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Developing a Simple Predictive Model for Job Growth in the Tertiary and Quaternary Sectors: Predicting Employment Based Upon Anticipated Population Growth

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Abstract

During times of economic growth, educators and civic leaders need a simple model for predicting employment growth in the tertiary and quaternary employment sectors, at least until more detailed predictive models can be applied. This paper proposes two simple models based on peer community and per-capita employment levels. The models are based on the assumption that employment in the tertiary and quaternary sectors is, for the most part, a by-product of population size. The proposed models allow educators to make early predictions and begin the process of recruiting, training, and educating an expanding workforce in areas most likely to need additional skilled labor.

Keywords: tertiary employment, quaternary employment, job growth, job forecasting, workforce development

1. Introduction

Growth is an eventual component of the economic cycles that affect our daily lives. While we often measure and view economic growth on a national scale, the economic changes we see as growth, contractions, stagnations, etc., are felt as regional phenomenon driven by regional changes in business activity. When plans are announced for new business activity within a specific geographic region, it is common for political leaders and educators in the region to offer whatever assistance they can to encourage and enhance economic growth, including efforts to train and educate the local workforce (ex. Jolley 2011).

An increase in the number and types of jobs available in a region will typically increase the population of the region as well, as more workers move in to take advantage of available jobs. This growth in population may, in turn, increase the attractiveness of business expansion in the tertiary and quaternary job sectors as the larger population demands more services.

While job predictions in the primary and secondary markets are often available from those employers who are preparing for business expansion, it is more difficult to predict growth in the tertiary and quaternary markets. Simulation models have been used for predictive purposes, but they typically require a wealth of information about current and predicted employment and income levels (Thompson & Black 1975). Community leaders and educators need a simple model for prediction which can be used to begin the process of training and educating an expanding workforce, at least until more complex predictive models can be applied.

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This paper proposes two simple models based on peer community and per-capita employment levels. The application of these models may allow educators to make quick predictions and begin the process of recruiting students for future employment in areas most likely to need a larger skilled labor force.

2. Developing a Predictive Model

The need for a simple predictive model was noted in 2013 with the announcement of planned industrial expansion in Southwest Louisiana. As a test case, the five-parish region of Southwest Louisiana was selected. This region consists of Allen, Beauregard, Calcasieu, Cameron, and Jeff Davis parishes and is a recognized metropolitan area commonly referred to as Southwest Louisiana (SWLA). As reported in the 2010 U.S. census, the region claims a population of over 292,000 (U.S. Department of Commerce Census Bureau). The primary industrial, business and population center is in and around the city of Lake Charles (in Calcasieu Parish) and the major industries in the region include agriculture and livestock, forestry, fishing, oil and natural gas production and petroleum and chemical refining.

Though severely damaged by Hurricane Rita in 2005, SWLA later prospered as local reconstruction efforts helped offset national economic declines and a collapse of the national housing market.

Recent technological breakthroughs in oil and natural gas extraction and refinement as well as lower prices for natural gas are now driving economic activity for the region with considerable growth predicted in the short to mid-term future.

Historically the region's economy has fluctuated with the rises and falls of the oil and natural gas industry. Given this history, local leaders have witnessed previous eras of "boomtown" growth, many with long-term "busts" following the "boom." Hoping to avoid repeating past failures, area leaders and educational institutions are attempting to coordinate efforts to help the region meet future workforce requirements in a way that can stabilize long-term employment in the region. Specific objectives include a high utilization of the existing workforce and the support of long-term economic growth after the initial construction phase. Preparation thus far has centered largely on the workforce needs of the primary and secondary employment sectors (notably the petrochemical industry and related industries). These needs have been mostly identified as part of each organization's strategic plan and human resource planning efforts. Human resource needs have been communicated to educational and training institutions and efforts are made to encourage sufficient enrollment and to align training and educational activities with regional resource needs.

