

## TOWARDS A NEW NORMAL: TRANSPORTATION AND REGIONAL ECONOMIES POST-COVID

Billy Leung, Natalie Zhu, PhD; Brandon Stanaway, Naveen Kammar

what does **REMI** say? <sup>sm</sup>

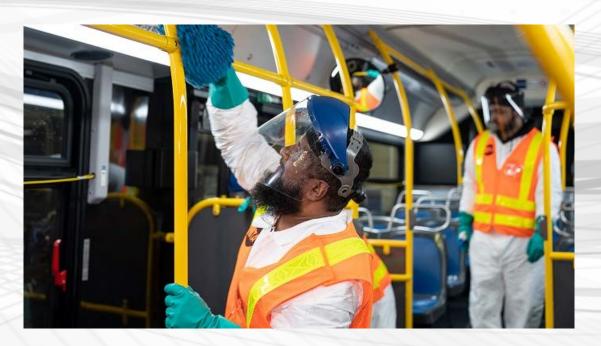




- □ COVID & Transportation
- Infrastructure Investment
- Cities
- Labor Force
- Model Demo



## **Transportation & COVID**



## **Coronavirus and Transportation**



"Coronavirus will have significant effect on the economy in the near term."

Federal Reserve Chair Jerome Powell

"We know that many of our nation's public transportation systems are facing extraordinary challenges..." FTA Acting Administrator Jane Williams

"During times like this, we as a nation realize and appreciate the vital role the transportation infrastructure plays in the 'supply chain' to stock our grocery stores, get needed medicine and equipment to hospitals, and allow the rest of us to carry on our daily lives."

U.S. Secretary of Transportation Elaine Chao



## **Challenges Faced by DOTs and MPOs**



#### Health Crisis

- Transportation ensures that communities can access needed goods and services
  - Transportation agencies must still provide these services while facing labor, supply, and funding challenges
- □ Economic Crisis
  - During an economic crisis, the provision of these services is even more critical
    - Networks enable the flow of workers, goods and services within regions and between regions
  - Infrastructure can be a key tool in responding to recessionary pressures



## **Infrastructure Investment**







## **Fiscal Shortfalls**



- State and local governments face revenue shortfalls and expenditure increases
  - Increased UI claims as employees are furloughed and businesses close permanently
  - Decrease in gas tax revenue fewer people traveling and commuting

Exhibit 4: Estimated Combined Fiscal Shock as a Percentage of Pre-COVID-19 Revenue Estimates by Region (USD millions)

REGION	PRE-COVID-19 REVENUE FORECAST (FYE2020 AND 2021)	ESTIMATED REVENUE DECLINE BY FYE2021	ESTIMATED MEDICAID SPENDING INCREASE BY FYE2021	COMBINED FISCAL SHOCK PERCENTAGE OF PRIOR REVENUE FORECAST
East	\$493,013	-\$43,615	\$6,820	-10.2%
Midwest	\$380,767	-\$34,852	\$6,790	-10.9%
South	\$512,423	-\$36,044	\$8,078	-8.6%
West	\$492,617	-\$67,461	\$7,586	-15.2%
U.S.	\$1,878,819	-\$181,972	\$29,273	-11.2%

# **Federal Funding**



- Funding for federal highway and transit investment agencies and programs is set to expire at the end of September
- House of Representatives passed a 5-year \$500B reauthorization act in June
  - \$319B for Federal-aid Highway Program
  - \$105B for transit programs under the FTA
  - \$60B for passenger rail programs under the FRA
  - House and Senate GOP seek more modest spending
- House unveiled bill to extend funding until December
- A lapse in funding will lead to the FTA and other federal transportation regulatory agencies shutting down



- Major projects may have been derailed or face budget shortfalls as the bottom falls out on common state-level transportation funding mechanisms
- Federal relief funds
  - Across all jurisdictions ~10% shortfall in expected gas tax related revenues since March
  - AASTO requested \$17B to support ongoing transportation projects
- Active state governments can save stranded projects
  - Move funds from other budget accounts to mitigate losses







# **Cities, COVID, Mobility**



- □ The pandemic will shift perceptions of how cities should serve its residents
  - Less centralized as previously downtown workers have the option to work from home
  - Walking and biking as alternative options to transit commutes
- Cities and towns are:
  - Repurposing roadways for bus, bike, and pedestrian use
    - Sales of children's and adult leisure bicycles have increased by 56% and 121% from March 2019, respectively
    - Boston is making protected bike lanes permanent and expanding bus lanes in the absence of normal car traffic
  - Allowing businesses (restaurants) to repurpose outside space (car parking, sidewalks) for extra seating

## Pedestrianization



### Cities and towns are:

- Repurposing roadways for bus, bike, and pedestrian use
  - Sales of children's and adult leisure bicycles have increased by 56% and 121% from March 2019, respectively
  - Boston is making protected bike lanes permanent and expanding bus lanes in the absence of normal car traffic
- Allowing businesses (restaurants) to repurpose outside
- Pedestrianization of streets
  - Copenhagen, 1962

what does

- Main stretch of commercial street → 35% increase in foot traffic, 81% increase in restaurant seating
- Waltham, MA closed down Moody Street to car traffic → supports the small businesses and restaurants that, otherwise, would not be open for business will say? <sup>sm</sup>

## **Urban Land Use**



#### Commercial property

- Researchers do not expect firms to shift away from downtown (core) offices
  - Face-to-face interactions still of high value
  - New firms form and lease offices once occupied by firms that have moved out or gone under
- Residential property
  - Housing Stock
    - Interest rates are projected to stay low for the next couple of years; opportunity to expand housing stock
    - Decentralization of work for "high skilled" workers → less spatially constrained → can expand search for quality, low cost/rent housing



