

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

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what does **REMI** say? sm

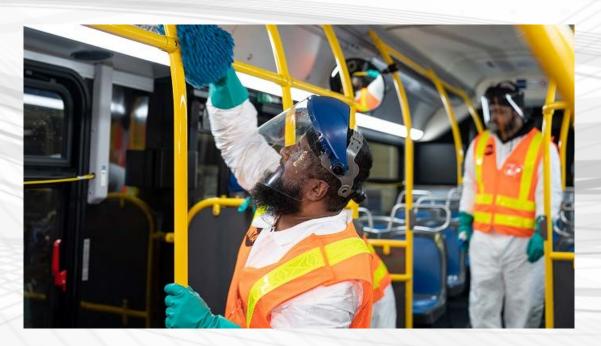




- □ COVID & Transportation
- Infrastructure Investment
- Cities
- Labor Force
- Model Demo



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? sm

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

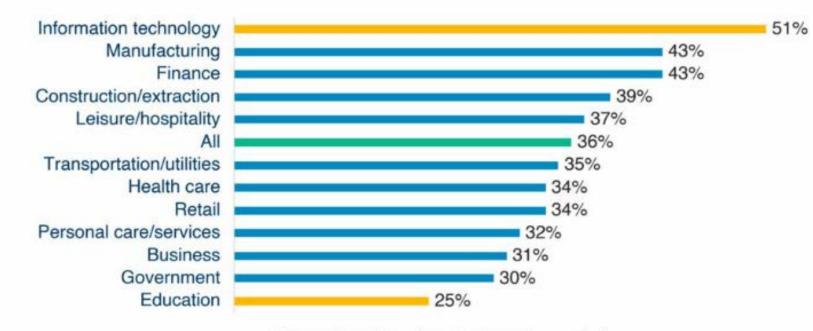
- About 43% of the United States' labor force is able to transition to telework
 - Telework is feasible for 63% of workers with a bachelors or graduate degree whereas that number drops to 24.7% for workers with only a high school degree
- Essential workers bear greater health risks in the short-term
- 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

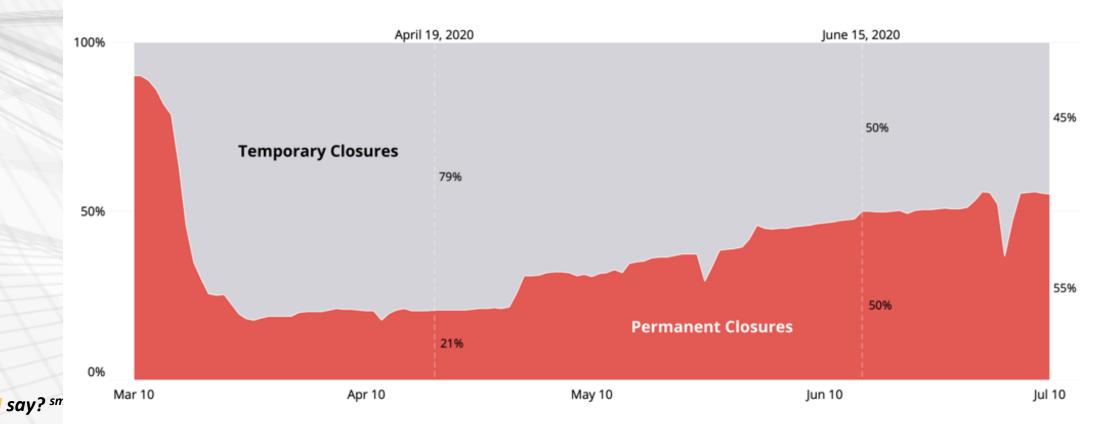
Permanent Business Closures

what does



The Share of Permanently Closed Businesses is Rising

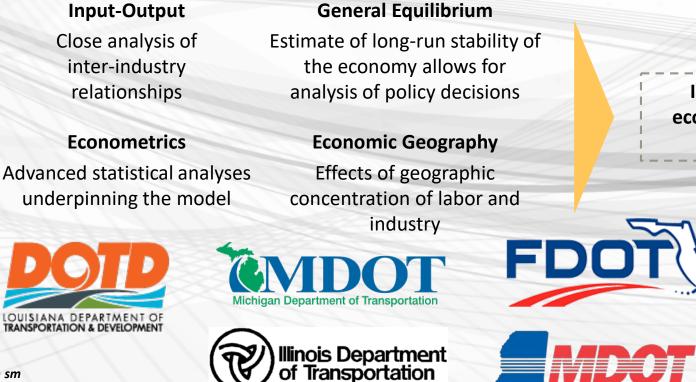
Share of business closures on Yelp that were temporary vs. permanent



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.)

