The Effects of Regional Out-Migration on Job Openings by Occupation

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ABSTRACT

This paper explores the use of synthetic estimates of regional occupational employment migration rates to augment state occupational employment projections and investigates the influence of occupational migration on estimates of future job openings by occupational group. The first section provides a general description of state and metropolitan area migration by occupation and other demographic variables. The descriptive statistics and model-based results demonstrate that the overall level of out-migration rates and their variation among demographic and occupational groups are substantial enough to justify attempts to integrate migration into the occupational employment projections process. The second section describes the construction, and use of, estimated adjusted out-migration rates. The adjusted out-migration rates are created by using incomplete data methods to statistically combine data from the 1990 Census and the 1987 Occupational Mobility Current Population Survey. The synthetic estimates contain complete information on occupational migration and mobility and allows us to isolate the out-migration rate that reflects changes in state-of-residence but not changes in occupation. The synthetic data are used to produce a set of estimated job openings that take into account regional out-migration. The results show that the total number of estimated job openings by occupation have to be revised significantly upwards when out-migration is taken into account.

INTRODUCTION

Current methods for constructing state occupational employment projections ignore the role migration plays in shaping future state occupational employment stocks (Goldstein 1990, Eck and Berkery, 1990). If migration propensities are constant across occupation groups then excluding the effects of migration would be inconsequential and current projection methods would be sufficient. Recent research suggests, however, that interstate and intermetropolitan migration do vary among occupation groups. These differences are apparent in summary statistics and statistically significant differences persist in mover-stayer models of migration after controlling for standard demographic factors and economic conditions (Goldstein and Sweeney 1997, 1998).

Given these differences in occupational migration, the state occupational employment projections could be improved by integrating the occupation-specific interstate migration rates into the projections process. The current method of decomposing the projected change in occupational employment levels into growth and separations (occupational mobility) could be augmented to include a third component of change due to migration. To construct such a decomposition requires data in the form of occupational migration and mobility accounts so that a pure migration effect can be separated from other occupation related separations. Available secondary data sources do not contain the appropriate variable combinations to construct occupational migration and mobility accounts.

This paper describes how synthetic estimates of the accounts can be produced using log-linear models to synthesize information from multiple data sources, and demonstrates how the accounts can be used to modify state occupational employment projections. The paper briefly presents some of the differences in occupational migration rates at the state and metropolitan level. The remainder of the paper is then devoted to describing the methodology for producing the synthetic estimates and the construction of projections based on the data.

CHARACTERISTICS OF OCCUPATIONAL MIGRATION

Several researches have investigated the general characteristics and differences in occupational migration rates. Much of the work looking at occupational migration flows is based on the 1970 Public Use Sample and is relatively outdated given the significant changes in female labor force participation, weakening of the employer-employee workplace attachment, and other changes in the labor market since the late 1960s (Engles 1976, Stone 1971, Long 1973, Schroeder 1976, Herzog and Schlottman 1981, 1983). The most relevant research to our work was by Long (1973) who found that differences in occupational flows can largely be described by demographic features and the educational attainment of the members of a given occupation group. More recently Ellis et. al. (1993) examine the 1980 data focusing on the geographic structure of occupational migration flows and found evidence of distinct subsystems of interstate migration flows differentiated by occupation. The former research would seem to indicate that efforts to integrate migration into occupational employment projections would not be justified whereas the latter results on occupational subsystems would support the effort.

The first task in this paper, therefore, is to report the results of recent research of the 1990 5% Census Public Use Micro data that indicates statistically significant differences in occupational migration exist even after controlling for demographic and economic factors (Goldstein and Sweeney 1998). Table 1 presents total migration figures for major occupation groups, census region of origin, and various demographic variables for states and metropolitan areas. The rates are further decomposed into migration (domestic moves) and immigration (moves originating outside the U.S.). The five-year rates are constructed by dividing the five year flow by the relevant 1990 population stock. There are large differences in the total migration rate and its components across occupational categories, sex, region of origin, education levels, and age class. Of particular interest for this study is the variation in occupational migration across categories within these variables. Two pertinent conclusions based on the migration rates in Table 1 are: (1) the aggregate rate of out-migration is large enough to have significant effects on metropolitan area labor supply, and (2) variation in the rates across occupation groups is sufficiently large to justify analysis of separate occupation groups.

With regard to the first conclusion, note that the aggregate average annual level of internal migration activity over the study period includes between 2.4 to 2.8 percent of the metropolitan area labor force and 2.2-2.4 percent of state labor force. Over a ten year projection period approximately one-fourth of the labor market will experience some type of migration event; over a fifteen-year projection period approximately forty percent of the labor force will move from one labor market area to another. The overall levels of migration activity, therefore, justify attempting to include the effects of migration into the state and substate employment projection process.

With regard to the second major conclusion, it will be helpful to compare variation in occupational migration rates to other demographic characteristics commonly used to study migration, namely age and education level. If the occupational category private household services (PHO) is included, then the range of variation for total migration rates across occupations is greater than the variation across the age pattern. If private household services is excluded, then the variation is comparable to that for education classes. Either way, there are pronounced differences in the propensity to migrate and immigrate by occupation category, and the role of migration is large enough that fluctuations in the migration level will alter available occupational labor supply significantly.

Some of the differences at the aggregate occupation level are certainly due to the different demographic composition of occupation groups. Table 2 contains sex, age class, education level, foreign born, previous mover, and head of household disaggregations for 13 major occupations and 10 major industry groups. Looking first at occupations, we see that some occupation groups are evenly distributed over males and females while others are male- or female-dominated. In particular, Protective Services (PSE), Farming, Forestry and Fishing (FFF), Transportation (TMM), and Handlers (HAN) are all more than 80 percent male, whereas Administrative Support (ASC), Private Household (PHO), and Other Services (SXX) are predominantly female. There are also large differences in the age structure and educational attainment of the occupation groups. For example, 70 percent of individuals in Technicians (TRS) occupations are below 35 years of age and only 2.7 percent are older than 55. At the other extreme, more than 10 percent of Farming, Forestry and Fishing (FFF) and 15 percent of Private Household (PHO) are older than 55 years of age. The simple cross tabulations generally indicate that occupation groups partition the labor force into distinct demographic groups.

The educational differences across occupations are even more pronounced than the age structure, as we might expect. At least one-third of the individuals in the occupations Private Household (PHO), Farming, Forestry and Fishing (FFF), Machinists (MAI), and Handlers (HAN) have less than a high school education. The occupations Executives, Administrative, and Managerial (EAM), Professional Specialty (PSP), Technicians (TRS), and Sales (SAL) all contain large share of college graduates with the first three also having a high percentage of advanced degree holders. In Professional Specialty (PSP) almost three-quarters have at least a college degree and more than one-third have advanced degrees. There are also differences in the proportion foreign born, previous mover and head of household percentages across occupation groups shown in the table.