What has been more difficult for educational institutions is predicting workforce needs in the tertiary and quaternary employment sectors. Businesses in these sectors are primarily in a reactionary position, as they are unable to accurately forecast employment needs by function. Educational and training institutions are thus in a reactionary position as well, as they too find it difficult to predict jobs growth and training needs in such types of markets.

2.1 Economic Sectors

A nation's economy can be divided into various sectors for the purpose of categorizing labor and work activity. The five basic sectors are 1) Primary, 2) Secondary, 3) Tertiary, 4) Quaternary, and 5) Quinary.

Work in the primary sector extracts or harvests products from the earth. This sector includes the production of raw materials and basic foods.

Activities associated with the primary sector include agriculture, mining, forestry, fishing and quarrying. The packaging and processing of the raw material associated with this sector is also considered to be part of this sector.

Work in the secondary sector manufactures finished goods. All of manufacturing, processing, and construction lies within the secondary sector. This includes automobile production, chemical and engineering industries, energy utilities and construction.

The tertiary sector of the economy is the service industry. This sector provides business-to-business and business-to-consumer services. Activities associated with this sector include retail and wholesale trades, transportation and distribution, entertainment, restaurants, clerical services, media, tourism, insurance, banking, healthcare, and law.

The quaternary sector consists of intellectual activities. Activities associated with this sector include government, culture, libraries, scientific research, education, and information technology.

The quinary sector is often considered a branch of the quaternary sector. The quinary sector includes top executives or officials in such fields as government, science, universities, nonprofits, healthcare, and the media.

3. Industry Growth in SWLA

Planned industry growth in Southwest Louisiana (SWLA) includes $65 billion in capital investment and includes the following project investments (SWLA Chamber Report 2013; SWLA Chamber Projects Report 2012-2019):

- Belle Savanne - $230 million capital investment
- Big Lake Fuels - $1.3 billion capital investment
- Boise Inc. - $113 million capital investment
- BP Biofuels - $400 million capital investment
- CB&I/Shaw Modula Solutions - $100 million capital investment
- Cheniere Energy - $20 billion capital investment
- Coushatta Casino Resort - $60 million capital investment
- Golden Nugget/Pinnacle/Ameristar - $580 million capital investment
- IFG Port Holding/New Grain Terminal - $59.5 million capital investment
- Juniper GTL - $100 million capital investment
- Lake Charles Clean Energy (Leucadia) - $2.6 billion capital investment
- Lake Charles LNG (Trunkline LNG Export) - $9 billion capital investment
- Lakes at Morganfield - $350 million capital investment
- Leucadia National Corporation/LC Cogeneration - $2.6 billion capital investment
- Magnolia LNG - $3.5 billion capital investment
- National Hurricane Museum - $66 million capital investment
- SASOL Ethylene Tetramerization - $175 million capital investment
- SASOL GTL & Derivatives - $16 billion capital investment
- Sempra/Cameron LNG - $9 billion capital investment
- Virtual Engineering Operations VEOPS - $100 million capital investment

The subtotal of projected capital investments is over $65 billion. It is anticipated that over 31,000 construction workers will be employed during peak construction years, expected to end between 2018 and 2020 (SWLA Chamber Report 2013; SWLA Chamber Projects Report 2012-2019). A more specific projection of workforce needs includes the following (SWLA Chamber Report 2013; SWLA Chamber Projects Report 2012-2019):

New Construction Jobs	31000+
New Permanent/Direct Jobs	6300+
New Permanent/Indirect Jobs	6300+
New Permanent/Induced Jobs	6200+

After construction is completed, as many as 18,000+ new permanent jobs will be added to the primary and secondary employment sectors to accommodate new production. New employment opportunities typically equate to population growth, as workers and their families move into the area to take advantage of the growing economy. It is predicted that the five-parish area classified as "Southwest Louisiana" may have as many as 50,000 new residents by the year 2020 (Schmidt 2013).

3.1 Estimations of Added Jobs and Population Increase

The planned capital investment and industrial growth in SWLA includes human resource planning with relatively detailed predictions of workforce needs and employee skills. What is less known are the workforce needs in the tertiary and quaternary sectors. In the U.S., more than 80% of the labor force is in the tertiary sector.

