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Economic Impact Analysis of the Calhoun Area Metropolitan Planning Organization Fixed Transit Route Service

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EXECUTIVE SUMMARY

Public mass transit plays a crucial role in society by providing people with the means to access employment, medical services, community resources, and recreational opportunities in communities nationwide. Enhancing urban mobility, a core goal of public transportation investments, is underscored by the National Research Council Transportation Research Board. Beyond being an essential service for those without vehicles, robust public transit systems contribute to economic vitality, making communities attractive for business and individuals alike.

The economic significance of transportation, extending beyond mere mobility, is fundamental to fostering growth and development. A well-developed transportation infrastructure facilitates the movement of workers to a broader range of potential employers, particularly vital in diverse and dispersed urban job markets. Accessible transportation options broaden job seekers' choices, potentially leading to optimal employment matches and overall economic productivity.

Public transit systems emerge as invaluable when acknowledging that not everyone has access to private automobiles. These networks provide an affordable and efficient means for individuals without cars to access diverse job opportunities, preventing inconvenience and enhancing economic productivity. Employers, in turn, benefit from improved transportation infrastructure, tapping into a larger talent pool and fostering a competitive and dynamic workforce.

The broader societal impacts of public transit encompass reduced road congestion, travel times, air pollution, and energy consumption, benefiting both users and non-users. Importantly, during emergencies, public transit plays a critical role in safe and efficient evacuations and contributes to the resilience of the U.S. emergency transportation network.

As elected officials and decision-makers increasingly focus on the economic returns of public transportation investments, the positive correlation between transportation and economic prosperity becomes evident. While acknowledging the environmental and societal benefits, attention is shifting toward the financial outcomes of transit proposals. In this context, investments in modern, efficient transportation infrastructure emerge as essential, not only for

enhancing urban mobility but also for fostering economic prosperity, ensuring a thriving job market, and building a resilient emergency transportation network.

To find the economic impact of the proposed changes for the Calhoun Area MPO Area MPO, our research team utilized the REMI TranSight model TS-ALwin20.70 - Calhoun Alabama – v5.0.1. The model has two regions: Calhoun MPO area and the rest of Alabama.

The analysis shows that increases in public transit ridership have positive impacts on the Calhoun Area MPO economy as well as the rest of the state. The simulations show projected increases in employment, population, and GDP with the highest increases in labor force and labor force participation. The analysis looks at the additional amount of a variable in one year compared to the baseline forecast projection of that variable in the same year.

$$\text{Net New Jobs}_{year} = \text{Projected Jobs in New Simulation}_{year} - \text{Projected Jobs in Baseline Forecast}_{year}$$

There were 8 simulations performed. This was partly because there were two ways to measure ridership as a percentage of the region. Average monthly ridership is about 1.7% of monthly trips and about 6.6% of population. Separate simulations were run with each of the percentages. The research team then examined the impact of an increase in ridership.

By decreasing commuting costs, it becomes easier for employers to access workers. This impacts labor productivity, which impacts employment.

INTRODUCTION

BACKGROUND

The Calhoun Area Metropolitan Planning Organization (MPO) currently has a public transit system; however, the system does not connect every city within the MPO. In June 2023, the Calhoun Area MPO contracted Jacksonville State University's Center for Economic Development and Business Research (CEDBR) to perform an Economic Impact Analysis of the Calhoun Area MPO's Fixed Transit Route Service based on a revised proposal for changes that had been performed by JRWA in May 2023.

Historically, the Calhoun Area MPO transit system has provided public transportation on a route connecting the cities of Oxford and Anniston. The updated transit system report provides a proposed route for the city of Jacksonville as well. The analysis provided in this report is comprehensive of both the proposed revisions to the Anniston/Oxford route as well as the addition of the new Jacksonville route.

PROJECT METHODOLOGY

DATA SOURCES

Primary Data

Primary data sources used as the inputs for this project were provided by the Calhoun Area MPO. Table 1 below highlights the existing transit costs for the previous three fiscal years, FY 2020 through FY 2022.

Table 1: Existing Calhoun Area MPO Transit Operating Costs

FY 2020	$882,419.94
FY 2021	$796,894.09
FY 2022	$860,572.86

Table 2: Existing Calhoun Area MPO Transit Monthly Fixed Route Ridership

EXISTING FIXED ROUTE RIDERSHIP							
	FY16-17	**FY17-18**	**FY18-19**	**FY19-20**	**FY20-21**	**FY21-22**	**FY22-23**
OCT	9,011	9,560	9,993	8,871	5,541	7,679	7,483
NOV	9,481	9,225	8,504	7,665	5,425	7,272	7,024
DEC	9,459	8,205	8,082	7,596	5,266	7,745	7,184
JAN	8,019	7,510	8,239	7,614	5,177	7,114	7,151
FEB	8,462	8,960	7,800	7,262	4,773	7,305	7,301
MAR	9,707	9,493	8,979	7,185	5,512	8,757	8,230
APR	8,240	8,942	9,045	4,285	6,263	8,965	7,090
MAY	9,900	9,502	8,774	5,141	6,498	9.012	7,509
JUN	9,977	9,905	7,993	5,852	7,197	10,500	6,979
JUL	8,971	8,820	8,626	6,160	7,836	9,141	
AUG	10,511	10,617	9,314	6,111	7,771	10,763	
SEPT	9,280	8,607	7,868	5,923	8,019	10,645	

Table 2 illustrates monthly total ridership of the Existing Calhoun Area MPO Transit Monthly Fixed Route Ridership for each month from October 2016 to June 2023.

Table 3: Existing Calhoun Area MPO Transit Monthly ADA Paratransit Ridership – OCT 2022 – JUN 2023

ADA PARATRANSIT RIDERSHIP						
FY22-23	**ANNISTON**	**JACKSONVILLE**	**WEAVER**	**OXFORD**	**SECTION 5307 CC URBAN**	**SECTION 5311 CC RURAL**
OCT	474	117	43	65	118	114
NOV	524	107	43	67	134	98
DEC	537	113	41	61	122	119
JAN	482	112	32	62	94	86
FEB	456	182	27	52	68	74
MAR	636	217	17	71	86	87
APR	518	187	15	47	81	65
MAY	529	169	15	54	58	31
JUN	474	168	13	88	87	45
2022 AVG	552	137	25	125	127	97
2023 AVG	514	152	27	63	94	80

Table 3, "ADA Paratransit Ridership," expresses monthly totals of Paratransit riders from the cities of Anniston, Jacksonville, Weaver, Oxford, and the Urban and Rural County areas.

To date, the existing Calhoun MPO Fixed Transit Route is only in a portion of the Calhoun MPO area – predominantly the southern region. Jacksonville, Alabama, is currently not one of the Calhoun MPO Area cities that have fixed transit service.

Projections made by JRWA for the Jacksonville potential transit ridership were given in the JRWA Word document "Draft 8-7-23 City of Jacksonville Transit Ridership Estimates". This document concludes "the Jacksonville transit system could experience anywhere from 50 to 65 riders daily depending on marketing and scheduling."

Table 4: JRWA Jacksonville Ridership Forecasts

	JAN 2023	FEB 2023	MAR 2023	APR 2023	MAY 2023	JUN 2023
Riders (monthly)	1,340	1,533	1,641	1,259	1,435	1,252

Table 4 shows JRWA projected ridership for Jacksonville Transit. These figures illustrate what Jacksonville Ridership could have looked like for 2023 based on actual ridership numbers for the same months from the existing fixed route.

Secondary/Supplemental Data

Population data was obtained from the TranSight model baseline forecast, where there are projected to be 110,301 people in Calhoun Area MPO in 2023. For trip data, the Excel file "Alabama trips and distances" was used, where REMI obtained estimates of total trips taken in Calhoun Area MPO in different months. The following data was taken from the Bureau of Transportation Statistics: https://data.bts.gov/Research-and-Statistics/Trips-by-Distance-Daily-Average-by-Month/bnhp-2ktx/data. Maryland Transportation Institute and Center for Advanced Transportation Technology Laboratory at the University of Maryland http://www.usa.gov/publicdomain/label/1.0/. Bureau of Transportation Statistics. (2021) *Trips by Distance – Daily Average by Month* [Dataset]. Data Provided by Maryland Transportation Institute and Center for Advanced Transportation Technology Laboratory at the University of Maryland. Bureau of Transportation Statistics. https://data.bts.gov/Research-and-Statistics/Trips-by-Distance-Daily-Average-by-Month/bnhp-2ktx.

From January 2022 to May 2023, the average monthly number of trips in Calhoun Area MPO was 440,130.59.

MODEL DESCRIPTION

PI+ is REMI's flagship software product and the leading out-of-box commercial economic forecasting and impact simulation software used by policy researchers. A demo

version of the model can be downloaded from the REMI website. PI+ integrates input-output, computable general equilibrium, econometric, and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors. It understands local and national constraints on economic growth, allows for consumer and producer behavioral responses to evolve over time and encompasses the range of market interactions that one would need to consider as part of any robust economic analysis.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, as well as other details in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares.

Figure 1: REMI Model Linkages

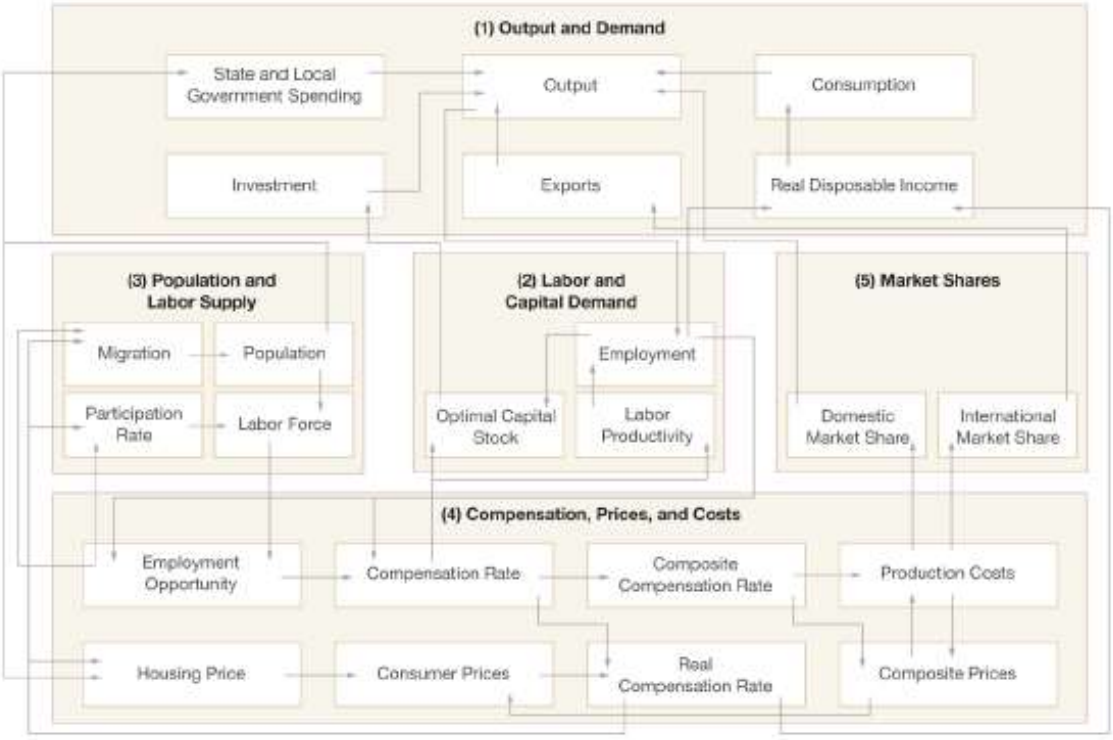


Figure 1: REMI Model Linkages, **Block 1: Output and Demand**, analyzes the output, demand, consumption, investment, government spending, import, commodity access, and export of each industry in the home region. Factors affecting output include industry demand in all regions in the nation, the home region's share of each market, and international exports. Demand is determined by the amount of output, consumption, investment, and capital demand. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population.

Block 2: Labor and Capital Demand focuses on labor productivity, labor intensity, and the optimal capital stocks. Labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force. Labor intensity is determined by the cost of labor relative to the other factor inputs, capital, and fuel. Optimal capital stock for each industry depends on the relative cost of labor and capital as well as the employment weighted by capital use for each industry.

Block 3: Population and Labor Supply includes detailed demographic information about the region, such as age, gender, and ethnic category, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

Block 4: Compensation, Prices, and Costs analyzes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Prices consider the access to production locations and the specialization of production within each industry. The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate.

Block 5: Market Shares measures the proportion of local and export markets that are captured by each industry. This depends on relative production costs, the estimated

price elasticity of demand, and the effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market.

DATA PREPARATION

Average Ridership

REMI took an estimate of the average ridership of the Calhoun transit system. This work is in the "Alabama towns transit usage population" Excel file. REMI used the data from Fixed Route Ridership and took the monthly average of FY22-23 ridership. (The data REMI received for that fiscal year goes only from October to June.) The result was 7,327.89 monthly average riders.

Ridership in Relation to Total Populations

To best input the data into the REMI model, it is helpful to know how common ridership is compared to the region as a whole. There are at least two ways to measure how large the ridership is as a portion of the region. The number of riders can be compared to the population in the region. The number of riders can also be compared to the number of trips in the region.

If one takes monthly average ridership and divides by population, one gets about 6.6% of the region. This is taken by using monthly average ridership in FY22-23 (from October to June) and dividing by TranSight's projected 2023 population of the region.

If one takes monthly average ridership and divides by the monthly average number of trips in the Calhoun MPO area, one gets about 1.665% of the region. This number is found by dividing the monthly average ridership by the monthly average number of trips in early 2023. Using the data from the Bureau of Transportation Statistics, REMI found that the average number of trips from January 2022 to May 2023 was 440,130.5885.[1]

[1] At the time of calculation, the data only went to May 2023.

Measuring Effective Distances

One of the intents of this project is to determine the economic impact an increase in public transit could have on the Calhoun MPO Area. To measure this impact in TranSight, REMI is changing effective transportation distances.

An effective transportation distance greater than 1 means movement is relatively slower compared to the baseline control forecast. An effective distance of less than 1 means movement is relatively quicker compared to the baseline control forecast. We are changing the effective distances for commuting costs, transportation costs, and accessibility costs. There are two main concepts behind the idea that an increase in public transit makes movements relatively quicker from place to place. First, people who do not use cars can now use public transit. Those people can move around more effectively. Second, if a person uses transit instead of a car, that takes a car off the road. This means there is less congestion, which allows a quicker flow of traffic for people and goods.

To measure this impact in TranSight, REMI is changing the effective transportation distances to

J- *((average monthly ridership/ (total population of the region or average monthly trips)) * %increase in ridership).*

In the TranSight model, there are three variables for effective distances: commuting costs, accessibility costs, and transportation costs. Each is being altered by an equal amount in these simulations. For commuting costs, we are assuming an immediate market share response. The following estimates do not assume any other changes in inputs. There is no change to government spending or taxation in these estimates. The estimates do not input any change to demand for gasoline.

ANALYSIS APPROACH

In projecting the potential impact of increased ridership, REMI employed a comprehensive approach, conducting simulations based on three distinct scenarios representing varying degrees of ridership growth. These scenarios, encompassing increases of 10%, 30%, and 50%, provided a nuanced perspective on how changes in ridership might affect the local economy. Each of these simulations offered insights into the potential economic outcomes that could result from an enhanced transportation network.

Furthermore, REMI's analysis delved into the specific implications of the Jacksonville route, a particularly significant addition to the transportation infrastructure. The introduction of this route equated to an approximate 23.5% increase in ridership. By examining the Jacksonville route separately, REMI highlighted the substantial impact that targeted expansions can have on ridership numbers and, consequently, on the regional economy. This particular case exemplifies how strategic investments in transportation infrastructure can lead to substantial economic benefits, not only by facilitating the movement of people but also by stimulating economic activity along the newly established transit corridor.

The various scenarios and the Jacksonville route analysis collectively underscore the dynamic nature of transportation planning and its potential to shape economic landscapes. They emphasize the importance of a flexible and adaptable approach to transportation development that considers the unique needs and growth potential of a region. As such, these simulations serve as valuable tools for policymakers and stakeholders, offering a range of potential outcomes to inform decision-making processes and highlight the far-reaching implications of transportation investments on local and regional economies.

The 1.7% Calculation Methodology

The formula used was *1 – (percentage of riders * percentage change)*

Table 5: Effective Distances for the 1.7% Methodology

Percent Increase in Ridership	Effective Distance input into model
10%	0.998335
30%	0.995005
50%	0.991675

The 6.6% Calculation Methodology

The formula used was *1 – (percentage of riders * percentage change)*

Table 6: Effective Distances for the 6.6% Methodology

Percent Increase in Ridership	Effective Distance input into model
10%	0.993356
30%	0.980069
50%	0.966782

It's anticipated the additional Jacksonville route will attract a daily ridership ranging from 50 to 65 passengers. By taking the average of these two figures, we arrive at an estimate of approximately 57.5 daily passengers. When this average is extrapolated over the course of a month, assuming 30 days, it results in a monthly ridership projection of 1,725 passengers. This significant increase in passenger numbers, when compared to the existing ridership baseline, effectively represents an estimated boost of about 23.5% in overall ridership.

The introduction of this new route and the subsequent surge in ridership offer compelling insights into the transformative potential of targeted transportation expansions. Such developments not only enhance the mobility options available to the community but also have the capacity to significantly impact the local economy. This boost in ridership doesn't just translate to greater convenience for passengers; it can also stimulate economic activity along the route, supporting businesses and encouraging further investment in the transportation network.

In essence, the Jacksonville route serves as a prime example of how strategic infrastructure investments can yield substantial benefits, fostering both enhanced mobility for residents and potential economic growth for the region. This underscores the importance of thoughtful and forward-looking transportation planning, which takes into account the potential synergies between improved transit options and economic development, ultimately contributing to the overall well-being and prosperity of the community.

Numbers in the following table are rounded for reader convenience:

Table 7: Projected Effective Distances for the Proposed Jacksonville Route

Percent of region using public transit	% Change in ridership with Jacksonville addition	% Change as % of the region	Effective distance input into model
1.7%	23.5%	00.3919291%	0.996080709
6.6%	23.5%	01.5639024%	0.984360976

ECONOMIC IMPACT RESULTS

BASELINE CONTROL FORECAST

The REMI baseline control forecast serves as a fundamental starting point for economic analysis, providing a snapshot of a region's anticipated economic trajectory under the assumption that no specific policy changes or external disruptions will occur. Essentially, it encapsulates the region's expected economic evolution based on historical trends and the existing conditions at the time of the analysis. This baseline forecast plays a critical role in setting the stage for further assessments, as it serves as a reference point against which the potential impacts of policy interventions, such as changes in transportation infrastructure, can be measured and evaluated.

When specific changes, such as modifications in effective transportation distance, are introduced, a simulation is conducted to generate new projections for various economic indicators. These simulations are instrumental in understanding the potential impacts of policy changes on a region's economic landscape. In most cases, the key figure of interest is the difference between the outcomes of the simulation and the baseline control forecast. This difference indicates the net impact of the policy change on the region's economy.

However, there are instances where expressing these changes as a percent can offer a clearer understanding of the magnitude of the impact. Percent changes provide a standardized way to gauge the relative significance of shifts in economic indicators, making it easier to interpret the implications of policy interventions.

The primary focus of the subsequent economic analysis revolves around net new units of a given variable, such as jobs. For instance, to understand the employment impact of a policy change, one would subtract the baseline forecasted jobs from the jobs projected in the simulation for a particular year. This yields the number of "additional jobs compared to the baseline forecast" – a metric that quantifies the employment effects attributable to the policy change:

$$Net\ New\ Jobs_{year} = Projected\ Simulation\ Jobs_{year} - Baseline\ Forecast\ Jobs_{year}$$

To illustrate, if the baseline control forecast anticipates 100,000 jobs for a specific region in a given year, and the new simulation predicts 101,000 jobs for the same year, this can be described as "1,000 additional jobs compared to the baseline forecast." This method is not limited to jobs but can also be applied to other economic statistics, offering a comprehensive framework for assessing the broader economic implications of policy decisions and their impact on a region's development and well-being. For this analysis, we used fixed local 2023 dollars, converting using prices from the baseline forecast.

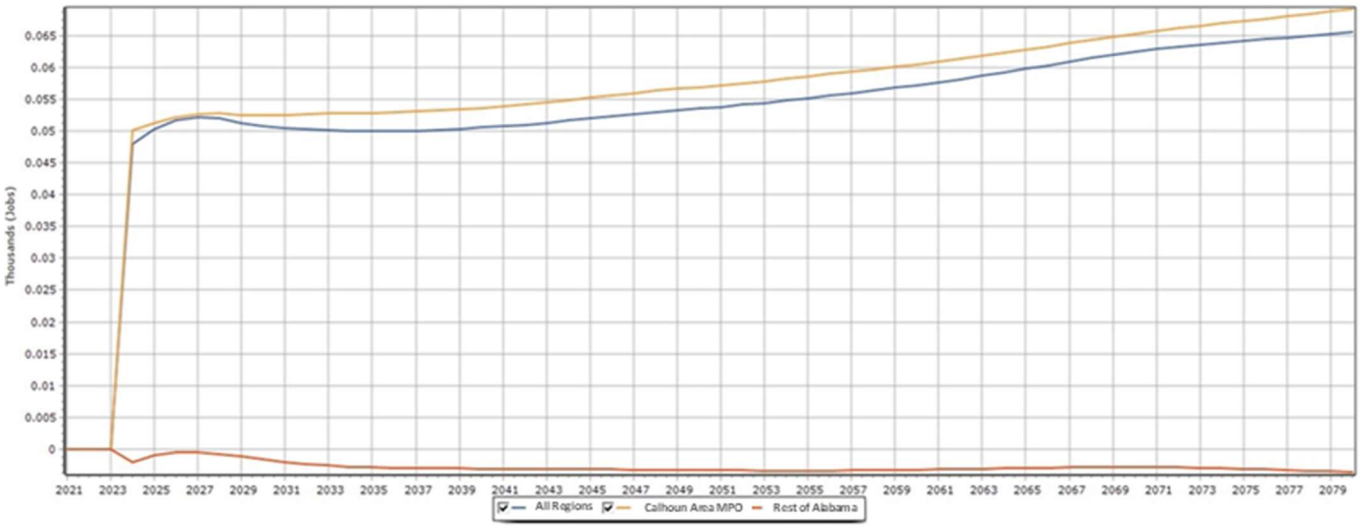
UTILIZING THE 1.7% CALCULATION

Table 8: Additional Employment in Calhoun MPO Area – 1.7% Calculation

Increase in Ridership	2024	2030	2040	2050
10%	50	53	54	57
30%	151	158	162	171
50%	253	264	270	285
Jacksonville 23.5%	118	124	127	134

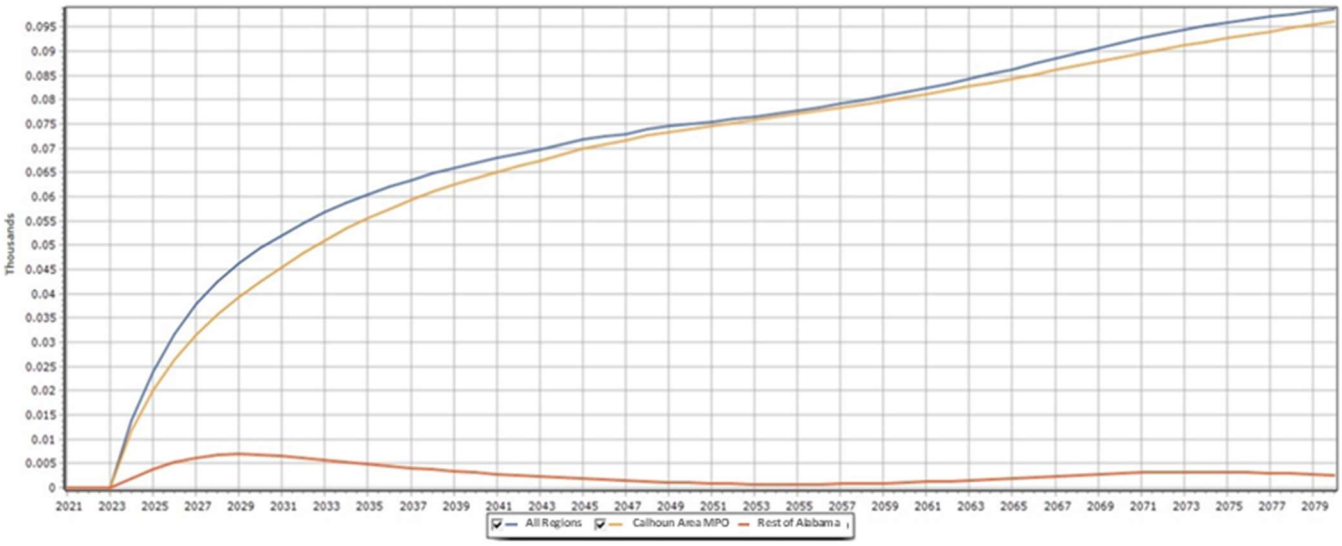
10% Increase in Ridership

Figure 2: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



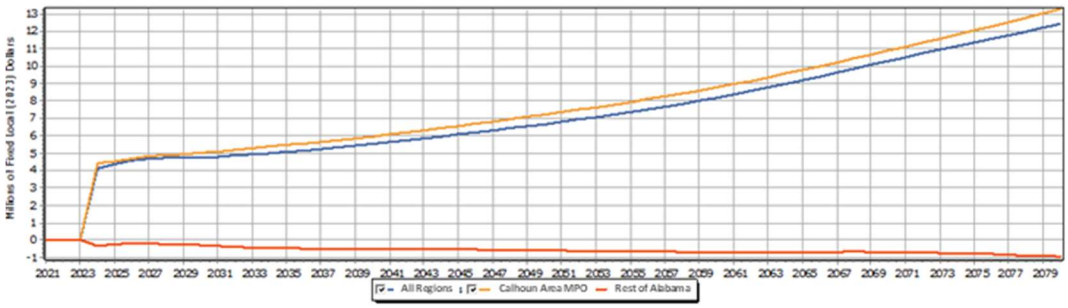
For the 10% increase in ridership, employment is projected to increase in Calhoun Area MPO compared to the baseline control forecast. In 2024, Calhoun Area MPO is projected to have 50 more jobs than in the baseline control forecast.

