Metro Regional Economic Model

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Dennis Yee
Senior Economist
Metro
Data Resource Center
600 NE Grand Ave.
Portland, OR 97232-2736
Phone: (503) 797-1578
Fax: (503) 797-1909
E-Mail: yeed@metro.dst.or.us

METRO

Executive Officer
Mike Burton

Elaine Wilkerson
Director

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0. Abstract

Portland Metro presents its version of a regional economic model with embedded input-output coefficients as explanatory variables in the model's employment sector equations. The Metro model implements the integration strategy as described by Coomes et al (1991), Stover (1994), and Rey (1997). Coomes et al first described the I-SAMIS model technique for linking I-O and econometric models. Stover evaluates the efficacy of using Census benchmark I-O tables as technical coefficients for creating the inter-industry demand variables (IDV) in each industry employment equation. Rey clarifies the theoretical underpinnings of the IDV and the use of a national I-O matrix as a proxy for an unavailable regional matrix. The regional model implemented by Metro is based on this integrated approach as described by the literature. This paper describes Metro's regional model and presents the empirical estimates and some results from our study. It is shown that the Metro model contains reasonable parameter estimates and produces forecast estimates within tolerable limits.

Key words: integrated regional econometric and input-output model; inter-industry demand variable; forecasting

1. Introduction.

For metropolitan areas, the federal ISTEA (Intermodal Surface Transportation Efficiency Act) legislation has generated a considerable amount of study into the relationship between urban growth and transportation. ISTEA requires an understanding of how choices made in transportation and land-use simultaneously impact each other. In addition, Metro (the metropolitan planning organization for the Portland, OR metropolitan region) initiated its own 50-year regional planning framework to encourage more compact urban development. Influence from the Metro Region 2040 Framework plan and ongoing interest to link transportation and land use modeling has been the main stimulus behind Portland Metro's regional model development.

In Portland, Metro has responded to the planning and information demands of ISTEA and Region 2040 with two operational models: one designed and patterned after so-called integrated regional econometric and input-output methodologies and the second a micro-simulation model based on theories between the interaction of land-use and transportation. The two models taken together are used by Metro planners to forecast regional economic and population growth, future real estate and land prices, and future population or household distributions in each forecast analysis zone.

The focus of this paper is to describe the regional economic and demographic model. The organization of this paper begins with an introduction in section 1, followed in section 2 by a description of the integrated econometric and I-O modeling approach for the Metro model's employment equations, and concluding in section 3 with empirical results and our conclusions.

The region is defined to be the Portland-Vancouver CMSA[1]. The regional model includes a fully described employment sector with manufacturing industries disaggregated to two-digit SIC and nonmanufacturing in one-digit SIC. The model also includes econometrically estimated regional wage rates, components of regional personal income, and non-stochastic equations which estimate regional production (indexed). Also included in the model is a cohort-component population model linked by a stochastic net migration equation to regional economic/employment growth.

2. Metropolitan Regional Model Described

Integration strategies for combining econometric and input-output models for regional forecasting and policy analysis have been gaining attention in regional economic literature. This attention is based on blending the analytical and policy properties found in input-output modeling with the strengths and features available from traditional econometric forecasting models. Input-output models generally perform well in analyzing inter-industry impacts and policy alternatives, but are not as well suited in forecasting future years. Structural econometric models are designed for forecasting and are constructed in a fashion to maximize this capability. The integration of a structural econometric model with an input-output matrix for regional forecasting and analysis is the marriage of these two approaches in an effort to create a combined model that exceeds the capabilities of the traditional models taken individually. However, Metro has so far employed the regional model as a device for forecasting population and employment growth in the region.

The initial theoretical approach of the Metro economic model was fundamentally based on a traditional export-based structural econometric model formulation for the Portland-Vancouver MSA. A structural econometric model of the Portland region had never before been constructed for long-range planning in the history of Metro and its predecessor the Columbia Regional Association of Governments (CRAG). The structural model included detailed stochastic estimates of industry manufacturing and nonmanufacturing employment, wage rates for aggregations for groupings of manufacturing and nonmanufacturing industries, components of regional income, and a net-migration equation linking economic growth with future population increases. A five-year age-cohort survival model provided annual estimates of population growth along with changes in employment, wages, and income from the econometric half of the model.