Regional planners, educational institutions, and vocational training facilities have long provided the education and specific training needed by the regional workforce. Collaborations between industries in the primary/secondary sectors with regional educational and training facilities have an established and productive history. However, the educational and training needs to satisfy growth in the tertiary and quaternary sectors is more difficult to predict when compared to growth in primary and secondary sectors, as this growth is not part of the planned expansion but rather the by-product of expansion and population growth.

4. Predictive Models for Tertiary and Quaternary Employment

Predictive models for tertiary employment were found to be relatively limited. A model designed by Thompson and Black (1975) and later validated by Thompson and Stollar (1983) utilizes the variables of 1) per capita income, 2) percentage of the populations in urban areas, 3) life expectancy at birth, 4) tourist expenditure per capita, and 5) labor force participation rates (Thompson & Black 1975; Thompson & Stollar 1983). This model was designed to have international applications in predicting employment levels in the tertiary or service sectors of an economy.

What may be most notable from the Thompson/Black model and applicable to the SWLA region are the relative influence of per capita income and labor force participation rates. The influx of new jobs to SWLA is likely to increase per capita income as the majority of new jobs are expected to pay at levels above the current median income for the region (SWLA Estimated Workforce Needs Report 2013). What is not known is if there will be any change to the current labor participation rate. It is also assumed that the degree of urbanization, life expectancy, and tourist expenditures per capita will remain relatively unchanged through this period of growth.

After evaluating the Thompson/Black model, it was concluded that data for the SWLA region relevant to the model is not easily accessible. It was also concluded that a more simplified and easily applicable model is desired.

In order to provide a reasonable estimate of future employment needs in the tertiary and quaternary sectors, this report develops two simple models to predict jobs growth. The models are based on the assumption that industry growth leads to population growth and the increased population leads to growth in the tertiary and quaternary sectors.

4.1 Model 1

The first model is a peer group estimate. It is based upon employment data from other metropolitan areas with a population size similar to that which is predicted to reside in SWLA after the "boom" period of growth. This model assumes a logical relationship between the number of people living in a geographic area and the number of job specializations required to service the population. Thus the formula for Model 1 is as follows:

Model 1: $FE = \sum PE \div N$

Where: FE = Future Employment per job category
PE = Employment per job category among post-growth peers
N = Number of peer metropolitan areas

4.2 Model 2

The second predictive model calculates employment on a per-capita basis and applies this ratio to the assumed future population. A formula for each job category is created that develops the ratio for the number of jobs per current level of population. As population predictions increase, this ratio thus predicts the number of jobs required to service a larger population given the same ratio of current "jobs per population." Thus the formula for Model 2 is as follows:

Model 2: $CR = \frac{CE}{CP}$

$FE = CR \times GP$

Where: FE = Future Employment per job category
CR = Current Ratio of employment per category
CE = Current Employment per job category
CP = Current Population
GP = Growth Population (expected future population size)

The two-model approach provides both potential advantages and potential weaknesses in estimating employment growth. Probable limitations include:

- Each metropolitan area may have a unique industry base that, in turn, skews or biases the number of jobs in those specific areas. For example, the petrochemical industry in SWLA is not replicated in most of the other metropolitan areas in the study.
- Each metropolitan area will have a unique culture and population base, influencing demand in various markets of the tertiary and quaternary sectors.
- As noted in the Thompson/Black model, variations of per capita income, urban density, and labor force participation rates may create significant variances among tertiary employment within the peer regions used in the study (Thompson & Black 1975; Thompson & Stollar 1983).

4.3 Model 1 - Data Collection and Comparison Process

Based on 2010 census data, the population for the five-parish region of Southwest Louisiana (SWLA) is approximately 292,000 persons (U.S. Department of Commerce Census Bureau). Based on an assumed growth of about 50,000 people (Schmidt 2013), a "post growth" permanent population of approximately 342,000 is the baseline for this study. To make a comparison, metropolitan areas in the US ranging in population between 330,000 and 360,000 were selected (10 metropolitan areas were found).