Figure 3: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



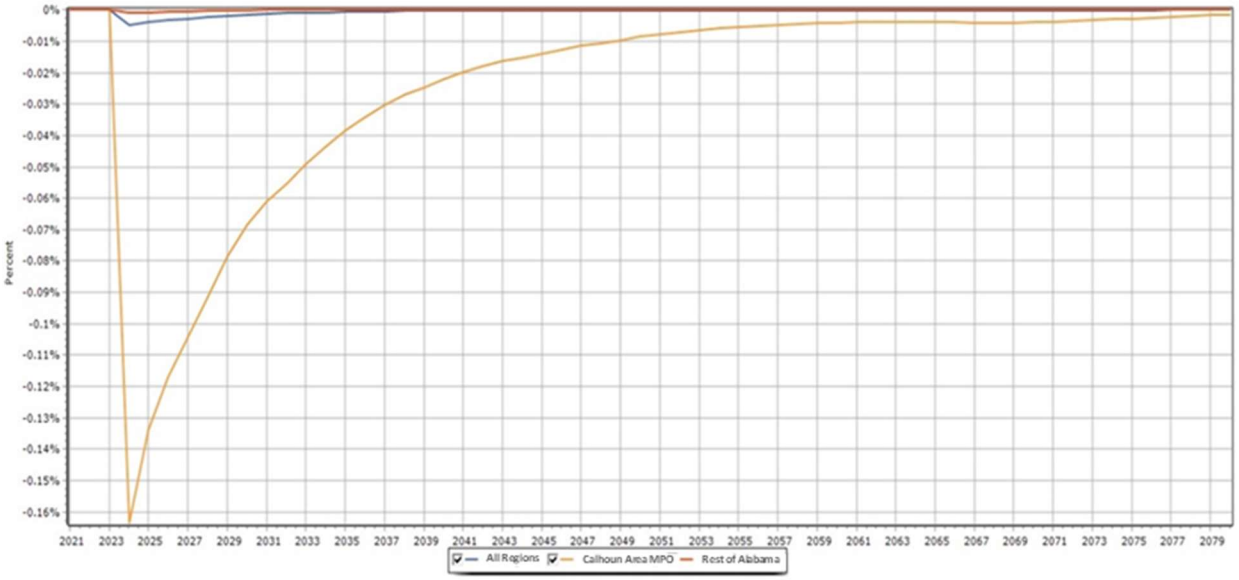
For the 10% increase in ridership, there are small projected increases in population. In 2024, the projected population for Calhoun Area MPO has 12 more people than in the baseline control forecast. In 2030, the projected population for the region is 43 more people than in the baseline forecast.

Figure 4: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



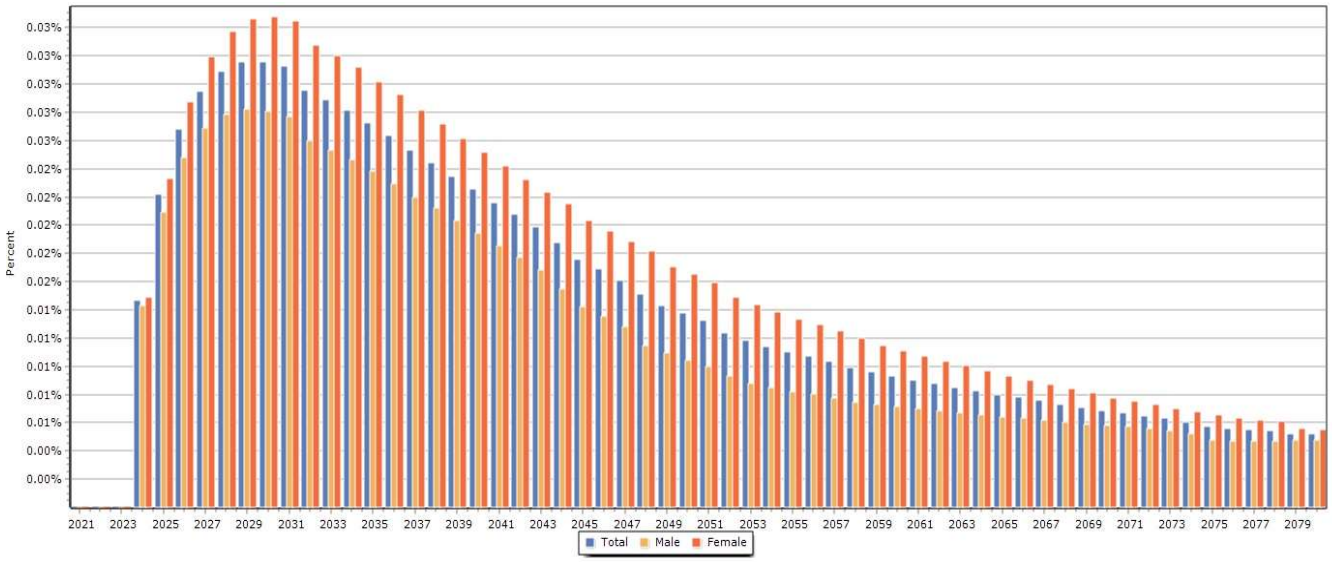
For the 10% increase in ridership, there are projected increases in GDP. In 2024, GDP in Calhoun Area MPO is projected to be about 4 million (fixed local 2023) dollars greater than the baseline control forecast. In 2030, GDP in Calhoun Area MPO is projected to be about 5 million (fixed local 2023) dollars greater than the baseline control forecast.

Figure 5: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



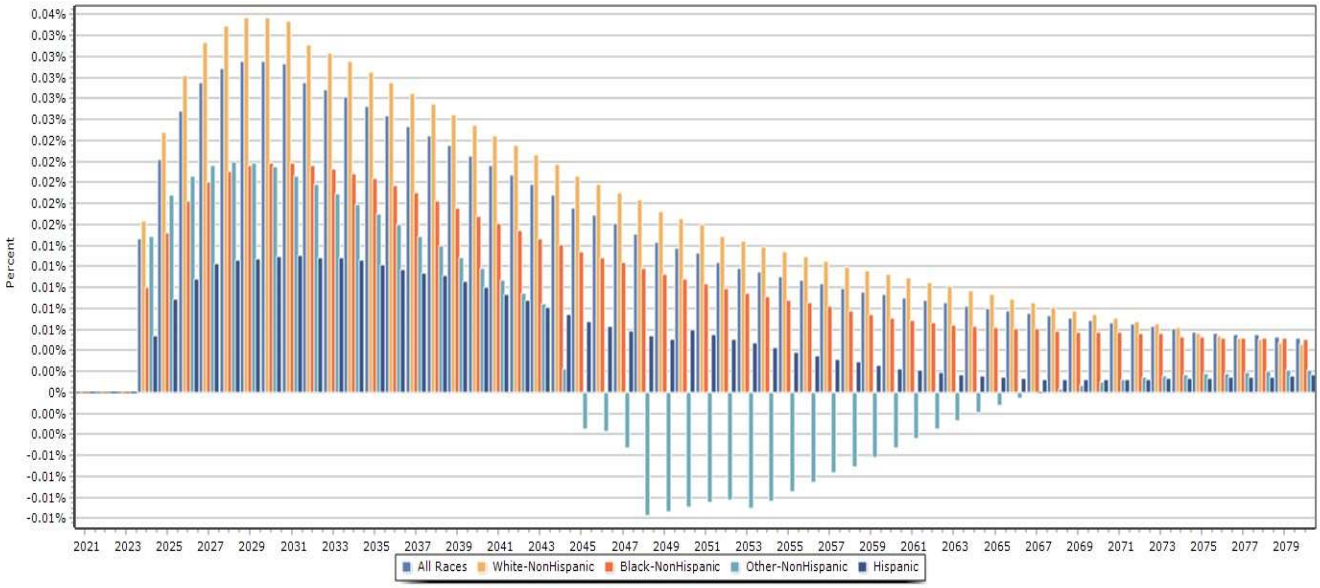
For the 10% increase in ridership, unemployment rates decline relative to the baseline forecast. This is most prominent in Calhoun Area MPO where the percent change in unemployment rate compared to the baseline forecast spikes downward in 2024 when the transportation change is projected to happen. While the Calhoun Area MPO unemployment rate gets closer to the baseline control forecast over time, it remains less than the baseline control forecast.

Figure 6: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



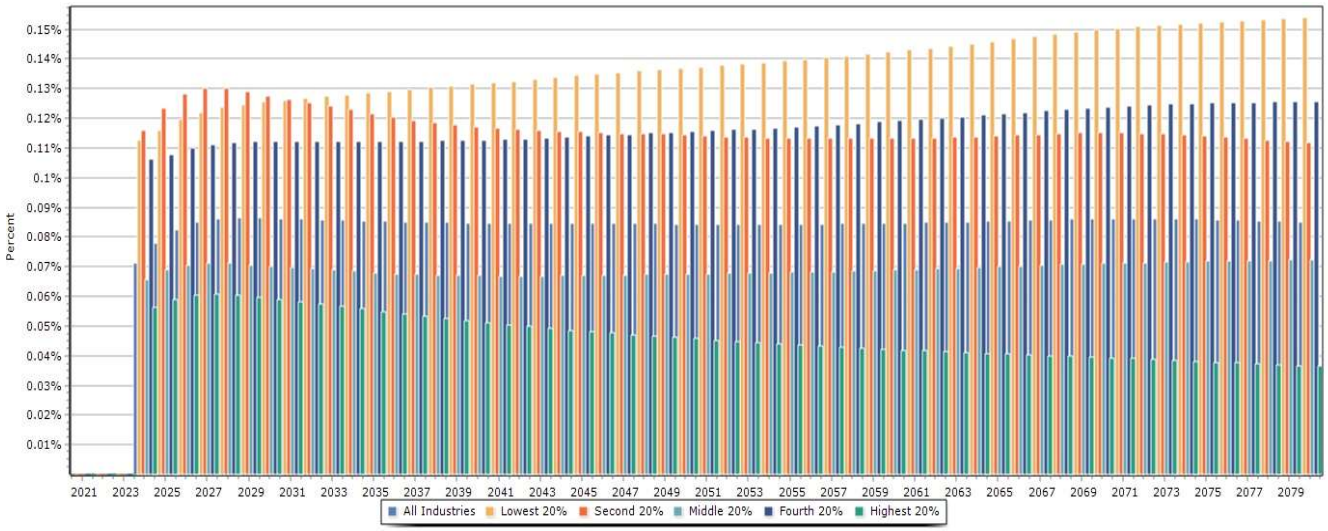
For the 10% increase in ridership, there are projected to be percent increases in labor force participation rates compared to the baseline control forecast. These percent increases are projected for both men and women.

Figure 7: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



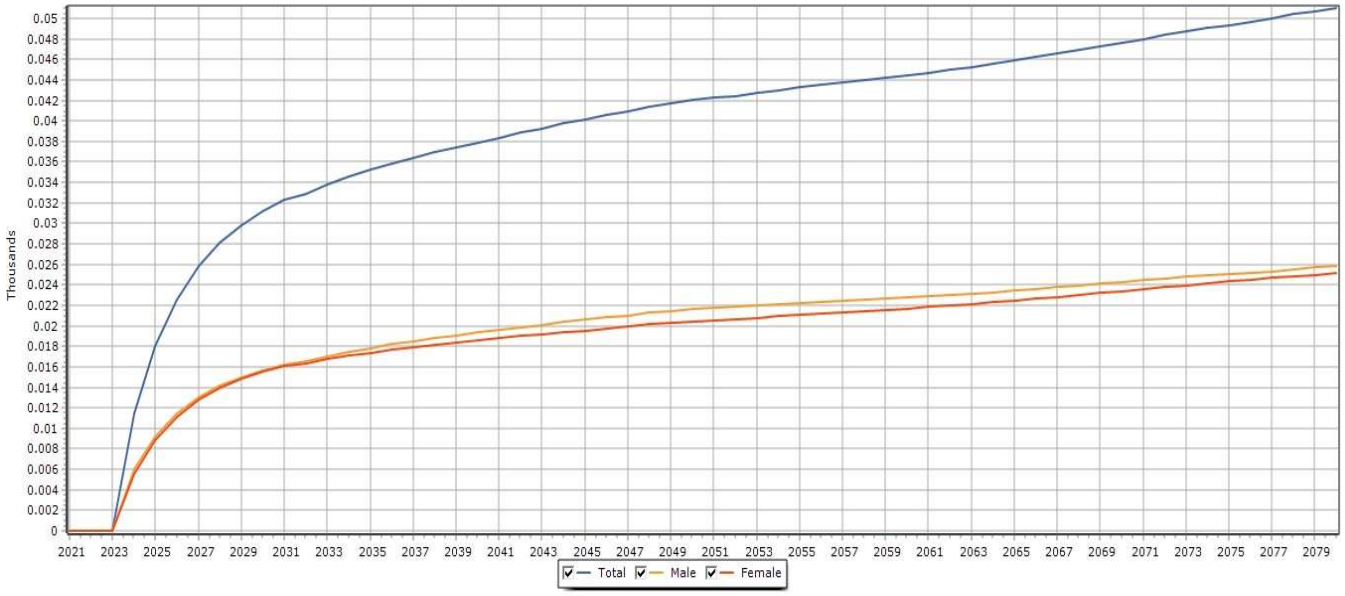
Until the 2040s, there is projected to be percent increases in labor force participation rates for all listed demographics in Calhoun Area MPO compared to the baseline control forecast.

Figure 8: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



For the 10% increase in ridership, percent increases in total compensation for all industry quintiles compared to the baseline control forecast are expected. That does not mean income quintiles, it means industries sorted by how much they pay. This is not the same as income quintiles.

Figure 9: Additional Projected Labor Force in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 10% Increase in Ridership



Total labor force in Calhoun Area MPO is also expected to be greater than in the baseline forecast. In 2024, Calhoun Area MPO's labor force is projected to have 11 more people than in the baseline control forecast. In 2030, Calhoun Area MPO's labor force is projected to have 31 more people than in the baseline control forecast. With the 10% increase in ridership, additional employment is expected to be spread over several industries.

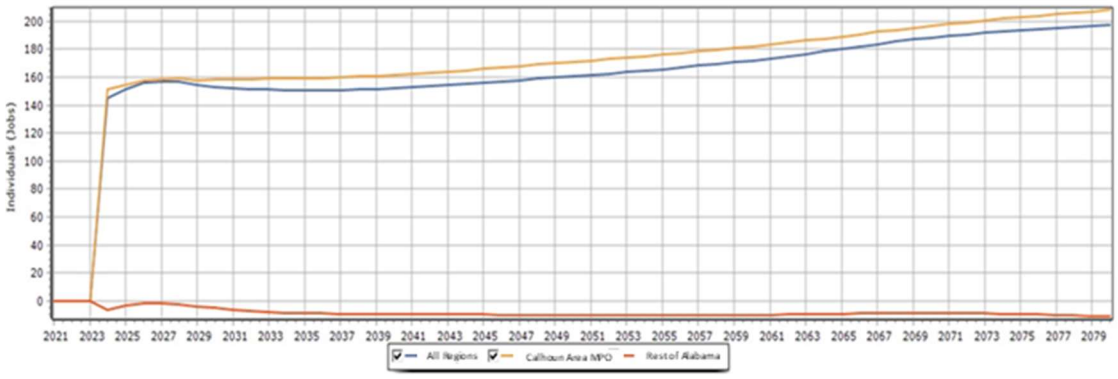
Table 9: Additional Employment by Industry in Calhoun MPO Area – 1.7% Calculation with 10% Increase in Ridership

Industry	Units	2024
All Industries	Individuals (Jobs)	50
Construction	Individuals (Jobs)	11
Professional, scientific, and technical services	Individuals (Jobs)	5
Administrative and support services	Individuals (Jobs)	5
Ambulatory health care services	Individuals (Jobs)	3
Personal and laundry services	Individuals (Jobs)	3
State and Local Government	Individuals (Jobs)	3
Retail trade	Individuals (Jobs)	3
Real estate	Individuals (Jobs)	2
Wholesale trade	Individuals (Jobs)	2
Food services and drinking places	Individuals (Jobs)	1

This table shows the projected additional employment by industry compared to the baseline control forecast. It shows these numbers for the 10 industries with the most projected additional jobs.

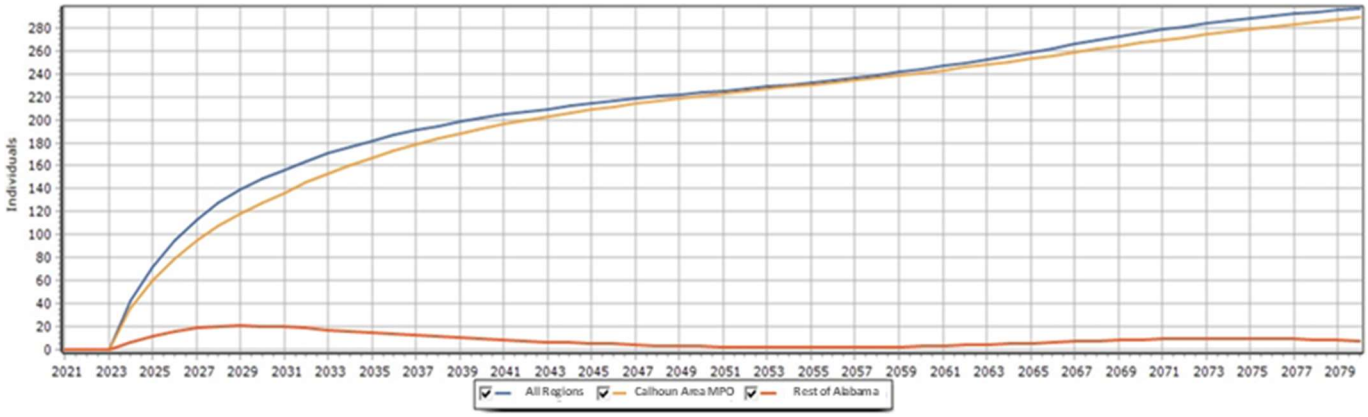
30% Increase in Ridership

Figure 10: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



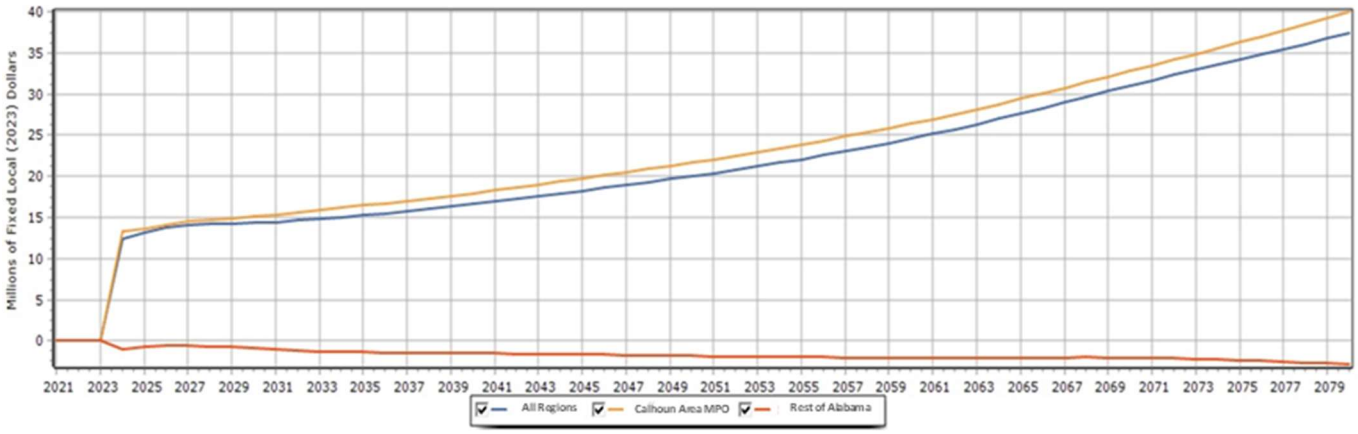
For the 30% increase in ridership, there are more than 150 projected additional jobs in the Calhoun MPO area compared to the baseline forecast. In 2024, Calhoun Area MPO is projected to have about 151 more jobs than in the baseline control forecast. In 2030, Calhoun Area MPO is projected to have about 158 more jobs than in the baseline control forecast.

Figure 11: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



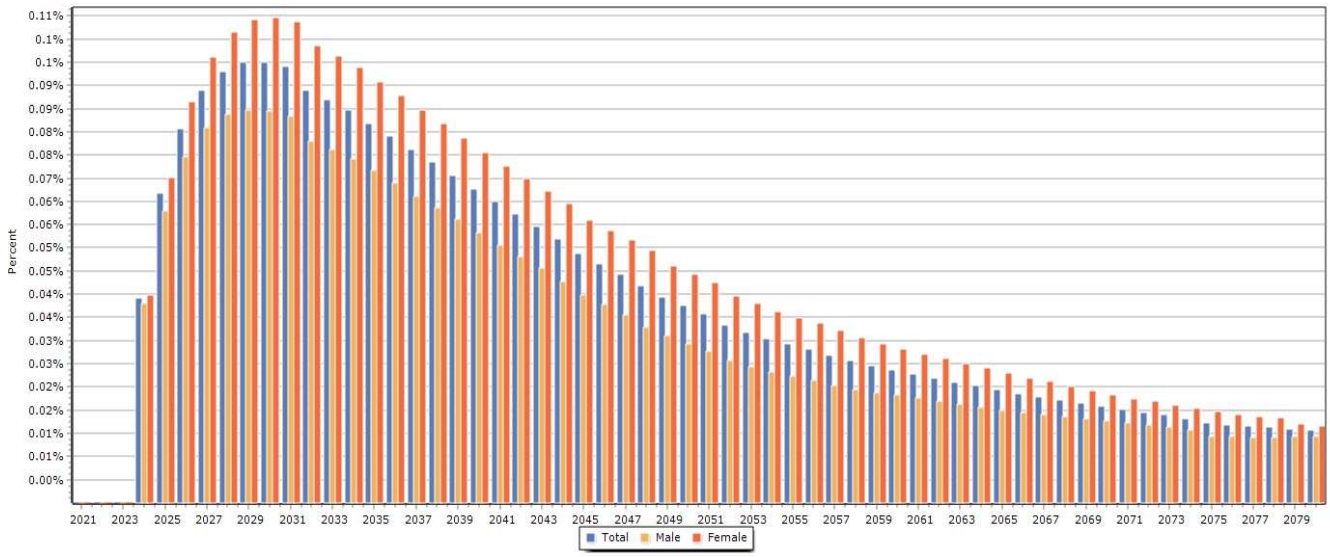
For the 30% increase in ridership, there is projected to be an increase in population in Calhoun Area MPO compared to the baseline forecast. In 2024, Calhoun Area MPO is projected to have about 36 more people than in the baseline forecast. In 2030, Calhoun Area MPO is projected to have about 128 more people than in the baseline forecast.

