

# Recent Changes and Future Trends For North Dakota's Economy

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The North Dakota economy has gone through numerous transition periods during the past three decades--periods of stability and rapid growth to stagnation and decline. North Dakota's economic base, or those activities that bring money into the state, is highly dependent upon agriculture and energy. The volatility of these two industries in recent years has resulted in periods of economic prosperity and recession for the state. Examination of the components of the state's economic base can lead to an understanding of why the state's economy is not as prosperous as it once was and which economic activities have realized the greatest losses in recent years.

Projecting the state's economy provides valuable information for those concerned with economic planning and development. These forecasts can provide indications of future levels of business activity, employment, tax revenues, etc. It is important, therefore, that the assumptions forecasts are based on be consistent with current situations. Forecasts provided in this article are based on a method that allows combining current conditions and the longer-term economic prospects. However, large-scale changes that occurred in the past (i.e., unprecedented crop and energy price increases) could occur again in the future and are nearly impossible to predict. Forecasts provided in this article can be viewed as conservative but indicative as to whether downturns in recent years will continue or if the state's economy will turn around and begin to recover.

## METHODOLOGY

Input-output analysis was used to quantify the North Dakota economy, which was divided into industrial sectors. Each sector has a unique multiplier that indicates the number of times a dollar is spent and respent within the economy, or as it is commonly termed "turns over." Export sales of the state's products bring dollars into the state and comprise the economic base for North Dakota. Applying the state's basic economic activity to the respective multipliers results in the total business activity, or gross business volume, for each economic sector. For a discussion of the North Dakota Input-Output model, see Coon et al. (1985).

Input-output analysis assumes that economic activity in a region is dependent upon its basic industries, referred to as its economic base. The economic base is largely a region's export base (i.e., those industries or "basic" sectors that earn income from outside the area). North Dakota's economic

base is comprised of those activities producing a product paid for by nonresidents--agriculture (livestock and crop production plus government payments for agricultural programs), mining, manufacturing, tourist expenditures for retail purchases and for business and personal services, and federal government outlays for construction and to individuals in the form of transfer payments and compensation to federal employees (Coon, Vocke, and Leistritz 1984). All sales for final demand in this analysis are in terms of constant dollars (i.e., the effects of inflation have been removed).

To incorporate current conditions and likely future changes, a modified Delphi analysis technique was also employed to provide the state's economic forecasts. The Delphi forecasting method is a structured procedure that seeks to derive a consensus of opinion among a group of experts regarding future events. A committee of economists, extension personnel, and industry experts was assembled to project the growth for each of the state's basic economic sectors. Also, a thorough review of literature was conducted to help support the opinions of the committee.

