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Native and Foreign Interstate Migration:
An Empirical Comparison of the Last 40 years

In the last 50 years, the United States has experienced a large influx of immigrants. The current literature suggests that the impact on native wages is small or nonexistent, but the effect of the foreign born on native internal migration is still disputed. Using Public Use Microdata Samples from every decennial census from 1970 to 2000, this study estimates the response of native and foreign interstate migration flows to the concentration of the foreign-born population. The results indicate that natives avoid higher foreign concentrations, but the foreign-born are strongly attracted to such concentrations. There is also evidence that this major difference between native and foreign response has motivated the end of positive net migration to the West.

Introduction

A large literature estimates the effects of immigration on wages of native-born Americans. The majority of this research has found that the direct wage effect is either small or nonexistent (Card, 1990; Borjas, 1994; Friedburg and Hunt, 1995; Greenwood and Hunt, 1995; Greenwood, Hunt, and Kohli, 1997). However, many studies of the wage impact fail to account for internal migration. The true wage impact of immigration on the native-born may be distorted if natives are simply migrating out of areas with a large concentration of immigrants (Borjas, Freeman, and Katz, 1996). This paper addresses the differences between native and foreign internal migration and specifically how increasing foreign concentrations affect the internal migration of natives and foreign-born.

Individual-level microdata from the U.S. decennial censuses from 1970 to 2000 allow the distinction between the native-born and foreign-born. The microdata for each group are then aggregated into a panel of interstate migration. A modified gravity model is used to predict interstate migration flows for each period based on variable costs of migration, state economic conditions, amenities, and census regions. The model is estimated using bivariate seemingly unrelated Tobit regressions to account for the cluster of zero-migrant flows as well as inter-year and inter-group error correlation.

Background and Literature Review

Since Congress passed the Immigration and Nationality Act of 1965, the demographic makeup and dispersal of immigrants into the United States has changed considerably. Whereas past immigrants were generally more educated and skilled, the new immigrants have tended to increase the education and wage gap between the native-born and foreign-born (Borjas, 1994). Moreover, since the laws have given preference to family reunification, immigrants are more likely to concentrate in a small number of areas (Frey, Liaw, and Hayase, 1998). This has, of course, led to the current debate about the impact of immigrants on native wages – especially natives with low skill and low education. The argument is that low skill immigrants are substitutes for low skill natives, so the increasing supply of low skill labor due to immigration causes a decrease in low skill wages. Because labor markets are open, the wage shock may result in increased migration of the natives to less competitive labor markets (Borjas, Freeman, and Katz, 1996).

Migration can be defined in a variety of ways. In this study, a person age 5 and over is considered a migrant if at the time of measurement (i.e. the census date) they were living in a different state 5 years earlier. Defining what constitutes a different place of residence also varies across studies. States make an especially convenient measure for studies with panel data because of their fixed geographical boundaries.

Numerous studies conducted in the last 30 years have shown that the wage impact is probably either small or nonexistent (see White and Imai, 1994, for a review). There is less agreement, however, about whether foreign concentration in a region causes natives to migrate elsewhere. Some studies have found little or no effect (Butcher and Card, 1991; White and Imai, 1994; Card and DiNardo, 2000; Card, 2001; Kritz and Gurak, 2001;). Kritz and Gurak, for example, conducted a thorough cross sectional analysis of state migration with the 1990 census. Their data includes more detail about the people migrating than in this study, and they use this detail to look specifically at the impact of recent immigration by country of origin. On the other hand, their cross sectional analysis is a severe limitation. They find no evidence for native migration out of high immigration states. Other studies have found some native migration response on certain demographic and skill groups (Filer, 1992; Frey, 1994; Frey et al., 1996; Liaw et al., 1998; White and Liang, 1998; Borjas, 2006). As expected, they find low skill and low education natives are most affected. Kritz and Gurak (2001) review the different studies and their various findings. This study uniquely addresses this question by looking at a longer history of interstate migration, as opposed to the cross-sectional or net migration analysis that many of the previously mentioned studies have employed.

Another advantage of this study is due to the use of interstate flows. [1] Studies that use a smaller region are typically forced to analyze total inflows and outflows (or sometimes just total net migration). This provides little insight into what kinds of people are migration, where they are migrating in from or migrating out to, and the subsequent economic conditions they face in those places. The downside of using interstate flows is, of course, that an average or aggregate measurement at the state level fails to capture the detail within highly specific labor markets (Navratil and Doyle, 1977). [2] For example, a large and economically complex state like California or New York contains urban and rural areas, both the rich and destitute, and some of the most and least desirable places to live. The ways this study attempts to partially circumvent this issue, and the effects of not accounting for labor market detail, will be discussed later.

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1. Kritz and Gurak (2001) define migration at the state level, but their unit of observation is the individual. Frey (1994; 1995a) and Frey et al. (1996) analyzes states, net migration is the focus (and with less extensive regression analysis). Borjas (2006) also studies net migration at the state level, but he puts the states into through categories: California, other high immigration states (top 5 after California), and the rest of the country. Frey (1995b) uses a similar set up for a case study of California, but without regression analysis.
2. Greenwood (1975; 1985; 1997) discusses and reviews the use of modified gravity models, as well as the empirical issues of using aggregate measures “as proxies for personal characteristics of the migrants.”

The final distinctive part of this study is the modified gravity model specification using panel data. Although gravity models are fairly common within migration research, they have not been used with panel data as frequently. Even panel data studies in general are rare; most are cross sectional (Greenwood, 1985). Borjas (2006) conducts a panel data study from 1960 to 2000 at the state and metro area level, though his state level analysis does not include flows. Some International studies of internal migration have used modified gravity models on panel data: Andrienko and Guriev (2004) study interregional Russian migration from 1992 to 1999 and van Lottum and Marks (working paper, 2010) study Indonesian inter-provincial migration from 1930 to 2000. The lack of temporal analysis in the literature indicates that we have little understanding of trends or the stability of the determinants of migration over time.

There have been significant changes in U.S. migration trends and demographic composition in the last 50 years (Greenwood, 1985; 1997). Frey (2006) discusses the changing demographics caused by seniors, Baby Boomers, and "New Minorities" – Hispanics and Asians. These demographic changes have possibly spurred the changes in migration trends, such as the decreased propensity to migrate (Frey, 2009) and the end of positive net migration to the West (Greenwood, 1985). Why the South is now the only region seeing positive net migration is a phenomenon that has not yet been fully addressed in the literature. Table 1 contains recent data on interregional flows for the native and foreign-born from the 2009 Current Population Survey. [3]

Table 1: Interregional Migration, 2008–2009 (in Thousands)

3. Interregional flows are broken down by native-born and foreign-born. "% Native" and "% Foreign" denotes the percentage of total out-migrants from the origin region that migrated to each destination.

Origin Region	Destination Region	Native	Foreign	% Native	% Foreign
Northeast	Midwest	47	9	13.17	15.00
Northeast	South	230	54	64.43	47.37
Northeast	West	80	31	22.41	35.63
Midwest	Northeast	45	7	7.96	15.56
Midwest	South	308	38	54.51	33.33
Midwest	West	212	25	37.52	28.74
South	Northeast	145	32	20.60	71.11
South	Midwest	343	42	48.72	70.00
South	West	216	31	30.68	35.63
West	Northeast	61	6	11.34	13.33
West	Midwest	183	9	34.01	15.00
West	South	294	22	54.65	19.30

Origin Region	Destination Region	Net Native	Net Foreign
Northeast	Midwest	2	2
Northeast	South	85	22
Northeast	West	19	25
Midwest	Northeast	-2	-2
Midwest	South	-35	-4
Midwest	West	29	16
South	Northeast	-85	-22
South	Midwest	35	4
South	West	-78	9
West	Northeast	-19	-25
West	Midwest	-29	-16
West	South	78	-9

	Native			Foreign			Total		
	Out	In	Net	Out	In	Net	Out	In	Net
Northeast	357	251	-106	94	45	-49	451	296	-155
Midwest	565	573	8	70	60	-10	635	633	-2
South	704	832	128	105	114	9	809	946	137
West	538	508	-30	37	87	50	575	595	20

The sign of the net flow, which indicates the net direction of the flow, is the same for the native and foreign for all flows except the South and West. The foreign-born are net migrating from the South to the West, but natives are doing the opposite. It is possible that differences between native and foreign migration are driving the decrease in positive net migration to the West. The data suggest net out-migration from the west on the part of the native-born (of about 30,000), but net-in migration on the part of the foreign-born (of about 50,000). This issue will be explored later in greater depth.

Data

State-level migration data are obtained by aggregating Public Use Microdata Samples (PUMS) from 1970 to 2000 into interstate migration flows for the native-born and foreign-born separately. [4] The PUMS files differ in size depending on the year. For 1970, 2 samples are pooled, each containing 1% of the population for a total of 2%. The 1980 data is built from a single sample of 5% of the population. Both 1990 and 2000 combine a 1% sample and a 5% sample into 6% samples. [5] As mentioned before, migration of persons five years old and over is defined in the data as anyone living in a different state five years before the census is taken. [6] Each observation is a pair of states – origin i and destination j at period t, and the generalized regressand is defined as:

$$\mathrm{M}_{ij,t} \equiv 100 * \frac{\text{Number of Migrants}_{i\to j,t}}{\text{At} - \text{Risk Population}_{i,t}}$$

At-risk population is the population that is at risk of moving five years before the census. It is calculated from the population taken at the census by subtracting everyone who migrated into the state and adding back everyone who migrated out of the state during the migration period. $\mathrm{M}_{ij,t}$ measures the percent of the at-risk population of i that migrated to a specific destination state j. Keep in mind that $\mathrm{M}_{ij,t}$ is defined

4. Censuses before 1970 must be excluded due to comparability issues and data availability.
5. There are two different census long forms for 1970, but they are similar enough to be comparable for this study. Because the 1970 samples are equal in size, the sample weights can simply be halved. For 1990 and 2000, the weights for the 1% sample are multiplied by $^1/_6$, and the 5% sample weights are multiplied by $^5/_6$. These methods are recommended by the IPUMS website as a way to combine samples.
6. Alaska and Hawaii are excluded because they are not included in the amenity data, and The District of Columbia is removed because there is consistently a large difference in response rates between the District of Columbia and other states. Their removal is common in similar studies.

separately for the native and foreign-born (e.g. $M_{ij,t}$ of the natives is the number of native migrants for *i* to *j* divided by the at-risk native-population of *i*). The microdata aggregates allow for analysis of differences in migration between natives and the foreign-born over time. This results in a panel of 2256 observations per periods. Summary statistics of $M_{ij,t}$ are provided below in Table 2. [7]

Table 2: Summary Migration Statistics by Foreign and Native

Native $M_{ij,t}$

	1970	1980	1990	2000
Mean	0.2001	0.1155	0.2282	0.2067
St. Dev.	0.3898	0.1952	0.4000	0.3319
25%	0.0291	0.0216	0.0359	0.0386
Median	0.0847	0.0511	0.0967	0.0986
75%	0.2087	0.1173	0.2342	0.2272

Foreign $M_{ij,t}$

	1970	1980	1990	2000
Mean	0.3814	0.1604	0.4248	0.3188
St. Dev.	0.8870	0.3065	0.8796	0.5535
25%	0.0000	0.0079	0.0310	0.0376
Median	0.0764	0.0538	0.1332	0.1302
75%	0.3494	0.1638	0.4146	0.3388

The census provides a great deal of information about each state, including foreign population, population with a bachelor's degree [8], and lagged migrant stock [9], which all

7. $M_{ij,t}$ values are expressed as percentages in the table (e.g. Mean Native $M_{ij,t}$ in 1970 is .2%).
8. Population with a bachelor's degree is not strictly comparable for certain years. For 1970 and 1980, only years of schooling are reported, so anyone with 4 years of college education is assumed to have a bachelor's degree. See the appendix for summary statistics on all variables. There does not seem to be a

serve as the push and pull factors between states. Just as the regressand is defined differently for the native and foreign-born, so too are some independent variables. These tailored variables are constructed by averaging or aggregating the microdata separately for the natives and foreign-born. These include native and foreign CPI-adjusted median family income and native and foreign at-risk population. [10] Bureau of Labor Statistics employment data are used to calculate the employment growth and the percent of jobs in manufacturing for each state. Distance between the origin and destination states is calculated using state geographic data. [11] Apart from distance and migrant stock, which are defined uniquely for each state pair, all regressors are defined for both the origin and destination.

