater the rate of out-migration. This finding is consistent with the importance of radio in the 1930s in providing access to information about the wider world (Stromberg, 2004). Higher shares of church membership slowed out-migration rates, perhaps because church members had strong community ties. Finally, the presence of manufacturing industries attracted in-migrants to non-urban areas, although this effect was absent in the central cities.

Table 2 presents the results from first-stage regressions, which depicts the relationship between our predicted migration flows and actual in- and out-migration. In the first row, we regress actual in-migration as a share of 1935 population on the predicted in-migration share, region dummies, and the full set of controls used in the second stage. The coefficient on the instrument is positive and statistically significant, implying that a one percentage-point increase in predicted inflow is associated with an actual inflow of 2.8 percentage points. We under-predict actual migration for two reasons: first, our instrument is based solely on in-migration from outside the state. Secondly, we capture only those migrants pushed from their home market, rather than pulled by economic opportunities in their new destination.

In the second and third rows, we use our predicted flows in both directions to explain migration into and out of major US cities. As before, predicted in-migration has a large and significant relationship with actual in-migration. The same is true of predicted and actual out-migration. Reassuringly, the cross relationships are much weaker and insignificant.

In the final row we consider the relationship between actual net-migration and predicted in-migration alone (column 1), and in- and out-migration together (columns 2 and 3). Actual net migration displays a strong positive relationship with predicted in-migration in both equations.

The relationship of actual net migration with predicted out-migration is negative but is statistically insignificant. The late 1930s was a period of in-migration to cities, which might explain why out-migration has a weaker effect in this setting.[13]

V. The Impact of Internal Migration on Labor Markets

To compare our results with the prior immigration literature, we begin in Table 3 by examining the impact of in-migration alone on labor market outcomes in three sectors: manufacturing, retail trade, and wholesale trade. The first and second columns present estimates using Ordinary Least Squares (OLS).

The expansion of labor supply associated with in-migration has a negative effect on annual earnings in all three sectors. The magnitudes of the effects are unchanged when we include a set of city-level controls in the second column. We expect the endogeneous location choices of migrants to bias the OLS coefficients in a positive direction, because higher earnings growth was likely to attract migrants to a city. Consistent with this view, the coefficients in the instrumental variable (IV) analysis (column 3) are substantially more negative than their OLS counterparts. The negative effect of in-migration on the wages of manufacturing production workers and wholesale workers nearly doubles, while the effect on retail workers more than quadruples. A one standard deviation increase in the in-migrant flow (equivalent to 3.5 percent of the existing population in 1935) leads to a 2.5 percent decline in the growth rate of annual earnings for manufacturing production workers (or, one-third of a standard deviation), a 4.5 percent decline for wholesale workers (two-thirds of a standard deviation) and a 11.5 percent decline for retail workers (nearly a full standard deviation).

The anticipated effect of in-migration on employment rates is less clear. On the one hand, in-migrants might displace members of the existing workforce. On the other hand, in-migrants might have a higher propensity to seek or secure employment. Employment rates could either rise or fall with in-migration, depending on which effect dominates. In all three equations, we see a small positive effect of in-migration on employment rates, but in no case can we reject the hypothesis of no effect. The IV coefficients are more positive than the OLS coefficients, but still do not allow us to reject the hypothesis of zero.

Modern studies disagree about the extent to which immigration induces departures among the existing workforce (see Filer, 1992; Card 2001; Wright, Ellis, and Reibel, 1997). We find that, during the decade of the Depression, internal migration stimulated some out-migration – but the displacement was hardly one-for-one. The OLS estimates imply that two new arrivals are associated with the departure of one existing resident. The sign of the potential bias is uncertain. For a given level of labor demand, in-migrants will be attracted to areas with recent departures, which will have higher wages and lower housing costs. However, a negative labor demand shock might simultaneously induce out-migration and repel new arrivals. Empirically, the IV coefficient is smaller than its OLS counterpart, suggesting that the former effect dominates. The IV estimate indicates that it would take four new arrivals to displace a member of the existing population.

Our results indicate that in-migrants do prompt existing workers to leave an area. Thus, the size of the true labor supply shock associated with in-migration is smaller than is implied by the number of in-migrants alone. Does this induced out-migration buoy wages just as in-migration depresses them? In the simplest model, in which all individuals are endowed with one unit of identical labor input, in- and out-migration should have equal and opposite effects on wages.

However, this prediction might not be borne out, for example if the skills of in- and out-migrants systematically differ.

The regressions in Table 4 test the hypothesis that in- and out-migration have equal and opposite effects on the growth of annual earnings. OLS coefficients are displayed in the first two columns; corresponding IV estimates are in columns three and four. We focus here on the IV results. In retail and wholesale trade, in-migration has the expected negative effect on earnings growth, while out-migration has a positive effect. We fail to reject the hypothesis that the coefficients are equal in absolute value. After accounting for out-migration, which is omitted from the regression in Table 3, the estimated effect of in-migration on earnings in the wholesale sector nearly doubles (but is unchanged in the retail sector).