Figure 12: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



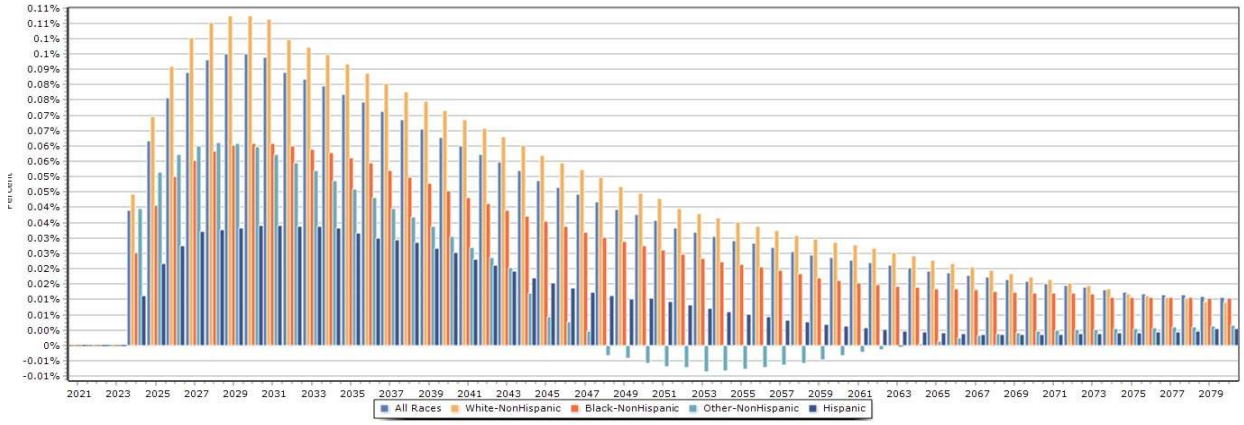
For the 30% increase in ridership, there is projected to be an increase in GDP in Calhoun Area MPO compared to the baseline forecast. In 2024, Calhoun Area MPO's GDP is projected to be about 13 million (fixed 2023) dollars higher than in the baseline forecast. In 2030, the region's GDP is projected to be about 15 million (fixed 2023) dollars greater than in the baseline forecast.

Figure 13: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



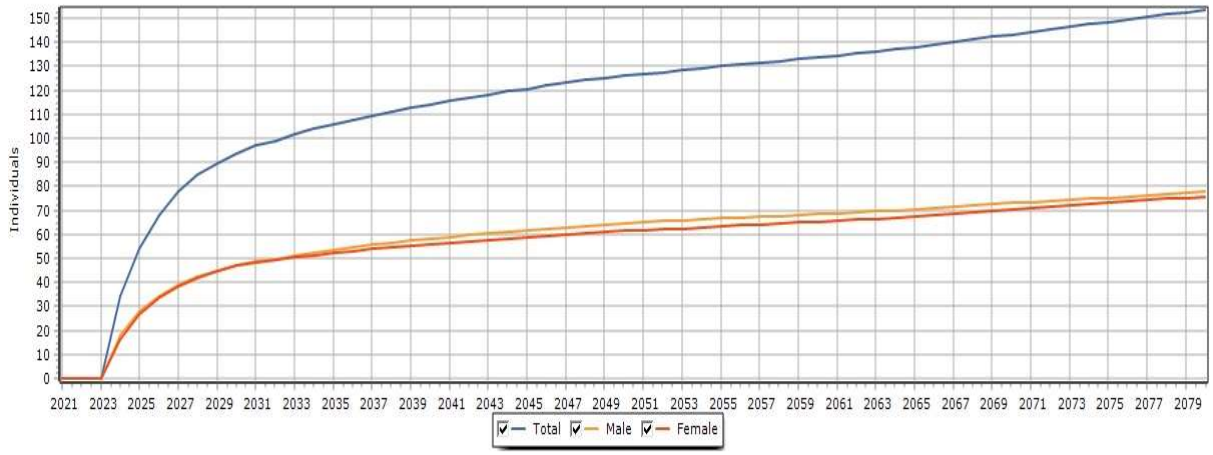
For the 30% increase in ridership, there is expected to be a percent increase in labor force participation rates in Calhoun Area MPO. This increase is expected to occur for both men and women in Calhoun Area MPO.

Figure 14: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



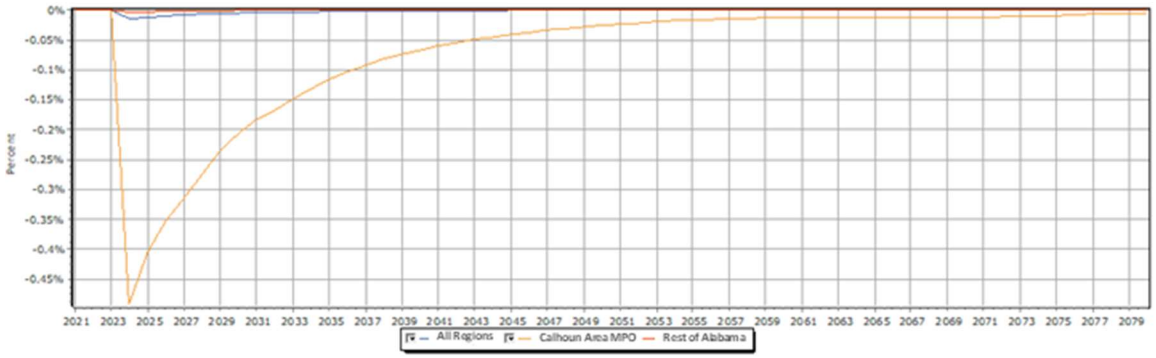
Until the late 2040s, labor force participation rates are also projected to increase across all listed races compared to the baseline forecast.

Figure 15: Additional Projected Labor Force in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



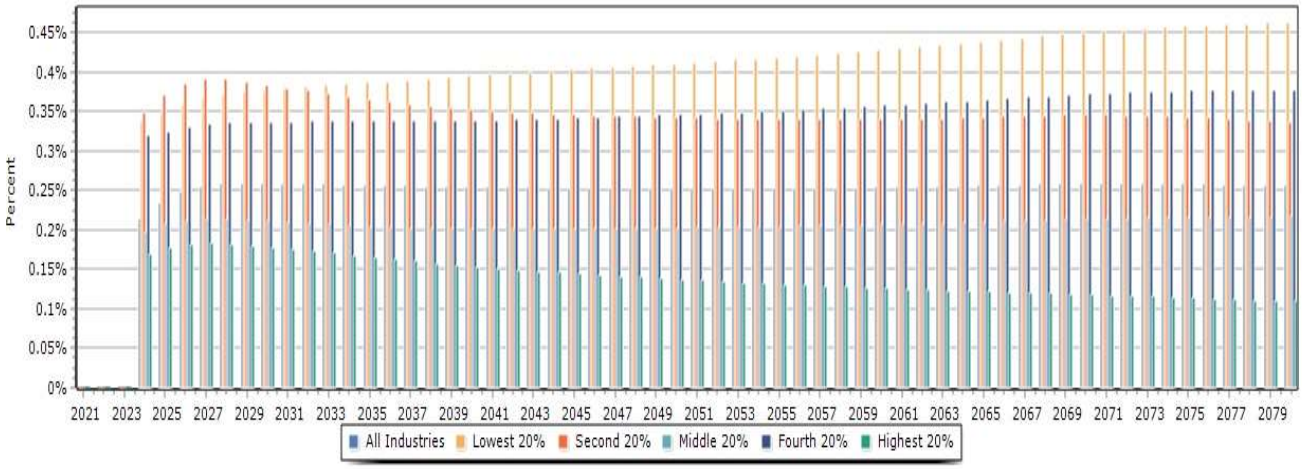
Total labor force in Calhoun Area MPO is projected to increase compared to the baseline control forecast. In 2024, the labor force is projected to be about 35 people greater than in the baseline control forecast. In 2030, the labor force is projected to be about 94 people greater than in the baseline control forecast.

Figure 16: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



For the 30% increase in ridership, there is projected to be a lower unemployment rate in Calhoun Area MPO than in the baseline control forecast. While the unemployment rate gets closer to the baseline control forecast rate over time, it remains below the baseline control forecast rate.

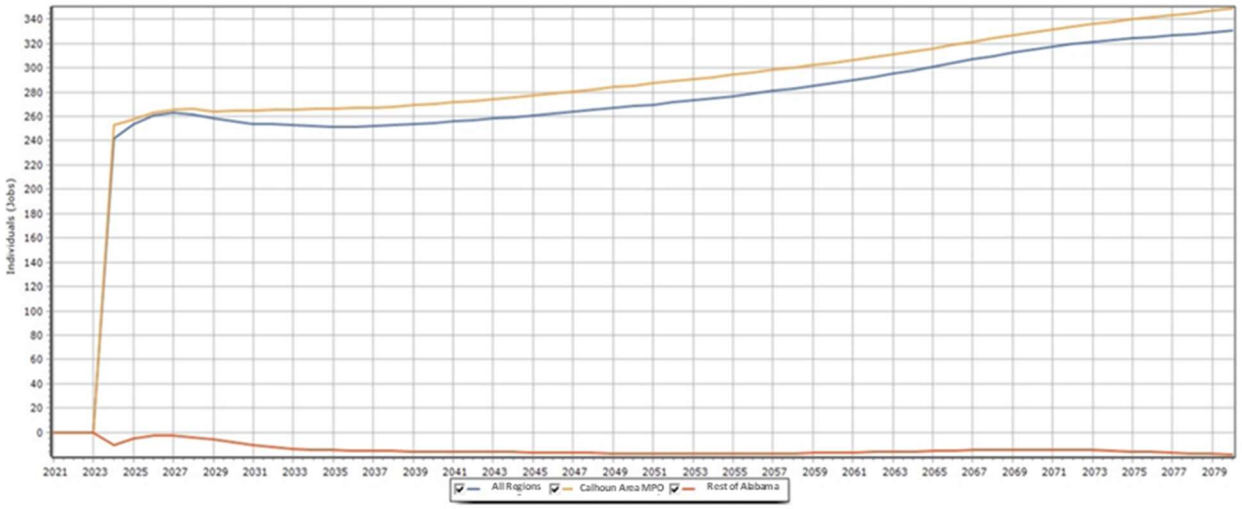
Figure 17: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 30% Increase in Ridership



For the 30% increase in ridership, there is projected to be percentage increases in compensation for all industry quintiles. That does not mean income quintiles, it means industries sorted by how much they pay. This is not the same as income quintiles.

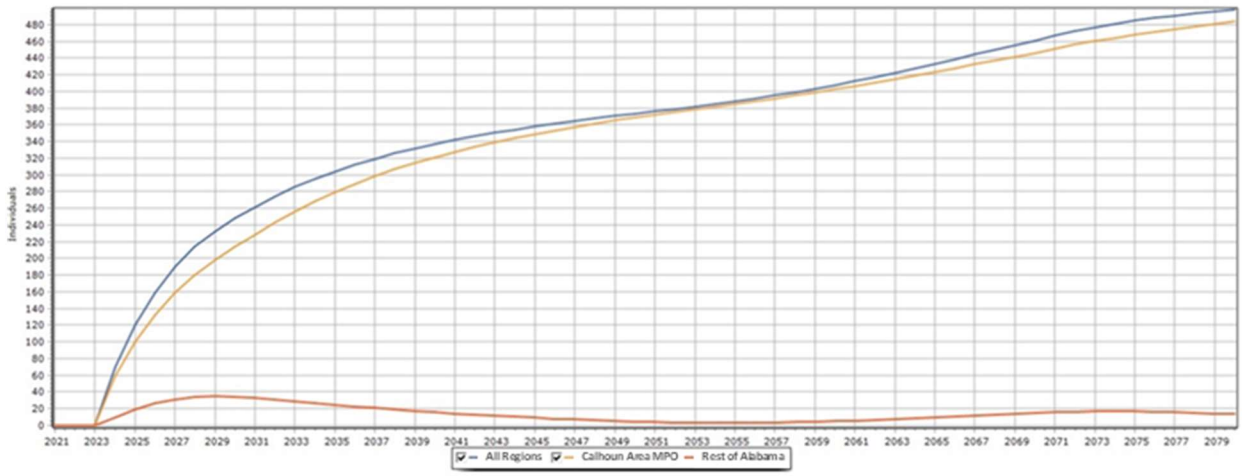
50% Increase in Ridership

Figure 18: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



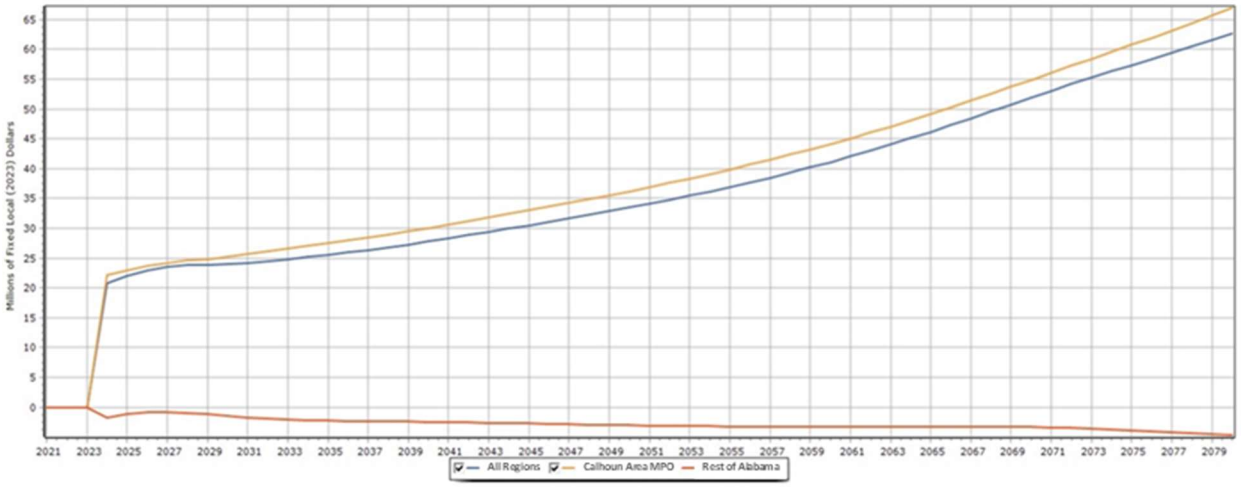
For the 50% increase in ridership, there are projected to be increases in employment in Calhoun Area MPO. In 2024, there are projected to be 253 more jobs in Calhoun Area MPO than in the baseline forecast. In 2030, there are projected to be 264 more jobs in Calhoun Area MPO than in the baseline forecast.

Figure 19: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



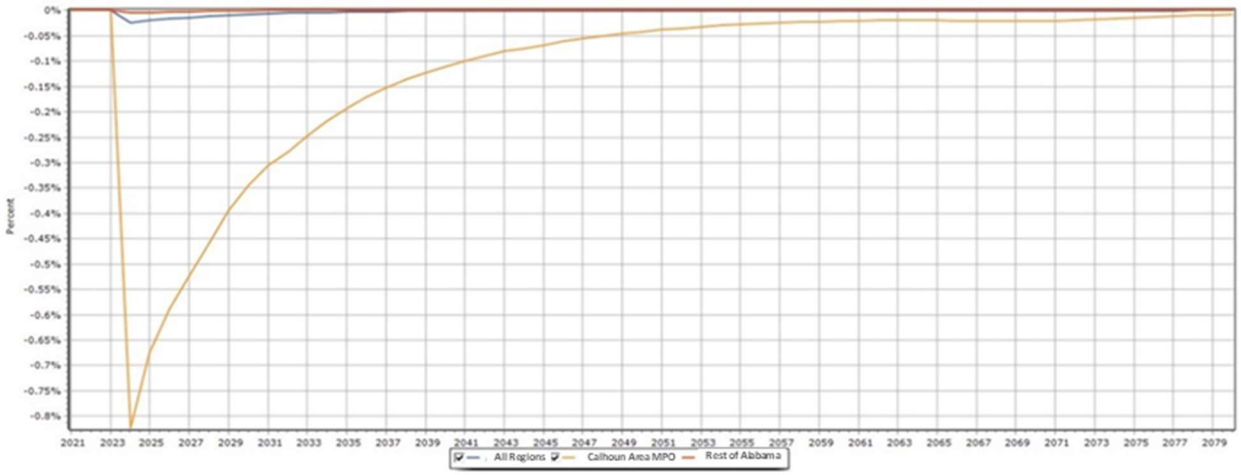
For the 50% increase in ridership, there are projected to be increases in population in Calhoun Area MPO compared to the baseline control forecast. These increases grow over time. In 2024, there are projected to be 60 more people in Calhoun Area MPO than in the baseline control forecast. In 2030, there is projected to be 214 more projected people in Calhoun Area MPO than in the baseline control forecast.

Figure 20: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



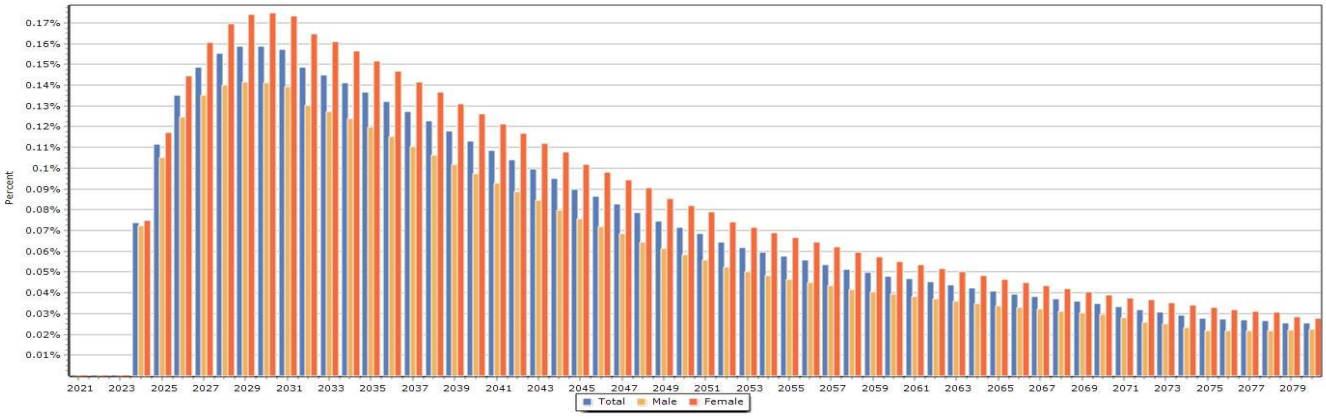
For the 50% increase in ridership, there is projected to be increases in GDP in Calhoun Area MPO. These increases grow over time. In 2024, there is projected to be about 22 million (fixed local 2023) dollars in additional GDP in Calhoun Area MPO compared to the baseline control forecast. In 2030, there are projected to be about 25 million (fixed local 2023) dollars in additional GDP in the Calhoun MPO area compared to the baseline control forecast.

Figure 21: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



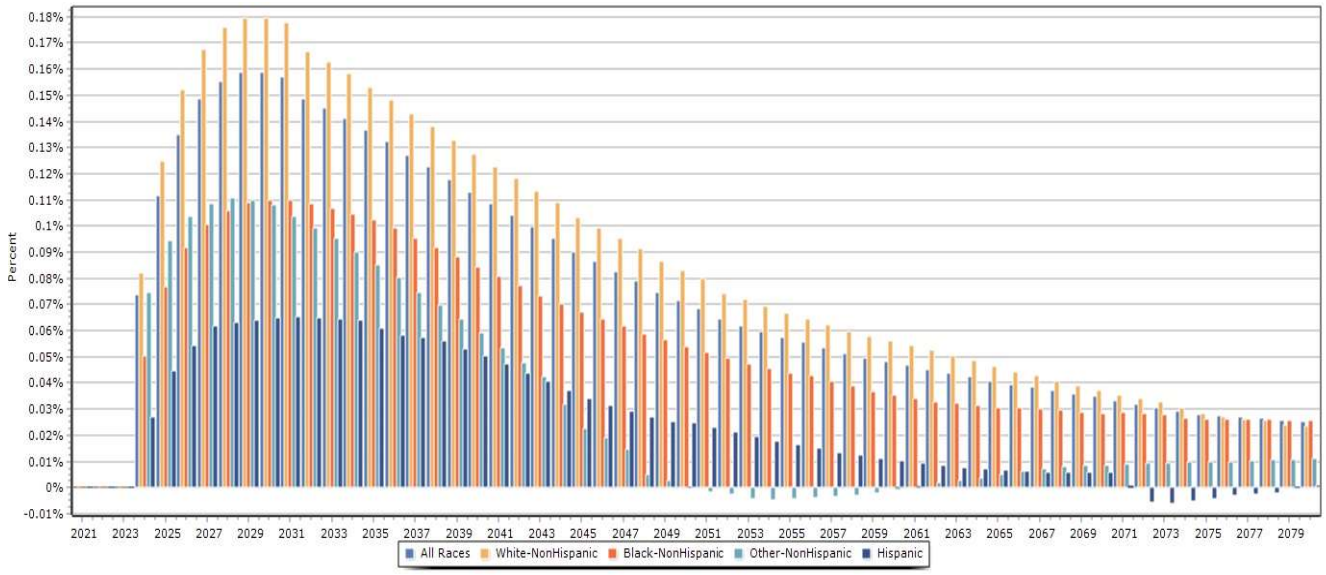
For the 50% increase in ridership, there is projected to be a percent decrease in unemployment rate in Calhoun Area MPO compared to the baseline control forecast. There is an initial downwards spike in 2024. While the unemployment rate does get closer to the baseline control forecast, it remains below the baseline control forecast.

Figure 22: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



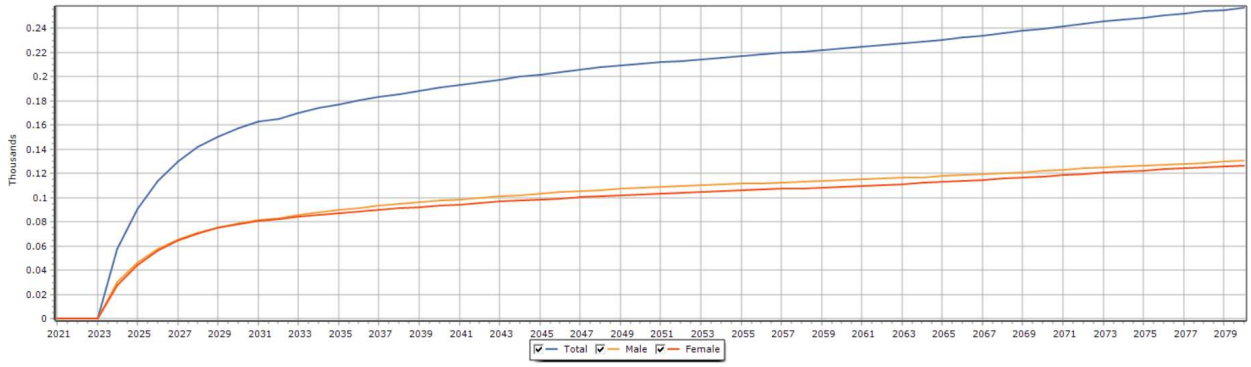
For the 50% increase in ridership, there is projected to be a percent increase in labor force participation in Calhoun Area MPO compared to the baseline forecast. The percent increase is expected for both women and men in the region.