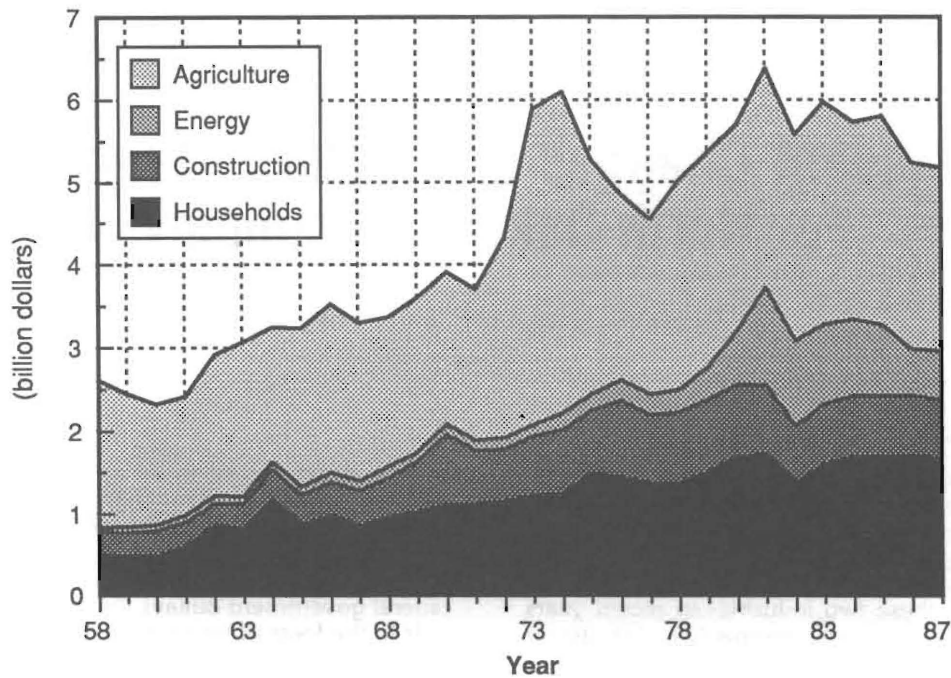
## RECENT CHANGES

North Dakota's economic base has grown from \$2.6 billion to \$5.2 billion dollars from 1958 to 1987 in real dollars (Figure 1). This period was characterized by relatively steady growth to the early 1970s, followed by a period of rapid growth in the agricultural sectors of the mid 1970s (primarily due to large increases in crop prices) and a time of very large increases in the energy sectors in the late 1970s through the early 1980s. These periods of rapid growth in the agriculture and energy sectors have been followed by a steady decline in the state's total economic base. In real dollars, the 1981 total economic base (\$6.4 billion) was the largest in the state's past three decades. Since 1981, the total economic base has declined by \$1.2 billion. This reduction in economic base activity was translated into many problems for the state, including failed farms and businesses, unemployment, and reduced tax revenues.

A sector-by-sector analysis of the change in sales for final demand from 1981 to 1987 can help explain why the state's economy has declined in recent years. Total decline in basic economic activity amounted to over \$1.2 billion during that period, with the petroleum exploration/extraction sector experiencing the largest decrease (a decline of \$650 million) followed by the agriculture-crops sector (reduced by \$478 million) (Table 1). In perspective, the value of oil produced for export from the state in 1987 was approximately one-

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Note: **Construction** also includes Ag. Processing, Misc. Mfg., Retail Trade, and Business & Personal Services. **Energy** includes Coal Mining, Thermal-electric generation, Petroleum Exploration and Extraction, and Petroleum Refining.

Figure 1. North Dakota Economic Base Components in 1980 Dollars, 1958-1987.

fourth of what it was in 1981. The decline in crops production is second largest in terms of dollars; the industry's receipts decreased by nearly 25 percent during the 1981-1987 period. The agricultural processing and miscellaneous manufacturing sector realized the third largest loss (\$14 million) primarily due to the large amount of agricultural machinery and equipment produced by this sector. As the crops sector declined so did the demand for farm machinery and equipment, thereby resulting in a reduction to the agricultural processing and miscellaneous manufacturing sector. Many of the remaining sectors experienced little change, but some

sectors did grow during this period--thermal-electric generation (\$62.9 million), livestock (\$40 million), and coal mining (\$38 million).

Relative contributions that each basic economic sector makes to the total has changed during the 1958-1987 period (Figure 2). Agriculture accounted for over two-thirds of the economic base in 1958, but that portion had slipped to less than one-half in 1987. Energy-related activity increased its share of the total during that period from 2 percent to over 11 percent, and the household sector (i.e., federal government payrolls and transfer payments) grew from over 19 percent in 1950 to over 32 percent in 1987. In 1987 the household sector was the largest source of economic base activity followed closely by crop sales. The activity in these two sectors reflects the importance of federal government expenditures to North Dakota's economy.

Table 1. Sales For Final Demand, By Economic Sector, North Dakota, (1980 = Base Dollars), 1981 and 1987.

