Population Forecasts: Long-Term Projections for Clark County, Nevada 2018-2060

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Prepared by

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Prepared for

Regional Transportation Commission of Southern Nevada, Southern Nevada Water Authority, Southern Nevada Regional Planning Coalition, and members of the Forecasting Group

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Executive Summary

Each year, the Regional Transportation Commission of Southern Nevada (RTC); the Southern Nevada Water Authority (SNWA); the Southern Nevada Regional Planning Coalition (SNRPC); the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas; and a group of community demographers and analysts work together to develop a long-term forecast of Clark County's population growth that is consistent with the structural economic characteristics of the county. Toward this end, we employ a general-equilibrium demographic and economic model developed by Regional Economic Models, Inc. (REMI), specifically for Clark County.

We recalibrate the REMI model to incorporate the most recent available information regarding local employment growth and local public and private investment projects. The resulting long-term forecast predicts positive population growth throughout the range of the forecast. We predict that Clark County's population will reach approximately 2.67 million by 2035 and marginally above 2.90 million by 2060.

Table 1 summarizes the population forecast, showing a gradually declining growth rate of Clark County's population over the forecast horizon. Despite short-term economic uncertainties and modeling difficulties, we note that this forecast is intended for medium- to long-term planning purposes. In the medium term, the population growth rate declines to 1.9 percent by 2020, and in the long term, its growth tapers off as Clark County's maturing economy attracts fewer economic migrants. The rate of growth, which exceeded the national average over the past 50 years, moderates and eventually moves below the national rate of growth. That is, by 2029, the population growth rate falls to 0.58 percent,

slightly below the projected[1] long-term national population growth rate of 0.60 percent, and as the Clark County economy continues to mature, it falls further to 0.20 percent by 2060.

As is typical of any forecast, potential risks exist that could lead to either over- or underestimated population growth. Since currently the upside risk to U.S. economic growth exceeds the downside risk, the risk of underestimating population growth exceeds the risk of overestimating it in the near term. The forecast began with the assumption that the local economy will continue to expand in 2018 and 2019. To the extent that the near-term economic outlook differs, the short-run forecasts will differ. Our long-term forecasts exclude business-cycle, seasonal, and irregular events, which respond more to these short-run risks. We believe, however, that these risks arise from short-term uncertainty; whereas, our forecasts primarily provide a long-term planning tool. In other words, our long-term forecast addresses the trend movement in population, excluding the business-cycle, seasonal, and irregular effects.

[1] Source: https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html.

Table 1: Clark County Final Population Forecast: 2010-2060

Year	Population Forecast	Change in Population Forecast	Growth in Population (Percent)
2010	1,951,269*	-55,078	-2.7%
2011	1,966,630**	15,361	0.8%
2012	2,008,654**	42,024	2.1%
2013	2,062,253**	53,599	2.7%
2014	2,102,238**	39,985	1.9%
2015	2,147,641**	45,403	2.2%
2016	2,205,207**	57,566	2.7%
2017	2,248,391**	43,184	2.0%
2018	2,296,000	47,609	2.1%
2019	2,344,000	48,000	2.1%
2020	2,389,000	45,000	1.9%
2021	2,423,000	34,000	1.4%
2022	2,452,000	29,000	1.2%
2023	2,481,000	29,000	1.2%
2024	2,507,000	26,000	1.0%
2025	2,530,000	23,000	0.9%
2026	2,550,000	20,000	0.8%
2027	2,568,000	18,000	0.7%
2028	2,585,000	17,000	0.7%
2029	2,600,000	15,000	0.6%
2030	2,615,000	15,000	0.6%
2031	2,628,000	13,000	0.5%
2032	2,640,000	12,000	0.5%
2033	2,651,000	11,000	0.4%
2034	2,662,000	11,000	0.4%
2035	2,672,000	10,000	0.4%
2040	2,719,000	9,000	0.3%
2045	2,766,000	10,000	0.4%
2050	2,816,000	10,000	0.4%
2055	2,863,000	9,000	0.3%
2060	2,900,000	6,000	0.2%

* 2010 U.S. Census.
** SNRPC consensus population estimate.

Acknowledgements

CBER thanks the members of the Population Forecasting Group for comments on earlier versions of this report.

I. Introduction

Each year, the Regional Transportation Commission (RTC); the Southern Nevada Water Authority (SNWA); the Southern Nevada Regional Planning Coalition (SNRPC); the Center for Business and Economic Research (CBER) at the University of Nevada, Las Vegas; and a group of community demographers and analysts work together to provide a long-term forecast of economic and demographic variables influencing Clark County. The primary goal is to develop a long-term forecast of the Clark County population growth that is consistent with the structural economic characteristics of the county. Toward this end, we employ a general-equilibrium demographic and economic model developed by Regional Economic Models, Inc. (REMI), specifically for Clark County.

The REMI model is a state-of-the-art econometric forecasting model that accounts for dynamic feedback between economic and demographic variables. Special features allow the user to update the model to include the most current economic information. CBER calibrates the model using information on recent local employment levels, the most recent national Gross Domestic Product (GDP) forecast, and spending on local capital projects.

The model employed divides Nevada into five regions: Clark County; Nye County; Lincoln County; Washoe County; and the remaining counties, which are combined to form a fifth region. These regions are modeled using the U.S. economy as a backdrop. The model contains over 100 economic and demographic relationships that are carefully constructed to represent concisely the Clark County economy. The model includes equations to account for migration and trade between Nevada counties and other states and counties in the country.

The demographic and economic data used to construct the model begin in 2001 and end in 2015. The most important variables include the aggregate totals of employment, the labor force, and population. The economic data for the most recent version of the model (REMI PI+ v2.1) are consistent with the North American Industry Classification System (NAICS). The REMI PI+ v2.1 model was released in 2017. Hence, the model's most recent data are from 2015, since the Bureau of Economic Analysis (BEA) personal-income data only become available with a two-year lag. The availability of the most recent income data sets the last year of history with each release of an updated model.

The REMI model is the best model available for describing how economies interact geographically.[2] These interactions may take place within a single economy (such as the interaction between house-price growth and employment growth in Clark County) or between two economies (such as the interaction between Southern Nevada and Southern California through migration flows). These and over 100 other interactions contained within the model are too complex to consider modeling on our own. Rather, we turn to the REMI model because it has a solid foundation in economic theory and the principles of general-equilibrium-based growth theory and distribution, yet it still offers the flexibility required to model a regional economy like Clark County.

To guarantee that the model incorporates the most recent data, we make a series of adjustments to the model. In this way, we ensure that the forecast model includes the best available information when making the final forecast. First, we update the model's national GDP forecast using the latest available national forecast from the University of Michigan's

[2] See Schwer, R. K. and D. Rickman (1995), "A comparison of the multipliers of IMPLAN, REMI and RIMS II: Benchmarking ready-made models for comparison," *The Annals of Regional Science,* 29(4), 363-374.

Research Seminar in Quantitative Economics (RSQE), since REMI uses the RSQE forecast in its model development. Second, we rebase the population forecast to the most recent population estimate for Clark County available from SNRPC. Third, we update the model with current employment data from the Bureau of Economic Analysis (BEA) and the Nevada Department of Employment, Training and Rehabilitation (DETR). Fourth, we adjust future hotel employment based on the expected number of hotel rooms that will be added in the near future. Fifth, we incorporate the expected direct output produced by the expansion and renovation of the Las Vegas Convention Center District. Sixth, we include the expected economic impact from construction of the Las Vegas Stadium for the Oakland Raiders of the National Football League. Lastly, we include planned new investment in public infrastructure in the model using information from the RTC.

This report proceeds as follows. Section II examines the changes in the REMI model from the prior year's model. Section III presents sequentially the changes made to update the model and tailor it to local information. Section IV reports the population forecast and gives a brief discussion of the economic environment surrounding the forecast. Section V compares the population growth forecast with the previous years' forecast. Section VI discusses the risks to the forecast. Finally, section VII concludes.

II. Comparison of REMI Models: Current and Previous Year

Based on our past practice, we begin by comparing the most recent REMI out-of-the-box benchmark forecast prior to any model recalibrations with the corresponding out-of-the-box forecasts from the REMI models used in prior reports. This gives us the opportunity to examine how the new model differs from previous versions and to explore the basis of these differences.

The most recent data used to develop this year's model end with data from 2015. Thus, we refer to the current model by its last historical year 2015 (LHY2015) and the previous model by its last historical year 2013 (LHY2013).[3]

Each year, the REMI staff and users discuss how the model works and propose adjustments and changes for improvement. The newest REMI model, PI+ v2.1, offers one major improvement: it includes an updated equation for economic migration. Economic migration is one of the important factors for population growth in Southern Nevada, since Southern Nevada population changes largely reflect net domestic migration.[4] Economic migrants emigrate from other regions to improve their living standards and to seek better job opportunities. Three major components attract these interstate migrants according to REMI: relative employment opportunities, relative compensation rates, and amenity values.[5] REMI reestimated the responses (parameters) to the relative employment

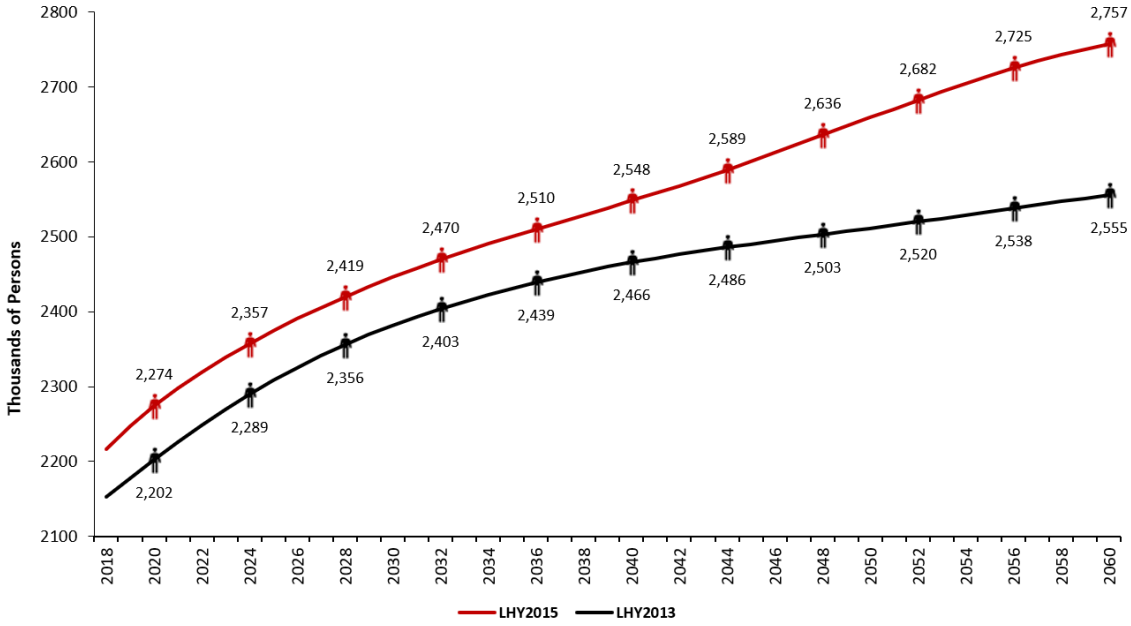
[3] Last year, we used version 1.7 (LHY2013) instead of version 2.0, which was released in 2016 because of some uncertainty about the changes included in version 2.0. We, however, updated version 1.7 with new data history that was contained in version 2.0; therefore, the last year of history in last year's forecast was 2014. Although the last year of history was 2014, we identify the model used last year as LHY2013 to avoid confusion for the reader.

[4] According to the U.S. Census, Clark County added 47,355 residents, including 29,414 net domestic migrants, in 2017.