Figure 23: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



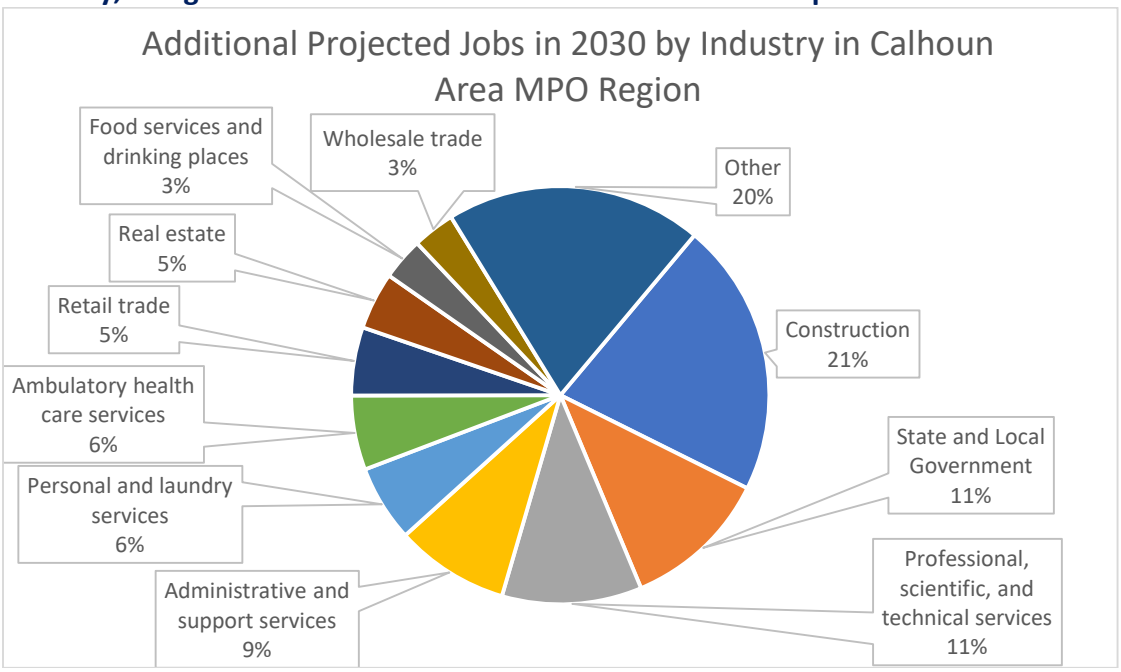
For the 50% increase, for the first three decades, there is projected to be a percent increase in labor force participation rates for all listed races. Until 2051, there are projected to be positive percent increases in labor force participation rates for all races compared to the baseline control forecast.

Figure 24: Additional Projected Labor Force in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



Total labor force in Calhoun Area MPO is projected to increase compared to the baseline control forecast. In 2024, the region's labor force is projected to be 58 people greater than in the baseline control forecast. In 2030, the region's labor force is projected to be 157 people greater than in the baseline control forecast.

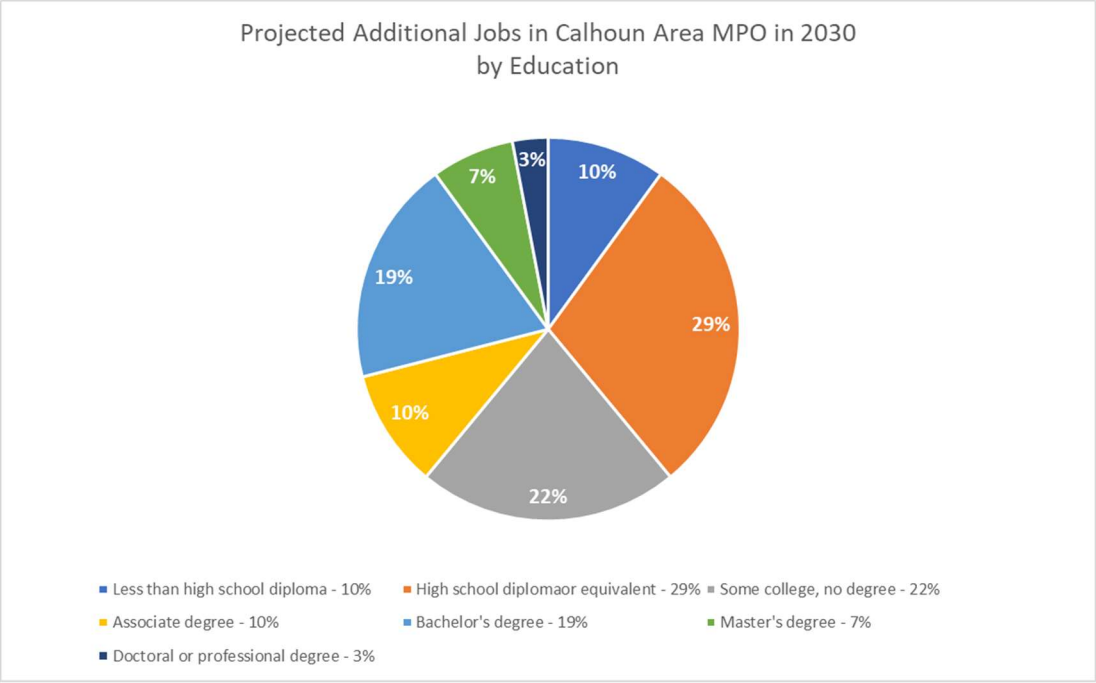
Figure 25: Additional Projected Individuals (Jobs) in 2030 in Calhoun Area MPO Area by Industry, using 1.7% Calculation and 50% Increase in Ridership



Note: Chart data is rounded to nearest percent

For the 50% increase, the additional projected jobs in 2030 are projected to be spread across various industries.

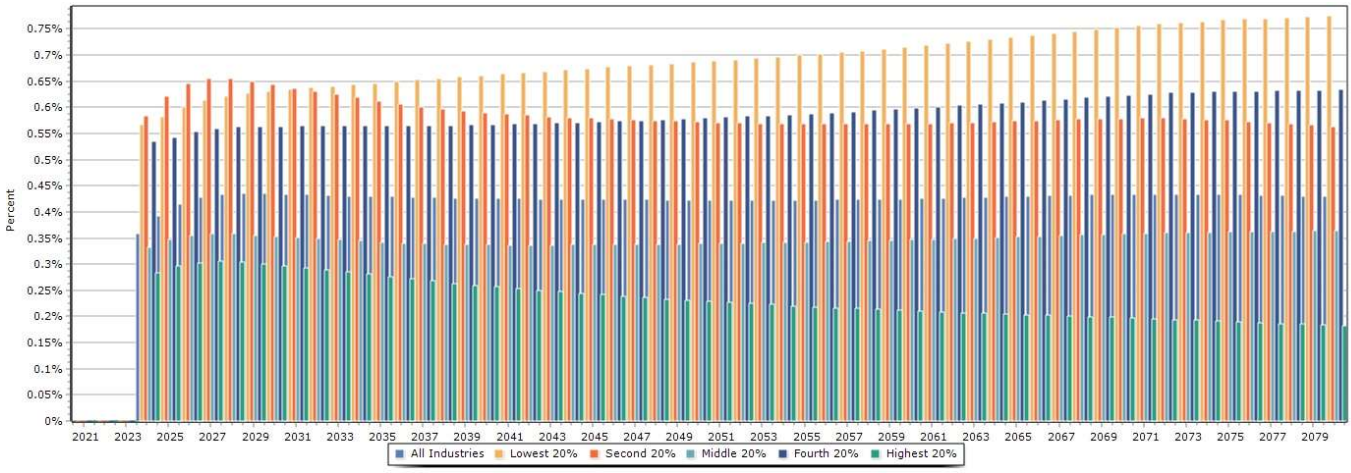
Figure 26: Additional Projected Individuals (Jobs) in 2030 by Education, using 1.7% Calculation and 50% Increase in Ridership



Note: Chart data is rounded to nearest percent

For the 50% increase, the additional projected jobs in 2030 are spread across various education levels.

Figure 27: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% Calculation and 50% Increase in Ridership



Every industry quintile sees a percent increase in compensation in Calhoun Area MPO compared to the baseline control forecast. Industry quintiles are industries divided into five groups.

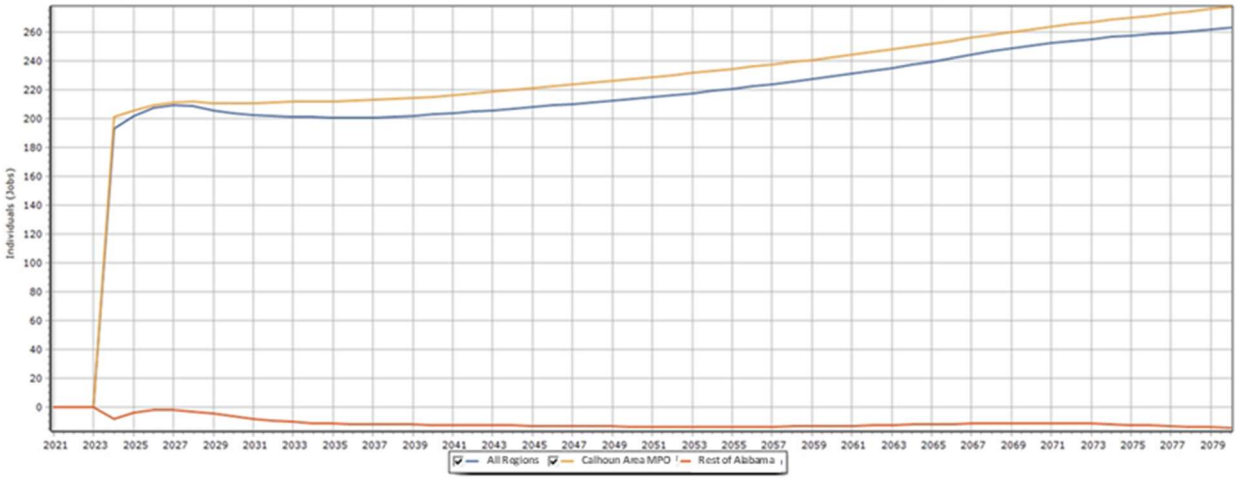
UTILIZING THE 6.6% CALCULATION

Table 10: Additional Employment in Calhoun MPO Area – using 6.6% Calculation

Increase in Ridership	2024	2030	2040	2050
10%	201	211	215	228
30%	612	640	653	690
50%	1,034	1,079	1,101	1,163
Jacksonville 23.5%	478	500	511	540

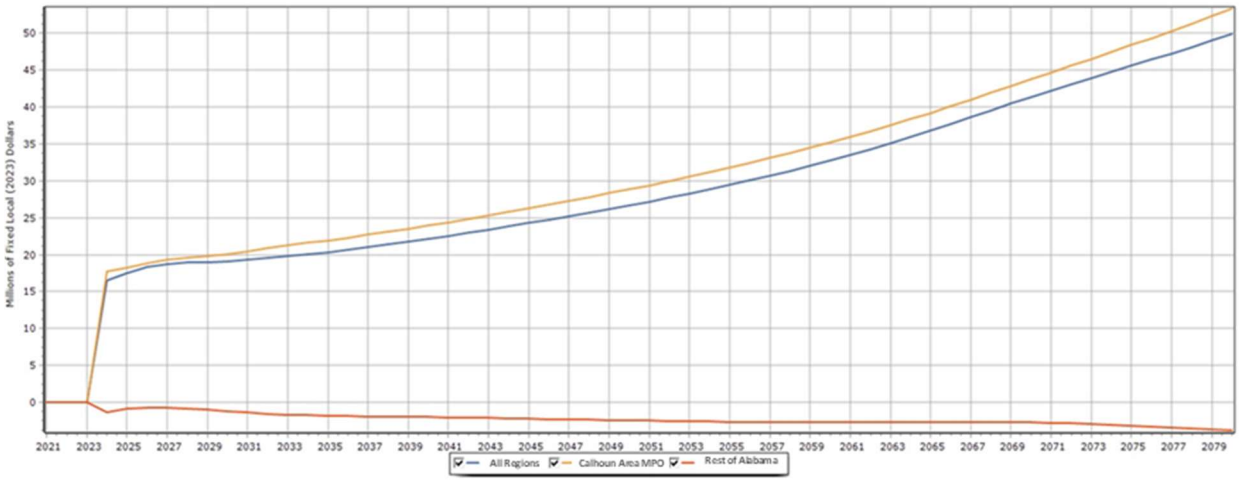
10% Increase in Ridership

Figure 28: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



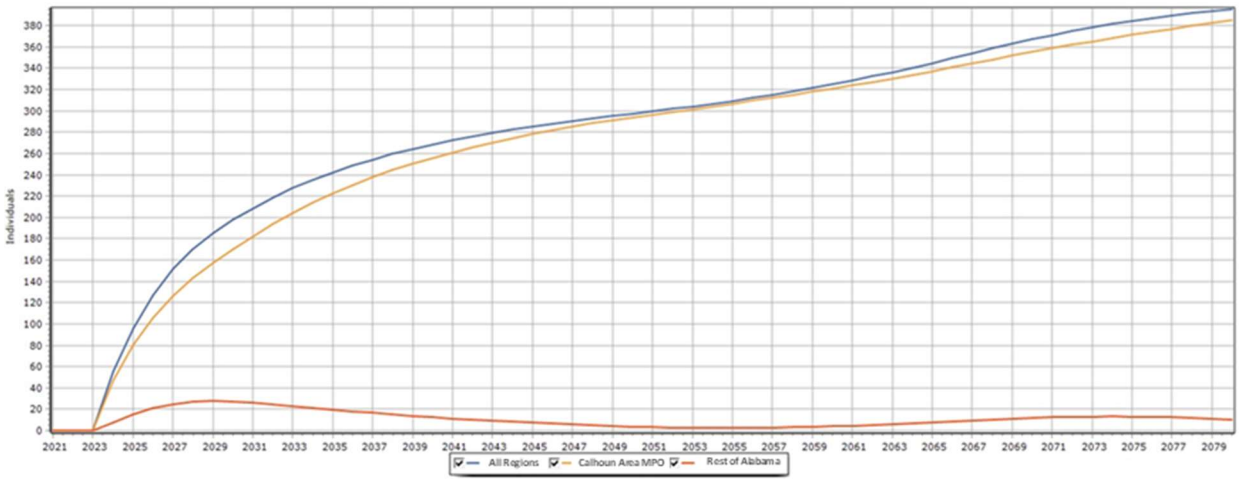
There is projected to be an increase in employment compared to the baseline forecast. In 2024, Calhoun Area MPO is projected to have about 201 more jobs than it has in the baseline control forecast. In 2030, Calhoun Area MPO is projected to have about 211 more jobs than in the baseline control forecast.

Figure 29: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



There is projected to be an increase in GDP compared to the baseline forecast. In 2024, Calhoun Area MPO is projected to have about 18 million (fixed local 2023) dollars higher GDP than in the baseline control forecast.

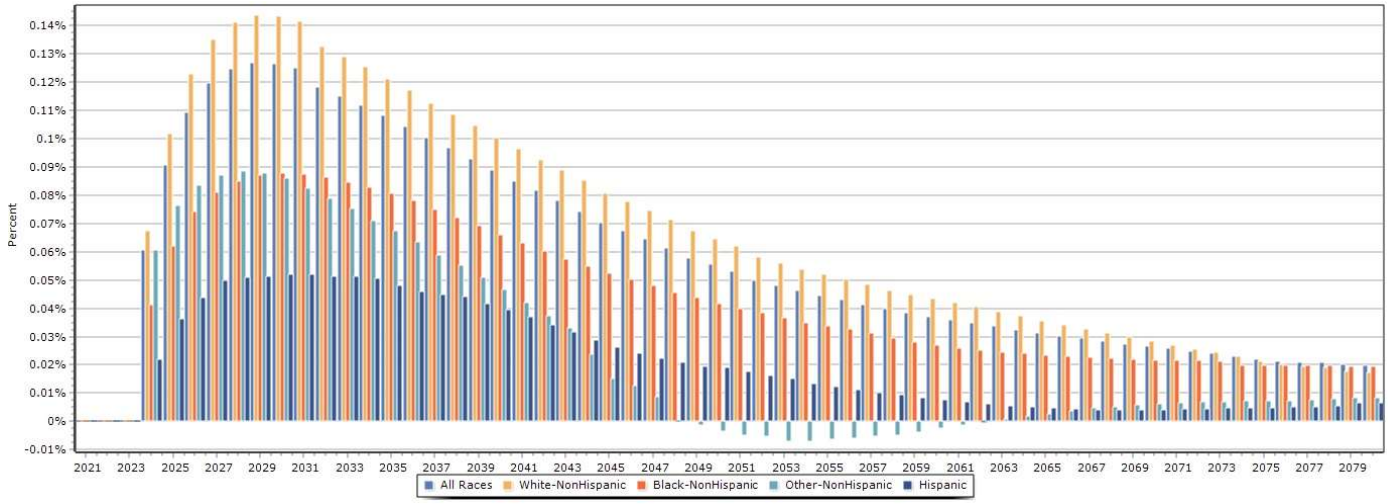
Figure 30: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



Population is expected to increase compared to the baseline control forecast. In 2024, the population in Calhoun Area MPO is projected to be about 48 people greater than in the

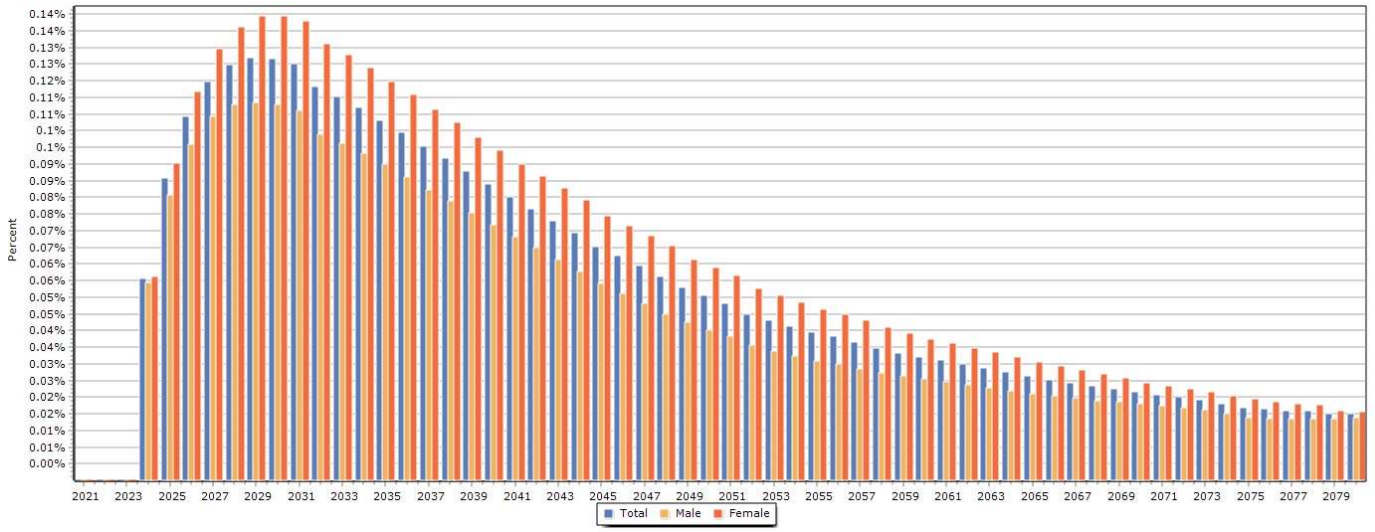
baseline control forecast. In 2030, the population in Calhoun Area MPO is projected to be 171 people greater than in the baseline control forecast.

Figure 31: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



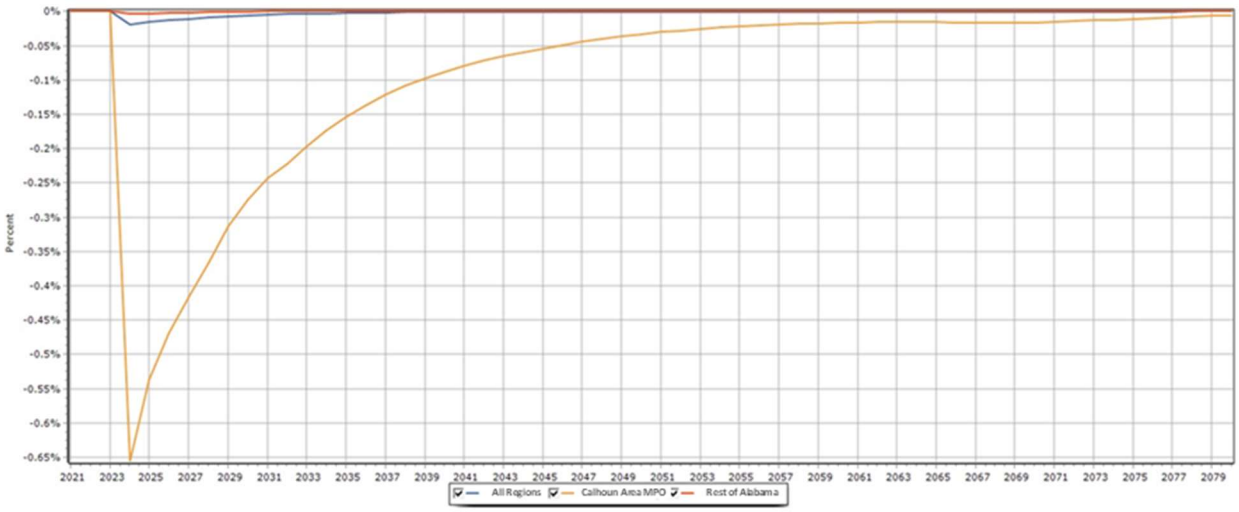
For the 10% increase in ridership, there is projected to be a percent increase in labor force participation rates in Calhoun Area MPO for all listed races until 2049.

Figure 32: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



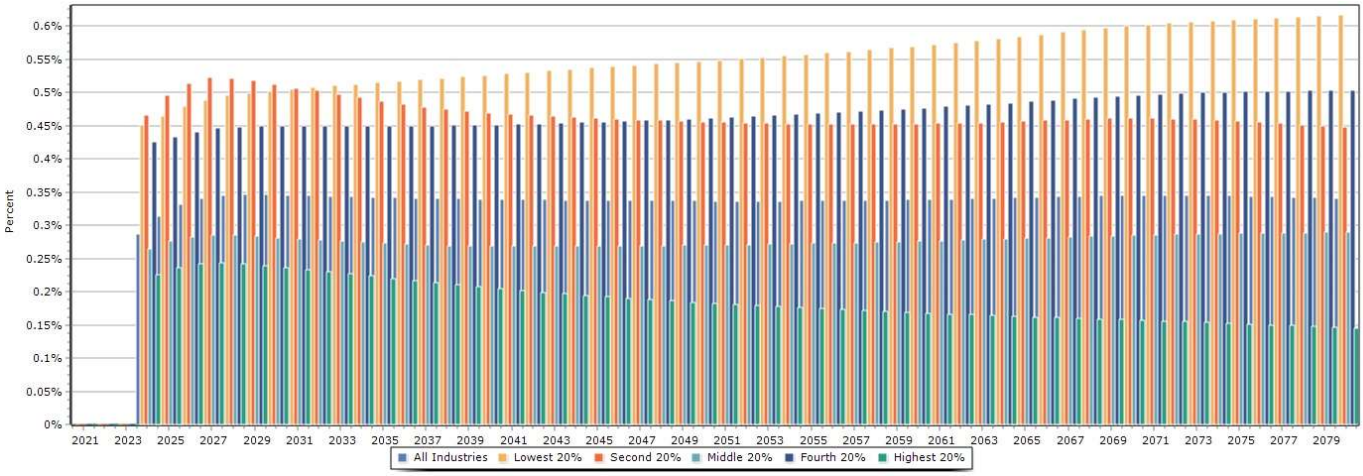
For the 10% increase in ridership, there is projected to be a percent increase in labor force participation in Calhoun Area MPO compared to the baseline forecast. The percent increase is expected for both women and men in the area.

Figure 33: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



As with other simulations, there is a decline in the Calhoun Area MPO unemployment rate compared to the baseline control forecast.

