Staff Papers Series

P85-40 December 1985

FORECASTING OCCUPATIONAL REQUIREMENTS

IN LOCAL LABOR MARKETS

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Staff Papers are published without formal review within the Department of Agricultural and Applied Economics

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State and local planning and employment counseling agencies as well as higher education authorities, teachers and students seek a variety of occupational forecasts and projections. However, relatively little effort has been directed towards the construction and improvement of occupational employment forecasts. Presented in this paper is the proposition that such forecasts must incorporate both the gradual changes and the cyclical fluctuations in the representation of specific occupational trends in local labor markets.

Such forecasts require:

1. Accurate monitoring of industry and occupational employment changes on the local economy,

2. A method of tying the numbers of entrants into an occupation with the employment requirements of industry growth in the local economy (to allow the timely prediction of labor market area shortfalls or surpluses in available workers in particular occupations).

3. A strategy for using the economic projections in educational planning, occupational counseling, and career guidance.

The aim of this paper is to present a model of the local labor market that can provide essential information for various planning and educational purposes. Its presentation is organized topically with a

focus on (1) occupational data users and uses, (2) labor market information systems, (3) industry employment growth models, and (4) labor market impact assessments.

Occupational Data Users and Uses

Occupational data users are ubiquitous. Virtually everyone has an interest in the number and quality of job openings within a local or regional labor market.

In this study, four major groups are identified as the principal occupational data users. They include technology-intensive businesses, post-secondary educational institutions, state and local government agencies, and the person entering the labor market or seeking a change in current occupational status.

Technology-intensive businesses, by nature of their product and market orientation, are highly sensitive to the business cycle. They experience wide fluctuations in their demand for labor, particularly in the technology-related occupations, and their access to such a labor supply. These industries rely heavily on the availability of trained technical, professional and technical support personnel.

As the general economy recovers from recession, the "high tech" employers have increasing difficulty finding the kind of technical talent they need in their expanding production and marketing endeavors. Individual employers eventually will recruit such technically talented workers from other local labor markets. Proximity to large post-secondary educational institutions may be sought by such employers as one means of coping with labor shortages.[4]

From the supply side, the major potential clients of occupational forecasts are higher education institutions. The challenge facing

such insitutions is to accurately anticipate and direct educational programs in response to changing occupational requirements. The demand for and supply of teachers changes more slowly than the occupational qualifications of new entrants into the work force. Supply-side considerations critically influence educational programming decisions in ways that contribute to prolonged delays in adjusting the occupational distribution of new entrants to changing market conditions.

Because educational institutions are experiencing increasing costs per student and decreasing per capita public spending in real terms, cost-reducing strategies in post secondary education are increasingly important means of coping with reduced rates of increase in their financial support. To economize on the cost of student training, a dependable link between employment projections by occupation and training programs is being sought. When lagging supply fails to meet growing demands for skilled work force, the future growth of the local economy is being jeopardized.

State and local governments are directly involved in monitoring employment and indirectly in monitoring the occupational supply in local labor markets. Concern about the future of a state's economy and its ability to sustain growth lends support to the preparation and use of accurate occupational forecasts among state agencies. In some states, this concern has focused on particular occupational groups, for example, engineers, scientists, technicians and other skilled personnel in the technology-intensive industries. Accurate forecasts of the occupational composition of the local labor force, as well as the industry distribution of employment, are sought as essential

sources of information for occupational counseling and job creation in the local labor markets of these states.

The last major group of client, and the largest one, are individual participants in the labor market. These individuals--graduates of high schools, colleges, and other educational institutions and unemployed job seekers--are either new entrants to the job market or already employed workers seeking a change in occupations. Accurate monitoring of the supply of and the demand for occupational employment, by industry, facilitates the mobility of local labor force in general and professional and technical manpower in particular.