Sector	1981	1987	Difference
	----- million dollars -----		
(1) Ag, livestock	538.9	578.9	40.0
(2) Ag, crops	2,122.4	1,644.4	-478.0
(4) Construction	71.5	59.3	-12.0
(7) Ag proc & misc mfg	559.1	444.7	-114.4
(8) Retail trade	145.5	150.8	5.3
(10) Bus & pers service	48.5	50.3	1.8
(12) Households	1,720.5	1,668.8	-51.7
(14) Coal mining	49.5	87.5	38.0
(15) Thermal-elec gen	127.7	190.6	62.9
(16) Pet exp/ext	882.8	233.3	-649.5
(17) Pet refining	119.6	64.0	-55.6
Total	6,385.9	5,172.6	-1,213.3

Application of the sales for final demand to the North Dakota multipliers yields gross business volumes (total dollars of business activity that takes place when the state exports products). Figure 3 shows the gross business volumes for North Dakota for the period 1958-1987. Total business volume essentially follows the same pattern as sales for final demand. Gross business volume reached its peak in real dollars in 1974 (\$21.9 billion in 1981)--seven years before the economic base activity reached its highest level (\$21.1 billion in 1981). The reason for this is the crops sector (which was at its highest level in 1974) has a higher multiplier than the energy sectors, which were at their highest output in 1981. Total business volume in 1987 was \$17.6 billion.

At the state level, employment has fared much better than basic economic activity. North Dakota's employment was

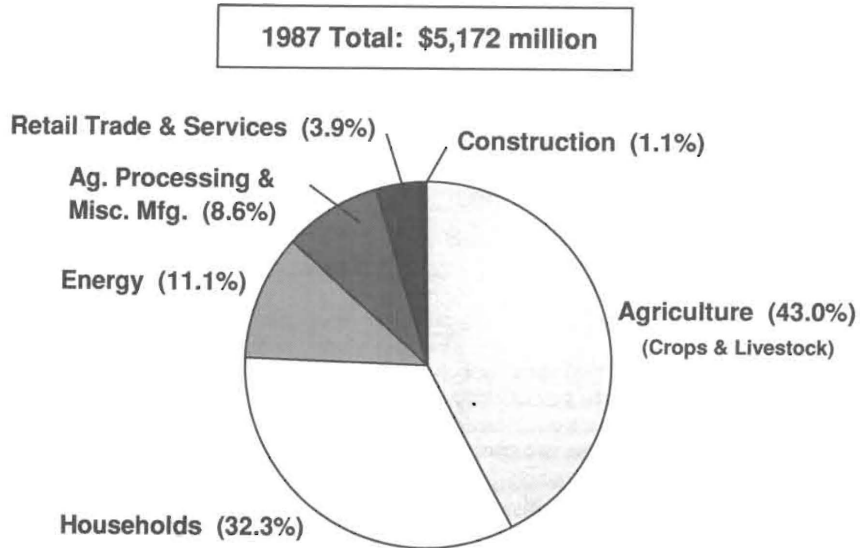
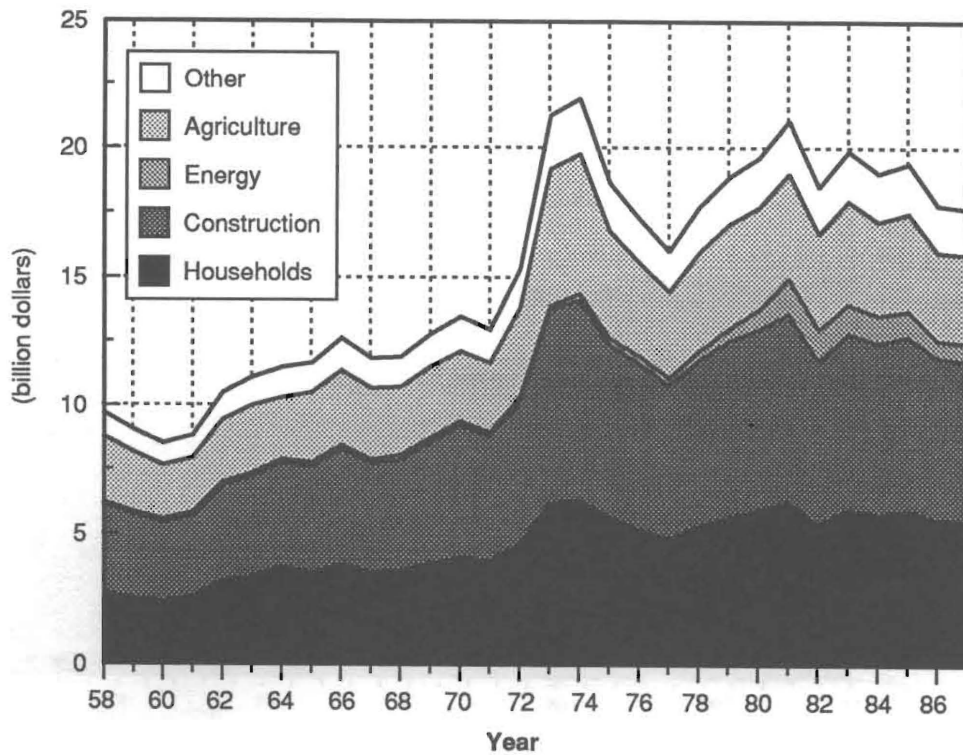


