

REVISED



SALES AND PROPERTY TAX PROJECTIONS FOR THE CITY OF FAYETTEVILLE

Produced for the City of Fayetteville

CENTER FOR BUSINESS AND ECONOMIC RESEARCH

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INTRODUCTION

This report is the result of the City of Fayetteville contracting with the Center for Business and Economic Research in the Sam M. Walton College of Business at the University of Arkansas. The purpose of this study is to estimate sales and property taxes to be collected by the City of Fayetteville from 2008 to 2017. To provide context for these projections, retail sales projection estimates for the cities of Bentonville, Rogers, Springdale, and for Washington County are included.

Forecasting sales and property taxes estimates is crucial for constructing a city budget. The Center researchers took a conservative estimation approach so as to minimize the risk of overstating the revenues that the city can expect. However, there are many factors that could cause the forecasted values to be incorrect: a significant change to the state of the national, regional, or local economy, geopolitical turmoil, and many other unforeseeable, external forces. These estimates should be used as they are presented—using past economic performance as the best indicator of future trends is the gold standard in the forecasting profession.

The report is organized as follows. First, historical data on retail sales and property values are described. After that, the methodology used for projecting future sales and property values is specified. Forecasted taxes for the City of Fayetteville as well as retail sales projections for the cities of Bentonville, Rogers, Springdale, and for Washington County are illustrated. Finally, conclusions are drawn.

DATA DESCRIPTION

The City of Fayetteville provided the Center with sales tax data collected from city vendors for retail sales, which occurred from December 1994 till September 2007. The City of Bentonville provided sales tax data for retail sales, which occurred during the period of December 1999 through September 2007. Rogers provided data for the period of November 1999 through September 2007 and Springdale provided data for the period of November 2000 through September 2007. Washington County retail sales were estimated using the Fayetteville portion of county sales taxes. These county level data were provided by the City of Fayetteville. In order to be consistent when computing ratios of local to regional retail sales, data from the Office of Excise Tax Administration at the Arkansas Department of Finance and Administration was used for both Benton and Washington counties.

Historical Fayetteville retail sales and sales tax data are shown in Table 1. Sales taxes are aggregated based on accounting year—the time period when sales tax revenues are received by the city of Fayetteville—and includes the actual collection months of December through November. However, retail sales are calculated for the calendar year, from January till December. Additionally, annual growth rates were estimated. On average, retail sales taxes rose at a 5.8 percent annual growth rate (the median annual growth rate was 5.4 percent) per accounting year during the period of 1996 to 2006. The year 2004 showed an extraordinary 9.4 percent sales taxes growth rate. This period of rapid growth has slowed since.

TABLE 1: RETAIL SALES AND SALES TAXES, CITY OF FAYETTEVILLE, 1995-2007

Year	Sales Taxes at 2 %, Accounting Year	Sales Taxes Annual Growth Rate	Total City Sales, Calendar Year	Sales Annual Growth Rate
1995	\$16,937,308	--	\$854,105,173	--
1996	\$18,165,003	7.2%	\$918,716,240	7.6%
1997	\$19,202,847	5.7%	\$967,175,262	5.3%
1998	\$20,890,185	8.8%	\$1,049,922,000	8.6%
1999	\$21,970,082	5.2%	\$1,106,498,802	5.4%
2000	\$23,161,715	5.4%	\$1,154,367,496	4.3%
2001	\$23,871,741	3.1%	\$1,207,892,438	4.6%
2002	\$24,902,191	4.3%	\$1,250,714,280	3.5%
2003	\$25,924,883	4.1%	\$1,301,694,267	4.1%
2004	\$28,368,748	9.4%	\$1,436,914,536	10.4%
2005	\$30,700,316	8.2%	\$1,543,435,906	7.4%
2006	\$31,522,532	2.7%	\$1,568,394,947	1.6%
2007 ¹	\$25,875,430	-2.4%	\$1,132,620,678	-2.0%

To compare the Fayetteville retail sales trend to the growth of retail sales in the cities of Bentonville, Rogers, Springdale, and in Washington County, historical growth rates were calculated (Table 2). For comparison purposes, the annual growth rates for the five years, from 2002 to 2006, were estimated, even if additional years of data were available for a particular city. Rogers experienced the highest annual growth rate among the cities, followed by Bentonville and Springdale. Fayetteville retail sales increased annually at 5.4 percent, which was 1.0 percent lower than the Washington County average growth rate.

In addition, ratios of city retail sales to regional Northwest Arkansas (NWA) retail sales were estimated, using total Benton and Washington County sales as a base for evaluation. It is clear from Table 2 that the portion of Washington County retail sales out of total Northwest Arkansas retail sales is decreasing. Thus, both Fayetteville and Springdale ratios to regional sales decline as well. On the contrary, the ratios of Bentonville and Rogers sales to Northwest Arkansas regional retail

¹ September 2007 is the last month for which data are provided; thus, sales taxes for the 10 months and retail sales for the first 9 months of 2007 are shown. Growth rates are calculated based on year to date sums for 2006.

sales increase over time. This is due to the higher retail sales growth rates of cities in Benton County compared with the cities in Washington County. However, Fayetteville still has the largest share among all cities, accounting for 25.7 percent of total NWA retail sales in August 2007.