Those areas selected are:

1. Ann Arbor MI
2. Eugene, OR
3. Hickory-Lenoir-Morganton, NC
4. Huntington-Ashland, WV-KY-OH
5. Kalamazoo-Portage, MI
6. Naples-Immokalee-Marco Island, FL
7. Ocala, FL
8. Rockford, IL
9. Savannah, GA
10. Trenton, NJ

With data taken from The Bureau of Labor Statistics, the number of jobs listed in each of the provided job categories from these ten metropolitan areas was collected and averaged. This average is presumed to represent the potential number of jobs likely to be required in SWLA given the potential population growth of the region (Table 1, Comparison Model Prediction).

4.4 Model 2 – Overall Predictions and Development of Per-Capita Rules of Thumb

Given the variations in regional employment and the affects of cultural and industrial variation on employment needs, a second method of "jobs per capita" was also calculated. Using current employment numbers, the per capita number of jobs given the existing population was set as the base measure. This formula is then adjusted for the expected increase in population of approximately 342,000 persons (Tables 1, Per Capita Model Predictions).

Data for the two models was taken from the Louisiana Workforce Commission Occupational Wage Data 2012 (Louisiana Workforce Commission Occupational Wage Data 2012) and the United States Department of Labor Bureau of Labor Statistics.

5. Conclusion

For those involved in workforce development, education, and training, forecasts in the tertiary and quaternary sectors are a needed tool. It is assumed that no single model will provide a perfect prediction, but it is hoped that these simple models will provide sufficient accuracy while also providing flexibility and ease of use as future population predictions are adjusted. It is hoped that the two proposed models will create a predictive range that is reasonably accurate and useful to those responsible for developing our future workforce.

In closing, such a large capital investment in the SWLA region ensures some measure of economic change. It is highly likely this change will include economic growth and a considerable increase in the permanent population. Increased industrial activity and a population increase will in-turn create a greater demand for the goods and services provided through the tertiary and quaternary markets, thus fueling growth in these markets. To prepare for this growth, two predictive models are combined to provide a suggested range of change to our regional employment markets.

The comparison model for predicted change is limited by the fact that no two metropolitan areas are the same regarding culture, industry, and thus basic employment demands. The per-capita model fails to capture potential economies of scale as businesses grow and may thus provide an oversimplified and/or overstated expectation for jobs growth. It is hoped that the two models together can create a realistic range of expectations in jobs growth that are of benefit to planners, educators, and business managers in our region.

It should also be noted many of the jobs listed in Table 1 can be classified as part of both the tertiary and/or primary/secondary sectors.

For example, an accountant may work at a public accounting firm (tertiary) or an accountant may work as a corporate accountant for a mining company (primary). Therefore, the jobs listed in Table 1 were included if they may fit the tertiary/quaternary sectors and it is expected that the listed jobs are not included as part of the job requirements publicized by major industries in the region.

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Table 1: Comparison Models for Predicted Jobs Growth (Occupations Listed by Job Classification)

	SWLA Current Employment	Comparison Model Prediction	Per Capita Model Prediction	Range of Change	
Management Occupations					
Marketing Managers	40	172	47	7	132
Sales Managers	140	296	164	24	156
Administrative Services Managers	160	292	187	27	132
Computer and Information Systems Managers	60	302	70	10	242
Financial Managers	190	490	222	32	300
Transportation, Storage, and Distribution Managers	60	88	70	10	28
Human Resources Managers	60	132	70	10	72
Education Administrators, Elementary and Secondary School	380	273	444	0	64
Education Administrators, All Other	30	60	35	5	30
Food Service Managers	90	191	105	15	101
Gaming Managers *	70	0	82	0	12
Medical and Health Services Managers	190	324	222	32	134
Postmasters and Mail Superintendents	30	40	35	5	10
Property, Real Estate, and Community Association Managers	160	170	187	10	27
Social and Community Service Managers	80	147	93	13	67
Managers, All Other	120	383	140	20	263
Business and Financial Management Occupations					
Wholesale and Retail Buyers, Except Farm Products	30	89	35	5	59
Purchasing Agents, Except Wholesale, Retail, and Farm Products	170	311	199	29	141
Cost Estimators	160	179	187	19	27
Employment, Recruitment, and Placement Specialists *	120	0	140	0	20
Compensation, Benefits, and Job Analysis Specialists	30	90	35	5	60
Training and Development Specialists	60	189	70	10	129
Market Research Analysts	100	235	117	17	135