Labor Market Information Systems

Forecasting the demand for and supply of occupation-specific employment is complicated by the cyclical sensitivity of employment. Separations and replacements in the industry work force vary widely over the business cycle for each industry and each occupation. Because of industry interdependence in labor markets, accurate forecasting of occupational requirements depends on accurate forecasting of all industry requirements.

Lack of accurate and comprehensive statistics on new hires, quits, and transfers limits accurate forecasting of year-to-year change in occupational employment. While short-term employment changes are correlated closely with the general business cycle, long-term changes relate to changes in industry distribution and staffing pattern.

Valid forecasts and projections of occupational employment require the monitoring of industry changes and their causal factors, including those factors affecting industry market share as well as output per

worker. Such data are not readily acquired for regional labor market services linked to multi-state national labor market information systems that can provide locally-specific time series.

Regional labor market information systems, if available, would provide industry occupation profiles that show the differential shifts toward professional, technical, managerial, administrative, and clerical occupations from new entrants as well as the existing work force in blue-collar occupations. This shift parallels the overall shift in the U.S. from an industrial to a post-industrial, information-based society.[7] Such shifts are due to changes in industry growth and decline on the one hand and a host of occupational changes due to a variety of local and regional factors, such as shifts from one occupation or job to another, retirement, work disability, death, and other voluntary and involuntary changes in employment status.[3]

Demand for employment in a given occupation is represented by the total increase in employment which is equal to the total projected reduction in employment plus the net increase. The total projected reduction in employment is equal to the total employment shift to other occupations plus all transfers out of the employed labor force, either through unemployment or leaving the labor force altogether. For some occupations, such as elementary and secondary school teaching, large employment increase may be accompanied by equallly large employment decreases, with only small changes occuring in total employment. For some other occupations, however, a small net change may be accompanied by correspondingly small gross additions to and reductions from total employment, as in the case of the

health-diagnosing occupations.

On the other hand, labor supply in a labor market, by occupation, is represented by the total projected increase in labor force by occupation, plus total net employment due to occupational mobility. The result of this complex interplay between the demand-absorbing and supply-generating sources of occupational employment requires a dynamic model capable of forecasting occupational employment in a local labor market. A regional labor market information system would focus, therefore, on the factors accounting for region-to-region differences in the demand for and supply of various occupational skills.

Industry Employment Growth

The method used to prepare the occupational projections by industry is represented in a series of equations, starting with the industry distribution of total regional employment. This method shows how available labor market information in a given year is used in the preparation of future year industry-occupation profiles.

Let EMP be a n by m matrix that represents the staffing pattern of m occupations for n industries in a local labor market for a base year t. The row total of such a matrix represents the employment by industry and column total represent the employment by occupation.

$$\text{Row total, } EMP_i = \sum_{j=1}^{m} EMP_{ij}; \tag{1}$$

$$\text{Column total, } EMP_j = \sum_{t=1}^{n} Emp_{ij}; \tag{2}$$

$$\text{Total employment, } \sum_{i=1}^{n} EMP_{i\cdot} = \sum_{j=1}^{n} EMP_{\cdot j} = EMP.. \tag{3}$$

The EMP matrix is capable of converting direct industry demand to derived occupation demand. Thus, occupational requirements of the ith industry from the jth occupation is estimated by the ratio,

$$OR_{ij} = EMP_{ij}/EMP_{i}. \quad (4)$$

Total demand of an occupation by each local industry and total supply of the same occuption at year t+1 depends on the level of employment and net change in supply of labor force, by occupation, from period t to period t+1, as shown in Table 1. This table reveals the fact that in a disequilibrium labor market, job seekers (supply) is not equal to job openings by occupation in a given year. The net increase in jobs due to industry expansion is represented by (1) differences between a total increase due to new entrants and total decrease due to transfers out of the work force and (2) net inter-occupation mobility.

Thus, demand for an occupation and the supply of occupations are affected by occupational mobility, which is depicted by a transition matrix, as shown in Table 2. This table shows that rate of occupational mobility is smallest for professional and technical and largest for household service workers. These figures suggest that most of white-collar workers and blue-collar workers remained in the same occupation from 1980 to 1981.

