



Economic Outlook Update: October 2017

ALABAMA HIGHLIGHTS

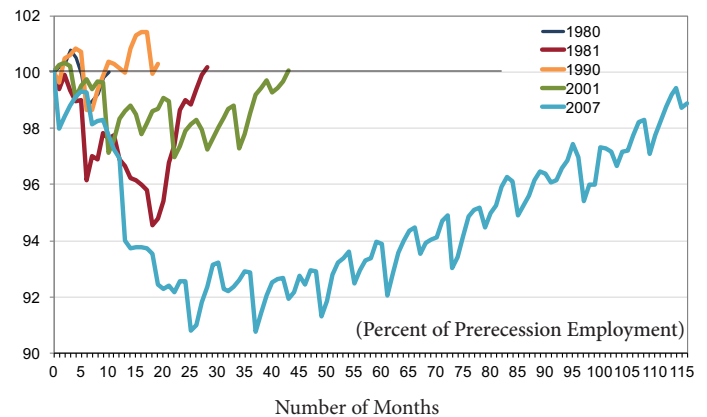
- ▶ The State gained 28,300 jobs from August 2016 to August 2017, bringing total nonfarm employment to 2,004,000, while the seasonally adjusted unemployment rate declined from 5.9 to 4.2 percent.
- ▶ Seasonally adjusted unemployment based on the household survey dropped from 128,413 in August 2016 to 90,913 in August 2017. During this period, the labor force declined from 2,172,599 to 2,148,022. Decreases in the labor force also push the unemployment rate down.
- ▶ Total nonfarm employment is forecasted to increase by about 1.5 percent in 2017, with professional, scientific and technical services; administrative support, remediation and waste management services; healthcare and social assistance; and food services and drinking places adding the most to their payrolls.
- ▶ Overall, the state's economy is forecasted to grow by approximately 1.9 percent in 2017, above the 1.3 percent growth rate seen in 2016.
- ▶ After increasing by 4.2 percent in fiscal year 2016-2017 (FY2017), state tax revenues will increase by about 3.5 percent in FY2018.

EMPLOYMENT

After peaking in December 2007 at 2,026,700, the state currently employs 2,004,000 nonfarm workers, 22,700 below its level prior to the beginning of the recession. Over the twelve-month period ending in August 2017, the state gained a net of 28,300 jobs. Most of the job

gains were in services providing firms (15,700). The employment level within goods producing firms also rose by 12,600, including gains in manufacturing and construction totaling 5,700 and 6,500, respectively. Industries with a significant increase in employment included wood product manufacturing (1,100), motor vehicle and parts manufacturing (900), food manufacturing (800), fabricated metal products (700), and plastics and rubber products manufacturing (500). Among the services providing sectors, most of the jobs were added in professional and business services (7,600); accommodation and food services (7,500); healthcare and social assistance (5,700); and finance and insurance (2,300). Compared to year-ago levels, retailers had a net loss of 5,200 workers.

Alabama Employment Level Compared to the Beginning of Each Recession



Source: Alabama Department of Labor, Labor Market Information Division, and Center for Business and Economic Research, The University of Alabama.

Job gains in the state's metro areas (28 counties) totaled 19,700 while non-metro areas (39 counties) had a net gain of 8,600 jobs. During the twelve month period ending in August 2017, nine of the 12 metro areas experienced job gains. The Huntsville metro gained most jobs (6,200); followed by Birmingham-Hoover (5,400); Tuscaloosa (2,100); Daphne-Fairhope-Foley and Montgomery (2,000 each); Auburn-Opelika (1,100);