	SWLA Current Employment	Comparison Model Prediction	Per Capita Model Prediction	Range of Change	
Business Operations Specialists, All Other	440	1283	514	74	843
Accountants and Auditors	650	990	760	110	340
Personal Financial Advisors	70	184	82	12	114
Loan Officers	240	209	280	0	40
Tax Examiners, Collectors, and Revenue Agents	30	82	35	5	52
Tax Preparers	40	68	47	7	28
Computer & Mathematical Occupations					
Computer Systems Analysts	90	294	105	15	204
Information Security Analysts	30	120	35	5	90
Computer Programmers	90	353	105	15	263
Web Developers	30	98	35	5	68
Network and Computer Systems Administrators	70	281	82	12	211
Computer Network Support Specialists	80	94	93	13	14
Computer Occupations, All Other	30	259	35	5	229
Architecture & Engineering Occupations					
Surveyors	30	40	35	5	10
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	90	35	105	0	15
Architectural and Civil Drafters	80	69	93	0	13
Civil Engineering Technicians	120	88	140	0	20
Surveying and Mapping Technicians	60	54	70	0	10
Life, Physical, & Social Science Occupations					
Environmental Scientists and Specialists, Including Health	50	186	58	8	136
Biological Technicians	60	720	70	10	660
Life, Physical, and Social Science Technicians, All Other	30	1965	35	5	1935
Community & Social Services Occupations					
Educational, Vocational, and School Counselors *	290	0	339	0	49
Mental Health Counselors	50	151	58	8	101
Rehabilitation Counselors	50	113	58	8	63
Counselors, All Other	50	47	58	0	8
Child, Family, and School Social Workers	120	280	140	20	160
Mental Health and Substance Abuse Social Workers	90	136	105	15	46
Health Educators	40	56	47	7	16
Probation Officers and Correctional Treatment Specialists	120	85	140	0	20
Social and Human Service Assistants	220	404	257	37	184
Community and Social Service Specialists, All Other	180	156	210	0	30
Legal Occupations					
Lawyers	300	538	351	51	238
Paralegals and Legal Assistants	160	215	187	27	55
Title Examiners, Abstractors, and Searchers *	30	0	35	0	5
Education, Training, & Library Occupations					
Vocational Education Teachers, Postsecondary	140	140	164	0	24
Kindergarten Teachers, Except Special Education	270	155	316	0	46
Elementary School Teachers, Except Special Education	1280	1368	1496	88	216
Middle School Teachers, Except Special and Vocational Education	720	713	841	0	121
Secondary School Teachers, Except Special and Vocational Education	1140	953	1332	0	192
Vocational Education Teachers, Secondary School *	150	0	175	0	25
Special Education Teachers, Preschool	120	300	140	20	180
Special Education Teachers, Kindergarten, and Elementary School	430	300	503	0	73
Special Education Teachers, Middle School	170	125	199	0	29
Special Education Teachers, Secondary School	250	174	292	0	42
Adult Literacy, Remedial Education, and GED Teachers and Instructors*	30	0	35	0	5
Self-Enrichment Education Teachers	100	240	117	17	140
Librarians	140	156	164	16	24
Library Technicians	170	109	199	0	29
Instructional Coordinators	140	131	164	0	24
Teacher Assistants	1060	1525	1239	179	465
Education, Training, and Library Workers, All Other	50	258	58	8	208
Arts, Design, Entertainment, Sports, & Media Occupations					
Floral Designers	60	51	70	0	10
Graphic Designers	60	202	70	10	142
Public Relations Specialists	50	183	58	8	133
Photographers	30	43	35	5	13
Healthcare Practitioners & Technical Occupations					
Chiropractors	30	50	35	5	20
Dietitians and Nutritionists	40	81	47	7	41