The U.S. Department of Agriculture supplies natural amenity data at the county level. This study uses January temperature, July temperature, July relative humidity, and land area (used to calculate population density), which are all average measures for each county between 1941 and 1970. Averaging the county level data to create a state measure is problematic because it fails to capture an amenity's perceived effect. This study employs a unique method to determining the perceived effect of an amenity. The list of counties was first standardized in order to be comparable from 1960 to 2000. [12] Using county level population data from the census, each county is given a weight for

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notable jump in the trend of the population with a bachelor's degree, which provides some evidence that 1970 and 1980 are still fairly comparable.

9. Migrant stock is defined as the number of people born in a specific origin state i, but are living in another destination state j at the time of the census (see Greenwood, 1969 for more detailed justification). The variable is lagged 10 years to avoid endogeneity. As Greenwood describes, it is largely a proxy for informational costs of migration due to family and friends.

10. The tailored at-risk population of *i* is the same variable used in the denominator of the regressand.

11. The distance between two states is calculated using the great circle distance formula and latitude/longitude of the geographic center of each state. The method is inspired by Glynn (2006), who also supplied the data (the original data is from the Census of Population and Housing in 1990).

12. The U.S. Census Bureau's Geography Division supplies a detailed report of significant county changes from 1970 to 2000.

each period. The county weight is equal to a county's population divided by the state's total population in period t. Multiplying the weight and the amenity measure, then summing up the resulting amount for each state yields a weighted average of the amenity. While this method does not account for the decrease in variation due to aggregation, it more accurately describes the amenities that people experience.

The Model

This study uses a modified gravity model to describe state migration flows. Gravity models are characterized by using distance and population of the origin and destination to explain migration flows between those places. They are then modified to include other push and pull factors between the origin and destination. Typically these models use a double log specification because they tend to have high explanatory power, an intuitive multiplicative structure, and are very robust (Greenwood, 1997). Due to the large number of zeros in the regressand, however, a double log specification is impossible to use without either dropping many observations or significantly changing the data. [13] For these reasons, an additive, linear model is used to describe the data.

Variables are grouped into four categories: costs of migration, economic differentials, amenities, and regional dummies. Within the mathematical model, each category constitutes a vector. These are represented by $\vec{C}, \vec{E}, \vec{A},$ and $\vec{R}$, respectively. Thus, the basic model has the following form:

13. The possibility of substituting some positive number for all zeros in the regressand was considered, but sensitivity analysis revealed that the results were too dependent upon which number was used. For example, substituting ones for zeros produced considerably different results than substituting tens for zeros. This would have the additional problem of undermining the weighting system applied to the microdata.

$$\frac{Migration\ i \rightarrow j}{At - Risk\ Population\ i} = \beta_{0,t} + \vec{\beta}_{1,t} \cdot \vec{C}_t + \vec{\beta}_{2,t} \cdot \vec{E}_t + \vec{\beta}_{3,t} \cdot \vec{A}_t + \vec{\beta}_{4,t} \cdot \vec{R}_t + \varepsilon_t$$

As discussed before, both the right and left side of the equation are tailored to the population in consideration.

Costs include distance between the origin and destination, group-specific population of both states, and migrant stock for each flow. All of these variables serve as proxies for informational and psychic costs of migration, which are regarded as being larger than the explicit costs of migration (Greenwood, 1975). As a result, these variables tend to have high explanatory power within gravity models (Greenwood, 1969). Economic differentials capture the economic condition within the origin and destination. Group-specific median family income, employment growth rate, the percent of jobs in manufacturing, and the percent of the population with a degree are all included in this category. [14] Amenities contain all of the natural amenities described before: population density, average January temperature, average July temperature, and average July relative humidity. Foreign concentration (the percent of the total at-risk population born outside of the United States) and a coastal dummy (equal to 1 if coastal) are also contained within the amenity vector. [15] Like the economic differentials, all amenities measures have both origin and destination variables. Finally, the regional dummy vector is comprised of a Midwestern, Southern, and Western dummy for both

14. Employment growth and manufacturing jobs are averaged over the 5 year period before the beginning of the migration period in order to remain exogenous. Median family income is endogenous, however. It is measured 1 year before the end of the migration period. This is discussed in more detail in the results.
15. Foreign Concentration and, to a lesser extent, population density, do not cleanly fit into one category. Both seem related to information costs, economic conditions, and amenities. Nonetheless, the amenity category is the best fit because it is the least presumptuous about the effects of foreign concentration and population density.

the origin and destination. Summary statistics for all of these variables are contained in the appendix.

Methodology

The largest problem with the data is a large number of observations for which there is a migration flow of zero. This naturally arises because of the relatively small sample sizes followed by cutting the population into groups. Because the foreign-born are a relatively small percentage of the total population, the problem is especially true for them. Table 3 gives the number of zeros for each year by group:

Table 3: Number of flows with zero migration

	1970	1980	1990	2000
Native	46	16	6	6
Foreign	788	488	258	188

There are 2256 flows for each year, so many of the foreign flows cluster at zero (35% in 1970). This is the primary motivation behind using a Tobit model.

The structure of the panel data seems to make it a prime candidate for a fixed-effects time series regression. Unfortunately, the large number of zeros practically requires a Tobit specification, but a fixed effects Tobit regression produces inconsistent and biased estimates in short panels such as this one (Honoré, 1992; Greene, 2004). Tobit takes into account clumping of zeros and produces consistent estimates. Moreover, OLS generally produces biased estimates, unlike Tobit (Wooldridge, 2009).

Although separate Tobit models could be estimated for natives, foreign-born, and each year, there are efficiency gains in taking advantage of the method of Seemingly Unrelated Regression (SUR) that Zellner (1962) proposed. SUR is a form of Feasible Generalized Least Squares that weights the estimates of multiple equations by using the correlated error terms across those equations. The estimates are more efficient than if the equations are estimated separately. Tobit and SUR can be combined into Seemingly Unrelated Tobit Regressions (SUTR) to utilize the properties of both (Huang, Sloan, and Adamache, 1987).

SUTR has been developed for any number of equations, but it quickly becomes computationally infeasible with additional equations, so this study limits itself to estimating two equations per model (Roodman, 2009). [16] There are two similar types of bivariate model used in this study, each having a different purpose. The primary model simultaneously describes the native and foreign migration within a single period. Following Huang, Sloan, and Adamache (1987), let the following be latent variables indexed by observation i (i = 1, 2, …, 2256) and period t (t = 1, 2, 3, 4):

$$\mathrm{NM}_{i,t}^{*} = \frac{\text{Native Migration}_{i,t}}{\text{Native At} - \text{Risk Population}_{i,t}} \qquad \mathrm{FM}_{i,t}^{*} = \frac{\text{Foreign Migration}_{\mathrm{i,t}}}{\text{Foreign At} - \text{Risk Population}_{i,t}}$$

$$\begin{bmatrix} \mathrm{NM}_{i,t}^{*} \\ \mathrm{FM}_{i,t}^{*} \end{bmatrix} = \begin{bmatrix} \beta_{i,t}^{F} & 0 \\ 0 & \beta_{i,t}^{F} \end{bmatrix} \begin{bmatrix} X_{i,t}^{N} \\ X_{i,t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{i,t}^{N} \\ \varepsilon_{i,t}^{F} \end{bmatrix}$$

16. The maximization process involves iterations with large dimension integrals (the dimension increases with the number of equations). As a test of the efficacy of SUTR for several equations, I attempted to run a reduced version of the model: 4 equations with only a few independent variables and generous conditions for convergence. The model ran for over 3 days, iterated over 4000 times, but still never converged. Another test was run with a full 8 equations. Iterations occurred about twice per hour, and the process ran for over a week without converging.

Where the vector $X_{i,t}^{\circ}$ contains all group specific variables, the $\beta_{i,t}^{\circ}$ are vectors of parameters, and $\varepsilon_{i,t}^{\circ}$ are error term vectors. The vector of error terms is distributed normally with zero expectation and variance Ω_t, which is the variance covariance matrix:

$$\Omega_t = \begin{bmatrix} \sigma_t^N \sigma_t^N & \rho_t^N \rho_t^F \\ \rho_t^F \rho_t^N & \sigma_t^F \sigma_t^F \end{bmatrix}$$

The observed data are related to the latent variables in the following way:

$$\mathrm{NM}_t = \begin{cases} 0 & \mathrm{NM}_t^* \leq 0 \\ \mathrm{NM}_t^* = \beta_{i,t}^F X_t^N + \varepsilon_{i,t}^N & \mathrm{NM}_t^* > 0 \end{cases}$$

$$\mathrm{FM}_t = \begin{cases} 0 & \mathrm{FM}_t^* \leq 0 \\ \mathrm{FM}_t^* = \beta_{i,t}^F X_t + \varepsilon_{i,t}^F & \mathrm{FM}_t^* > 0 \end{cases}$$

SUTR is more efficient than separate estimated Tobit regressions if $\mathrm{Cov}\left(\varepsilon_{i,t}^N, \varepsilon_{i,t}^F\right) \neq 0$. This is equivalent to the off diagonal terms in Ω_t being unequal to zero. The parameters are estimated by maximum likelihood. See Huang, Sloan, and Adamache (1987) for a rigorous statement of the math behind maximum likelihood. This technique is implemented in Stata with the user-written command “mvtobit” (Barslund, 2007). This model is used to compare the native to the foreign-born within a single period.

The second model is a slight modification of the first that will allow for year-to-year analysis. Instead of regressing natives and the foreign-born within one period, this model regresses one period with another for a single group. That is, *t* was fixed in the first model, and the groups (N and F) varied. In the second model, the group is fixed and the period *t* varies. The parameters of this model are estimated in the same way.

The largest problem with these SUTR models is that they are not robust to non-normality or heteroscedasticity. [17] Unfortunately, the empirical models show evidence for both of these properties. While this does not necessarily invalidate the model entirely, the estimates are likely to be inconsistent and possibly biased as well.

Results

Regression results of the pairwise SUTR for the native-born and foreign born are reported in Table 4 (page 17-18). Each bordered column describes a different period, and hence a different regression. Summary statistics are provided for each regression, which includes the number of observations (always 2256), the log-likelihood of the full regression, and a goodness of fit measure. [18] The t-statistics are reported below each coefficient. A “box” (the native and foreign coefficients for a single period) is colored gray if a Wald test reveals that the coefficient for the native-born is statistically significantly different (at the 5% level) from the analogous coefficient for the foreign-born.

The previous table is capable of comparing the native and the foreign born within a period, but is unable to track changes in coefficients over time. Tables 5 and 6 (page 19-22) use the second model described in the previous section. Table 5 and 6 are read in basically the same way as the previous table. The first three columns show the changes from one census to the next, and the last column shows the change from 1970 to 2000.

17. The literature on SUTR is quite small, and the literature on the properties and assumptions (as well as the effects of violating these assumptions) is much smaller. That said, I am not entirely sure that SUTR is not robust to non-normality or heteroscedasticity, but it is the case that Tobit is not robust (Wooldridge, 2009).
18. OLS R-Squared is the R-Squared value of the separate OLS regressions. The pseudo R-Squared values that SUTR produces are difficult to interpret.

Table 5 observes these changes for the native-born, and Table 6 does so for the foreign-born. Each year shows up in two equations, each time with a different coefficient. Ideally the coefficients will be close, but there is no guarantee.

The pseudo R-Squared values are all reasonably high for each year, which suggests that the models are a decent fit. The main coefficients of the gravity model also generally have the expected signs. Distance is negative, migrant stock is positive, and both are highly significant. [19] Most of the regional dummies are insignificant, so the other variables are picking up most regional differences. A quick look at the number of gray boxes in the first table shows that there are about as many differences between the native-born and foreign-born as there are similarities. Coefficients over the years display instability over time for both groups. Summary statistics for all variables are provided in the appendix.