## **Labor Force**



## **Employment Shifts**



### Employment

### Work from home

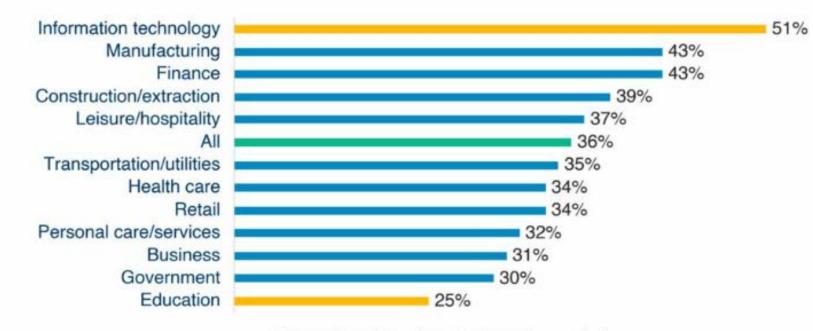
- About 43% of the United States' labor force is able to transition to telework
  - Telework is feasible for 63% of workers with a bachelors or graduate degree whereas that number drops to 24.7% for workers with only a high school degree
- Essential workers bear greater health risks in the short-term
- Business Closures
  - Temporary business closures are becoming permanent
    - Lack of sustained federal and state support
    - Case spike in summer and potential "second wave" this winter
    - Future market uncertainty

## **Automation & Worker Confidence**



- Firm-level
   technological
   uptake has
   accelerated
- Economists at the Becker-Friedman
   Institute predict
   32-42% of COVID induced layoffs will
   be permanent

How worried are you that you may lose your job as a result of the coronavirus (COVID-19) events?



Share of workers (very/extremely worried)

Public Viewpoint: COVID-19 Work and Education Survey STRADA EDUCATION NETWORK

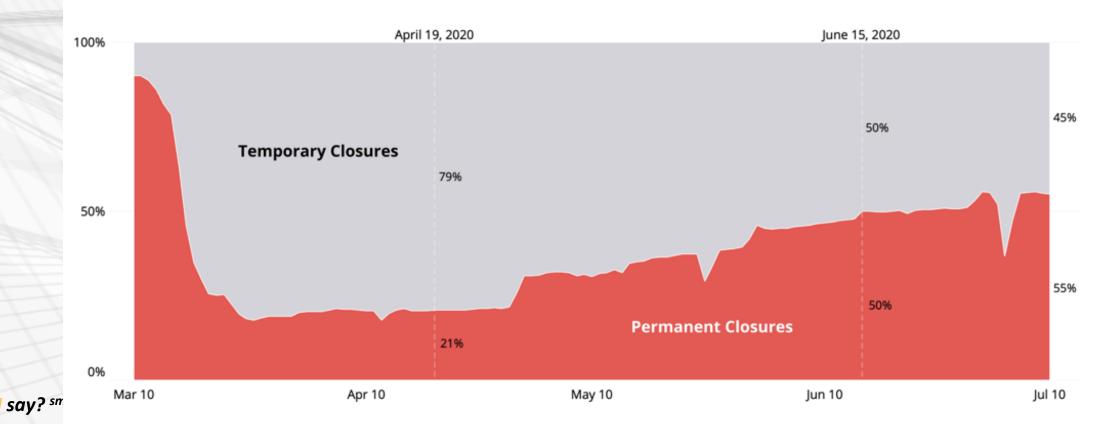
## **Permanent Business Closures**

what does



### The Share of Permanently Closed Businesses is Rising

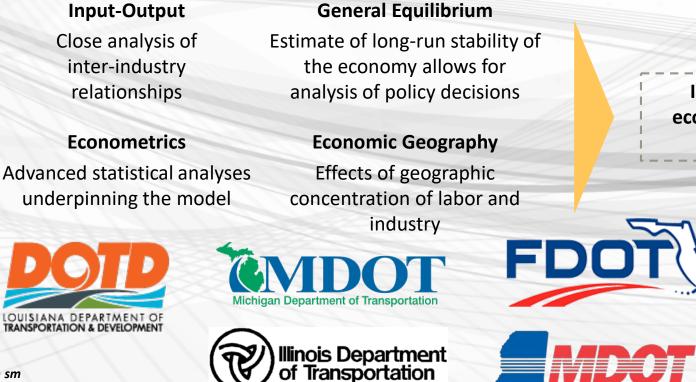
Share of business closures on Yelp that were temporary vs. permanent



## **About REMI**



REMI's 35-year history of rigorous academic research and software development has led to the development of the the industry standard in macroeconomic research methodology:



Integrated REMI economic modelling approach



## Transportation and Economic Development Transight



## **Static vs. Dynamic Analysis**



#### **Static Analysis**

- Construction spending
- O&M spending

#### **Dynamic Analysis**

- Construction spending
- O&M spending
- Travel time savings
- Emissions savings
- Safety improvements
- Fuel expenditures
- Non-fuel VOCs
- Network speed improvements
- Access to labor
- Access to intermediate inputs

FHWA: TranSight is among the "best equipped to estimate *productivity* impacts"\*

\*https://ops.fhwa.dot.gov/publications/fhwahop15034/ch5.htm

## **TranSight Process**



#### VMT (by mode)

- VHT (by mode)
- Trip Counts (by mode)

Inputs: TDM Indicators

#### TranSight Calculations

- Accessibility Costs
- Commuting Costs
- Transportation Costs
  - Parameterization

#### • Employment

- GDP
- Personal Income
- Economic Migration

#### Outputs: Macroeconomic Results

## **Applications of TranSight**



Long-Range Planning

**Project Prioritization** 

**Transportation Finance** 

**Economic Impact Analysis** 

**Grant Applications** 

**TIP and STIP Planning** 

**Regional Transportation Plans** 



# **Model Demonstration**



### □ Mission of a DOT

- Provide a safe and efficient transportation system for people and goods
- Enhance economic prosperity and livability in the region through transportation

Due to unprecedented circumstances posed by COVID-19 pandemic the efforts of a DOT have been thrown into disarray



### □ Impacts of COVID 19 on transportation

- The pressure on transportation demand during this coronavirus pandemic has shifted from moving people and goods for economic prosperity and growth to making a core transportation system operational to ensure freight, key essential workers and the economy can continue to function
  - In such circumstances it is important to maintain a resilient transportation infrastructure system for COVID and other unforeseen events (natural disasters, etc.)