Figure 2. Distribution of Sales For Final Demand Components, North Dakota, 1987.



Note: **Construction** also includes Ag. Processing, Misc. Mfg., Retail Trade, Business & Personal Services, and Professional & Social Services. **Other** includes Nonmetallic Mining, Transportation, Communications & Public Utilities, FIRE, and Government.

Figure 3. Gross Business Volume Components in 1980 Dollars, North Dakota, 1958-1987.

relatively stable from the late 1950s to late 1960s, followed by strong growth to the early 1980s (Figure 4). Since 1980, total employment has experienced very little expansion. Interestingly, the state's total has grown during a period when agricultural employment has declined steadily and substantially. This results in the agricultural sectors experiencing declines in population while contributing a sizable (and relatively stable) portion of the state's basic economic activity.

### THE FUTURE OF THE ECONOMY

Changes in the state's economic base over this time period can provide some indication of what the state's economy may be in the future. In order to project the state's economic base using current conditions and to incorporate prospects for the state's economy, a Delphi analysis approach (described earlier) was taken. Results of the Delphi analysis of the economic forecasting group were summarized for each basic sector and are presented in Table 2.

Sales for final demand in constant dollars were projected for the 1988 to 2010 period for North Dakota. The total economic base for the state was plotted with the historic values in Figure 5. These projections show the state's economy growing in the short run and remaining relatively flat with slight growth in the long run. This set of projections indicates the state's economy will not reach the levels it attained in 1981 (in real dollars) but will recover in the short run and remain relatively stable throughout the projection period. Drought conditions that existed in 1988 were a major factor in the short-run recovery. Continued dry conditions in North Dakota, in the U.S. grain-producing states, or

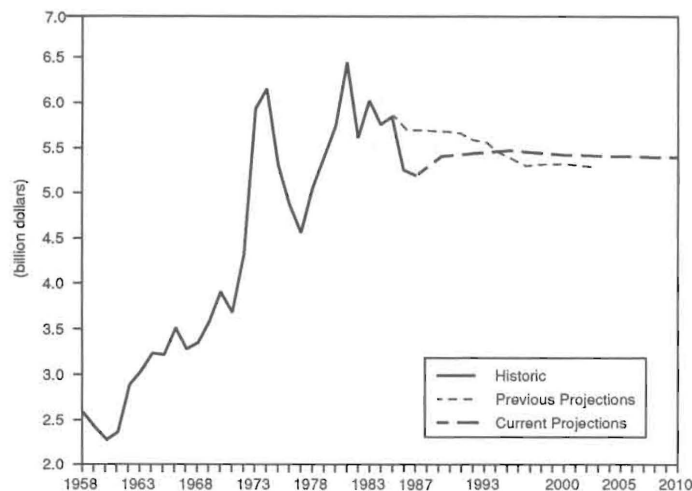


Figure 5. North Dakota's Historic Economic Base and Projected Economic Base From Current and Previous Studies, 1958-2010.

worldwide could drastically alter the future economic base. If dry conditions were to occur in areas other than North Dakota, world grain stocks could be further drawn down. This situation could result in "more prosperous" times (because of higher grain prices) than forecasted in this analysis. Similarly, world events could cause a drastic recovery of the state's energy industries at any point in time.