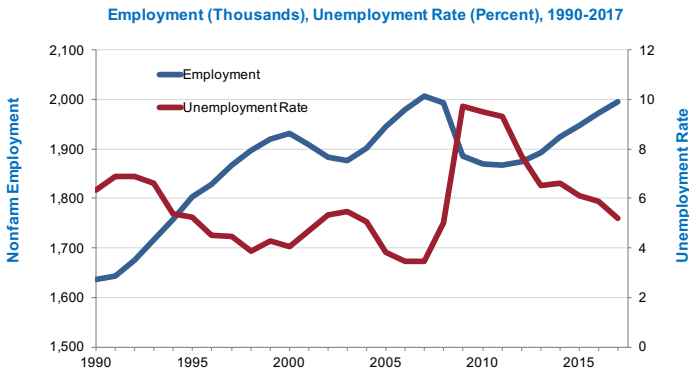
Alabama Forecast

(Percent change)	2015	2016	2017	2018
Real GDP	1.6	1.3	1.9	2.2
range		1.0 to 2.0	0.5 to 2.5	1.0 to 3.5
Employment	1.3	1.0	1.5	1.1
range			0.5 to 1.7	0.6 to 1.5
Total Tax Receipts, FY	4.0	1.2	4.2	3.5
range				2.0 to 4.0

Source: Center for Business and Economic Research, The University of Alabama.

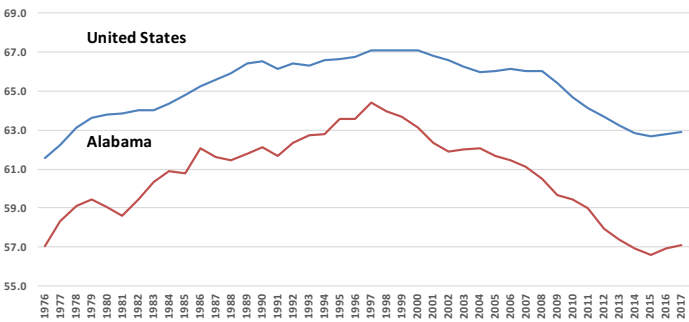
Gadsden (700); Decatur (400); and Anniston-Oxford-Jacksonville (200). Job losses were experienced in the metro-areas Dothan (100), Florence-Muscle Shoals (100), and Mobile (200). As of August 2017, the Mobile metro had the highest unemployment rate at 5.2 percent while Huntsville had the lowest at 3.7 percent. Among the state's 67 counties, Wilcox County had the highest unemployment rate at 11.3 percent while Shelby's was the lowest at 3.2 percent. Among the major cities in the state, as of August 2017, Vestavia Hills had the lowest unemployment rate at 2.8 percent (compared to 4.0 percent a year ago) while Selma had the highest at 8.3 percent (compared to 11.1 percent a year ago).

Total Annual Nonfarm Employment and Unemployment Rate (Annual)



Source: Alabama Department of Labor.

Labor Force Participation Rate (Percent)



Source: Bureau of Labor Statistics.

Alabama Nonfarm Employment Change in Number of Jobs

	August 2015 to August 2016	August 2016 to August 2017
Total Nonagricultural	24,100	28,300
Mining and Logging	-1,800	400
Construction	1,100	6,500
Manufacturing	2,700	5,700
Durable Goods Manufacturing	900	2,800
Nondurable Goods Manufacturing	1,800	2,900
Trade, Transportation and Utilities	1,300	-6,800
Wholesale Trade	0	100
Retail Trade	1,400	-5,200
Transportation, Warehousing and Utilities	-100	-1,700
Information	-600	-1,000
Financial Activities	800	1,900
Professional and Business Services	3,800	7,600
Educational and Health Services	5,700	4,500
Leisure and Hospitality	7,700	9,600
Other Services	0	3,000
Government	3,400	-3,100
Federal Government	700	-700
State Government	800	-4,800
Local Government	1,900	2,400

Source: Alabama Department of Labor, Labor Market Information Division, and Center for Business and Economic Research, The University of Alabama.