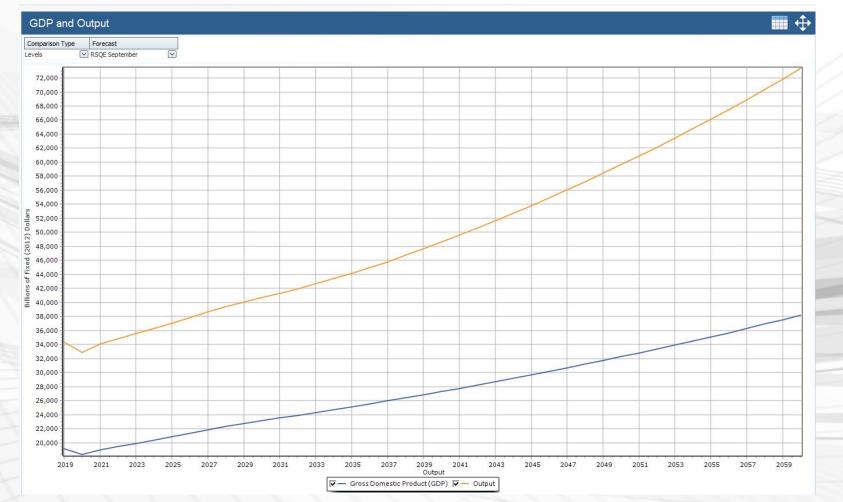


Given the impacts of COVID-19 on the economy and the transportation sector it is important to know

- What is the impact?
  - Scale of the impact
  - What sectors?
  - Regional and national effects
- Will the impact be short term or will it be a long term impact?

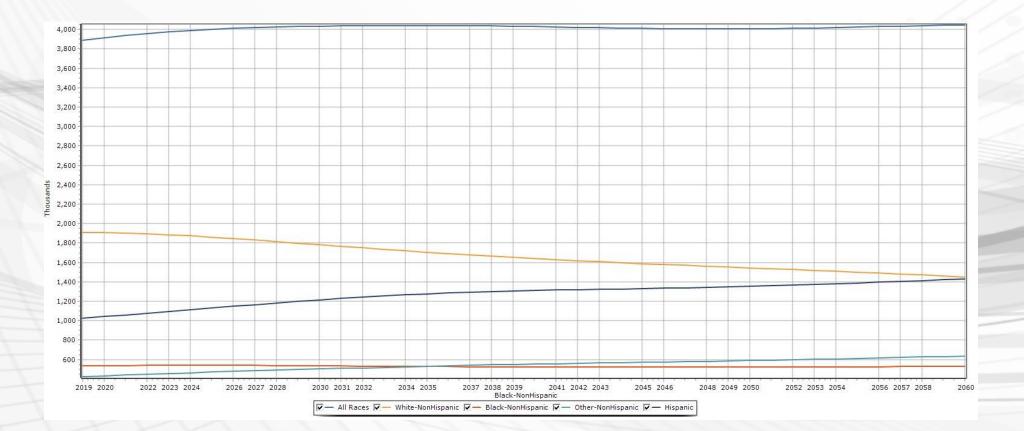
### **US Output and GDP with COVID Impact**