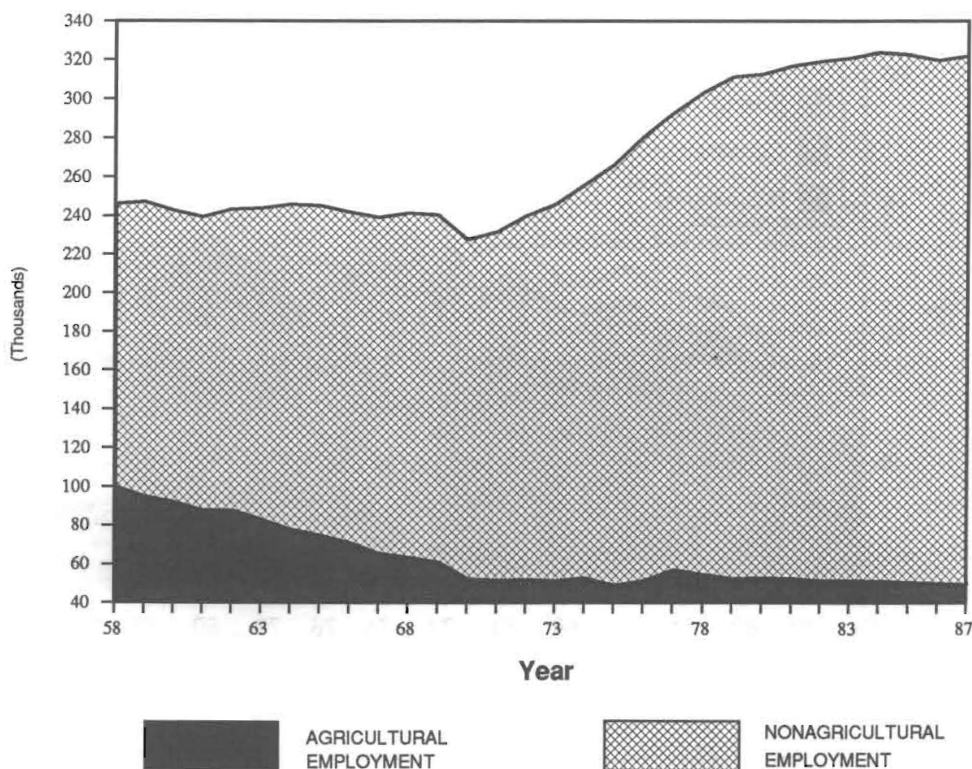


Figure 4. Agricultural and Nonagricultural Employment for North Dakota, 1958-1987.



Making economic projections is never an easy job because factors that influence an economy such as North Dakota's are constantly changing. Two very important conditions that have a bearing on the state's economic fortunes are the prices of grains and oil; both of these items are controlled by conditions and events not only outside of North Dakota but also beyond the U.S. borders. Thus, it is interesting to compare these projections with those made in a similar previous research effort (Coon and Leistriz 1987).

This comparison may lead to a better understanding of the changes that have resulted (and the interpretation of these changes and how they were transformed into a new set of projections).

Projections from the previous study are presented with the historic economic base and current forecasts (Figure 5). Three important changes exist in the current set of projections: (1) the crops sector is projected to recover (partially