Year-to-year variability in occupational employment is represented by separations from the work force in Table 23, which, for the 1980-81 period, varied from 11.2 percent of total professional and technical employment to 39.6 percent of the total employed household workers. The U.S. occupational change coefficients, by industry, are used because of the lack of corresponding data for Minnesota.

Table 1. Simulated changes in total employment in specified occupations due to occupational mobility and persons entering and leaving the work force, Minnesota, 1980-81.

No.	Occupation Title	Source of Job Seekers (number) Entering Work Force	From Other Occupations	Total	Source of Job Openings (number) Leaving Work Force	To Other Occupations	Total
1	Managers, Administrators	9460	13541	23001	9501	8133	17634
2	Management-Related	4262	5168	9430	3209	3385	6594
3	Aerospace Engineers	19	14	33	5	11	16
4	Chemical Engineers	110	39	149	12	28	40
5	Civil Engineers	269	192	461	78	132	210
6	Electrical Engineers	715	103	818	134	227	361
7	Industrial Engineers	797	300	1097	237	424	661
8	Mechanical Engineers	522	281	803	69	167	236
9	Metallurgical Engineers	38	19	57	9	14	23
10	Mining Engineers	16	10	26	6	11	17
11	Other Engineers	577	295	872	133	228	361
12	Architects, Surveyors	82	47	129	23	38	61
13	Mathematical Scientist	124	44	168	16	14	30
14	Computer Scientists	610	273	883	54	179	233
15	Operations Research	203	17	220	39	87	126
16	Chemists, Exc. Biochemist	137	101	238	40	34	74
17	Other Physical Scientist	88	58	146	20	17	37
18	Agriculture, Forestry, Food	41	43	84	15	12	27
19	Other Life Scientists	187	109	296	41	36	77
20	Health Diagnosing	195	493	688	134	161	295
21	Health Treating	495	1785	2280	470	372	842
22	Teachers, Excluding Post	5811	3911	9722	5759	3404	9163
23	Social Scientists	467	321	788	238	246	484
24	Social, Recreation Workers	2920	868	3788	1333	1610	2943
25	Lawyers, Judges	1952	643	2595	250	278	528
26	Writers, Enter., Athletics	3019	1723	4742	3071	2077	5148
27	Other Professionals	4125	2253	6378	1245	1408	2653
28	Health Technicians	3924	1130	5054	1082	836	1918
29	Engineers, Scientists Tech.	5167	1562	6729	1176	1562	2238
30	Computer Programmer	2200	697	2897	419	484	903
31	Other Technicians	2497	1022	3519	679	911	1590
32	Sales	16642	15586	32228	20047	19855	39902
33	Administrative Support	54686	36338	91024	45124	35257	80381
34	Services	51576	29389	81185	52476	31628	84104
35	Farm, Forestry, Fisheries	16307	3375	19682	18923	14045	32968
36	Production, Crafts	22715	19820	42535	18045	13447	31492
37	Operators, Assemblers, Laborers	44395	29516	73911	46573	31845	78418
	Total	257350	171086	428436	230185	172603	402788

Source: W. Maki and H. Akhavipour, "The Role of Technology Intensive Industry in Minnesota," MHTC, December 1984, Table 14.