Given the demographic differences across occupations, the next step would be to test whether the differences in migration rates are significantly different after controlling for the demographic factors that also influence migration. In Goldstein and Sweeney (1998) several specifications of mover-stayer models using interstate and intermetropolitan migration data establish that the influence of occupations as a group is significant. The differences in migration propensity are demonstrated visually in Figure 1 that presents the model predicted probabilities of out-migration among various demographic sub-populations that are representative of each occupation. The full results of the mover-stayer model are available from the authors.

ADJUSTING STATE REPLACEMENT DEMAND FOR OUT-MIGRATION

Objective

In the previous section summary statistics and the mover-stayer model results were used to demonstrate the importance of occupational migration in state and sub-state labor markets, both in terms of the magnitude of flows and differential propensities across occupations. The results indicate that taking into account the effects of migration should improve the accuracy of the estimates of future job openings by occupation at the state and substate levels. In this section we develop a set of adjusted out-migration rates which can be used as starting points to adjust estimates of projected job openings.

The general task, given a regional occupation stock at time t, is to obtain estimates of the annual outflow of that occupational group over the period t to t+1. The outflow can take many forms, of which only one is out-migration. The stock at time t is also reduced by individuals changing occupations (mobility), leaving the labor force for any number of reasons, or dying. To construct occupational out-migration rates using Census data, we need to have additional information about occupational mobility, since Census data do not provide information about individuals occupation five years earlier (1985).   Table 3 contains occupational mobility tables (including moves into and out of the labor force) for interstate migrants and non-migrants. We would like to integrate the information from Table 3 on the mobility process with the Census data to estimate the number of individuals in a given occupation at time t who: (1) migrate over the period and do not change occupations; (2) migrate over the period and do change occupations; (3) do not migrate over the period but do change occupations; and (4) neither migrate nor change occupations.   In terms of the data requirements we need a contingency table which cross-classifies occupational migration and mobility.

We will call this cross-classification the *complete* data. Public Use Micro data (PUMs) from the 1990 Census and 1985-1990 Current Population Survey (CPS) data only provide part of the complete data, or *partial* tables. To remedy this problem and produce estimates of the complete data we use log-linear models to produce synthetic estimates of the complete data.

Synthetic Estimates of Occupational Migration and Mobility

As just stated, the synthetic estimates of the complete matrix of occupational mobility and migration are produced using log-linear models to statistically combine information from different data sources. The log-linear model method produces equivalent results to similar methods for updating or synthesizing data sets such as SPREE (structure preserving) estimates (Purcell and Kish 1979, Cassel et. al. 1987, Feeney 1987, Lundstrüm 1987), biproportional adjustment (Stone), and entropy maximization (Golan, Judge, and Miller 1997). The log-linear model approach was introduced by Willekens (1980, 1982, 1983) and has been used in several applications in addition to this research (for instance, Willekens and Ramachandran 1993). Extensions to the basic method can be found in Sweeney (1997, 1998a, 1998b). A brief explanation of the log-linear method follows.

Defining **M** as a 4-dimensional contingency table with dimensions for occupation in 1985 (O85), state of residence in 1985 (R85), occupation in 1990 (O90), and state of residence in 1990 (R90), data from the 1990 PUMs provide the partial table R85 x R90 x O90 and the Current Population Survey provides the partial tables R85 x O85 and O85 x O90. Log-linear modeling is used to combine information from these partial tables and generate predicted values for the complete data tables.

In the complete data case, log-linear models are used as tools for studying the patterns of statistical dependence in cross-classified categorical data. A log-linear model for a 2-dimensional contingency table classifying the categorical variables X and Y with cell counts n_{ij} can be expressed as,

$$\ln\ m_{ij} = mu + \lambda_i^X + \lambda_j^Y + \lambda_{ij}^{XY}, \qquad \textbf{(1)}$$

where ln m_{ij} is the log of the expected cell count, μ is an overall mean effect, λ_i^X and λ_j^Y are main effects, and λ_{ij}^{XY} is an interaction effect. The superscript designates the variables, while subscripts index the levels of the variable. Log-linear models for higher dimension tables include additional main effects and higher-order interactions terms (e.g. 3-way, 4-way,...,n-way). A log-linear model which includes all of the possible interactions terms is called *saturated* and the expected cell counts, m_{ij}, predicted by the model will equal observed cell counts, n_{ij}. If some interaction terms are left out of the log-linear model the predicted cell counts will be characterized by independence at that level of interaction.

The essential feature of the log-linear model for the analysis of incomplete data is that it can be used to reduce cross-classified data to a set of estimated parameter values, e.g. μ, λ_i^X and λ_j^Y. These model parameters can then be used to generate predicted values for the cell counts. With complete data the log-linear model is used to compare model predicted cell counts to actual cell counts and test hypotheses about the underlying data structure. In the incomplete data case, the log-linear model is used to generate predicted cell counts that match the marginal totals for the available partial tables but also embody certain model implied assumptions imposed by missing interaction terms and the inclusion of prior information in the estimation process. Prior information is included using a technique called the method of offsets which allows the missing interaction effects to be borrowed from a different (usually historical) data set. The auxiliary data set is called an *offset* or *distribution* matrix.

The specific incomplete data problem for our purposes involves the prediction of a complete 4-dimensional table of occupational mobility and migration from partial tables from the Census and CPS and a distribution matrix also constructed from the CPS. The log-linear model predicted complete data matrix will be referred to as *synthetic* data.

Construction and Use of Adjustment Factors

Given the complete synthetic estimates of the mobility and migration account, it is possible to create occupational out-migration rates adjusted for occupational mobility. We define the cells of the synthetic data matrix of occupational mobility and migration as n_{ijkl} where the subscripts index origin (i) and destination (j) regions and origin (k) and destination (l) occupations. The following flows and populations can then be defined as:

(1) The total population in occupation *k*, region *i* at time *t*,

$$p_{ik}^{t}=\sum_{j}\sum_{l} n_{ijkl}; \qquad \textbf{(2)}$$

(2) The out-migration flow from occupation *k*, region *i*, for individuals not changing occupations,

$$f_{ik,k=l}^{t,t+5}=\sum_{j} n_{ijkl} \;\; for \;\; i\neq j,\;\; k=l; \qquad \textbf{(3)}$$

(3) The out-migration flow from occupation *k*, region *i*, for individuals changing occupations,

$$f_{ik,k\neq l}^{t,t+5}=\sum_{j}\sum_{l} n_{ijkl} \;\; for \;\; i\neq j,\;\; k\neq l. \qquad \textbf{(4)}$$

Since the occupational employment population, p_{ik}^{t}, is the population at-risk of out-migration at time t, the out-migration rate in occupation *k*, region *i*, for individuals not changing occupations is,

$$r_{ik} = f_{ik,k=l}^{t,t+5} \;/\; p_{ik}^{t}. \qquad \textbf{(5)}$$

We isolate this rate, which captures only the portion of out-migration which does not include occupation changes, since the existing U.S. Bureau of Labor Statistics method already accounts for occupational mobility.[1]

Given the adjusted occupational out-migration rates, r_{ik}, the number of job openings in occupation *k* due to out-migration will simply be the result of multiplying the rate times the occupational employment stock at time *t* in region *i*,

$$O_{ik} = r_{ik} * E_{ik}^{t}. \qquad \textbf{(6)}$$

To create the adjusted out-migration rates, we also have to make decisions regarding the level of occupational disaggregation the sample data could support, and which occupational classification system to use. The 512 Census Occupation codes and the 1024 Occupational Employment Survey (OES) codes require more detailed estimates than the data are capable of producing reliably at the state level. Moreover, even if the disaggregate OES classifications could be supported by the sample size, the National Occupation Information Coordinating Committee (NOICC) crosswalk does not provide a clean match to the Census codes at that level.

