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Urban Migration of Persons Employed in Two-Digit Industries: A Regional Analysis Using the 10-Percent Continuous Work History Sample

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Urban Migration of Persons Employed in Two-Digit Industries: A Regional Analysis Using the 10-Percent Continuous Work History Sample

by

Morris M. Kleiner

Introduction

Several studies have examined urban migration, employment change, unemployment, and wage change of persons by age, race, and sex (Greenwood, 1969; 1975; and DeVanzo, 1977). However, there has been a lack of studies devoted to analyzing and testing the major components of labor market change by the industries that employ these persons. Because the industry composition of a metropolitan workforce has a significant influence on the economic growth of an area, a study that analyzes the factors that influence the migration of persons employed in detailed industry groups would enhance our knowledge of the functioning of labor markets. Moreover, the impact that migrants have on employment changes and wage changes of persons employed in these industries would also appear to justify further study.

In addition, with the change in manpower programming from the national to the local level, there has been an increase in the demand for more demographic information for metropolitan areas. This change in policy has, in turn, given rise to two more reasons for a study such as is proposed here. First, this change has resulted in federal revenue allocation decisions being made, in part, on the composition of the urban population (Kleiner and McWilliams, 1977). Second, decisions on the federal allocation of funds across geographic areas must, in part, be based on their impact on the migration of persons employed in certain key industries, their detailed employment effects, and their wage effects (U.S. Government DMP-4, 1977).

It has been argued that "migration models should be tested using homogeneous groups of migrants together with comparable data" (Hart, 1975). Moreover, given the need outlined above for more highly detailed migration models, one which has a time series component would assist significantly in our understanding of how the business cycle affects migration. In addition, these models could be formulated in such a way that partial effects of economic conditions on migration can be assessed. A study which estimates the most important determinants of aggregate migration would have considerable policy payoffs (Todaro, 1977).

In developing models to explain migration and urban growth, it has also been argued that the behavior of migrants as well as the impact of migration on the labor market would vary across regions of the country. For example, persons employed in the South may be more reluctant to move than persons employed in the North Central region due to the amenities of a warmer climate. Thus, the modeling of regions is generally considered to be better for explaining the areas' economic strengths and weaknesses than a national model (Glickman, 1977).

The purpose of this paper will be to analyze the metropolitan migration, employment change and wage change of persons employed in specific two-digit industries. Within this context this research will attempt to answer four questions. First, are the responses of migrants similar to economic and demographic variables across industries and regions? Second, is the impact of employed migrants on wage changes and employment changes similar across regions? Third, what has been the impact of the business cycle on migration, employment, and wage changes by region of the country? Fourth, to what extent have overall metropolitan employment and wage growth influenced specific industry's employment and wage change? The remainder of the paper includes sections on the theoretical backdrop, the data and methodology, the estimated model, and the summary and conclusion.

Theoretical Backdrop

Although there has been considerable theoretical work on migration, it has developed within an individual and present value framework (Sjaastad, 1962). However, in dealing with an urban area, a factor price equalization approach would be more useful (Samuelson, 1949). Although the assumptions of this model are restrictive, it does provide the basis of a model for analyzing movement to and from an urban area.

Suppose that output for the two sectors is given by the production functions:

$$(1) \qquad Q_i = Q^i(K_i, N_i) \qquad i = a,b$$

where K_i is the amount of capital employed in sector i; N_i is the number of workers employed in sector i; and subscripts a and b stand for two separate markets (Lucus, 1977). A necessary condition for the maximization of the value of output [$P \cdot Q_a + Q_b$, where P is the commodity terms of trade], subject to full employment of both factors, and a given P is:

$$(2) \qquad P \cdot (\partial Q_a/\partial N_a) = (\partial Q_b | \partial N_b) \ .$$

If, in addition, labor is hired in both sectors up to the point at which workers receive a wage (W_i; i = a,b) equal to the value of marginal product, then (2) is satisfied when

$$(3) \qquad P \cdot (\partial Q_a/\partial N_a) = W_a = W_b = (\partial Q_b/\partial N_a) .$$

If trade in equation (3) does not complete the central equality, then the question is, will migration? If workers shift geographically from low-wage to high-wage areas and continue to shift until no wage-differential remains,

$$N_b \gtreqless 0 \quad \text{as} \quad w_b \gtreqless W_a .$$

from the assumption of diminishing marginal productivity of labor, then the geographic migration leads to an equilibrium in which labor is used efficiently and serves to promote an equal distribution of wages between geographic areas. By extension, the movement of persons to areas and their employment within a particular industry could follow the same comparative static approach. Also, extensions of this approach could include an adaptive expectations approach as well as noneconomic factors (Fabricant, 1970; Liu, 1975).

An additional issue is whether the labor market response of persons employed in primary industries is different to overall urban growth than the response of persons employed in secondary industries. Some evidence shows that employment and wage growth in key industries may have a varying effect on the migration response of individuals in the U.S. (West, 1975). Furthermore, results from Canadian data have shown considerable variability in the response of individuals in varying occupations and industries (Grant and Vandercamp, 1976). The industrial composition of persons employed in an urban area is of particular importance to those persons planning labor market solutions which may be different than competitive ones.

Changes in the national and regional business cycles also are hypothesized to have had a significant impact on migration and urban labor markets. However little testing of this hypothesis has occurred.[1] Moreover, the years 1971 to 1975 provide an interesting time period for analyzing the business cycles' effect on urban workers. For example, during the period 1971-73, the economy was in a mild upturn, whereas, during the 1973-75 period there was a significant down-turn in national economic activity. Some basic data from the four-year period show that during 1971-73 unemployment fell from 5.9 percent to 4.9 percent but that during 1973-75 the unemployment rate rose to 8.4 percent. In addition, prices rose 9 percent during the 1971-73 period but the inflation rate nearly doubled to 17 percent during 1973-75. These changes in the national economy are hypothesized to have had an important impact on changes in urban labor markets.

One final issue concerning the impact of migration on wages and employment within an industry is of considerable importance. Although other studies have tested the expected signs and significance of demographic group migration on employment and wages, the relationship of new migrants within a specific industry would further enhance our knowledge of the economic impact of migration for groups on which they have a direct effect (Greenwood, 1975). Therefore, this study will test the hypothesis that migration is not only a consequence of economic growth but also an integral part of it.