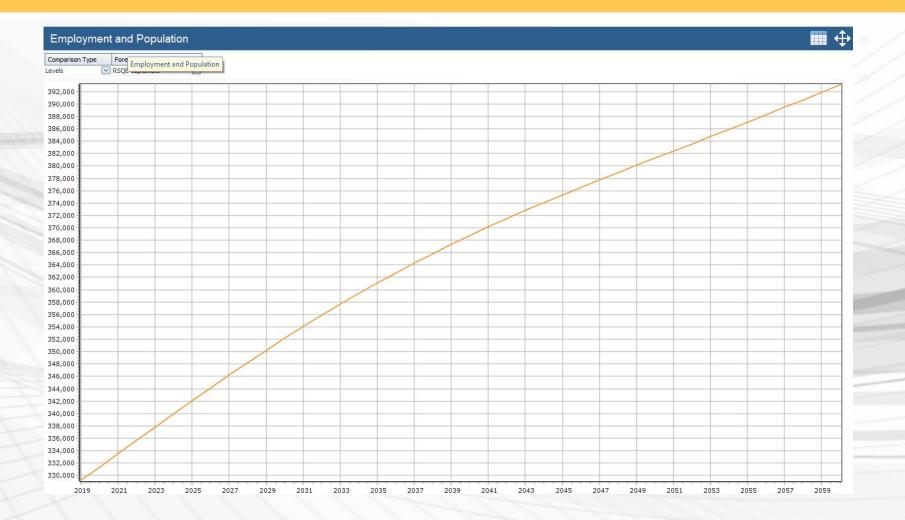
### **Births by Ethnicity**





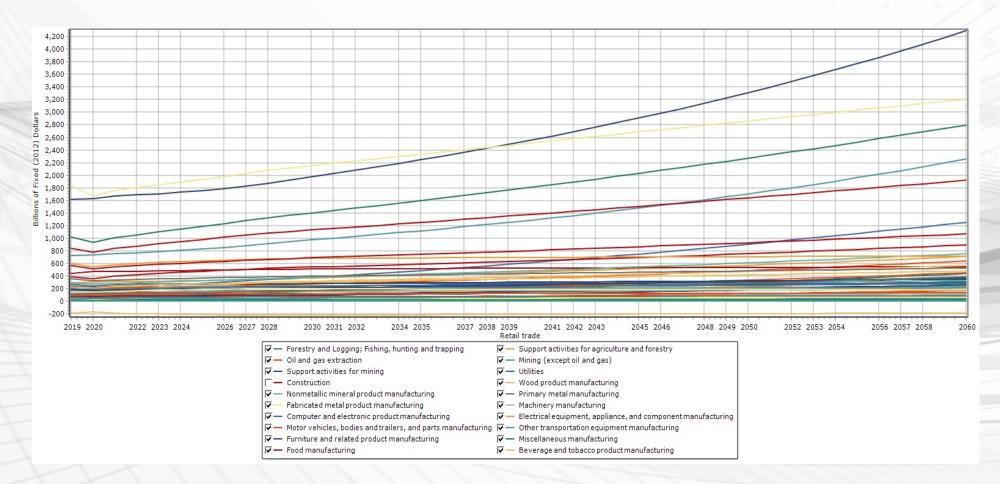
### **Population Growth Over Time**





### **National Consumption**







- Although there is a disruption in the economy for a few years due to COVID the overall economy's outlook of the country will maintain a positive trajectory
- Given the current low rates of borrowing, States can invest in infrastructure for immediate economic impacts and for future economic prosperity through construction and enhancement in transportation

## **Simulation Inputs**



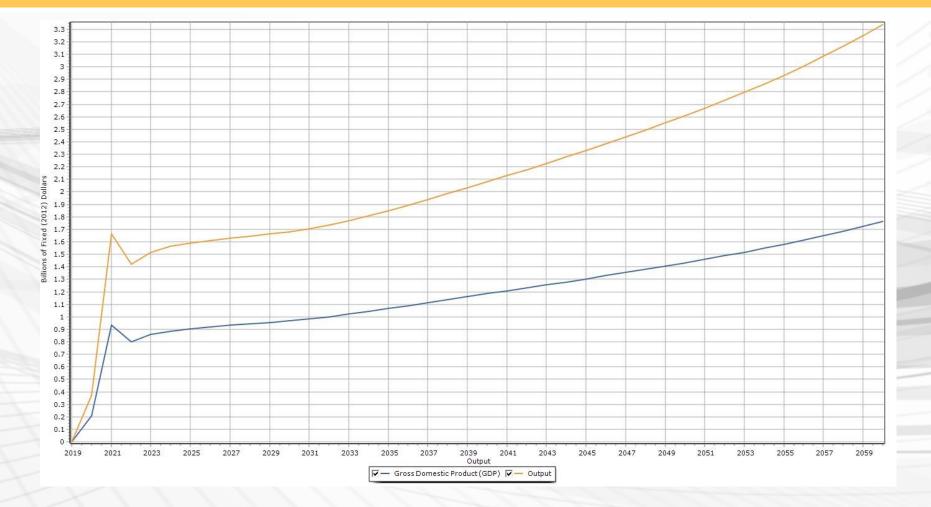
The following simulations were done with the TranSight Arizona model

cy Variable Inputs																											
Edit Group																											
💉 🕺 New Industries																											
c Vier Category	Detail	Region	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Exogenous Final De	mar Construction	Arizona	2018 Fixed !	0	200	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
/ 🙀 Transportation	Cost Matrix																										
c Vier Category	Detail	Region	Units	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Transportation Cos	Arizona to Arizona	Interregional	Proportion	0	0	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01

Inputs to the simulation: Investment of 200 Million in the years 2020 – 21, and reduction in transportation costs by 1% from 2023-2060