	SWLA Current Employment	Comparison Model Prediction	Per Capita Model Prediction	Range of Change	
Pharmacists	390	351	456	0	66
Family and General Practitioners	80	156	93	13	76
Pediatricians, General	30	50	35	5	20
Surgeons	50	75	58	8	25
Physicians and Surgeons, All Other	70	380	82	12	310
Physician Assistants	30	139	35	5	109
Occupational Therapists	90	129	105	15	39
Physical Therapists	180	241	210	30	61
Respiratory Therapists	80	127	93	13	47
Speech-Language Pathologists	120	149	140	20	29
Veterinarians	40	76	47	7	36
Registered Nurses	2150	3759	2513	363	1609
Nurse Anesthetists	40	80	47	7	40
Nurse Practitioners	80	138	93	13	58
Medical and Clinical Laboratory Technicians	100	189	117	17	89
Medical and Clinical Laboratory Technologists	190	144	222	0	32
Cardiovascular Technologists and Technicians	90	118	105	15	28
Diagnostic Medical Sonographers	40	76	47	7	36
Nuclear Medicine Technologists	30	50	35	5	20
Radiologic Technologists and Technicians	210	266	245	35	56
Emergency Medical Technicians and Paramedics	270	285	316	15	46
Dietetic Technicians *	30	0	35	0	5
Pharmacy Technicians	370	441	432	62	71
Surgical Technologists	100	114	117	14	17
Veterinary Technologists and Technicians	40	116	47	7	76
Licensed Practical and Licensed Vocational Nurses	1260	699	1473	0	213
Medical Records and Health Information Technicians	180	205	210	25	30
Opticians, Dispensing	60	84	70	10	24
Health Technologists and Technicians, All Other	30	123	35	5	93
Occupational Health and Safety Specialists	80	117	93	13	37
Healthcare Practitioners and Technical Workers, All Other	50	57	58	7	8
Healthcare Support Occupations					
Home Health Aides	740	1021	865	125	281
Psychiatric Aides	150	320	175	25	170
Nursing Assistants	1540	1816	1800	260	276
Physical Therapist Aides	90	85	105	0	15
Physical Therapist Assistants	90	79	105	0	15
Dental Assistants	220	317	257	37	97
Medical Assistants	400	694	467	67	294
Medical Equipment Preparers	30	83	35	5	53
Medical Transcriptionists	70	101	82	12	31
Veterinary Assistants and Laboratory Animal Caretakers	80	97	93	13	17
Phlebotomists	160	118	187	0	27
Healthcare Support Workers, All Other	100	150	117	17	50
Protective Service Occupations					
First-Line Supervisors/Managers of Correctional Officers	130	83	152	0	22
First-Line Supervisors/Managers of Police and Detectives	170	133	199	0	29
First-Line Supervisors/Managers of Fire Fighting and Prevention Workers	100	73	117	0	17
First-Line Supervisors/Managers, Protective Service Workers, All Other	40	87	47	7	47
Fire Fighters	330	321	386	0	56
Correctional Officers and Jailers	1000	775	1169	0	169
Detectives and Criminal Investigators	220	101	257	0	37
Police and Sheriff's Patrol Officers	840	575	982	0	142
Security Guards	1010	873	1180	0	170
Crossing Guards	120	130	140	10	20
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	60	148	70	10	88
Food Preparation & Serving Related Occupations					
Chefs and Head Cooks	130	120	152	0	22
First-Line Supervisors/Managers of Food Preparation and Serving Workers	930	880	1087	0	157
Cooks, Institution and Cafeteria	440	418	514	0	74
Cooks, Restaurant	600	1321	701	101	721