TABLE 2: COMPARISON OF HISTORICAL RETAIL SALES GROWTH RATES AND RATIOS

Rate/Ratio	Fayetteville	Bentonville	Rogers	Springdale	Washington County
Average Annual Growth Rate, 2002-2006	5.4%	9.4%	12.1%	7.0%	6.4%
Median Annual Growth Rate, 2002-2006	4.1%	9.6%	12.9%	7.8%	6.2%
Ratio of City/County to NWA Retail Sales, August 2000	29.9%	10.4%	14.0%	--	56.3%
Ratio of City/County to NWA Retail Sales, August 2003	27.9%	10.4%	14.9%	20.8%	55.0%
Ratio of City/County to NWA Retail Sales, August 2006	26.1%	10.4%	16.2%	20.5%	53.3%
Ratio of City/County to NWA Retail Sales, August 2007	25.7%	11.0%	19.2%	19.4%	51.0%

Assessed real property values for parcels contained within the city of Fayetteville (parcels beginning with either a 765- or 348- prefix) were obtained from the Washington County Assessor's Office for the years 1997 through 2006. The number of parcels and their assessed values, excluding those exempt from taxes, are presented in Table 3. On average, property values grew at 8.6 percent annually for the reported period, while the median growth rate was also 8.6 percent.

TABLE 3: TAXABLE REAL PROPERTY VALUES, CITY OF FAYETTEVILLE, 1997-2006

Year	Number of Parcels	Assessed Value	Annual Growth Rate
1997	19,444	\$384,453,663	--
1998	19,793	\$403,201,321	4.9%
1999	20,058	\$416,504,615	3.3%
2000	20,479	\$435,673,591	4.6%
2001	20,773	\$489,778,618	12.4%
2002	21,134	\$531,950,558	8.6%
2003	21,290	\$571,217,477	7.4%
2004	22,010	\$653,573,397	14.4%
2005	23,619	\$724,683,320	10.9%
2006	25,190	\$802,313,442	10.7%

In addition, utility and personal property values for the city of Fayetteville were obtained from the Washington County Assessor's Office. Before 2004, utility values for real estate and for personal property were reported separately. Since that year, all utility values are presented as personal property utility. For comparison purposes, total personal and real estate utility values were used by the Center. Table 4 shows data for the years 1996 through 2007. On average, personal property values grew at 5.5 percent annually over the last decade, while the median growth rate was 5.6 percent. The annual growth rate of total utilities varied significantly from 14.9 percent in 2001 to -1.8 percent in 2004, with the average growth rate being 6.2 percent from 1997 to 2007 (the median growth rate being 5.5 percent).

TABLE 4: PERSONAL PROPERTY AND TOTAL UTILITIES, CITY OF FAYETTEVILLE, 1996-2007

Year	Personal Property Value	Personal Property Annual Growth Rate	Total Utilities Value	Total Utilities Annual Growth Rate
1996	\$113,157,365	--	\$17,083,527	--
1997	\$120,064,627	6.1%	\$17,028,801	-0.3%
1998	\$121,164,095	0.9%	\$17,934,809	5.3%
1999	\$137,404,499	13.4%	\$18,915,447	5.5%
2000	\$145,147,891	5.6%	\$20,864,749	10.3%
2001	\$155,794,579	7.3%	\$23,973,609	14.9%
2002	\$158,778,031	1.9%	\$26,500,324	10.5%
2003	\$167,638,657	5.6%	\$27,064,246	2.1%
2004	\$183,102,702	9.2%	\$26,573,316	-1.8%
2005	\$189,404,588	3.4%	\$28,033,318	5.5%
2006	\$198,469,816	4.8%	\$29,811,241	6.3%
2007	\$202,103,404	1.8%	\$32,690,625	9.7%

METHODOLOGY

Using Statistical Analysis Software (SAS), Fayetteville retail sales and property values were projected. In addition, retail sales for the cities of Bentonville, Rogers, and Springdale and for Washington County were forecasted. Center researchers used a univariate forecasting approach as it is widely used in business and economics and results are similar to the estimates based on other forecasting methods.

Since monthly retail sales have seasonal features, a model for seasonal time series with a linear trend was used for projecting sales. In particular, the Basic Structural Model (BSM) was utilized. The BSM models a time series as a sum of three stochastic components; a trend component μ_t , a seasonal component γ_t , and a random error ε_t . Formally, a BSM for a response retail sales series r_t can be described as

$$r_t = \mu_t + \gamma_t + \varepsilon_t$$

Each of the stochastic components in the model is constructed separately. The random error is modeled as a sequence of independent, identically distributed (i.i.d.) with zero mean Gaussian random variables. The trend used is a locally linear time trend, which can be written as:

$$\mu_t = \mu_{t-1} + \beta_{t-1} + \eta_t \quad \eta_t \sim i.i.d. N(0, \sigma_t^2),$$

where μ_t is the trend level and β_t is the slope, allowed to vary over time. The seasonal component γ_t was specified by Center researchers to have season length 12, corresponding to the monthly seasonality, and to be of trigonometric type. The parameters were estimated in SAS by maximizing the likelihood of data and future values were forecasted by the software. The confidence of the forecasts is captured by the error term and estimation of an interval, which allows the future value to be contained with 95 percent confidence. The confidence interval is described as:

$$Pr = (l_t < r_t < u_t) = 0.95,$$

where l_t is a lower limit of confidence interval, u_t is an upper limit of confidence interval, and Pr is the probability equaling 95 percent that future value of retail sales r_t will be included in the confidence interval.

The estimates suggested that all the components were significant except for the slope component of Springdale and Washington County retail sales. However, examining the significance analysis table of the components showed that the slope component could not be dropped from the model. Thus, for Springdale and Washington County projections, a slightly different model specification was used. The slope component for both analyses was made deterministic by holding the value of its error variance fixed at zero and the resulting significant estimates were used for the report.