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[1] The rate, r_{ik}, could be further refined to account for mortality using life table techniques but these adjustments are beyond the scope of this report.

The main sample size constraint is imposed by the occupational mobility data from the January 1987 Current Population Survey (CPS). To examine differential mobility rates for interstate migrants and non-interstate migrants, person records were matched between the January 1987 and March 1987 CPS. The resulting data set contained retrospective questions on both previous occupation and previous residence. Since only 2-3 percent of the population are interstate migrants during any given year the occupation mobility matrix for migrants does not contain a sufficiently large sample to support detailed occupational disaggregation. We decided, therefore, to produce the rates at the 13 major Census occupation group level.[2]

We also provide a means for *roughly* gauging the effect of out-migration at the detailed OES level. This further disaggregation of the 13 occupations is accomplished with the aggregation adjustment factors in Table 6. The factors represent the average percent deviation between the unadjusted detailed OES migration and mobility rates from the associated 13 unadjusted migration and mobility rates. This conversion to detailed rates is based on the idea that the aggregation bias present in the adjusted rates can be approximated by the average of the two unadjusted rates.

The conversion from Census to OES occupation codes also requires using the 512 Census categories as proxies for the more disaggregate OES categories based on the NOICC crosswalk. In general, the final estimate of job openings due to out-migration resulting from this estimation process should be used as a preliminary and “rough” indicator of the true level. Based on these preliminary estimates the analysts should check each for reasonableness and adjust the estimates

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[2] To use the 13 rates we provide with the OES survey data the occupational employment data needs to be converted to Census classifications then aggregated up to the major group level. In fact, only 12 of the 13 rates become applicable since Private Household Occupations (PHO) have no equivalents in the OES survey.

based on current migration trends and prevailing or projected economic conditions in the particular state or sub-state area. The detailed OES adjustment factors, especially, should be used with extreme care because of the following potential problems and sources of estimation error:

(1) The rates are based on small population estimates and are therefore subject to large standard errors.[3]

(2) Out-migration can be job search related, but may also represent jobs moving with people or job dissolutions. An unknown proportion of the total occupational out-migration from a state does not, therefore, indicate new job openings. Because of this uncertainty the estimated job openings from out-migration should be treated as an *upper limit* of the actual job openings.

(3) Several assumptions are made to generate the rates including underlying assumptions of the incomplete data estimation, aggregation bias factor adjustments, and matching Census occupations and OES occupation with the NOICC crosswalk. The estimated rates need to be viewed with a healthy skepticism; that is, the estimates do contain useful information but do not represent the level of accuracy of the OES survey-based occupational employment levels.

(4) Migration fluctuates and the 1990 Census based rates from retrospective questions for the 1985-90 period may not hold in the projection period. Analysts should use annual Census Bureau projections of aggregate interstate migration to adjust the occupational out-

[3] Future tables will be produced with estimated standard errors and interval estimates for the rates rather than point estimates.

migration rates.

Example: Adjusting Projected Ohio Estimates of Future Job Openings for Out-migration

In Table 4 are adjusted 1-year out-migration rates for a sample of states: New York, North Carolina, Ohio, and Texas.[4] In this section we use the adjusted out-migration rates for Ohio to develop a set of aggregate and disaggregate estimates of projected job openings due to out-migration.

As discussed in the previous section, the appropriate rates to use to avoid double-counting of occupational mobility are the adjusted out-migration rates with no occupational mobility (the 3rd column under each state in Table 4). Columns 1-6 and 9 are based on data from the Ohio Bureau of Employment Services. The only change we made was to aggregate OES occupations up to the major Census occupation categories. To find the projected level of annual openings due to out-migration, one multiplies the base year employment level for a given occupation by the associated adjusted occupational out-migration rate. In Table 5, for instance, the annual out-migration rate for executives, administrative, and managerial (EAM) in Ohio of 0.021 (column 7) is multiplied by the 1991 base employment for EAM of 563,640 (column 1) to get 12,003 openings due to out-migration (column 8). Accounting for out-migration the total openings increase from 16,779 (row EAM, column 9) to 28,782 (row EAM, column 10). In column 11 of Table 5, we provide a measure of the increase in projected annual opening when the effects of out-migration are included. Overall out-migration increases job openings from between 7 percent for protective services (PSE) to 80 percent for professional specialty (PSP) occupations.

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[4] Complete data for other states can be generated if there is sufficient interest

To create a set of projected job openings due to out-migration for detailed OES occupations these same calculations are repeated using detailed Census occupation rates as proxies for OES classifications. The detailed Census occupation rates are derived from the 13 rates in Table 5 using the aggregation bias adjustment factors found in Table 6. The adjustment factors were created by dividing the detailed census rate by the major census category rate. Since the NOICC crosswalk matches more than one Census occupation to each OES occupation, the final OES adjusted out-migration rates are the average over the detailed census categories associated with each OES category.

The final detailed OES calculations can be found in Table 7. The data in columns 1-6 and column 9 were produced by the Ohio Bureau of Employment Services using current projection methods that do not take into account migration. We then multiply base employment levels in each detailed OES occupation by the rates in column 7 to obtain openings due to out-migration in column 8. The range of variation for the increase in projected openings as a result of adjusting for out-migration (column 11) is from no change (no out-migration for the occupation) to a 350 percent increase in openings. On average the number of openings for the detailed OES occupations increases 50 percent after accounting for out-migration; approximately two-thirds of the occupations have additional openings less than or equal to the unadjusted estimate of openings.

Based on these initial estimates of job openings the analyst should check for reasonableness of estimates and the need for any other adjustments. For example, the likely unrealistic 350 percent increase in job openings noted above indicates that some of the estimated levels should be adjusted downwards or suppressed. A first pass through the data should identify any unrealistically large increases due to out-migration. This could be done by either suppressing, or replacing with proxy occupations, the adjusted openings due to out-migration for occupations whose percent increases are above some designated threshold value. If the state labor market is projected to be in a contraction phase over the projection period then out-migration rates probably should be revised upwards. In border states such as California or Texas additional adjustments may be necessary to account for the relatively large share of immigrants and foreign-born in their labor markets.