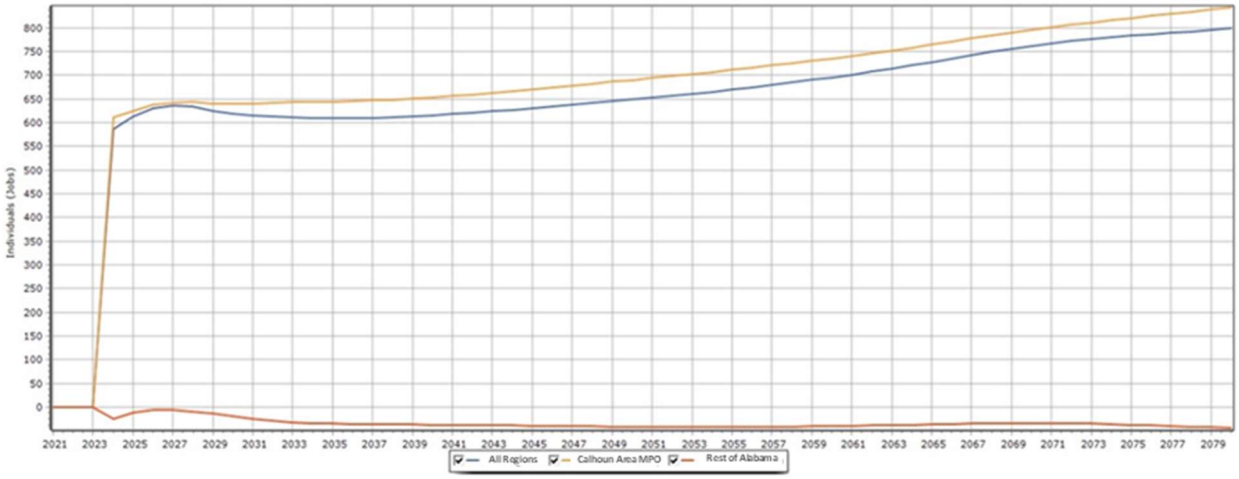
Figure 34: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 10% Increase in Ridership



Every industry quintile sees percent increases in compensation in Calhoun Area MPO compared to the baseline control forecast. Industry quintiles are industries divided into five groups. They are not the same as the income quintiles for individuals.

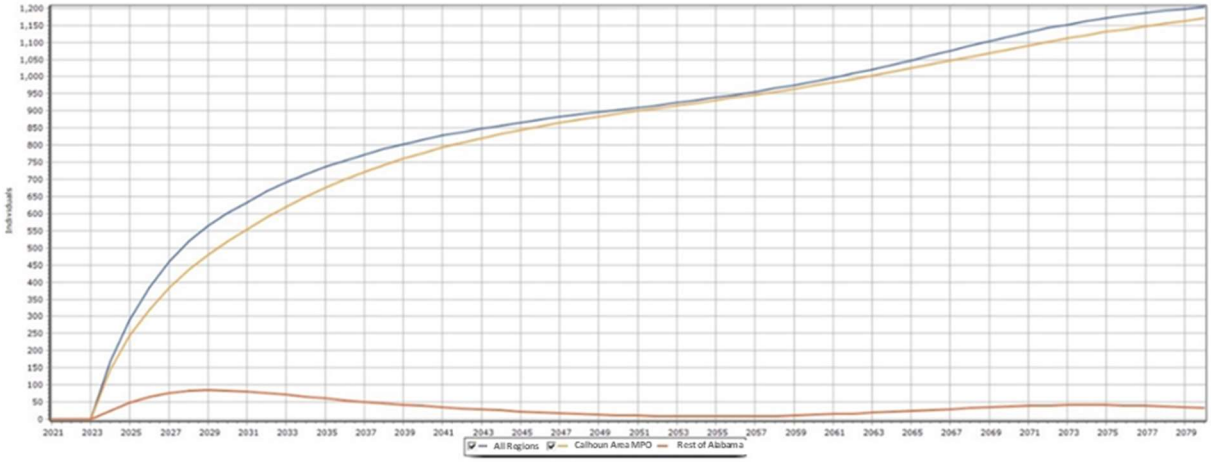
30% Increase in Ridership

Figure 35: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



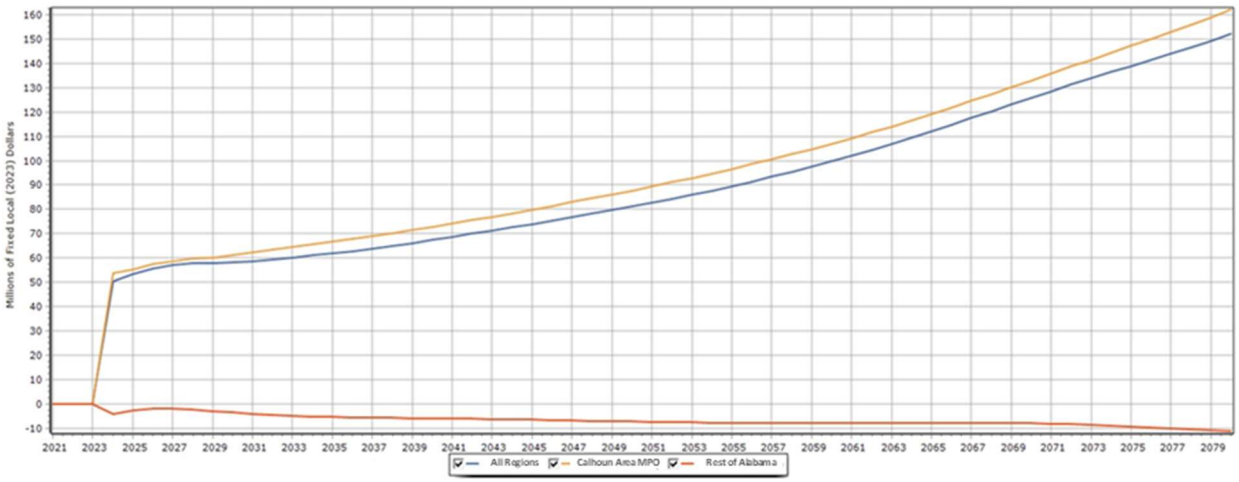
There is projected to be an increase in employment compared to the baseline forecast. In 2024, Calhoun Area MPO area is projected to have about 612 more jobs than in the baseline control forecast. In 2030, Calhoun Area MPO is projected to have about 640 more jobs than in the baseline control forecast.

Figure 36: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



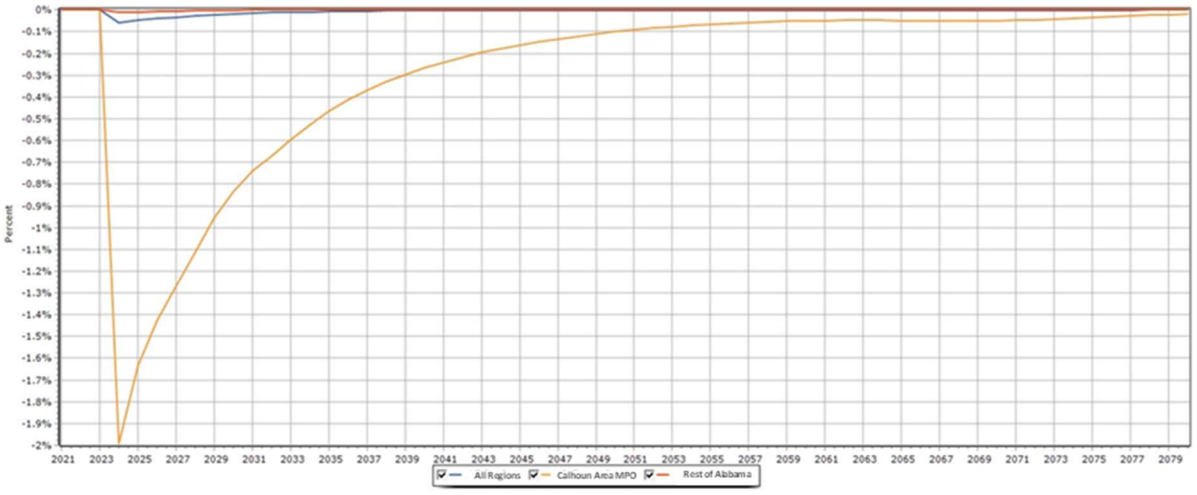
Population is expected to increase compared to the baseline control forecast. In 2024, the population in the Calhoun Area MPO area is projected to be about 145 people greater than in the baseline control forecast. In 2030, the population in the region is projected to be 518 people greater than in the baseline control forecast.

Figure 37: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



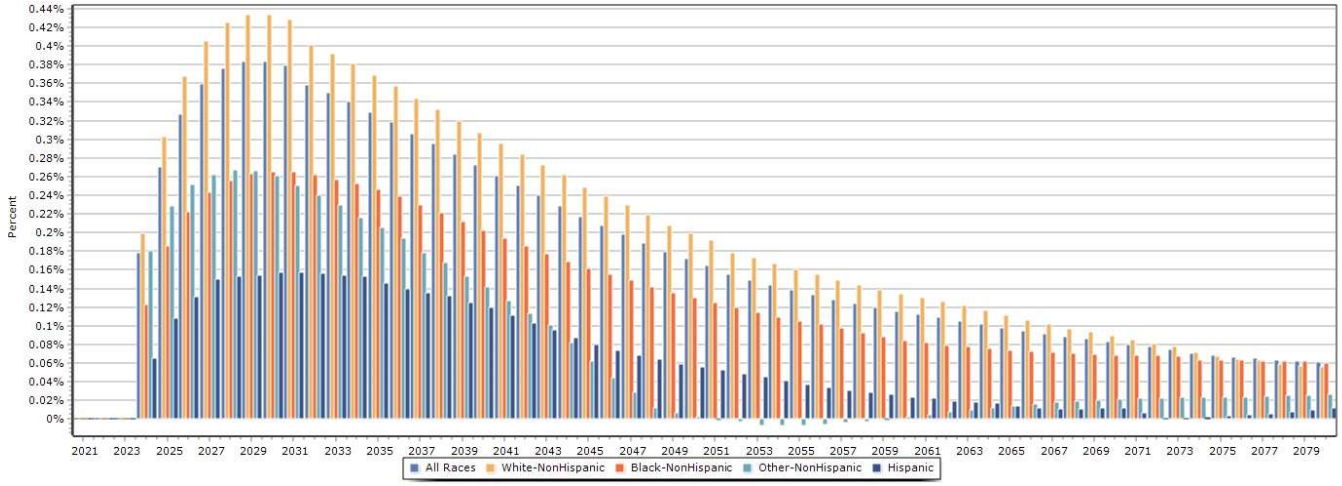
There is projected to be an increase in GDP compared to the baseline forecast. In 2024, Calhoun Area MPO Area is projected to have about 54 million (fixed local 2023) dollars higher GDP than in the baseline control forecast.

Figure 38: Percent Change in Projected Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



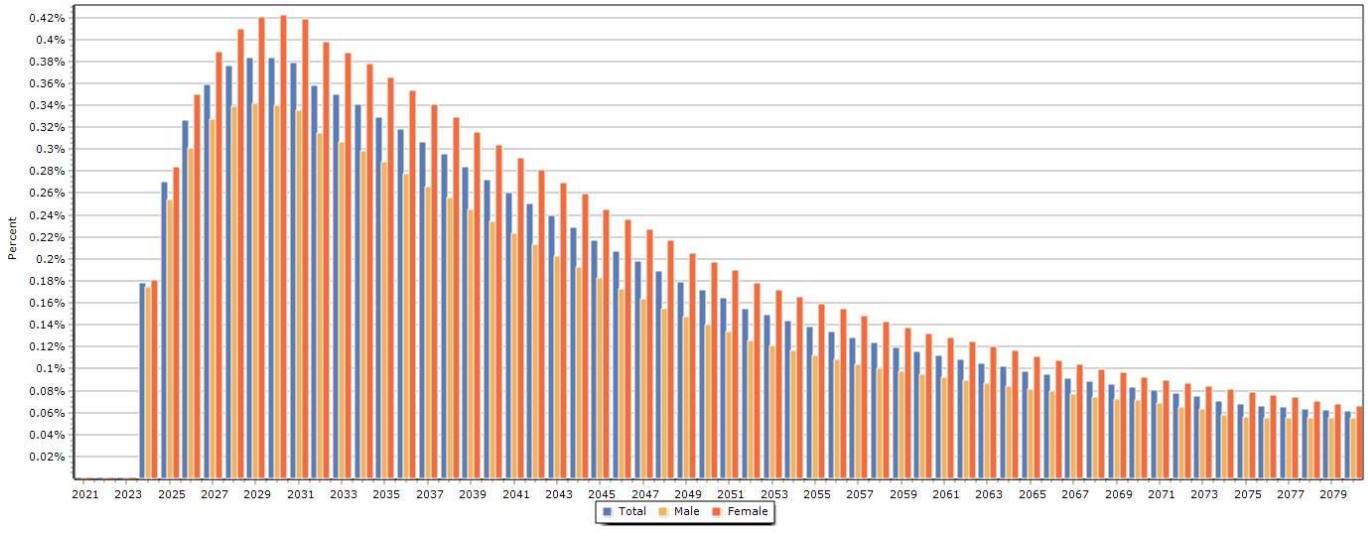
As with the other simulations, there is a projected decline in the Calhoun Area MPO area unemployment rate compared to the baseline control forecast.

Figure 39: Percent change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



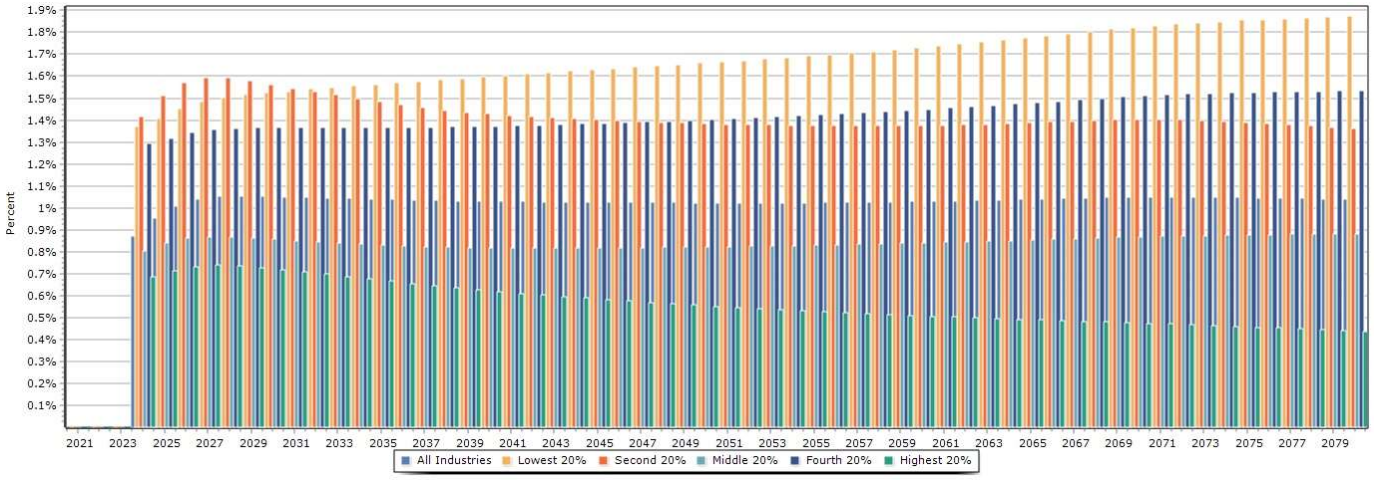
As illustrated in Figure 39 above, for the 30% increase in ridership, there is projected to be a percent increase in labor force participation rates in Calhoun Area MPO area for all listed races until 2051.

Figure 40: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



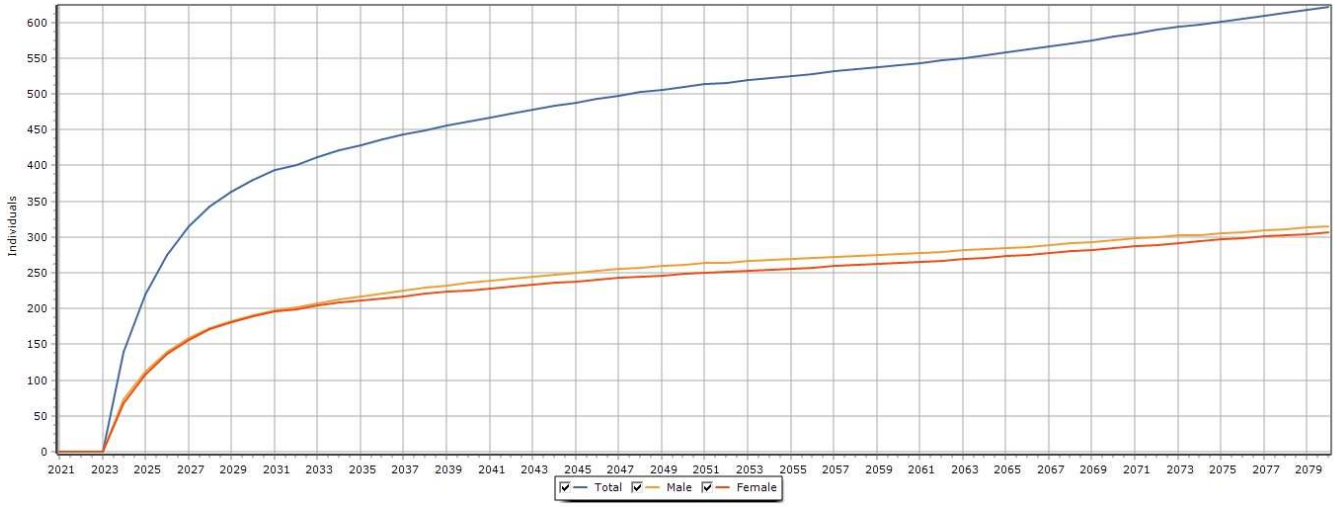
Labor force participation rates are projected to increase for both females and males.

Figure 41: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 30% Increase in Ridership



Every industry quintile sees percent increases in compensation in the Calhoun Area MPO area compared to the baseline control forecast. Industry quintiles are industries divided into five groups. This is not the same as income quintiles.

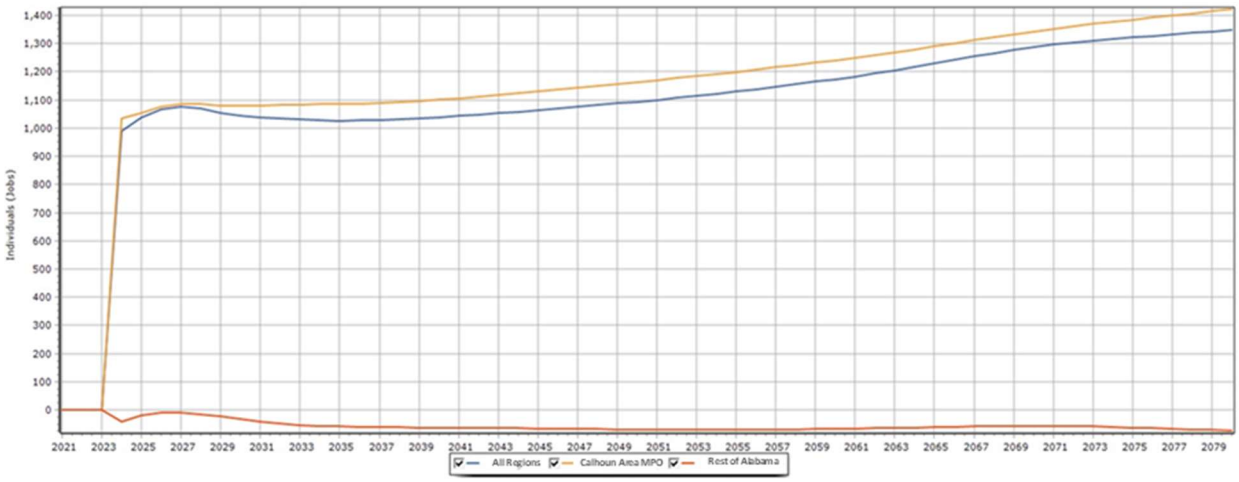
Figure 42: Additional Projected Labor Force in Calhoun Area MPO Area compared to baseline forecast, using 6.6% Calculation and 30% Increase in Ridership



The labor force in Calhoun Area MPO area is projected to increase compared to the baseline forecast. In 2024, Calhoun Area MPO area is projected to have 140 more people in the labor force than in the baseline control forecast. In 2030, Calhoun Area MPO region is projected to have 380 more people in the labor force than in the baseline control forecast

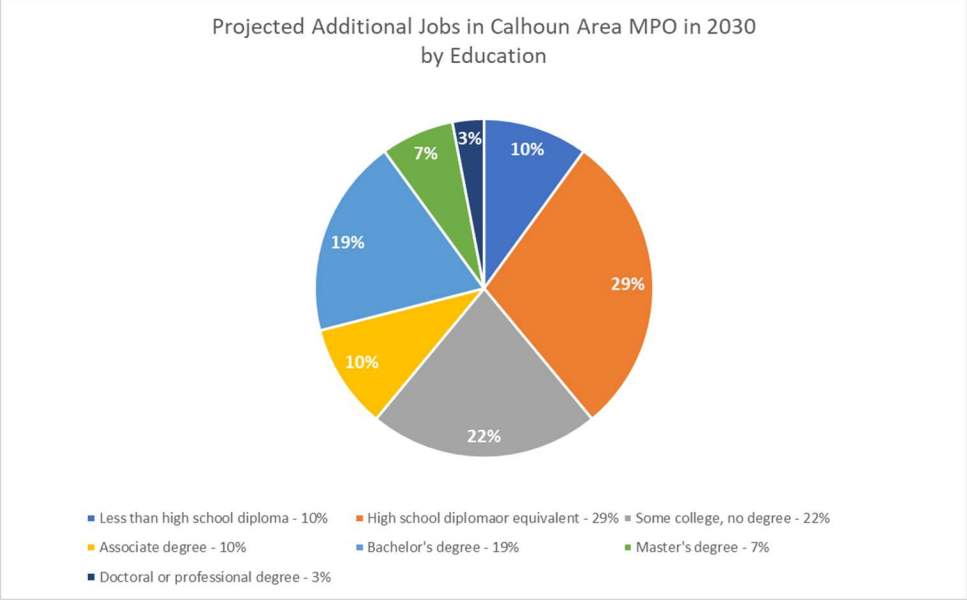
50% Increase in Ridership

Figure 43: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% Calculation and 50% Increase in Ridership



For a 50% increase in ridership, there is projected to be an increase in employment in Calhoun Area MPO. In 2024, Calhoun Area MPO is projected to have about 1,034 more jobs than in the baseline forecast. In 2030, Calhoun Area MPO is projected to have about 1,079 more jobs than in the baseline forecast.