Table 2 Percentage Distribution of Persons Employed in Specified Occupation in 1980, by Employment Status in 1981 and Replacements, 1980-90, U.S.[1/]

Occupation in 1980	Employment Status in 1981					Projected Replacements, 1980-90
	Remained in Occupation	Separations				
		Changed Occupation	Unemployed	Not in Labor Force	Total	
	(percent)					
White-collar Workers:						
Professional, Tech.	88.8	5.2	1.2	4.8	11.2	11.2
Manag., Adm.	88.4	5.9	1.5	4.1	11.6	11.6
Sales	76.7	11.0	2.6	9.8	23.3	23.3
Clerical	78.4	10.5	2.4	8.7	21.6	21.6
Service-Workers:						
Household	60.4	3.0	4.1	32.6	39.6	39.6
Other Service	72.5	10.7	3.9	12.8	27.5	27.5
Farm Workers:						
Farmers	87.6	2.1	.4	9.9	12.4	9.1
Farm Laborers	71.6	7.5	3.5	17.4	28.4	27.7
Blue-collar Workers:						
Craft	84.0	7.2	4.3	4.5	16.0	14.1
Operatives, exc. Tran.	76.0	9.7	7.1	7.3	24.0	20.9
Transport Equip. Oper.	80.6	9.2	5.2	5.1	19.4	17.0
Nonfarm Laborers	66.9	13.8	8.2	11.1	33.1	30.4
All Occupations	80.0	8.9	3.4	7.7	20.0	19.4

1/ Eck, Alan, "New occupational seperation data to improve estimates of job replacement needs", Monthly Labor Review, March 1984, p. 5-7.

For the 1980-81 period in the U.S., changes from one occupation to another accounted for the largest portion of total separations in all occupations, except service and farm workers. Occupational vacancy rates were the largest for household workers and smallest in the professional and technical occupations. Only 60.4 percent of household workers had remained in the same job from 1980 to 1981, while 88.8 percent professional and technical workers remained in the same occupation for the year.

As a result of a cyclically-changing economy, job replacement is not necessarily equal to job separation. Usually, net job expansions account for only a small share of year-to-year variability in occupational employment. Thus, even the most optimistic forecast of industry growth would account for only a small portion of year-to-year changes in occupational employment demand, by industry.

The data on occupational mobility is used in accounting for the redistribution of occupational employment among occupations. If OMC were to represent an occupational mobility ocefficient matrix of size m+1, then each element of OMC would show the percentage distribution of employed persons who either stay or change occupation from a sepcified occupation class. The diagonal elements of OMC would show the percentage of employed person who would stay in the same occupation from one period to the next. Row m + 1 of the OMC matrix shows the distribution of new entrants by occupation in the current period while column m+1 shows the distribution of new entrants by occupation in next period. Thus, each row of the transitional matrix represents the occupational distribution next year of this year's occupational employment.

Table 3 Percentage Distribution of Employed Persons Who Changed Occupations in Specified Occupation Class in January 1980, by Occupation in January 1981, U.S.[1/]

Occupation in 1980	Occupation in 1981								
	White-collar Workers						Blue-collar Workers		
	Prof., Tech.	Mgrs., Admin.	Sales Work.	Cler. Work	Svce. Work.	Farm Work.	Crafts, Trans., Labor.	Oper., exc. Trans.	All Occupations
	(percent)								
White-collar Workers:									
Professional, Tech.	47.0	16.5	4.7	12.7	7.2	0.3	9.2	2.3	100.0
Manag., Admin.	14.1	37.7	12.8	13.2	6.6	0.6	14.6	3.4	100.0
Sales	8.1	21.3	15.5	21.2	13.2	0.8	13.8	6.1	100.0
Clerical	12.0	10.6	7.3	50.5	8.5	0.1	7.8	3.3	100.0
Service Workers	7.0	6.9	5.8	18.5	31.9	0.7	18.5	10.8	100.0
Farm Workers	4.3	3.3	6.6	0.0	38.5	13.2	16.5	17.6	100.0
Blue-collar Workers:									
Craft	6.1	7.3	3.5	9.6	7.2	2.4	47.4	16.4	100.0
Transportation	4.2	6.1	5.5	14.6	7.4	1.9	41.1	19.1	100.0
Nonfarm Laborers	5.3	6.1	4.1	9.0	42.8	18.0	10.7	4.1	100.0
Operative Exc. Trans.	4.6	3.3	3.0	8.1	11.5	1.5	37.2	30.6	100.0
All Occupations	12.8	12.0	6.7	21.3	12.1	1.3	22.6	11.2	100.0

1/ Rytina, Nancy F., "Occupational changes and tenure, 1981", Monthly Labor Review, September 1982, p. 32.