CONCLUDING REMARKS

This paper provides a novel application of log-linear models to predict missing values from partial contingency tables to the problem of forecasting regional job openings by occupation. As a practical development planning problem, the modeling strategy demonstrated here allows regional analysts to include the effects of labor force out-migration to be included along with other components of future job openings, i.e., due to economic growth, occupational mobility, and other replacement needs such as death and retirement, in the context of the federal and state data sources in the United States. Our results indicate that including labor force migration does indeed "paint" a quite different picture of estimates of future regional job openings by occupation than we otherwise have, at least in the U.S. Knowing that the incidence of internal labor force migration in the U.S. tends to exceed that in most countries of Europe, a similar methodological application in the context of the EC might not be as practically significant. Nevertheless, a cross-national comparison of the relative contribution of out-migration to job openings by occupation would be interestimng.

Although we believe the procedures reported here produce valid and useful estimates, they represent only a ‘first step’ towards integrating the effects of out-migration into occupational employment projections. Extensions to this research are currently underway to: (1) evaluate the reliability of the adjusted out-migration rates by estimating “quasi” confidence intervals; (2) estimate adjusted out-migration rates for a larger sample of states and analyze the relative importance of in- and out-migration to generating new job openings in different regional economic conditions; (3) develop algorithms and standard protocol for the review and refinement of the adjusted out-migration rates, and (4) develop methods to update the synthetic estimates on an annual basis.

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Table 1: Total 5-year Migration and Immigration Rates for Metropolitan Areas and States

Demographic Measure		Metro. Areas Migration	Metro. Areas Immigration	Metro. Areas Total	States Migration	States Immigration	States Total
Major Occupation	EAM	0.14	0.03	0.17	0.13	0.01	0.14
	PSP	0.16	0.04	0.19	0.15	0.02	0.16
	TRS	0.15	0.04	0.19	0.15	0.02	0.17
	SAL	0.13	0.03	0.17	0.12	0.02	0.13
	ASC	0.11	0.03	0.13	0.10	0.01	0.11
	PHO	0.23	0.18	0.41	0.15	0.08	0.22
	PSE	0.10	0.03	0.13	0.10	0.01	0.11
	SXX	0.15	0.08	0.22	0.12	0.03	0.15
	FFF	0.14	0.09	0.22	0.09	0.03	0.12
	PCR	0.10	0.04	0.14	0.09	0.02	0.11
	MAI	0.12	0.08	0.20	0.08	0.03	0.11
	TMM	0.09	0.03	0.12	0.08	0.01	0.09
	HAN	0.13	0.07	0.20	0.10	0.03	0.13
Sex	Male	0.14	0.05	0.19	0.12	0.02	0.14
	Female	0.12	0.04	0.16	0.11	0.02	0.13
Region	Northeast	0.10	0.04	0.14	0.10	0.02	0.12
	Midwest	0.08	0.02	0.10	0.08	0.01	0.09
	South	0.16	0.04	0.19	0.13	0.02	0.14
	West	0.18	0.07	0.24	0.14	0.03	0.17
Education	Less	0.13	0.08	0.21	0.09	0.03	0.13
	HS	0.09	0.03	0.12	0.08	0.01	0.09
	Some	0.12	0.03	0.15	0.12	0.01	0.13
	Bach	0.18	0.04	0.21	0.17	0.02	0.19
	Adv.	0.19	0.05	0.24	0.17	0.03	0.19
Age	15-19	0.14	0.06	0.20	0.12	0.03	0.14
	20-24	0.18	0.07	0.25	0.16	0.03	0.20
	25-29	0.17	0.06	0.23	0.18	0.03	0.22
	30-34	0.14	0.04	0.19	0.14	0.02	0.16
	35-39	0.12	0.04	0.16	0.11	0.02	0.13
	40-44	0.11	0.03	0.14	0.09	0.01	0.11
	45-49	0.09	0.03	0.12	0.07	0.01	0.09
	50-54	0.08	0.03	0.10	0.06	0.01	0.07
	55-59	0.06	0.02	0.09	0.05	0.01	0.05
	60-64	0.06	0.02	0.07	0.04	0.01	0.05
	65+	0.05	0.01	0.06	0.03	0.00	0.04

Source: Tabulations based on U.S. Bureau of Census. 1992. *Census of Population and Housing, 1990: Public Use Microdata Samples* 5 Percent "A" Sample Reissue, All State Data Files. Washington, DC.

Note: Census major occupation category abbreviations used in this report are: EAM=Executives, Administrative, and Managerial; PSP=Professional Specialty; TRS=Technicians, and Related Support; SAL=Sales; ASC=Admin. Support, excluding Clerical; PHO=Private Household; PSE=Protective Services; SXX=Other Services; FFF=Farming,Forestry, and Fishing; PCR=Precision Production, Craft, and Repair; MAI=Machinist, Assemblers, and Inspectors; TMM=Transportation and Material Moving; HAN=Handlers.

Table 2: Demographic Profile by Major Occupation and Industry

Variable:		Major Occupation												
		EAM	PSP	TRS	SAL	ASC	PHO	PSE	SXX	FFF	PCR	MAI	TMM	HAN
Male		57.2	47.9	55.3	56.5	23.1	5.8	84.2	37.5	82.9	90.7	63.4	89.5	80.3
Age	*16-24*	21.3	20.7	31.5	27.5	31.2	22.1	27.6	32.1	31.1	27.4	27.1	25.7	37.2
	25-34	35.0	37.1	38.1	31.7	30.6	26.9	33.4	29.9	30.4	35.5	33.1	33.1	31.5
	35-44	26.1	25.4	19.6	21.6	20.9	19.0	21.6	18.7	16.3	20.6	21.0	21.5	16.7
	45-54	12.3	11.5	8.2	11.8	11.4	16.4	10.2	11.8	11.7	11.6	13.0	13.3	9.7
	55+	5.3	5.3	2.7	7.4	5.9	15.6	7.2	7.6	10.6	4.8	5.8	6.4	5.0
Educ.	*Less HS*	4.2	1.3	3.9	9.1	7.2	47.2	9.3	28.9	37.1	22.5	36.0	28.4	33.7
	High School	15.8	5.5	15.2	25.6	36.0	28.8	26.8	35.4	31.7	39.5	38.9	42.2	39.3
	Some College	31.8	19.9	45.9	35.0	42.5	18.7	46.1	28.1	22.0	31.4	20.7	24.4	22.5
	College	33.6	36.6	26.0	25.1	12.0	4.4	14.8	6.0	7.6	5.4	3.6	4.1	3.8
	Adv.Degree	14.7	36.6	9.0	5.2	2.3	1.0	3.0	1.6	1.7	1.3	0.8	0.9	0.8
F. Born		10.2	10.9	12.9	11.5	10.5	41.8	7.1	21.6	23.1	15.9	27.2	12.8	20.0
P.Mover		42.6	43.7	37.9	37.8	33.4	24.1	32.3	29.2	23.3	28.7	23.2	29.6	25.0
H.Household		64.6	57.5	58.6	57.7	40.5	36.0	72.2	43.2	59.1	72.5	56.9	69.5	54.5

Source: See Table 1.