The accuracy of forecasting depends on how closely the historical data used for estimation resemble an unknown future. Although short-term forecasting can be estimated more precisely, longer-term projections have to be taken with a grain of salt. Longer historical data series allow for more accurate forecasting.

Alternatively, ordinary least squares (OLS) regression was used to estimate Fayetteville retail sales (Fr) with the following model:

$$Fr_t = Fp_t + Fbw_t + F\epsilon_t,$$

regressing city retail sales on the Fayetteville population (Fp_t), proxied by the number of gas facility customers, and on the ratio of Fayetteville retail sales to the Northwest Arkansas retail sales (Fbw_t), including a random error ($F\epsilon_t$). The model was estimated using available time series data. After that, both population proxy and sales ratio were forecasted using linear trend exponential smoothing method (which is discussed in details below). Projected values of Fayetteville retail sales were then calculated using estimates from the OLS model and forecasted values of city population proxy and retail sales ratio.

Fayetteville property values were projected using an exponential smoothing method since the data have no seasonality. Exponential smoothing fits a time trend model using a smoothing scheme in which the weights decline geometrically as you go backward in time. The forecasts from exponential smoothing are a time trend, but the trend is based mostly on the recent observations instead of on all the observations equally. The weight function is

$$w_t = w(1-w)^{t-\tau},$$

where τ is the observation number of the past observation, t is the current observation number, and w is the weighting constant, equal to 0.106 with a linear trend and 0.072 with quadratic trend. Based on the available data, a quadratic trend was chosen for the real estate property estimation and a linear trend for the personal property and utilities evaluation. The SAS program reported that more than 48 percent of the fit was due to the initial real property values, and, thus, the estimates may suffer. The program forecasting personal property and utilities showed that only 26 percent of the fit was due to the initial values. In order to provide an alternative scenario for the growth of real property values, the projected growth rates, whenever exceeding 10.0 percent, were substituted with the average growth rates of 1997-2006 (which also happen to equal the median growth rate of the last decade: 8.6 percent).

Fayetteville property taxes were estimated based on the forecasted total property values (excluding parcels exempt from taxes) and using the current millage rate of 3.1 mils. Moreover, the creation of the East Square Redevelopment TIF district was taken into account. The value of the parcels comprising the TIF district was assumed to grow at the same rate as the rest of Fayetteville parcels and was subtracted from the projected total property values each year. Additionally, taxes received from the frozen 2004 value of the parcels within the TIF district were added to the final property taxes.

In addition to the reported projected values, forecasting errors, and lower and upper limits, the R-square or adjusted R-square is presented in the next section as well. The R-square is a measure of how much variation in the response values explained by the model and the is defined as

$$R^2 = 1 - (SSE/TSS),$$

Where SSE is the sum of squares for error and TSS is the corrected total sum of squares. It ranges between 0 and 1; the nearer R-square is to 1, the better the model fits the response values. Adjusted R-square is alternative measure adjusted for the number of parameters (p) and observations (n):

$$\text{Adjusted } R^2 = 1 - \{[(n-1)*(1 - R^2)]/[n-p]\}$$

The adjusted R-square was reported whenever available because it is more useful for comparing models with differing numbers of parameters and/or observations.

PROJECTIONS

Based on the available data and methodology described above, Center researchers have projected a plausible sales and property tax revenue scenario for the City of Fayetteville. In addition, retail sales for Bentonville, Rogers, Springdale, and Washington County were forecasted.

FAYETTEVILLE RETAIL SALES AND SALES TAX PROJECTIONS

Using a univariate model approach, retail sales occurring in the City of Fayetteville were forecasted for each year from 2007 to 2017 (Table 5). The adjusted R-square of the forecast was 0.97. Retail sales for 2007 include the nine months of realized data provided by the city and three months of

projected values, from October through December. During the next ten years, from 2008 to 2017, retail sales are predicted to increase at 3.3 percent average annual growth rate. This is slower than the realized average annual growth rate of 5.8 percent from 1995 to 2006. Forecasting errors for the years 2008 through 2017 vary from 3.5 to 8.9 percent, increasing each year as uncertainty increases.

TABLE 5: RETAIL SALES PROJECTIONS FOR FAYETTEVILLE, 2007-2017

Year	Total Sales	Sales Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ²	\$1,553,156,557	-1.0%	\$11,185,456	0.7%	\$1,531,233,467	\$1,575,076,646
2008	\$1,607,849,981	3.5%	\$56,429,113	3.5%	\$1,497,250,947	\$1,718,449,013
2009	\$1,667,068,954	3.7%	\$75,649,257	4.5%	\$1,518,799,130	\$1,815,338,779
2010	\$1,726,287,930	3.6%	\$92,408,596	5.4%	\$1,545,170,411	\$1,907,405,448
2011	\$1,785,506,903	3.4%	\$107,880,098	6.0%	\$1,574,065,794	\$1,996,948,013
2012	\$1,844,725,879	3.3%	\$122,557,261	6.6%	\$1,604,518,058	\$2,084,933,698
2013	\$1,903,944,852	3.2%	\$136,697,859	7.2%	\$1,636,021,973	\$2,171,867,731
2014	\$1,963,163,827	3.1%	\$150,453,974	7.7%	\$1,668,279,452	\$2,258,048,201
2015	\$2,022,382,800	3.0%	\$163,922,796	8.1%	\$1,701,100,024	\$2,343,665,577
2016	\$2,081,601,775	2.9%	\$177,170,051	8.5%	\$1,734,354,854	\$2,428,848,696
2017	\$2,140,820,750	2.8%	\$190,242,155	8.9%	\$1,767,952,977	\$2,513,688,523

An alternative estimation of Fayetteville retail sales (using ordinary least squares regression as well as forecasted values of the population proxy and ratio of city retail sales to Northwest Arkansas regional sales) gave similar results. Using this method, the annual average growth rate of Fayetteville retail sales was predicted to be 3.1 percent from 2009 to 2017 – compared with the projected 3.2 percent by the univariate model for the same period. Hence, the resulting univariate estimates described above are a good fit and the alternative projections are omitted for simplicity.