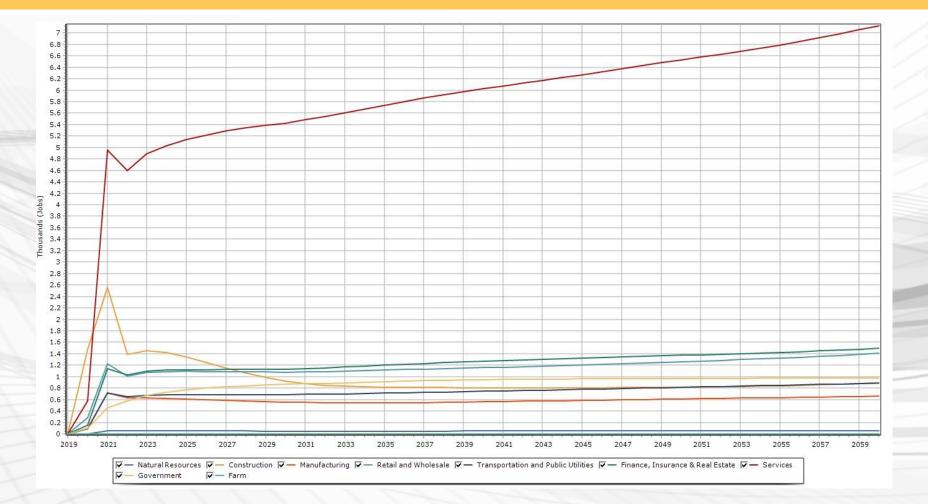
### **GDP & Output After Investment**





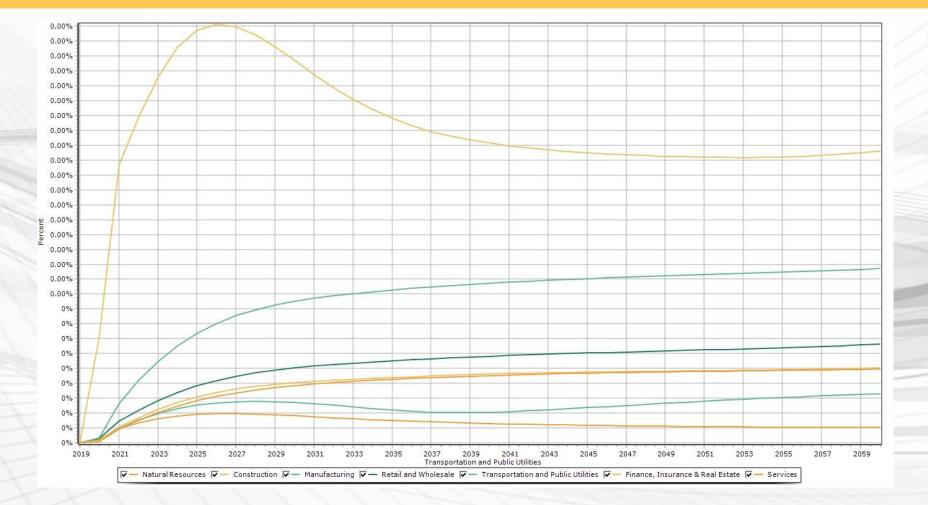
### **Employment by Industry**





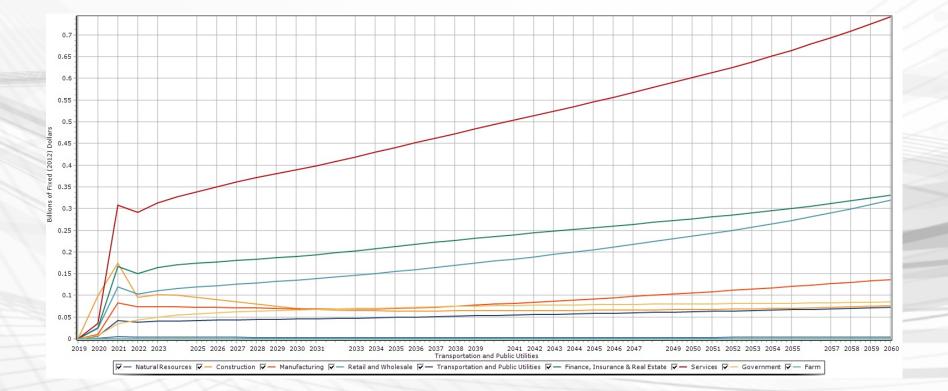
### **Commodity Access Index**





### **Value Added by Industry**





## **Economic Summary**



omparison Type Forecast																		
vels Regional Simulation	1 🔍																	
Kegional Sindiadon	1																	
,000																		
,000																		
,000																		
,000														-				-
,000														_				
													-	_	-			_
,000			_															
,000															_			_
.000																		
,000														-				=
,000							_		-	_								
- 되 - 되	– Labor Force 🔽 – – Personal Income 🔽 –	Private No Gross Do Disposabl	mestic Proc le Personal	duct Income			esidence A utput eal Disposa	djusted Em able Persor		Val	ue-Added al Disposab	le Persona	2051	2053 er Capita				
- - - -	– Labor Force 🔽 – – Personal Income 🔽 –	Gross Do	mestic Proc le Personal	duct Income			esidence A utput eal Disposa	djusted Em able Persor		Val	ue-Added	le Persona	Income pe					
- - - -	Labor Force     Personal Income     PCE-Price Index     ✓	- Gross Doi - Disposabl	mestic Proc le Personal	duct Income			esidence A utput eal Disposa	djusted Em able Persor		Val	ue-Added al Disposab	le Persona	Income pe		2032	2033	2034	
Category	– Labor Force	- Gross Doi - Disposabl - Commodi	mestic Proc le Personal ity Access I	duct Income ndex (mov	ngaverage	▼	esidence Ar utput eal Disposa abor Access	djusted Em able Persor s Index	nal Income	Val	ue-Added al Disposab ative Cost	le Persona of Producti	l Income pe	er Capita	2032 4277.266	2033 4292.812	2034 4308.880	-
Category Total Employment	- Labor Force	- Gross Dor - Disposabl - Commodi 2019	mestic Proc le Personal ity Access I 2020	duct Income ndex (mov 2021	ng average 2022	✓ — R ✓ — 0 ✓ — R e) ✓ — La 2023	esidence Ar utput eal Disposa abor Access 2024	djusted Em able Persor s Index 2025	aal Income 2026	Val	ue-Added al Disposab ative Cost 2028	le Personal of Producti 2029	I Income pe on 2030	er Capita 2031				) 4
Category Total Employment Private Non-Farm Employment Residence Adjusted Employment	Labor Force     Versonal Income     PCE-Price Index     Versonal Income     PCE-Price Index     Versonal Versona Versonal Versona Versonal Versonal Versonal Versonal Versonal Ver	- Gross Doi Disposabl Commodi 2019 3932.751 3443.168 3926.292	mestic Proc le Personal ity Access I 2020 3788.729 3308.708 3779.246	duct Income ndex (mov 2021 3817.014 3341.223 3808.189	2022 3918.590 3440.102 3910.299	Image: Constraint of the second se	esidence Ad utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043	djusted Em able Persor s Index 2025 4089.060 3599.006 4082.380	2026 4139.603 3645.762 4133.464	<ul> <li>✓ Val</li> <li>✓ Rez</li> <li>✓ Rel</li> <li>2027</li> <li>4184.579</li> <li>3686.870</li> <li>4178.940</li> </ul>	ue-Added al Disposab ative Cost 2028 4217.088 3715.884 4211.845	le Personal of Producti 2029 4232.084 3728.503 4227.224	2030 4248.450 3743.054 4243.896	2031 4262.531 3755.541 4258.127	4277.266 3768.815 4272.980	4292.812 3782.997 4288.612	4308.880 3797.813 4304.762	) 4 3 3 2 4
Category Total Employment Private Non-Farm Employment Residence Adjusted Employment	Labor Force     Labor Force     Personal Income     PCE-Price Index     V     Onits     Units     Thousands (Jobs)     Thousands     Thousands	Gross Doi Disposable Commodi 3932.751 3443.168 3926.292 7274.060	2020 3788.729 3308.708 3779.246 7430.567	2021 3817.014 3341.223 3808.189 7539.991	2022 3918.590 3440.102 3910.299 7650.281	Image: Constraint of the second se	esidence Ad utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114	djusted Em able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521	2026 4139.603 3645.762 4133.464 8014.765	▼         ∨al           ▼         Rez           2027         Rel           √         Rel           2027         4184.579           3686.870         4178.940           8091.868         8091.868	ue-Added al Disposab ative Cost 2028 4217.088 3715.884 4211.845 8161.749	2029 4232.084 3728.503 4227.224 8223.532	2030 4248.450 3743.054 4243.896 8281.034	2031 4262.531 3755.541 4258.127 8335.088	4277.266 3768.815 4272.980 8386.437	4292.812 3782.997 4288.612 8435.580	4308.880 3797.813 4304.762 8482.945	) 4 3 3 2 4 5 8
Category Category Total Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force	Labor Force     Versonal Income     Personal Income     PCE-Price Index     Versonal Income     Relative Delivered Price     Units     Thousands (Jobs)     Thousands     Thousands     Thousands	Gross Doi Disposable Commodi 3932.751 3443.168 3926.292 7274.060 3496.477	2020 3788.729 3308.708 3779.246 7430.567 3546.937	2021 3817.014 3341.223 3808.189 7539.991 3579.838	2022 3918.590 3440.102 3910.299 7650.281 3631.101	Image: Constraint of the system         R           Image: Constraint of the system         R           2023         3981.387           3981.387         3498.902           3973.724         7752.543           3681.256         3681.256	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609	djusted Em able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495	2026 4139.603 3645.762 4133.464 8014.765 3822.689	▼         Val           ▼         Rez           2027         Rez           4184.579         3686.870           4178.940         8091.868           3866.877         3866.877	2028 4217.088 3715.884 4211.845 8161.749 3906.704	2029 4232.084 3728.503 4227.224 8223.532 3929.180	2030 4248.450 3743.054 4243.896 8281.034 3948.214	2031 4262.531 3755.541 4258.127 8335.088 3966.422	4277.266 3768.815 4272.980 8386.437 3983.506	4292.812 3782.997 4288.612 8435.580 4000.450	4308.880 3797.813 4304.762 8482.945 4016.527	) 4 3 3 2 4 5 8 7 4