Table 3: 1986-87 Occupational Mobility by Interstate Migrant Status (1987->1986)

Mig. Status		Occ.	1986													
			EAM	PSP	TRS	SAL	ASC	PHO	PSE	SXX	FFF	PCR	MAI	TMM	HAN	NLF
Same State		EAM	**0.926**	0.009	0.002	0.011	0.010	0.000	0.001	0.007	0.000	0.002	0.003	0.003	0.000	0.025
		PSP	0.004	**0.926**	0.001	0.003	0.010	0.000	0.000	0.003	0.001	0.004	0.001	0.000	0.001	0.046
		TRS	0.004	0.012	**0.892**	0.009	0.019	0.000	0.003	0.009	0.000	0.004	0.000	0.004	0.003	0.041
		SAL	0.013	0.007	0.001	**0.820**	0.020	0.001	0.000	0.011	0.003	0.005	0.004	0.002	0.005	0.110
		ASC	0.009	0.007	0.002	0.020	**0.861**	0.000	0.001	0.015	0.000	0.004	0.001	0.003	0.003	0.074
		PHO	0.001	0.003	0.000	0.009	0.002	**0.775**	0.000	0.011	0.000	0.000	0.006	0.000	0.000	0.193
	1987	PSE	0.002	0.008	0.002	0.016	0.006	0.000	**0.876**	0.012	0.000	0.005	0.001	0.007	0.002	0.063
		SXX	0.004	0.003	0.002	0.012	0.012	0.001	0.000	**0.770**	0.002	0.004	0.005	0.003	0.005	0.177
		FFF	0.002	0.001	0.000	0.008	0.007	0.000	0.001	0.006	**0.893**	0.019	0.007	0.003	0.003	0.050
		PCR	0.005	0.002	0.002	0.008	0.008	0.001	0.000	0.015	0.003	**0.852**	0.025	0.005	0.013	0.063
		MAI	0.001	0.005	0.004	0.020	0.006	0.000	0.003	0.012	0.007	0.015	**0.834**	0.004	0.012	0.078
		TMM	0.000	0.002	0.000	0.009	0.013	0.000	0.005	0.023	0.005	0.023	0.019	**0.710**	0.031	0.161
		HAN	0.000	0.000	0.001	0.002	0.003	0.000	0.003	0.002	0.008	0.005	0.002	0.002	**0.911**	0.062
		NLF	0.005	0.004	0.001	0.007	0.009	0.002	0.000	0.008	0.006	0.005	0.002	0.003	0.004	**0.942**
Diff. State		EAM	**0.687**	0.054	0.010	0.028	0.028	0.000	0.000	0.048	0.000	0.029	0.000	0.000	0.000	0.117
		PSP	0.018	**0.751**	0.020	0.000	0.016	0.000	0.000	0.019	0.000	0.017	0.000	0.012	0.000	0.147
		TRS	0.074	0.067	**0.551**	0.095	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.200
		SAL	0.026	0.043	0.000	**0.565**	0.056	0.000	0.000	0.059	0.027	0.006	0.023	0.015	0.000	0.181
		ASC	0.040	0.003	0.000	0.061	**0.638**	0.000	0.000	0.046	0.000	0.012	0.000	0.007	0.000	0.193
		PHO	0.000	0.000	0.000	0.000	0.000	**0.705**	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.270
	1987	PSE	0.000	0.000	0.000	0.156	0.000	0.000	**0.417**	0.000	0.029	0.081	0.070	0.000	0.000	0.246
		SXX	0.047	0.007	0.000	0.024	0.035	0.000	0.013	**0.535**	0.000	0.056	0.000	0.000	0.000	0.283
		FFF	0.018	0.033	0.000	0.010	0.000	0.000	0.015	0.027	**0.624**	0.080	0.000	0.034	0.000	0.159
		PCR	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.050	**0.778**	0.057	0.000	0.000	0.091
		MAI	0.000	0.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	**0.567**	0.000	0.000	0.209
		TMM	0.000	0.000	0.012	0.114	0.000	0.000	0.000	0.067	0.000	0.157	0.073	**0.241**	0.027	0.306
		HAN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.322	0.114	0.000	0.000	**0.469**	0.095
		NLF	0.002	0.027	0.002	0.003	0.004	0.007	0.000	0.009	0.004	0.011	0.000	0.005	0.011	**0.914**

Note: These mobility tables look backwards in time. The cells are interpreted across a row as the probability that an individual in row occupation i at time t+1 was in columan occupation j at time t. Cells on the diagonal (in bold) are the percent of individuals that did not change occupations during the period.

Source: Tabulations based on U.S. Bureau of Census. 1988. January 1987 *Occupational Mobility* Current Population Survey.

Table 4: One-year and Five-year Out-migration rates by Major Census Occupation, Unadjusted and Adjusted