Forecasted retail sales taxes for the 2007 through 2017 accounting years are presented in Table 6. The accounting year is defined as the time period when sales tax revenues are received by the city of Fayetteville and includes the actual collection months of December through November. Projected

² Fayetteville retail sales from October to December 2007 were forecasted. As a result, the 2007 forecasting error is estimated for these three months only.

taxes are shown at a 2 percent tax rate. During the next ten years, from 2008 to 2017, retail sales taxes are predicted to increase at a 3.3 percent average annual growth rate, following the rise of total retail sales. The sales taxes forecasting errors for the years 2008 through 2017 vary from 3.4 to 8.9 percent as well, increasing each year as uncertainty rises.

TABLE 6: RETAIL SALES TAX PROJECTIONS FOR FAYETTEVILLE, ACCOUNTING YEARS 2007-2017

Year	Total Sales Tax, 2%	Sales Tax Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales Taxes	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ³	\$30,988,309	-1.7%	\$145,999	0.5%	\$30,702,157	\$31,274,461
2008	\$32,058,301	3.5%	\$1,093,783	3.4%	\$29,914,526	\$34,202,077
2009	\$33,242,681	3.7%	\$1,483,834	4.5%	\$30,334,420	\$36,150,942
2010	\$34,427,060	3.6%	\$1,821,705	5.3%	\$30,856,585	\$37,997,536
2011	\$35,611,440	3.4%	\$2,132,711	6.0%	\$31,431,402	\$39,791,477
2012	\$36,795,819	3.3%	\$2,427,288	6.6%	\$32,038,423	\$41,553,216
2013	\$37,980,199	3.2%	\$2,710,824	7.1%	\$32,667,081	\$43,293,317
2014	\$39,164,578	3.1%	\$2,986,480	7.6%	\$33,311,185	\$45,017,971
2015	\$40,348,958	3.0%	\$3,256,262	8.1%	\$33,966,801	\$46,731,115
2016	\$41,533,337	2.9%	\$3,521,525	8.5%	\$34,631,274	\$48,435,400
2017	\$42,717,717	2.9%	\$3,783,222	8.9%	\$35,302,738	\$50,132,695

BENTONVILLE, ROGERS, SPRINGDALE, AND WASHINGTON COUNTY RETAIL SALES PROJECTIONS

Table 7 presents retail sales projected to occur in Bentonville from 2007 to 2017. (The model had 0.62 adjusted R-square.) Retail sales for 2007 include nine months of data provided by the city and three months of projected values (from October to December). During the next ten years, retail sales are predicted to rise at a 7.4 percent average annual growth rate in Bentonville. Forecasting errors for years 2008 to 2017 vary from 2.2 to 27.5 percent, increasing each year with the growth

³ Fayetteville retail sales tax for October and November 2007 were forecasted. As a result, the 2007 forecasting error is estimated for these two months only.

of uncertainty. The higher forecasting errors for the Bentonville projections are explained by less historical data available for use in the projection model compared to the Fayetteville time series.

TABLE 7: RETAIL SALES PROJECTIONS FOR BENTONVILLE, 2007-2017

Year	Total Sales	Sales Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ⁴	\$760,306,227	14.0%	\$16,945,535	2.2%	\$166,122,519	\$232,547,795
2008	\$830,226,349	9.2%	\$73,192,323	8.8%	\$686,772,033	\$973,680,665
2009	\$910,705,153	9.7%	\$91,010,153	10.0%	\$732,328,534	\$1,089,081,772
2010	\$991,183,958	8.8%	\$116,523,413	11.8%	\$762,802,264	\$1,219,565,652
2011	\$1,071,662,762	8.1%	\$148,426,211	13.9%	\$780,752,732	\$1,362,572,792
2012	\$1,152,141,567	7.5%	\$185,543,130	16.1%	\$788,483,719	\$1,515,799,414
2013	\$1,232,620,372	7.0%	\$227,045,325	18.4%	\$787,619,715	\$1,677,621,027
2014	\$1,313,099,176	6.5%	\$272,367,690	20.7%	\$779,268,314	\$1,846,930,038
2015	\$1,393,577,981	6.1%	\$321,113,432	23.0%	\$764,207,218	\$2,022,948,743
2016	\$1,474,056,785	5.8%	\$372,991,314	25.3%	\$743,007,243	\$2,205,106,326
2017	\$1,554,535,589	5.5%	\$427,778,180	27.5%	\$716,105,763	\$2,392,965,416

The next table shows retail sales projected to occur in Rogers during the period of 2007 to 2017 (Table 8). The adjusted R-square was equal 0.96. Like Fayetteville and Bentonville, the Rogers retail sales numbers for 2007 include nine months of data provided by the city and three months of projected values, from October to December. During the next ten years, from 2008 to 2017, the retail sales are predicted to increase at a 6.9 percent average annual growth rate in Rogers. Forecasting errors for years 2008 through 2017 vary from 3.5 to 19.5 percent, increasing each year as uncertainty increases.