Early testing of the structural model yielded surprisingly effective inter-industry employment impact estimates. However, continued concern over the model's lack of specific input-output features prompted a make-over in the theoretical formulation of the model. Research into integrating regional econometric models with input-output models revealed three main strategies for combining regional econometric and input-output models*: linking, coupling, and embedding* strategies.

[1] The CMSA includes the Oregon counties of Multnomah, Clackamas, Washington, Yamhill, and the Washington county of Clark.

The Portland Metro economic model adopts an embedding integration strategy similar to the one used by the I-SAMIS (integrated-small area modeling of the industrial sector) model from the St. Louis MSA (metropolitan statistical area). This paper describes Metro's results from its attempt at combining a traditional export-based regional econometric model and the technical coefficients of a national input-output matrix.

2.1 Data and Methodology

The input-output table used in the embedding strategy derives from the U.S. Bureau of Economic Analysis (BEA) industry-commodity flow table. The table includes considerably wider industry detail than is possible in a regional model. The disaggregate industry data is collapsed into broader aggregate estimates of industry-commodity flow which match the desired industry employment detail of the Metro economic model. This means that the 90 industries/commodities shown in the national input-output matrix collapses to 20 industries in the desired Metro model.

The procedure combines the input-output matrix to the econometric model using an *inter-industry demand variable* (IDV) in equations for industry employment in the model. The parameter of the IDV is determined by regression and therefore not pre-determined or fixed as in other embeddding strategies. Generalization of the industry employment equations in the Metro economic model are as follows:

$$E_{jt} = \beta_j * IDV_{jt} + \sum_{a=1}^{m} \nu_{aj} N_{ajt} + \sum_{b=1}^{n} \rho_{bj} R_{bjt} + \varepsilon_{jt}$$

where,

E_{jt} = employment in industry *j* at time *t*
IDV_{jt} = inter-industry dependent variable for industry *j* at time *t*
N_{ajt} = national variables $a_1 \ldots a_m$ for industry *j* at time *t*
R_{bjt} = national variables $b_1 \ldots b_n$ for industry *j* at time *t*
β_j = regression parameter for inter-industry variable for industry *j* at time *t*
ν_{aj} = parameter estimate for national variables for industry *j*
ρ_{aj} = parameter estimate for national variables for industry *j*
ε_{jt} = stochastic error term for industry *j* at time *t*.

The employment equation represents one of twenty manufacturing or nonmanufacturing industry sector. Explanatory variables for employment in any industry *j* may (or may not) include national drivers and/or aggregate regional macroeconomic drivers, such as: population, personal income, sector wage rates, land development activity, productivity or output production indexes, etc.

The inter-industry dependent variable is defined as follows:

$$IDV_{jt} = \sum_{\substack{i=1 \\ j \neq i}}^{n} C_{ij} E_{jt}$$

where,

C_{ij} = commodity by industry direct requirements coefficient

E_{it} = employment in industry *i* at time *t*

The commodity by industry direct requirements coefficient is taken from the 1987 *Use of Commodities by Industry Table* and groupings of each industry/commodity are collapsed to the desired industry detail. The cross product of the direct requirement coefficients matrix and the industry employment matrix results in an IDV term for an industry *j* with an historical time-series equal to the number of time periods for the matrix of employment. Thus, the IDV term provides an historical measurement of the inter-industry demand linkage between industry *j* and all the other industries in the region.

3. Empirical Results

Table 1, nearby, summarizes the employment demand equations from the Metro economic model. In all but one equation, the IDV term is statistically significant at the 1 percent level (except in health services in which the term was not positive and significant). Specification of employment equations with the IDV variable seems to provide both satisfactory statistical fit and explanatory information. (In the following section, we shall compare an ex ante forecast with actual employment data to see how the model equations have performed in an out of sample forecast.)