Data and Methodology

One of the unique aspects of this research is the use of the 10-percent sample from the Continuous Work History Sample (CWHS) for the periods 1971-73 and 1973-75. The data base contains over 8,000,000 observations per year, and includes first-quarter data on sex, race, and year of birth; and for each time period, data on the state, county, and industry of employment, as well as an estimate of wages earned from each Social Security-covered job. Two-digit Standard Industrial Classification (SIC) detail is obtainable using this data base as are industry-specific wages, employment, age of employees, and gross migration flows. This detailed data is available for Standard Metropolitan Statistical Areas of 250,000 or larger population. The use of the 250,000 population floor is a standard used by the Bureau of Labor Statistics in defining large urban areas, and has the advantage of providing sufficiently detailed data for analyzing employed industry migrants.

Seven two-digit SIC's were chosen for the analysis. These included at least one two-digit SIC from each one-digit category for which data is available, using the availability of data for each SMSA as a further criteria in selecting the industries to be studied. The industries to be analyzed include agricultural services, general building contractors, food and kindred products, communications, general merchandise stores, real estate, and business services.[2] Overall, they reflect a broad representative group of industries for analyzing a local labor market. One of the problems of using CWHS migration data is that administrative changes in the location of firm record keeping may appear as changes in the mobility status of individuals. However, there is no evidence that this accounts for any systematic bias in the data.

In order to implement a price and quantity relationship in the labor market, both employment-change and wage-change will be implemented as dependent variables, with migration serving as a mechanism for the factor equalization approach. Given the simultaneous relationship among migration, wage-change, and employment-change, these factors will be implemented as dependent variables (Muth, 1971). The independent variables will be measures of conditions of the metropolitan labor market as well as a measure of national economic conditions.

Given this development of the model, the following migration equations can be specified for persons employed in the two-digit SIC industries:

(1) $$In = f_1 (\hat{E}_i, PE_i, \hat{W}, PW_i, Q, PIn, U, B, e_1)$$

(2) $$Out = f_2 (\hat{E}_i, PE_i, \hat{W}_i, PW_i, Q, POut, U, B, e_2)$$

where In is the industry-specific in-migration; Out is the industry-specific out-migration ; E is the change in employment in the industry; PE is the change in employment in the industry in the previous period; W is the change in wages for persons in the industry; PW is the wage level for persons in the industry in the previous period; Q is a measure of the quality of life in the SMSA; PIN and POUT are measures of the previous period's migration to (PIN) and out of (POUT) the SMSA; U is a measure of the SMSA unemployment rate; B is a dummy variable measuring changes in the national economy from 1971-73 to 1973-75; and e_1 and e_2 are the error terms associated with each equation.

The hypotheses associated with each of the variables in the model can be explained succinctly in the following manner. It is assumed that increases in employment would increase the number of persons moving to the S.M.S.A. In contrast, it is assumed that little or no growth in an industry would reduce the related in-migration and increase the out-migration for the metropolitan area.

The model further assumes that wages would be the major determinant of geographic labor market adjustments. Consequently, wage levels are assumed to have a positive effect on in-migration and a negative effect on out-migration for an SMSA. However, because there has been conflicting evidence concerning whether persons respond to wage levels or the change in wages, the model will use both variables in analyzing in- and out-migration (Fields, 1977).

The quality of life variable includes measures of a social, political, economic, environmental, and health and welfare index for each of the SMSA's to be studied. Simple correlations between economic status and other area characteristics such as individual status, living conditions, education development, and health and welfare are quite high, and all are statistically significant (Liu, 1975). Moreover, these locational characteristics can serve as derived demand curves for location based on the shadow prices of locational attributes.

A common finding of many migration studies is that present migration patterns are affected by the allocation of past migrants (Greenwood, 1969; Dunlevy and Gemery, 1977). It is hypothesized that the distribution of friends and relatives in areas with favorable information about the SMSA diminishes the noneconomic and informational costs of moving to potential destinations. Therefore, the number of persons who moved to the SMSA in the previous period should be directly related to the in-migration to the SMSA in the current period. Similarly, current gross out-migration from the SMSA in the previous period should have a direct relationship to its "migrant stock." Thus, the stock of migrants in an area may serve as a proxy for the average propensity to migrate of the current residents.

Although the data only contain persons who are employed, the unemployment rate is generally regarded as one of the best measures of the tightness or looseness of local labor markets. That is, it is assumed that areas with increasing unemployment would not appear attractive to potential in-migrants. Also, the rapid downturn in the business cycle may either cause persons who may lose their jobs to search and find jobs elsewhere, or remain at their present location.

The employment change equation for an industry can be specified as a function of the gross migration rates, wage changes, overall employment in the area, the previous period's industry-specific employment growth, the area unemployment rate, and changes over the period of analysis. More specifically, the equation may be written as follows:

$$(3) \qquad E = f_3\ (\hat{In},\ \hat{Out},\ PE,\ PW,\ U,\ ME,\ B,\ e_3)\ .$$

The inclusion of ME, the overall growth of employment in the SMSA, is warranted to account for the impact of the overall growth in the local economy and its effect on the specific industry. In order to avoid the potential of a spurious correlation, ME was computed by subtracting the industry in question.[3]

In a similar manner, the change in wages for persons employed in an industry is determined by gross migration flows, employment change, wage levels, local price changes, the age of new migrants, the unemployment rate, overall wage growth in the area, and the changes in the economy over time. The wage change equation can be written as follows:

(4) $$W = f_4\ (\hat{In}, \hat{Out}, PW, CPI, A, U, MW, B, e_4)$$

The variables in the above equation that were not previously defined can be included for the following reasons. First, CPI is the change in the estimated consumer price index in the SMSA over the period of analysis. The addition of CPI attempts to reflect the increase in local prices which would, in turn, have a significant wage effect, particularly in those industries that are unionized and have "escalator clauses." Second, A, the mean age of migrants into the industry and SMSA, is a measure of the change in human capital in the area. The hypothesis in this case is that with an increase in the age of the industry workforce, wages would also increase. Finally, MW is a measure of the increase in wages in the SMSA. Similar to ME, MW was calculated by subtracting the industry's wages in question to avoid a spurious correlation.[4] The hypothesized signs of the model specified in equations (1) through (4) are presented in Table 1. The signs are assumed to be constant across the Census regions.