⁴ Bentonville retail sales from October to December 2007 were forecasted. As a result, the 2007 forecasting error and 95% confidence interval are estimated for these three months only.

TABLE 8: RETAIL SALES PROJECTIONS FOR ROGERS, 2007-2017

Year	Total Sales	Sales Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ⁵	\$1,156,348,926	9.7%	\$9,259,515	0.8%	\$303,401,398	\$339,698,030
2008	\$1,268,659,161	9.7%	\$43,787,303	3.5%	\$1,182,837,624	\$1,354,480,699
2009	\$1,378,021,755	8.6%	\$67,189,698	4.9%	\$1,246,332,368	\$1,509,711,146
2010	\$1,487,384,352	7.9%	\$97,743,195	6.6%	\$1,295,811,213	\$1,678,957,494
2011	\$1,596,746,950	7.4%	\$134,113,200	8.4%	\$1,333,889,904	\$1,859,603,992
2012	\$1,706,109,543	6.8%	\$175,389,454	10.3%	\$1,362,352,529	\$2,049,866,562
2013	\$1,815,472,140	6.4%	\$220,970,040	12.2%	\$1,382,378,818	\$2,248,565,461
2014	\$1,924,834,738	6.0%	\$270,432,741	14.0%	\$1,394,796,306	\$2,454,873,169
2015	\$2,034,197,331	5.7%	\$323,463,156	15.9%	\$1,400,221,196	\$2,668,173,470
2016	\$2,143,559,928	5.4%	\$379,815,792	17.7%	\$1,399,134,654	\$2,887,985,203
2017	\$2,252,922,526	5.1%	\$439,291,909	19.5%	\$1,391,926,202	\$3,113,918,848

Table 9 shows retail sales projected to occur in the City of Springdale during the period of 2007 to 2017. (The adjusted R-square of the forecast was 0.89.) Similar to the other cities, Springdale retail sales for 2007 consist of data provided by the city (for the months of January through September) and of projected sales values (for the period of October through December). During the next ten years, Springdale retail sales are predicted to rise at a 3.1 percent average annual growth rate. Forecasting errors for years 2008 to 2017 vary from 5.7 to 19.3 percent, increasing each year with the growth of uncertainty.

⁵ Rogers retail sales from October to December 2007 were forecasted. As a result, the 2007 forecasting error and 95% confidence interval are estimated for these three months only.

TABLE 9: RETAIL SALES PROJECTIONS FOR SPRINGDALE, 2007-2017

Year	Total Sales	Sales Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ⁶	\$1,160,777,478	-6.0%	\$11,022,719	0.9%	\$269,708,292	\$312,916,560
2008	\$1,189,888,413	2.5%	\$67,759,615	5.7%	\$1,057,082,010	\$1,322,694,818
2009	\$1,232,789,284	3.6%	\$99,470,186	8.1%	\$1,037,831,302	\$1,427,747,267
2010	\$1,275,690,153	3.5%	\$127,666,452	10.0%	\$1,025,468,505	\$1,525,911,802
2011	\$1,318,591,024	3.4%	\$154,332,742	11.7%	\$1,016,104,408	\$1,621,077,639
2012	\$1,361,491,893	3.3%	\$180,157,819	13.2%	\$1,008,389,059	\$1,714,594,729
2013	\$1,404,392,764	3.2%	\$205,461,522	14.6%	\$1,001,695,582	\$1,807,089,946
2014	\$1,447,293,633	3.1%	\$230,416,595	15.9%	\$995,685,408	\$1,898,901,860
2015	\$1,490,194,504	3.0%	\$255,125,771	17.1%	\$990,157,185	\$1,990,231,824
2016	\$1,533,095,373	2.9%	\$279,654,436	18.2%	\$984,982,749	\$2,081,207,998
2017	\$1,575,996,244	2.8%	\$304,046,397	19.3%	\$980,076,256	\$2,171,916,231

Washington County projected retail sales are presented in Table 10 for the period of 2007-2017. The forecasting model had a 0.98 adjusted R-square. Retail sales for 2007 consist of data provided to the Center (for the months of January through September) as well as of projected sales values (for the period of October to December). Retail sales are predicted to increase at the average annual growth rate of 3.2 percent in Washington County during the next ten years. Forecasting errors for years 2008 to 2017 vary from 3.4 to 9.7 percent, rising each year with uncertainty growth. Lower forecasting errors for the Washington County projections are explained by more historical data available for use in the projection model compared to the time series of other cities.

⁶ Springdale retail sales from October to December 2007 were forecasted. As a result, the 2007 forecasting error and 95% confidence interval are estimated for these three months only.

TABLE 10: RETAIL SALES PROJECTIONS FOR WASHINGTON COUNTY, 2007-2017

Year	Total Sales	Sales Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Sales	95% Confidence Lower Limit	95% Confidence Upper Limit
2007 ⁷	\$3,020,304,821	-2.7%	\$19,145,850	0.6%	\$753,316,902	\$828,367,253
2008	\$3,126,116,742	3.5%	\$107,625,969	3.4%	\$2,915,173,715	\$3,337,059,765
2009	\$3,240,555,512	3.7%	\$150,775,488	4.7%	\$2,945,040,985	\$3,536,070,038
2010	\$3,354,994,280	3.5%	\$187,681,571	5.6%	\$2,987,145,157	\$3,722,843,402
2011	\$3,469,433,051	3.4%	\$221,551,694	6.4%	\$3,035,199,708	\$3,903,666,396
2012	\$3,583,871,821	3.3%	\$253,618,005	7.1%	\$3,086,789,663	\$4,080,953,982
2013	\$3,698,310,593	3.2%	\$284,495,175	7.7%	\$3,140,710,296	\$4,255,910,886
2014	\$3,812,749,364	3.1%	\$314,535,236	8.2%	\$3,196,271,626	\$4,429,227,100
2015	\$3,927,188,132	3.0%	\$343,958,359	8.8%	\$3,253,042,136	\$4,601,334,129
2016	\$4,041,626,903	2.9%	\$372,911,003	9.2%	\$3,310,734,767	\$4,772,519,038
2017	\$4,156,065,672	2.8%	\$401,495,183	9.7%	\$3,369,149,576	\$4,942,981,770