**Table 2. Summation Delphi Analysis Projected Growth For Basic Economic Sectors, North Dakota, 1988-2010.**

		Projected Growth
Agriculture, Livestock		Livestock prices will remain strong through the mid 1990s. The drought of 1988 caused liquidation of some cow herds, and it is unlikely there will be a rapid build-up in cattle numbers. This combination should result in a modest real growth through the mid 1990s followed by slightly lower growth rates to reflect livestock cycles. (The 1987 sales for final demand will have an annual nominal growth rate of 5 percent through 1995, followed by a 4 percent annual nominal growth rate for the 1996 to 2010 period.)
Agriculture, Crops		Crop prices should remain very strong through 1989. The 1988 drought has caused stocks to be reduced so prices should remain strong through 1990. However, a reduced set-aside, lower target prices, and a likely continuation of present farm programs will result in lower prices in the long run, excluding the prospect of a continuation of the 1988 drought or world crop failures. (The 1987 sales for final demand will have a 10 percent nominal increase for 1988 and 1989. The 1989 nominal final demand sector will be increased by 4 percent per year through 1995 and then increased by 3 percent per year until 2010.)
Construction } Households }	Federal Government Outlays	Federal government expenditures to the household sector have shown a trend of increasing faster than the inflation rate during the 1980-1987 period. This trend will continue, despite the federal deficit, because programs such as social security have cost-of-living increases built into them. Federal government expenditures for construction have shown more variability than those to households. No major projects are on the horizon, so the construction sector will not experience any rapid growth. (The 1985-1987 construction sector sales for final demand will be averaged for 1988 and an annual nominal growth rate of 3.5 percent will be used through 2010. Federal government outlays to the household sector have shown an annual nominal growth rate of 5.0 percent, which will be used through 2010.)
Agricultural Processing & Miscellaneous Manufacturing		Much of the activity in this sector is associated with agriculture; these activities consist largely of agricultural commodities, processing, and producing farm equipment and machinery. The potential for large growth in this sector is unlikely. Current facilities should remain operational, and processing at or near capacities. Potential for additional oil seed processing and ethanol production exists. (The sales for final demand have experienced a 40 percent nominal growth over the past 10-year period. This growth rate will be applied for each 10-year period through 2010.)
Retail Trade } Business & Personal Service }	Tourism	In recent years there has been a rather stable growth in the tourism-related sectors. These sectors have not shown a wide variation in past years. Recent trends are projected to continue. (Nominal increases that occurred during the recent 5-year period will be used to project this sector. A 4.75 percent annual growth rate will be used through 2010.)
Coal Mining		Coal production is at an all-time high. Reduced taxes have resulted in a lower cost for coal and enhanced its competitive position. Continued growth for the coal industry hinges on the increased demand for electrical energy. Trade laws with Canada could encourage U.S. imports of Canadian power, and environmental issues remain a concern. (The coal and electric generation final demand vector for 1987 will be increased by an annual nominal rate of 2 percent.)
Thermal Electric Generation		
Petroleum Exploration/Extraction		Oil prices have declined during the 1981-1986 period but gained some strength in 1987. It appears they have bottomed out and are rebounding; however, the price of oil is extremely volatile and the state's oil industry is greatly influenced by external factors. North Dakota oil production has declined slightly in recent years, while refining has remained at a stable level of output. (The petroleum exploration/extraction final demand vector for 1987 will be increased by an annual nominal rate of 3 percent through 2000 and by a 5 percent rate for the 2001-2010 period. An annual nominal growth rate of 5 percent will be used for the petroleum refining sector final demand vector.)
Petroleum Refining		

due to the drawdown of stocks resulting from the drought of 1988), (2) the household sector (federal government outlays) is not expected to grow as fast as previously believed, and (3) the decline in world oil prices that occurred from 1981 to 1985 (and was not expected to continue in the previous analysis) did continue through 1986 and into 1987. Other basic sectors of the economy did not have major changes since the last forecasts. Thus, the current forecasts show real economic growth through 1990, followed by a slower rate of growth through 1995, followed by a period of relatively small expansion to no growth through 2010. Although the current forecasts are more optimistic in terms of real dollars, they do not show the economic base of the state reaching its 1981 level during the projection period.

## CONCLUSIONS

The North Dakota economy has experienced numerous changes during the past three decades. The most volatile sectors of the economy have been the crops and petroleum exploration/extraction sectors. North Dakota's economy is natural-resource based, and many of the factors that influence these activities are external to the state. Historic data bases provide a good record of where the state's economic fortunes have been, and forecasts are also provided to show where they might be headed based on situations as they currently exist. Economic conditions have improved in the last couple of years, and the state's economy appears to be recovering. However, this does not imply that all economic problems are solved, but rather that progress has been made. Results of this analysis clearly demonstrate the vulnerability of the North Dakota economy to national and international economic forces that depress the price of the state's leading export commodities (i.e., grain and petroleum). Economic development efforts that would diversify the state's economy would clearly be desirable and could potentially reduce that vulnerability in the future.

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