According to the findings made by Stover, he suggests that "in general, the IDV is a useful explanatory variable in those industrial sectors where the output serves as an input for other local industries." The health service industry (SIC 80) is certainly an industry which serves mostly final demand and has little interaction with other industries in the region, and therefore the IDV term was found to be insignificant and not a useful explanatory variable in the Metro health service employment equation.

Stover goes on to suggest that the estimated coefficient for the IDV term may be an indicator of the degree of inter-industry interactions and a measure of the strength of this relationship[2]. In our log-log formulation of each employment equation, the IDV term may be interpreted in terms of an elasticity measurement. The empirical results in each equation show the estimated IDV to be relatively inelastic – although some more inelastic than others. Our interpretation is that the more inelastic IDV's indicate a lesser dependence of the particular industry with all other industries in the regional economy. Generally, the inelastic nature of the IDV term in each of the employment equations suggests to us that the regional industries in the Portland MSA are relatively less dependent and have less inter-industry interactions with one another than perhaps in other regional economies. This also suggests that the mix of industries in the Portland MSA may have stronger commodity flow relationships with industry sectors outside of the region.

The empirical findings of the model estimations reveal no major surprises with the use of the IDV as an explanatory term and seems consistent with the recent literature on the matter. The Metro model in all but one equation found satisfactory fits, and in the industry sector that produced unsatisfactory statistics, the IDV term was excluded.

[2] Rey also agrees so long as the estimation of the employment equations with the IDV term is unrestricted.

3.1 Equation Listing

Table 1. Metro Regional Economic Model – Employment Equations

Industry	Intercept	Inter-Industry Demand Variable	Real Industry Wage Rate	Other Regional Explanatory Variable(s)	Industry Output Index	Industry Product-ivity Index	Other National Explanatory Variable(s)	Durbin-Watson	Adj.-R^2
Food Processing	0.8951 (4.33)	0.4313 (7.86)						1.43	0.90
Textile & Apparel	1.8235 (3.51)	0.5364 (3.24)			0.6339 (4.10)	-0.9456 (4.45)		2.06	0.96
Lumber & Wood Products	3.9579 (6.33)	0.1931 (3.49)	-0.7740 (4.45)	0.0392[a] (2.52)	0.1665 (2.17)		0.1259[b] (1.82) 0.1854[c] (3.05)	1.84	0.99
Paper & Pulp	2.8822 (5.37)	0.4538 (6.68)	-0.2147 (2.69)	Dummy[d]		-0.3167 (2.37)		2.12	0.86
Printing & Publishing	-0.8372 (2.36)	0.7828 (12.95)		Dummy[d]	0.5009 (12.95)	-0.2917 (1.75)		1.98	0.99
Metals	3.2341 (5.31)	0.6420 (11.08)	-0.3558 (2.18)	Dummy[d]			0.2324[e] (3.42) -0.1267[f] (1.84)		
Nonelectrical Machinery	0.1343 (0.52)	0.6500 (8.33)			0.2472 (3.98)	-0.1664 (2.03)	0.1307[g] (2.94)	1.98	0.99
Electrical Mach. & Instruments	1.6767 (2.47)	0.4399 (6.59)	0.4657 (2.88)		0.2203 (2.22)		0.2424[h] (2.37)	1.59	0.99
Transportation Equipment	1.5380 (1.63)	0.7122 (8.66)	-0.2629 (2.27)				-0.3074[f] (1.85)	1.94	0.93
Other Durable Goods	-1.1273 (2.20)	0.6684 (9.32)			0.3547 (3.11)			1.95	0.98
Other Nondurable Goods	-3.6252 (8.87)	0.6360 (7.08)			0.6457 (5.81)			1.87	0.99
Construction & Mining	-0.7889 (0.65)	0.4222 (5.91)		0.0490[a] (2.25)	0.3062 (4.38)			1.81	0.99
Transp., Comm. & Utilities	1.2896 (6.09)	0.6672 (15.98)				-0.0803 (3.00)		1.03	0.99
Wholesale Trade	1.0729 (4.14)	0.5493 (7.65)		0.2121[i] (2.60)		-0.0934 (2.04)		2.09	0.99
Retail Trade	-0.4829 (0.58)	0.2614 (7.46)				-0.1976 (4.61)			
Finance, Ins. & Real Estate	1.1425 (2.38)	0.4526 (3.18)		0.0207[a] (2.00)			4.4556[j] (1.91)	2.03	0.99
Health Services	-4.7777 (7.63)		-0.3480 (2.73)	0.40540[k] (4.01)			0.4933[l] (7.15)	2.13	0.99
Nonhealth Other Services	-0.0397 (0.11)	0.3706 (5.76)	-0.1535 (1.53)				0.1294[m] (4.09) 0.9847[n] (7.64)	1.70	0.99
State & Local Government	0.2365 (0.26)	0.2881 (5.21)	-0.2537 (4.95)					1.44	0.99