1) Costs of Migration:

As expected, distance plays a large role and tends to discourage migration. The coefficients fluctuate, but ultimately decrease in magnitude for both groups. The change is much smaller for the natives. Since distance is largely a proxy for information, this is anticipated assuming information diffuses and becomes cheaper over time. For every year, the magnitude on the distance coefficient is much larger for the foreign-born, which suggests higher migration costs for the foreign-born. This could be due to language and cultural changes over longer distances, geographically concentrated ports of entry, and less access to technology.

19. For variables for which there is an origin and destination measure, the interpretation is slightly less convenient. If the origin coefficient is positive, then that variable is positively correlated with migration out of the origin (push effect). If the destination coefficient is positive, then that variable is positively correlated with migration into the origin (pull effect).

Table 4: Unrestricted Regression Model (Native - Foreign)

Seemingly Unrelated Tobit Model 1, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (performed with a Wald test)

Summary	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Observations	2256		2256		2256		2256	
Log Likelihood	-2428.95		1556.99		-1739.03		-382.43	
OLS R-Squared	0.5187	0.4395	0.5438	0.5865	0.5478	0.6042	0.5354	0.5423

Costs of Migration	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Distance i → j (1,000 miles)	-0.3125	-0.5305	-0.1649	-0.1947	-0.3295	-0.5082	-0.2671	-0.3033
	-25.58	-13.35	-27.92	-19.48	-27.34	-19.48	-26.28	-17.51
Population i (1 Million) *	-0.0114	0.2488	-0.0043	0.0375	-0.0072	0.1055	-0.0087	0.0298
	-3.73	2.04	-3.25	2.17	-3.00	3.99	-4.85	2.69
Population j (1 Million) *	0.0429	1.4317	0.0132	0.2307	0.0134	0.3907	0.0097	0.1376
	13.48	11.22	9.63	12.91	5.54	14.71	5.26	12.21
Migrant Stock i → j (10,000)	0.0212	0.0364	0.0104	0.0126	0.0191	0.0205	0.0172	0.0174
	13.89	7.76	15.22	11.19	16.24	8.21	19.13	11.48

Economic Differentials	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Median Income i ($10,000) *	0.0152	0.0808	-0.0072	-0.0041	0.0013	-0.0228	-0.0367	0.0034
	0.59	2.06	-0.72	-0.36	0.06	-0.80	-2.14	0.19
Median Income j ($10,000) *	-0.1415	0.0005	-0.0521	0.0016	-0.1164	-0.0938	-0.0887	-0.0293
	-5.47	0.01	-5.24	0.14	-5.24	-3.33	-5.18	-1.65
Employment Growth i (%)	0.0039	-0.0001	0.0017	0.0038	0.0036	-0.0001	0.0022	0.0008
	3.38	-0.03	2.36	3.00	1.99	-0.01	1.17	0.26
Employment Growth j (%)	0.0018	0.0009	0.0014	0.0043	0.0087	0.0194	0.0085	0.0164
	1.55	0.23	1.83	3.38	4.76	4.98	4.52	5.23
Jobs in Manufacturing i (%)	-0.0042	-0.0066	-0.0010	-0.0015	-0.0062	-0.0158	-0.0048	-0.0168
	-3.85	-2.10	-1.92	-1.79	-4.91	-6.03	-3.82	-8.53
Jobs in Manufacturing j (%)	-0.0016	-0.0031	-0.0016	-0.0007	0.0007	-0.0015	0.0011	-0.0020
	-1.44	-0.99	-3.05	-0.79	0.58	-0.58	0.89	-1.00
Population with Degree i (%)	-0.0054	-0.0168	0.0023	-0.0002	-0.0064	-0.0255	0.0026	-0.0245
	-0.66	-0.71	1.51	-0.07	-1.32	-2.77	0.87	-5.39
Population with Degree j (%)	0.0593	0.1716	0.0084	0.0154	0.0188	0.0378	0.0239	0.0383
	7.25	7.18	5.47	5.87	3.88	4.11	8.03	8.40

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970 Native	1970 Foreign	1980 Native	1980 Foreign	1990 Native	1990 Foreign	2000 Native	2000 Foreign
Foreign Concentration i (%)	0.0106	-0.0346	0.0076	-0.0139	0.0066	-0.0416	0.0078	-0.0183
	2.05	-1.98	4.24	-3.63	2.13	-5.20	3.96	-4.83
Foreign Concentration j (%)	0.0200	-0.0420	0.0071	0.0050	0.0201	0.0188	0.0102	0.0115
	3.85	-2.43	3.89	1.31	6.41	2.36	5.12	3.03
Population Density i (1,000)	-0.0095	-0.0279	-0.0077	-0.0030	-0.0262	-0.0294	-0.0202	-0.0224
	-2.35	-1.71	-3.32	-0.80	-5.80	-3.24	-6.48	-4.45
Population Density j (1,000)	-0.0350	-0.1103	-0.0158	-0.0232	-0.0185	-0.0442	-0.0080	-0.0073
	-8.59	-6.67	-6.70	-6.23	-4.11	-4.97	-2.59	-1.48
Jan. Tempertature i (10° F)	0.0030	0.0050	-0.0171	-0.0174	-0.0244	-0.0352	-0.0283	-0.0850
	0.14	0.08	-1.60	-1.04	-1.10	-0.79	-1.61	-3.11
Jan. Tempertuture j (10° F)	0.0028	0.3170	0.0518	0.1714	0.0652	0.3168	0.0608	0.2099
	0.13	5.03	4.85	10.28	2.92	7.12	3.44	7.63
July Temperature i (10° F)	-0.0139	0.0360	0.0084	0.0244	-0.0230	0.0573	0.0029	0.0501
	-0.35	0.29	0.45	0.80	-0.57	0.69	0.10	1.03
July Temperature j (10° F)	-0.0589	-0.3298	-0.0903	-0.2337	-0.1545	-0.5255	-0.0800	-0.2962
	-1.48	-2.70	-4.80	-7.77	-3.78	-6.29	-2.61	-6.06
July Humidity i (10%)	0.0049	0.0233	0.0016	0.0135	-0.0163	-0.0138	-0.0007	0.0200
	0.34	0.51	0.24	1.10	-1.16	-0.42	-0.06	0.90
July Humidity j (10%)	0.0028	-0.0521	-0.0324	-0.0852	-0.0248	-0.1013	-0.0243	-0.0817
	0.20	-1.14	-4.70	-7.01	-1.77	-3.10	-1.89	-3.69
Coastal Dummy i	0.0598	0.0875	0.0339	0.0554	0.0916	0.2524	0.0829	0.1924
	2.73	1.25	3.14	3.11	3.94	5.22	4.28	6.07
Coastal Dummy j	0.0990	0.1074	0.0468	0.0279	0.0255	-0.0399	0.0391	-0.0069
	4.51	1.52	4.33	1.56	1.10	-0.82	2.02	-0.22

Regional Dummies & β_0	1970 Native	1970 Foreign	1980 Native	1980 Foreign	1990 Native	1990 Foreign	2000 Native	2000 Foreign
Midwest Dummy i	-0.0399	-0.0952	-0.0117	-0.0355	-0.0734	-0.1375	-0.0395	-0.0785
	-1.40	-1.06	-0.93	-1.52	-2.97	-2.53	-1.81	-2.16
Midwest Dummy j	0.0809	0.2663	0.0262	0.0566	0.1046	0.3105	0.0315	0.1019
	2.82	2.98	2.07	2.39	4.22	5.71	1.44	2.81
South Dummy i	-0.0574	0.1272	-0.0136	-0.0245	-0.0486	-0.1120	-0.0280	-0.0480
	-1.51	1.03	-0.84	-0.79	-1.59	-1.54	-1.08	-1.06
South Dummy j	0.0131	-0.0613	0.0016	-0.0022	0.0555	0.2184	-0.0140	0.0458
	0.35	-0.50	0.10	-0.07	1.82	3.01	-0.54	1.01
West Dummy i	0.1512	0.2717	0.0759	0.0785	0.0934	0.1005	0.1083	0.1605
	2.31	1.25	2.52	1.42	1.65	0.76	2.24	1.91
West Dummy j	0.1870	-0.2724	-0.0445	-0.3181	0.0707	-0.2816	-0.0594	-0.4243
	2.85	-1.27	-1.47	-5.77	1.25	-2.14	-1.23	-5.04
Constant	0.9595	0.8873	0.9626	1.5698	2.0862	4.5355	0.9477	2.3670
	2.11	0.63	4.56	4.53	4.61	4.71	2.72	4.10

Table 5: Unrestricted Regression Model (Native Year to Year)

Seemingly Unrelated Tobit Model 2, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (performed with a Wald test)

Summary	1970	1980	1980	1990	1990	2000	1970	2000
Observations	2256		2256		2256		2256	
Log Likelihood	2807.31		2887.43		2245.41		1111.39	

Costs of Migration	1970	1980	1980	1990	1990	2000	1970	2000
Distance i → j (1,000 miles)	-0.3138	-0.1658	-0.1719	-0.3539	-0.3404	-0.2822	-0.3100	-0.2707
	-26.11	-28.57	-29.10	-28.99	-28.34	-27.91	-26.10	-27.30
Population i (1 Million) *	-0.0096	-0.0047	-0.0032	-0.0065	-0.0091	-0.0097	-0.0107	-0.0102
	-3.39	-3.67	-2.33	-2.46	-3.58	-4.95	-3.71	-5.51
Population j (1 Million) *	0.0455	0.0197	0.0179	0.0241	0.0241	0.0202	0.0509	0.0249
	15.65	15.28	12.99	9.10	9.34	10.15	17.08	13.28
Migrant Stock i → j (10,000)	0.0159	0.0084	0.0060	0.0088	0.0140	0.0121	0.0178	0.0145
	12.68	15.13	11.16	9.29	13.02	14.58	14.93	20.41

Economic Differentials	1970	1980	1980	1990	1990	2000	1970	2000
Median Income i ($10,000) *	0.0084	-0.0105	-0.0499	-0.0652	-0.0083	-0.0335	0.0331	-0.0155
	0.48	-1.44	-6.38	-4.27	-0.52	-2.49	1.64	-1.06
Median Income j ($10,000) *	0.0099	-0.0043	0.0205	0.0656	-0.0248	-0.0311	-0.1094	-0.0606
	0.56	-0.59	2.58	4.21	-1.54	-2.30	-5.42	-4.16
Employment Growth i (%)	0.0004	0.0010	-0.0004	0.0011	-0.0004	0.0011	0.0018	0.0024
	0.71	2.78	-1.16	1.13	-0.53	1.28	2.43	2.02
Employment Growth j (%)	0.0024	0.0024	0.0003	0.0040	0.0027	0.0035	0.0012	0.0115
	4.38	6.48	0.73	4.21	3.62	4.18	1.66	9.54
Jobs in Manufacturing i (%)	-0.0042	-0.0012	-0.0009	-0.0037	-0.0044	-0.0031	-0.0035	-0.0041
	-4.42	-2.68	-2.00	-3.15	-3.83	-2.69	-3.86	-3.95
Jobs in Manufacturing j (%)	-0.0058	-0.0028	-0.0029	-0.0063	-0.0041	-0.0035	-0.0039	-0.0033
	-6.12	-6.07	-6.33	-5.44	-3.53	-3.07	-4.31	-3.14
Population with Degree i (%)	-0.0082	0.0045	0.0041	-0.0015	-0.0116	-0.0052	-0.0128	0.0022
	-1.80	4.83	4.30	-0.57	-3.46	-2.16	-2.05	0.92
Population with Degree j (%)	0.0133	0.0040	0.0003	-0.0064	0.0168	0.0182	0.0525	0.0227
	2.88	4.33	0.32	-2.38	4.99	7.65	8.36	9.52