[5] Relative employment opportunity stands for employment opportunity in the region compared to the U.S. average, the relative compensation rate stands for the real compensation (disposable income) rate compared to the national average level, and amenity values include factors such as climate, community safety,

opportunity and the relative compensation rate based on state and county migration and economic data from 2009 to 2014.[6] Previously, REMI used estimates of the economic migration parameters using data from 2001 through 2008. These model updates and the new history for 2015 lead to the difference in the out-of-the-box population forecasts between the LHY2015 and the LHY2013.

Figure 1: Clark County Population Forecasts: REMI Out-of-the-Box LHY2015 and LHY2013: 2018-2060



Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

Figures 1 and 2 compare the LHY2015 and LHY2013 population forecasts from the out-of-the-box models (i.e., before any updating for employment, infrastructure projects, the national GDP forecast, and so on).[7] The out-of-the-box population forecast

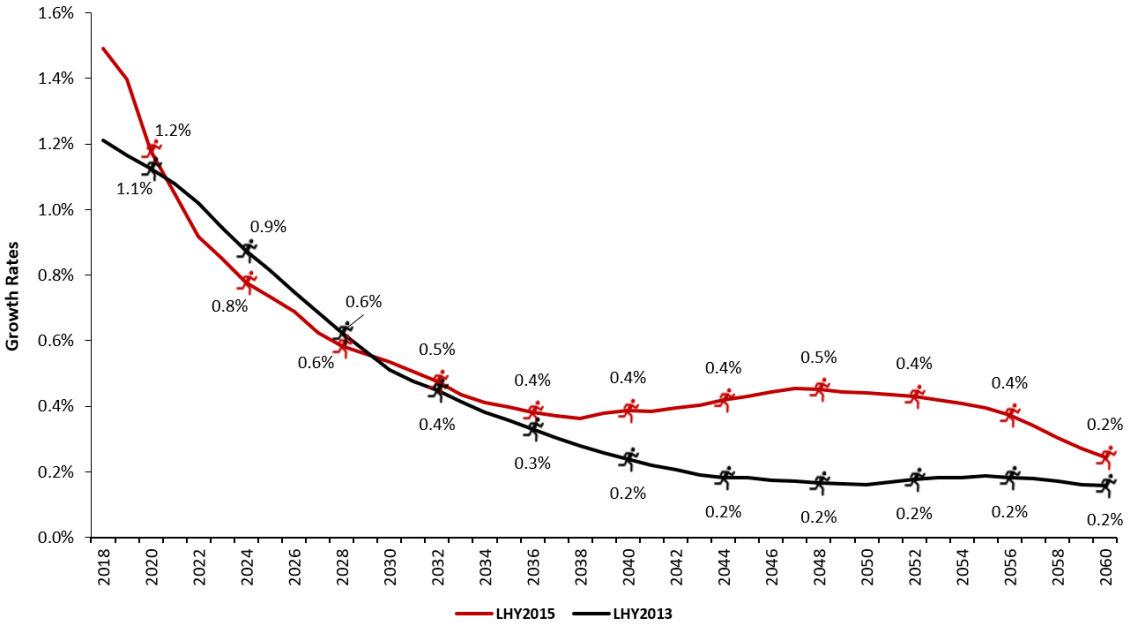
education, and so on. REMI states that economic migrants are of working age who not only contribute to the local human capital resources, but also boost the development of local businesses.

[6] Clark County employment experienced a larger dip during the Great Recession than the national average. Thus, the Clark County economy took more time to recover compared to other counties. Therefore, using migration and economic data from 2009 to 2014 may produce a slightly lower long-term population forecast for Clark County.

[7] The detailed out-of-the-box results through 2060 appear in Table B1 of the appendix.

arising from the LHY2015 model predicts higher population levels than the LHY2013 model through 2060 (Table 2). Regarding population levels, the out-of-the-box model forecasts population in the LHY2015 model for 2018 approximately 64,030 higher than the LHY2013 model. This gap monotonically increases over the entire forecast horizon. By 2060, the out-of-the-box model forecasts population in LHY2015 approximately 201,500 higher than the LHY2013 model.

Figure 2: Clark County Population-Growth-Rate Forecasts: REMI Out-of-the-Box LHY2015 and LHY2013: 2018-2060

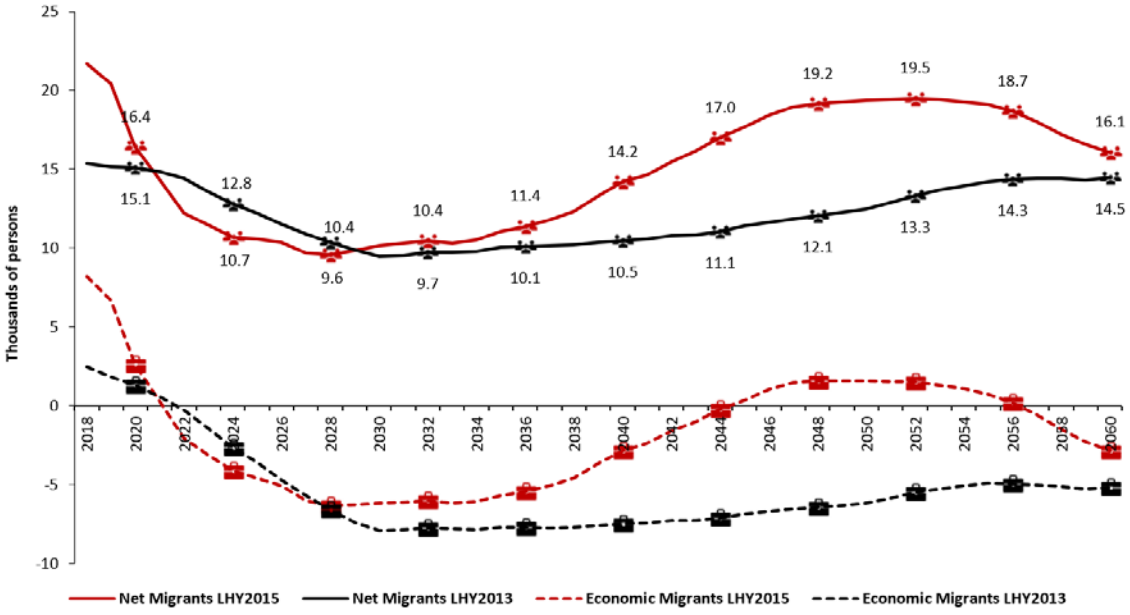


Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

The forecasted population growth rate for LHY2015 generally declines over the entire forecast horizon through 2060, except for the period from 2038 to 2047, which shows a slight rise (Figure 2). The LHY2015 model forecasts a growth rate of population that exceeds the growth rate of the LHY2013 model in most of the years, except for the years from 2021 to 2029 where the LHY2015 model forecasts a growth rate of population below the growth rate of the LHY2013 model. These slower growth rates from the LHY2015

model between 2021 and 2029 mainly reflect lower net economic migrants for the LHY2015 model compared to the LHY2013 model (Figure 3). After 2029, a net outflow (inflow) of economic migrants are lower (higher) in the LHY2015 model over the forecast horizon, which results in higher population growth rates as these working-age migrants promote population growth by bringing families to the region.

Figure 3: Clark County Net Migrant and Net Economic Migrant Forecasts: REMI Out-of-the-Box LHY2015 and LHY2013: 2018-2060



Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.

We also notice that the higher out-of-the-box forecasted population level in 2060 from the LHY2015 model uses the out-of-the-box economic and demographic forecasts. Table 2 shows a comparison of the REMI out-of-the-box economic and demographic forecasts from LHY2015 and LHY2013 for the years 2018 and 2060. The LHY2015 out-of-the-box model predicts a stronger Clark County economy in 2060, compared to the LHY2013 model in terms of total population, employment, and real GDP.[8] The LHY2015

[8] The LHY2015 model predicts a lower real GDP in 2018 compared to the LHY2013 model. We note that the LHY2015 model was updated for an additional two years of history as well as BEA's annual revisions of

out-of-the box model predicts a larger Clark County economy as a percentage of the nation in 2060 compared to LHY2013 model. The stronger out-of-the-box Clark County economic forecast from the LHY2015 model makes the region more attractive relative to the rest of the nation. This creates a lower net outflow of economic migrants from Clark County in 2060.

Table 2: Clark County REMI Out-of-the-Box Forecast Comparison: LHY2015 and LHY2013

	2018			2060		
	LHY2015	**LHY2013**	**Change to Forecast**	**LHY2015**	**LHY2013**	**Change to Forecast**
Population (Thousands)	2,216.26	2,152.23	3.0%	2,756.95	2,555.45	7.9%
Total employment (Thousands)	1,286.60	1,217.54	5.7%	1,566.56	1,370.29	14.3%
Total employment as a percent of nation	0.65	0.63	2.0%	0.60	0.58	2.0%
Gross domestic product (Billions of fixed 2009 dollars)	103.92	105.59	-1.6%	239.85	200.72	19.5%
Gross domestic product as a percent of nation	0.59	0.58	1.0%	0.57	0.52	5.0%
Migrants (Thousands)						
Economic migrants	8.18	2.45	233.9%	-2.84	-5.18	45.2%
Retired migrants	5.14	5.15	-0.2%	8.92	8.91	0.1%
International migrants	8.50	7.98	6.5%	10.06	10.85	-7.3%
Population by age (Thousands)						
Ages 0-14	424.20	414.33	2.4%	419.78	385.63	8.9%
Ages 15-24	272.49	259.12	5.2%	286.04	246.34	16.1%
Ages 25-64	1,181.55	1,141.72	3.5%	1,283.84	1,181.43	8.7%
Ages 64+	338.02	337.06	0.3%	767.29	742.05	3.4%

real GDP. As a result, the LHY2015 model forecasts a slightly lower value for regional GDP in 2018 compared to the LHY2013 model. In 2018, the LHY2015 model predicts more employees relative to the LHY2013 model. More employment, but smaller GDP, may imply that the share of part-time workers increased or that labor productivity per hour decreased. The LHY2015 model actually shows that labor productivity per worker for both the United States and Clark County for 2014 and 2015 were lower than what REMI forecasted in the LHY2013 model.

III. Recalibrating the Model

As noted previously, county-level personal income data only become available with a two-year lag. As a result, the REMI model also imposes a two-year lag on all its data history that ends with 2015 data for the current model, PI+ v2.1, released in 2017. To update the model, we incorporate available pertinent model information, including the most recent national GDP forecast, more recent employment figures, and spending on public and private capital projects to reflect local information in the forecast. We describe each update in sequence.

In the previous two forecasts, we incorporated expected investment and job increases due to Faraday Future at the Apex Industrial Park in Clark County. The project planned to create many new jobs in the region with significant capital investment. Faraday Future cancelled its plans at the Apex Industrial Park last year. Therefore, we did not include the expected investment and job creation from Faraday Future for this year's population forecasts.

A. Adjustment of the national GDP forecast

The REMI model relies on a baseline national GDP forecast from the University of Michigan's RSQE. The REMI model, PI+ v2.1, utilizes the January 2017 GDP forecast from RSQE. We adjust the model's national GDP forecast using both the BEA's most recent data and the March 2018 national GDP forecast from RSQE. Overall, we adjusted the national GDP components downward by about $112 billion in 2018 and $194 billion in 2019. The adjusted national forecast generates a new baseline forecast for Clark County. We, then, use the baseline forecast for the subsequent adjustments.

B. Rebasing the population forecast

We rebase the population forecast using the population update feature in the REMI model. We update the population in 2017 based on the most recent information from the SNRPC. The SNRPC consensus population estimate for Clark County in 2017 is 2.25 million. In addition, we update the population levels in 2018 and 2019 to reflect the population growth-rate forecast from CBER's *2018 Economic Outlook*, which was published in December 2017. The latter adjustment incorporates the views of local economic experts at CBER in the short-term population forecasts. CBER predicts that the Clark County population will grow by 2.1 percent both in 2018 and 2019. These population growth-rate forecasts translate to a forecasted population of 2.30 and 2.34 million, respectively, in 2018 and 2019. We use these forecasted population levels to update the population data in the REMI model, and use the baseline forecast for the subsequent adjustments.