Insert Table 1 about Here

The Estimated Model

Equations (1) through (4) are a set of structural simultaneous equations. Two-stage least-squares was used to estimate these equations, which were either exactly identified or overidentified. The rank-conditions of identification were all satisfied, and Monte Carlo studies indicate that the two-stage method is the best technique for an over-identified system (Christ, 1973).

The specified model was estimated in linear form, proportional form, reduced form, and in logarithmic form. The linear model resulted in a reasonably good fit of the model. However, problems of heteroscedasticity, i.e., having large and small SMSA and industry populations, would violate the statistical assumptions of least-squares analysis, and the resulting coefficients would not provide reliable estimates of the model. On the other hand, the proportional form eliminated the problems of heteroscedasticity, but the resulting fit of the model and statistical significance of the coefficients were considerably lower. Next, a reduced form of the model was also specified with net migration and employment change as the dependent variables. Unfortunately, this specification of the model resulted in insignificant results, which had little utilization for analysis or policy purposes. Finally, a log linear model using the structural equations was specified and estimated for each of the seven SIC's. Although the results varied across industries and Census regions, this specification provided an acceptable fit of the model, and did not violate the assumptions of two-stage least squares.[5] The number of observations ranged from a low of 18 for agricultural services in North Central SMSA's to a high of 78 for general merchandise stores and food products for Northeast SMSA's. The mean number of observations for each industry and region was 55.

Insert Table 2 about Here

Table 2 presents the two-stage least squares estimates for the seven industries for each of the four Census regions. The log linear results are presented so that the coefficients can be directly interpreted as elasticities. As a general indication of the explanatory ability of the variables in the relationships, the coefficients of determination (R^2) associated with the ordinary least-squares estimates of the model are presented. For the industry migration equations, the model does well in accounting for overall variation in both in- and out-migration. The range of the migration R^2's are from a low of .54 for in-migration of persons employed in food products in the South to a high of .95 for out-migrants of persons employed in business services in the West. On average, the migration equation R^2's are above .70, and the models do about as well explaining in-migration as they do in explaining out-migration.[6] However, the explanatory power of the model is generally better for secondary industries (i.e., general merchandise stores, real estate, and business services) than for the primary industries.

Overall for the migration equations, the statistically significant signs associated with the estimated coefficients are generally as expected. The previous migration into and out of the SMSA was statistically significant most often (i.e., 44 times out of 56 equations (79%)). Of the economic variables, B is statistically significant most often with a generally consistent positive coefficient for both in- and out-migration. Moreover, the business cycle appears to have influenced persons employed and migrating in secondary industries to a greater extent than primary industries. However, the results do not show that the business cycle influenced migration more in industries in Southern or Western urban areas than in Northeastern or North Central SMSA's. In addition, the wage and employment variables were approximately equally significant across industries and regions, although there were some changes in the signs of these variables. The unemployment rate was the least significant variable across regions and industries, which is consistent with the DeVanzo findings that the unemployment rate affects unemployed persons' migration (DeVanzo, 1977). Finally, a measure of SMSA quality of life was statistically significant as hypothesized in only 8 of the SMSA's and industries.

In contrast, the model was not able to explain variations in employment change and wage changes as well as gross migration. For employment change, the R^2 ranged from a high of .71 for general merchandise stores in the North Central region to a low of .07 for business services in the Northeast. On average, approximately 45% of the total variation in employment change could be explained. The variable that was statistically significant most often was the previous change in employment, and it was significant in 11 of 28 cases. The change in overall employment in the urban area is the next most statistically significant variable. The results show that this variable had a positive effect on industry specific employment growth. Although gross migration did not consistently affect employment growth for most industries, a 1-percent increase in in-migration of food product workers in the South increased employment by .02 percent, and a 1-percent increase in out-migration decreased employment growth by .02 percent.

As with most regional labor market models, industry wage changes are the most difficult to explain (Glickman, 1977). Although the coefficient of determination is .71 for Southern agricultural services, the explanatory ability of the wage change model is, on average, worse than for the other estimated endogenous variable equations. Given the rapid increase in inflation during the first half of this decade, it is not surprising that B is the variable that had the most significant and positive effect on wage changes. Again, there was no significant difference across regions with respect to wage changes.

In summation, the results of Table 2 provide some answers to the questions that were posed earlier. First, migrants in all regions were similar in terms of their response to both past migration and economic variables. Moreover, there was some variation across the seven industries to the variables in the model. That is, the migration models were better able to explain variations in secondary industries than primary ones. Second, migrants have some impact on employment change and wage changes, although for most industries it is not statistically significant. Also, there was little evidence of a regional effect of migration on industry specific wage or employment growth. Third, the business cycle appears to have had a statistically significant effect on increasing migration and raising wages in several of the seven two-digit SIC's that were studied. Finally, overall employment growth had a statistically significant effect on a number of the industries and regions that were studied. However, the overall wage growth in an SMSA and region was not significant in explaining variations in wage changes for the specific two-digit SIC's.

Summary and Conclusions

This paper has attempted to analyze metropolitan migration, employment change and wage change of persons employed in specific two-digit industries. Moreover, the models that were developed were tested using homogeneous groups of migrants together with comparable data. A theoretical backdrop is developed within a factor price equalization approach, with migration serving as a variable which could complete the central equality. Extensions of this theoretical framework are developed to include some noneconomic factors as well as the business cycle. Next, the rationale for the data (i.e., CWHS) and regional disaggregation of a model are discussed. The model is then developed using gross migration, employment change, and wage change as endogenous variables and other labor market factors as exogenous variables. The results show that migration can be explained most consistently, and that past metropolitan migration and the decline in the business cycle over the period studied are the most significant variables. For the employment change equation, the previous growth in industry employment and overall urban growth were statistically most often significant. The business cycle influenced industry-specific wage changes most often. Finally, there appeared to be little variation across regions with respect to each of these equations, and any effects appeared to be industry-specific influences rather than region-specific.