a. Regional building permits, number of dwelling units

b. (U.S. fixed investment in nonresidential structures, 1992$)/(Gross Domestic Product, 1992$)
c. (U.S. fixed investment in residential structures, 1992$)/(Gross Domestic Product, 1992$)
d. dummy variable(s) for periods of work stoppages
e. (U.S. fixed investment in nonresidential producer durable industrial equipment, 1992$)/(Gross Domestic Product, 1992$)
f. 1990$ exchange rate index, weighted average, U.S. dollar vs. 18 countries, Morgan Guaranty. A polynomial distributed lags was used in the employment equation for the metals industry (the exchange rate statistic reported is a summation of the lags).
g. Exports of Computer Goods, nominal $
h. (U.S. investments in information processing equipment)/(Gross Domestic Product) in nominal $
i. Regional retail trade employment
j. U.S. employment in Finance, Insurance & Real Estate (FIRE)
k. Regional total personal income, 1992$
l. Regional proxy of per capita share of U.S. consumption of medical services, 1992$
m. U.S. exports of Services, total, 1992$
n. U.S. Service employment, less employment in health services (SIC 80)

Each employment equation is specified in log-log form and estimated using OLS and corrected for autocorrelation. Since the data are quarterly frequency, the Durbin-Watson statistic that we report is modified to detect the existence of a fourth-order autocorrelation.[3] Durbin Watson statistics to test for first-order autocorrelation report generally nothing significant.

3.2 Forecast Results and Conclusions

Table 2. Employment Forecast

	1995			1996			1997			MAPE*
Wage & Salary Employment	**Forecast**	**Actual**	**%diff**	**Forecast**	**Actual**	**%diff**	**Forecast**	**Actual**	**%diff**	**1995-97**
Nonfarm, Total	813,288	812,800	0.06%	848,981	851,800	-0.33%	878,852	897,400	-2.07%	0.8%
Food Processing	9,875	10,100	-2.23%	9,855	10,000	-1.45%	9,985	9,700	2.94%	2.2%
Textile & Apparel	4,967	4,900	1.37%	4,957	4,600	7.76%	4,942	4,500	9.82%	6.3%
Lumber & Wood	7,666	7,800	-1.72%	7,449	7,700	-3.26%	7,218	7,800	-7.46%	4.1%
Paper & Pulp	6,956	7,100	-2.03%	6,641	6,500	2.17%	6,549	6,300	3.95%	2.7%
Printing	10,304	10,200	1.02%	10,469	9,900	5.75%	10,698	10,300	3.86%	3.5%
Metals	18,159	18,700	-2.89%	18,770	19,000	-1.21%	18,592	19,600	-5.14%	3.1%
Nonelectrical	18,496	18,700	-1.09%	19,032	19,900	-4.36%	19,432	21,300	-8.77%	4.7%
Electrical Mach. & Instruments	29,350	30,600	-4.08%	31,728	34,200	-7.23%	34,562	36,900	-6.34%	5.9%
Transportation	10,210	10,600	-3.68%	9,884	10,400	-4.96%	9,748	10,900	-10.57%	6.4%
Other Durable	10,049	8,200	22.55%	10,192	8,200	24.29%	10,193	8,300	22.81%	23.2%
Other Nondurable	7,957	8,000	-0.54%	8,469	8,800	-3.76%	8,669	9,400	-7.78%	4.0%
Construction & Mining	44,640	44,900	-0.58%	46,578	51,600	-9.73%	48,920	64,500	-24.16%	11.5%
Transp., Comm. & Utilities	46,926	47,800	-1.83%	48,708	49,400	-1.40%	50,461	50,600	-0.27%	1.2%
Wholesale Trade	63,077	61,800	2.07%	65,790	63,600	3.44%	67,959	66,700	1.89%	2.5%
Retail Trade	147,364	147,000	0.25%	155,832	153,100	1.78%	160,366	160,800	-0.27%	0.8%
FIRE	61,392	59,800	2.66%	64,379	63,000	2.19%	67,166	65,900	1.92%	2.3%
Health Services	55,847	56,100	-0.45%	57,167	57,700	-0.92%	58,892	59,100	-0.35%	0.6%
Nonhealth Services	170,243	169,900	0.20%	180,287	180,300	-0.01%	189,612	189,600	0.01%	0.1%
State & Local Government	89,810	90,600	-0.87%	92,794	93,900	-1.18%	94,888	95,200	-0.33%	0.8%