C. Employment adjustment

The county-level employment data in REMI come from the BEA's local area personal income data, which are only provided for 23 sectors. Even though BEA reports the county-level employment data for 23 sectors, BEA supplies the county-level wage data for 70 sectors. This means that REMI calculates employment for 70 sectors by incorporating the county-level wage data. We, therefore, update REMI's employment data with recent BEA data for sectors that do not identify subcategories. Although the most recent historical year in the model's employment data is 2015, BEA employment data are available for 2016. In addition, more recent wage and salary employment data are available from the Nevada DETR for 2016 and 2017. We, therefore, update the model to account for this more recent information.

The latest growth rates for the out-of-the-box REMI-model forecasts as well as recent BEA and DETR estimates appear in Table 3. The actual growth rates from BEA and DETR differ substantially from the REMI out-of-the-box forecasts, suggesting a clear need for adjustment. For example, the growth rate estimates by the BEA and DETR of total employment exceed the REMI forecasts in 2016 and 2017 by 0.23 and 0.77 percentage point, respectively. The employment update proceeds as follows. First, we calculate the annual percentage change using BEA data and apply the percentage changes to generate new estimates for 2016. Second, we compute the annual percentage change using DETR data and apply them to produce new estimates for 2016 and 2017. This procedure implicitly assumes that the proportion of self-employed in each industry classification grows at the same rate as does the ratio between full- and part-time workers.

Table 3: Employment Growth Rates for Clark County before BEA & DETR Adjustment

	REMI Baseline Forecast		BEA & DETR Estimates	
Industrial Classification	**2016**	**2017**	**2016**	**2017**
Construction	4.66%	3.58%	5.85%	8.41%
Wholesale trade	2.96%	2.82%	3.25%	5.09%
Retail trade	4.24%	2.36%	0.82%	0.84%
Transit, ground passenger transportation	0.26%	-0.76%	-5.63%	-6.72%
Monetary authorities, et al.	1.30%	-0.29%	5.76%	4.08%
Ins carriers, related activities	2.43%	0.88%	3.92%	3.77%
Real estate	2.50%	1.08%	6.31%	4.57%
Professional, technical services	3.95%	2.61%	3.64%	3.82%
Management of companies	2.41%	1.89%	8.16%	6.09%
Administrative, support services	2.54%	1.53%	6.48%	2.07%
Ambulatory health care services	6.84%	4.78%	4.51%	5.39%
Hospitals	4.00%	2.65%	8.06%	5.97%
Amusement, gambling, and recreation	2.68%	1.32%	7.30%	4.08%
Accommodation	1.97%	1.05%	-1.48%	-0.42%
Food services, drinking places	2.93%	1.74%	4.99%	3.34%
State & Local government	2.29%	1.04%	2.21%	2.53%
Total	2.94%	1.75%	3.17%	2.52%

Note: BEA estimates are used on the preferential basis if available.

Table 4 reports the updated employment data by category for the model. The Clark County job growth numbers in 2016 and 2017 suggest that general economic conditions continue to improve in the Las Vegas area. While the Southern Nevada economy gained 4.0 percent of its total employment in 2015, the BEA and DETR updated estimates suggest that Clark County employment grew by about 3.2 percent and 2.5 percent in 2016 and 2017, respectively. Most sectors of Southern Nevada's economy experienced positive job growth in 2016. Strong employment gains occurred in key sectors such as health care, gaming, and food services. The construction sector, moreover, continues to experience strong positive job growth in 2016, as the sector continues to recover from the Great Recession. Overall, Southern Nevada's economy gained roughly 38,000 jobs in 2016.

The local economic recovery continued in 2017 with stronger employment growth in key sectors such as construction, management, hospitals, and wholesale trade. Overall, Southern Nevada's economy gained roughly 31,000 jobs in 2017. Accommodation employment for 2016 and 2017 declined as average room inventories fell, which mainly reflected major renovations of the existing rooms on the Las Vegas Strip.

Table 4: Model Job Adjustments (in 000s) for 2016 and 2017

	Baseline	BEA & DETR Growth Rates		Adjusted Job Levels	
Industrial Classification	**History 2015**	**2016**	**2017**	**2016**	**2017**
Forestry et al.	0.31	4.92%	4.47%	0.33	0.34
Agriculture	0.10	3.86%	3.00%	0.10	0.11
Oil, gas extraction	2.06	1.34%	1.92%	2.09	2.13
Mining (except oil, gas)	0.80	0.81%	1.53%	0.81	0.82
Support activities for mining	0.02	0.30%	2.17%	0.02	0.02
Utilities	2.74	3.68%	-0.76%	2.90	2.88
Construction	62.43	5.85%	8.41%	65.93	71.47
Wood product mfg	0.43	1.76%	3.18%	0.44	0.46
Nonmetallic mineral prod mfg	2.14	1.79%	2.07%	2.18	2.22
Primary metal mfg	0.71	-3.63%	4.32%	0.68	0.71
Fabricated metal prod mfg	2.07	0.27%	1.73%	2.07	2.11
Machinery mfg	0.54	-1.67%	0.10%	0.53	0.53
Computer, electronic prod mfg	0.53	2.39%	2.13%	0.55	0.56
Electrical equip, appliance mfg	0.52	-0.69%	1.58%	0.52	0.53
Motor vehicle mfg	0.22	-1.06%	-0.18%	0.22	0.22
Transp equip mfg exc motor veh	0.44	-5.79%	1.03%	0.41	0.41
Furniture, related prod mfg	1.05	1.92%	1.55%	1.07	1.09
Miscellaneous mfg	5.68	-1.78%	-0.97%	5.58	5.53
Food mfg	3.44	3.48%	1.84%	3.56	3.63
Beverage, tobacco prod mfg	0.46	4.07%	3.42%	0.47	0.49
Textile mills; textile prod mills	0.66	1.47%	-0.07%	0.67	0.67
Apparel mfg	0.36	4.29%	-0.08%	0.38	0.38
Paper mfg	0.48	1.67%	1.53%	0.49	0.50
Printing, rel supp act	2.49	0.22%	-0.59%	2.50	2.48
Petroleum, coal prod mfg	0.03	2.27%	0.45%	0.03	0.03
Chemical mfg	1.02	0.77%	-0.48%	1.03	1.02
Plastics, rubber prod mfg	1.67	1.30%	1.24%	1.69	1.72
Wholesale trade	28.04	3.25%	5.09%	29.42	30.92
Retail trade	128.50	0.82%	0.84%	129.81	130.90
Air transportation	6.66	4.92%	3.13%	6.99	7.20
Rail transportation	0.28	-1.72%	1.29%	0.27	0.28
Water transportation	0.09	3.17%	2.92%	0.09	0.09
Truck transportation	5.34	1.81%	1.84%	5.44	5.54
Couriers and messengers	3.66	1.34%	0.74%	3.71	3.74
Transit, ground pass transp	17.77	-5.63%	-6.72%	16.77	15.64
Pipeline transportation	0.04	3.03%	1.86%	0.05	0.05
Scenic, sightseeing transp; supp	6.73	2.93%	2.22%	6.93	7.08
Warehousing, storage	6.59	3.24%	2.05%	6.80	6.94

Table 4: Model Job Adjustments (in 000s) for 2016 and 2017 (continued)

	Baseline	BEA & DETR Growth Rates		Adjusted Job Levels	
Industrial Classification	**History 2015**	**2016**	**2017**	**2016**	**2017**
Publishing, exc Internet	2.69	2.81%	1.92%	2.76	2.81
Motion picture, sound rec	3.73	5.04%	3.99%	3.92	4.07
Internet serv, data proc, other	3.00	4.80%	3.47%	3.15	3.26
Broadcasting, exc Int;	1.70	2.23%	0.91%	1.74	1.76
Telecommunications	4.35	0.00%	3.45%	4.35	4.50
Monetary authorities, et al.	16.69	5.76%	4.08%	17.65	18.37
Sec, comm contracts, inv	31.00	3.92%	3.77%	32.21	33.43
Ins carriers, rel act	13.95	3.92%	3.77%	14.50	15.05
Real estate	64.93	6.31%	4.57%	69.02	72.18
Rental, leasing services	7.17	2.20%	1.93%	7.32	7.47
Prof, tech services	65.04	3.64%	3.82%	68.49	71.10
Mgmt of companies, enterprises	21.90	8.16%	6.09%	23.91	25.37
Administrative, support services	90.31	6.48%	2.07%	96.16	98.16
Waste mgmt, remed services	2.71	2.25%	1.18%	2.77	2.80
Educational services	11.90	4.11%	1.82%	12.19	12.41
Ambulatory health care services	42.92	4.51%	5.39%	44.85	47.27
Hospitals	20.12	8.06%	5.97%	21.75	23.05
Nursing, residential care facilities	9.36	3.73%	2.20%	9.71	9.93
Social assistance	19.81	4.22%	2.36%	20.65	21.13
Performing arts, spectator sports	22.79	2.23%	1.24%	23.30	23.59
Museums et al.	0.41	3.78%	2.31%	0.43	0.44
Amusement, gambling, recreation	16.18	7.30%	4.08%	17.36	18.06
Accommodation	174.48	-1.48%	-0.42%	171.90	171.17
Food services, drinking places	95.34	4.99%	3.34%	100.10	103.44
Repair, maintenance	11.81	2.30%	0.59%	12.08	12.15
Personal, laundry services	30.01	5.34%	3.43%	31.61	32.70
Membership assoc, organ	8.98	4.13%	2.13%	9.35	9.55
Private households	7.19	0.33%	-1.78%	7.21	7.08
State & local government	84.20	2.21%	2.53%	85.83	88.00
Federal civilian	12.69	1.81%	-2.34%	12.98	12.67
Federal military	15.10	0.23%	-0.95%	15.14	15.00
Farm	0.46	0.86%	0.98%	0.47	0.47
Total	1,210.02	3.17%	2.52%	1,248.37	1,279.85

D. Hotel room adjustment

We make an adjustment to future hotel employment based on our expectation of the number of hotel rooms added in each of the next few years. The additional rooms and related employment represent either properties that are under construction with fixed opening dates or properties that have development plans and a high probability of project

completion during the specified year. In this way, we ensure that the model includes a good short-term forecast of new hotel investment and employment.

As of April 2018, the Las Vegas Convention and Visitors Authority (LVCVA) projects that hotel/motel construction will add an additional 801 rooms to the local room inventory by the end of 2018 (Table 5). This includes the opening of My Place Hotel, Hilton Garden Inn, Homewood Suites, and Starwood Hotels and Resorts. In 2019, the LVCVA projects an additional 827 hotel/motel rooms will get added to the inventory rooms. This includes the Fairfield Marriott, Fairfield Inn & Suites, TownePlace Suites, SpringHill Suites Marriott, and the Residence Inn Marriott. In 2020, the LVCVA expects to see an additional 9,250 rooms added to the room stock, which includes the opening of the Drew Las Vegas, Paradise Park, and Resorts World Las Vegas. Finally, the LVCVA expects 700 additional hotel/motel rooms will get added to inventory in 2023, with the main addition coming from the Mardi Gras Hotel and Casino.

Table 5: Hotel Construction Adjustment

Year	Total Rooms	New Rooms	New Jobs Implied*	REMI Hotel Employment after DETR Adjustment	REMI New Jobs Implied	Cumulative Additional Jobs after Hotel Adjustment
2017	148,899			171,173		
2018	149,700	801	1,202	172,700	1,527	1,527**
2019	150,527	827	1,241	173,968	1,268	2,795**
2020	159,777	9,250	13,875	173,120	-848	15,822
2023	160,477	700	1,050	172,487	-633	16,239

* Assumes a jobs-to-room multiplier of 1.5.
** The new jobs implied by the room additions are less than the REMI hotel employment.