Pre-multiplication of the occupational mobilty coefficents matrix, OMC, by the total employment in the corresponding occupational group yields a square matrix of total occupational employment, OE. Columns of OE represent the distribution of total employment by occupation in year t+1, while rows represent the distribution of total employment by occupation in year t.

We specify, futher a diagonal matrix, DEBO, of size m+1 which represents total employment by occupation in the current period. The last element of this diagonal is the total of new entrants in the next period.

Then, OE = OPMC * DEBO, (5)

where OE is the matrix of total emplyoment by occupation. Column sum of OE, $OE_{.j}$ provides the projection of total employment by occupation in year t+1.

Changing occupational distribution for each industry for the year t+1 is illustratd in Table 4. This table shows a shift in occupational employment from blue-collar to white-collar occupations, particularly to professional and technical occupations. This shift is illustrated by the comparisons of occupational employment in 1972 and 1981 in the U.S. For example, employed persons in professional occupations increased in relative importance in the 1972-81 period in all major industry groups, except construction and retail trade. Data from table 4 could be used to construct matrix of occupational requirement, ORF, in year t+1.

We specify a diagonal matrix, DOE, of size m which represents total employment by occupation, $OE_{.j}$, in year t+1. Pre-multiplication of occupational requirement matrix, ORF, and diagonal matrix of

Table 4 Average annual change in percentage distribution of employed persons age 16 and over in specified occupation, by industry, U.S., 1972-1981 (U.S. Bureau of Labor Statistics).

Occupation	Agri-culture	Mining	Con-struction	Manufacturing		Tran., Comm., Util.	Trade		Fin., Ins., Real Est.	Services		Public Admin.	All Industry
				Nondurable	Durable		Whole-sale	Retail		Priv. Hsld.	Other		
						(percent)							
White-collar Workers:													
Prof., Tech.	0.05	0.23	-0.03	0.13	0.28	0.18	0.10	-0.01	0.13	0.10	0.11	0.31	0.25
Mgrs., Admin.	0.04	0.29	0.35	0.23	0.17	0.26	0.20	0.04	0.02	-0.01	0.12	0.15	0.18
Sales	0.01	0.03	0.03	0.04	0.01	0.04	0.14	-0.34	0.08	0.00	0.01	0.00	-0.01
Clerical	0.11	0.20	0.10	0.01	0.06	-0.05	-0.23	0.17	-0.02	0.02	0.08	-0.31	0.13
Service Workers:													
Private Household	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.32	0.00	0.00	-0.07
Other Service	0.05	0.01	0.01	-0.01	-0.02	0.01	0.01	0.44	-0.12	-0.02	-0.07	0.00	-0.03
Farm, For., Fish.	-0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.10
Blue-collar Workers:													
Craft & Kindred	0.08	-0.34	-0.07	0.04	-0.02	-0.13	0.05	-0.07	-0.02	0.05	0.02	-0.09	-0.05
Oper., Exc. Trans.	0.00	-0.01	0.03	-0.43	-0.32	-0.01	-0.11	-0.24	0.00	0.02	-0.04	-0.02	-0.21
Trans. Equip.	0.00	-0.20	-0.07	-0.03	-0.05	-0.12	-0.17	-0.03	-0.01	-0.04	-0.01	0.00	-0.04
Nonfarm Labor.	0.32	-0.20	-0.35	0.02	-0.11	-0.18	0.01	0.04	-0.06	0.18	-0.02	-0.04	-0.05

employment by occupation, DOE, yields a matrix of occupation profile at t+1, as shown by the form,

$$EMP = ORF * DOE. \quad (6)$$

Labor Market Impact Assessments

A large portion of labor force enters and leaves the labor market each year. In addition, it is known that large flows are occuring strictly within the labor force, as many workers move from employment to unemployment and vice versa. However, the large volume of outflow and inflow in a local labor market is due to occupational mobilty. Local labor market information system, even if available, often lacks accurate data and procedures for monitoring the inflow and the outflow of labor force by employment and occupation status.