*Mean Absolute Percent Error

In total, the mean absolute percent error is under 0.8 of a percent for the forecast years 1995 to 1997 for nonfarm wage and salary employment. In particular, the employment equations for nonmanufacturing industries exhibit consistently lower MAPE's than the manufacturing and producer industry equations. The two highest being other nondurables (includes SIC 25, 32, and 39) and construction and mining. The high MAPE's do not necessarily point to a misspecification, but could mean that these two particular industries are just subject to wider variance. This is probably more likely in the manufacturing sector than in nonmanufacturing as the results reveal.

During this periods, the Portland Metro area has experienced above average employment growth which has exceeded the U.S. average. The regional model has apparently captured the current trend and seems to have produced reasonably accurate projections for this short term period. Of course as the forecast period extends out, we see increasing volatility from the 1994 base year. Nevertheless, we have deemed the regional forecast to be sufficient for our planning purposes and are generally pleased with the model's performance and accuracy.

In this paper, we have described the employment sector of the Portland Metro economic model. We took an econometrically estimated structural model and re-estimated each of its employment equations by embedding the technical coefficients of a national input-output table using the so-called inter-industry demand variable. The IDV is purported to indicate the degree of inter-industry trade between a particular industry and all others in the region.

The Metro formulation with the IDV is in log-log specification which in turn easily shows the degree of elasticity of this inter-industry relationship. A higher elasticity in the IDV term suggests greater economic relationship between the particular industry and other industries in the region. More inelastic IDV's suggest that the particular industry is more highly linked or dependent to national trends and trade conditions. All the regional employment IDV's indicate inelastic coefficients which suggest the latter regional inter-industry conditions may exist.

In closing, the IDV appears to be a useful explanatory variable. Integration of an input-output table produces significant parameter estimates, and also provides reasonable and statistically good fitting model equations overall. Sensitivity tests of the multiplier impacts (incomplete and not reported in this paper) also reveal reasonable results.

[3] Wallis test for fourth-order autocorrelation; J. Johnston, *Econometric Methods*, 3rd Edition, p. 317

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OVERHEAD SLIDES

GENERALIZED INDUSTRY EMPLOYMENT EQUATION

$$E_{jt} = \beta_j * IDV_{jt} + \sum_{a=1}^{m} \nu_{aj} N_{ajt} + \sum_{b=1}^{n} \rho_{bj} R_{bjt} + \varepsilon_{jt}$$

where,

E_{jt} = employment in industry *j* at time *t*
IDV_{jt} = inter-industry dependent variable for industry *j* at time *t*
N_{ajt} = national variables $a_1 \ldots a_m$ for industry *j* at time *t*
R_{bjt} = national variables $b_1 \ldots b_n$ for industry *j* at time *t*
β_j = regression parameter for inter-industry variable for industry *j* at time *t*
ν_{aj} = parameter estimate for national variables for industry *j*
ρ_{aj} = parameter estimate for national variables for industry *j*
ε_{jt} = stochastic error term for industry *j* at time *t*.