The model adjustment for new hotel construction uses a jobs-to-room ratio of approximately 1.5, which was obtained in the following manner.[9] First, we expect new

[9] The detailed computation of the jobs-to-room ratio appears in Appendix A.

hotel rooms to create new jobs in hotel services. Using historical information from 2007-2016, we take the historical average ratio of annual accommodation employment from the Bureau of Labor Statistics (BLS) divided by the total number of hotel rooms. From this calculation, we generate a jobs-to-room multiplier of roughly 1.2 for hotel services. New hotel rooms will also generate secondary economic activity and, hence, additional jobs in other sectors. For example, increased tourism activity from new hotel rooms will also increase the demand for food services and other tourism-related industries. We account for these new jobs in the following manner. We use each industry's location quotient[10] to estimate the portion of the industry's employment attributable to tourism activity. We, then, take the historical average ratio of the annual employment in each of these sectors, which is attributable to tourism activity, divided by the total hotel rooms. The sum of the ratios for the food services and other tourism-related industries is approximately 0.3. This, together with the jobs-to-room multiplier of 1.2 for hotel services, produces the overall jobs-to-room ratio of approximately 1.5. The jobs-to-room multiplier is, then, used as the multiplicand times the number of additional rooms *over and above* the rooms and jobs already accounted for in the model. Table 5 reports these results, revealing an increase of about 16,000 jobs by 2023.

E. The Las Vegas Convention Center adjustment

The LVCVA will expand and renovate the current Las Vegas Convention Center (LVCC) by investing $1.4 billion, which is financed by a small portion of the special room tax. The

[10] The Location Quotient (LQ) compares Clark County's employment in a given industry sector to that of the nation. An LQ greater than 1 indicates that the area has proportionately more workers than the nation employed in that specific industry sector. This implies that the area is producing more than is consumed by its residents. Hence, the portion of the LQ that is above 1 represents the proportion of the industry's employment attributable to tourism activity.

LVCVA completed phase one: acquisition and demolition of the Riviera in 2016 and started phase two and three: expansion and renovation in 2017. The construction phase is expected to finish in 2022. The new and renovated LVCC facilities are expected to generate 610,000 additional annual convention attendees.[11] According to LVCVA, the estimated average spending per convention attendee was $869, including gaming expenditure, in 2017.[12] We allocate the total spending of 610,000 additional convention attendees in Las Vegas on the various categories–lodging, food, gaming and so on–based on the *2016 Las Vegas Visitor Profile*,[13] and incorporate the numbers in the REMI model.

F. Las Vegas Stadium adjustment

As the National Football League's (NFL) owners approved the move of the Oakland Raiders to Las Vegas, the new 65,000-seat Las Vegas Stadium is expected to be completed by 2020. The total cost for construction is estimated at $1.33 billion, and funding will come from a portion of the special room tax, the Las Vegas Raiders, and Bank of America, which implies that the investment is fully funded from sources outside of Clark County. Bank of America will lend money to construct the Las Vegas Stadium, and the Raiders organization will pay back the loan. The Las Vegas Stadium is expected to bring 450,000 additional annual visitors to Las Vegas.[14] Visitor economic activity is estimated by multiplying this

[11] Source: Las Vegas Convention and Visitors Authority (2016), *Las Vegas Convention Center District Expansion and Renovation*.

[12] Source: Las Vegas Convention and Visitors Authority (2018), *The Economic Impacts of Southern Nevada's Tourism Industry and Convention Sector*.

[13] Every year, the LVCVA publishes the *Las Vegas Visitor Profile*, which shows visitors' characteristics and expenditure behavior. This report contains information on average spending per visitor in terms of lodging, food and drink, transportation, entertainment, and sightseeing.

[14] Source: http://sntic.org/meeting/17/staff/SNTIC%20Stadium%20Economic%20Impact%20Brief.pdf.

increment (450,000) by average per-visitor, per-trip spending as reported by the LVCVA, for a total of $824 per visitor.[15]

G. Transportation and infrastructure improvements

Clark County continues to invest in transportation infrastructure such as roads, highways, and mass transit. The REMI model assumes that public-infrastructure investment will follow a path consistent with the model history. Thus, some local spending on public infrastructure, such as road building and additional services, is built into the model. One-time monies, however, tend to come from outside the region (e.g., federal transportation funding). We need to incorporate these large, special projects into the forecast process.

The estimated federal funding in transportation-infrastructure investment is about $5.585 billion between 2017 and 2040.[16] We annualize these transportation-infrastructure expenditures and include them in the REMI model as new construction projects. In addition, we assume that federal funding in transportation-infrastructure investment after 2040 will continue with a reasonable expectation that the federal funding will not fall to zero. Rather, we apply the flat amount of federal funding after 2040, where the REMI model adjusts this amount for inflation.

IV. Analysis of the Economic and Demographic Forecast

The forecast predicts moderate rates of population growth for Southern Nevada over the forecast period extending out to 2060. The rate of growth, which decidedly exceeded the

[15] *The Economic Impacts of Southern Nevada's Tourism Industry and Convention Sector*, which was published by the LVCVA in 2018, addresses the adjusted total spending per visitor. According to the report, an average visitor spent 22.6, 17.4, 16.3, and 11.4 percent of his/her total spending on gaming, shopping, rooms, and food and beverage, respectively.

[16] Source: Regional Transportation Commission (2016), *Access 2040 Enhancing Mobility for Southern Nevada, Residents.*

national average over the past 50 years, moderates and eventually moves below the national rate of growth as the Southern Nevada economy matures. The economic forecast calls for the continuation of the economic expansion in 2018 and steady employment growth through 2020. Tables 6, 7, and 8, respectively, report the population, employment, and real GDP predictions for Clark County from the calibrated model.

A. Population

In the short term, the current forecast predicts moderate rates of population growth in Southern Nevada. The population in Clark County is predicted to grow at rates of 2.1 percent in 2018 and 2019 and 1.9 percent in 2020 (Table 6). The population growth rate declines in the medium term as the Clark County economy matures. By 2029, the population growth rate falls to 0.58 percent, slightly below the projected[17] national population growth rate of 0.60 percent. The population growth rate falls further to 0.2 percent by 2060, which is roughly half the size of the projected national population growth of 2060. This result reflects the cumulative losses of economic migrants that emerge in the long-term forecast for the period from 2022 to 2044 and for the period from 2057 to 2060. This loss occurs because Clark County becomes a less competitive economic destination for economic migrants in the long term relative to the nation. That is, Clark County experiences negative net economic migration. We also stress that the forecasted growth rates experience increasing uncertainty as the forecast extends further into the future that may ultimately lead to higher or lower forecasts. We discuss the potential sources for these uncertainties in section VI, which addresses the risks to the forecast.

[17] Source: https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html.

Table 6: Population History, REMI Forecast, and Rebased Forecast[18]

Year	Population REMI Forecast*	Population Rebased Forecast	Change in Population Rebased Forecast	Growth in Population Rebased Forecast
2017	2,184,000	2,248,391**		
2018	2,216,000	2,296,000***	47,609	2.1%
2019	2,247,000	2,344,000***	48,000	2.1%
2020	2,274,000	2,389,000	48,000	1.9%
2021	2,298,000	2,423,000	45,000	1.4%
2022	2,319,000	2,452,000	34,000	1.2%
2023	2,338,000	2,481,000	29,000	1.2%
2024	2,357,000	2,507,000	29,000	1.0%
2025	2,374,000	2,530,000	26,000	0.9%
2026	2,390,000	2,550,000	23,000	0.8%
2027	2,405,000	2,568,000	20,000	0.7%
2028	2,419,000	2,585,000	18,000	0.7%
2029	2,433,000	2,600,000	17,000	0.6%
2030	2,446,000	2,615,000	15,000	0.6%
2031	2,458,000	2,628,000	15,000	0.5%
2032	2,470,000	2,640,000	13,000	0.5%
2033	2,481,000	2,651,000	12,000	0.4%
2034	2,491,000	2,662,000	11,000	0.4%
2035	2,501,000	2,672,000	11,000	0.4%
2040	2,548,000	2,719,000	9,000	0.3%
2045	2,600,000	2,766,000	10,000	0.4%
2050	2,659,000	2,816,000	10,000	0.4%
2055	2,715,000	2,863,000	9,000	0.3%
2060	2,757,000	2,900,000	6,000	0.2%

* This forecast refers to the model prior to recalibration.
** Southern Nevada consensus population estimate.
*** CBER 2018 Economic Outlook forecast, December 2017.

We forecast that Clark County will add roughly 48,000 new residents in 2018. The forecast then predicts that population growth will remain strong in the near term as the local economy continues to experience strong expansion in employment. Population growth, however, will not drive economic growth as it did throughout much of Las Vegas' history. Rather, economic growth will drive population growth in the future. The

[18] A table detailing the rebased population forecast appears in the appendix–Table B2.

population forecast predicts that the Clark County population will increase to roughly 2.90 million by 2060.

B. Employment

The forecast predicts a continuing economic expansion for Southern Nevada in 2018. We forecast that the Las Vegas economy will add an additional 31,000 jobs in 2018, which represents a 2.4 percent growth in employment from 2017. See Table 7.[19] We predict that employment growth will remain stable in 2019 as the economy is predicted to add 17,000 new jobs. The forecast also predicts a continuation of steady employment growth in the near term and then eventually stabilizes at around a 0.5 percent growth rate as the Southern Nevada economy matures.

[19] Unadjusted employment forecasts are shown in Appendix B.

Table 7: Employment History and Forecasts

Year	Employment Forecast	Change in Employment Forecast	Growth in Employment Forecast	Employment-Population Ratio Forecast
2016	1,251,582*			
2017	1,280,000	28,000	2.5%	0.57
2018	1,311,000	31,000	2.4%	0.57
2019	1,328,000	17,000	1.3%	0.57
2020	1,351,000	23,000	1.7%	0.57
2021	1,355,000	4,000	0.3%	0.56
2022	1,355,000	0	0.0%	0.55
2023	1,364,000	9,000	0.7%	0.55
2024	1,366,000	2,000	0.1%	0.54
2025	1,369,000	3,000	0.2%	0.54
2026	1,373,000	4,000	0.3%	0.54
2027	1,375,000	2,000	0.2%	0.54
2028	1,380,000	5,000	0.4%	0.53
2029	1,385,000	5,000	0.3%	0.53
2030	1,390,000	5,000	0.4%	0.53
2031	1,396,000	6,000	0.4%	0.53
2032	1,401,000	5,000	0.4%	0.53
2033	1,405,000	4,000	0.3%	0.53
2034	1,410,000	5,000	0.3%	0.53
2035	1,415,000	5,000	0.3%	0.53
2040	1,442,000	6,000	0.4%	0.53
2045	1,472,000	7,000	0.4%	0.53
2050	1,512,000	8,000	0.6%	0.54
2055	1,555,000	9,000	0.5%	0.54
2060	1,595,000	8,000	0.5%	0.55

* Actual employment, Local Area Personal Income and Employment, BEA.

C. Gross domestic product

Real gross domestic product (GDP) is defined as the (constant) dollar value of all final goods and services sold in a regional economy over a given time period. As such, it reflects the output of a local economy and avoids double-counting initial and intermediate goods. The forecast for growth in Clark County real GDP, shown in Table 8, basically mirrors the

growth pattern of local employment. The real GDP growth forecast starts at 3.6 percent in 2018, but falls below 2 percent by 2024. The real GDP growth forecast finally stabilizes at around 2.0 percent growth rate in 2060 as the Southern Nevada economy reaches maturity.