Our results for the manufacturing sector are harder to explain. The OLS coefficients are consistent with expectations; in-migration lowers earnings growth and out-migration raises it. However, when we move to instrumental variable analysis, the signs change. This finding might be sensitive to adding black migration flows. Black workers were more likely to enter manufacturing than retailing or wholesale trade when they moved North.

That in- and out-migration appear to have equal and opposite effects on wages argues for a parsimonious specification with net-migration – the true change in labor supply, after induced out-migration – on the right-hand side. We present this specification in Table 5. The results are more reasonable, with higher net migration associated with slower wage growth in all three sectors. As before, wages in the retail sector are the most sensitive to labor supply shocks. The effect of a one standard deviation increase in net-migration (equivalent to 2.5 percent of the existing population) varies from a 2.5 decline in annual earnings growth in the manufacturing sector to 11.5 percent decline in retail.

VI. Conclusions and Directions for Continued Work

Even in the heart of the Great Depression, despite extraordinarily high rates of unemployment, we find that additions to a city's labor supply in the form of net internal migration reduced local earnings growth. These effects are stronger for employees in retail and wholesale trade than for production workers in manufacturing. This difference might reflect the fact that unionization was more prevalent in manufacturing than in the trade sectors, leading to wage rigidity. Perhaps because of the dampening effect of in-migration on wages, members of the existing workforce in the cities chose to leave the area. We find no evidence that net in-migration reduced employment opportunities. If anything, in-migration is associated with a positive up-tick in the employment-to-population ratio.

While our results are still preliminary, we believe that the demonstrated sensitivity of wages to local labor flows might challenge the prevailing views of wage rigidity during the Great Depression. If wages were indeed slow to adjust to economic shocks, we would expect the response to in-migration to occur primarily through employment. In fact, we find the opposite.

The disparity between our results and the macroeconomic literature could be due in part to the over-reliance of wage rigidity literature on evidence from the manufacturing sector, which employed less than a quarter of the 1930s workforce. For example, Hanes (1996) argues that hourly manufacturing earnings were less cyclical during the Depression than during the post-World War II era.[14] Cole and Ohanian (1999).point to the fact that, despite staggering rates of unemployment, hourly earnings in manufacturing were 8 percent above the 1929 level in 1935 and reached a level 17 percent higher by 1938. In contrast, detrended real hourly wage rates outside manufacturing were still 13 percent below the 1929 level in 1935 and failed to rise above

91.4 percent of the 1929 level through 1940. Our results likewise find that annual earnings in manufacturing were less responsive to new in-migration than in retail or wholesale trade.

We hesitate to push criticism of the rigid-wage literature too far at this point because that the macroeconomic literature relies on hourly or weekly earnings information, while our results are based on annual earnings. Annual earnings are a function of both work opportunities and wage rates. Our findings of local *earnings fluidity* might be consistent with the macroeconomic literature on *wage rigidity* if the response we document here occurred solely through reduced opportunities for work hours rather than through wage cuts. We are currently searching for measures of wage rates or measures of hourly or weekly earnings that we can match up to the migration flows.

In future work, we plan to incorporate information on black migrant flows and on the arrivals of immigrants from abroad. These additions will provide a more complete picture of labor supply shocks, and allow us to compare the effect of black and white arrivals by sector. We stressed in our introduction the potential importance of worker and firm mobility in response to in-migration shocks. Thus far, we have only considered the effect of in-migration on the existing workforce. A future draft will also examine changes in the numbers of establishments offering employment. With more trepidation, we plan to offer estimates of the effects of internal migration on unemployment rates and the number of people on work relief.

Figure 1a
Annual Earnings Growth for Manufacturing Workers, 1935-1939 and In-Migration Rates, 1935-1940, 86 Cities