For policy analysis, the methodology should enable planners to make estimates of the impact of urban employment change or national changes on these three key components of the labor market for detailed industry groups. Also, the model could be used in estimating the impact of federal government expenditures on a specific industry. In this way, preliminary estimates of the impact of social policy on urban labor markets can be estimated. Finally, the equations that were developed, as well as the specific data base, can be used to develop short-run forecasts for urban areas.

The importance of this paper does not necessarily lie with the exact parametric estimates that were obtained, but rather with the methodology and data bases that were used. By using homogenous migrants and comparable data, as well as using a time series component for specific industries, a framework for more precision was developed. Only future work will develop a more detailed equation specification which can specify and estimate migration paths over time.

FOOTNOTES

[1]Major tests of this hypothesis have been completed by Renshaw, Friedenberg, and Levine (1977) and McCarthy and Morrison (1977). However, neither paper has addressed the impact of the business cycle on the migration of persons employed in specific industries.

[2]For the industries studied, the coverage of the CWHS is almost 100%. Moreover, the use of the "best data" from this data source should serve as a boundary for other analysis with the CWHS.

[3]ME was calculated as follows

$$\sum_{i=1}^{99} E - E_i = ME$$

where i is the SICs' from 1 to 99, and E_i is the industry in question.

[4] $$\sum_{i=1}^{99} W - W_i = MW$$

where i is the SICs' from 1 to 99, and W_i is the industry in question.

[5]A Neter and Wasserman test was implemented comparing the F-levels of the 1971-73 and 1973-75 migration equations. In all cases the F levels were insignificant. We can therefore conclude that the regressions have equal error variances and that pooling is an appropriate technique (Neter and Wasserman, 1974).

[6]Although there is a lack of stability of some of the coefficients across industries and regions, an examination of the correlation matrices shows little evidence of multicollinearity.

TABLE 1

Predicted Signs on the Coefficients of the Estimated Model

Equation for:	$\hat{IN}$	$\hat{OUT}$	$\hat{E}$	PE	$\hat{W}$	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B
(1) In			(+)	(+)	(+)	(+)	(+)		(+)			(-)			(?)
(2) Out			(-)	(-)	(-)	(-)	(-)			(+)		(+)			(?)
(3) E	(+)	(-)		(+)		(-)						(-)	(+)		(-)
(4) W	(-)	(+)	(+)			(?)		(+)			(+)	(-)		(+)	(+)

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
AGRICULTURAL SERVICES																	
Northeast																	
In			-283.63 (-1.35)	-19.15 (-.18)	12.50 (2.05)*	-.74 (-.74)	1.32 (1.70)		.60 (1.57)			-1.45 (-1.37)			-.93 (-1.83)	1467.13 (.97)	(.68)
Out			-393.32 (-1.54)	-190.82 (-1.23)	2.37 (.33)	-2.14 (-1.73)	-.31 (-.33)			1.44 (2.43)*		-1.22 (-1.00)			-.61 (-1.06)	2915.76 (1.49)	(.59)
E	.0034 (1.04)	-.00027 (-.068)		-.72 (-1.87)		-.0019 (-.27)						-.0036 (-.94)	.00013 (.43)		-.00088 (-.76)	8.62 (4.49)*	(.36)
W	-.38 (-.70)	.46 (.87)	46.46 (1.59)			-.064 (-.22)		-3.34 (-.59)			1.00 (.85)	.17 (1.46)		-.15 (-.73)	.18 (1.35)	-225.45 (-1.57)	(.27)
South																	
In			-286.31 (-1.63)	-491.39 (-1.63)	-25.35 (-1.59)	-3.22 (-1.13)	1.95 (2.05)*		1.44 (2.67)*			-2.35 (-1.84)			.60 (1.71)	3999.78 (1.64)	(.72)
Out			-707.79 (-.89)	-1175.60 (-.83)	-49.15 (-.72)	-6.60 (-.60)	3.39 (.85)			2.84 (1.13)		-3.88 (-.75)			.82 (.61)	9631.79 (.85)	(.72)
E	.0011 (.42)	-.00019 (-.083)		-.93 (3.67)*		-.00048 (-.12)						-.000093 (-.033)	.00029 (1.64)		-.46 (-.56)	9.66 (7.60)*	(.51)
W	.057 (.61)	-.051 (-.50)	5.13 (.80)			-.72 (-2.06)*		.0049 (.00076)			.18 (.82)	-.013 (-.15)		.12 (1.23)	.016 (.64)	-21.64 (-.71)	(.45)
North Central																	
In			-5.72 (-.043)	-74.58 (-.53)	5.36 (1.22)	1.99 (1.25)	-1.11 (-.92)		.53 (2.75)*			-.45 (-.39)			-.14 (-.79)	372.48 (.29)	(.77)
Out			-47.40 (.40)	-84.39 (-.67)	1.69 (.42)	1.21 (.80)	.069 (.065)			.76 (4.29)*		.18 (.18)			.038 (.24)	646.01 (.56)	(.84)
E	-.0011 (.32)	-.0018 (-.47)		-.82* (-2.55)		.0033 (.40)						.0041 (.68)	.00051 (-1.21)		-.0016 (-.94)	9.11 (5.68)*	(.52)
W	.13 (.98)	-.17 (.93)	-20.73 (-1.47)			-.30 (-.86)		2.69 (.85)			.12 (.47)	.13 (.56)		.27 (1.26)	.061 (1.53)	104.31 (1.48)	(.61)
West																	
In			90.13 (.51)	93.84 (.54)	-8.56 (-.77)	-1.10 (-1.19)	-.60 (-.54)		.17 (.31)			.36 (.72)			.20 (.95)	-880.20 (-.52)	(.61)
Out			519.25 (2.94)*	485.90 (2.90)*	-40.00 (-3.52)*	-15.94 (-2.79)*	-3.84 (-3.16)*			-.76 (-1.50)		.80 (1.76)			.72* (3.39)	-4801.35 (-2.92)*	(.65)
E	.01 (1.82)	.002 (-.67)		-.91 (-3.08)*		.0062 (.46)						.00085 (.24)	.00047 (2.11)		-.48 (-.53)	9.50 (6.37)*	(.65)
W	-.099 (-.55)	.086 (.78)	3.23 (.72)			-.27 (-.90)		-2.05 (-1.06)			-.54 (-1.28)	.084 (.85)		-.068 (-.88)	.0054 (.30)	-7.74 (-.35)	(.25)

*Indicates that the coefficient is significantly different from zero at the 5 percent level or greater.