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970	1980	1980	1990	1990	2000	1970	2000
Foreign Concentration i (%)	0.0091	0.0044	0.0074	0.0115	0.0126	0.0107	0.0087	0.0061
	2.33	3.02	4.46	4.10	4.95	6.47	2.57	3.93
Foreign Concentration j (%)	0.0085	0.0017	0.0055	0.0096	0.0139	0.0039	0.0087	-0.0013
	2.15	1.14	3.31	3.41	5.47	2.33	2.55	-0.81
Population Density i (1,000)	-0.0099	-0.0054	-0.0079	-0.0192	-0.0256	-0.0182	-0.0089	-0.0144
	-2.52	-2.44	-3.49	-4.24	-5.80	-5.95	-2.32	-4.83
Population Density j (1,000)	-0.0394	-0.0198	-0.0222	-0.0313	-0.0323	-0.0162	-0.0392	-0.0116
	-10.02	-8.98	-9.81	-6.94	-7.30	-5.31	-10.18	-3.88
Jan. Tempertature i (10° F)	0.0013	-0.0020	-0.0139	-0.0338	-0.0510	-0.0381	-0.0010	-0.0037
	0.06	-0.20	-1.35	-1.61	-2.45	-2.20	-0.05	-0.22
Jan. Tempertuture j (10° F)	0.0266	0.0373	0.0302	0.0859	0.0648	0.0567	-0.0009	0.0376
	1.27	3.70	2.94	4.08	3.11	3.28	-0.04	2.21
July Temperature i (10° F)	0.0100	-0.0030	0.0121	-0.0125	0.0368	0.0095	0.0115	-0.0277
	0.27	-0.17	0.67	-0.33	1.00	0.31	0.32	-0.92
July Temperature j (10° F)	-0.0594	-0.0681	-0.0410	-0.1024	-0.1079	-0.0654	-0.0393	-0.0099
	-1.59	-3.78	-2.26	-2.72	-2.94	-2.16	-1.09	-0.33
July Humidity i (10%)	0.0003	-0.0015	-0.0064	-0.0267	-0.0093	0.0015	0.0017	-0.0064
	0.02	-0.22	-0.93	-1.87	-0.67	0.12	0.12	-0.53
July Humidity j (10%)	0.0283	-0.0208	-0.0115	0.0127	-0.0082	-0.0303	0.0184	-0.0088
	2.01	-3.07	-1.65	0.89	-0.59	-2.54	1.32	-0.73
Coastal Dummy i	0.0764	0.0308	0.0391	0.1109	0.1172	0.0904	0.0682	0.0688
	3.62	2.96	3.70	5.00	5.22	4.76	3.20	3.64
Coastal Dummy j	0.1051	0.0617	0.0551	0.0376	0.0209	0.0450	0.1164	0.0875
	4.98	5.93	5.21	1.69	0.93	2.37	5.46	4.63

Regional Dummies & β_0	1970	1980	1980	1990	1990	2000	1970	2000
Midwest Dummy i	-0.0448	-0.0135	0.0059	-0.0749	-0.0855	-0.0430	-0.0422	-0.0364
	-1.72	-1.13	0.46	-3.04	-3.54	-2.09	-1.67	-1.78
Midwest Dummy j	0.0108	-0.0192	-0.0112	0.0347	0.0496	0.0116	0.0238	-0.0332
	0.41	-1.60	-0.88	1.40	2.06	0.56	0.94	-1.62
South Dummy i	-0.0655	-0.0305	-0.0030	-0.0478	-0.0524	-0.0308	-0.0461	-0.0361
	-1.99	-2.10	-0.19	-1.62	-1.82	-1.31	-1.49	-1.59
South Dummy j	-0.0328	-0.0365	-0.0162	-0.0493	0.0221	-0.0110	-0.0507	-0.0960
	-1.00	-2.50	-1.04	-1.67	0.76	-0.47	-1.64	-4.20
West Dummy i	0.1597	0.0567	0.0875	0.0733	0.1393	0.1292	0.1779	0.0839
	2.64	2.01	3.03	1.27	2.48	2.72	3.05	1.79
West Dummy j	0.2067	-0.0369	0.0241	0.1474	0.0952	-0.0258	0.1887	-0.0222
	3.41	-1.30	0.83	2.56	1.69	-0.54	3.23	-0.47
Constant	0.4876	0.7511	0.5670	1.4230	1.1160	0.9222	0.5599	0.5251
	1.12	3.59	2.69	3.26	2.65	2.65	1.33	1.52

Table 6: Unrestricted Regression Model (Foreign Year to Year)

Seemingly Unrelated Tobit Model 2, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (performed with a Wald test)

Summary	1970	1980	1980	1990	1990	2000	1970	2000
Observations	2256		2256		2256		2256	
Log Likelihood	-2330.64		-1746.64		-2517.07		-3341.97	

Costs of Migration	1970	1980	1980	1990	1990	2000	1970	2000
Distance i → j (1,000 miles)	-0.5723	-0.2090	-0.2069	-0.5372	-0.5244	-0.3105	-0.5794	-0.3146
	-14.13	-19.84	-20.32	-20.13	-19.78	-17.64	-14.15	-17.71
Population i (1 Million) *	0.2897	0.0458	0.0391	0.1171	0.1196	0.0354	0.3347	0.0372
	2.28	2.30	2.04	3.86	4.02	2.78	2.62	2.87
Population j (1 Million) *	1.6109	0.2751	0.2701	0.4169	0.4383	0.1537	1.5971	0.1553
	12.15	13.45	13.69	13.69	14.63	11.92	11.98	11.86
Migrant Stock i → j (10,000)	0.0312	0.0120	0.0098	0.0154	0.0191	0.0172	0.0301	0.0172
	6.60	10.28	8.83	6.25	7.64	11.24	6.34	11.22

Economic Differentials	1970	1980	1980	1990	1990	2000	1970	2000
Median Income i ($10,000) *	0.0700	0.0155	0.0041	-0.0051	0.0251	0.0345	0.0732	0.0279
	1.74	1.19	0.34	-0.18	0.92	1.74	1.75	1.24
Median Income j ($10,000) *	0.0210	0.0027	-0.0074	-0.0588	-0.0576	-0.0500	0.0202	-0.0409
	0.52	0.20	-0.60	-2.07	-2.11	-2.54	0.48	-1.83
Employment Growth i (%)	0.0011	0.0037	0.0021	-0.0012	0.0014	0.0012	0.0006	0.0012
	0.28	2.92	1.89	-0.34	0.43	0.46	0.14	0.39
Employment Growth j (%)	0.0029	0.0049	0.0034	0.0141	0.0130	0.0116	0.0012	0.0165
	0.77	3.83	3.07	4.04	3.97	4.32	0.29	5.22
Jobs in Manufacturing i (%)	-0.0059	-0.0021	-0.0017	-0.0171	-0.0175	-0.0181	-0.0048	-0.0178
	-1.83	-2.34	-2.02	-6.44	-6.64	-9.10	-1.47	-8.87
Jobs in Manufacturing j (%)	-0.0042	-0.0005	-0.0006	-0.0016	-0.0033	-0.0016	-0.0045	-0.0012
	-1.32	-0.55	-0.74	-0.59	-1.24	-0.80	-1.38	-0.62
Population with Degree i (%)	-0.0130	0.0003	-0.0006	-0.0318	-0.0310	-0.0271	-0.0032	-0.0261
	-0.55	0.12	-0.26	-3.65	-3.54	-5.92	-0.13	-5.51
Population with Degree j (%)	0.1453	0.0156	0.0110	0.0176	0.0474	0.0413	0.1862	0.0426
	6.08	5.84	4.46	2.01	5.42	9.01	7.61	8.98

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970	1980	1980	1990	1990	2000	1970	2000
Foreign Concentration i (%)	-0.0363	-0.0152	-0.0144	-0.0442	-0.0465	-0.0193	-0.0467	-0.0201
	-2.07	-3.63	-3.60	-5.12	-5.47	-4.86	-2.65	-4.91
Foreign Concentration j (%)	-0.0454	-0.0012	0.0037	0.0232	0.0126	0.0066	-0.0493	0.0069
	-2.61	-0.28	0.93	2.71	1.50	1.66	-2.83	1.69
Population Density i (1,000)	-0.0293	-0.0032	-0.0035	-0.0260	-0.0275	-0.0232	-0.0306	-0.0223
	-1.74	-0.81	-0.93	-2.82	-3.01	-4.57	-1.80	-4.34
Population Density j (1,000)	-0.1273	-0.0254	-0.0285	-0.0532	-0.0536	-0.0084	-0.1262	-0.0062
	-7.47	-6.46	-7.47	-5.86	-5.97	-1.68	-7.34	-1.24
Jan. Tempertature i (10° F)	0.0248	-0.0067	-0.0100	-0.0135	-0.0028	-0.0792	0.0309	-0.0781
	0.38	-0.38	-0.59	-0.30	-0.06	-2.87	0.47	-2.80
Jan. Tempertuture j (10° F)	0.2961	0.1778	0.1581	0.2872	0.3255	0.2121	0.3159	0.2197
	4.62	10.17	9.39	6.44	7.29	7.62	4.90	7.82
July Temperature i (10° F)	0.0113	0.0188	0.0344	0.0544	0.0374	0.0590	0.0187	0.0558
	0.09	0.59	1.13	0.66	0.46	1.19	0.15	1.12
July Temperature j (10° F)	-0.2978	-0.2369	-0.2109	-0.4314	-0.4765	-0.2802	-0.3294	-0.2881
	-2.41	-7.55	-6.96	-5.22	-5.81	-5.66	-2.65	-5.77
July Humidity i (10%)	0.0060	0.0088	0.0097	-0.0226	-0.0337	0.0170	-0.0042	0.0148
	0.13	0.68	0.78	-0.67	-1.01	0.76	-0.09	0.65
July Humidity j (10%)	-0.0471	-0.0971	-0.0865	-0.0971	-0.1175	-0.1009	-0.0474	-0.0934
	-1.01	-7.54	-6.96	-2.88	-3.51	-4.52	-1.01	-4.09
Coastal Dummy i	0.0867	0.0569	0.0589	0.2745	0.2649	0.2063	0.0975	0.2081
	1.21	3.02	3.23	5.58	5.38	6.36	1.35	6.34
Coastal Dummy j	0.1535	0.0456	0.0480	0.0407	-0.0336	0.0006	0.1095	0.0022
	2.13	2.40	2.62	0.83	-0.69	0.02	1.50	0.07

Regional Dummies & β_0	1970	1980	1980	1990	1990	2000	1970	2000
Midwest Dummy i	-0.0931	-0.0510	-0.0378	-0.1556	-0.1497	-0.0947	-0.1012	-0.0886
	-1.01	-2.00	-1.54	-2.77	-2.70	-2.58	-1.09	-2.31
Midwest Dummy j	0.2436	0.0435	0.0613	0.2449	0.2556	0.1215	0.2530	0.1031
	2.68	1.68	2.47	4.36	4.61	3.31	2.76	2.71
South Dummy i	0.1113	-0.0519	-0.0375	-0.1783	-0.1821	-0.0856	0.0865	-0.0782
	0.89	-1.57	-1.18	-2.38	-2.45	-1.87	0.69	-1.64
South Dummy j	-0.1002	-0.0298	0.0024	0.1274	0.1659	0.0686	-0.0837	0.0338
	-0.81	-0.89	0.07	1.71	2.24	1.50	-0.67	0.71
West Dummy i	0.2217	0.0494	0.0810	0.0576	0.0363	0.1475	0.1872	0.1480
	1.01	0.84	1.45	0.42	0.27	1.73	0.85	1.71
West Dummy j	-0.2326	-0.3618	-0.2891	-0.2509	-0.3530	-0.4251	-0.2929	-0.4551
	-1.08	-6.17	-5.17	-1.85	-2.61	-4.98	-1.34	-5.25
Constant	1.0224	1.6406	1.4680	4.1438	4.2090	2.3065	0.9458	2.2569
	0.71	4.52	4.17	4.31	4.43	3.94	0.65	3.81

The regression-specific origin population reveals a large difference between the native and foreign-born. The native-born tend to stay in states with a larger native population, but the foreign-born leave states with a higher foreign population. This is true of all years, though the coefficient significantly decreases in magnitude for the foreign-born between 1970 and 2000. For the destination population, both groups are drawn to states with higher population. The coefficients for the foreign-born appear to be much larger than those of the natives, and we also see a sizeable decrease in magnitude for both groups, but these observations do not take into account a much larger native population or the population growth of both groups.