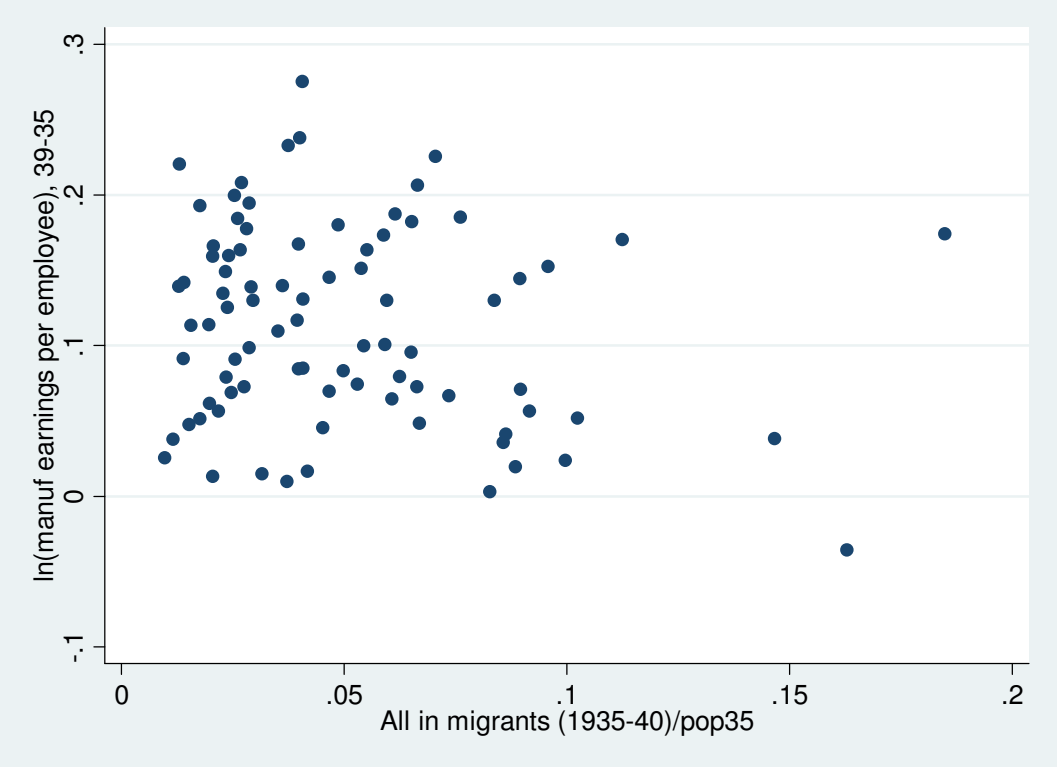

Figure 1b
Annual Earnings Growth in Retail Trade, 1935-1939 and In-Migration Rates, 1935-1940, 86 Cities

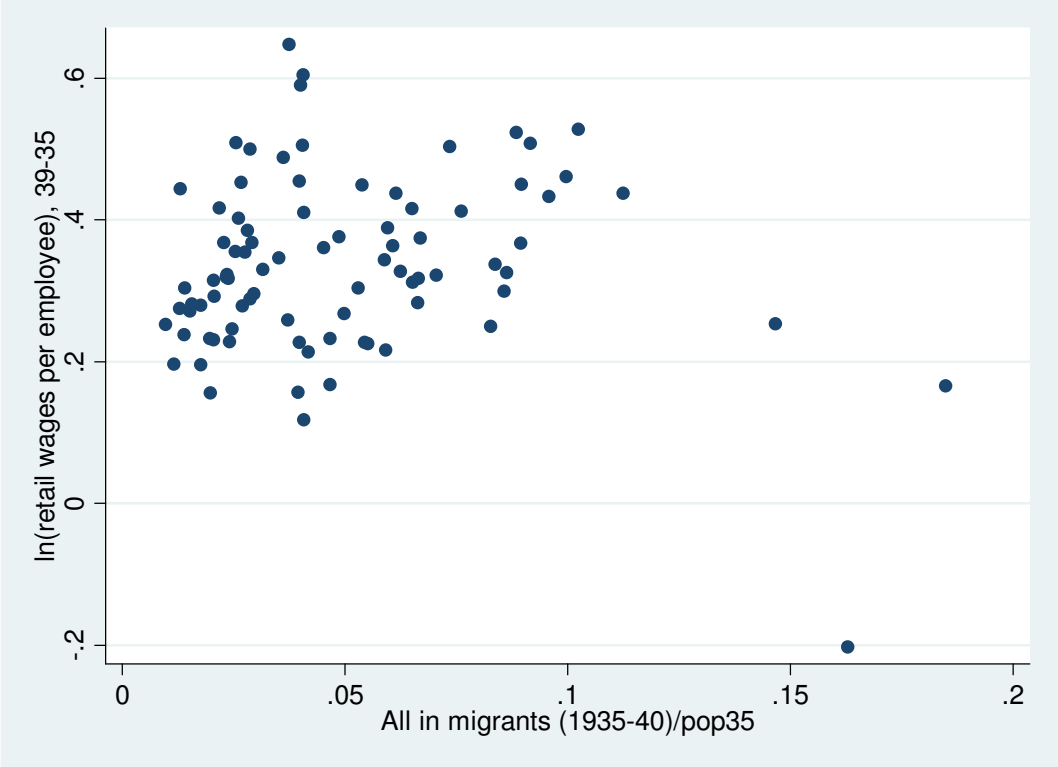

Figure 1c
Annual Earnings Growth in Wholesale Trade and In-Migration Rates, 1935-1940
86 Cities