	Major Occ.	New York Out-migration Rates				North Carolina Out-migration Rates				Ohio Out-migration Rates				Texas Out-migration Rates			
		Unadj.	Adjusted			Unadj.	Adjusted			Unadj.	Adjusted			Unadj.	Adjusted		
			total	no mob.	mob.		total	no mob.	mob.		total	no mob.	mob.		total	no mob.	mob.
One-Year	EAM	0.023	0.032	0.028	0.004	0.017	0.023	0.020	0.003	0.018	0.024	0.021	0.003	0.018	0.025	0.022	0.003
	PSP	0.029	0.038	0.033	0.005	0.024	0.031	0.027	0.004	0.026	0.033	0.029	0.004	0.024	0.030	0.026	0.004
	TRS	0.016	0.024	0.019	0.005	0.011	0.017	0.013	0.003	0.010	0.016	0.012	0.004	0.010	0.015	0.012	0.003
	SAL	0.032	0.041	0.031	0.010	0.022	0.028	0.021	0.007	0.023	0.030	0.023	0.007	0.023	0.029	0.022	0.007
	ASC	0.029	0.034	0.027	0.006	0.023	0.026	0.021	0.005	0.021	0.024	0.019	0.005	0.022	0.025	0.020	0.005
	PHO	0.044	0.033	0.012	0.021	0.030	0.022	0.009	0.013	0.040	0.027	0.010	0.017	0.021	0.018	0.008	0.010
	PSE	0.003	0.005	0.004	0.001	0.004	0.007	0.006	0.001	0.002	0.004	0.003	0.001	0.003	0.005	0.003	0.002
	SXX	0.031	0.040	0.024	0.016	0.022	0.028	0.017	0.011	0.020	0.025	0.015	0.010	0.023	0.029	0.018	0.011
	FFF	0.077	0.055	0.017	0.038	0.035	0.030	0.010	0.020	0.048	0.037	0.013	0.025	0.043	0.038	0.018	0.021
	PCR	0.053	0.044	0.017	0.028	0.031	0.028	0.013	0.016	0.033	0.029	0.012	0.018	0.038	0.035	0.017	0.018
	MAI	0.021	0.021	0.011	0.009	0.009	0.010	0.006	0.004	0.011	0.011	0.007	0.005	0.018	0.018	0.011	0.008
	TMM	0.031	0.030	0.008	0.022	0.020	0.021	0.008	0.013	0.019	0.020	0.007	0.014	0.020	0.022	0.008	0.014
	HAN	0.012	0.011	0.008	0.004	0.007	0.007	0.006	0.002	0.006	0.006	0.005	0.002	0.009	0.009	0.007	0.002
	NLF	0.096	0.056	0.023	0.033	0.080	0.042	0.014	0.028	0.067	0.039	0.015	0.024	0.077	0.042	0.014	0.028
Five-Year	EAM	0.113	0.159	0.139	0.020	0.086	0.117	0.101	0.016	0.089	0.122	0.106	0.015	0.090	0.124	0.108	0.015
	PSP	0.146	0.191	0.167	0.025	0.121	0.155	0.134	0.021	0.128	0.165	0.144	0.021	0.119	0.151	0.129	0.022
	TRS	0.079	0.122	0.096	0.026	0.056	0.084	0.067	0.017	0.052	0.078	0.060	0.018	0.051	0.077	0.060	0.016
	SAL	0.161	0.205	0.153	0.052	0.111	0.141	0.107	0.034	0.117	0.150	0.117	0.033	0.113	0.144	0.110	0.034
	ASC	0.145	0.169	0.137	0.032	0.115	0.131	0.106	0.026	0.104	0.119	0.094	0.025	0.109	0.125	0.100	0.025
	PHO	0.218	0.167	0.060	0.106	0.148	0.112	0.045	0.067	0.200	0.135	0.050	0.084	0.104	0.090	0.040	0.049
	PSE	0.014	0.026	0.020	0.006	0.020	0.037	0.031	0.007	0.012	0.022	0.015	0.006	0.014	0.025	0.017	0.008
	SXX	0.157	0.198	0.118	0.079	0.112	0.141	0.084	0.057	0.100	0.127	0.075	0.052	0.114	0.146	0.092	0.054
	FFF	0.383	0.273	0.085	0.188	0.173	0.149	0.049	0.100	0.239	0.187	0.064	0.123	0.215	0.192	0.088	0.104
	PCR	0.264	0.222	0.084	0.138	0.154	0.142	0.065	0.078	0.164	0.147	0.059	0.088	0.191	0.175	0.085	0.089
	MAI	0.104	0.104	0.057	0.046	0.044	0.048	0.031	0.018	0.053	0.056	0.033	0.023	0.091	0.091	0.053	0.038
	TMM	0.153	0.151	0.041	0.110	0.098	0.105	0.042	0.064	0.097	0.102	0.033	0.069	0.102	0.108	0.040	0.068
	HAN	0.058	0.057	0.039	0.018	0.036	0.036	0.029	0.008	0.032	0.032	0.024	0.008	0.043	0.044	0.035	0.009
	NLF	0.482	0.279	0.115	0.164	0.399	0.208	0.071	0.138	0.336	0.196	0.075	0.121	0.387	0.208	0.070	0.138

Note: Unadjusted out-migration rates are constructetd by dividing the number of out-migrants from a state i with occupation l in 1990 by the population in state i with occupation l in 1990. The adjusted out-migration rates divide the number of out-migrants from state i with occupation k in 1985 by the population in state i with occupation k in 1985. The adjusted rates are the correct demographic rates since the flows are divided by the relevant population at risk. The adjusted rates are partitioned into the total out-migration rate, the rate for individuals that migrate but do not change occupations (no mob.) and the rate for individuals that migrate and do change occupations (mob.). The one-year rates are 1/5 of the five year rates.

Source: Rates based hybrid data using U.S. Bureau of Census. 1992. Census of Population and Housing, 1990: Public Use Microdata Samples. 5 Percent "A" Sample Reissue, All State Data Files. Washington, DC., and January 1987 Occupational Mobility Current Population Survey.

Table 5: Adjusted Ohio Occupational Employment Projections for Major Census Occupation Groups

	Column Number										
	1	2	3	4	5	6	7	8	9	10	11
Major	Employment			Annual	Annual Job Openings From…				Total Openings		
Occ.	1991	Projected 2000	Change 1991-2000	Rate of Change	Growth (G)	Replace (R)	Out-migration rate	Out-migration flow (O)	G+R	G+R+O	Percent Increase
EAM	563,640	639,450	75,810	1.495	8,424	8,336	0.021	12,003	16,779	28,782	1.72
PSP	693,640	800,430	106,790	1.710	11,864	12,649	0.029	19,919	24,546	44,465	1.81
TRS	169,110	199,980	30,870	2.030	3,433	3,167	0.012	2,024	6,608	8,632	1.31
SAL	616,050	693,130	77,080	1.390	8,564	17,864	0.023	14,374	26,445	40,819	1.54
ASC	819,380	877,450	62,270	0.788	6,454	16,474	0.019	15,339	23,659	38,998	1.65
PHO	**	**	**	**	**	**	**		**	**	**
PSE	87,790	98,410	10,620	1.342	1,178	2,523	0.003	265	3,713	3,978	1.07
SXX	717,630	825,420	107,790	1.669	11,978	21,700	0.015	10,702	33,678	44,380	1.32
FFF	23,550	24,290	740	0.348	82	620	0.013	304	747	1,051	1.41
PCR	474,520	517,230	44,020	1.001	4,750	10,854	0.012	5,613	16,193	21,806	1.35
MAI	470,870	459,390	6,720	-0.271	-1,276	10,098	0.007	3,148	11,577	14,725	1.27
TMM	215,820	242,210	26,390	1.358	2,931	3,743	0.007	1,419	6,730	8,149	1.21
HAN	228,090	242,870	14,780	0.720	1,643	4,357	0.005	1,090	6,002	7,092	1.18

Note: Columns 1-6 and 9 are from the Ohio Employment Security Commision 1991-2000 Occupational Employment Projections. Column 7 is from Table 6 and column 8 is found by multiplying the rate in column 7 by the base year employment in column 1.