Category Total Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force Gross Domestic Product	Labor Force     Personal Income     PCE-Price Index     PCE-Price Index     Units     Thousands (Jobs)     Thousands (Jobs)     Thousands     Thousands     Billions of Fixed (20 12) Dollars	Gross Doi Disposabl Commodi 3932.751 3443.168 3926.292 7274.060 3496.477 331.003	mestic Proceeding Personal ty Access I 2020 3788.729 3308.708 3779.246 7430.567 3546.937 326.282	2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262	Image: Constraint of the system         R           Image: Constraint of the system         R           2023         3981.387           3498.902         3973.724           7752.543         3681.256           350.506         350.506	esidence Ad utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053	djusted Em able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917	☑         ✓         ∨al           ☑         —         Rez           ☑         —         Rel           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑	2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157	le Personal of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033	2030 4248.450 3743.054 4243.896 8281.034 3948.214 410.167	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703	4277.266 3768.815 4272.980 8386.437 3983.506 423.423	4292.812 3782.997 4288.612 8435.580 4000.450 430.326	4308.880 3797.813 4304.762 8482.945 4016.527 437.397	) 4 3 3 2 4 5 8 7 4 7
Category Category Total Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force Gross Domestic Product Output	Labor Force     Personal Income     PCE-Price Index     Relative Delivered Price      Units     Thousands (Jobs)     Thousands     Thousands     Billions of Fixed (20 12) Dollars Billions of Fixed (20 12) Dollars	Gross Doi Disposabl Commodi 3932.751 3443.168 3926.292 7274.060 3496.477 331.003 561.601	2020 3788.729 3308.708 3779.246 7430.567 3546.937 326.282 553.758	2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674 564.261	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697	▼         R           ▼         0           ▼         R           2023         3981.387           3498.902         3973.724           7752.543         3681.256           350.506         592.753	esidence Au utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 606.229	2025 4089.060 3599.006 4082.300 7932.521 3775.495 368.209 620.527	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917 635.519	☑         ✓         Val           ☑         —         Rez           ☑         —         Rel           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑	2028 2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157 662.667	le Personai of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 672.793	2030 4248,450 3743,054 4243,896 8281,034 93948,214 410,167 683,561	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733	) 4 3 3 2 4 5 8 7 4 7 3
Category Total Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force Gross Domestic Product Output Value-Added	Labor Force     Personal Income     PCE-Price Index     PCE-Price Index     Units     Thousands (Jobs)     Thousands (Jobs)     Thousands     Thousands     Billions of Fixed (20 12) Dollars	Gross Doi Disposabl Commodi 3932.751 3443.168 3926.292 7274.060 3496.477 331.003	mestic Proceeding Personal ty Access I 2020 3788.729 3308.708 3779.246 7430.567 3546.937 326.282	2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262	Image: Constraint of the system         R           Image: Constraint of the system         R           2023         3981.387           3498.902         3973.724           7752.543         3681.256           350.506         350.506	esidence Ad utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053	djusted Em able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917	☑         ✓         ∨al           ☑         —         Rez           ☑         —         Rel           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑         —         —           ☑	2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157	le Personal of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033	2030 4248.450 3743.054 4243.896 8281.034 3948.214 410.167	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703	4277.266 3768.815 4272.980 8386.437 3983.506 423.423	4292.812 3782.997 4288.612 8435.580 4000.450 430.326	4308.880 3797.813 4304.762 8482.945 4016.527 437.397	) 4 3 3 2 4 5 8 7 4 7 3
Category Category Total Employment Population Labor Force Gross Domestic Product Dutput Value-Added Personal Income	Labor Force     Personal Income     PCE-Price Index     PCE-Price Index     Relative Delivered Price      Units     Thousands (Jobs)     Thousands     Thousands     Thousands Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars	Gross Doi Disposabl Commodi 2019 3932.751 3443.168 3926.292 7274.060 3496.477 331.003 561.601 331.003	mestic Procession of the personal style of t	duct Income ndex (mov 2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674 564.261 332.674	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697 342.262	Image: marked with the second seco	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 606.229 359.053	djusted En able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209 620.527 368.209	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917 635.519 377.917	▼         ∨al           ▼         Rez           ▼         Rez           ▼         Rez           2027         4184.579           3686.870         4178.940           8091.868         3866.877           387.520         650.043           387.520	2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157 662.667 396.157	le Personal of Producti 2029 4232.084 3728.503 4227.224 8223.532 3929.180 403.033	2030 4248.450 3743.054 4243.896 8281.034 3948.214 410.167 683.561 410.167	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626 416.703	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397	3 3 2 4 5 8 7 4 7 3 7