	SWLA Current Employment	Comparison Model Prediction	Per Capita Model Prediction	Range of Change	
Cooks, Short Order	450	150	526	0	76
Food Preparation Workers	2090	901	2443	0	353
Bartenders	650	540	760	0	110
Combined Food Preparation and Serving Workers, Including Fast Food	1320	3286	1543	223	1966
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	400	526	467	67	126
Waiters and Waitresses	2460	2716	2875	256	415
Food Servers, Nonrestaurant	80	283	93	13	203
Dining Room and Cafeteria Attendants and Bartender Helpers	330	336	386	6	56
Dishwashers	300	584	351	51	284
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	200	378	234	34	178
Food Preparation and Serving Related Workers, All Other	30	120	35	5	90
Building & Grounds Cleaning, & Maintenance Occupations					
First-Line Supervisors/Managers of Housekeeping and Janitorial Workers	110	178	129	19	68
First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers	60	157	70	10	97
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	1560	2056	1823	263	496
Maids and Housekeeping Cleaners	1190	1023	1391	0	201
Landscaping and Groundskeeping Workers	460	1100	538	78	640
Pesticide Handlers, Sprayers, and Applicators, Vegetation	30	70	35	5	40
Personal Care & Service Occupations					
Gaming Supervisors *	390	0	456	0	66
First-Line Supervisors/Managers of Personal Service Workers	100	155	117	17	55
Gaming Dealers *	1240	0	1449	0	209
Amusement and Recreation Attendants	120	315	140	20	195
Entertainment Attendants and Related Workers, All Other *	30	0	35	0	5
Funeral Attendants	40	60	47	7	20
Morticians, Undertakers, and Funeral Directors *	40	0	47	0	7
Hairdressers, Hairstylists, and Cosmetologists	190	371	222	32	181
Child Care Workers	530	642	619	89	112
Personal and Home Care Aides *	1320	0	1543	0	223
Fitness Trainers and Aerobics Instructors	30	376	35	5	346
Recreation Workers	230	436	269	39	206
Sales & Related Occupations					
First-Line Supervisors/Managers of Retail Sales Workers	1310	1362	1531	52	221
First-Line Supervisors/Managers of Non-Retail Sales Workers	120	206	140	20	86
Cashiers	4090	3486	4780	0	690
Counter and Rental Clerks	290	438	339	49	148
Parts Salespersons	280	221	327	0	47
Retail Salespersons	3490	5042	4079	589	1552
Advertising Sales Agents	110	127	129	17	19
Insurance Sales Agents	310	303	362	0	52
Securities, Commodities, and Financial Services Sales Agents	110	301	129	19	191
Sales Representatives, Services, All Other	170	637	199	29	467
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1030	1398	1204	174	368
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	170	281	199	29	111
Sales and Related Workers, All Other	100	155	117	17	55
Office & Administrative Support Occupations					
First-Line Supervisors/Managers of Office and Administrative Support Workers	850	1296	993	143	446
Switchboard Operators, Including Answering Service	180	133	210	0	30
Bill and Account Collectors	270	326	316	46	56
Billing and Posting Clerks and Machine Operators	380	494	444	64	114
Bookkeeping, Accounting, and Auditing Clerks	1490	1577	1741	87	251
Gaming Cage Workers *	220	0	257	0	37
Payroll and Timekeeping Clerks	240	162	280	0	40
Procurement Clerks	50	61	58	8	11
Tellers	710	592	830	0	120
Court, Municipal, and License Clerks	140	204	164	24	64
Credit Authorizers, Checkers, and Clerks	30	60	35	5	30
Customer Service Representatives	710	2538	830	120	1828
Eligibility Interviewers, Government Programs	80	117	93	13	37
File Clerks	140	140	164	0	24
Hotel, Motel, and Resort Desk Clerks	220	259	257	37	39
Interviewers, Except Eligibility and Loan	80	323	93	13	243
Loan Interviewers and Clerks	60	125	70	10	65
New Accounts Clerks	80	92	93	12	13
Order Clerks	90	201	105	15	111
Human Resources Assistants, Except Payroll and Timekeeping	80	151	93	13	71