The projected results show continuous higher growth of retail sales in Benton County during the period of 2008-2017, with Bentonville growing at an average annual growth rate of 7.4 percent and Rogers at 6.9 percent. The growth rate in Washington County is forecasted to be less than half that in those cities (3.2 percent), with a slightly bigger retail sales growth rate in Fayetteville (3.3 percent) and slightly smaller growth rate in Springdale (3.1 percent).

⁷ Washington County retail sales from October to December 2007 were forecasted. As a result, the 2007 forecasting error and 95% confidence interval are estimated for these three months only.

FAYETTEVILLE PROPERTY VALUES AND PROPERTY TAX PROJECTIONS

Using an exponential smoothing model approach, Fayetteville real property values were forecasted for the period of 2007 to 2017 and personal property values as well as utilities for the period of 2008 to 2017. Table 11 presents projections of real estate property values, Table 12 personal property values, and Table 13 projections of city utilities. R-squares of the real property, utilities, and personal property forecasts were 0.99, 0.94, and 0.99 respectively.

The creation of the East Square Redevelopment TIF district was also taken into account. The value of parcels comprising the TIF district was assumed to grow at the same rate as the rest of Fayetteville real estate parcels. In order to estimate taxable assessed property values, TIF district values were subtracted from the projected total real property values and frozen 2004 value of the parcels within the TIF district (\$16,691,661) was added each year.

TABLE 11: REAL ESTATE PROPERTY VALUES PROJECTIONS FOR FAYETTEVILLE, 2007-2017

Year	Total Real Property Values	Forecasting Error	Forecasting Error, % of Projected Property Value	Real Property Values in TIF District	Total Real Property Values, Accounting for TIF	Real Property Values Annual Growth Rate
2007	\$896,744,014	\$18,245,883	2.0%	\$16,594,332	\$896,841,343	11.5%
2008	\$997,938,526	\$18,518,018	1.9%	\$18,466,945	\$996,163,241	11.1%
2009	\$1,108,275,684	\$18,824,394	1.7%	\$20,508,745	\$1,104,458,601	10.9%
2010	\$1,227,755,489	\$19,166,055	1.6%	\$22,719,730	\$1,221,727,420	10.6%
2011	\$1,356,377,939	\$19,543,874	1.4%	\$25,099,900	\$1,347,969,700	10.3%
2012	\$1,494,143,036	\$19,958,552	1.3%	\$27,649,256	\$1,483,185,441	10.0%
2013	\$1,641,050,778	\$20,410,627	1.2%	\$30,367,798	\$1,627,374,642	9.7%
2014	\$1,797,101,167	\$20,900,473	1.2%	\$33,255,525	\$1,780,537,304	9.4%
2015	\$1,962,294,202	\$21,428,318	1.1%	\$36,312,437	\$1,942,673,426	9.1%
2016	\$2,136,629,883	\$21,994,249	1.0%	\$39,538,535	\$2,113,783,008	8.8%
2017	\$2,320,108,209	\$22,598,234	1.0%	\$42,933,819	\$2,293,866,052	8.5%

On average, from 2008 to 2017, real property values are projected to increase at a 9.8 percent average annual growth rate (at a 10.0 percent from 2007 to 2017). This is higher than the realized average annual growth rate of 8.6 percent from 1995 to 2006. Forecasting errors for the years 2007 through 2017 vary from 1.0 to 2.0 percent, which is smaller than the errors of retail sales or other

property values projections due to the different model specification (i.e. due to the use of a quadratic trend).

Forecasting errors for personal property projections vary during the reported period, comprising from 3.3 to 3.9 percent of personal property values (Table 12). Overall, utility values projections have higher forecasting errors, altering from 8.7 percent of the projected utility values in 2008 to 6.9 percent in 2017 (Table 13). Higher utility projections errors are the result of relatively smaller utility values compared with the real estate and personal property values. It also should be noted that forecasting errors of all property projections are higher for the recent future, which is due to the nature of exponential smoothing model used for estimation.

TABLE 12: PERSONAL PROPERTY VALUES PROJECTIONS FOR FAYETTEVILLE, 2008-2017

Year	Total Personal Property Values	Personal Property Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Property Value
2008	\$212,001,933	4.9%	\$8,348,443	3.9%
2009	\$220,297,213	3.9%	\$8,437,477	3.8%
2010	\$228,592,494	3.8%	\$8,534,365	3.7%
2011	\$236,887,774	3.6%	\$8,638,845	3.6%
2012	\$245,183,055	3.5%	\$8,750,643	3.6%
2013	\$253,478,335	3.4%	\$8,869,483	3.5%
2014	\$261,773,615	3.3%	\$8,995,087	3.4%
2015	\$270,068,896	3.2%	\$9,127,174	3.4%
2016	\$278,364,176	3.1%	\$9,265,468	3.3%
2017	\$286,659,457	3.0%	\$9,409,695	3.3%