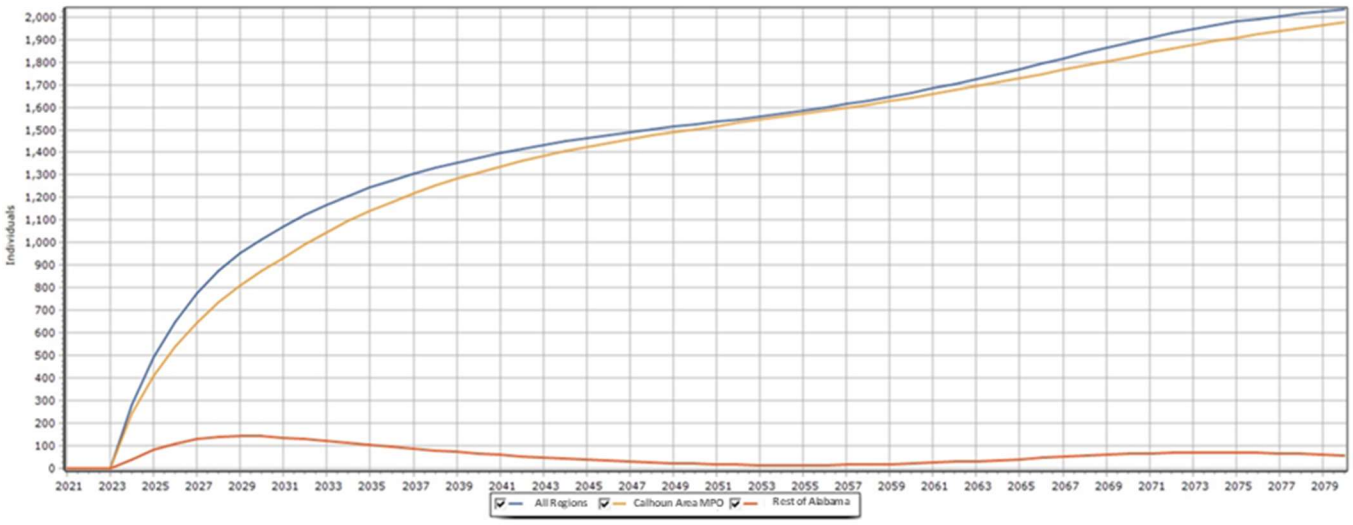
Figure 44: Projected Additional Jobs in Calhoun Area MPO Area in 2030 by Education Level, Compared to Baseline Control Forecast, using 6.6% number and 50% Increase in Ridership



Note: Chart data is rounded to nearest percent

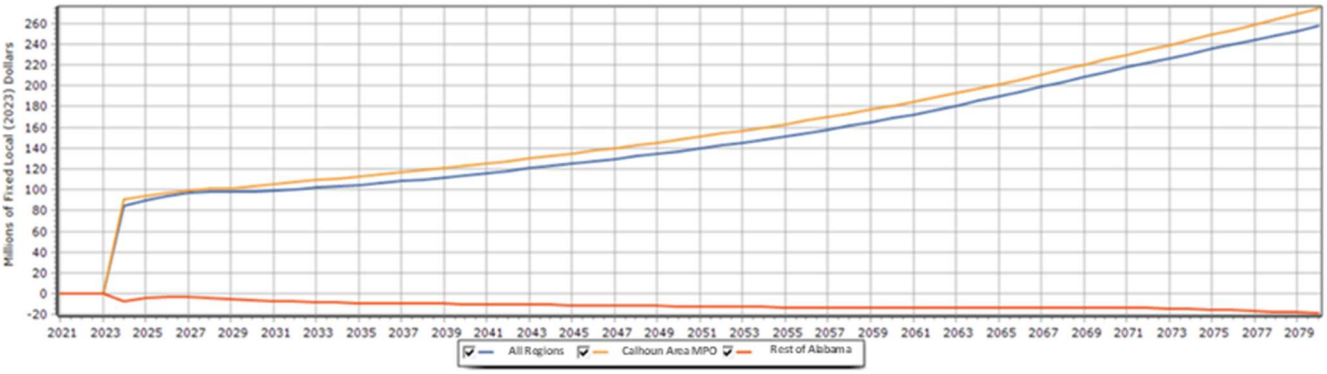
The projected additional jobs are projected to be spread across various education levels. In 2030, about 39% of the additional projected jobs do not need any college experience. About 60% of the additional projected jobs do not need a college degree.

Figure 45: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership



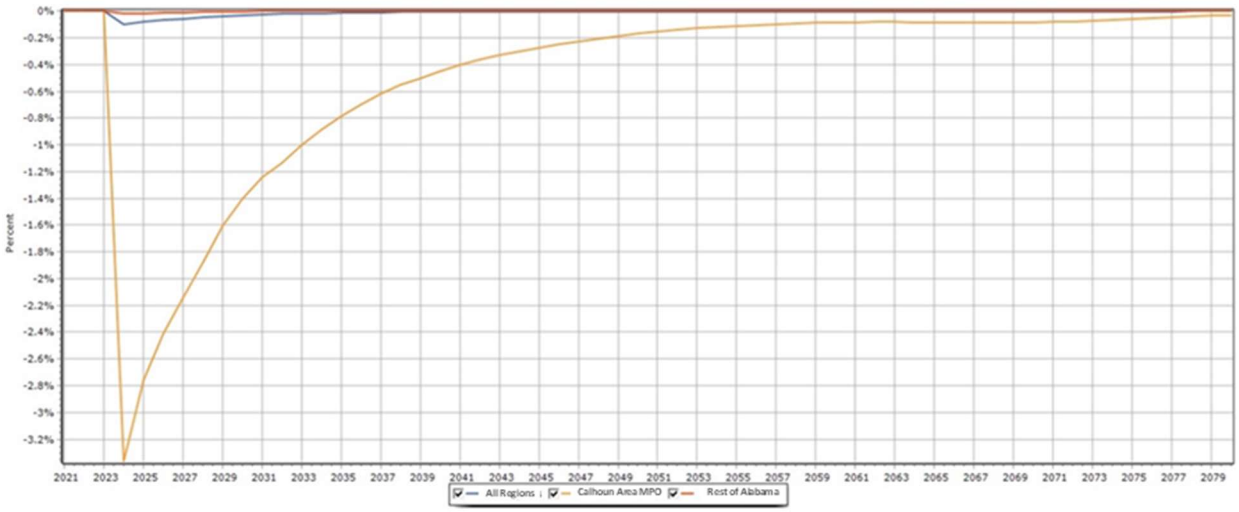
For a 50% increase in ridership, there is projected to be an increase in population in Calhoun Area MPO. In 2024, Calhoun Area MPO is projected to have 244 more people than in the baseline control forecast. In 2030, Calhoun Area MPO is projected to have 874 more people than in the baseline control forecast.

Figure 46: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership



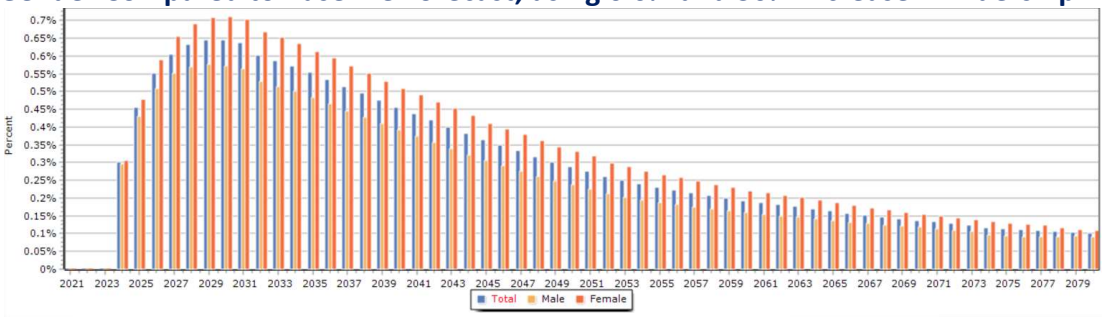
For a 50% increase in ridership, there is projected to be an increase in GDP in Calhoun Area MPO compared to the baseline forecast. In 2024, Calhoun Area MPO is projected to have about 91 million (fixed local 2023) dollars more of GDP than in the baseline control forecast. In 2030, Calhoun Area MPO is projected to have about 103 million (fixed local 2023) dollars more of GDP than in the baseline forecast.

Figure 47: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership



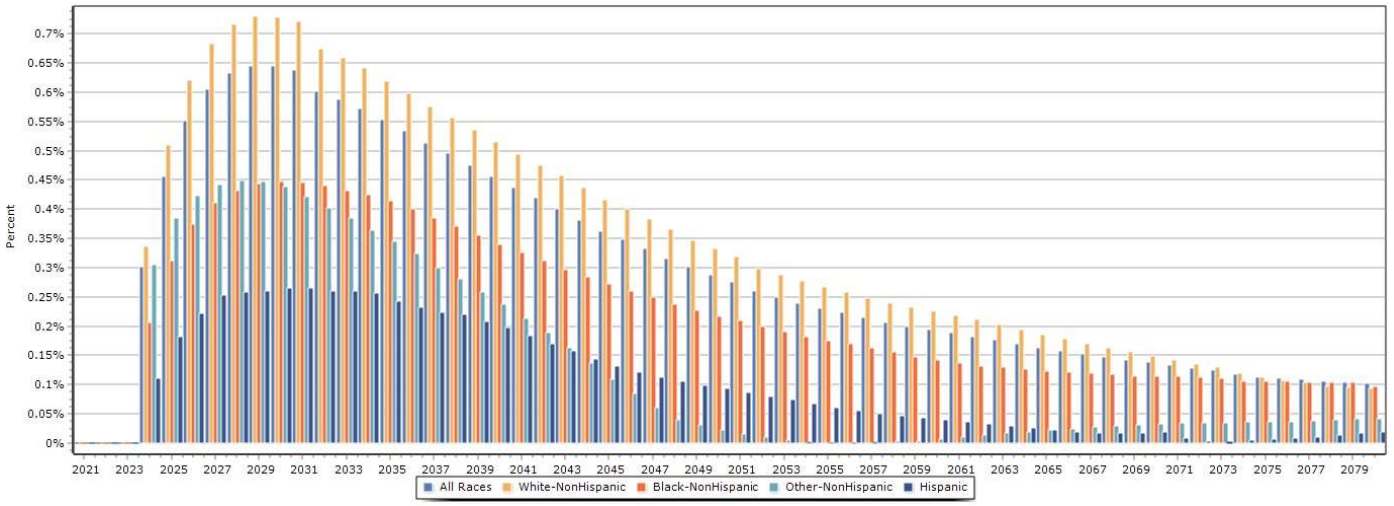
For a 50% increase in ridership, there is projected to be a percent decrease in unemployment in Calhoun Area MPO compared to the baseline forecast. While the unemployment rate gets closer to the baseline control forecast over time, the unemployment rate remains below the baseline control forecast.

Figure 48: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership



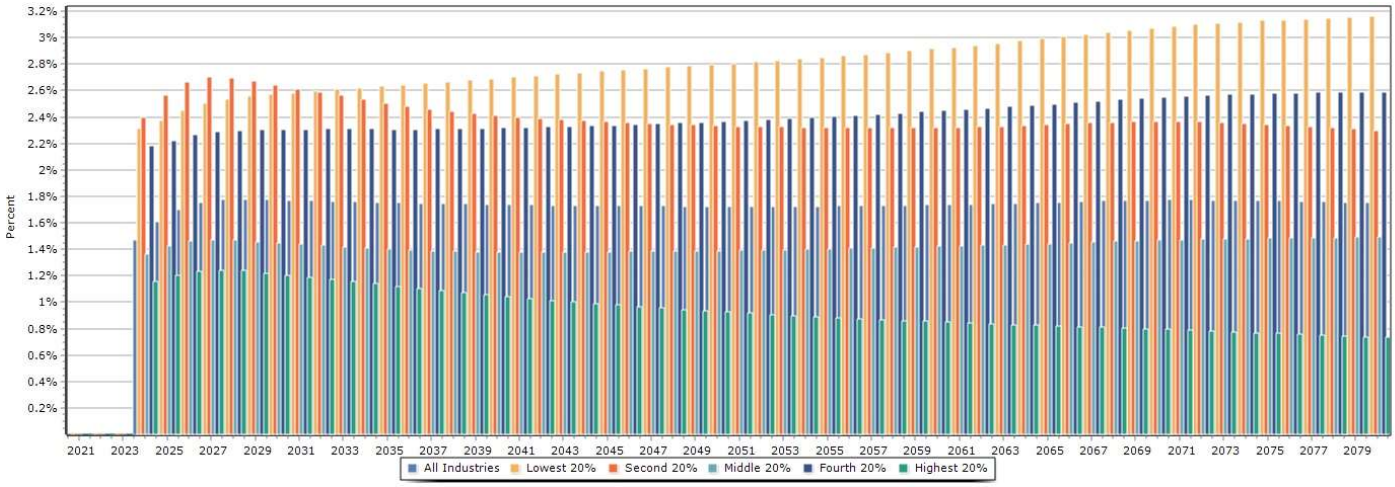
For a 50% increase in ridership, there is projected to be a percent increase in labor force participation in Calhoun Area MPO compared to the baseline control forecast. This percent increase occurs for both men and women in the MPO area.

Figure 49: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership



For a 50% increase in ridership, labor force participation rates increase for all the listed races in most of the listed years.

Figure 50: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and 50% Increase in Ridership

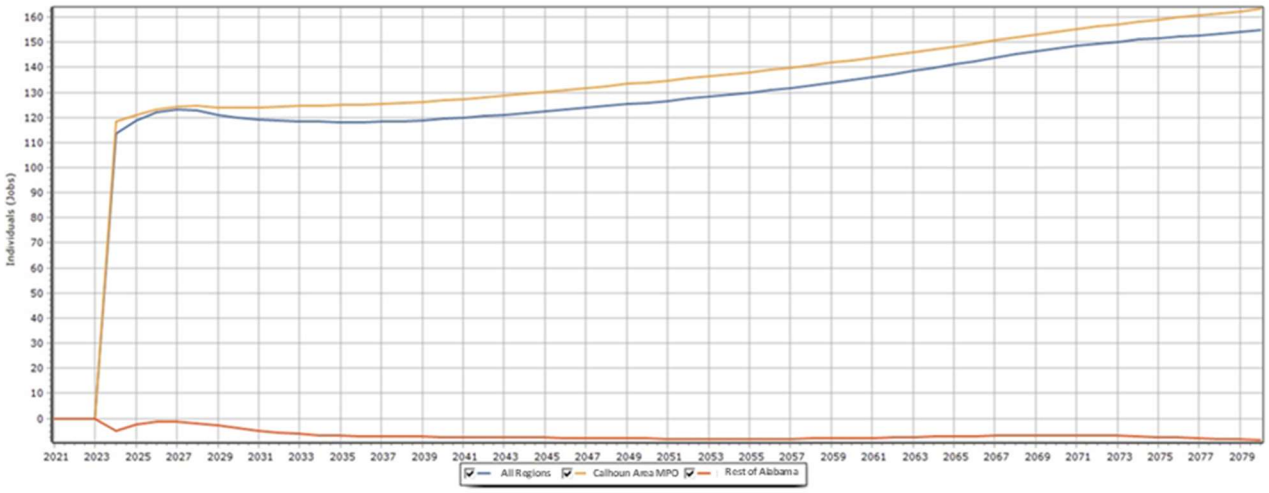


Every industry quintile sees percent increases in compensation in Calhoun Area MPO compared to the baseline control forecast. Industry quintiles are industries divided into five groups.

JACKSONVILLE RIDERSHIP INCREASE

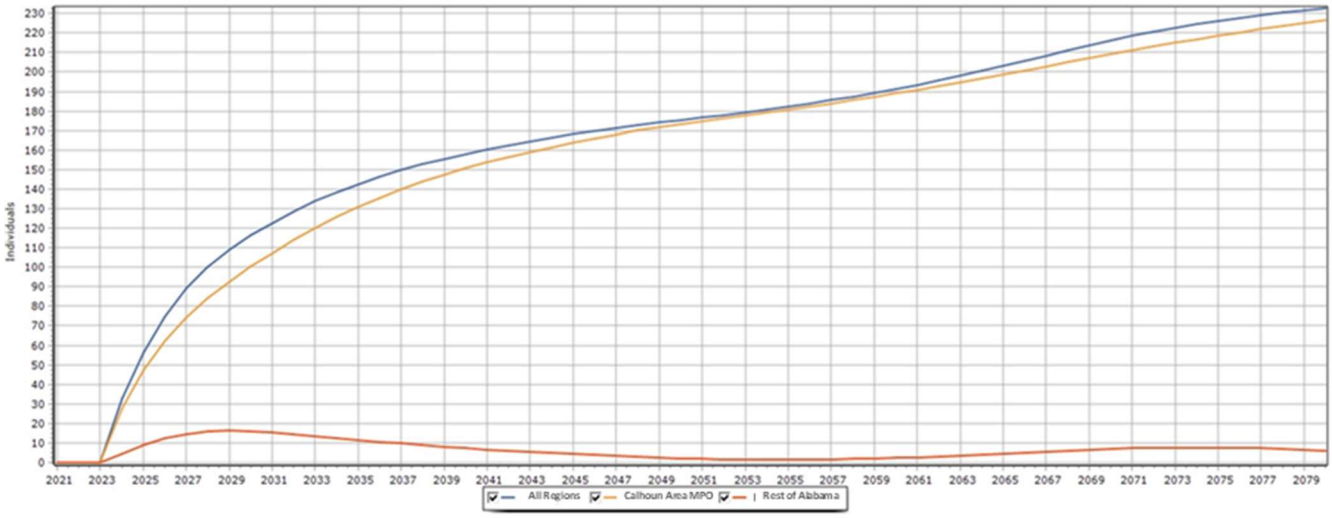
Utilizing the 1.7% Calculation for Ridership as a portion of the Calhoun MPO Area

Figure 51: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



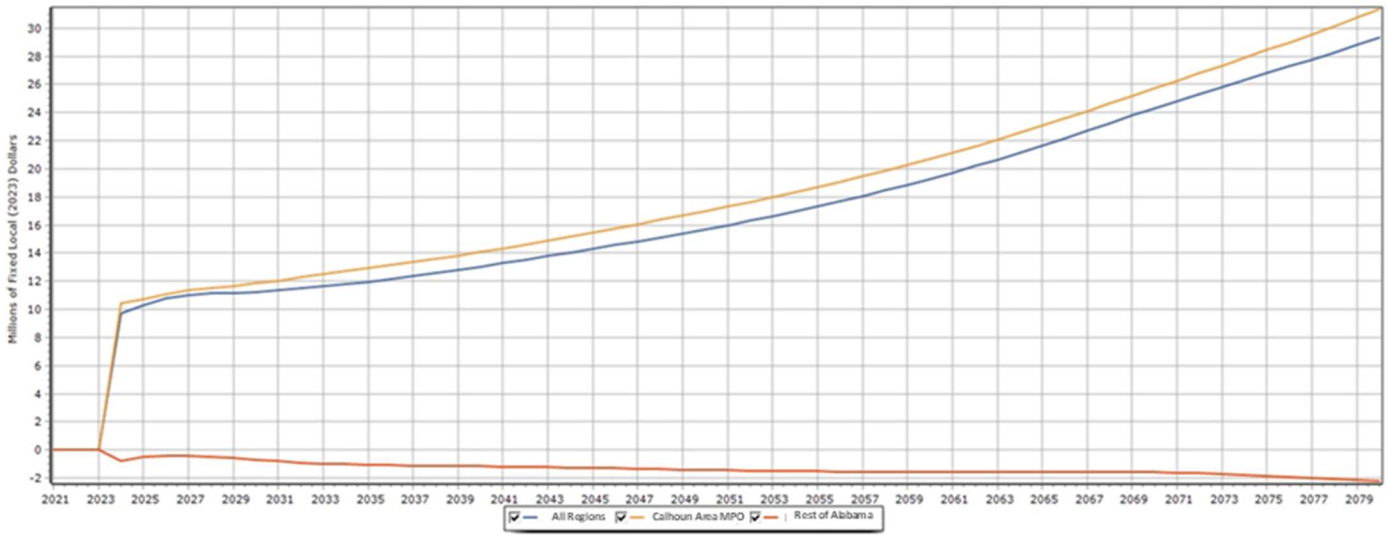
With the new Jacksonville route, employment in Calhoun Area MPO is projected to increase compared to the baseline forecast. In 2024, the region is projected to have about 118 more jobs than the baseline control forecast. In 2030, the region is projected to have about 124 more jobs than the baseline control forecast.

Figure 52: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



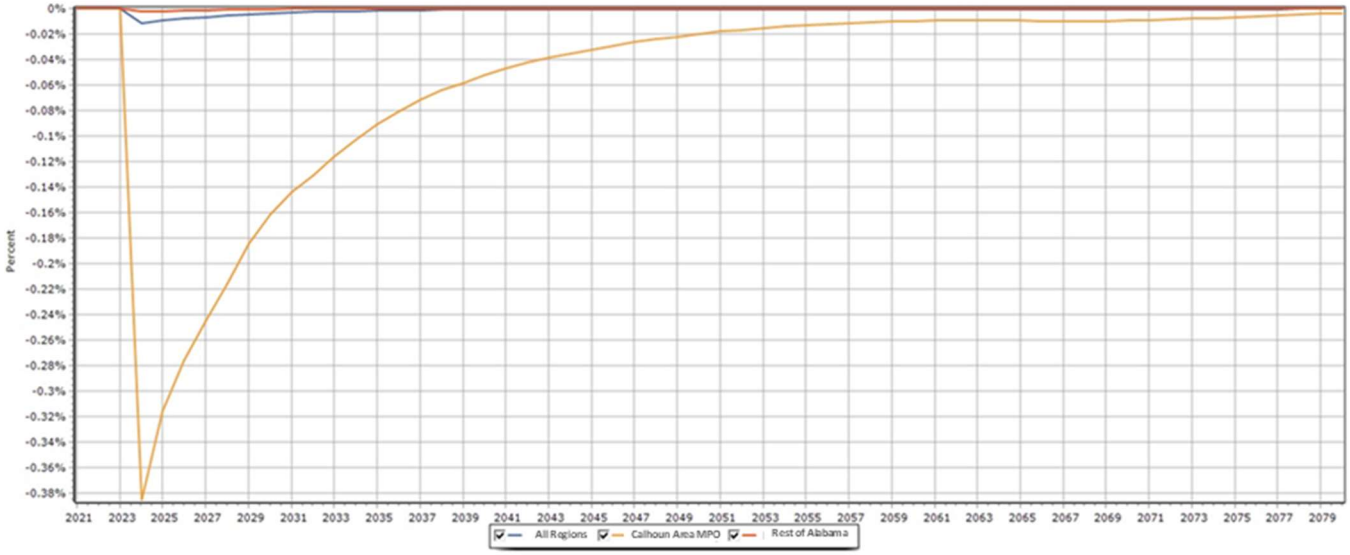
With the new Jacksonville route, the population in Calhoun Area MPO is projected to increase compared to the baseline forecast. In 2024, the population in Calhoun Area MPO is projected to be 28 people more than in the baseline control forecast. In 2030, the population in Calhoun Area MPO is projected to be 100 people more than in the baseline control forecast.

Figure 53: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



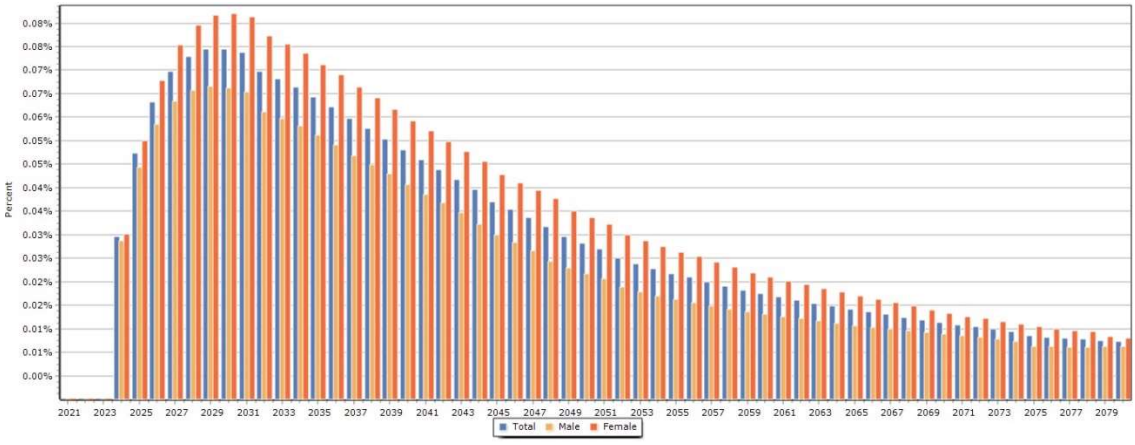
With the new Jacksonville route, GDP in Calhoun Area MPO is projected to increase compared to the baseline control forecast. In 2024, Calhoun Area MPO area GDP is projected to be about 10 million (fixed local 2023) dollars greater than the baseline control forecast. In 2030, GDP is projected to be about 12 million (fixed local 2023) dollars greater than the baseline control forecast.

