

The Regional Economy



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Forecasting: A Simple Example of Projecting Northeast Minnesota Employment

Background: The Minnesota Department of Economic Security (MDES) supplied the data for these analyses. The MDES Website contains information for workers, employees, and labor market information for Minnesota and its regions.

Measures: Employment is listed as a single number of jobs for each industry, including both full-time and part-time employees.

Forecasting has become a common practice for individual businesses, and industries as a whole. Although there are many ways to predict the future, we will be showing a straightforward method. It is also possible to forecast a variety of variables (employment, output, value added, etc.). We will be forecasting employment for Northeast Minnesota. One of the easiest methods of forecasting is known as the *constant share* technique. This assumes that the proportion of employment in a smaller region compared to a larger will stay the same. If this is assumed true, it is possible to use the larger region's growth rates, over a given period, to project regional employment.

For this article Minnesota growth rates were calculated between 1991-1996. The results are shown in the first table labeled Minnesota Employment. The total percent change (1991-1996) was found by subtracting 1996 employment from 1991, then dividing by 1991. Now divide this total change by the number of years to give the average annual percent change. These are the percentages that will be used to project Northeast Minnesota employment.

Now locate current employment (1996 employment was used for comparison reasons) in the smaller region. This is the second column (first column of numbers) of

the second table. Now apply the Minnesota average annual growth rate to the current Northeast employment numbers. For example, to forecast 1997 employment multiply 1996 employment by $1 +$ growth rate. Notice that the growth rates in the table are expressed as percentages, not decimals ($2.9\% = .029$).

$1997 = 1996(1+gr)$, or from table 2 for total NE employment:

$1997 = 146,386(1+0.029) = 150,598$

Therefore, for a ten year projection:

$2006 = 1996((1+gr)^{10})$, where 10 is to the tenth power.

$2006 = 146,386((1+0.029)^{10}) = 194,396$

By doing the same for each individual industry it is possible to obtain 2006 projections for any industry.

Notice that, with the formula above, projections to any year are possible. Also be very aware of the assumptions in any forecast, and realize that in this model we are assuming constant share for every year or time period projected. This assumption is made to simplify the model and may not be true for even the first projected year, let alone the tenth. Again, this is a very uncomplicated model so we do not expect a high level of accuracy.

MDES publishes their own forecasts. Their major industry sector projections for NE Minnesota are given in the last table. I am not sure what technique they use, but their predictions are lower than our constant share method. It is easy to see this by comparing MN average annual % change to MDES average annual % change.

Minnesota Employment

	Minnesota 1991	Minnesota 1996	Percent Change 1991-1996	MN Average Annual % Change
Total All Industries	2,069,197	2,366,865	14.4%	2.9%
Agriculture, Forestry and Fishing	18,116	21,843	20.6%	4.1%
Mining	7,870	7,850	-0.3%	-0.1%
Construction	76,244	89,024	16.8%	3.4%
Manufacturing	396,357	428,669	8.2%	1.6%
Transportation, Communications, and Public Utilities	102,708	113,848	10.8%	2.2%
Trade	518,147	592,855	14.4%	2.9%
Finance, Insurance and Real Estate	125,823	141,355	12.3%	2.5%
Services	517,791	642,753	24.1%	4.8%
Government	306,141	328,671	7.4%	1.5%

NE Projections Based On MDES Data

	NE Minnesota 1996	MN Average % Change	1997 Projected Employment	2006 Projected Employment
Total All Industries	146,386	2.9%	150,598	194,396
Agriculture, Forestry and Fishing	1,738	4.1%	1,810	2,601
Mining	6,089	-0.1%	6,086	6,058
Construction	5,014	3.4%	5,182	6,973
Manufacturing	13,933	1.6%	14,160	16,379
Transportation, Communications, and Public Utilities	6,792	2.2%	6,939	8,418
Trade	33,090	2.9%	34,044	43,970
Finance, Insurance and Real Estate	4,186	2.5%	4,289	5,342
Services	51,020	4.8%	53,483	81,745
Government	14,067	1.5%	14,274	16,280

MDES Projections NE Minnesota

	NE Minnesota 1996	2006 Projected Employment	Percent 1996-2006	MDES Annual Average% Change
Total All Industries	146,386	165,286	13%	1.3%
Agriculture, Forestry and Fishing	1,738	1,636	-6%	-0.6%
Mining	6,089	5,915	-3%	-0.3%
Construction	5,014	5,563	11%	1.1%
Manufacturing	13,933	15,449	11%	1.1%
Transportation, Communications, and Public Utilities	6,792	7,585	12%	1.2%
Trade	33,090	37,441	13%	1.3%
Finance, Insurance and Real Estate	4,186	4,444	6%	0.6%
Services	51,020	61,868	21%	2.1%
Government	14,067	14,176	1%	0.1%

Sources: IMPLAN software and data, 1997; Minnesota Department of Economic Security.

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