Table 6: Aggregation Bias Adjustment Factors

Occ. Code		New York			North Carolina			Ohio			Texas		
		Out-mig. Rate		Adj.	Out-mig. Rate		Adj.	Out-mig. Rate		Adj.	Out-mig. Rate		Adj.
Det.	Maj.	Detail	Major	Factor	Detail	Major	Factor	Detail	Major	Factor	Detail	Major	Factor
003	1	0.300	0.283	1.061	0.563	0.232	2.423	0.787	0.235	3.351	0.194	0.233	0.831
004	1	0.131	0.283	0.465	0.272	0.232	1.172	0.075	0.235	0.321	0.040	0.233	0.171
005	1	0.264	0.283	0.934	0.225	0.232	0.971	0.174	0.235	0.741	0.255	0.233	1.094
006	1	0.231	0.283	0.817	0.077	0.232	0.333	0.178	0.235	0.759	0.069	0.233	0.297
007	1	0.270	0.283	0.956	0.215	0.232	0.925	0.203	0.235	0.864	0.235	0.233	1.011
008	1	0.256	0.283	0.907	0.253	0.232	1.091	0.207	0.235	0.882	0.213	0.233	0.913
009	1	0.272	0.283	0.964	0.276	0.232	1.190	0.329	0.235	1.402	0.269	0.233	1.154
013	1	0.369	0.283	1.305	0.345	0.232	1.488	0.362	0.235	1.542	0.349	0.233	1.500
014	1	0.276	0.283	0.975	0.230	0.232	0.989	0.214	0.235	0.910	0.183	0.233	0.785
015	1	0.241	0.283	0.852	0.160	0.232	0.691	0.207	0.235	0.883	0.214	0.233	0.920
016	1	0.240	0.283	0.849	0.126	0.232	0.542	0.052	0.235	0.222	0.320	0.233	1.372
017	1	0.312	0.283	1.103	0.227	0.232	0.977	0.204	0.235	0.870	0.228	0.233	0.980
018	1	0.241	0.283	0.853	0.205	0.232	0.883	0.239	0.235	1.016	0.207	0.233	0.888
019	1	0.202	0.283	0.715	0.108	0.232	0.464	0.143	0.235	0.607	0.093	0.233	0.398
021	1	0.265	0.283	0.938	0.247	0.232	1.066	0.252	0.235	1.073	0.253	0.233	1.085
022	1	0.285	0.283	1.007	0.226	0.232	0.973	0.246	0.235	1.046	0.239	0.233	1.025
023	1	0.263	0.283	0.931	0.237	0.232	1.022	0.218	0.235	0.927	0.207	0.233	0.888
024	1	0.221	0.283	0.783	0.179	0.232	0.769	0.189	0.235	0.805	0.235	0.233	1.009
025	1	0.296	0.283	1.045	0.222	0.232	0.955	0.208	0.235	0.884	0.216	0.233	0.927
026	1	0.381	0.283	1.347	0.330	0.232	1.421	0.326	0.235	1.386	0.312	0.233	1.340
027	1	0.264	0.283	0.934	0.255	0.232	1.100	0.259	0.235	1.103	0.264	0.233	1.132
028	1	0.216	0.283	0.763	0.000	0.232	0.000	0.290	0.235	1.235	0.108	0.233	0.465
029	1	0.301	0.283	1.065	0.189	0.232	0.816	0.195	0.235	0.831	0.212	0.233	0.910
033	1	0.220	0.283	0.778	0.185	0.232	0.797	0.214	0.235	0.913	0.172	0.233	0.740
034	1	0.398	0.283	1.409	0.109	0.232	0.471	0.297	0.235	1.264	0.181	0.233	0.777
035	1	0.294	0.283	1.038	0.181	0.232	0.780	0.120	0.235	0.512	0.242	0.233	1.038
036	1	0.249	0.283	0.882	0.251	0.232	1.081	0.136	0.235	0.581	0.193	0.233	0.830
037	1	0.257	0.283	0.909	0.240	0.232	1.032	0.238	0.235	1.015	0.220	0.233	0.946
043	2	0.300	0.286	1.051	0.312	0.255	1.222	0.254	0.259	0.983	0.501	0.237	2.110
044	2	0.502	0.286	1.759	0.784	0.255	3.069	0.442	0.259	1.709	0.242	0.237	1.019
045	2	0.488	0.286	1.709	0.224	0.255	0.878	0.479	0.259	1.853	0.375	0.237	1.581
046	2	0.500	0.286	1.751	0.434	0.255	1.699	0.288	0.259	1.113	0.483	0.237	2.035
047	2	***	0.286	***	1.000	0.255	3.916	0.520	0.259	2.012	0.263	0.237	1.109
048	2	0.293	0.286	1.027	0.503	0.255	1.970	0.458	0.259	1.772	0.288	0.237	1.215
049	2	0.423	0.286	1.481	0.655	0.255	2.566	0.676	0.259	2.612	0.301	0.237	1.270
053	2	0.280	0.286	0.980	0.301	0.255	1.180	0.316	0.259	1.220	0.348	0.237	1.466
054	2	***	0.286	***	0.000	0.255	0.000	1.000	0.259	3.866	0.521	0.237	2.197
055	2	0.373	0.286	1.306	0.308	0.255	1.206	0.358	0.259	1.384	0.277	0.237	1.166
056	2	0.353	0.286	1.234	0.228	0.255	0.892	0.313	0.259	1.208	0.254	0.237	1.071
057	2	0.312	0.286	1.091	0.297	0.255	1.162	0.326	0.259	1.260	0.299	0.237	1.260
058	2	0.497	0.286	1.739	0.000	0.255	0.000	0.847	0.259	3.274	0.231	0.237	0.973

Table 7: Adjusted Ohio Occupational Employment Projections for Detailed OES Occupations