INTER-INDUSTRY DEMAND VARIABLE

$$IDV_{jt} = \sum_{\substack{i=1 \\ j \neq i}}^{n} C_{ij} E_{jt}$$

where,

C_{ij} = commodity by industry direct requirements coefficient (Take the *Use of Commodities by Industries* table and collapse this I-O table to reflect the desired industry aggregations as the regional economic model. C_{ij} is computed by adding together the desired aggregation of rows of commodities in the *Use of Commodities by Industries* table and dividing this sum by the column total of industry output.)

E_{it} = employment in industry *i* at time *t*

Table 1. Metro Regional Economic Model – Employment Equations

Industry	Intercept	Inter-Industry Demand Variable	Real Industry Wage Rate	Other Regional Explanatory Variable(s)	Industry Output Index	Industry Product-ivity Index	Other National Explanatory Variable(s)	Durbin-Watson	Adj.-R^2
Food Processing	0.8951 (4.33)	0.4313 (7.86)						1.43	0.90
Textile & Apparel	1.8235 (3.51)	0.5364 (3.24)			0.6339 (4.10)	-0.9456 (4.45)		2.06	0.96
Lumber & Wood Products	3.9579 (6.33)	0.1931 (3.49)	-0.7740 (4.45)	0.0392[a] (2.52)	0.1665 (2.17)		0.1259[b] (1.82) 0.1854[c] (3.05)	1.84	0.99
Paper & Pulp	2.8822 (5.37)	0.4538 (6.68)	-0.2147 (2.69)	Dummy[d]		-0.3167 (2.37)		2.12	0.86
Printing & Publishing	-0.8372 (2.36)	0.7828 (12.95)		Dummy[d]	0.5009 (12.95)	-0.2917 (1.75)		1.98	0.99
Metals	3.2341 (5.31)	0.6420 (11.08)	-0.3558 (2.18)	Dummy[d]			0.2324[e] (3.42) -0.1267[f] (1.84)		
Nonelectrical Machinery	0.1343 (0.52)	0.6500 (8.33)			0.2472 (3.98)	-0.1664 (2.03)	0.1307[g] (2.94)	1.98	0.99
Electrical Mach. & Instruments	1.6767 (2.47)	0.4399 (6.59)	0.4657 (2.88)		0.2203 (2.22)		0.2424[h] (2.37)	1.59	0.99
Transportation Equipment	1.5380 (1.63)	0.7122 (8.66)	-0.2629 (2.27)				-0.3074[f] (1.85)	1.94	0.93
Other Durable Goods	-1.1273 (2.20)	0.6684 (9.32)			0.3547 (3.11)			1.95	0.98
Other Nondurable Goods	-3.6252 (8.87)	0.6360 (7.08)			0.6457 (5.81)			1.87	0.99
Construction & Mining	-0.7889 (0.65)	0.4222 (5.91)		0.0490[a] (2.25)	0.3062 (4.38)			1.81	0.99
Transp., Comm. & Utilities	1.2896 (6.09)	0.6672 (15.98)				-0.0803 (3.00)		1.03	0.99
Wholesale Trade	1.0729 (4.14)	0.5493 (7.65)		0.2121[i] (2.60)		-0.0934 (2.04)		2.09	0.99
Retail Trade	-0.4829 (0.58)	0.2614 (7.46)				-0.1976 (4.61)			
Finance, Ins. & Real Estate	1.1425 (2.38)	0.4526 (3.18)		0.0207[a] (2.00)			4.4556[j] (1.91)	2.03	0.99
Health Services	-4.7777 (7.63)		-0.3480 (2.73)	0.40540[k] (4.01)			0.4933[l] (7.15)	2.13	0.99
Nonhealth Other Services	-0.0397 (0.11)	0.3706 (5.76)	-0.1535 (1.53)				0.1294[m] (4.09) 0.9847[n] (7.64)	1.70	0.99
State & Local Government	0.2365 (0.26)	0.2881 (5.21)	-0.2537 (4.95)					1.44	0.99