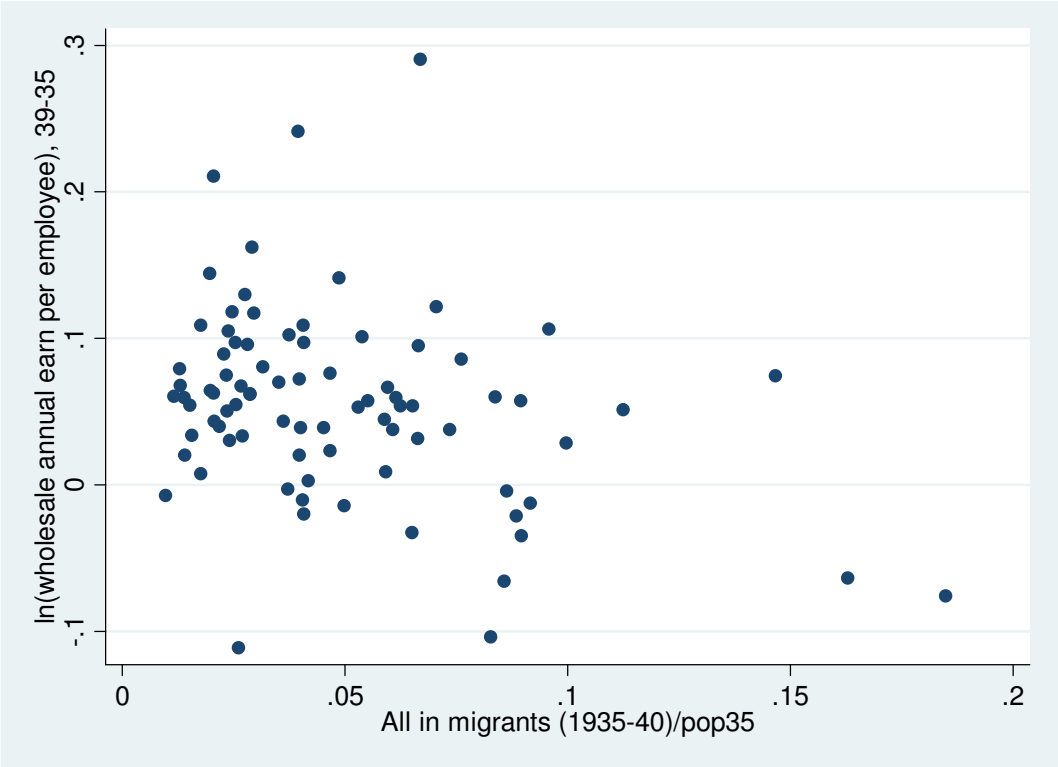

Figure 2a
Manufacturing Annual Earnings Growth and Net-Migration Rates, 1935-1940
86 Cities