Figure 54: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



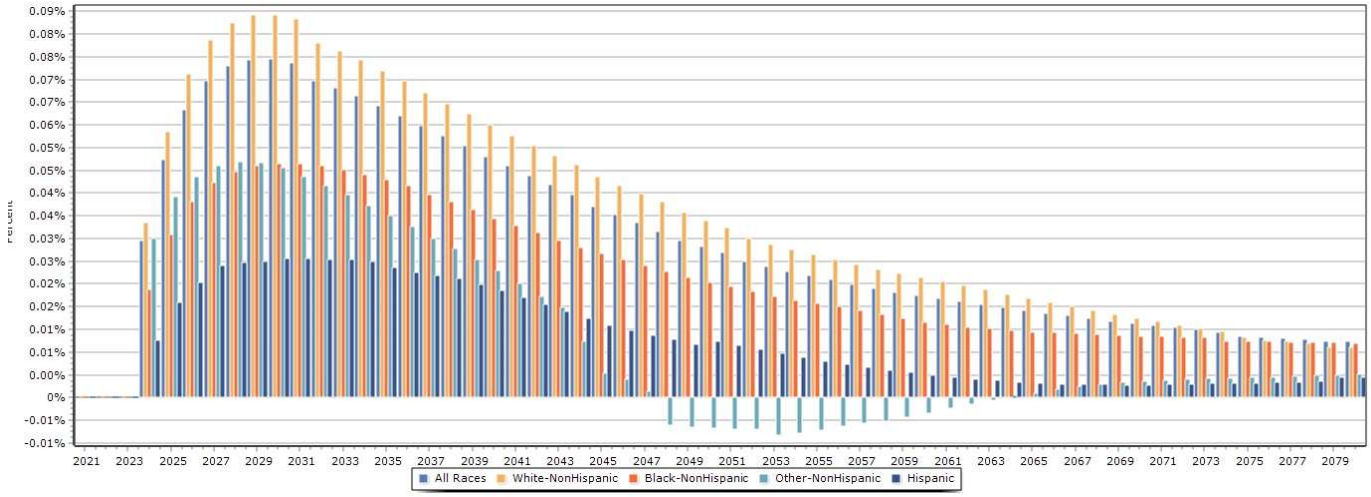
With the new Jacksonville route, there is projected to be a percent decrease in the unemployment rate compared to the baseline control forecast.

Figure 55: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



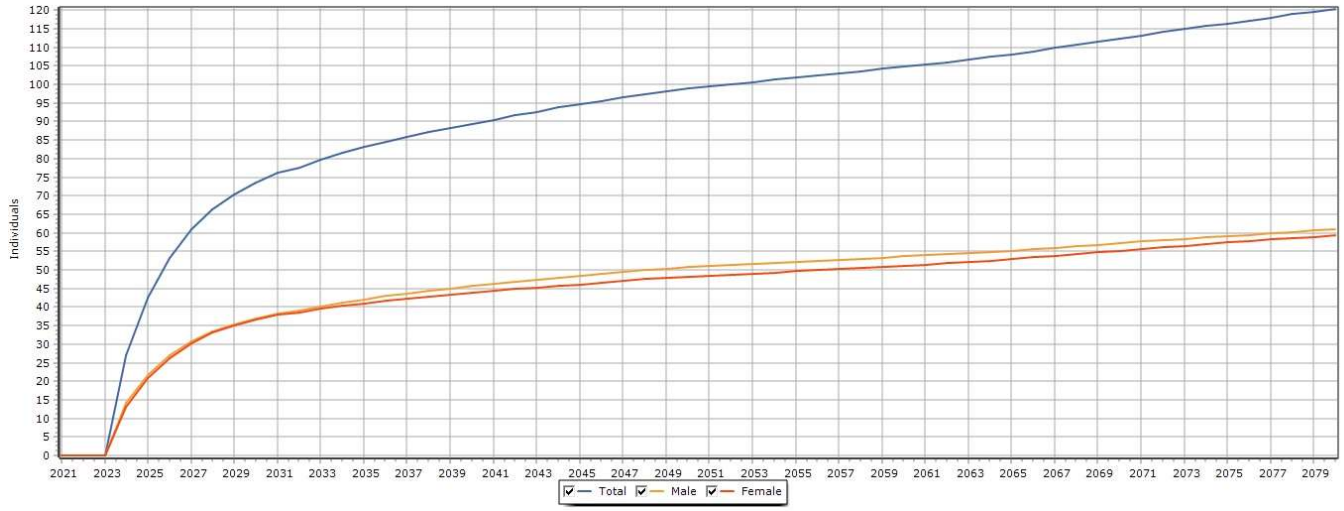
With the new Jacksonville route, there is projected to be a percent increase in labor force participation rates in Calhoun Area MPO compared to the baseline control forecast. This is true for both women and men.

Figure 56: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



Until the late 2040s, there is projected to be a percent increase in labor force participation rates for all listed races in Calhoun Area MPO compared to the baseline control forecast.

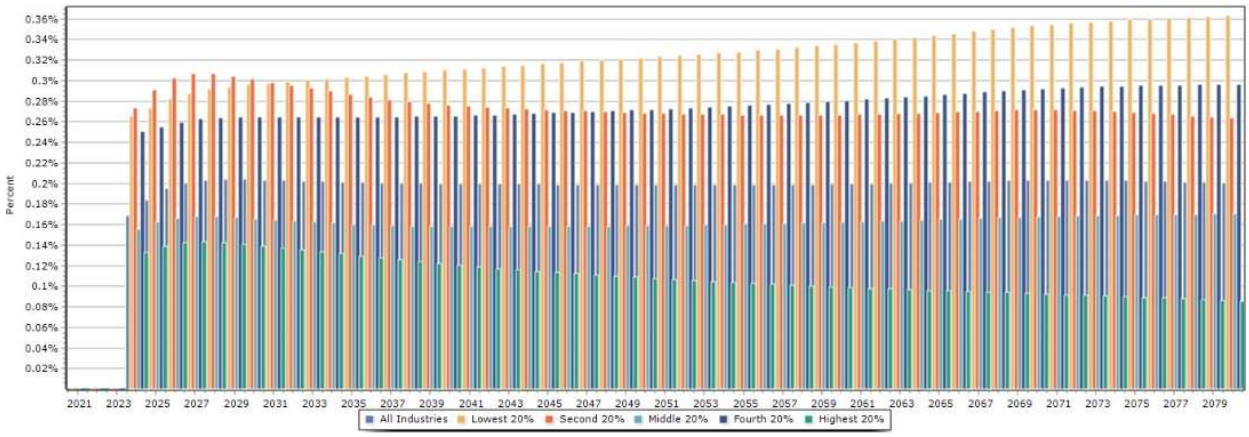
Figure 57: Additional Projected Labor Force in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



There is a projected increase in labor force for both women and men. In 2024, the region is projected to have a labor force about 27 people higher than the baseline forecast. In

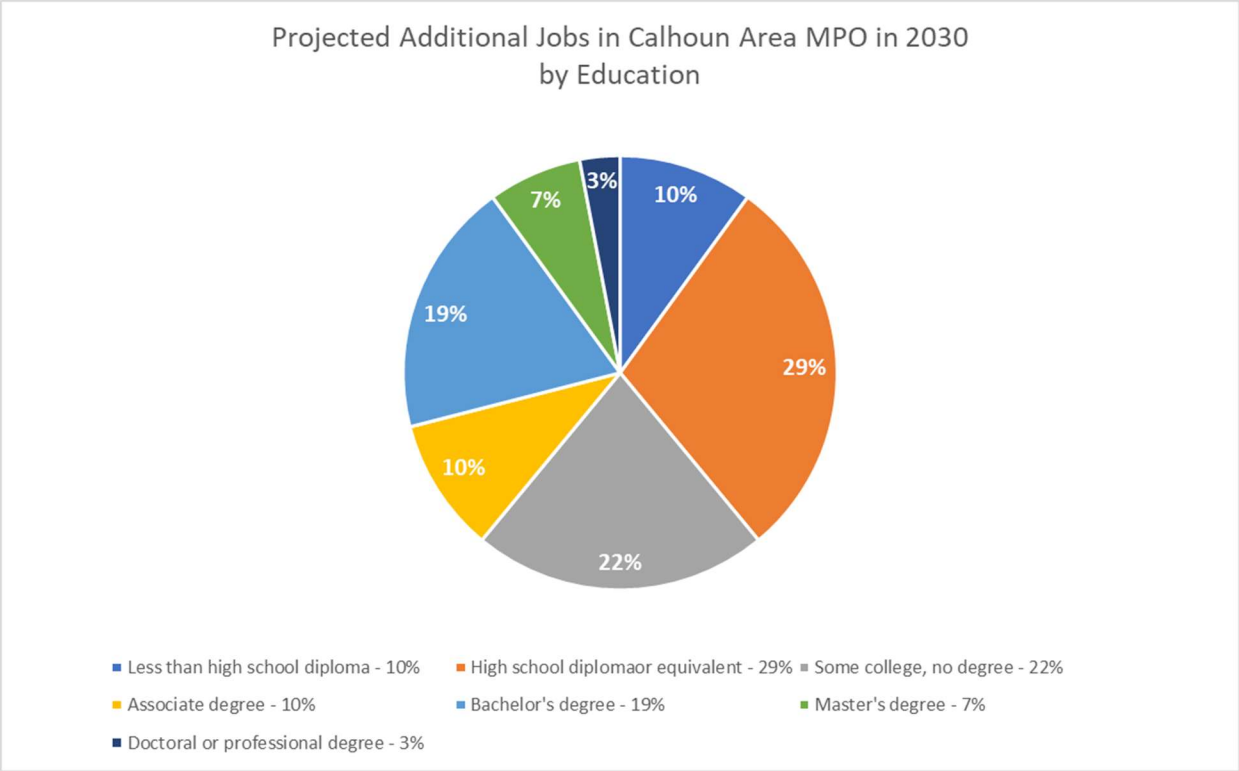
2030, the region is projected to have a labor force about 74 people higher than the baseline forecast.

Figure 58: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 1.7% and projected Jacksonville Ridership



Every industry quintile has percent increases in compensation in Calhoun Area MPO compared to the baseline control forecast. Industry quintiles are industries divided into five groups. These groups are not the same as income quintiles for individuals.

Figure 59: Additional Projected Jobs in 2030 in Calhoun Area MPO Area by Education, using 1.7% Calculation and projected Jacksonville Ridership



Note: Chart data is rounded to nearest percent

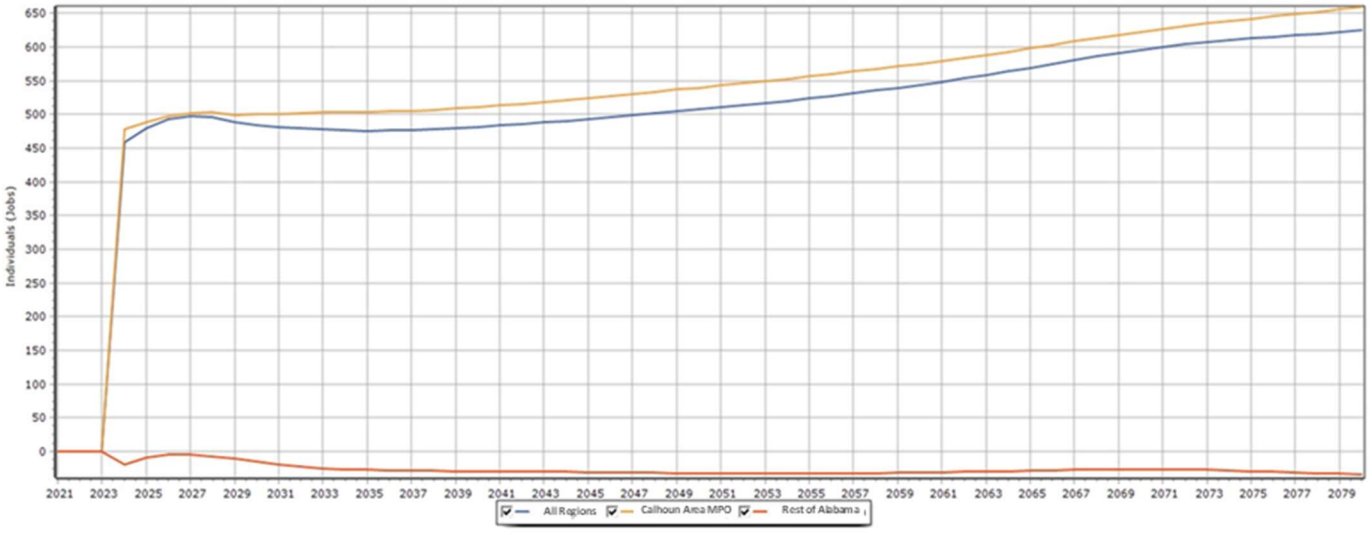
With the new Jacksonville route, the projected additional jobs are projected to be spread across various education levels.

Jobs in 2030 by industry

With the new Jacksonville route, the projected additional jobs are projected to be spread across several industries. The industries with the most projected additional jobs in 2030 include construction; state and local government; professional, scientific, and technical services; administrative and support services; personal and laundry services; retail trade; ambulatory health care services; real estate; food services and drinking places; and wholesale trade.

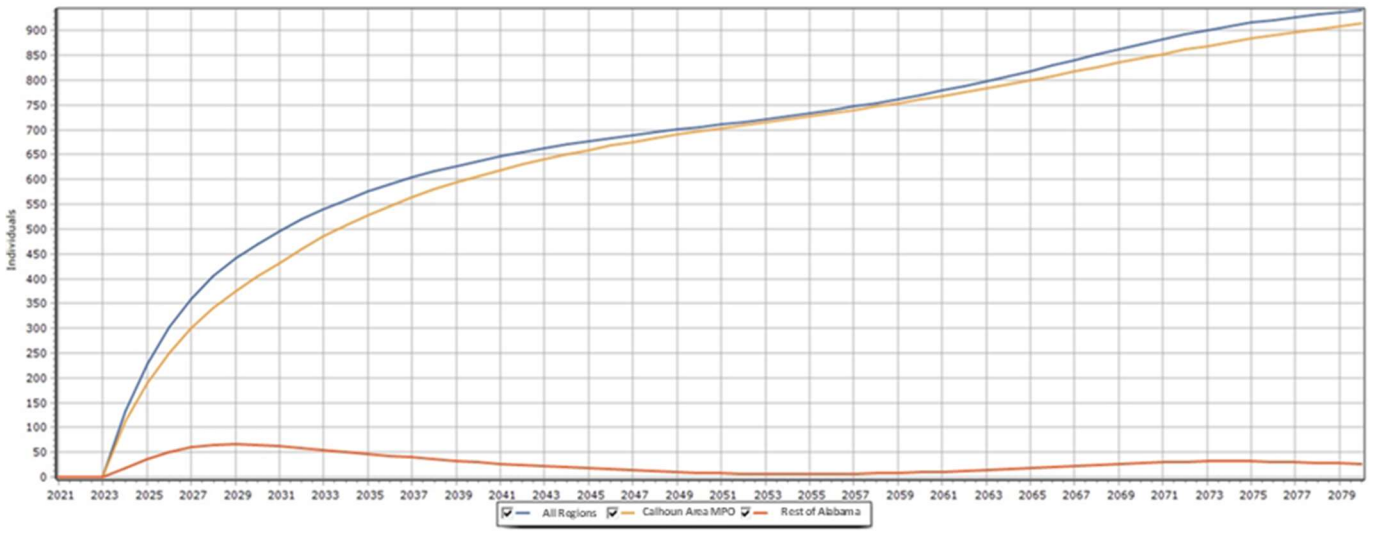
Utilizing the 6.6% Calculation for Ridership as a portion of the Calhoun Area MPO Area

Figure 60: Additional Projected Employment in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



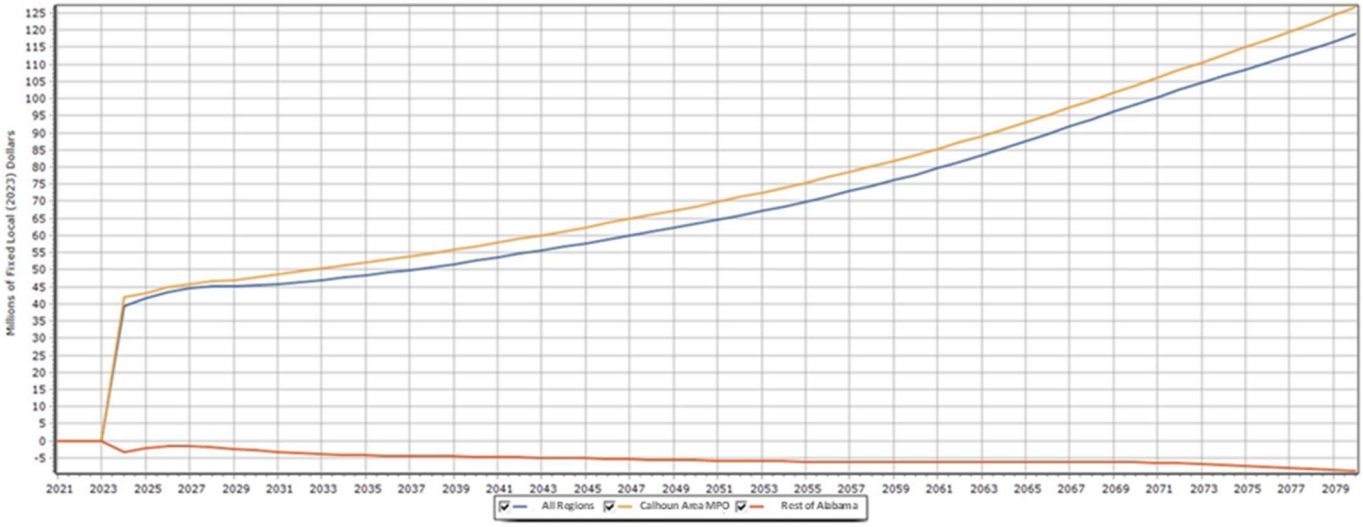
With the new Jacksonville ridership, the projected additional increase in employment is over 400 additional projected jobs in Calhoun Area MPO compared to the baseline control forecast. In 2024, Calhoun Area MPO is projected to have about 478 more jobs than in the baseline control forecast.

Figure 61: Additional Projected Population in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



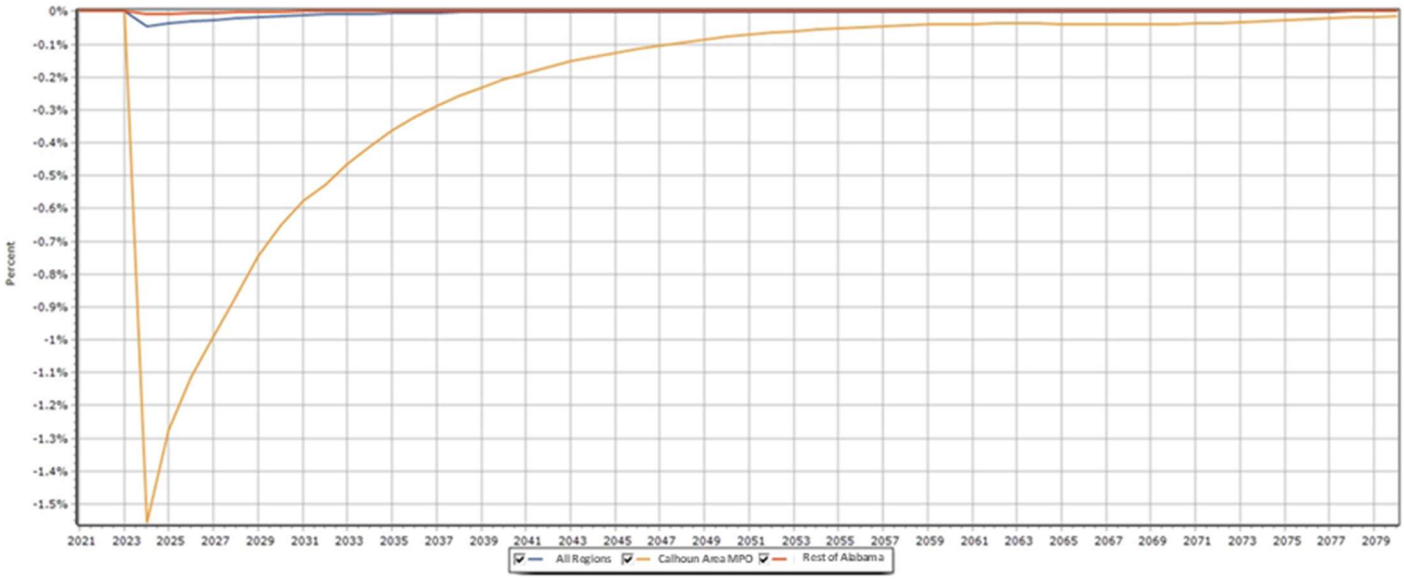
With the new Jacksonville ridership, there is a projected increase in population compared to the baseline control forecast. In 2024, Calhoun Area MPO is projected to have about 113 more people than in the baseline control forecast. In 2030, the region is projected to have 405 more people than in the baseline control forecast.

Figure 62: Additional Projected GDP in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



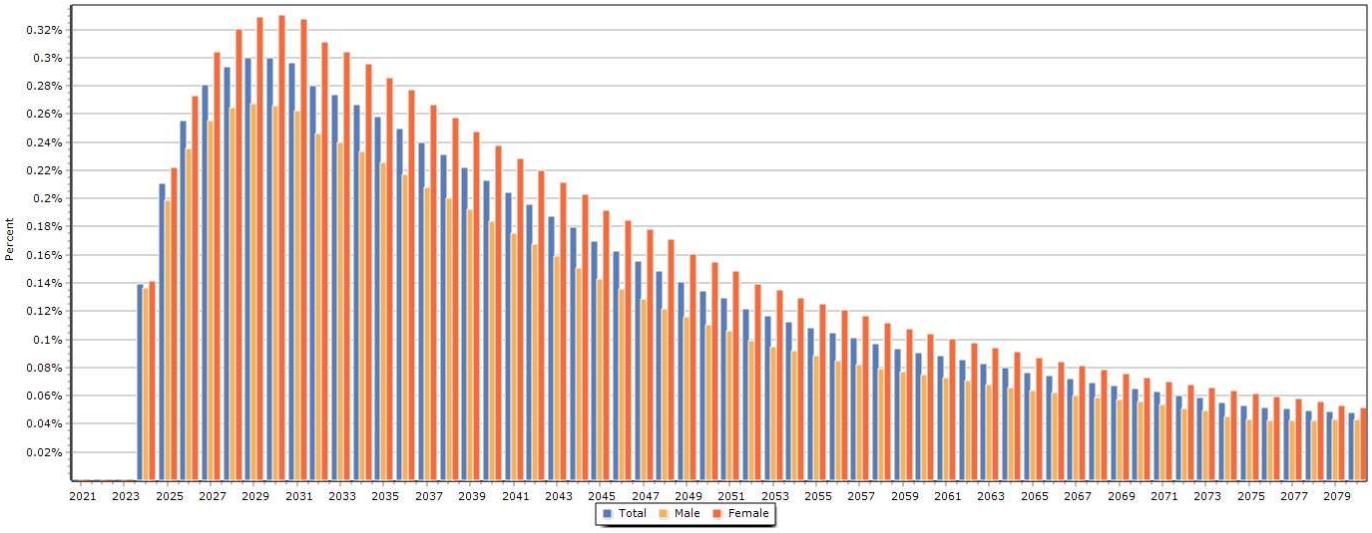
With the new Jacksonville ridership, there is a projected increase in GDP in Calhoun Area MPO compared to the baseline control forecast. In 2024, there is projected to be an additional 42 million (fixed local 2023) dollars in GDP compared to the baseline control forecast. In 2030, there is projected to be an additional 48 million (fixed local 2023) dollars in GDP compared to the baseline control forecast.

Figure 63: Percent Change in Unemployment Rate in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



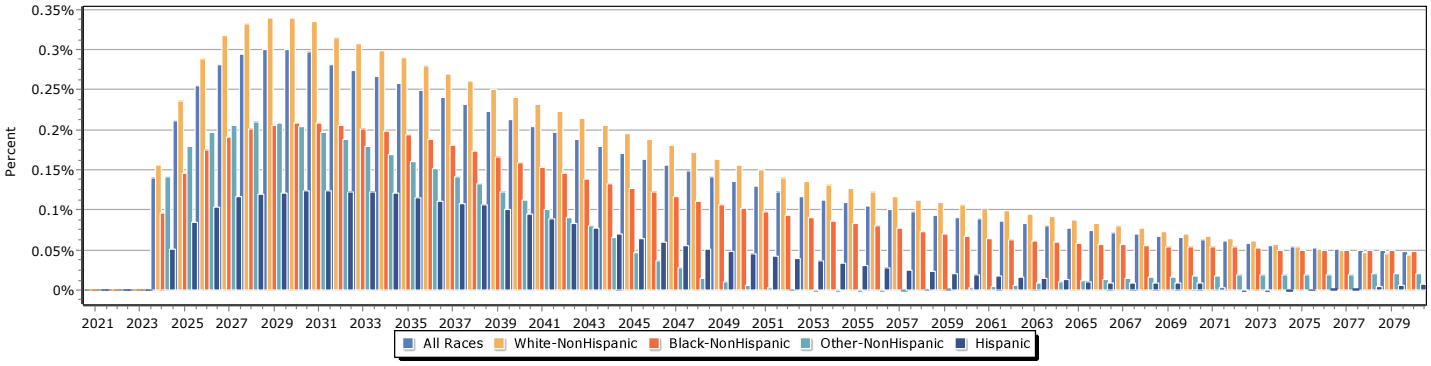
With the new Jacksonville ridership, there is a projected percent decline in unemployment rate in Calhoun Area MPO compared to the baseline control forecast.