Category Category Total Employment Private Non-Farm Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force Gross Domestic Product Output Value-Added Personal Income Disposable Personal Income	Labor Force     Personal Income     PCE-Price Index     PCE-P	Gross Doi Disposabl Commodi 3932.751 3443.168 3926.292 7274.060 3496.477 331.003 561.601 331.003 334.964	mestic Proc le Personal ty Access I 2020 3788.729 3308.708 3779.246 7430.637 3546.937 326.282 355.758 326.282 374.045	duct Income ndex (mov 2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674 350.182	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697 342.262 364.561	2023           3981.387           3498.902           3973.724           7752.543           3681.256           350.506           377.476	esidence Ar utput eal Disposa abor Access 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 606.229 359.053 393.349	djusted En able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209 620.527 368.209 414.014	2026 4139.603 3645.762 4133.464 8014.765 3822.691 377.917 435.020	↓         ↓         ∨al           ↓         ↓         Rez           ↓         ↓         Rez           ↓         ↓         Rez           ↓         ↓         ↓           ↓         ↓	ue-Added Il Disposab ative Cost 2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157 662.667 396.157 481.794	le Personal of Producti 2029 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 672.793 403.033 500.536	2030 4248.450 3743.054 4243.896 8281.034 3948.214 410.167 683.561 410.167 526.091	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626 416.703 546.810	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423 568.501	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326 591.201	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397 614.922	0     4       3     3       2     4       5     8       7     4       7     4       7     4       7     4       3     4       7     4       3     4       3     4       3     4       3     4       3     4       3     4       3     4       3     4       4     4       5     8       6     4       7     4       6     4       7     4       6     4       7     4       7     4       8     4       8     4       7     4       8     4       8     4       8     4       8     4
Category Category Total Employment Private Non-Farm Employment Residence Adjusted Employment Labor Force Gross Domestic Product Dutput Value-Added Personal Income Real Disposable Personal Income	Labor Force     Personal Income     PCE-Price Index     PCE-Price Index     Units     Thousands (Jobs)     Thousands (Jobs)     Thousands     Thousands     Iblions of Fixed (2012) Dollars     Billions of Fixed (2012) Dollars     Billions of Fixed (2012) Dollars     Billions of Current Dollars     Billions of Current Dollars	- Gross Doi - Disposable - Commodi - 2019 3932.751 3443.168 3926.292 7274.060 3496.477 331.003 561.601 333.964 - 301.796	mestic Proceeding of the second secon	duct Income ndex (mov 2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674 564.261 332.674 332.674 3350.182 351.8263	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697 342.262 364.561 326.635	2023 3981.387 7752.543 3681.256 350.506 592.753 350.506 592.753 350.506 592.753	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 369.053 363.349 351.880	djusted En able Persor s Index 2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209 620.527 368.209 414.014 370.225	2026 4139.603 3645.762 4133.644 8014.765 3822.689 377.917 635.519 377.917 435.020 385.999	▼         ∨al           ▼         −         Rez           2027         4184.579         3686.870           4178.940         8091.868         3866.877           387.520         650.043         387.520           455.796         402.750	ue-Added I Disposab ative Cost 2028 4217.088 3715.884 4211.845 8161.749 396.577 662.667 396.157 481.794 425.451	le Personal of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 672.793 403.033 672.793 403.033 6500.536 500.536	2030 4248.450 3743.054 4243.996 8281.034 3948.214 410.167 683.561 410.167 526.091 464.973	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626 416.703 546.810 483.315	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423 568.501 502.519	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326 591.201 522.614	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397 614.922 543.613	0     4       3     3       42     4       5     8       7     4       7     4       7     4       7     4       3     5       5     5
Category Category Total Employment Private Non-Farm Employment Private Non-Farm Employment Residence Adjusted Employment abor Force Sross Domestic Product Dutput Value-Added Personal Income Disposable Personal Income Real	Labor Force Personal Income PCE-Price Index Units Units Thousands (Jobs) Thousands (Jobs) Thousands Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Current Dollars Billions of Current Dollars Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Current Dollars Billions of Fixed (2012) Dollars	- Gross Dor Disposabl - Commodi 3932.751 3443.168 3926.292 7249.677 331.003 561.601 331.964 301.796 279.781	mestic Process I le Personal ity Access I 2020 3788.729 3308.708 3779.246 7430.567 3546.937 326.282 553.758 326.282 374.045 340.569 312.365	Juct Income ndex (mov 3817.014 3341.223 3808.189 7539.991 35279.838 332.674 332.674 332.674 350.182 315.263 285.762	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697 342.262 364.561 326.635 292.409	2023 3981.387 3498.902 3973.724 7752.543 3681.256 592.753 350.506 592.753 350.506 377.476 377.476	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 360.529 393.349 351.880 303.658	2025 4089,060 3599,006 4082,380 7932,521 3775,495 368,209 414,014 370,225 313,466	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917 435.020 385.999 320.629	☑         ∨al           ☑         ⊂           ☑         Rez           ☑         Rez           ☑         Rez           ☑         1184.579           3686.870         4178.940           №178.940         8091.868           3866.877         387.520           650.043         387.520           ↓55.796         ↓55.796           ↓402.750         328.215	2028 2028 4217.088 3715.884 4211.845 8161.749 3906.704 396.157 662.667 396.157 481.794 481.794 481.794 481.794	le Personai of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 672.793 403.033 500.536 441.822 346.535	2030 4248.450 3743.054 4243.896 8281.034 3948.214 410.167 526.091 464.973 357.787	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626 416.703 546.810 483.315 364.805	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423 568.501 502.519 372.051	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326 591.201 522.614 379.516	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397 614.922 543.613 387.185	) 4 3 3 2 4 5 8 5 8 7 4 7 7 2 2 3 3 5 5 3