Migrant stock is largely a proxy for the family and friends pull effect, but also captures past propensity to migrate, so the positive correlation that it has with migration is expected. By definition, migrant stock only measures past lifetime flows of natives, which implies that the family and friends pull effect on the foreign-born is not directly picked up by migrant stock. This makes it slightly odd that the magnitude of migrant stock is always greater for the foreign born, but there is a reasonable explanation. It is intuitive to expect that the foreign-born rely more on family and friends for information than natives, so if the analogous measure of migrant stock were observed for the foreign born, it would have a stronger effect than that of migrant stock for the natives. Such a measure is likely to be highly correlated with migrant stock.

1) Economic Differentials:

Median Family Income in the origin is typically insignificant for both groups. Interestingly, Table 5 reveals that its significance for the natives is highly unstable depending on how the system of equations is defined. For the destination, the coefficient has the “wrong” sign. That is, economic reasoning proposes that people will migrate to places where they can earn a higher income. To the extent that the median family income captures a person’s expected income, the results suggest the opposite – both groups avoid migrating to states with higher group-specific median family income. One possible explanation is endogeneity. Income is measured 1 year before the end of the migration period, and is therefore partially endogenous with migration flows. However, the migration flows probably only affect median family income microscopically. Median income is a very sticky measure, which is easy to see by looking at the change in median income over time (see the summary statistics in the appendix). Each flow composes a small percentage of total population (the quartiles range from about .02% to .23% for the natives and about 0% - .41 for the foreign), so the median will be practically unaffected by any single flow. A better explanation is that median family income may be too general to accurately proxy the income a migrant receives now or expects to receive after migrating.

Unexpected signs are also observed with employment growth. Origin employment growth is rarely significant for the foreign-born, and the natives unexpectedly tend to migrate out of places with greater employment growth. The destination variable does have the expected positive sign, and ultimately gains significance and increases in magnitude from 1970 to 2000 for both groups. From 1980 to 2000, the foreign-born are significantly more responsive to destination employment growth. This may be due to higher labor force participation for the foreign-born. The endogeneity criticism cannot be made for employment growth, or for percent of jobs in manufacturing, because these variables are lagged. However, state employment growth is unlikely to capture industry specific growth, which is likely to be a more meaningful measure.

Higher labor force participation rates, union membership, and skill differences may also explain why the foreign-born are more responsive in 1990 and 2000 to the percent of jobs in manufacturing for the origin. Both groups tend to stay in states with a higher concentration of manufacturing jobs. The destination measure is rarely significant. This result could be due to self-selection based on skills and union membership.

The percent of the origin population with a bachelor's degree always has an insignificant correlation with native migration. This may be due to increased propensity to migrate with more education (Greenwood, 1973). The correlation with foreign migration becomes significant for 1990 and 2000. These years also show a significant difference between the native and foreign. The foreign-born tend to stay in states with a higher concentration of degree holders. Both natives and the foreign-born tend to migrate to states with a higher concentration of degree holders, though the magnitude of this is significantly larger for the foreign-born. The net effect is that the foreign-born are strongly attracted to more educated states, which is evidence that they are labor market compliments with more educated workers.

2) Amenities

There is a striking difference between the native-born and foreign-born with regards to foreign concentration in the origin. Natives tend to migrate out of states with high foreign concentration, whereas the foreign-born stay in such places. The coefficients and the difference are significant in every period. There are some differences from year to year, but neither the natives nor the foreign experience a significant change from 1970 to 2000. For the destination, both the native and foreign-born are more likely to migrate to states with a higher foreign concentration. There is generally no significant difference between the natives and foreign for the destination variable. The destination coefficients are very unstable over time for both groups, but the magnitudes ultimately decrease from 1970 to 2000. The effect of foreign concentration will be discussed later in greater depth.

People tend to stay in states with higher population density, and this result is generally statistically significant (the practical effect is small, however). There is not a significant difference between the native-born and foreign-born for any year. Migrants do not, on average, migrate to more dense places, however. It is difficult to determine the net directional effect of population density. An adjustment can be made to the variables of the previous models to answer this question. The ratio of a destination variable to an origin variable has the convenient property of being greater than 1 if the destination variable is largest and less than 1 if the origin is largest. This variable is quantitatively difficult to interpret, but qualitatively simple: a positive sign implies that the destination effect dominates, which suggests that the variable is attractive overall. An excerpt of this regression is shown below (you can find the rest of the regression table in the appendix):

	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Population Density Ratio	-0.0002	-0.0005	-0.0001	-0.0005	-0.0001	-0.0007	-0.0001	-0.0002
	-1.55	-1.50	-1.74	-3.51	-0.86	-2.00	-0.47	-1.09

Although the negative signs suggest that population density is unattractive to migrants, few of the coefficients are significant. The extremely small coefficients also suggest than any net effect would be practically insignificant.

The natural amenities (January temperature, July temperature, and July humidity) display an interesting pattern. The origin variable is insignificant for basically all years, but the destination variable is generally very statistically and practically significant. As a rule, the foreign-born coefficients have a much greater magnitude (often several times greater), but they typically share the same sign. This pattern may be explained by the self-selecting nature of migration. Higher average January temperature in the destination is correlated with migration to that state. Higher average July temperatures have the opposite effect, and people avoid moving to more humid places as well. All of these results seem intuitively reasonable. [20] These variables generally show little trend or long-term change. This runs counter to the equilibrium theory of migration, which predicts that amenities should become increasingly important over time as national real income rises (Graves and Linneman, 1979). [21]

The origin and destination coastal dummies also do not support such a claim. In fact, the data reveal a slight decrease in native tendency to migrate to coastal states between 1970 and 2000. The positive signs on both the origin and destination coastal dummy for most years indicate that both groups are leaving coastal states, but also migrating to coastal states. In 1990 and 2000, the foreign born are significantly more likely to leave a coastal state, but that is the only detectable difference in native and foreign response. Unlike non-dummy origin and destination variables, it is impossible to use a ratio to determine whether the net direction is towards or away from coastal

20. This assumes that higher temperature eventually becomes a disamenity, but this is consistent with Mueser and Graves (1995). This assumption could be checked by including yearly temperature variance as an additional amenity. The purpose of this study is not about the effects of amenities on migration, so no further analysis is done. For a more rigorous study of the effects of amenities on migration, see Graves (1979) and Greenwood and Hunt (1989).
21. At the state level, these amenity measures are too general to make a convincing argument against the equilibrium theory of migration.

states. Comparing the magnitude of the coefficients suggests that both groups are leaving coastal states more than they migrate into coastal states for 1990 and 2000.

3) Regional Dummies

The overall majority of the regional dummies are insignificant. This is a good signal of the efficacy of the model, because it suggests that most of the differences between regions can be explained by the other variables. The most notable exception to this is the destination Midwestern dummy, for which the majority of the coefficients are statistically significantly greater than zero. Finally, the destination Western dummy for the foreign-born is significant for the last three periods, and the origin Western dummy for the native-born is significant for the first three periods.

The positive sign on the destination Midwestern dummy for both groups imply that, other things equal, both are migrating to the Midwest. Additionally, the negative sign on the origin dummy further suggest that both the native and foreign-born are staying in the Midwest (though, this is not statistically significant for 1970 and 1980). Considering that the Midwest has historically experienced negative or zero net migration, the implication is that asymmetry between regions with respect to information costs, economic conditions, and/or amenities are driving the net out-migration of the Midwest.[22, 23] The foreign-born appear to be more strongly drawn to the Midwest than the native-born. However – referring back to the 2009 regional flows (page 7) – the foreign-born are responsible for the slight net loss that occurred in the Midwest (native net migration to the Midwest is positive). Since regional asymmetry of the other control

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22. The 2009 regional flows table (page 7) shows that the Midwest experienced a net loss of about 2000. Since the table is based on estimates with fairly large error, the slightly positive net migration is likely to be statistically insignificant.
23. This result is consistent with Frey (1995c), who discusses how the economic downturn in the region is responsible for net out-migration.

variables are the primary reason for Midwestern net out-migration, then the implication is that the foreign-born are generally much more strongly affected by information costs, economic conditions and/or amenities than the native born. Their effect on the foreign-born must be so large that it slightly dominates the strong attraction of the unobserved qualities of the Midwest on both groups, which results in a small net loss in the Midwest.

The results for the West tell another interesting story. The summary statistics of regional flows in 2009 show that the West experienced a net loss of 30,000 natives and a net gain of 50,000 foreign-born migrants resulting in a net gain of 20,000 total. The positive sign on the origin west dummy for both groups imply that both are more likely to migrate out of the West. This result is always insignificant for the foreign-born, but it is significant for the natives in all years except 1990 (this changes at the 10% level with a two-tailed test). For the destination, the native response changes direction every period and is insignificant, but the year-to-year regression shows statistically significant attenuation in the coefficient. The foreign-born show a strong avoidance of the West. The coefficients for the foreign are significant from 1980 to 2000. The magnitude of the coefficient amplifies between 1970 and 2000, but the change is statistically insignificant.

This model suggests that natives have been somewhat more likely to experience net migration out of the west, ceteris paribus. Assuming this pattern has not drastically changed in the last 10 years, this result agrees with the regional flows in 2009. That is, the unobserved qualities of the West can explain at least some of why the West experienced negative net migration of natives in 2009. The same cannot be said of the foreign-born. The unobserved qualities of the West are strongly repellent of the foreign-born, which runs counter to what is observed in 2009: positive net migration from the foreign-born. [24] The direct implication of this inconsistency is that the foreign are strongly attracted to the West only because of advantageous information costs, economic conditions, and/or amenities found in the West. In fact, this attraction must be large enough to swamp the unattractiveness of the unobserved qualities of the West. The resulting pull on the foreign-born is sufficient to dominate the negative net migration of natives.

Discussion

Since the foreign-born tend to stay in states with high foreign concentration and migrate to states with high foreign-concentration, the net effect is clear – the foreign-born are attracted to higher foreign concentrations. The net effect on the native-born is not as straightforward because although natives are more likely to leave states with higher foreign concentration, they are also more likely to migrate to states with higher foreign concentration. To determine the net effect, a ratio (like the one used to determine the directional effect of population density) is used. Instead of making a ratio out of nearly every variable, the following model only transforms foreign concentration. [25] Only a piece of each table is provided here, but you can find the remainder in the appendix:

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24. Not only is it positive, but it is also very large. There are some other notable patterns from the 2009 regional flows table. The West is the only region to experience positive net foreign migration from every other region. Furthermore, despite the distance between the Northeast and West, the Northeast foreign flow into the West is as large as the foreign flow from the South to the West. Finally, foreign migration to the West composes nearly two-thirds of all foreign population growth due to internal migration.
25. The reason for this is that the ratio inherently restricts coefficients, and the ideal model is as unrestrictive as possible. Transforming just foreign concentration generally does not significantly change the other results.

Restricted Model with Foreign Concentration Ratio

	1970		1980		1990		2000	
Foreign Concentration Ratio	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
	-0.0097	0.0324	-0.0123	0.0200	-0.0084	0.0893	-0.0105	0.0732
	-3.78	4.14	-5.41	5.19	-2.52	12.46	-3.05	12.61

Native Yearly Changes

Foreign Concentration Ratio	1970	1980	1980	1990	1990	2000	1970	2000
	-0.0034	-0.0063	-0.0071	-0.0060	-0.0101	-0.0182	-0.0018	-0.0082
	-1.91	-3.87	-3.90	-2.29	-4.83	-8.42	-1.11	-3.78

Foreign Yearly Changes

Foreign Concentration Ratio	1970	1980	1980	1990	1990	2000	1970	2000
	0.0304	0.0132	0.0197	0.0813	0.0866	0.0707	0.0354	0.0676
	3.88	3.28	5.11	11.41	12.65	12.73	4.53	11.59

These results show a significant tendency away from higher foreign concentration for the native-born. Additionally, the coefficients for both groups display an overall increase in magnitude from 1970 to 2000. The transformation largely accounts for the increase in foreign concentration since 1970, so to some extent the increase in magnitude over time can be attributed to the increase in average foreign concentration.