Occupational mobility, which acounts for most of the year-to-year variablility in occupational employment, is related to educational status. The number of years of education completed also correlated with place-to-place variability in occupational employment.

Professional and technical occupations greatly out-number all other occupations in years of education completed. Increases in the educational attainment of the employed work force have been most rapid, however, among service and blue-collar occupation. Although most workers in professional specialty occupations continue to end their formal education at the baccalaurate level, advanced degrees have increasingly become an expectation for professional status in many of other occupations.

Although the assumptions that differentiate employment projection scenarios results in various rates of growth for most jobs in a local

labor market, changes in the occupational composition of total employment in each industry remain similar for all versions and generally correspond to past trends. For example, for the past two decades employment continues to grow in the service industry and decline in farming. Thus, employment continues to expand more rapidly in service occupations than in other categories.

Although the occupational structure of total employment may correspond to past trends, some occupations are more sensitive than others to the differences in underlying assumptions about future employment growth of a local market. Generally, jobs which are concentrated in manufacturing in general, and technology-intensive manufacturing industries in particular, are most affected. In contrast, occupations which are concentrated in government are relatively unaffected.

Growth rates are expected to vary greatly within this broad categories, because demographic changes, technological developments and shifts in the demand for goods and service affect major occupational categories differently. For example, anticipated decreases in the teenage population and increases in the number of elderly persons in the 1980's will reduce secondary schoolteacher requirements while increasing demand for nursing services. On the other hand, the productivity of nursing care services is probably increasing as a result of cost-reducing measures imposed by government.

Conclusion

Forecasting the demand for and supply of occupation-specific

employment is complicated, particularly in professional and technical occupations, because of cyclical and structural changes affecting industry employment requirements. This paper presents, in a systematic way, the use of available market information in constructing employment-occupation profiles for current and future years. It demonstrates the use of available published data on sources of job seekers and sources of job openings, in conjunction with projected levels of employment by industry, in constructing industry-occupation profiles for a local labor market.

Using 1970 and 1980 Census of Population data and BLS industry occupation employment series, among other data sources, Minnesota industry-occupation requirements have been projected to 1985 and 1990. These data are presented for a 53-occupation, 75-industry breakdown classification of the Minnesota economy.

The occupational forecasts in this study capture occupation-specific implications of the shift in occupational employment from blue-collar to white-collar occupations, particularly to professional and technical. The overall summary projection series are presented in Table 5.

Table 5 Total employment in specified occupations (Baseline Series) in Minnesota, 1988- 1990.