TABLE 13: UTILITY VALUES PROJECTIONS FOR FAYETTEVILLE, 2008-2017

Year	Total Utility Values	Utilities Annual Growth Rate	Forecasting Error	Forecasting Error, % of Projected Utility Value
2008	\$34,019,660	4.1%	\$2,964,445	8.7%
2009	\$35,605,617	4.7%	\$2,996,059	8.4%
2010	\$37,191,574	4.5%	\$3,030,464	8.1%
2011	\$38,777,531	4.3%	\$3,067,563	7.9%
2012	\$40,363,488	4.1%	\$3,107,261	7.7%
2013	\$41,949,445	3.9%	\$3,149,460	7.5%
2014	\$43,535,402	3.8%	\$3,194,061	7.3%
2015	\$45,121,358	3.6%	\$3,240,964	7.2%
2016	\$46,707,315	3.5%	\$3,290,070	7.0%
2017	\$48,293,272	3.4%	\$3,341,284	6.9%

In order to be more conservative, the Center researchers used an alternative approach for estimating real property values. The projected growth rates, whenever exceeding 10.0 percent, were substituted with the average growth rates of 1997-2006 (which also happen to equal the median growth rate of the last decade: 8.6 percent). The resulting real property tax projections of these two scenarios are presented in Table 14.

Fayetteville property taxes were estimated based on the forecasted total property values (for real estate property - excluding parcels exempt from taxes) and using the current millage rate of 3.1 mils. On average, real property taxes are projected to increase at a 9.8 percent average annual growth rate during the period from 2008 to 2017 (with the median growth rate being 9.9 percent). Based on alternative scenario, Fayetteville real property taxes are projected to rise at the average annual growth rate of 8.9 percent during the same period, while the median growth rate will be 8.6 percent.

TABLE 14: REAL PROPERTY TAX PROJECTIONS FOR FAYETTEVILLE, TWO SCENARIOS, 2007-2017

Year	Total Real Property Taxes	Real Property Taxes Annual Growth Rate	Total Real Property Taxes, Alternative Approach	Real Property Taxes Annual Growth Rate, Alternative Approach
2007	\$2,780,208	11.5%	\$2,707,279	8.6%
2008	\$3,088,106	11.1%	\$2,940,105	8.6%
2009	\$3,423,822	10.9%	\$3,192,954	8.6%
2010	\$3,787,355	10.6%	\$3,467,548	8.6%
2011	\$4,178,706	10.3%	\$3,765,757	8.6%
2012	\$4,597,875	10.0%	\$4,089,612	8.6%
2013	\$5,044,861	9.7%	\$4,487,188	9.7%
2014	\$5,519,666	9.4%	\$4,909,506	9.4%
2015	\$6,022,288	9.1%	\$5,356,566	9.1%
2016	\$6,552,727	8.8%	\$5,828,370	8.8%
2017	\$7,110,985	8.5%	\$6,324,916	8.5%

Projections of Fayetteville personal property and total utilities tax revenues are presented in Table 15. Personal property taxes are projected to rise at a 3.6 percent average annual growth rate during the period from 2008 to 2017, while the median growth rate will be 3.4 percent. On the other hand, property taxes from total utilities are projected to increase at the average annual growth rate of 4.0 percent during the same period (with the median growth rate being the same 4.0 percent). Although forecasted average growth rates of personal property and total utilities are smaller than historical average growth rates, significant variability of annual rates in the past justifies more conservative projections.

TABLE 15: PERSONAL PROPERTY AND UTILITIES TAX PROJECTIONS FOR FAYETTEVILLE, 2008-2017

Year	Total Personal Property Taxes	Personal Property Taxes Annual Growth Rate	Total Utilities Property Taxes	Utilities Property Taxes Annual Growth Rate
2008	\$657,206	4.9%	\$105,461	4.1%
2009	\$682,921	3.9%	\$110,377	4.7%
2010	\$708,637	3.8%	\$115,294	4.5%
2011	\$734,352	3.6%	\$120,210	4.3%
2012	\$760,067	3.5%	\$125,127	4.1%
2013	\$785,783	3.4%	\$130,043	3.9%
2014	\$811,498	3.3%	\$134,960	3.8%
2015	\$837,214	3.2%	\$139,876	3.6%
2016	\$862,929	3.1%	\$144,793	3.5%
2017	\$888,644	3.0%	\$149,709	3.4%

RETAIL SALES AND PROPERTY TAXES TO BE RECEIVED BY FAYETTEVILLE

The total retail sales tax revenues received by the City of Fayetteville contain 2 percent city sales taxes and a fraction of the 1 percent Washington County sales taxes (Table 16). Since the tax collected by the county is distributed to the city based on its population, it was assumed that Fayetteville will represent 36.805 percent of the total county population for the period of 2008 through 2017. Furthermore, property tax revenues received by the City of Fayetteville are added to the estimations. On average, total retail sales and property taxes collected by the City of Fayetteville will increase at a 3.8 percent annual growth rate and the median growth rate is projected to be the same. It should be noted that the following projections do not account for any refunds or state central services payments that the city would have to pay, but report solely the projected sales and property tax revenues collections.