There is one major remaining question: what specific factors make the Midwest unattractive to the foreign-born, but make the West extremely attractive compared to the native-born? This study is not well-suited to definitively answer this question, so a more detailed analysis is never completed. Nonetheless, the largest difference between native and foreign migration response is with regards to foreign concentration, which is a clue that regional differences in foreign concentration could be the driving force behind the regional trends that have taken place in the last 50 years. Certainly this is no smoking gun, but the considerable systematic difference in foreign concentration between regions is strongly suggestive.

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Appendix

Summary statistics, model with all ratios, and model with foreign concentration ratio:

Summary Statistics

Distance (1,000 Miles):

Mean	1.0366
Standard Deviation	0.5842
25%	0.5741
Median	0.9362
75%	1.4225

Population (1 Million People):

	Native				Foreign			
	1970	1980	1990	2000	1970	1980	1990	2000
Mean	3.6411	4.0489	4.3481	4.7747	0.1980	0.2893	0.4067	0.6414
Standard Deviation	3.6439	3.9740	4.1849	4.5707	0.4021	0.6234	1.0223	1.4280
25%	0.9754	1.1300	1.3958	1.5528	0.0185	0.0368	0.0352	0.0742
Median	2.5397	2.7166	3.0281	3.5812	0.0399	0.0812	0.0908	0.1588
75%	4.4047	4.9390	5.1677	5.7115	0.1433	0.2173	0.2956	0.5210

Migrant Stock (10,000 People):

	1970	1980	1990	2000
Mean	1.9276	2.2238	2.8168	3.0850
Standard Deviation	4.7735	5.2539	6.3101	6.9058
25%	0.1190	0.1719	0.2637	0.2740
Median	0.4235	0.5443	0.8000	0.8464
75%	1.5002	1.8741	2.5974	2.7928

Median Income ($10,000):

	Native				Foreign			
	1970	1980	1990	2000	1970	1980	1990	2000
Mean	4.2694	4.1316	4.0490	4.1087	3.9069	4.1845	4.0974	4.1533
Standard Deviation	0.6197	0.3626	0.6002	0.5215	0.6685	0.5206	0.6572	0.5276
25%	3.7989	3.8388	3.6725	3.6895	3.4472	3.8584	3.7530	3.8780
Median	4.2445	4.1913	3.9608	4.1200	3.9162	4.1173	3.9810	4.1658
75%	4.7369	4.3827	4.2916	4.4290	4.4086	4.4443	4.4360	4.4352

Employment Growth (%):

	1970	1980	1990	2000
Mean	9.1704	15.3175	4.2633	6.9361
Standard Deviation	6.6915	7.7370	5.4174	6.1056
25%	5.2717	9.5773	0.2818	3.1370
Median	8.0975	16.1173	3.7630	7.5992
75%	12.5281	19.1395	7.6865	9.8817

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Jobs in Manufacturing (%):

	1970	1980	1990	2000
Mean	26.9062	24.1007	20.2557	16.3765
Standard Deviation	10.8349	9.1275	7.4043	5.5973
25%	18.3493	17.1633	15.1957	12.9905
Median	27.2796	24.2564	20.5859	16.6252
75%	36.8347	31.6620	26.3520	19.9232

Population with Degree (%):

	1970	1980	1990	2000
Mean	6.0824	10.3244	13.4823	16.5413
Standard Deviation	1.4375	2.6734	2.8310	3.1166
25%	4.8966	8.3680	11.2840	14.5291
Median	5.8106	10.0362	12.7729	15.9213
75%	7.2052	11.8175	15.3320	18.0883

Population Density (1000 people / Sq. Mile):

	1970	1980	1990	2000
Mean	1.0993	0.9747	0.9638	1.0442
Standard Deviation	2.4357	2.0039	1.9289	2.2301
25%	0.1124	0.1359	0.1511	0.1699
Median	0.3748	0.4325	0.4574	0.4852
75%	1.2184	1.0511	1.0543	1.0055

Foreign Concentration (%):

	1970	1980	1990	2000
Mean	3.6528	4.5333	5.0388	7.5206
Standard Deviation	3.0440	3.5549	4.7378	5.9765
25%	1.3770	1.9210	1.7548	3.0660
Median	2.9228	3.4358	3.1640	5.4410
75%	5.0699	6.3735	7.3832	10.8820

Foreign Concentratic

	1970	1980	1990	2000
Mean	2.3083	1.7199	2.0073	1.8074
Standard Deviation	3.5720	2.0280	2.7829	2.2560
25%	0.3825	0.4719	0.4253	0.4528
Median	1.0000	1.0000	1.0000	1.0000
75%	2.6145	2.1191	2.3514	2.2086

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January Temperature (10° F):

	1970	1980	1990	2000
Mean	3.1927	3.1934	3.1953	3.1975
Standard Deviation	1.1313	1.1315	1.1306	1.1298
25%	2.4219	2.4162	2.4114	2.4044
Median	3.0404	3.0466	3.0486	3.0514
75%	3.8571	3.8745	3.8965	3.9439

June Temperature (10° F):

	1970	1980	1990	2000
Mean	7.5075	7.5062	7.5076	7.5100
Standard Deviation	0.4907	0.4897	0.4925	0.4971
25%	7.1091	7.1093	7.1122	7.1195
Median	7.4705	7.4683	7.4644	7.4593
75%	7.8896	7.8818	7.8762	7.8674

June Humidity (10%):

	1970	1980	1990	2000
Mean	5.5380	5.5359	5.5358	5.5336
Standard Deviation	1.5567	1.5600	1.5600	1.5625
25%	4.7542	4.7432	4.7467	4.7536
Median	6.0594	6.0623	6.0627	6.0482
75%	6.6925	6.6982	6.6988	6.6961

Dummy Variables (Number of States):

Coastal	21
Midwest	12
South	16
West	11
Northeast	9

Median Income Ratio:

	Native				Foreign			
	1970	1980	1990	2000	1970	1980	1990	2000
Mean	1.0227	1.0082	1.0215	1.0163	1.0357	1.0154	1.0274	1.0174
Standard Deviation	0.2185	0.1292	0.2125	0.1842	0.2823	0.1785	0.2432	0.1907
25%	0.8621	0.9170	0.8696	0.8835	0.8475	0.8848	0.8668	0.8838
Median	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
75%	1.1600	1.0905	1.1500	1.1318	1.1799	1.1302	1.1537	1.1315

Employment Growth Ratio:

	1970	1980	1990	2000
Mean	2.6071	0.9747	1.4714	0.5253
Standard Deviation	8.6288	2.6481	9.2273	4.3392
25%	0.5395	0.5558	-0.3762	-0.1576
Median	1.0000	0.9615	0.4315	0.6432
75%	1.8534	1.6197	1.4657	1.3362

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Jobs in Manufacturing Ratio:

	1970	1980	1990	2000
Mean	1.3577	1.2965	1.2725	1.2029
Standard Deviation	1.2727	1.1083	1.0437	0.8288
25%	0.6537	0.6740	0.6860	0.7103
Median	1.0000	1.0000	1.0000	1.0000
75%	1.5299	1.4836	1.4578	1.4078

Population Density Ratio:

	1970	1980	1990	2000
Mean	11.7734	8.4190	7.5981	7.0658
Standard Deviation	66.3953	44.7676	41.1330	41.4595
25%	0.2020	0.2476	0.2682	0.2858
Median	1.0000	1.0000	1.0000	1.0000
75%	4.9511	4.0387	3.7286	3.4985

January Temperature Ratio:

	1970	1980	1990	2000
Mean	1.1940	1.1928	1.1925	1.1917
Standard Deviation	0.8423	0.8371	0.8379	0.8355
25%	0.6970	0.6990	0.7000	0.6989
Median	1.0000	1.0000	1.0000	1.0000
75%	1.4348	1.4307	1.4285	1.4308

July Temperature Ratio:

	1970	1980	1990	2000
Mean	1.0043	1.0043	1.0044	1.0044
Standard Deviation	0.0935	0.0933	0.0938	0.0946
25%	0.9352	0.9354	0.9355	0.9355
Median	1.0000	1.0000	1.0000	1.0000
75%	1.0693	1.0690	1.0689	1.0689

July Humidity Ratio:

	1970	1980	1990	2000
Mean	1.1546	1.1554	1.1563	1.1582
Standard Deviation	0.6930	0.6951	0.6990	0.7063
25%	0.8016	0.8011	0.8015	0.8018
Median	1.0000	1.0000	1.0000	1.0000
75%	1.2475	1.2483	1.2477	1.2472

Restricted with All Ratios (Native - Foreign)

Seemingly Unrelated Tobit Model 1, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (performed with a Wald test)

Summary	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Observations	2256		2256		2256		2256	
Log Likelihood	-2542.56		1409.74		-1763.10		-327.00	
OLS R-Squared	0.4704	0.4019	0.4825	0.5306	0.5019	0.5870	0.4951	0.5319

Costs of Migration	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Distance i → j (1,000 miles)	-0.2882	-0.4649	-0.1466	-0.1650	-0.3026	-0.4501	-0.2511	-0.2705
	-21.96	-11.37	-22.72	-15.22	-23.34	-16.46	-23.08	-15.04
Population i (1 Million) *	-0.0144	0.0119	-0.0073	-0.0465	-0.0136	-0.0648	-0.0114	-0.0416
	-7.26	0.22	-8.15	-4.93	-8.44	-4.85	-9.25	-6.56
Population j (1 Million) *	0.0257	0.7800	0.0098	0.1545	0.0185	0.2703	0.0108	0.0895
	12.16	12.91	10.34	14.17	10.64	16.54	8.42	12.39
Migrant Stock i → j (10,000)	0.0263	0.0551	0.0130	0.0178	0.0228	0.0335	0.0189	0.0232
	17.04	12.21	18.80	15.61	19.62	14.06	21.31	16.22

Economic Differentials	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Median Income Ratio	-0.1148	-0.0961	-0.0606	-0.0187	-0.1229	-0.1924	0.0205	-0.0302
	-1.89	-1.25	-2.24	-0.61	-2.40	-3.04	0.51	-0.68
Employment Growth Ratio	0.0003	-0.0097	-0.0001	-0.0018	0.0009	0.0034	0.0013	-0.0002
	0.41	-3.25	-0.06	-0.87	1.28	2.34	1.02	-0.11
Jobs in Manufacturing Ratio	0.0141	0.0393	0.0009	0.0109	0.0211	0.0495	0.0194	0.0367
	1.88	1.59	0.22	1.56	2.62	2.88	2.40	2.76
Population with Degree Ratio	0.1249	0.3070	0.0308	0.0095	0.1447	0.2502	0.0688	0.1886
	3.80	3.61	2.64	0.51	3.85	3.75	2.09	3.98

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Foreign Concentration Ratio	-0.0082	0.0334	-0.0069	0.0333	-0.0047	0.0953	-0.0080	0.0761
	-3.03	4.09	-2.89	8.23	-1.37	12.59	-2.23	12.61
Population Density Ratio	-0.0002	-0.0005	-0.0001	-0.0005	-0.0001	-0.0007	-0.0001	-0.0002
	-1.55	-1.50	-1.74	-3.51	-0.86	-2.00	-0.47	-1.09
Jan. Temperature Ratio	0.0097	0.0286	0.0179	0.0334	0.0330	0.1434	0.0143	0.1180
	0.76	0.71	2.86	3.13	2.70	5.55	1.42	7.19
July Temperature Ratio	-0.0617	0.5255	0.0333	-0.0082	0.0974	-0.7004	0.2959	-0.3196
	-0.49	1.37	0.58	-0.08	0.84	-2.75	3.08	-1.97
July Humidity Ratio	0.0548	0.0178	0.0114	-0.0323	0.0270	-0.0166	0.0260	-0.0670
	2.61	0.27	1.10	-1.80	1.32	-0.39	1.53	-2.39
Coastal Dummy i	0.1113	0.1097	0.0440	0.0560	0.0958	0.2229	0.0873	0.1438
	5.79	1.79	4.76	3.58	5.07	5.53	5.30	5.30
Coastal Dummy j	0.1433	0.3587	0.0688	0.0802	0.1153	0.1138	0.0798	0.0497
	8.04	6.22	7.82	5.39	6.38	2.97	5.32	1.99