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
	Variables																
General Building Contractors																	
Northeast																	
In			2.25	7.77	3.98	-.054	-.34		.91			-.11			.16	-67.27	
			(.10)	(.84)	(1.73)	(-.065)	(-1.27)		(4.35)*			(-.42)			(1.53)	(-.46)	(.72)
Out			75.20	37.07	.16	2.43	-.77			1.57		.24			.34	-575.84	
			(2.71)*	(3.41)*	(.080)*	(2.74)*	(-2.84)*			(5.70)*		(.95)			(2.57)*	(-3.04)*	(.76)
E	-.0018	-.0078		-.28		-.033						-.0053	-.00044		-.0051	6.57	
	(-.14)	(-.57)		(-1.52)		(-1.60)						(-.76)	(-.71)		(-1.99)*	(6.88)*	(.35)
W	.042	-.022	2.51			-.12	1.68				.30	.01		.23	.0003	-10.58	
	(.55)	(-.19)	(.62)			(-.89)	(.62)				(1.20)	(.17)		(.48)	(.011)	(-.46)	(.23)
South																	
In			39.55	19.38	2.19	-.046	-.44		.72			-1.19			.16	-303.11	
			(.97)	(.73)	(.81)	(-.079)	(-1.47)		(2.84)*			(-1.57)			(.95)	(-.90)	(.70)
Out			13.85	15.81	.24	-.27	-.20			.86		-.89			.11	-148.78	
			(.19)	(.34)	(.072)	(-.32)	(-.39)			(1.79)		(-.71)			(.43)	(-.24)	(.72)
E	-.0069	-.013		-.70		-.017						.017	.0016		-.00058	8.55	
	(-.10)	(.21)		(-.93)		(-.85)						(1.07)	(1.48)		(-.11)	(2.27)*	(.23)
W	-.17	.16	2.30			.046		.86			-.40	-.017		.071	.0076	-8.25	
	(-1.14)	(1.16)	(1.01)			(.66)		(.57)			(-1.79)	(-.26)		(1.72)	(.58)	(-.71)	(.13)
North Central																	
In			-13.37	-4.23	-8.11	-.12	-.28		.74			-.40			-.34	121.17	
			(-.48)	(-.25)	(-1.31)	(-.19)	(-.84)		(5.47)*			(-.85)			(-1.10)	(.52)	(.61)
Out			-20.50	-4.97	-5.37	.044	-.37			.66		-.42			-.24	149.06	
			(-.79)	(-.32)	(-.93)	(.078)	(-1.22)			(5.59)*		(-.96)			(-.81)	(.68)	(.66)
E	.000072	.0059		-.56		.0084						-.0019	-.00015		-.0010	7.80	
	(.0053)	(-.44)		(-5.76)*		(.99)						(-.44)	(-.47)		(-.83)	(15.94)*	(.59)
W	.14	-.17	-1.57			-.024		1.24			.049	-.08		.053	-.043	10.44	
	(.65)	(-.77)	(-.73)			(-.21)		(.65)			(.25)	(-1.31)		(.88)	(-2.84)*	(.95)	(.27)
West																	
In			-18.69	3.14	-18.28	-6.58	-1.11		1.59			.79			.42	173.62	
			(-.65)	(.56)	(-1.52)	(-1.73)	(-1.56)		(3.36)*			(1.41)			(1.17)	(1.16)	(.83)
Out			-60.32	7.03	6.46	.85	-.42			.55		-.52			-.40	238.11	
			(-2.00)*	(1.20)	(.93)	(.32)	(-.66)			(2.05)*		(-1.42)			(-1.94)	(1.50)	(.81)
E	.039	-.043		.44		.0065						-.0053	.0023		-.0010	2.78	
	(1.43)	(-1.53)		(1.73)		(.19)						(-.44)	(3.49)*		(-.38)	(2.04)	(.40)
W	-.054	-.075	4.42			-.26	.23				.089	.046		.078	.027	-7.92	
	(-.46)	(.59)	(.35)			(-1.25)	(.044)				(.33)	(.54)		(1.15)	(.88)	(-.25)	(.34)