			Column										
			1	2	3	4	5	6	7	8	9	10	11
Occ. Code		OES Title	Employment			Annual	Annual Job Openings From…				Total Openings		
Census	OES		1991	Projected 2000	Change 1991-2000	Rate of Change	Growth (G)	Replace (R)	Out-migration rate	Out-migration flow (O)	G+R	G+R+O	Percent Increase
1	13002	Financial Managers	31,280	35,910	4,630	1.6	514	428	0.020	620	942	1,562	1.659
1	13005	Personnel, Training, Labo	9,290	10,810	1,520	1.8	169	208	0.019	180	377	557	1.477
1	13008	Purchasing Managers	10,420	11,440	1,020	1.1	113	194	0.030	311	307	618	2.014
1	13011	Marketing, Adv., Public R	20,960	26,150	5,190	2.8	577	404	0.026	545	981	1,526	1.555
2	13017	Engineering, Math., Nat.	13,330	15,800	2,470	2.1	274	192	0.036	486	466	952	2.044
1	15002	Postmasters, Mail Superin	1,230	1,340	110	1.0	12	19	0.005	6	31	37	1.188
1	15005	Education Administrators	18,380	20,090	1,710	1.0	190	359	0.019	356	549	905	1.649
1	15008	Medicine and Health Servi	8,380	10,000	1,620	2.1	180	91	0.019	158	271	429	1.581
1	15011	Property and Real Estate	5,880	7,090	1,210	2.3	134	76	0.022	127	210	337	1.606
1	15014	Industrial Production Man	12,670	14,530	1,860	1.6	207	182	0.016	205	389	594	1.527
1	15023	Communication, Transp., U	6,150	7,240	1,090	2.0	121	89	0.028	172	210	382	1.818
1	15026	Food Service and Lodging	29,010	33,210	4,200	1.6	467	417	0.019	538	884	1,422	1.608
1	19002	Government Chief Exec. an	4,610	4,440	-170	-0.4	-19	97	0.007	32	97	129	1.325
1	19005	General Managers and Top	127,970	141,060	13,090	1.1	1,454	1,842	0.018	2,313	3,296	5,609	1.702
1	19999	All Other Managers and Ad	70,770	81,660	10,890	1.7	1,210	1,019	0.020	1,419	2,229	3,648	1.637
1	21102	Underwriters	3,910	4,360	450	1.3	50	67	0.017	67	117	184	1.573
1	21105	Credit Analysts	1,010	1,150	140	1.5	16	13	0.019	19	29	48	1.656
1	21108	Loan Officers and Couns	6,160	7,150	990	1.8	110	80	0.019	116	190	306	1.611
5	21111	Tax Preparers	1,970	2,450	480	2.7	53	25	0.016	32	78	110	1.415
1	21114	Accountants and Auditor	39,680	46,700	7,020	2.0	780	580	0.020	784	1,360	2,144	1.576
1	21117	Budget Analysts	1,810	1,990	180	1.1	20	23	0.019	34	43	77	1.793
1	21199	All Other Financial Spe	8,700	9,610	910	1.2	101	113	0.019	164	214	378	1.766
1	21302	Wholesale, Retail Buyer	7,430	8,230	800	1.2	89	140	0.018	132	229	361	1.574
1	21305	Purchasing Agents and B	1,010	1,070	60	0.7	7	17	0.023	23	24	47	1.963
1	21308	Purchasing Agent, Ex. W	10,470	11,710	1,240	1.3	138	174	0.019	204	312	516	1.652
1	21502	Claims Takers, Unemploy	190	200	10	0.6	1	4	0.023	4	5	9	1.893
1	21505	Special Agents, Insuran	1,150	1,280	130	1.3	14	19	0.023	27	33	60	1.818
1	21508	Employment Interviewers	3,610	4,280	670	2.1	74	60	0.023	85	134	219	1.633
2	21511	Personnel, Training, La	13,910	16,290	2,380	1.9	264	229	0.031	437	493	930	1.886
1	21902	Cost Estimators	7,650	8,900	1,250	1.8	139	86	0.022	165	225	390	1.735
1	21905	Management Analysts	3,850	4,710	860	2.5	96	38	0.025	97	134	231	1.722
1	21908	Construction, Building	3,760	4,030	270	0.8	30	89	0.011	41	119	160	1.345
1	21911	Compliance and Enforcem	7,000	7,910	910	1.4	101	103	0.014	98	204	302	1.483
1	21914	Tax Examiner, Collector	2,170	2,190	20	0.1	2	32	0.012	27	34	61	1.789
1	21921	Claims Examiners, Insur	1,250	1,460	210	1.9	23	10	0.012	15	33	48	1.468
1	21999	All Other Management Su	14,430	15,490	1,060	0.8	118	161	0.019	271	279	550	1.972

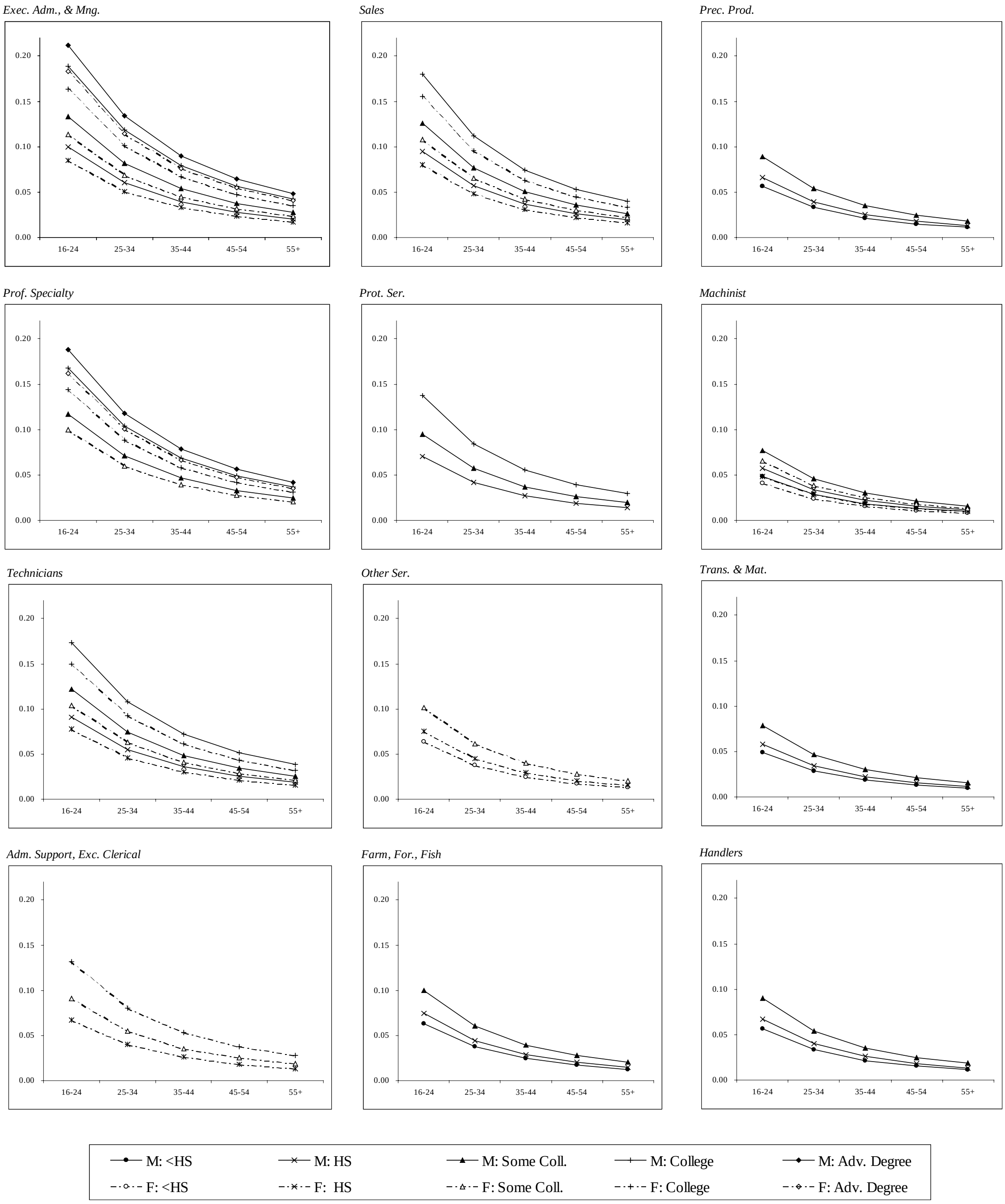

Figure 1: Model Predicted Probabilities of Out-migration by Major Occupation Group