Table 8: Gross Domestic Product Forecasts

Year	GDP (Billions of Fixed 2018$) REMI Forecast	Change in GDP (Billions of Fixed 2018$) REMI Forecast	Growth in GDP (Billions of Fixed 2018$) REMI Forecast	GDP per Capita (Fixed 2018$) REMI Forecast
2017	118.31	4.83	4.3%	52,619
2018	122.56	4.25	3.6%	53,387
2019	125.78	3.22	2.6%	53,663
2020	129.76	3.99	3.2%	54,310
2021	132.27	2.51	1.9%	54,595
2022	134.98	2.70	2.0%	55,042
2023	138.07	3.10	2.3%	55,648
2024	140.62	2.54	1.8%	56,098
2025	143.15	2.53	1.8%	56,590
2026	145.60	2.45	1.7%	57,097
2027	148.00	2.41	1.7%	57,633
2028	150.90	2.90	2.0%	58,378
2029	153.83	2.93	1.9%	59,156
2030	156.81	2.98	1.9%	59,969
2031	159.81	3.00	1.9%	60,810
2032	162.94	3.13	2.0%	61,713
2033	165.93	3.00	1.8%	62,582
2034	169.03	3.10	1.9%	63,495
2035	172.19	3.16	1.9%	64,433
2040	189.15	3.58	1.9%	69,569
2045	207.95	3.96	1.9%	75,175
2050	230.13	4.66	2.1%	81,732
2055	254.78	5.10	2.0%	89,004
2060	281.29	5.46	2.0%	96,992

V. Comparing the Current Forecast with Forecasts of Previous Years

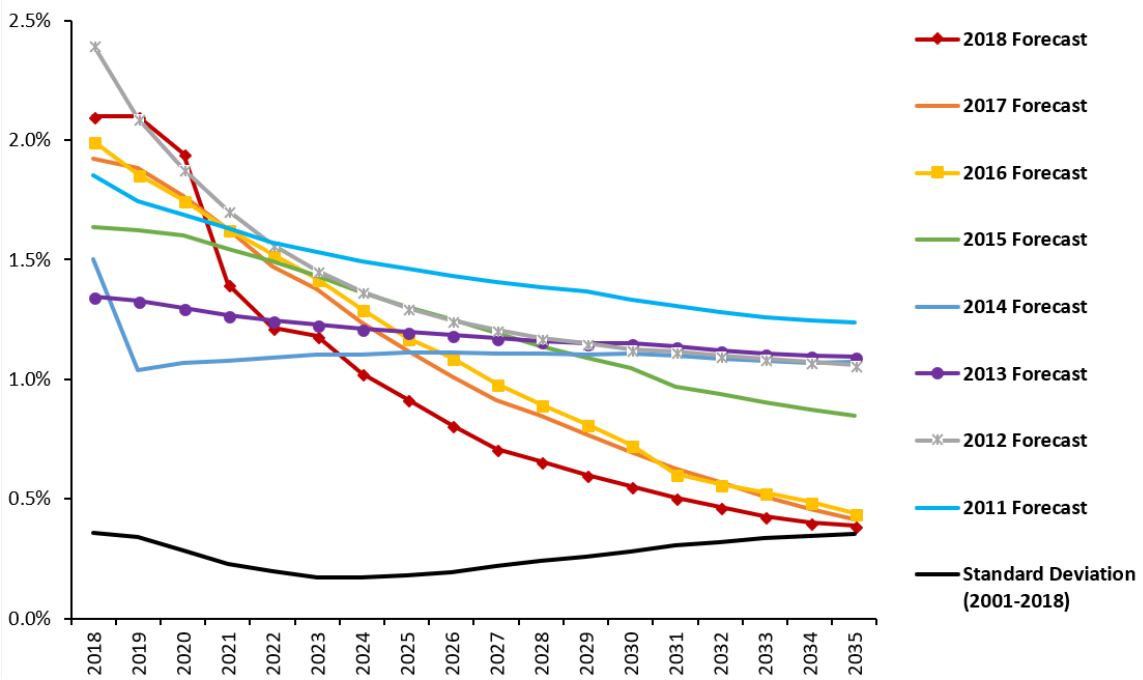
This section compares this year's final population growth-rate forecast with the final population growth-rate forecasts from previous years. This exercise assesses the

consistency of the forecast methodology and examines the variability in the population growth forecasts over the last eight years.

Figure 4 shows the population growth-rate forecasts generated from the 2011 to 2018 population forecast analyses as well as the standard deviation of the population-growth-rate forecast in the last 18 years (2001-2018).[20] The population growth-rate forecasts exhibit a slightly higher level of variability in the near term as compared to the longer term. The standard deviation of the population growth-rate forecast for the year 2018 is roughly 0.4 percent. This reflects a slightly higher degree of uncertainty in the short-term forecast (see section VI below). The variability among the population growth-rate forecasts falls in the long term. By 2030, the average of the forecasted growth rates converges to about 1.1 percent, with a standard deviation of 0.3 percent. Hence, a larger degree of consistency exists in the long-term growth predictions obtained during the last 18 years, as evidenced by the low standard deviation among the forecasts. This observation further confirms the fact that our forecasts are primarily meant to be long-run planning tools.

[20] The standard deviation measures the variability among data points. For data that follow a normal distribution, 99.7 percent of data points will fall within approximately 3 standard deviations of the mean.

Figure 4: Clark County Historical Population-Growth-Rate Forecasts: 2018-2035



VI. Risks to the Forecast

Our Southern Nevada population forecasts rest on economic and demographic models embedded in the structural model for Clark County as produced by REMI. This structure provides long-term forecasts that exclude the noise that one finds in time-series data–that is, business-cycle, seasonal, and irregular events. In addition, the uncertainty of the forecasts rises the further into the future that the forecasts extend. For example, forecasts of population growth for the next two years see a much smaller range over which the forecast may actually vary than the range for our forecasts 30 years into the future.[21]

[21] The discussions in this and the immediate prior paragraphs may seem inconsistent. The discussion, however, focus on two different issues. In the current paragraph, the uncertainty focuses on the range around an existing forecast within which we can expect the actual value to lie with some probability. For example, a typical range covers 95 percent of actual outcomes. In a statistical sense, the discussion involves confidence bands. The further into the future that the research tries to forecast, the larger the range of the confidence bands needs to be to capture 95 percent of potential outcomes. In the prior paragraph, the standard deviation came from a series of different vintage REMI forecasts. The economic and demographic structure of the REMI model leads to convergence over time. That is, the economic migrants respond to economic incentives. Then, the movement of economic migrants will tend to reduce and eliminate the economic incentive for more

The main risks to the population forecasts arise from short-term fluctuations in both U.S. and Southern Nevada economic conditions. Based on our assessment of national and regional trends, we believe that the Southern Nevada economy will continue to see improvements in 2018 and 2019. In addition, we anticipate that the short-term economic growth in the Southern Nevada economy will generally outperform the national economy, since we started our local recovery later and from a much deeper hole than faced at the national level. Nevertheless, the health of the Southern Nevada economy still depends on national and international economic activity.

The downside risk to U.S. economic growth no longer exceeds, in our view, the upside risk in the near term. With the policies of the current administration, we expect the national economy to strengthen in the short term. Recent economic data show improvement in business investment and consumer confidence, fueled both by a robust labor market and the recently implemented tax cut. A robust U.S. market should benefit the local economy as the majority of Clark County visitors come from the United States, an upside risk to Southern Nevada economic growth as the local economy still largely depends on the tourism sector despite an effort to be a diversified economy. Recent discussion of imposing tariffs on traded goods and services and the possibility of trade wars may produce headwinds for the expanding U.S. economy.

Economic growth in the rest of the world may also influence U.S. economic growth. For example, China became an important player in the world economy because of her aggregate size. China purchases a large share of commodities on international markets, which are the major exports from many emerging market economies. Thus, slower growth

migrants to move in the longer run. That is, excessive growth relative to national growth disappears as the incentives for economic migration diminish.

in China leads to slower growth in emerging market economies. Although the International Monetary Fund's (IMF) projection of economic growth in China was recently revised upward, a downside risk still exists with the continuing growth in its debt.

The Federal Reserve System's (Fed) Federal Open Market Committee (FOMC) ended quantitative easing (QE) and has raised the federal fund rates over last two years. In addition, the FOMC started to lower the size of its balance sheet that ballooned because of the various quantitative easing (QE) programs. Recently, the FOMC raised the federal fund rate to a range of 1.5 to 1.75 and hinted at three more increases in 2018. The pace of the interest rate hikes will largely depend on the degree of success of the tax cut to stimulate the economy. The FOMC's ultimate decision on the number of interest rate increases over the next few years will depend on what the data tell the Fed about the state of the U.S. economy. Fewer interest rate increases could lead to higher inflation, whereas more interest rate increases could lead to slower growth. The U.S. economy currently operates above its potential, which provides a stronger justification for the FOMC to raise interest rates.

The future diversification of the local economy can provide a positive upside risk in terms of long-term population growth. In a Brookings Institution report,[22] Las Vegas ranked 96th out of 100 metropolitan areas based on improvement in prosperity (changes in productivity, average wealth and income, and standard of living). The report emphasizes that high-tech-, research-, and capital-intensive-based economies grow faster than regions that rely on the hospitality and retail sectors for their economic growth. REMI's projections on net outflow of economic migrants may place too much weight on the tourism sector in the local economy. We witnessed the vulnerability of the local economy during the Great

[22] Source: The Brookings Institution (2017), *Metro Monitor*.

Recession because of our tourism-based economy. Approximately 53 percent of the region's gross domestic product currently relies on Southern Nevada's tourism industry, according to the LVCVA.[23]

Finally, the recent tragedy on October 1, 2017, in Southern Nevada could significantly lower future economic growth and, thus, the population forecast. Visitor volume and net immigration to Southern Nevada could fall. The fall in visitor volume would also quickly slow economic growth in Southern Nevada. We have seen some decline in visitor volume, but that may reflect the inventory of rooms under renovation rather than the October 1 shooting. The passage of time will provide a more definitive answer as to the long-term effect of Oct. 1 on the Southern Nevada economy.

In sum, although we feel that the population forecast is sound, risks exist that could lead to either over- or underestimated population growth. Since we think that the downside risk to U.S. economic growth no longer exceeds the upside risk, the risk of overestimating population growth no longer exceeds the risk of its underestimation in the near term. We reiterate that our long-term forecasts exclude business-cycle, seasonal, and irregular events, which respond more to these short-run risks. Our long-term forecasts are designed to aid in the process of long-term planning.

VII. Conclusion

The latest REMI model projects long-term population growth patterns that are consistent with previous population forecasts. In the short term, the population forecast is slightly higher than last year's forecast. By 2025, the population forecast falls below last year's

[23] A report by the LVCVA indicates that the total economic impact of Southern Nevada tourism represents about 53 percent of the region's GDP. More than four out of 10 jobs in Southern Nevada were generated by the Southern Nevada tourism industry, which accounted for 36 percent of regional wages.

forecast through 2048. After 2048, the current population forecast exceeds last year's forecast. These patterns reflect the new data incorporated into the model and major adjustments with current employment and population data. We note that despite short-term economic uncertainties and model difficulties, the long-term population forecast, which is our primary focus in this forecasting exercise, remains consistent with past forecasts. By 2035, we predict that Clark County's population will reach about 2.67 million. In 2060, Clark County is expected to hit slightly above 2.90 million residents.