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
								Variables									
Food and Kindred Products																	
Northeast																	
In			-21.17	5.55	13.84	.49	.15		2.00			.12			.18	21.71	
			(-2.66)*	(1.18)	(1.39)	(.60)	(.53)		(.74)			(.26)			(1.87)	(.45)	(.55)
Out			-2.76	-5.77	-12.36	.50	-.43			.92		-.85			-.10	89.73	
			(-.42)	(-1.70)	(-1.69)	(.80)	(-1.99)*			(3.87)*		(-2.50)*			(1.49)	(2.58)	(.73)
E	-.019	-.013		.039		.58						-.012	.0017		.0075	4.67	
	(-1.17)	(-.77)		(.28)		(1.53)						(-.81)	(1.36)		(1.60)	(6.66)*	(.35)
W	.038	.12	4.85			-.14		5.26			.10	-.0071		-.18	-.014	-26.09	
	(.39)	(1.43)	(1.18)			(-.88)		(1.15)			.84	(-.16)		(-.54)	(-.51)	(-1.03)	(.11)
South																	
In			-24.02	13.37	14.78	.72	.088		.61			.45			-.21	-3.91	
			(-.47)	(1.74)	(1.63)	(-.49)	(.15)		(2.44)*			(.67)			(-.90)	(-.019)	(.54)
Out			-53.76	15.05	10.63	-.14	-.022			.39		-.22			-.22	152.26	
			(-.74)	(1.97)*	(.79)	(-.081)	(-.028)			(1.06)		(-.25)			(-.67)	(.52)	(.55)
E	.017	-.023		.089		.0028						-.0069	.00027		-.00067	4.56	
	(2.98)*	(-3.33)*		(.68)		(.16)						(-.79)	(.48)		(-.30)	(6.95)*	(.17)
W	-.063	.097	4.93			.047		-.62			.19	-.0023		.019	.024	-20.56	
	(-.74)	(.95)	(1.29)			(.55)		(-.45)			(1.40)	(-.049)		(.60)	(2.53)*	(-1.09)	(.31)
North Central																	
In			3.71	-15.47	7.88	1.33	.81		.66			.21			-1.10	21.27	
			(.30)	(-2.18)*	(1.23)	(1.63)	(2.06)*		(3.13)*			(.60)			(-.66)	(.36)	(.72)
Out			5.94	-10.01	1.80	1.54	.60			.81		-.065			.0084	6.28	
			(.50)	(-1.84)	(.37)	(2.32)*	(1.87)			(4.25)*		(-.22)			(.068)	(.11)	(.77)
E	.014	-.027		.029		.70						.0025	.0019		.61	4.85	
	(.96)	(-1.63)		(.17)		(.28)						(.24)	(2.49)*		(2.00)*	(5.76)*	(.34)
W	.13	.19	-3.58			.13		-1.81			-.068	.0059		.064	.028	23.43	
	(1.26)	(-1.28)	(-.91)			(1.27)		(-.65)			(-.51)	(.11)		(1.63)	(2.80)*	(1.04)	(.24)
West																	
In			-106.87	-149.54	-9.00	-.74	2.20		-.74			-1.62			.15	1327.70	
			(-4.44)*	(-4.97)*	(-.95)	(-.69)	(2.80)*		(-2.05)*			(-2.38)*			(1.33)	(4.97)*	(.69)
Out			-76.47	-99.48	-3.16	-.61	1.57			-.11		-.60			.088	898.03	
			(-2.18)*	(-2.20)*	(-.31)	(-.58)	(2.02)*			(-.22)		(-.88)			(.77)	(2.31)	(.66)
E	.0044	-.015		-1.13		-.0052						-.0061	.00027		.0016	10.69	
	(.32)	(-1.08)		(-3.93)*		(-.22)						(-.55)	(.36)		(.54)	(7.23)*	(.41)
W	.057	.051	-.60			.061		.35			-.20	.021		-.0011	.00015	6.69	
	(.78)	(-.69)	(-.62)			(.83)		(.25)			(-1.27)	(.49)		(-.026)	(.015)	(1.53)	(.09)

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	Variables															
	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
Communication																	
Northeast																	
In			-6.99 (-.35)	-6.19 (-.44)	-4.80 (-.52)	-1.12 (-.52)	.65 (.49)		.98 (1.97)*			.56 (1.15)			-.30 (-.40)	87.78 (.41)	(.79)
Out			-21.38 (-1.45)	-13.52 (-1.30)	-9.37 (-1.57)	-2.02 (-1.22)	1.03 (1.06)			.71 (1.67)		.68 (1.61)			-.69 (-1.43)	219.79 (1.44)	(.83)
E	.025 (1.41)	-.049 (-2.98)*		-.53 (-4.38)*	-.016 (-.33)							.0086 (.43)	-.00045 (-.24)		-.0045 (-.72)	7.76 (11.83)	(.67)
W	-.069 (-.63)	.11 (.96)	.47 (.49)			-.19 (-.84)		4.31 (1.34)			.11 (.27)	.0068 (.071)		-.013 (-.14)	-.066 (2.53)*	-2.56 (-.35)	(.36)
South																	
In			-326.24 (-1.75)	205.16 (1.82)	227.20 (1.71)	-38.64 (-1.79)	6.14 (1.70)		1.33 (4.73)*			4.31 (1.76)			6.86 (1.78)	-383.02 (-1.77)	(.69)
Out			63.41 (.50)	-48.92 (-.65)	-77.73 (-.72)	10.92 (.76)	-1.53 (-.63)			.75 (3.79)*		-1.06 (-.67)			-1.82 (-.71)	202.48 (1.48)	(.66)
E	.011 (.52)	-.014 (-.64)		.096 (.33)		.045 (.74)						-.0064 (-.62)	.00073 (1.02)		-.0032 (-.68)	4.35 (3.29)*	(.12)
W	-.032 (-.38)	.032 (.34)	-2.11 (-.65)			.059 (.24)		-5.86 (-.87)			.057 (.30)	-.027 (-.74)		-.052 (-1.45)	-.024 (-1.34)	21.22 (.93)	(.20)
North Central																	
In			20.32 (1.53)	15.83 (1.76)	-4.21 (-.45)	-1.86 (-1.67)	-.44 (-.58)		1.09 (3.29)*			-.97 (-1.89)			.31 (1.85)	-158.14 (-1.63)	(.68)
Out			14.94 (1.04)	6.44 (.69)	-3.43 (-.29)	-2.71 (-2.28)*	.80 (-.95)			1.23 (2.96)*		-.14 (-.72)			.39 (2.13)*	-85.15 (-.85)	(.73)
E	.011 (.78)	-.014 (-1.22)		-.68 (-3.10)*		-.014 (-.44)						.019 (1.24)	.0015 (1.40)		-.00044 (-.11)	8.43 (7.78)*	(.37)
W	-.097 (-.18)	.090 (.21)	.53 (.23)			.0086 (.024)		-.24 (-.041)			.10 (.08)	-.024 (-.064)		.062 (.88)	-.014 (-.34)	1.27 (.076)	(.14)
West																	
In			-1.51 (-.21)	-5.88 (-.84)	4.21 (.85)	.48 (.29)	.79 (1.50)		.63 (2.69)*			-.19 (-.57)			.0081 (.11)	17.78 (.37)	(.87)
Out			-3.77 (-.47)	-6.66 (-.90)	3.05 (.49)	.17 (.089)	.50 (.86)			.77* (2.81)		-.11 (-.32)			.77 (.65)	38.38 (.78)	(.88)
E	.032 (.53)	-.045 (-.87)		-.57 (-1.26)		.11 (1.24)						.019 (.78)	.0036 (2.61)*		-.00037 (-.047)	7.44 (3.33)*	(.44)
W	-.078 (-.26)	.094 (.36)	.069 (.035)			-.12 (-.47)		-1.71 (-.34)			.14 (.82)	-.021 (-.26)		.021 (.30)	-.012 (-.32)	5.76 (.38)	(.21)