Regional Dummies & β_0	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Midwest Dummy i	-0.0192	0.0083	-0.0147	-0.0179	-0.0367	-0.0217	-0.0143	-0.0414
	-0.81	0.11	-1.23	-0.88	-1.57	-0.44	-0.71	-1.27
Midwest Dummy j	0.0832	0.5731	0.0271	0.1288	0.0503	0.3075	0.0202	0.1554
	3.59	7.79	2.34	6.54	2.22	6.41	1.05	4.94
South Dummy i	-0.0150	0.2872	-0.0147	0.0065	-0.0220	-0.0272	-0.0068	-0.0379
	-0.66	3.88	-1.35	0.34	-1.00	-0.57	-0.38	-1.25
South Dummy j	0.0124	0.5139	0.0085	0.1708	0.0057	0.3961	-0.0040	0.1798
	0.55	7.04	0.78	8.96	0.26	8.27	-0.22	5.89
West Dummy i	0.1987	0.4110	0.0983	0.1590	0.2086	0.4811	0.1625	0.2987
	6.71	4.53	7.01	6.60	7.12	7.59	6.85	7.32
West Dummy j	0.3134	0.7701	0.1543	0.2080	0.2857	0.3972	0.2148	0.1379
	10.98	8.78	11.90	9.45	10.70	7.09	9.95	3.81
Constant	0.1305	-1.4439	0.0922	-0.0528	0.0403	0.3609	-0.1919	0.1315
	0.88	-3.49	1.34	-0.44	0.30	1.23	-1.72	0.68

Restricted with Foreign Concentration Ratio (Native - Foreign)

Seemingly Unrelated Tobit Model 1, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (performed with a Wald test)

Summary	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Observations	2256		2256		2256		2256	
Log Likelihood	-2423.66		1581.02		-1640.53		-251.00	
OLS R-Squared	0.5175	0.4431	0.5461	0.5887	0.5448	0.6198	0.5330	0.5610

Costs of Migration	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Distance i → j (1,000 miles)	-0.3051	-0.5209	-0.1590	-0.1913	-0.3147	-0.4907	-0.2538	-0.2887
	-24.95	-13.16	-27.05	-19.18	-26.22	-19.22	-25.08	-17.06
Population i (1 Million) *	-0.0136	0.0695	-0.0049	-0.0305	-0.0099	-0.0358	-0.0090	-0.0241
	-4.51	0.67	-3.94	-2.50	-4.56	-2.21	-5.58	-3.14
Population j (1 Million) *	0.0390	1.0752	0.0147	0.1853	0.0163	0.2796	0.0106	0.0934
	12.34	9.64	11.01	13.33	7.10	15.05	6.12	10.91
Migrant Stock i → j (10,000)	0.0221	0.0410	0.0110	0.0143	0.0206	0.0277	0.0183	0.0214
	14.56	8.83	16.38	12.80	17.66	11.34	20.38	14.47

Economic Differentials	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Median Income i ($10,000) *	0.0200	0.0892	-0.0149	-0.0123	0.0350	-0.0211	-0.0074	-0.0277
	0.86	2.33	-1.50	-1.12	1.84	-0.79	-0.49	-1.65
Median Income j ($10,000) *	-0.0564	0.0515	-0.0414	-0.0079	-0.0075	-0.0525	-0.0162	-0.0134
	-2.48	1.34	-4.24	-0.71	-0.39	-1.96	-1.08	-0.81
Employment Growth i (%)	0.0046	-0.0022	0.0016	0.0027	0.0049	0.0046	0.0018	-0.0030
	4.08	-0.57	2.24	2.15	2.78	1.21	0.96	-0.98
Employment Growth j (%)	0.0027	-0.0026	0.0016	0.0036	0.0129	0.0220	0.0082	0.0145
	2.42	-0.67	2.22	2.87	7.19	5.80	4.40	4.74
Jobs in Manufacturing i (%)	-0.0043	-0.0080	-0.0014	-0.0019	-0.0077	-0.0135	-0.0072	-0.0120
	-4.33	-2.55	-2.85	-2.24	-6.82	-5.49	-6.09	-6.20
Jobs in Manufacturing j (%)	-0.0047	-0.0042	-0.0027	-0.0011	-0.0041	-0.0027	-0.0023	-0.0023
	-4.77	-1.34	-5.48	-1.28	-3.54	-1.10	-1.95	-1.18
Population with Degree i (%)	-0.0070	-0.0118	0.0038	-0.0008	-0.0118	-0.0175	0.0004	-0.0110
	-0.86	-0.58	2.75	-0.35	-2.46	-2.03	0.13	-2.57
Population with Degree j (%)	0.0575	0.1118	0.0127	0.0149	0.0096	0.0212	0.0221	0.0321
	7.16	5.86	9.07	6.42	2.03	2.52	7.69	8.11

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Foreign Concentration Ratio	-0.0097	0.0324	-0.0123	0.0200	-0.0084	0.0893	-0.0105	0.0732
	-3.78	4.14	-5.41	5.19	-2.52	12.46	-3.05	12.61
Population Density i (1,000)	-0.0047	-0.0177	-0.0036	0.0004	-0.0207	-0.0268	-0.0156	-0.0221
	-1.20	-1.10	-1.59	0.10	-4.73	-3.10	-5.23	-4.66
Population Density j (1,000)	-0.0280	-0.0873	-0.0112	-0.0181	-0.0074	-0.0360	0.0003	-0.0031
	-7.08	-5.38	-4.87	-4.89	-1.69	-4.22	0.12	-0.67
Jan. Tempertature i (10° F)	0.0256	-0.0055	0.0017	-0.0184	0.0080	-0.0349	-0.0039	-0.0722
	1.31	-0.09	0.17	-1.20	0.39	-0.89	-0.23	-2.85
Jan. Tempertuture j (10° F)	0.0664	0.2696	0.0799	0.1785	0.1482	0.3137	0.1056	0.2094
	3.34	4.51	7.87	11.52	7.09	7.78	6.11	8.08
July Temperature i (10° F)	-0.0366	0.0309	-0.0065	0.0220	-0.0589	0.0008	-0.0069	0.0389
	-0.98	0.26	-0.35	0.74	-1.47	0.01	-0.23	0.82
July Temperature j (10° F)	-0.1352	-0.2498	-0.1126	-0.2418	-0.2335	-0.5454	-0.0930	-0.3048
	-3.60	-2.13	-6.05	-8.14	-5.78	-6.72	-3.03	-6.37
July Humidity i (10%)	0.0067	0.0303	0.0027	0.0230	-0.0122	-0.0045	0.0012	0.0138
	0.47	0.67	0.39	1.95	-0.86	-0.14	0.09	0.65
July Humidity j (10%)	0.0065	-0.0146	-0.0341	-0.0771	-0.0231	-0.0712	-0.0265	-0.0669
	0.45	-0.33	-4.95	-6.58	-1.63	-2.30	-2.06	-3.20
Coastal Dummy i	0.0527	0.0803	0.0288	0.0508	0.0752	0.2303	0.0814	0.1731
	2.40	1.15	2.67	2.89	3.23	4.88	4.25	5.67
Coastal Dummy j	0.0868	0.0805	0.0515	0.0195	0.0072	-0.0656	0.0377	-0.0168
	3.95	1.14	4.80	1.11	0.31	-1.39	1.96	-0.55

Regional Dummies & β_0	1970		1980		1990		2000	
	Native	Foreign	Native	Foreign	Native	Foreign	Native	Foreign
Midwest Dummy i	-0.0620	-0.0060	-0.0146	0.0025	-0.0676	-0.0226	-0.0432	0.0097
	-2.60	-0.08	-1.24	0.12	-2.76	-0.44	-1.98	0.27
Midwest Dummy j	0.0027	0.4082	-0.0040	0.0741	0.0847	0.3351	0.0162	0.1202
	0.11	5.22	-0.34	3.55	3.44	6.47	0.74	3.40
South Dummy i	-0.0926	0.1733	-0.0360	0.0018	-0.0707	-0.0495	-0.0575	0.0156
	-3.38	1.81	-2.78	0.08	-2.62	-0.80	-2.35	0.37
South Dummy j	-0.1176	0.1729	-0.0679	0.0065	-0.0545	0.2240	-0.0758	0.0574
	-4.19	1.81	-5.14	0.27	-1.98	3.56	-3.06	1.35
West Dummy i	0.1092	0.3734	0.0573	0.1428	0.0776	0.2258	0.1065	0.2212
	1.89	2.02	1.96	2.89	1.37	1.86	2.19	2.73
West Dummy j	0.0308	0.1035	-0.1042	-0.2867	0.0105	-0.1696	-0.0730	-0.3543
	0.53	0.56	-3.56	-5.77	0.19	-1.39	-1.50	-4.35
Constant	1.3707	-0.0634	1.1824	1.5639	2.4648	4.4560	0.8092	2.1161
	3.07	-0.05	5.62	4.59	5.43	4.76	2.33	3.74

Restricted with Foreign Concentration Ratio (Native Yearly Changes)

Seemingly Unrelated Tobit Model 1, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (Wald test)

Summary	1970	1980	1980	1990	1990	2000	1970	2000
Observations	2256		2256		2256		2256	
Log Likelihood	2808.85		2880.34		2235.60		1104.72	

Costs of Migration	1970	1980	1980	1990	1990	2000	1970	2000
Distance i → j (1,000 miles)	-0.3098	-0.1636	-0.1677	-0.3458	-0.3302	-0.2748	-0.3067	-0.2689
	-25.76	-28.28	-28.45	-28.38	-27.51	-27.30	-25.78	-27.28
Population i (1 Million) *	-0.0102	-0.0043	-0.0017	-0.0019	-0.0044	-0.0052	-0.0107	-0.0080
	-3.58	-3.51	-1.34	-0.82	-1.86	-2.91	-3.71	-4.67
Population j (1 Million) *	0.0455	0.0205	0.0201	0.0296	0.0304	0.0234	0.0500	0.0248
	15.72	16.37	15.11	12.18	12.56	12.60	16.86	14.01
Migrant Stock i → j (10,000)	0.0160	0.0085	0.0061	0.0090	0.0143	0.0119	0.0178	0.0141
	12.83	15.36	11.42	9.46	13.33	14.44	14.88	19.92

Economic Differentials	1970	1980	1980	1990	1990	2000	1970	2000
Median Income i ($10,000) *	0.0158	-0.0121	-0.0466	-0.0558	0.0100	-0.0123	0.0509	-0.0019
	1.10	-1.74	-6.44	-4.54	0.69	-1.00	2.74	-0.14
Median Income j ($10,000) *	0.0256	-0.0018	0.0293	0.0750	0.0281	0.0035	-0.0821	-0.0577
	1.78	-0.26	4.00	5.80	1.90	0.28	-4.48	-4.14
Employment Growth i (%)	0.0000	0.0008	-0.0003	0.0008	0.0011	0.0025	0.0010	0.0017
	-0.05	2.23	-0.89	0.83	1.55	3.06	1.39	1.41
Employment Growth j (%)	0.0020	0.0021	0.0004	0.0032	0.0047	0.0047	0.0014	0.0111
	3.74	6.08	1.04	3.42	6.46	5.73	2.03	9.42
Jobs in Manufacturing i (%)	-0.0045	-0.0015	-0.0014	-0.0055	-0.0071	-0.0069	-0.0040	-0.0057
	-5.19	-3.59	-3.15	-5.13	-6.91	-6.37	-4.76	-5.49
Jobs in Manufacturing j (%)	-0.0067	-0.0032	-0.0037	-0.0083	-0.0079	-0.0061	-0.0051	-0.0037
	-7.76	-7.60	-8.32	-7.63	-7.48	-5.66	-6.00	-3.64
Population with Degree i (%)	-0.0051	0.0053	0.0059	0.0013	-0.0142	-0.0071	-0.0118	0.0011
	-1.15	6.92	7.70	0.50	-4.15	-2.96	-1.88	0.47
Population with Degree j (%)	0.0165	0.0055	0.0031	-0.0023	0.0173	0.0210	0.0542	0.0231
	3.67	6.92	3.80	-0.90	5.16	8.90	8.66	9.77