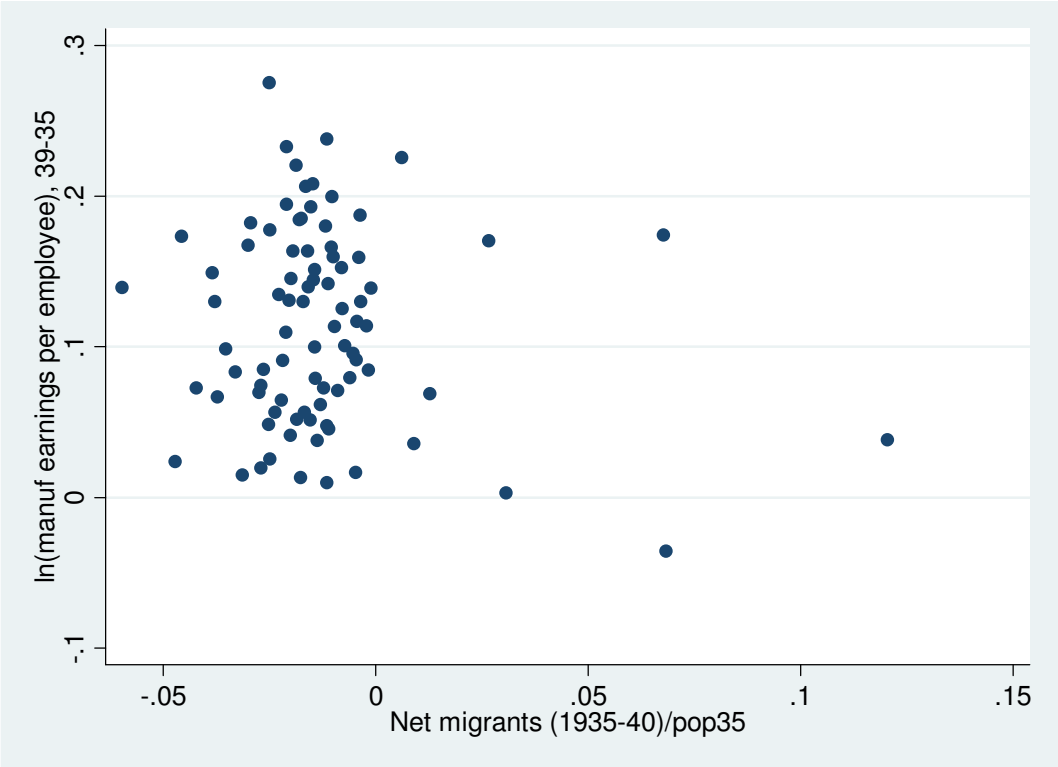

Figure 2a
Retail Trade Annual Earnings Growth and In-Migration Rates, 1935-1940
86 Cities

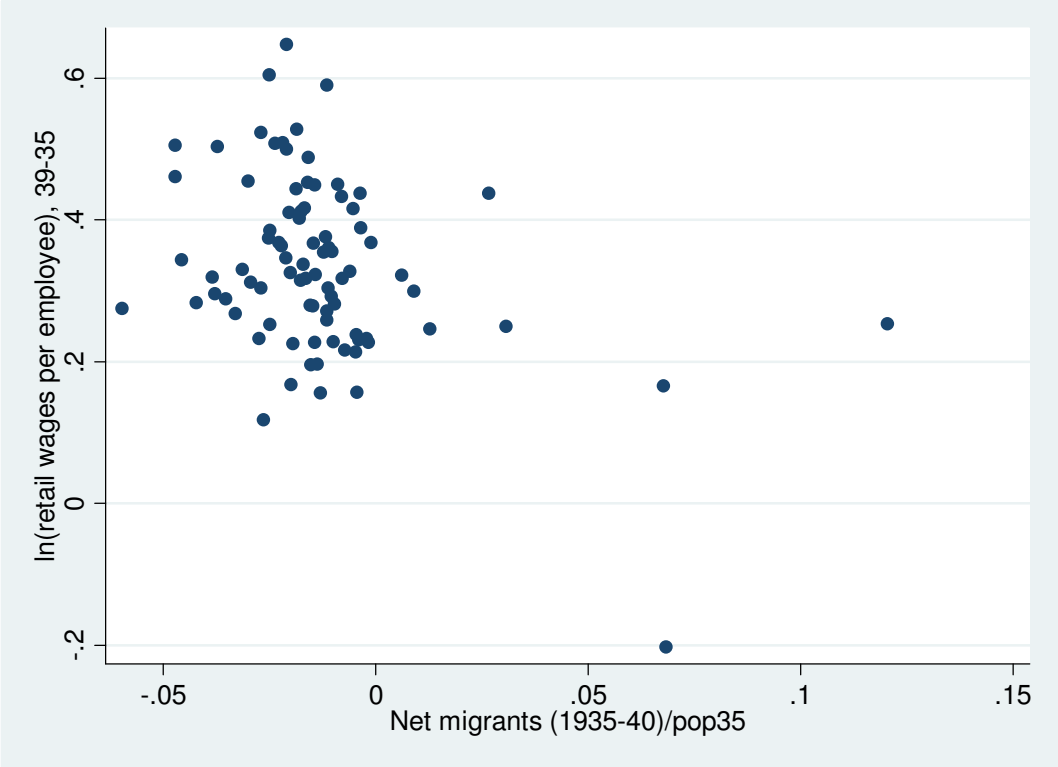

Figure 2c
Annual Earnings Growth in Wholesale Trade and In-Migration Rates, 1935-1940
86 Cities