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
	Variables																
General Merchandise Stores																	
Northeast																	
In			-6.30 (-.55)	-9.55 (-.46)	12.49 (.62)	.093 (.091)	-.21 (-.51)		.70 (2.50)*			.17 (-.73)			.54 (.37)	28.54 (.28)	(.72)
Out			2.90 (.28)	15.72 (.85)	-11.70 (-.75)	-.60 (-.92)	.21 (.71)			1.03 (4.11)*		-.28 (-1.78)			.14 (1.13)	-45.26 (-.50)	(.88)
E	.046 (.80)	-.062 (-1.13)		-1.12 (-2.31)*		-.058 (-.81)						.0045 (-.21)	-.00037 (-.21)		-.013 (-2.19)*	10.87 (4.44)*	(.34)
W	-.020 (-.20)	.025 (.24)	-.17 (-.44)			-1.000 (-2.03)*		-.85 (-1.31)			.11 (.81)	-.024 (-.91)		.0045 (.28)	-2.00 (-.23)	6.03 (2.51)*	(.14)
South																	
In			154.05 (3.12)*	103.32 (3.66)*	-256.38 (-3.49)*	18.57 (3.22)*	5.12 (3.38)*		.12 (.42)			3.39 (3.26)*			3.73 (3.46)*	-322.65 (-2.64)	(.78)
Out			95.70 (2.91)*	61.19 (2.82)*	-147.94 (-2.69)*	11.79 (2.97)*	3.02 (2.70)*			.47 (1.91)		2.05 (2.51)*			2.31 (2.96)*	-232.45 (-2.78)*	(.76)
E	.026 (1.20)	-.033 (-1.39)		.027 (.12)		-.045 (-.98)						.00018 (.016)	.00076 (1.15)		-.00047 (-.12)	5.05 (4.59)*	(.20)
W	-.14 (-2.47)*	.16 (2.42)*	2.05 (1.75)			.047 (.53)		.095 (.16)			-.18 (-2.54)*	-.0083 (-.48)		.0040 (.31)	.0037 (.59)	-6.31 (-.99)	(.23)
North Central																	
In			-22.46 (-2.04)*	43.37 (2.14)*	1.73 (.59)	-1.51 (-2.16)*	-.32 (-1.10)		.70 (3.96)*			.12 (.32)			-.028 (-.30)	721.39 (-2.43)*	(.87)
Out			2.89 (.15)	-5.59 (-.15)	-4.08 (-.95)	.12 (.13)	(.18) (.37)			1.03* (3.32)		-.55 (-.89)			.12 (.78)	28.24 (.34)	(.80)
E	-.018 (-.45)	.0051 (.12)		2.00 (7.41)*		-.041 (-.67)						.023 (.99)	.00099 (.61)		-.0032 (-.54)	4.85* (-3.41)*	(.71)
W	.14 (1.47)	-.16 (-1.48)	-.22 (-.83)			.11 (1.11)		-.81 (-.55)			-.0073 (-.063)	.025 (.59)		.017 (.74)	-.0036 (-.48)	5.65 (2.00)*	(.20)
West																	
In			3.40 (.43)	4.87 (.81)	5.40 (.45)	-.63 (-.78)	-.43 (-1.00)		1.00 (6.13)*			-.052 (-.15)			.12 (1.50)	-62.33 (-.64)	(.85)
Out			-2.40 (-.30)	2.50 (.46)	-6.90 (-.72)	-.72 (-.90)	-.023 (-.053)			.84 (6.44)*		.0080 (.025)			.096 (1.22)	29.13 (.35)	(.82)
E	.038 (.94)	-.049 (-1.16)		-.33 (-1.44)		.030 (.60)						-.010 (-.36)	.0031 (2.74)*		.0010 (.22)	6.58 (5.56)*	(.24)
W	-.10 (-1.90)	.11 (1.84)	1.09 (1.26)			.030 (.58)		[illegible] (.89)			-.14 (-1.87)	-.035 (-1.15)	-.00067 (-.038)		.010 (2.04)*	-2.14 (-.43)	(.23)

TABLE 11

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

Equations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
Real Estate																	
Northeast																	
In			3.05 (.97)	-1.59 (-1.01)	-9.64 (-1.43)	-1.38 (-1.10)	-.33 (-1.19)		1.41 (6.24)*			-.14 (-.51)			.031 (.25)	32.94 (.86)	(.74)
Out			1.86 (.55)	.58 (.37)	5.92 (1.00)	.55 (.49)	-.10 (-.38)			1.16 (5.29)*		-.71 (-2.74)*			.38 (3.10)*	-40.64 (-1.18)	(.77)
E	.060 (1.72)	-.068 (-2.27)*		.039 (.32)		-.023 (-.40)						-.0015 (-.073)	.00089 (.48)		.013 (1.49)	(4.90) (7.47)*	(.17)
W	.13 (.58)	-.089 (-.42)	.067 (.052)			-.23 (-1.66)		1.39 (.53)			.21 (.85)	-.0025 (-.059)		.031 (.81)	.12 (.29)	2.56 (.28)	(.30)
South																	
In			29.26 (.61)	27.24 (1.11)	8.50 (2.40)*	2.08 (1.61)	.14 (.83)		.82 (2.13)*			-.073 (-.24)			.21 (.63)	-325.66 (-.93)	(.77)
Out			-102.38 (-1.80)	-19.60 (-.67)	13.68 (3.00)*	4.60 (2.[illegible])*	.36 (2.09)*			4.60 (3.54)*		-.042 (-.15)			-.30 (-.89)	533.73 (1.32)	(.76)
E	.0050 (1.08)	.0014 (.24)		-.56 (-2.02)*		[illegible] ([illegible])						.0023 (.040)	.00049 (1.30)		.0048 (-2.11)*	7.75 (5.67)*	(.38)
W	.21 (1.53)	-.21 (-1.48)	-8.08 (-1.49)			-.20 (-1.32)		-1.12 -.70			-.31 (-1.23)	.042 (.83)		.025 (.63)	-.0049 (-.15)	46.78 (1.63)	(.17)
North Central																	
In			54.20 (2.47)*	31.19 (1.60)	3.43 (.74)	1.41 (.79)	-.85 (-1.75)		.89 (3.63)*			-.010 (-.035)			.22 (2.08)*	(-447.75) (-2.55)	(.86)
Out			-17.09 (-.65)	-11.81 (-.60)	3.11 (.71)	1.28 (.76)	.61 (2.09)			1.21 (4.58)*		-.23 (-.77)			.24 (2.32)*	124.25 (.61)	(.84)
E	.011 (1.11)	-.0092 (-.84)		-.43 (-1.21)		-.00059 (-.045)						-.53 (-.83)	-.000064 (-.14)		-.00048 (-.20)	7.17 (4.03)*	(.13)
W	-.12 (-1.19)	.099 (.92)	.47 (.14)			-.35 (-3.01)*		.68 (.32)			.074 (.86)	-.020 (-.34)		.20 (3.21)	.00055 (.025)	5.93 (.32)	(.46)
West																	
In			30.92 (.76)	-16.99 (-1.27)	11.27 (2.42)*	1.56 (2.39)*	.64 (1.18)		1.04 (5.99)*			-1.49 (-3.35)*			.45 (1.32)	-121.94 (-.56)	(.85)
Out			-47.25 (-1.08)	-19.36 (-1.38)	15.88 (3.49)*	2.90 (4.62)*	1.23 (2.41)*			1.14 (6.27)*		-2.09 (-4.16)*			-.00042 (-.0012)	252.43 (1.04)	(.87)
E	.012 (.62)	-.0096 (-.48)		-.0024 (-.0065)		.00049 (.027)						.0020 (.15)	.00044 (.79)		-.0053 (-1.89)	5.00 (2.65)*	(.37)
W	-.10 (-.80)	.11 (.92)	-4.43 (-.70)			-.094 (-.76)		-.39 (-.26)			-1.000 (-.67)	-.0016 (-.025)		-.024 (-.39)	-.055 (-1.37)	27.29 (.87)	(.25)