	SWLA Current Employment	Comparison Model Prediction	Per Capita Model Prediction	Range of Change	
Receptionists and Information Clerks	1110	1157	1297	47	187
Reservation and Transportation Ticket Agents and Travel Clerks	40	60	47	7	20
Information and Record Clerks, All Other	150	267	175	25	117
Couriers and Messengers	90	67	105	0	15
Police, Fire, and Ambulance Dispatchers	100	112	117	12	17
Dispatchers, Except Police, Fire, and Ambulance	370	142	432	0	62
Meter Readers, Utilities	70	47	82	0	12
Postal Service Clerks	70	69	82	0	12
Postal Service Mail Carriers	290	361	339	49	71
Postal Service Mail Sorters, Processors, and Processing Machine Operators	30	203	35	5	173
Production, Planning, and Expediting Clerks	100	316	117	17	216
Shipping, Receiving, and Traffic Clerks	320	689	374	54	369
Stock Clerks and Order Fillers	1270	1881	1484	214	611
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	30	62	35	5	32
Executive Secretaries and Administrative Assistants	710	940	830	120	230
Legal Secretaries	210	228	245	18	35
Medical Secretaries	90	536	105	15	446
Secretaries, Except Legal, Medical, and Executive *	2580	0	3015	0	435
Computer Operators	40	90	47	7	50
Data Entry Keyers	110	197	129	19	87
Insurance Claims and Policy Processing Clerks	150	218	175	25	68
Mail Clerks and Mail Machine Operators, Except Postal Service	30	99	35	5	69
Office and Administrative Support Workers, All Other	30	314	35	5	284
Office Clerks, General	2320	3333	2711	391	1013
Installation, Maintenance, & Repair Occupations					
First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	630	450	736	0	106
Computer, Automated Teller, and Office Machine Repairers	40	111	47	7	71
Telecommunications Equipment Installers and Repairers, Except Line Installers	290	202	339	0	49
Electrical and Electronics Repairers, Commercial and Industrial Equipment	50	88	58	8	38
Aircraft Mechanics and Service Technicians	140	367	164	24	227
Automotive Body and Related Repairers	120	117	140	0	20
Automotive Service Technicians and Mechanics	460	629	538	78	169
Bus and Truck Mechanics and Diesel Engine Specialists	290	210	339	0	49
Mobile Heavy Equipment Mechanics, Except Engines	160	105	187	0	27
Motorcycle Mechanics *	40	0	47	0	7
Tire Repairers and Changers	100	76	117	0	17
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	250	245	292	0	42
Maintenance Workers, Machinery	130	104	152	0	22
Electrical Power-Line Installers and Repairers	110	80	129	0	19
Telecommunications Line Installers and Repairers	70	76	82	6	12
Maintenance and Repair Workers, General	1750	1363	2045	0	295
Coin, Vending, and Amusement Machine Servicers and Repairers	110	55	129	0	19
Helpers--Installation, Maintenance, and Repair Workers	270	123	316	0	46
Production Occupations					
Bakers	130	175	152	22	45
Printing Press Operators	60	157	70	10	97
Print Binding and Finishing Workers	50	95	58	8	45
Laundry and Dry-Cleaning Workers	310	218	362	0	52
Pressers, Textile, Garment, and Related Materials	40	90	47	7	50
Packaging and Filling Machine Operators and Tenders	120	363	140	20	243
Transportation & Material Moving Occupations					
First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators	220	201	257	0	37
Bus Drivers, School	660	508	771	0	111
Driver/Sales Workers	290	407	339	49	117
Truck Drivers, Heavy and Tractor-Trailer*	1690	0	1975	0	285
Truck Drivers, Light or Delivery Services*	670	0	783	0	113
Taxi Drivers and Chauffeurs	70	139	82	12	69
Cleaners of Vehicles and Equipment	280	274	327	0	47
Refuse and Recyclable Material Collectors	50	93	58	8	43

* There was no data for the comparison model