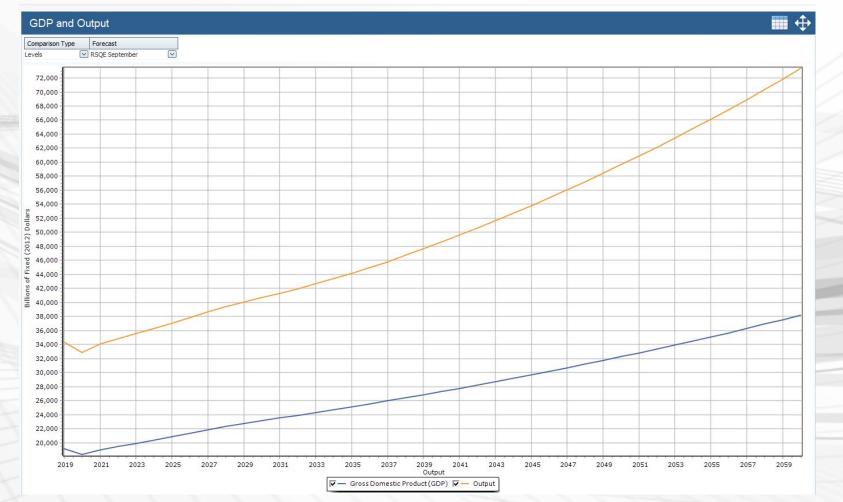


Given the impacts of COVID-19 on the economy and the transportation sector it is important to know

- 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?