Category Category Contained and the second s	Labor Force Personal Income PCE-Price Index C Relative Delivered Price Units Thousands (Jobs) Thousands (Jobs) Thousands Thousands Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Current Dollars Billions of Current Dollars Billions of Fixed (2012) Dollars Thousands of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Billions of Fixed (2012) Dollars Dillions D	- Gross Dor Disposabl - Commodi 3932,751 3443,168 3926,292 7274,060 3496,477 331,003 <b>561,601</b> 334,964 301,796 279,781 38,463 107,869 1,000	mestic Process I le Personal ty Access I 2020 3788.729 3308.708 3779.246 7430.567 326.282 <b>553.755</b> 326.282 326.282 326.282 3240.559 312.365 42.038 109.029 1.000	Juct Income ndex (mov 2021 3817.014 3341.223 3808.189 7539.991 3579.838 332.674 564.261 3350.82 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 285.762 315.263 315.26	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 579.697 342.262 364.561 326.635 292.409 38.222 111.705 1.000	☑         —         R           ☑         —         Q           ☑         —         R           ☑         —         R           ☑         —         R           ☑         ☑         —           ☑         ☑         □           ☑         ☑         ☑	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 369.053 393.349 351.880 303.658 38.702 115.880 1.000	2025 4089.060 3599.006 4082.380 7932.521 3775.495 368.209 620.527 368.209 620.527 368.209 414.014 370.225 313.466 39.517 118.107 1.000	2026 4139,603 3645,762 4133,464 8014,765 3822,689 377,917 435,020 385,999 320,629 40,005 120,388 1,000	☑         ∨al           ☑         Rez	ue-Added I Disposab ative Cost 2028 4217.088 4217.088 3715.884 4211.845 8161.749 396.157 662.667 396.157 481.794 425.451 340.193 41.681 125.062 1.000	le Personal of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 500.536 441.822 346.535 42.139 127.497 1.000	2030 4248.450 3743.054 4243.896 8281.034 4243.896 8281.034 410.167 526.091 464.973 357.787 43.206 129.958 1.000	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 546.810 483.315 364.805 43.767 132.486 1.000	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423 568.501 502.519 372.051 44.363 135.067 1.000	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326 591.201 522.614 379.516 44.990 137.705 1.000	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397 614.922 543.613 387.185 45.643 140.402 1.000	) 4 3 3 2 4 5 8 7 4 7 7 7 7 7 7 7 7 7 7 3 3 5 5 3 3 2 2
Category Category Category Total Employment Private Non-Farm Employment Private Non-Farm Employment Residence Adjusted Employment Population Labor Force Gross Domestic Product Output Value-Added Personal Income Real Disposable Personal Income Commodity Access Index (moving averag Labor Access Index (moving averag	Labor Force     Personal Income     PCE-Price Index     PCE-Price Index     Relative Delivered Price      Units     Units     Thousands (Jobs)     Thousands     Thousands     Billions of Fixed (2012) Dollars     Thousands of Fixed (2012) Dollars     Z012=100 (Nation)	- Gross Dor Disposabl Commodi 3932.751 3443.168 3926.292 7274.060 3496.477 331.003 3561.601 331.003 334.964 301.796 2279.781 38.463 107.869	mestic Process I le Personal ity Access I 3788,729 3308,708 3308,708 3308,708 3308,708 3779,246 7430,567 354,587 326,282 355,755 326,282 374,045 330,569 312,365 42,038 109,029	Juct Income ndex (mov 3817.014 3341.223 3308.189 7539.991 3579.838 332.674 332.674 3564.261 332.674 3564.261 332.674 356.263 265.762 37.900 110.324	2022 3918.590 3440.102 3910.299 7650.281 3631.101 342.262 364.561 326.635 292.409 38.222 111.705	Image: marked bit is a straight of the	esidence Ar utput eal Disposa abor Access 2024 4037.221 3550.918 4030.043 7846.114 3729.609 359.053 606.229 359.053 393.349 351.880 303.658 38.702 115.880	2025 4089.060 3599.006 4082.380 7932.52 368.209 620.527 368.209 414.014 370.225 313.466 313.467 313.467 118.107	2026 4139.603 3645.762 4133.464 8014.765 3822.689 377.917 435.020 385.999 320.629 40.005 120.388	↓         ↓	ue-Added I Disposab ative Cost 4217.088 3715.884 4211.845 8161.749 396.157 662.667 396.157 481.794 425.451 340.193 41.681 125.062	le Personal of Producti 4232.084 3728.503 4227.224 8223.532 3929.180 403.033 672.793 403.033 500.536 441.635 346.535 42.139 127.497	2030 4248.450 3743.054 4243.966 8281.034 3948.214 410.167 526.091 46.973 357.787 43.206 129.958	2031 4262.531 3755.541 4258.127 8335.088 3966.422 416.703 693.626 416.703 546.810 436.315 3546.810 436.405 43.645 43.767 132.486	4277.266 3768.815 4272.980 8386.437 3983.506 423.423 704.305 423.423 568.501 502.519 372.051 44.363 135.067	4292.812 3782.997 4288.612 8435.580 4000.450 430.326 715.652 430.326 591.201 522.614 379.516 44.990 137.705	4308.880 3797.813 4304.762 8482.945 4016.527 437.397 727.733 437.397 614.922 543.613 387.185 45.643 140.402	)     4       )     4       3     3       5     8       7     4       7     3       5     3       5     3       2     3       5     5       3     5       5     5       3     5       5     5       3     5       5     5

### **Summary**









- While COVID is significant and temporarily has disrupted the economy, The long term US economy has a positive outlook
- While COVID funding might not completely mitigate the economic pain, due to low rates it might be a good time to invest in infrastructure to increase a region's economic competitiveness and prosperity