OUTLOOK FOR 2017

According to the most recent data available on state GDP, Alabama's economy grew by 1.9 percent in the first quarter 2017. After an improving 2nd quarter, the overall growth for the year is still expected to be around 1.9 percent. Payroll gains in motor vehicle and parts manufacturing; wood products manufacturing; professional, scientific and technical services; leisure and hospitality; and healthcare and social assistance will continue to remain the state's major economic drivers for the remainder of 2017. Overall jobs gains are expected to be up 1.5 percent for the year. The state's economy will continue to grow at a moderate pace over the next few months, accelerating slightly in the second half of the year.

UNITED STATES

Gross Domestic Product (GDP). After growing by 1.9 percent in the first quarter, GDP growth for the second quarter was revised up from 3.0 to 3.1 percent, mainly due to upward revision in private inventories. Hurricanes Harvey and Irma will subtract about 1.0 to 1.5 percentage points from the third quarter growth but could add almost 1.0 percent to the fourth quarter. Overall economic growth is expected to be around 2.5 percent for the third quarter and about 3.0 percent for the fourth quarter. For the year, GDP growth will be 2.2 percent for 2017 and 2.4 percent for 2018, primarily driven by consumer spending, business spending, and exports.

Employment. The U.S. economy experienced its first monthly drop in employment in September, a loss of 33,000 jobs, primarily due to both hurricanes Harvey and Irma. However, the unemployment rate dropped to 4.2 percent while wages saw an increase of 2.9 percent. Food and drinking establishments, one of the fastest growing segments of the economy, alone lost 105,000 jobs. Meanwhile, the number of people reporting not working due to weather rose by 1.5 million, which contributed to the drop in the unemployment rate. Overall, the pace of employment growth is expected to be around 1.0 percent in the third quarter and about 2.0 percent for the fourth quarter.

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TAX RECEIPTS

During fiscal year 2016-2017 (FY2017) total tax revenues totaled \$10.3 billion, an increase of 4.2 percent or \$412 million from the previous fiscal year totaling \$10.3 billion. Individual income tax revenues rose 3.3 percent to \$4.2 billion while sales tax receipts went up by 1.8 percent totaling \$2.3 billion.

Also during the FY2017, appropriations to the Alabama Education Trust Fund rose 4.2 percent to approximately \$6.3 billion. Appropriations to the state's General Fund during the fiscal year ending in September 2017 were up \$74.5 million, totaling \$1.9 billion, an increase of 4.0 percent.

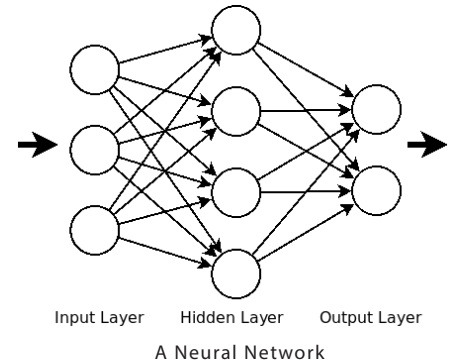
CBER Research Brief: New Frontiers in Data and Methods for Population Projections

Comparing Artificial Neural Network and Cohort-Component Models for Population Forecasts: Summary

Authors:

Viktoria Riiman¹, Amalee Wilson², Reed Milewicz³, Peter Pirkelbauer²

Artificial neural network (ANN) models are rarely used to forecast population in spite of their growing prominence in other fields. Researchers from the Center for Business and Economic Research in UA’s Culverhouse College of Commerce have collaborated with UAB’s Computer and Information Sciences Department and Sandia National Laboratories to explore using these techniques to forecast population. Researchers compared the forecasts generated by ANN long short-term memory models (LSTM) with population projections from traditional cohort-component method (CCM) for counties in Alabama.



The evaluation included forecasts for all 67 counties which are diverse in population and socioeconomic characteristics. When comparing projected values with total population counts from the 2010 decennial census, the CCM used by the Center for Business and Economic Research at the University of Alabama in 2001 produced more accurate results than a basic multi-county ANN LSTM model (Model A).