Appendices:

Appendix A: Computation of the Jobs-to-Room Ratio

The adjustment for new hotel construction uses a ratio of jobs to rooms. Two issues arise in the computation of the jobs-to-room ratio. First, we expect new hotel rooms to create new jobs in hotel services. Second, new hotel rooms will also generate economic activity and, hence, additional jobs in other sectors. Increased tourism activity from new hotel rooms will increase the demand for food services and other tourism-related industries. Hence, we need an approach that accounts for these two issues. We propose the following formula:

$$\text{Jobs}-\text{to}-\text{Room Ratio} = \begin{pmatrix}\text{Total}\\ \text{employment}\\ \text{due to tourism}\end{pmatrix} \Big/ \begin{pmatrix}\text{LVCVA}\\ \text{room count}\end{pmatrix},$$

where,

$$\begin{pmatrix}\text{Total}\\ \text{employment}\\ \text{due to tourism}\end{pmatrix} = \begin{pmatrix}\text{Accommodation}\\ \text{employment}\end{pmatrix} + \begin{pmatrix}\text{Employment}\\ \text{in tourism -}\\ \text{related}\\ \text{industries}\end{pmatrix} \times \begin{pmatrix}\text{Share of}\\ \text{employment}\\ \text{due to tourism}\end{pmatrix}.$$

Table A1: Computation of the Jobs-to-Room Ratio by Sequence (1) – (5)

(1) Employment (thousands)

Industrial Classification	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Accommodation	179.6	174.1	162.5	163.4	165.7	164.6	164.9	170.6	168.9	166.4
Clothing and clothing accessories	15.7	16.6	15.9	16.8	17.4	18.3	18.5	19.0	19.2	18.5
Transit, ground pass transportation	12.7	12.8	12.2	12.4	12.9	13.3	13.4	14.0	14.2	13.4
Arts, entertainment, and recreation	19.0	18.3	16.4	15.8	16.9	17.5	17.8	18.7	19.3	20.5
Food service and drinking places	74.4	77.1	72.4	74.2	77.0	79.4	84.5	89.3	94.1	98.8

Source: Quarterly Census of Employment and Wages, U.S. Bureau of Labor Statistics.

(2) Proportion of employment due to tourism* (= Location quotient-1)**

Industrial Classification	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Accommodation	1	1	1	1	1	1	1	1	1	1
Clothing and clothing accessories	0.45	0.58	0.73	0.84	0.96	1	1	1	1	0.98
Transit, ground pass transportation	1	1	1	1	1	1	1	1	1	1
Arts, entertainment, and recreation	0.34	0.30	0.26	0.26	0.34	0.36	0.33	0.32	0.30	0.32
Food service and drinking places	0.08	0.13	0.15	0.20	0.23	0.22	0.24	0.24	0.24	0.25

* Maximum value = 1. Minimum value = 0.

** The Location Quotient (LQ) compares Clark County's employment in a given industry sector to that of the nation. An LQ greater than 1 indicates that the area has proportionately more workers than the nation employed in that specific industry sector. This implies that the area is producing more than is consumed by its residents. The portion of the LQ that is above 1 represents the proportion of the industry's employment attributable to tourism activity.

(3) Employment due to tourism (thousands) = (1) x (2)

Industrial Classification	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Accommodation	179.6	174.1	162.5	163.4	165.7	164.6	164.9	170.6	168.9	166.4
Clothing and clothing accessories	15.7	16.6	15.9	16.8	17.4	18.3	18.5	19.0	19.2	18.1
Transit, ground pass transportation	12.7	12.8	12.2	12.4	12.9	13.3	13.4	14.0	14.2	13.4
Arts, entertainment, and recreation	6.4	5.5	4.2	4.0	5.7	6.2	5.8	6.0	5.8	6.5
Food service and drinking places	5.9	10.2	10.6	14.7	17.4	17.4	20.3	21.6	22.9	24.4
Total employment due to tourism*	**211.7**	**212.2**	**201.2**	**208.7**	**218.3**	**219.9**	**223.0**	**231.1**	**231.0**	**228.7**

* The numbers may not sum to the total because of rounding.

(4) LVCVA hotel room count (thousands)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Average room inventory	133.3	136.9	141.8	148.4	149.6	150.5	150.1	150.1	149.6	149.3

(5) Employment due to a hotel room = (3)*/(4)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Average**
Jobs-to-room ratio	1.59	1.55	1.42	1.41	1.46	1.46	1.49	1.54	1.54	1.53	1.50

*Total employment due to tourism.

**Averaged jobs-to-room ratio from 2007 to 2016.

Appendix B: Detailed Report Tables

Table B1: Out-of-the-Box Clark County Population and Population Growth Forecasts from REMI Models LHY2013 and LHY2015				
Year	**LHY2013 Population (Thousands)**	**LHY2015 Population (Thousands)**	**LHY2013 Population Growth**	**LHY2015 Population Growth**
2018	2,152	2,216	1.2%	1.5%
2019	2,177	2,247	1.2%	1.4%
2020	2,202	2,274	1.1%	1.2%
2021	2,226	2,298	1.1%	1.0%
2022	2,248	2,319	1.0%	0.9%
2023	2,270	2,338	0.9%	0.8%
2024	2,289	2,357	0.9%	0.8%
2025	2,308	2,374	0.8%	0.7%
2026	2,325	2,390	0.7%	0.7%
2027	2,341	2,405	0.7%	0.6%
2028	2,356	2,419	0.6%	0.6%
2029	2,369	2,433	0.6%	0.6%
2030	2,381	2,446	0.5%	0.5%
2031	2,393	2,458	0.5%	0.5%
2032	2,403	2,470	0.4%	0.5%
2033	2,413	2,481	0.4%	0.4%
2034	2,423	2,491	0.4%	0.4%
2035	2,431	2,501	0.4%	0.4%
2040	2,466	2,548	0.2%	0.4%
2045	2,490	2,600	0.2%	0.4%
2050	2,511	2,659	0.2%	0.4%
2055	2,534	2,715	0.2%	0.4%
2060	2,555	2,757	0.2%	0.2%
Note: Out-of-the-box refers to the model prior to recalibration. These numbers are not the final forecast.				

Table B2: Detailed Final Clark County Population Forecast: 2010 – 2060			
Year	**Population Forecast**	**Change in Population Forecast**	**Growth in Population (Percent)**
2010	1,951,269*	-55,078	-2.7%
2011	1,966,630**	15,361	0.8%
2012	2,008,654**	42,024	2.1%
2013	2,062,253**	53,599	2.7%
2014	2,102,238**	39,985	2.0%
2015	2,147,641**	45,403	2.2%
2016	2,205,207**	57,566	2.7%
2017	2,248,391**	43,184	2.0%
2018	2,296,000	47,609	2.1%
2019	2,344,000	48,000	2.1%
2020	2,389,000	45,000	1.9%
2021	2,423,000	34,000	1.4%
2022	2,452,000	29,000	1.2%
2023	2,481,000	29,000	1.2%
2024	2,507,000	26,000	1.0%
2025	2,530,000	23,000	0.9%
2026	2,550,000	20,000	0.8%
2027	2,568,000	18,000	0.7%
2028	2,585,000	17,000	0.7%
2029	2,600,000	15,000	0.6%
2030	2,615,000	15,000	0.6%
2031	2,628,000	13,000	0.5%
2032	2,640,000	12,000	0.5%
2033	2,651,000	11,000	0.4%
2034	2,662,000	11,000	0.4%
2035	2,672,000	10,000	0.4%
2036	2,682,000	10,000	0.4%
2037	2,692,000	10,000	0.4%
2038	2,701,000	9,000	0.3%
2039	2,710,000	9,000	0.3%
2040	2,719,000	9,000	0.3%
2041	2,728,000	9,000	0.3%
2042	2,737,000	9,000	0.3%
2043	2,747,000	10,000	0.4%
2044	2,756,000	9,000	0.3%
2045	2,766,000	10,000	0.4%
2046	2,776,000	10,000	0.4%
2047	2,786,000	10,000	0.4%
2048	2,796,000	10,000	0.4%
2049	2,806,000	10,000	0.4%
2050	2,816,000	10,000	0.4%
2051	2,825,000	9,000	0.3%
2052	2,835,000	10,000	0.4%
2053	2,844,000	9,000	0.3%
2054	2,854,000	10,000	0.4%
2055	2,863,000	9,000	0.3%
2056	2,871,000	8,000	0.3%
2057	2,879,000	8,000	0.3%
2058	2,886,000	7,000	0.2%
2059	2,894,000	8,000	0.3%
2060	2,900,000	6,000	0.2%

* 2010 U.S. Census.
** SNRPC consensus population estimate.
Note: The average annual forecasted growth rate is 0.6 percent.

Table B3: Economic Forecast										
Variable	**Unit**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Total Employment	Thousands (Jobs)	1311.03	1327.67	1350.60	1355.25	1355.45	1364.41	1365.85	1368.88	1372.60
Private Non-Farm Employment	Thousands (Jobs)	1193.89	1209.85	1232.92	1237.85	1238.69	1247.70	1249.38	1252.55	1256.32
Residence-Adjusted Employment	Thousands	1289.78	1306.66	1329.75	1334.90	1335.67	1345.10	1347.09	1350.55	1354.66
Population	Thousands	2295.61	2343.81	2389.34	2422.79	2452.20	2481.17	2506.58	2529.53	2549.97
Labor Force	Thousands	1122.25	1143.67	1170.43	1189.51	1206.78	1219.19	1229.90	1240.01	1249.10
Gross Domestic Product	Billions of Fixed (2018) $	122.56	125.78	129.76	132.27	134.98	138.07	140.62	143.15	145.60
Output	Billions of Fixed (2018) $	196.81	202.06	208.54	212.61	216.97	221.93	225.94	230.34	234.66
Value Added	Billions of Fixed (2018) $	124.20	127.46	131.51	134.04	136.78	139.91	142.50	145.06	147.55
Personal Income	Billions of Fixed (2018) $	102.77	106.02	109.40	111.79	114.66	116.99	118.95	121.44	123.72
Disposable Personal Income	Billions of Fixed (2018) $	92.36	95.46	98.42	100.54	103.11	105.14	106.81	109.01	111.01
PCE-Price Index	2009=100 (Nation)	114.87	117.31	120.20	123.27	126.28	129.36	132.52	135.74	139.02

Table B3: Economic Forecast (continued)											
Variable	**Unit**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Total Employment	Thousands (Jobs)	1374.94	1380.41	1385.22	1390.44	1414.62	1441.65	1471.94	1512.25	1554.60	1594.71
Private Non-Farm Employment	Thousands (Jobs)	1258.87	1264.35	1269.07	1274.03	1298.61	1325.76	1355.86	1394.81	1435.06	1473.49
Residence Adjusted Employment	Thousands	1357.37	1363.12	1368.17	1373.59	1398.65	1426.27	1457.05	1497.69	1540.47	1580.98
Population	Thousands	2568.01	2584.91	2600.45	2614.83	2672.41	2718.90	2766.24	2815.67	2862.56	2900.16
Labor Force	Thousands	1257.90	1266.27	1274.15	1281.30	1319.42	1361.77	1406.13	1445.38	1457.60	1467.00
Gross Domestic Product	Billions of Fixed (2018) $	148.00	150.90	153.83	156.81	172.19	189.15	207.95	230.13	254.78	281.29
Output	Billions of Fixed (2018) $	238.97	244.15	249.41	254.82	283.85	316.79	354.01	398.37	448.67	504.22
Value Added	Billions of Fixed (2018) $	149.99	152.93	155.90	158.91	174.51	191.70	210.74	233.19	258.12	284.91
Personal Income	Billions of Fixed (2018) $	125.97	128.44	130.95	133.56	148.10	165.36	186.03	210.62	239.67	272.24
Disposable Personal Income	Billions of Fixed (2018) $	112.98	115.15	117.35	119.64	132.38	147.47	165.51	186.92	212.11	240.14
PCE-Price Index	2009=100 (Nation)	142.38	145.81	149.35	152.98	172.60	194.74	219.65	247.76	279.48	315.21