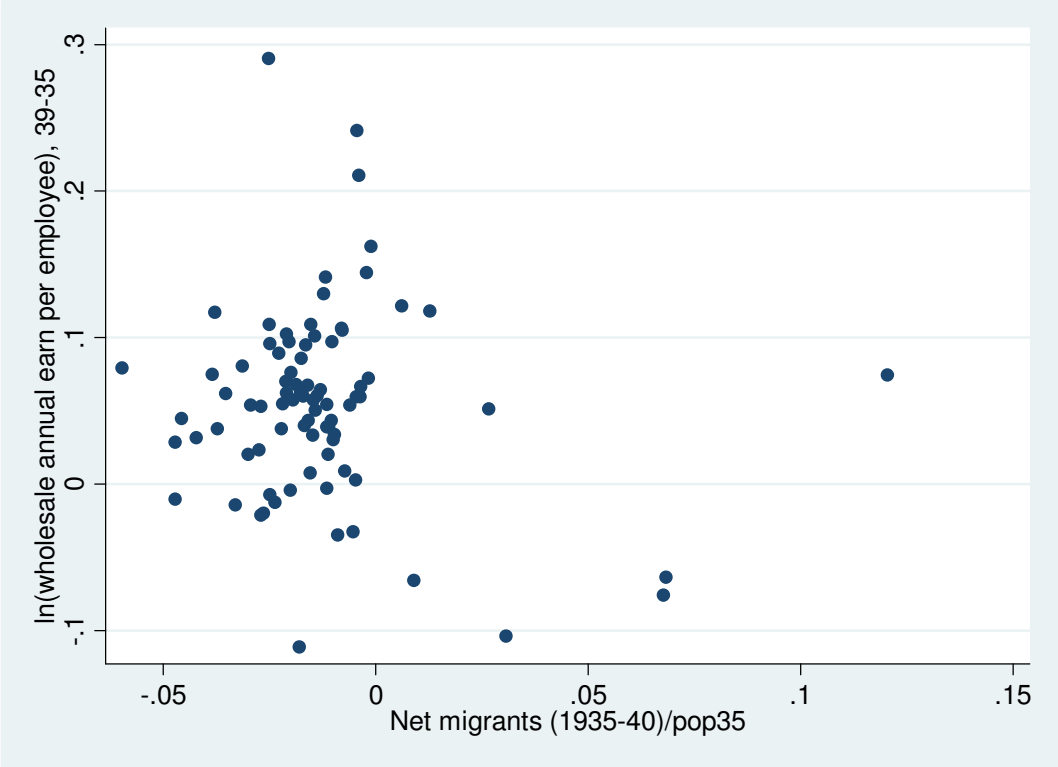

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Figure 3
In-Migration and Out-Migration Rates in 86 Cities, 1935-1940

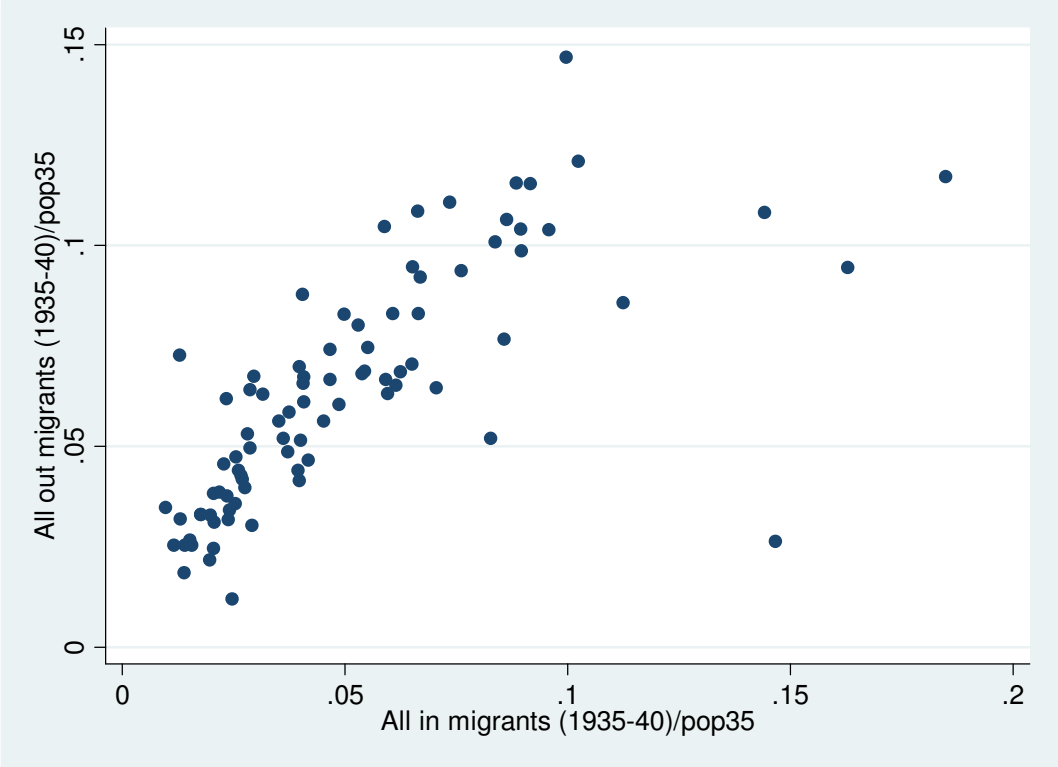

Table 1
Determinants of in- and out-migration (used to build the instrument)