Occupation No.	Title	Estimated 1988 (number)	Projected 1995 (number)	Projected 1998 (number)	Change, 1988-95 Total (number)	Change, 1988-95 Annual Rate (percent)	Change, 1995-98 Total (number)	Change, 1995-98 Annual Rate (percent)
1	Managers, Administors	170610	190637	213792	20027	2.3	23155	3.6
2	Management-Related	57629	65707	74596	8078	2.8	8889	2.7
3	Aerospace Engineers*	221	270	319	49	4.4	49	3.6
4	Chemical Engineers*	564	670	780	106	3.8	110	3.3
5	Civil Engineers*	3003	3187	3426	184	1.2	239	1.5
6	Electrical Engineers*	5582	6874	7762	1292	4.6	888	2.6
7	Industrial Engineers*	4559	5196	6015	637	2.8	819	3.2
8	Mechanical Engineers*	3663	4065	4683	402	2.2	618	3.0
9	Metallurgical Engeers*	287	297	343	10	0.7	46	3.1
10	Mining Engineers*	213	169	188	- 44	-4.1	19	2.2
11.	Other Engineers*	4448	5149	5893	700	3.1	744	2.9
12	Architects, Survey.*	754	828	932	74	2.0	104	2.5
13	Mathematical Scienceors*	662	813	990	151	4.6	177	4.4
14	Computer Scientists*	4504	5414	6522	910	4.0	1108	4.1
15	Operations Research*	1231	1522	1859	291	4.7	337	4.4
16	Chemists,Exc.Biochists*	1661	1959	2270	298	3.6	311	3.2
17	Other Physical Scienists*	820	904	1032	84	2.0	128	2.8
18	Agriculture, Forestry, Food*	607	678	738	71	2.3	60	1.8
19	Other Life Scientist*	1710	2018	2312	308	3.6	294	2.9
20	Health Diagnosing	9511	11330	13036	1819	3.0	1706	3.0
21	Health Treating	33558	39441	45069	5891	3.5	5628	2.9
22	Teachers,Excluding Post	66217	71484	77508	5267	1.6	6024	1.7
23	Social Scientists	4856	5563	6304	707	2.9	741	2.7
24	Social, Recreation Workers	13938	16156	18517	2218	3.2	2361	2.9
25	Lawyers, Judges	10881	14285	17976	3404	6.3	3692	5.2
26	Writers,Entertainers	25746	28773	33030	3027	2.4	3857	3.5
27	Other Professionals	28235	31463	34971	3228	2.3	3508	2.8
28	Health Technicians	18589	22110	25340	3521	3.0	3230	2.8
29	Engineers,Science Tech.	24604	28470	32910	3866	3.1	4440	3.1
30	Computer Programmer*	10482	12888	15694	2406	4.6	2806	4.4
31	Other Technicians	14211	15789	18100	1578	2.2	2311	2.9
32	Sales Representative	72289	77293	86613	5004	1.4	9320	2.4
33	Other Sales	131935	132768	138715	833	0.1	5947	0.9
34	Computer Operators	15016	17037	18851	2021	2.7	1814	2.1
35	Secretary Stenographer	101290	105702	112927	4412	0.9	7225	1.4
36	Records Processing	68994	74213	80589	5219	1.5	6376	1.7
37	Schedule Distribution	48540	51838	59356	3298	1.4	7518	2.9
38	Other Administration	123931	132309	143199	8378	1.4	10890	1.6
39	Protective Services	36273	38685	41203	2412	1.3	2518	1.3
40	Food Services	110214	119928	132052	9714	1.8	12124	2.8
41	Health Services	37769	44090	49670	6321	3.3	5580	2.5
42	Cleaning,Bldging Service	63363	69660	76084	6297	2.8	6424	1.8
43	Personal Services	52741	57498	63496	4757	1.8	5998	2.1
44	Farm, Forestry, Fisheries	160758	146104	127844	-14654	-1.8	- 18260	-2.5
45	Mechanics	74079	80653	90253	6574	1.8	9600	2.4
46	Construction	71764	66633	67770	- 5131	-1.4	1137	0.4
47	Extractive	2285	1451	1416	- 734	-6.8	- 35	-0.5
48	Precision Production	74561	72047	75691	- 2514	-0.7	3644	1.8
49	Machine Operators	91625	88446	86335	- 3179	-0.7	- 2111	-0.5
50	Fabricators, Assemblers	60762	57467	56211	- 3295	-1.1	- 1256	-0.4
51	Truck Drivers	45171	43838	43801	- 1333	-0.6	- 37	-0.1
52	Other Transportation	32819	31894	31341	- 925	-0.6	247	0.1
53	Handlers, Laborers	79611	80571	81927	960	0.2	1356	0. 3
54	Total	2078099	2153162	2308081	75063	0.7	154919	1.4

* Engineers, scientists, and computer programmers in the 10 technology-intensive industies.

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