Table B4: Employment (in Thousands)									
Variable	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Private Non-Farm	1193.89	1209.85	1232.92	1237.85	1238.69	1247.70	1249.38	1252.55	1256.32
Forestry, Fishing, Other	0.46	0.47	0.47	0.48	0.47	0.48	0.48	0.48	0.49
Mining	3.03	3.04	3.08	3.07	3.04	3.03	3.00	2.96	2.94
Utilities	2.87	2.84	2.80	2.75	2.70	2.66	2.62	2.55	2.49
Construction	81.42	83.23	85.46	83.58	84.30	82.87	82.79	82.67	82.02
Manufacturing	25.39	25.22	25.02	24.61	24.16	23.87	23.48	23.16	22.96
Wholesale Trade	31.77	32.35	32.94	33.30	33.53	33.82	34.01	34.23	34.46
Retail Trade	133.61	135.45	136.65	137.34	137.16	138.18	138.02	138.50	139.14
Transportation and Warehousing	47.02	47.25	47.39	47.92	47.79	48.58	48.55	48.56	48.63
Information	16.68	16.89	17.06	17.16	17.16	17.20	17.18	17.23	17.27
Finance and Insurance	67.66	67.99	68.59	68.89	69.15	69.91	70.64	71.45	72.29
Real Estate and Rental and Leasing	80.84	81.48	81.79	81.78	81.56	81.79	81.85	81.97	82.13
Professional and Technical Services	73.04	74.51	76.06	77.08	77.61	78.35	78.87	79.36	79.76
Mngmt of Companies and Enterprises	25.76	26.05	26.50	26.62	26.60	26.78	26.81	26.86	26.96
Admin and Waste Services	102.61	103.71	104.87	105.25	105.22	105.85	106.03	106.34	106.73
Educational Services	12.67	12.86	12.96	13.02	13.05	13.13	13.18	13.23	13.30
Health Care and Social Assistance	105.34	108.73	111.23	112.97	114.40	116.20	117.48	118.96	120.63
Arts, Entertainment, and Recreation	42.65	43.01	43.11	44.42	44.30	45.43	45.44	45.49	45.61
Accommodation and Food Services	278.02	280.69	292.10	292.69	291.63	294.56	294.13	293.84	293.83
Other Services, except Govt	63.04	64.08	64.83	64.92	64.84	65.00	64.80	64.69	64.68
Government	116.67	117.35	117.22	116.95	116.31	116.27	116.04	115.90	115.85
State and local	89.42	90.58	91.02	91.23	91.15	91.56	91.75	91.95	92.24
Federal civilian	12.36	12.01	11.78	11.62	11.43	11.29	11.19	11.10	10.99
Federal military	14.89	14.76	14.42	14.09	13.73	13.43	13.10	12.85	12.62
Farm	0.47	0.46	0.46	0.45	0.45	0.44	0.44	0.43	0.43

Table B4: Employment (in Thousands) (continued)										
Variable	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Private Non-Farm	1258.87	1264.35	1269.07	1274.03	1298.61	1325.76	1355.86	1394.81	1435.06	1473.49
Forestry, Fishing, Other	0.50	0.50	0.51	0.52	0.56	0.62	0.67	0.73	0.79	0.84
Mining	2.91	2.89	2.85	2.83	2.69	2.57	2.44	2.33	2.21	2.07
Utilities	2.42	2.35	2.28	2.21	1.85	1.52	1.24	1.01	0.82	0.66
Construction	81.67	82.58	82.77	83.15	86.89	91.41	97.39	103.86	110.76	117.00
Manufacturing	22.75	22.59	22.38	22.21	21.51	21.08	20.71	20.53	20.33	20.10
Wholesale Trade	34.66	34.95	35.21	35.47	36.85	38.26	39.69	41.23	42.76	44.15
Retail Trade	139.49	140.13	140.84	141.58	145.37	149.58	154.00	159.76	165.42	170.08
Transportation and Warehousing	48.67	48.79	48.90	49.02	49.69	50.54	51.52	52.83	54.28	55.80
Information	17.31	17.40	17.48	17.57	18.11	18.74	19.46	20.35	21.31	22.31
Finance and Insurance	73.04	73.90	74.73	75.52	79.51	83.52	87.97	92.92	97.94	102.70
Real Estate and Rental and Leasing	82.14	82.27	82.39	82.50	82.70	82.90	83.06	83.76	84.34	84.51
Professional and Technical Services	80.25	80.90	81.49	82.11	85.31	88.51	91.98	95.75	99.66	103.61
Mngmt of Companies and Enterprises	27.05	27.17	27.28	27.39	27.96	28.50	28.99	29.61	30.22	30.84
Admin and Waste Services	107.01	107.45	107.89	108.32	110.33	112.40	114.47	117.24	120.19	122.92
Educational Services	13.34	13.39	13.44	13.48	13.59	13.66	13.71	13.89	14.04	14.08
Health Care and Social Assistance	121.95	123.44	124.98	126.49	133.34	140.47	147.87	156.94	166.54	175.88
Arts, Entertainment, and Recreation	45.64	45.74	45.83	45.92	46.15	46.42	46.64	47.15	47.61	47.91
Accommodation and Food Services	293.56	293.46	293.42	293.37	292.40	291.80	291.38	292.33	293.35	296.00
Other Services, except Govt	64.51	64.46	64.41	64.36	63.80	63.26	62.68	62.60	62.48	62.02
Government	115.64	115.64	115.73	115.99	115.61	115.51	115.72	117.10	119.22	120.92
State and local	92.34	92.58	92.90	93.35	94.05	94.73	95.34	97.08	99.41	101.35
Federal civilian	10.91	10.85	10.79	10.74	10.50	10.47	10.75	10.90	11.05	11.13
Federal military	12.39	12.20	12.03	11.90	11.06	10.31	9.62	9.12	8.77	8.44
Farm	0.43	0.42	0.42	0.42	0.40	0.38	0.36	0.34	0.32	0.30

Table B5: Gross Domestic Product (Billions of fixed 2018 $)*									
Variable	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Personal Consumption Expenditures	86.58	88.85	91.13	92.81	94.88	97.18	99.24	101.40	103.59
Motor vehicles and parts	3.24	3.24	3.28	3.30	3.33	3.38	3.41	3.44	3.48
Furnishings and durable household equipment	2.68	2.83	2.99	3.12	3.25	3.39	3.50	3.62	3.74
Recreational goods and other durable goods	5.69	5.98	6.31	6.58	6.87	7.17	7.44	7.73	8.03
Food and beverages	6.58	6.64	6.68	6.70	6.76	6.83	6.91	6.99	7.07
Clothing and footwear	2.82	2.89	2.97	3.03	3.11	3.19	3.28	3.37	3.44
Motor vehicle fuels, lubricants, and fluids	1.78	1.81	1.82	1.83	1.85	1.86	1.87	1.88	1.89
Fuel oil and other fuels	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04
Other nondurable goods	9.84	10.15	10.47	10.72	11.00	11.30	11.56	11.84	12.12
Housing	14.95	15.20	15.40	15.54	15.77	16.04	16.31	16.59	16.86
Household utilities	1.90	1.91	1.91	1.91	1.92	1.94	1.96	1.97	1.98
Transportation services	2.14	2.16	2.20	2.21	2.24	2.27	2.29	2.32	2.35
Health care	12.64	13.26	13.81	14.26	14.75	15.23	15.66	16.10	16.55
Recreation and other services	22.28	22.73	23.23	23.55	23.99	24.52	25.00	25.51	26.03
Gross Private Domestic Fixed Investment	25.17	26.27	27.57	28.62	29.43	30.10	30.80	31.42	31.72
Residential	5.54	5.90	6.29	6.47	6.55	6.59	6.59	6.57	6.49
Nonresidential structures	3.77	3.84	4.09	4.25	4.37	4.49	4.60	4.69	4.72
Nonresidential equipment	9.47	9.81	10.19	10.61	10.98	11.31	11.71	12.08	12.33
Nonresidential intellectual property products	6.38	6.73	7.00	7.29	7.53	7.71	7.90	8.08	8.18
Change in Private Inventories	0.13	0.14	0.13	0.13	0.12	0.11	0.10	0.10	0.09
Government Consumption Expenditures	19.55	20.02	20.19	20.32	20.49	20.70	20.85	21.02	21.18
Federal military	6.08	6.21	6.21	6.20	6.20	6.21	6.21	6.21	6.22
Federal civilian	2.44	2.50	2.50	2.50	2.50	2.51	2.51	2.51	2.51
State and local government	11.04	11.30	11.48	11.62	11.79	11.98	12.14	12.30	12.45
Total Exports	67.04	68.58	71.22	72.61	74.16	76.03	77.48	79.07	80.67
Total Imports	77.60	80.02	82.66	84.63	86.75	88.89	90.86	93.07	95.05

*Note: The sum of the components may not add up to the total GDP due to rounding.

Table B5: Gross Domestic Product (Billions of fixed 2018 $) (continued)*										
Variable	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Personal Consumption Expenditures	105.54	107.82	110.21	112.59	125.06	138.00	153.09	171.85	193.05	215.37
Motor vehicles and parts	3.50	3.54	3.59	3.63	3.85	4.10	4.37	4.73	5.13	5.53
Furnishings and durable household equipment	3.85	3.98	4.12	4.26	5.01	5.88	6.90	8.16	9.64	11.27
Recreational goods and other durable goods	8.32	8.65	9.01	9.37	11.44	13.73	16.59	20.23	24.56	29.47
Food and beverages	7.13	7.21	7.29	7.36	7.69	8.02	8.35	8.80	9.25	9.63
Clothing and footwear	3.51	3.59	3.69	3.78	4.43	4.38	4.75	5.18	5.59	5.92
Motor vehicle fuels, lubricants, and fluids	1.90	1.91	1.92	1.93	1.97	2.01	2.06	2.14	2.24	2.32
Fuel oil and other fuels	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03
Other nondurable goods	12.37	12.67	12.97	13.28	14.91	16.73	18.78	21.33	24.26	27.41
Housing	17.08	17.34	17.61	17.86	19.01	20.17	21.34	22.76	24.14	25.30
Household utilities	1.99	2.00	2.01	2.02	2.04	2.05	2.06	2.09	2.12	2.12
Transportation services	2.37	2.40	2.44	2.48	2.67	2.90	3.17	3.54	3.97	4.46
Health care	16.97	17.43	17.91	18.39	20.80	23.38	26.15	29.38	32.88	36.45
Recreation and other services	26.49	27.04	27.61	28.19	31.20	34.63	38.53	43.49	49.25	55.44
Gross Private Domestic Fixed Investment	32.22	32.88	33.56	34.26	38.55	43.09	48.68	54.80	61.57	68.74
Residential	6.47	6.51	6.58	6.68	7.56	8.67	10.09	11.71	13.53	15.26
Nonresidential structures	4.76	4.82	4.89	4.95	5.39	5.86	6.51	7.23	8.07	9.04
Nonresidential equipment	12.65	13.03	13.40	13.76	15.78	17.83	20.24	22.83	25.63	28.63
Nonresidential intellectual property products	8.34	8.52	8.70	8.87	9.82	10.74	11.84	13.04	14.35	15.80
Change in Private Inventories	0.09	0.09	0.08	0.08	0.07	0.06	0.06	0.06	0.06	0.06
Government Consumption Expenditures	21.33	21.54	21.79	22.09	23.24	24.47	25.76	27.51	29.74	32.09
Federal military	6.23	6.26	6.31	6.36	6.57	6.80	7.04	7.43	7.95	8.55
Federal civilian	2.51	2.52	2.54	2.56	2.63	2.72	2.80	2.93	3.12	3.32
State and local government	12.58	12.75	12.94	13.16	14.04	14.96	15.92	17.15	18.67	20.23
Total Exports	82.33	84.30	86.19	88.09	98.46	110.16	123.09	137.89	154.45	173.49
Total Imports	97.08	99.51	102.02	104.56	118.76	133.73	151.71	173.35	198.30	225.92

*Note: The sum of the components may not add up to the total GDP due to rounding.