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970	1980	1980	1990	1990	2000	1970	2000
Foreign Concentration Ratio	-0.0034	-0.0063	-0.0071	-0.0060	-0.0101	-0.0182	-0.0018	-0.0082
	-1.91	-3.87	-3.90	-2.29	-4.83	-8.42	-1.11	-3.78
Population Density i (1,000)	-0.0072	-0.0040	-0.0058	-0.0167	-0.0223	-0.0146	-0.0072	-0.0124
	-1.86	-1.85	-2.60	-3.70	-5.07	-4.86	-1.91	-4.22
Population Density j (1,000)	-0.0372	-0.0190	-0.0203	-0.0291	-0.0276	-0.0127	-0.0373	-0.0115
	-9.60	-8.71	-9.07	-6.48	-6.29	-4.25	-9.79	-3.93
Jan. Tempertature i (10° F)	0.0184	0.0060	-0.0025	-0.0160	-0.0347	-0.0295	0.0110	0.0028
	0.95	0.62	-0.25	-0.78	-1.74	-1.74	0.57	0.17
Jan. Tempertuture j (10° F)	0.0461	0.0456	0.0444	0.1039	0.1115	0.0819	0.0207	0.0427
	2.36	4.69	4.46	5.05	5.55	4.80	1.08	2.54
July Temperature i (10° F)	-0.0056	-0.0063	0.0068	-0.0102	0.0371	0.0257	0.0095	-0.0181
	-0.15	-0.35	0.38	-0.27	1.02	0.86	0.27	-0.61
July Temperature j (10° F)	-0.0797	-0.0711	-0.0484	-0.0939	-0.1408	-0.0707	-0.0639	-0.0118
	-2.19	-3.96	-2.67	-2.49	-3.87	-2.36	-1.80	-0.39
July Humidity i (10%)	-0.0008	-0.0005	-0.0050	-0.0227	0.0016	0.0124	0.0027	-0.0058
	-0.06	-0.07	-0.72	-1.58	0.11	1.04	0.20	-0.48
July Humidity j (10%)	0.0273	-0.0208	-0.0116	0.0149	-0.0055	-0.0302	0.0204	-0.0090
	1.94	-3.08	-1.68	1.04	-0.39	-2.53	1.46	-0.74
Coastal Dummy i	0.0759	0.0293	0.0397	0.1177	0.1222	0.1028	0.0710	0.0758
	3.61	2.83	3.75	5.33	5.45	5.47	3.34	4.04
Coastal Dummy j	0.1084	0.0642	0.0614	0.0533	0.0153	0.0439	0.1126	0.0852
	5.16	6.24	5.84	2.42	0.69	2.33	5.28	4.55

Regional Dummies & β_0	1970	1980	1980	1990	1990	2000	1970	2000
Midwest Dummy i	-0.0655	-0.0187	-0.0091	-0.0961	-0.1077	-0.0689	-0.0648	-0.0438
	-2.80	-1.63	-0.77	-4.00	-4.52	-3.40	-2.78	-2.14
Midwest Dummy j	-0.0189	-0.0294	-0.0350	0.0072	0.0246	-0.0029	-0.0054	-0.0300
	-0.80	-2.56	-2.95	0.30	1.03	-0.14	-0.23	-1.47
South Dummy i	-0.1035	-0.0436	-0.0317	-0.0978	-0.1076	-0.0804	-0.0811	-0.0552
	-3.94	-3.53	-2.49	-3.72	-4.09	-3.67	-3.13	-2.48
South Dummy j	-0.0885	-0.0591	-0.0627	-0.1135	-0.0595	-0.0521	-0.1012	-0.0982
	-3.32	-4.74	-4.86	-4.27	-2.24	-2.36	-3.84	-4.41
West Dummy i	0.1169	0.0497	0.0687	0.0643	0.1417	0.1398	0.1507	0.0959
	2.06	1.78	2.43	1.11	2.53	2.95	2.72	2.04
West Dummy j	0.1496	-0.0508	-0.0084	0.1333	0.0580	-0.0448	0.1320	-0.0228
	2.63	-1.82	-0.30	2.31	1.03	-0.95	2.37	-0.49
Constant	0.6844	0.7901	0.5942	1.2116	1.0920	0.6427	0.6003	0.4530
	1.59	3.79	2.84	2.78	2.61	1.89	1.43	1.33

Restricted with Foreign Concentration Ratio (Foreign Yearly Changes)

Seemingly Unrelated Tobit Model 1, Dependent: $M_{ij,t}$

Coefficients and t-statistics are reported; an outlined box is colored gray if the coefficients within are significantly different at the 5% level (Wald test)

Summary	1970	1980	1980	1990	1990	2000	1970	2000
Observations	2256		2256		2256		2256	
Log Likelihood	-2331.37		-1700.63		-2434.26		-3292.17	

Costs of Migration	1970	1980	1980	1990	1990	2000	1970	2000
Distance i → j (1,000 miles)	-0.5737	-0.2098	-0.2080	-0.5357	-0.5237	-0.3100	-0.5795	-0.3126
	-14.19	-19.94	-20.46	-20.51	-20.16	-18.01	-14.21	-18.01
Population i (1 Million) *	0.1653	-0.0030	-0.0017	-0.0047	-0.0051	-0.0023	0.1786	-0.0041
	1.52	-0.21	-0.13	-0.25	-0.28	-0.26	1.63	-0.46
Population j (1 Million) *	1.3491	0.2496	0.2547	0.3808	0.3676	0.1263	1.3052	0.1277
	11.63	15.87	16.72	18.11	17.67	12.93	11.19	12.79
Migrant Stock i → j (10,000)	0.0339	0.0127	0.0106	0.0197	0.0234	0.0191	0.0333	0.0194
	7.23	10.88	9.56	8.11	9.50	12.75	7.09	12.93

Economic Differentials	1970	1980	1980	1990	1990	2000	1970	2000
Median Income i ($10,000) *	0.0708	0.0072	0.0071	-0.0167	0.0004	0.0011	0.0782	-0.0063
	1.78	0.57	0.60	-0.61	0.01	0.06	1.90	-0.29
Median Income j ($10,000) *	0.0417	-0.0012	-0.0100	-0.0636	-0.0672	-0.0598	0.0430	-0.0491
	1.04	-0.09	-0.84	-2.31	-2.55	-3.13	1.04	-2.25
Employment Growth i (%)	0.0005	0.0032	0.0023	0.0017	0.0009	-0.0005	-0.0016	-0.0007
	0.14	2.55	2.09	0.51	0.27	-0.17	-0.41	-0.23
Employment Growth j (%)	0.0003	0.0049	0.0034	0.0140	0.0124	0.0112	-0.0014	0.0164
	0.09	3.91	3.09	4.13	3.86	4.26	-0.35	5.29
Jobs in Manufacturing i (%)	-0.0064	-0.0017	-0.0015	-0.0134	-0.0131	-0.0122	-0.0052	-0.0122
	-2.00	-1.89	-1.78	-5.38	-5.25	-6.26	-1.60	-6.19
Jobs in Manufacturing j (%)	-0.0034	-0.0003	-0.0004	-0.0008	-0.0013	-0.0007	-0.0035	-0.0007
	-1.05	-0.34	-0.53	-0.30	-0.53	-0.36	-1.08	-0.37
Population with Degree i (%)	-0.0126	-0.0025	-0.0029	-0.0260	-0.0195	-0.0148	-0.0075	-0.0148
	-0.63	-1.04	-1.37	-3.21	-2.37	-3.48	-0.36	-3.34
Population with Degree j (%)	0.0904	0.0130	0.0096	0.0136	0.0377	0.0350	0.1238	0.0365
	4.74	5.54	4.41	1.71	4.71	8.85	6.33	8.92

* Variable is tailored to the regression-specific population (e.g. Foreign Median Income)

Amenities	1970	1980	1980	1990	1990	2000	1970	2000
Foreign Concentration Ratio	0.0304	0.0132	0.0197	0.0813	0.0866	0.0707	0.0354	0.0676
	3.88	3.28	5.11	11.41	12.65	12.73	4.53	11.59
Population Density i (1,000)	-0.0251	-0.0029	-0.0033	-0.0281	-0.0312	-0.0253	-0.0258	-0.0249
	-1.51	-0.74	-0.86	-3.14	-3.52	-5.20	-1.54	-5.07
Population Density j (1,000)	-0.1147	-0.0243	-0.0282	-0.0540	-0.0567	-0.0111	-0.1121	-0.0079
	-6.84	-6.21	-7.41	-6.14	-6.50	-2.32	-6.64	-1.64
Jan. Tempertature i (10° F)	-0.0013	-0.0238	-0.0241	-0.0446	-0.0464	-0.0843	-0.0084	-0.0837
	-0.02	-1.46	-1.53	-1.12	-1.17	-3.25	-0.13	-3.20
Jan. Tempertuture j (10° F)	0.2239	0.1685	0.1509	0.2568	0.2674	0.1840	0.2360	0.1960
	3.65	10.29	9.55	6.32	6.61	7.00	3.83	7.39
July Temperature i (10° F)	0.0205	0.0287	0.0393	0.0339	0.0495	0.0566	0.0487	0.0470
	0.17	0.91	1.30	0.42	0.63	1.17	0.39	0.96
July Temperature j (10° F)	-0.1799	-0.2323	-0.2066	-0.4080	-0.4373	-0.2833	-0.2041	-0.2929
	-1.51	-7.48	-6.89	-5.07	-5.49	-5.86	-1.70	-6.01
July Humidity i (10%)	0.0112	0.0172	0.0138	-0.0120	-0.0200	0.0115	0.0030	0.0112
	0.24	1.39	1.14	-0.38	-0.64	0.54	0.06	0.52
July Humidity j (10%)	-0.0118	-0.0910	-0.0833	-0.0839	-0.0887	-0.0822	-0.0082	-0.0747
	-0.26	-7.37	-6.98	-2.65	-2.84	-3.92	-0.18	-3.51
Coastal Dummy i	0.0811	0.0503	0.0598	0.2591	0.2568	0.1902	0.0935	0.1872
	1.14	2.71	3.33	5.44	5.37	6.14	1.30	5.97
Coastal Dummy j	0.1296	0.0395	0.0450	0.0379	-0.0456	-0.0159	0.0824	-0.0127
	1.80	2.14	2.52	0.80	-0.96	-0.51	1.13	-0.40

Regional Dummies & β_0	1970	1980	1980	1990	1990	2000	1970	2000
Midwest Dummy i	0.0016	-0.0121	-0.0131	-0.0476	-0.0430	-0.0279	0.0204	-0.0194
	0.02	-0.55	-0.62	-0.90	-0.82	-0.78	0.25	-0.52
Midwest Dummy j	0.4058	0.0611	0.0715	0.2562	0.2870	0.1339	0.4328	0.1133
	5.07	2.72	3.31	4.85	5.48	3.75	5.36	3.05
South Dummy i	0.1929	0.0027	-0.0070	-0.0757	-0.0678	-0.0203	0.2083	-0.0049
	1.96	0.11	-0.28	-1.20	-1.08	-0.49	2.10	-0.11
South Dummy j	0.1916	-0.0001	0.0224	0.1695	0.2628	0.1170	0.2410	0.0727
	1.96	0.00	0.92	2.67	4.14	2.79	2.45	1.65
West Dummy i	0.3428	0.1235	0.1260	0.2011	0.2027	0.1879	0.3702	0.1920
	1.82	2.38	2.53	1.63	1.66	2.30	1.95	2.32
West Dummy j	0.1852	-0.3234	-0.2647	-0.1833	-0.2083	-0.3666	0.1683	-0.4020
	0.99	-6.20	-5.29	-1.47	-1.69	-4.48	0.89	-4.83
Constant	-0.1858	1.4956	1.3437	3.7951	3.4681	2.1170	-0.4960	2.1281
	-0.14	4.17	3.86	4.06	3.76	3.71	-0.36	3.68