Table 1. *continued*

a. Regional building permits, number of dwelling units

b. (U.S. fixed investment in nonresidential structures, 1992$)/(Gross Domestic Product, 1992$)

c. (U.S. fixed investment in residential structures, 1992$)/(Gross Domestic Product, 1992$)

d. dummy variable(s) for periods of work stoppages

e. (U.S. fixed investment in nonresidential producer durable industrial equipment, 1992$)/(Gross Domestic Product, 1992$)

f. 1990$ exchange rate index, weighted average, U.S. dollar vs. 18 countries, Morgan Guaranty. A polynomial distributed lags was used in the employment equation for the metals industry (the exchange rate statistic reported is summation of the lags).

g. Exports of Computer Goods, nominal $

h. (U.S. investments in information processing equipment)/(Gross Domestic Product) in nominal $

i. Regional retail trade employment

j. U.S. employment in Finance, Insurance & Real Estate (FIRE)

k. Regional total personal income, 1992$

l. Regional proxy of per capita share of U.S. consumption of medical services, 1992$

m. U.S. exports of Services, total, 1992$

n. U.S. Service employment, less employment in health services (SIC 80)

Table 2. Employment Forecast

	1995			1996			1997			MAPE*
Wage & Salary Employment	**Forecast**	**Actual**	**%diff**	**Forecast**	**Actual**	**%diff**	**Forecast**	**Actual**	**%diff**	**1995-97**
Nonfarm, Total	813,288	812,800	0.06%	848,981	851,800	-0.33%	878,852	897,400	-2.07%	0.8%
Food Processing	9,875	10,100	-2.23%	9,855	10,000	-1.45%	9,985	9,700	2.94%	2.2%
Textile & Apparel	4,967	4,900	1.37%	4,957	4,600	7.76%	4,942	4,500	9.82%	6.3%
Lumber & Wood	7,666	7,800	-1.72%	7,449	7,700	-3.26%	7,218	7,800	-7.46%	4.1%
Paper & Pulp	6,956	7,100	-2.03%	6,641	6,500	2.17%	6,549	6,300	3.95%	2.7%
Printing	10,304	10,200	1.02%	10,469	9,900	5.75%	10,698	10,300	3.86%	3.5%
Metals	18,159	18,700	-2.89%	18,770	19,000	-1.21%	18,592	19,600	-5.14%	3.1%
Nonelectrical	18,496	18,700	-1.09%	19,032	19,900	-4.36%	19,432	21,300	-8.77%	4.7%
Electrical Mach. & Instruments	29,350	30,600	-4.08%	31,728	34,200	-7.23%	34,562	36,900	-6.34%	5.9%
Transportation	10,210	10,600	-3.68%	9,884	10,400	-4.96%	9,748	10,900	-10.57%	6.4%
Other Durable	10,049	8,200	22.55%	10,192	8,200	24.29%	10,193	8,300	22.81%	23.2%
Other Nondurable	7,957	8,000	-0.54%	8,469	8,800	-3.76%	8,669	9,400	-7.78%	4.0%
Construction & Mining	44,640	44,900	-0.58%	46,578	51,600	-9.73%	48,920	64,500	-24.16%	11.5%
Transp., Comm. & Utilities	46,926	47,800	-1.83%	48,708	49,400	-1.40%	50,461	50,600	-0.27%	1.2%
Wholesale Trade	63,077	61,800	2.07%	65,790	63,600	3.44%	67,959	66,700	1.89%	2.5%
Retail Trade	147,364	147,000	0.25%	155,832	153,100	1.78%	160,366	160,800	-0.27%	0.8%
FIRE	61,392	59,800	2.66%	64,379	63,000	2.19%	67,166	65,900	1.92%	2.3%
Health Services	55,847	56,100	-0.45%	57,167	57,700	-0.92%	58,892	59,100	-0.35%	0.6%
Nonhealth Services	170,243	169,900	0.20%	180,287	180,300	-0.01%	189,612	189,600	0.01%	0.1%
State & Local Government	89,810	90,600	-0.87%	92,794	93,900	-1.18%	94,888	95,200	-0.33%	0.8%