	Dependent variables	
RHS variables	In-migration rate	Out-migration rate
City Dummy (1 is a Central City; 0 otherwise	0.023	0.015
	(0.015)	(0.011)
New Deal $ per cap, in $100s		
Public works	0.020	0.011
	(0.006)	(0.004)
Loans		-0.020
		(0.009)
FHA insured loans	0.036	
	(0.012)	
Loans x City Dummy		0.017
		(0.010)
Weather		
Wet months, 1935-39	0.007	0.002
	(0.001)	(0.001)
Wet months x City Dummy	-0.008	-0.003
	(0.001)	(0.001)
Average temperature, 1920	0.002	0.001
	(0.0005)	(0.0004)
Other conditions		
Share families with radio		0.105
		(0.024)
Share with radio x City Dummy		-0.120
		(0.022)
Share church members		-0.028
		(0.011)
Manuf. employ per cap, 1929	0.385	
	(0.146)	
Manuf. employ x City Dummy	-0.342	
	(0.142)	
Region dummies?	Y	Y
N	133	133

Robust standard errors in parentheses (cluster by state)

Table 2
First-stage regressions.
Relationship between predicted and actual in-/out- migration (white men), 1935-40

Actual migration	Predicted migration		
	In-migration only	In- and out- migration	
		In	Out
1. In-migration only	2.867		
	(0.533)		
2. Both in- and out-			
In		2.365	1.830
		(0.621)	(1.192)
Out		0.241	2.293
		(0.453)	(0.872)
3. Net migration	1.996	2.123	-0.463
	(0.406)	(0.478)	(0.920)
Region dummies?	Y	Y	Y
Controls?	Y	Y	Y
N	76	76	76

Robust standard errors in parentheses (cluster by state)

Table 3
Estimating the Relationship between In-Migration (White Men) and Labor Market Outcomes by City, 1935-40

Migration variable = Number of migrants 1935-40 as a percentage of the population in 1935

Dependent variable	OLS	OLS w/ controls	IV
1. Change in ln(wages), 1935-39			
Manufacturing	-0.449	-0.409	-0.718
	(0.386)	(0.348)	(0.576)
Retail	-0.699	-0.727	-3.342
	(1.105)	(0.911)	(1.855)
Wholesale	-0.616	-0.928	-1.354
	(0.201)	(0.169)	(0.458)
2. Change in Employment/population, 1935-1939			
Full population as numerator	0.001	0.069	0.092
	(0.041)	(0.081)	(0.082)
Population Aged 21 and over as numerator	0.026	0.112	0.150
	(0.060)	(0.127)	(0.122)
3. Out-migration 1935-1940 as percentage of population in 1935	0.537	0.400	0.246
	(0.150)	(0.083)	(0.112)
Region dummies?	Y	Y	Y
Controls?	N	Y	Y
N	76	76	76

Robust standard errors in parentheses (cluster by state)

Notes: Control variables include: changes in the share of the population in various age categories from 1930-1940; initial share of the population that is black, foreign-born or illiterate (1930); initial share of the population working in the manufacturing, retail, or wholesale trade. (The one exception is the out-migration regression, which includes the initial age distribution, rather than *changes* in that distribution).

Table 4
Relationship between In- and Out-Migration (White Men) and Labor Market Outcomes by City, 1935-40

Migration variables = # in- or out-migrants/population in 1935

	OLS		IV	
Dependent variable	In-migrants	Out-migrants	In-migrants	Out-migrants
1. Change in ln(wages), 1935-1939				
Manufacturing	-0.594	0.425	0.480	-3.946
	(0.585)	(0.831)	(1.097)	(1.781)
Retail	-1.594	2.072	-3.564	0.797
	(1.347)	(1.471)	(2.042)	(3.675)
Wholesale	-0.792	-0.342	-2.169	3.113
	(0.358)	(0.813)	(1.027)	(2.542)
2. Change in Employment/population, 1935-1939	0.037	0.150	0.087	0.142
	(0.162)	(0.209)	(0.190)	(0.371)
Region dummies?	Y	Y	Y	Y
Controls?	Y	Y	Y	Y
N	76	76	76	76

Robust standard errors in parentheses (cluster by state)

Notes: Control variables include: changes in the share of the population in various age categories from 1930-1940; initial share of the population that is black, foreign-born or illiterate (1930); initial share of the population working in the manufacturing, retail, or wholesale trade. (The one exception is the out-migration regression, which includes the initial age distribution, rather than *changes* in that distribution). Population in the employment to population ratio is population aged 21 and over.