The results from ANN models improved only when single-county models were used or potential economic forecasts were utilized as a proxy for a forecaster’s experience and personal judgment. The results indicate the significance of forecaster’s experience and judgment for CCM and the difficulty, but not impossibility, of substituting these insights with available data.

Overall, in the future it could be worthwhile to explore using ANN models to project only some population components instead of total population. This could make ANN models another alternative in the toolbox of demographers.

Comparison of Estimate Errors: Cohort-Component vs ANN LSTM, 2010 Data

Method	RMSE	MAE	MAPE
Cohort-Component Method	5,251	3,216	6.5%
ANN-LSTM Model A			
Mid-year population	17,523	11,004	16.7%
Decennial census population	5,442	3,346	6.3%
ANN-LSTM Model B			
Mid-year population	7,160	3,663	6.3%
Decennial census population	4,529	2,742	5.0%

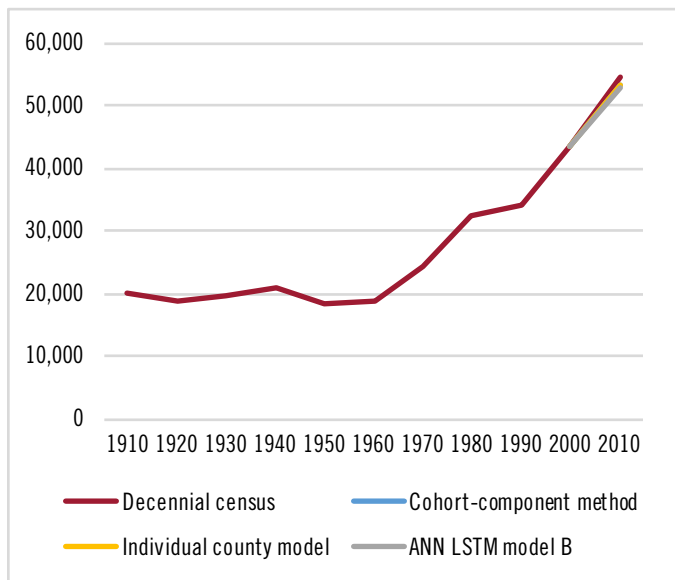
Model A: Model is trained on data from all counties, with training process done on one county data at a time.
 Model B: Each county has a separate model trained on data from that county only. All 67 counties have the same model specification.
 RMSE: root mean-squared error, MAE: mean absolute error, MAPE: mean absolute percent error
 Source: Center for Business and Economic Research, The University of Alabama.

Estimate Errors Using True Data in ANN LSTM Model B, 2010 Comparison

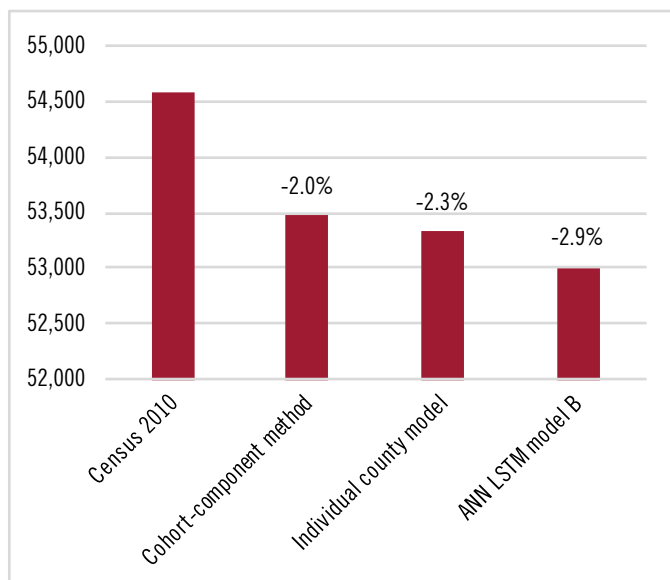
Model	RMSE	MAE	MAPE
True births and deaths	6,273	4,215	8.80%
True economic data	5,984	3,196	5.00%
True births, deaths, and economic data	4,844	2,988	5.10%