TABLE 16: TOTAL FAYETTEVILLE SALES AND PROPERTY TAX REVENUES, ACCOUNTING YEARS 2008-2017

Year	City Sales Tax Revenues, 2%	Fayetteville Portion of Washington County Sales Tax Revenues	City Total Property Tax Revenues	Total Sales and Property Tax Revenues	Annual Growth Rate
2008	\$32,058,302	\$11,470,573	\$3,850,773	\$47,379,648	3.9%
2009	\$33,242,680	\$11,891,765	\$4,217,120	\$49,351,565	4.2%
2010	\$34,427,060	\$12,312,957	\$4,611,286	\$51,351,303	4.1%
2011	\$35,611,440	\$12,734,149	\$5,033,268	\$53,378,857	3.9%
2012	\$36,795,820	\$13,155,341	\$5,483,069	\$55,434,230	3.9%
2013	\$37,980,198	\$13,576,533	\$5,960,687	\$57,517,418	3.8%
2014	\$39,164,578	\$13,997,725	\$6,466,124	\$59,628,426	3.7%
2015	\$40,348,958	\$14,418,917	\$6,999,378	\$61,767,252	3.6%
2016	\$41,533,338	\$14,840,108	\$7,560,449	\$63,933,896	3.5%
2017	\$42,717,716	\$15,261,300	\$8,149,338	\$66,128,354	3.4%

The projected lower limit of tax estimates is presented in Table 17. The alternative approach of real property tax evaluations was used in order to provide lowest projected property tax revenues. This scenario allows for lower annual growth rates in Fayetteville sales and property taxes, estimated to be on average 2.0 percent during the period of 2008-2017. The median growth rate of city sales and property tax revenues is projected to be 2.5 percent.

TABLE 17: TOTAL FAYETTEVILLE SALES AND PROPERTY TAX REVENUES, LOWER LIMIT, ACCOUNTING YEARS 2008-2017

Year	City Sales Tax Revenues, 2%	Fayetteville Portion of Washington County Sales Tax Revenues	City Total Property Tax Revenues	Total Sales and Property Tax Revenues	Annual Growth Rate
2008	\$29,914,526	\$10,723,508	\$3,667,702	\$44,305,736	-1.9%
2009	\$30,334,420	\$10,827,625	\$3,950,809	\$45,112,854	1.8%
2010	\$30,856,584	\$10,980,154	\$4,255,628	\$46,092,366	2.2%
2011	\$31,431,402	\$11,155,665	\$4,584,030	\$47,171,097	2.3%
2012	\$32,038,424	\$11,344,684	\$4,938,047	\$48,321,155	2.4%
2013	\$32,667,080	\$11,542,551	\$5,365,755	\$49,575,386	2.6%
2014	\$33,311,186	\$11,746,620	\$5,818,178	\$50,875,983	2.6%
2015	\$33,966,800	\$11,955,244	\$6,295,315	\$52,217,359	2.6%
2016	\$34,631,274	\$12,167,335	\$6,797,169	\$53,595,778	2.6%
2017	\$35,302,738	\$12,382,135	\$7,323,741	\$55,008,614	2.6%

The estimated upper limit of Fayetteville retail sales and property tax revenues is shown in Table 18. City tax revenues are projected to increase at a 5.2 annual average growth rates, while the median growth rate is estimated to be 4.7 percent.

TABLE 18: TOTAL FAYETTEVILLE SALES AND PROPERTY TAX REVENUES, UPPER LIMIT, ACCOUNTING YEARS 2008-2017

Year	City Sales Tax Revenues, 2%	Fayetteville Portion of Washington County Sales Tax Revenues	City Total Property Tax Revenues	Total Sales and Property Tax Revenues	Annual Growth Rate
2008	\$17,101,038	\$12,217,639	\$3,942,186	\$50,361,902	9.4%
2009	\$18,075,471	\$12,955,905	\$4,309,840	\$53,416,687	6.1%
2010	\$18,998,768	\$13,645,760	\$4,705,452	\$56,348,748	5.5%
2011	\$19,895,739	\$14,312,633	\$5,129,023	\$59,233,133	5.1%
2012	\$20,776,608	\$14,965,998	\$5,580,555	\$62,099,768	4.8%
2013	\$21,646,658	\$15,610,515	\$6,060,048	\$64,963,880	4.6%
2014	\$22,508,986	\$16,248,830	\$6,567,502	\$67,834,303	4.4%
2015	\$23,365,557	\$16,882,589	\$7,102,917	\$70,716,621	4.2%
2016	\$24,217,700	\$17,512,882	\$7,666,292	\$73,614,574	4.1%
2017	\$25,066,348	\$18,140,466	\$8,257,624	\$76,530,786	4.0%

CONCLUDING COMMENTS

Fayetteville retail sales taxes are forecasted to increase at 3.3 percent average annual growth rate during the period of 2008 to 2017, ranging from 2.9 percent in 2017 to 3.7 percent in 2009. Sales taxes forecasting errors vary, comprising from 3.4 to 8.9 percent of total estimated sales taxes, increasing each year as uncertainty rises.

The total retail sales tax revenues received by the City of Fayetteville include the 2 percent city-levied sales taxes and a fraction of the 1 percent Washington County sales taxes (Table 16). Since the tax collected by the county is distributed to the city based on its population, it was assumed that Fayetteville will represent 36.8 percent of the total county population for the period of 2008 through 2017.

Fayetteville real property tax revenues are estimated to increase at a 9.8 percent average annual growth rate, personal property tax revenues at a 3.6 percent, and utilities property taxes at a 4.0 percent during the same period. An alternative, more conservative scenario projects real property tax revenues using an average growth rate of 8.9 percent from 2008 to 2017.

On average, total retail sales and property taxes collected by the City of Fayetteville will increase at a 3.8 percent annual growth rate. The lower limit of an average annual growth rate is expected to be 2.0 percent and the upper limit 5.2 percent.