Table 5
Relationship between Net-Migration (White Men) and Labor Market Outcomes by City, 1935-40

Migration variables = # migrants/population in 1935

Dependent variable	OLS	IV
1. Change in ln(wages), 1935-1939		
Manufacturing	-0.602	-1.032
	(0.549)	(0.852)
Retail	-1.597	-4.629
	(1.394)	(2.323)
Wholesale	-0.775	-1.835
	(0.397)	(0.676)
2. Change in Employment/population, 1935-1939	0.040	0.267
	(0.135)	(0.262)
Region dummies?	Y	Y
Controls?	Y	Y
N	76	76

Robust standard errors in parentheses (cluster by state)

Notes: Control variables include: changes in the share of the population in various age categories from 1930-1940; initial share of the population that is black, foreign-born or illiterate (1930); initial share of the population working in the manufacturing, retail, or wholesale trade. (The one exception is the out-migration regression, which includes the initial age distribution, rather than *changes* in that distribution). Population in the Employment to population ratio is the population aged 21 and over

Appendix Table 1: Summary Statistics for 76 Major US Cities

Variable	Mean	Standard Deviation
Dependent Variables (changes from 1935-40)		
Wage growth in: Manufacturing	0.112	0.065
Retail trade	0.342	0.126
Wholesale trade	0.051	0.064
Employment-to-pop ratio	0.008	0.018
Explanatory Variables (as share of 1935 pop.)		
In-migration from 1935-40	0.047	0.032
Out-migration from 1935-40	0.061	0.027
Net-migration from 1935-40	-0.013	0.019

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FOOTNOTES

[1]See Hamaleinen and Bockerman (2004) for modern evidence on the impact on internal in- and out-migration across regions on labor and housing market outcomes.

[2]In the 1930s 699,375 immigrants arrived from abroad. This immigrant flow represented 0.57 percent of the 1930 population, compared to 4 percent in the 1920s and an astounding 10.7 percent in the 1900s.

3 In the U.S. as a whole, 15.7 million people changed counties or moved to major cities from the same county between 1935 and 1940. Over the same period, 359,499 people entered and settled in the country from abroad (U.S. Bureau of the Census, 1943, 8). Thus, international migrants accounted for less than 2.2 percent of the combined total of internal and international migrants The city most likely to be affected by international immigration is New York City, where the number of international in-migrants was 101,971, compared to 232,999 internal in-migrants, and to a lesser extent Chicago (11,432 immigrants compared with 163,818 internal in-migrants) and San Francisco (9,715 compared with 84,203) (U.S. Bureau of the Census, 1943, 20).

[4] See Boustan (2004, 2005) for use of a similar method to examine the impact of black in-migration into the North on labor markets and white flight to the suburbs.

[5]Another infamous example of antipathy toward new migrants from other parts of the country was white workers' protests over the arrival of rural black migrants during the World Wars (Gottlieb, 1987; Sugrue, 1996). The Chicago riots in 1919 were an extreme manifestation of this phenomenon. Even when race is not an issue, complaints arise.

[6] To correspond with the scatter plots, we regressed the difference in the logarithm of annual earnings from 1935 to 1939 on the in-flow of migrants (either gross or net), expressed as a percentage of the 1935 population. The coefficients for gross in-migration are: retail (-0.232, s.e. = 0.405); manufacturing (-0.348, s.e. = 0.209); wholesale trade (-0.613, s.e. = 0.209). The coefficients for net migration are: retail (-1.897, s.e. = 0.525); manufacturing (-0.379, s.e. = 0.297); wholesale trade (-0.357, s.e. = 0.293). Note that only three of these six estimates are statistically significant at conventional levels.

[7] We base our determination of the extent of local labor markets on the Census concept of Standard Metropolitan Statistical Areas (SMSA). We plan to 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.

[8] Migrants were less likely than the existing population to be children or elderly. Only 17.8 percent of male in-migrants to central cities between 1935-1940 were between 5-17 or greater than 70 years old, compared to 25.3 percent of men who remained in the same urban areas in both years (Ruggles and Sobek, 2003).

[9] Figures for high school graduation are calculated by industry for all male workers in central cities. Manufacturing production workers include those who report an occupation of "operative and kindred worker."

[10]Average annual earnings are calculated as the total wage bill divided by the average number of employees for the year. In manufacturing this is restricted to production workers.

[11]The 1940 census was the first to use the modern definition of unemployment, which is restricted to individuals who did not hold a job but were actively seeking work during a reference week. In the 1930 census, reports of unemployment were based on a single reference day, and the unemployed did not need to be actively seeking work. Data for 1937 is based on a survey conducted through the post office which separately enumerated employment, unemployment, partial employment, and work relief. In contrast, the 1940 Census considered those employed through "public emergency works projects" to be employed.

[12] See Fishback, Horrace, and Kantor (2005, forthcoming) and Fishback, Haines and Kantor (2001 and forthcoming) 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/.

[13]We also explored the use of *actual* weights (rather than weights predicted by distance) in constructing the instruments. In this case, both predicted in- and out-migration have the expected sign in the net-migration equation, and both coefficients are statistically significant. We believe that the asymmetric effect of predicted in- and out-migration on actual net-migration in Table 2 occurs because the distance-based weights favor the same areas as both sources and destinations.

[14] However, when the oil shocks of the 1970s were excluded from the post-war era, the degree of cyclicality in the two periods appear quite similar.