TABLE II

Two-Stage Least Squares Estimates of Persons Employed in Two-Digit Urban Industries

quations for:	In	Out	E	PE	W	PW	Q	CPI	PIN	POUT	A	U	ME	MW	B	Constant	R^2
								Variables									
USINESS SERVICES																	
ortheast																	
In			2.38 (.56)	3.73 (1.04)	2.28 (.64)	.81 (2.51)*	.092 (.53)		1.20 (12.71)*			.063 (.31)			.15* (2.00)	-45.23 (-1.74)	(.88)
Out			7.88 (1.72)	4.79 (1.25)	10.11 (3.01)*	.60 (1.87)	-.050 (-.28)			1.16 (12.60)*		.054 (.26)			.076 (1.02)	-108.66 (-4.20)*	(.86)
E	.030 (.59)	-.031 (-.62)		.41 (1.37)		-.010 (-.30)						-.0027 (-.15)	-.00068 (-.55)		-.0066 (-1.53)	2.97 (2.01)*	(.07)
W	-.13 (-.97)	.13 (.97)	4.31 (1.53)			.0088 (.10)		8.51 (1.52)			.016 (.091)	.017 (.39)		.059 (1.20)	.036 (1.93)	-27.54 (-1.36)	(.11)
outh																	
In			7.69 (1.45)	11.24 (1.92)	2.88 (1.19)	.50 (1.59)	-.023 (-.21)		.91 (6.18)*			.36 (1.78)			.075 (.96)	-109.52 (-2.25)*	(.84)
Out			2.29 (.42)	23.67 (4.20)*	.087 (-.041)	-.097 (-.33)	.12 (1.20)			.87 (5.63)*		.18 (1.08)			.15 (2.20)*	-130.98 (-2.59)*	(.89)
E	.024 (.49)	-.0030 (-.051)		-.92 (-.96)		-.0095 (-.61)						.0024 (.23)	.00070 (1.16)		-.14 (-.50)	9.59 (2.01)*	(.36)
W	-.13 (-.22)	.12 (.24)	2.24 (.24)			-.025 (-.24)		-.12 (-.016)			.28 (.54)	-.014 (-.29)		-.018 (-.70)	.032 (1.75)	-7.27 (-.13)	(.34)
orth Central																	
In			68.97 (4.40)*	51.18 (4.24)*	-14.07 (-2.41)*	-.95 (-1.61)	-.96 (-2.79)*		.24 (.97)			-1.19 (-4.05)*			.46 (3.88)*	-538.49 (-4.03)*	(.92)
Out			-66.52 (-1.92)	-46.15 (-1.73)	-4.33 (-.90)	1.02 (1.62)	.80 (1.51)			2.26 (4.17)*		.44 (1.11)			.33 (3.47)*	569.86 (1.91)	(.94)
E	.0079 (.78)	.0028 (.27)		-.76 (-4.54)*		.064 (.36)						.011 (1.12)	-.00021 (-.29)		-.0024 (-.91)	8.76 (10.39)*	(.45)
W	-.052 (-.66)	.055 (.74)	.26 (.27)			-.071 (-1.19)		1.10 (1.11)			.064 (.48)	-.035 (-.96)		-.017 (-.55)	.017 (1.86)	1.76 (.35)	(.18)
est																	
In			11.69 (.99)	2.65 (.62)	-.40 (-.14)	.58 (2.83)*	.94 (2.17)*		.80 (3.09)*			-.21 (-.87)			.22 (3.67)*	-72.84 (-1.11)	(.91)
Out			12.29 (1.02)	7.47 (2.21)*	-9.17 (-4.15)*	.54 (3.32)*	1.19 (3.29)*			.74 (2.95)*		-.61 (-3.26)*			.21 (4.42)*	-63.99 (-.97)	(.95)
E	.015 (.93)	.00058 (.038)		.020 (.11)		-.012 (-1.30)						.0035 (.36)	.00083 (1.25)		-.0014 (-.56)	4.90 (5.37)*	(.54)
W	.17 (.90)	-.16 (-.71)	-.56 (-.24)			-.019 (-.31)		1.43 (.51)			-.043 (-.098)	-.0081 (-.14)		.025 (.43)	-.0027 (-.13)	5.23 (.52)	(.11)

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