Note: Comparison of projected mid-year 2010 population and 2010 mid-year population estimate from the U.S. Census Bureau using actual economic and demographic data as a proxy for forecaster’s experience and judgement.
 RMSE: root mean-squared error, MAE: mean absolute error, MAPE: mean absolute percent error
 Source: Center for Business and Economic Research, The University of Alabama.

Autauga County: Population and 2010 Projections

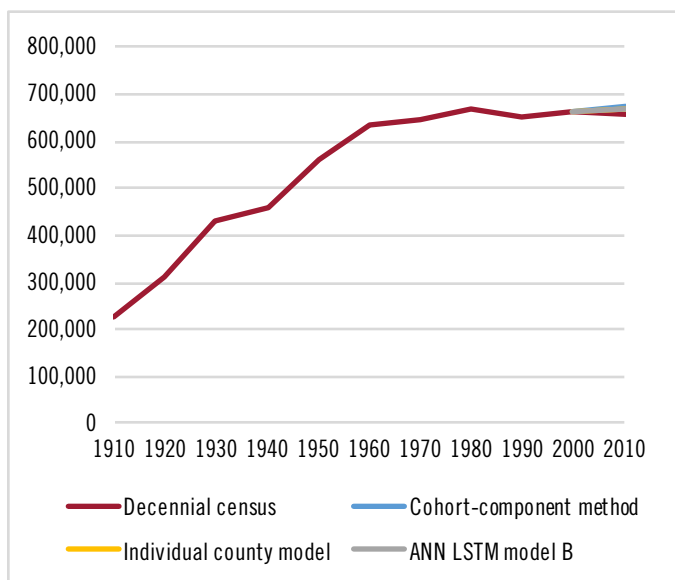


Source: National Historical Geographic Information System, U.S. Census Bureau, and Center for Business and Economic Research, The University of Alabama.

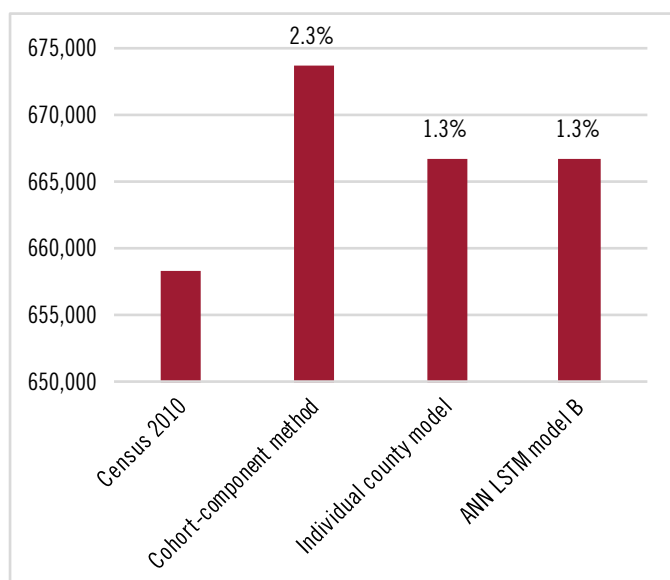


Source: U.S. Census Bureau and Center for Business and Economic Research, The University of Alabama.

Jefferson County: Population and 2010 Projections



Source: National Historical Geographic Information System, U.S. Census Bureau, and Center for Business and Economic Research, The University of Alabama.



Source: U.S. Census Bureau and Center for Business and Economic Research, The University of Alabama.

Note: Paper presented at the Population Association of America 2017 Annual Meeting. For more on this research, read the full paper at <http://pirkelbauer.com/uab/papers/pp17.pdf>.

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