Table B6: Income (Billions of fixed 2018 $)									
Variable	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Total earnings by place of work	71.58	73.09	75.34	76.28	77.53	78.94	80.02	81.08	82.04
Total wage and salary disbursements	53.44	54.61	56.35	57.05	57.97	59.02	59.80	60.53	61.20
Supplements to wages and salaries	13.38	13.72	14.21	14.48	14.80	15.13	15.40	15.68	15.92
Employer contributions for employee pension and insurance funds	9.31	9.57	9.91	10.10	10.33	10.55	10.74	10.94	11.10
Employer contributions for government social insurance	4.07	4.15	4.30	4.38	4.48	4.58	4.66	4.74	4.81
Proprietors' income with inventory valuation and capital consumption adjustments	4.76	4.76	4.78	4.75	4.75	4.78	4.82	4.87	4.92
Less: Contributions for government social insurance	8.24	8.43	8.65	8.77	8.93	9.11	9.22	9.34	9.45
Employee and self-employed contributions for government social insurance	4.17	4.28	4.35	4.39	4.46	4.53	4.56	4.60	4.64
Employer contributions for government social insurance	4.07	4.15	4.30	4.38	4.48	4.58	4.66	4.74	4.81
Plus: Adjustment for residence	-0.29	-0.29	-0.31	-0.30	-0.29	-0.28	-0.27	-0.25	-0.24
Gross in	1.31	1.34	1.36	1.38	1.41	1.43	1.45	1.48	1.50
Gross out	1.60	1.63	1.67	1.68	1.70	1.71	1.72	1.73	1.74
Equals: Net earnings by place of residence	63.04	64.38	66.38	67.21	68.31	69.55	70.54	71.48	72.34
Plus: Rental, personal interest, and personal dividend income	22.39	23.62	24.35	25.23	26.03	26.77	27.40	27.94	28.53
Plus: Personal current transfer receipts	17.33	18.02	18.66	19.35	20.33	20.67	21.01	22.02	22.85
Equals: Personal income	102.77	106.02	109.40	111.79	114.66	116.99	118.95	121.44	123.72
Less: Personal current taxes	10.41	10.57	10.97	11.26	11.55	11.86	12.13	12.43	12.71
Equals: Disposable personal income	92.36	95.46	98.42	100.54	103.11	105.13	106.81	109.01	111.01
Real personal income with housing price (billions of fixed 2009 $)	91.86	94.62	97.50	99.54	102.04	104.06	105.76	107.95	109.95
Real disposable personal income with housing price (billions of fixed 2009 $)	82.55	85.19	87.72	89.52	91.76	93.52	94.97	96.90	98.66
PCE-price index with housing price, 2009=100	111.98	114.53	117.51	120.63	123.64	126.71	129.87	133.05	136.30
Relative housing price	0.83	0.84	0.85	0.85	0.86	0.86	0.86	0.86	0.86

Table B6: Income (Billions of fixed 2018 $) (continued)										
Variable	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Total earnings by place of work	82.96	84.03	85.09	86.19	92.45	99.72	108.41	118.55	130.46	144.17
Total wage and salary disbursements	61.84	62.59	63.33	64.10	68.46	73.50	79.54	86.57	94.82	104.31
Supplements to wages and salaries	16.15	16.41	16.66	16.92	18.38	20.06	22.08	24.45	27.27	30.53
Employer contributions for employee pension and insurance funds	11.27	11.45	11.62	11.81	12.83	14.00	15.40	17.06	19.02	21.30
Employer contributions for government social insurance	4.88	4.96	5.04	5.12	5.56	6.07	6.68	7.39	8.25	9.23
Proprietors' income with inventory valuation and capital consumption adjustments	4.97	5.03	5.09	5.17	5.61	6.16	6.80	7.53	8.37	9.32
Less: Contributions for government social insurance	9.54	9.65	9.75	9.86	10.45	11.14	11.95	12.91	14.03	15.30
Employee and self-employed contributions for government social insurance	4.66	4.69	4.71	4.74	4.89	5.07	5.28	5.52	5.78	6.07
Employer contributions for government social insurance	4.88	4.96	5.04	5.12	5.56	6.07	6.68	7.39	8.25	9.23
Plus: Adjustment for residence	-0.23	-0.22	-0.22	-0.21	-0.21	-0.23	-0.25	-0.28	-0.28	-0.29
Gross in	1.53	1.55	1.57	1.60	1.73	1.89	2.07	2.28	2.53	2.83
Gross out	1.75	1.77	1.79	1.81	1.94	2.11	2.32	2.56	2.81	3.12
Equals: Net earnings by place of residence	73.19	74.16	75.12	76.12	81.79	88.35	96.20	105.36	116.15	128.58
Plus: Rental, personal interest, and personal dividend income	29.20	29.89	30.60	31.34	35.41	40.24	45.87	52.48	60.18	68.50
Plus: Personal current transfer receipts	23.59	24.40	25.23	26.09	30.90	36.78	43.96	52.78	63.34	75.17
Equals: Personal income	125.97	128.44	130.95	133.56	148.10	165.36	186.03	210.62	239.67	272.24
Less: Personal current taxes	12.99	13.29	13.60	13.92	15.72	17.89	20.52	23.70	27.56	32.10
Equals: Disposable personal income	112.98	115.15	117.35	119.64	132.38	147.47	165.51	186.92	212.11	240.14
Real personal income with housing price (billions of fixed 2009 $)	111.95	114.14	116.37	118.69	131.71	147.18	165.67	187.65	213.64	242.88
Real disposable personal income with housing price (billions of fixed 2009 $)	100.40	102.33	104.29	106.32	117.73	131.26	147.40	166.54	189.07	214.24
PCE-price index with housing price, 2009=100	139.60	142.97	146.44	149.98	169.10	190.64	214.90	242.30	273.19	307.85
Relative housing price	0.86	0.86	0.86	0.86	0.86	0.86	0.85	0.85	0.85	0.84

Table B7: Population and Labor Force (in Thousands)									
Variable	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Total population	2295.61	2343.81	2389.34	2422.78	2452.20	2481.17	2506.58	2529.53	2549.97
By race and ethnicity									
White	998.88	1011.80	1023.37	1029.30	1033.21	1036.71	1038.45	1038.96	1038.26
Black	245.11	249.84	254.21	257.34	260.07	262.75	265.06	267.11	268.90
Other	327.11	334.55	341.63	346.99	351.77	356.50	360.71	364.55	368.02
Hispanic	724.50	747.63	770.13	789.15	807.14	825.21	842.36	858.90	874.80
By age									
Ages 0-14	439.39	444.14	449.42	451.25	451.44	451.58	451.92	452.07	452.46
Ages 15-24	282.24	288.57	296.59	303.73	308.85	312.28	313.65	313.44	312.51
Ages 25-64	1223.86	1241.54	1256.25	1263.53	1270.87	1279.58	1286.87	1292.77	1297.36
Ages 65 & older	350.12	369.57	387.08	404.28	421.03	437.72	454.13	471.24	487.64
Labor force	1122.25	1143.67	1170.43	1189.51	1206.78	1219.19	1229.90	1240.01	1249.10
Labor force participation rate	0.620	0.618	0.619	0.618	0.618	0.616	0.613	0.611	0.609
Participation rates by gender									
Male (16 & older)	0.683	0.680	0.680	0.679	0.678	0.675	0.672	0.670	0.669
Female (16 & older)	0.559	0.557	0.559	0.560	0.560	0.558	0.556	0.554	0.552

Table B7: Population and Labor Force (in Thousands) (continued)										
Variable	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Total population	2568.01	2584.91	2600.44	2614.83	2672.41	2718.90	2766.24	2815.67	2862.56	2900.16
By race and ethnicity										
White	1036.39	1033.91	1030.74	1026.99	1000.77	967.69	933.08	899.43	866.89	834.73
Black	270.44	271.86	273.14	274.31	278.74	282.10	285.53	289.03	292.24	294.87
Other	371.13	374.07	376.81	379.39	390.81	401.83	414.12	427.48	440.74	452.26
Hispanic	890.06	905.08	919.76	934.13	1002.09	1067.28	1133.52	1199.74	1262.69	1318.31
By age										
Ages 0-14	453.28	453.76	453.84	453.23	443.43	434.72	431.80	434.06	437.70	438.14
Ages 15-24	310.94	309.34	307.20	305.82	300.32	305.45	303.59	300.73	299.21	298.82
Ages 25-64	1300.37	1302.55	1304.50	1305.71	1315.07	1316.07	1331.21	1342.12	1343.76	1348.47
Ages 65 & older	503.43	519.27	534.91	550.07	613.60	662.66	699.64	738.76	781.89	814.74
Labor force	1257.90	1266.27	1274.15	1281.30	1319.42	1361.77	1406.13	1445.38	1457.60	1467.00
Labor force participation rate	0.608	0.607	0.606	0.606	0.605	0.608	0.614	0.618	0.612	0.607
Participation rates by gender										
Male (16 & older)	0.668	0.667	0.667	0.666	0.664	0.666	0.670	0.673	0.667	0.662
Female (16 & older)	0.550	0.549	0.548	0.548	0.547	0.553	0.561	0.566	0.559	0.554

Table B8: Demographics (in Thousands)									
Variable	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Starting population	2248.39	2295.61	2343.81	2389.34	2422.78	2452.20	2481.17	2506.58	2529.53
Births	28.714	29.126	29.80	29.87	30.01	30.07	30.10	30.08	30.03
Deaths	17.473	18.179	18.88	19.49	20.12	20.76	21.41	22.08	22.75
Natural growth	11.24	10.94	10.92	10.39	9.89	9.31	8.69	8.00	7.27
Population before migrants	2259.63	2306.55	2354.73	2399.72	2432.67	2461.51	2489.85	2514.58	2536.80
Total migrants	35.98	37.26	34.61	23.06	19.52	19.66	16.72	14.94	13.18
Economic migrants	22.41	23.21	21.25	9.05	5.29	5.10	1.94	-0.19	-2.25
Retired migrants	5.14	5.32	5.52	5.71	5.88	6.05	6.22	6.39	6.55
International migrants	8.50	8.58	8.65	8.73	8.81	8.89	8.98	9.07	9.16
Special pops migrants	-0.07	0.16	-0.80	-0.42	-0.46	-0.39	-0.41	-0.33	-0.29
Total population	2295.61	2343.81	2389.34	2422.78	2452.20	2481.17	2506.58	2529.53	2549.97

Table B8: Demographics (in Thousands) (continued)										
Variable	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**	**2055**	**2060**
Starting population	2549.97	2568.01	2584.91	2600.44	2662.11	2709.67	2756.38	2806.07	2853.52	2893.51
Births	29.95	29.85	29.72	29.58	28.81	28.45	28.45	28.76	28.88	28.57
Deaths	23.44	24.15	24.87	25.60	29.32	32.57	35.07	36.78	37.89	38.69
Natural growth	6.50	5.70	4.85	3.98	-0.51	-4.12	-6.62	-8.02	-9.01	-10.12
Population before migrants	2556.48	2573.71	2589.77	2604.43	2661.60	2705.55	2749.76	2798.05	2844.51	2883.39
Total migrants	11.54	11.20	10.68	10.40	10.81	13.35	16.47	17.62	18.05	16.78
Economic migrants	-4.11	-4.69	-5.46	-5.91	-5.90	-3.66	-0.81	-0.17	-0.28	-2.12
Retired migrants	6.68	6.80	6.92	7.01	7.22	7.30	7.45	7.82	8.33	8.91
International migrants	9.25	9.34	9.43	9.48	9.70	9.87	10.00	10.07	10.09	10.06
Special pops migrants	-0.29	-0.24	-0.21	-0.17	-0.21	-0.17	-0.16	-0.10	-0.09	-0.08
Total population	2568.01	2584.91	2600.44	2614.83	2672.41	2718.90	2766.24	2815.67	2862.56	2900.16