Figure 64: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Gender Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



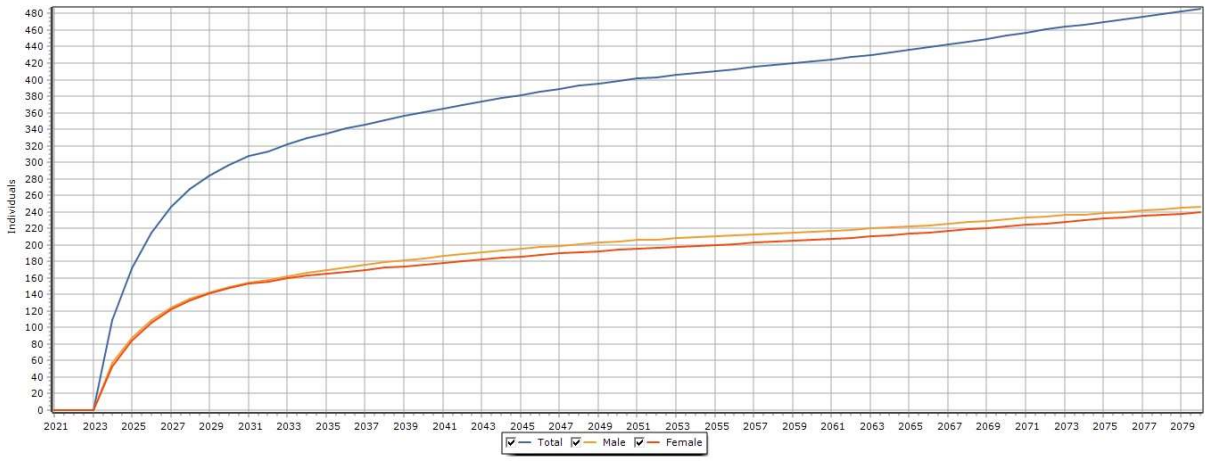
With the new Jacksonville ridership, there is projected to be a percent increase in labor force participation rate in Calhoun Area MPO. This percent increase is projected for both men and women.

Figure 65: Percent Change in Labor Force Participation Rate in Calhoun Area MPO Area by Race Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



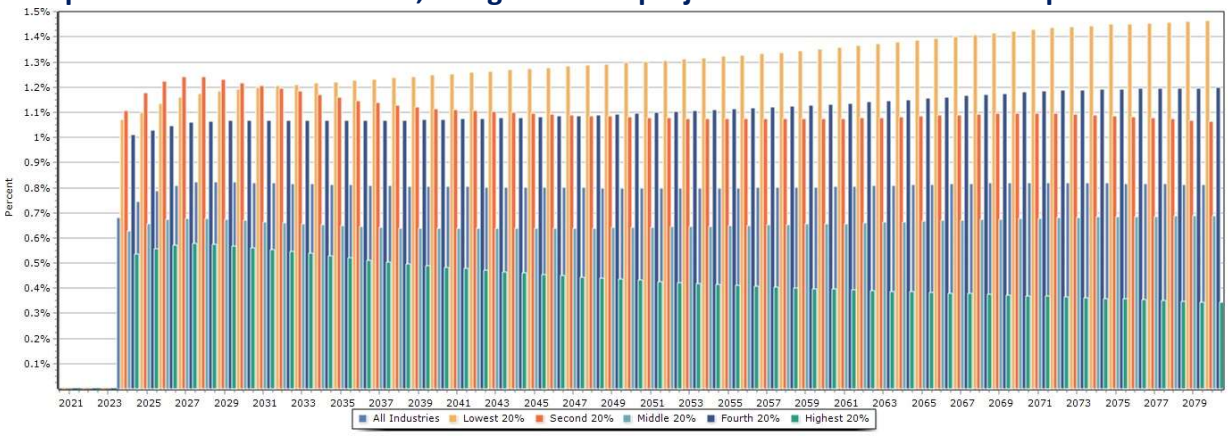
With the new Jacksonville ridership, there is projected to be a percent increase in labor force participation rates in Calhoun Area MPO for all races up until the 2050s.

Figure 66: Additional Projected Labor Force in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



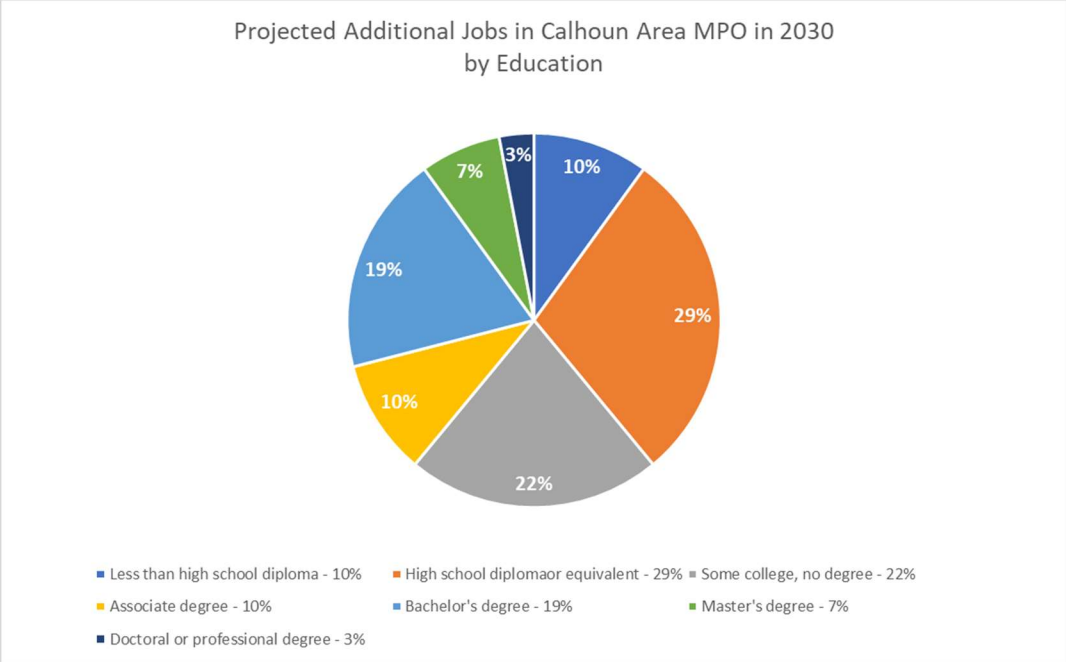
Calhoun Area MPO is projected to have a larger labor force than in the baseline control forecast. In 2024, the labor force is projected to be about 109 people more than in the baseline forecast. In 2030, the labor force is projected to be about 297 people more than in the baseline forecast.

Figure 67: Percent Change in Compensation by Industry Quintile in Calhoun Area MPO Area Compared to Baseline Forecast, using 6.6% and projected Jacksonville Ridership



Every industry quintile sees percent increases in compensation in Calhoun Area MPO compared to the baseline control forecast. Industry quintiles are industries divided into five groups.

Figure 68: Projected Additional Jobs in Calhoun Area MPO Area in 2030 by Education, using 6.6% Calculation and Projected Jacksonville Ridership



Note: Chart data is rounded to nearest percent

The projected additional jobs are expected to be spread across multiple education levels. About 39% of the additional jobs are expected to not need any college experience. About 61% of the additional jobs are expected to not need a college degree.

CONCLUSION

The analysis of transportation's significance in Calhoun Area MPO underscores its pivotal role in shaping the local economy. Even seemingly minor adjustments in effective transportation distances can have far-reaching repercussions on economic dynamics. This highlights the intricate interplay between transportation and economic prosperity, as well as the potential for strategic investments in transportation infrastructure to catalyze positive transformations within a region.

Across all the simulations conducted, a consistent trend emerges – anticipated increases in employment, population, and Gross Domestic Product (GDP). These simulations serve as a compelling testament to the transformative power of an efficient transportation network. Notably, many of the simulations exhibited initial percentage increases in labor force participation rates when compared to the baseline forecasts. This suggests that improved transportation not only fuels economic growth but also encourages a more active and engaged workforce.

Table 11: Additional Calhoun Area MPO Area GDP in (fixed local 2023) Millions of Dollars Using the 1.7% Calculation

	2024	2030	2040	2050
10%	4.4	5.0	6.0	7.2
30%	13.3	15.1	18.0	21.7
50%	22.2	25.3	30.0	36.2
Jacksonville 23.5%	10.4	11.8	14.1	17.0

Table 12: Additional Calhoun Area MPO Area GDP in (fixed local 2023) Millions of Dollars Using the 6.6% Calculation

	2024	2030	2040	2050
10%	17.7	20.1	23.9	28.9
30%	53.8	61.1	72.7	87.7
50%	90.8	103.3	122.9	148.1
Jacksonville 23.5%	42.1	47.8	56.8	68.5

However, it's crucial to recognize that the magnitude of these improvements is contingent upon several factors, including the specific numerical data employed and the percentage increase in ridership. In essence, the effectiveness of transportation enhancements in driving economic development can be fine-tuned to cater to the unique needs and characteristics of a region. The flexibility of transportation strategies allows policymakers and stakeholders to tailor their initiatives for maximum impact.

One of the primary mechanisms through which transportation influences the economy is by reducing commuting costs. When individuals can access their workplaces more easily and affordably, it has a direct bearing on the ability of employers and employees to connect with one another. This heightened accessibility, in turn, fosters increased labor productivity, a pivotal factor in employment growth. Enhanced transportation networks essentially shrink geographical barriers, making it easier for employers to tap into a broader talent pool and for employees to access a wider array of job opportunities, ultimately fostering a more robust and dynamic local economy.

In conclusion, the analysis of transportation's role in Calhoun Area MPO's economic landscape demonstrates its multifaceted impact. Minor adjustments in transportation can yield significant economic dividends. The simulations consistently point to increased employment, population, and GDP, signaling the pivotal role transportation plays in driving regional prosperity. By optimizing transportation strategies to match specific needs and priorities, policymakers can harness the transformative potential of transportation to foster economic growth, encourage workforce participation, and improve overall quality of life within the community. This underscores the enduring importance of well-planned and efficient transportation systems as a cornerstone of regional development.

APPENDICES

APPENDIX 1: REMI MODEL DOCUMENTATION

The following core framework applies to all REMI model builds. The model integrates input-output, computable general equilibrium, econometric and economic geography methodologies. The model is dynamic, with forecasts and simulations generated on an annual basis and behavioral responses to compensation, price, and other economic factors.

The model consists of thousands of simultaneous equations with a structure that is relatively straightforward. The exact number of equations used varies depending on the extent of industry, demographic, demand, and other detail in the specific model being used. The overall structure of the model can be summarized in five major blocks: (1) Output and Demand, (2) Labor and Capital Demand, (3) Population and Labor Supply, (4) Compensation, Prices, and Costs, and (5) Market Shares. The blocks and their key interactions are shown in Figures 1 and 2.

Figure 1: REMI Model Linkages

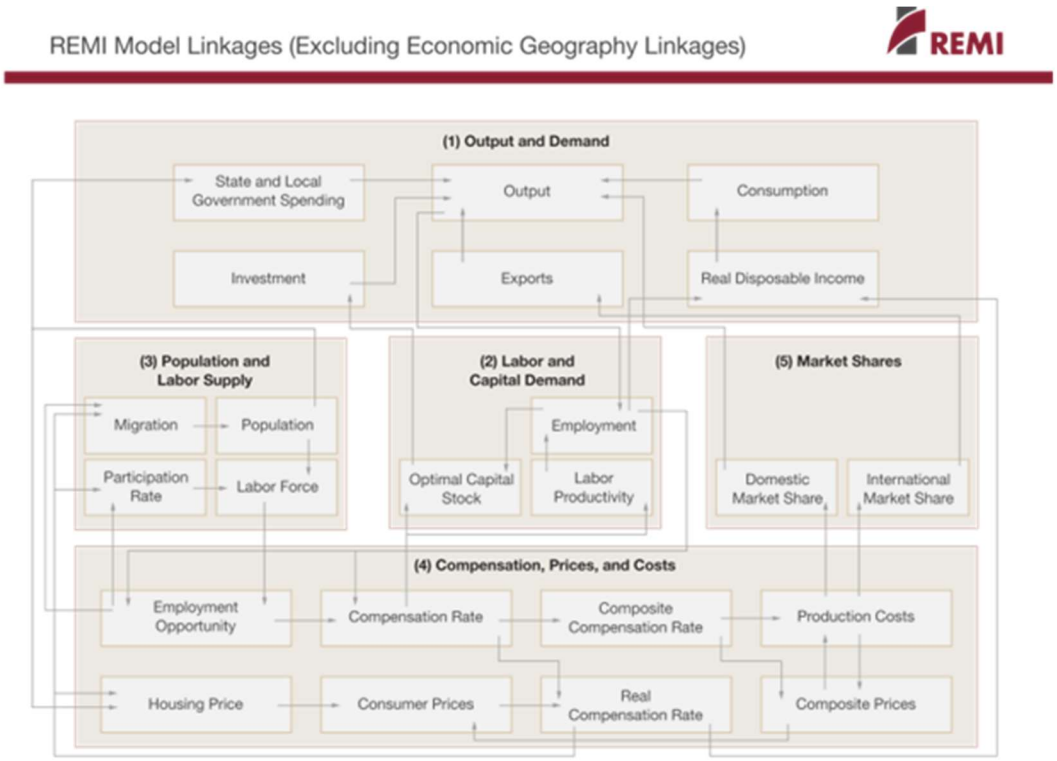
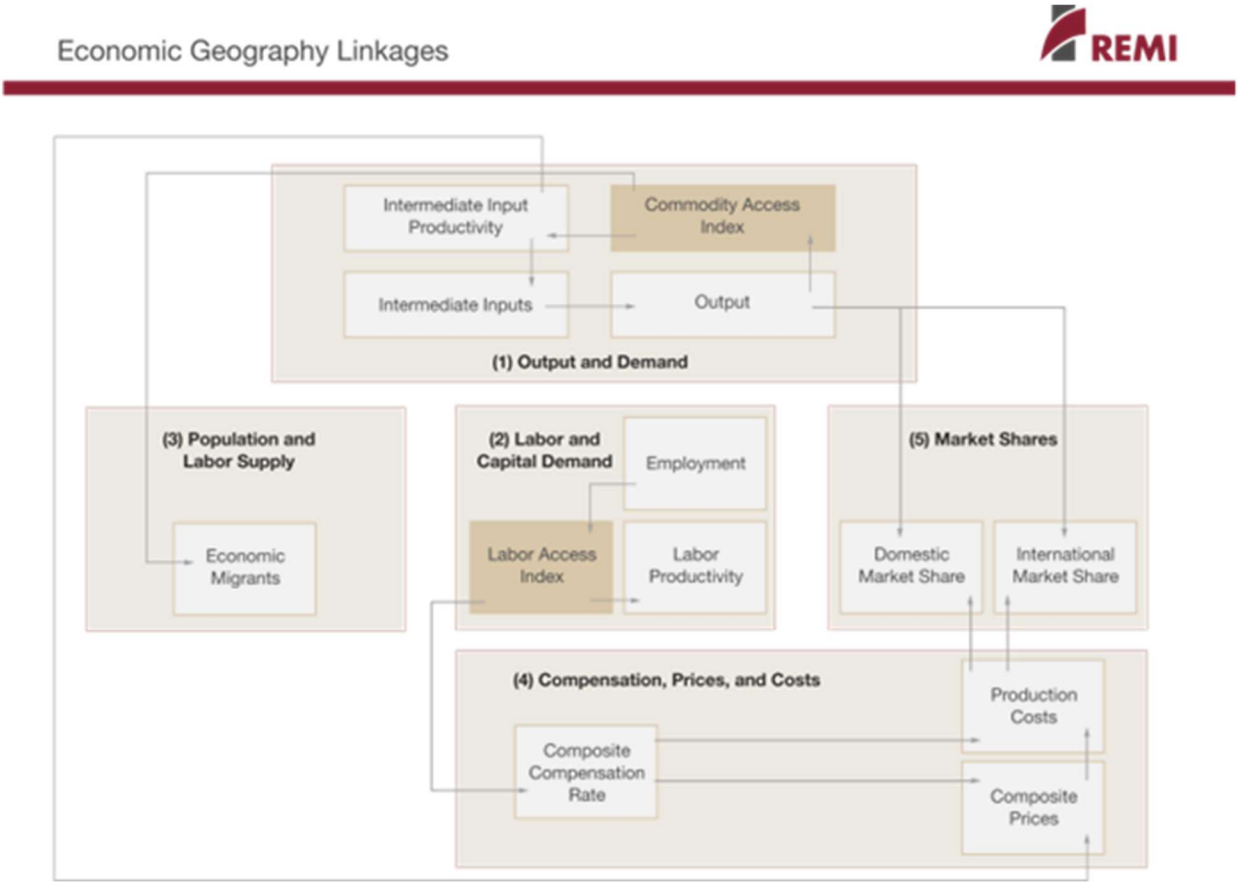


Figure 2: Economic Geography Linkages



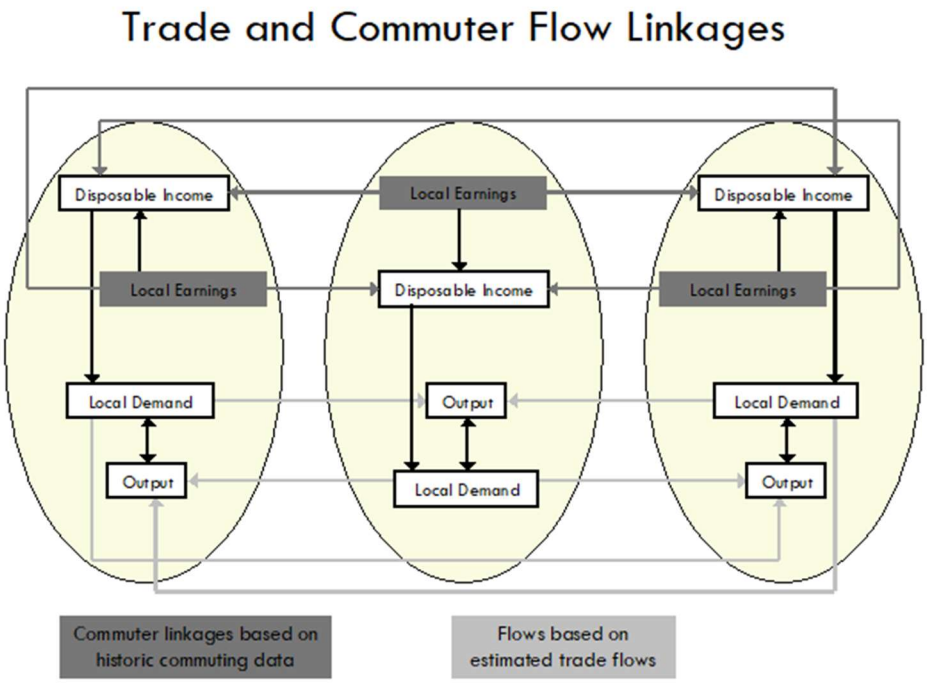
The Output and Demand block consists of output, demand, consumption, investment, government spending, exports, and imports, as well as feedback from output change due to the change in the productivity of intermediate inputs. The Labor and Capital Demand block includes labor intensity and productivity as well as demand for labor and capital. Labor force participation rate and migration equations are in the Population and Labor Supply block. The Compensation, Prices, and Costs block includes composite prices, determinants of production costs, the consumption price deflator, housing prices, and the compensation equations. The proportion of local, inter-regional, and export markets captured by each region is included in the Market Shares block.

Models can be built as single region, multi-region, or multi-region national models. A region is defined broadly as a sub-national area, and could consist of a state, province, county, or city, or any combination of sub-national areas.

Single-region models consist of an individual region, called the home region. The rest of the nation is also represented in the model. However, since the home region is only a small part of the total nation, the changes in the region do not have an endogenous effect on the variables in the rest of the nation.

Multi-regional models have interactions among regions, such as trade and commuting flows. These interactions include trade flows from each region to each of the other regions. These flows are illustrated for a three-region model in Figure 3.

Figure 3: Trade and Commuter Flow Linkages



Multiregional national models also include a central bank monetary response that constrains labor markets. Models that only encompass a relatively small portion of a nation are not endogenously constrained by changes in exchange rates or monetary responses.

Block 1. Output and Demand

This block includes output, demand, consumption, investment, government spending, import, commodity access, and export concepts. Output for each industry in the home region is determined by industry demand in all regions in the nation, the home region's share of each market, and international exports from the region.

For each industry, demand is determined by the amount of output, consumption, investment, and capital demand on that industry. Consumption depends on real disposable income per capita, relative prices, differential income elasticities, and population. Input productivity depends on access to inputs because a larger choice set of inputs means it is more likely that the input with the specific characteristics required for the job will be found. In the capital stock adjustment process, investment occurs to fill the difference between optimal and actual capital stock for residential, non-residential, and equipment investment. Government spending changes are determined by changes in the population.

Block 2. Labor and Capital Demand

The Labor and Capital Demand block includes the determination of labor productivity, labor intensity, and the optimal capital stocks. Industry-specific labor productivity depends on the availability of workers with differentiated skills for the occupations used in each industry. The occupational labor supply and commuting costs determine firms' access to a specialized labor force.

Labor intensity is determined by the cost of labor relative to the other factor inputs, capital and fuel. Demand for capital is driven by the optimal capital stock equation for both non-residential capital and equipment. Optimal capital stock for each industry depends on the relative cost of labor and capital, and the employment weighted by capital use for each industry. Employment in private industries is determined by the value added and employment per unit of value added in each industry.

Block 3. Population and Labor Supply

The Population and Labor Supply block includes detailed demographic information about the region. Population data is given for age, gender, and race, with birth and survival rates for each group. The size and labor force participation rate of each group determines the labor supply. These participation rates respond to changes in employment relative to the potential labor force and to changes in the real after-tax compensation rate. Migration includes retirement, military, international, and economic migration. Economic migration is determined by the relative real after-tax compensation rate, relative employment opportunity, and consumer access to variety.

Block 4. Compensation, Prices and Costs

This block includes delivered prices, production costs, equipment cost, the consumption deflator, consumer prices, the price of housing, and the compensation equation. Economic geography concepts account for the productivity and price effects of access to specialized labor, goods, and services.

These prices measure the price of the industry output, considering the access to production locations. This access is important due to the specialization of production that takes place within each industry, and because transportation and transaction costs of distance are significant. Composite prices for each industry are then calculated based on the production costs of supplying regions, the effective distance to these regions, and the index of access to the variety of outputs in the industry relative to the access by other uses of the product.

The cost of production for each industry is determined by the cost of labor, capital, fuel, and intermediate inputs. Labor costs reflect a productivity adjustment to account for access to specialized labor, as well as underlying compensation rates. Capital costs include costs of non-residential structures and equipment, while fuel costs incorporate electricity, natural gas, and residual fuels.

The consumption deflator converts industry prices to prices for consumption commodities. For potential migrants, the consumer price is additionally calculated to include

housing prices. Housing prices change from their initial level depending on changes in income and population density.

Compensation changes are due to changes in labor demand and supply conditions and changes in the national compensation rate. Changes in employment opportunities relative to the labor force and occupational demand change determine compensation rates by industry.

Block 5. Market Shares

The market shares equations measure the proportion of local and export markets that are captured by each industry. These depend on relative production costs, the estimated price elasticity of demand, and the effective distance between the home region and each of the other regions. The change in share of a specific area in any region depends on changes in its delivered price and the quantity it produces compared with the same factors for competitors in that market. The share of local and external markets then drives the exports from and imports to the home economy.

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