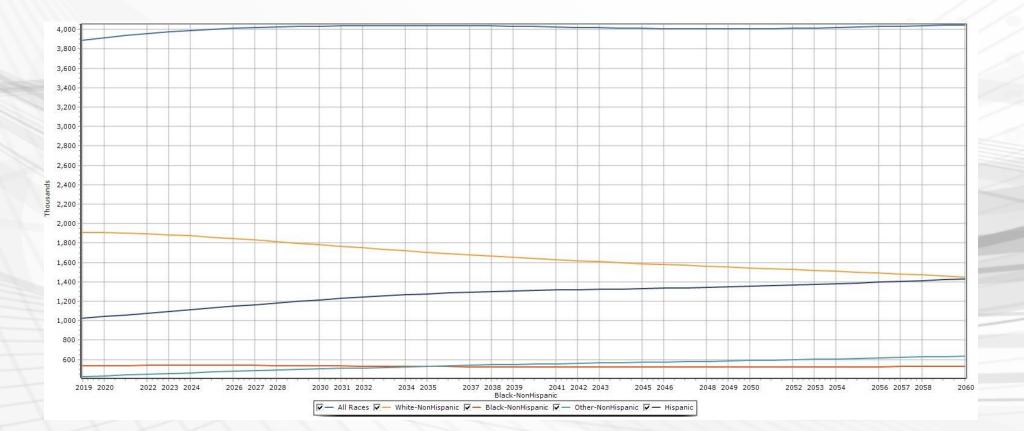
US Output and GDP with COVID Impact





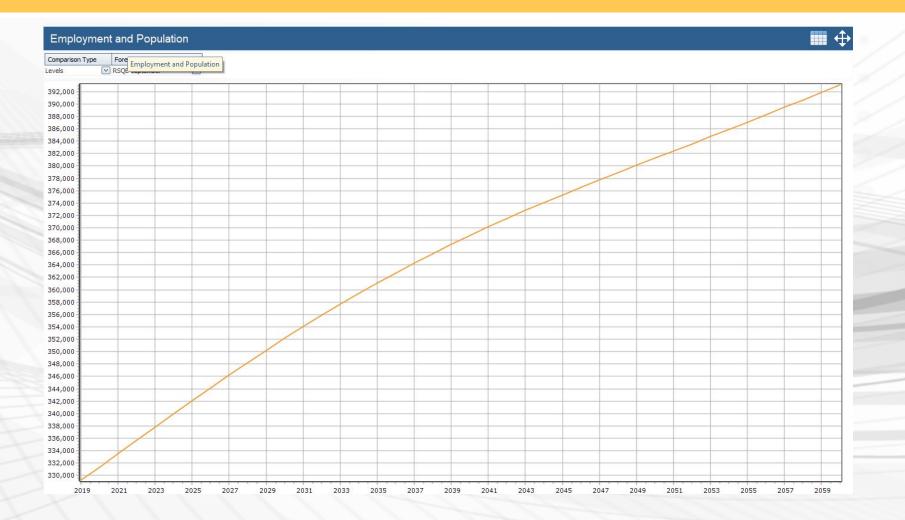
Births by Ethnicity





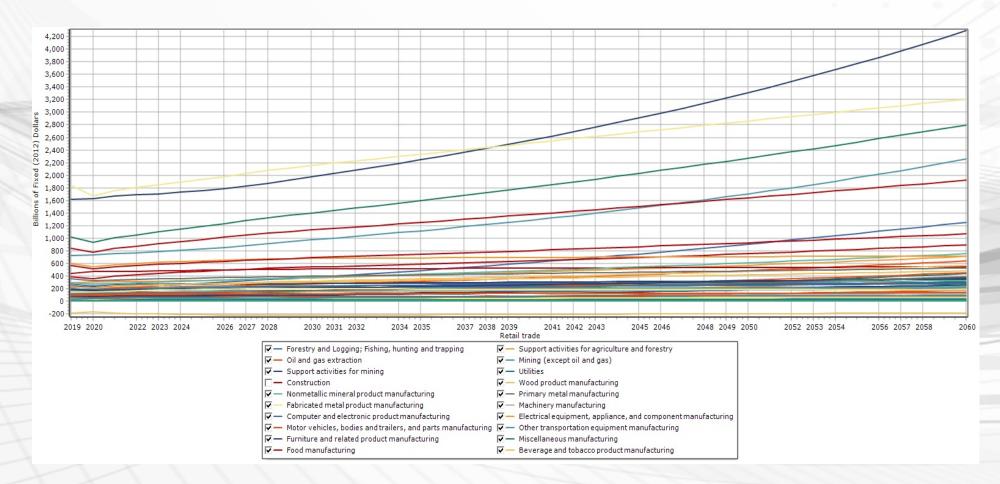
Population Growth Over Time





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



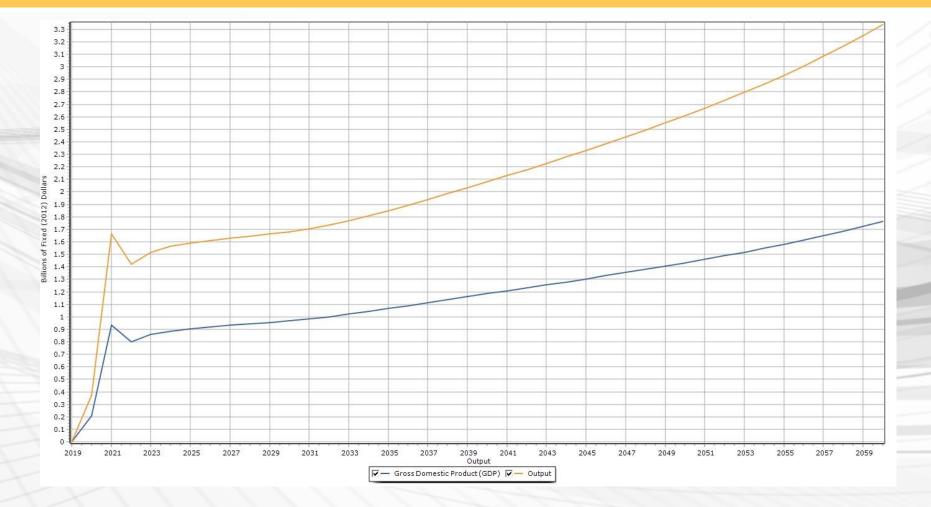
The following simulations were done with the TranSight Arizona model

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

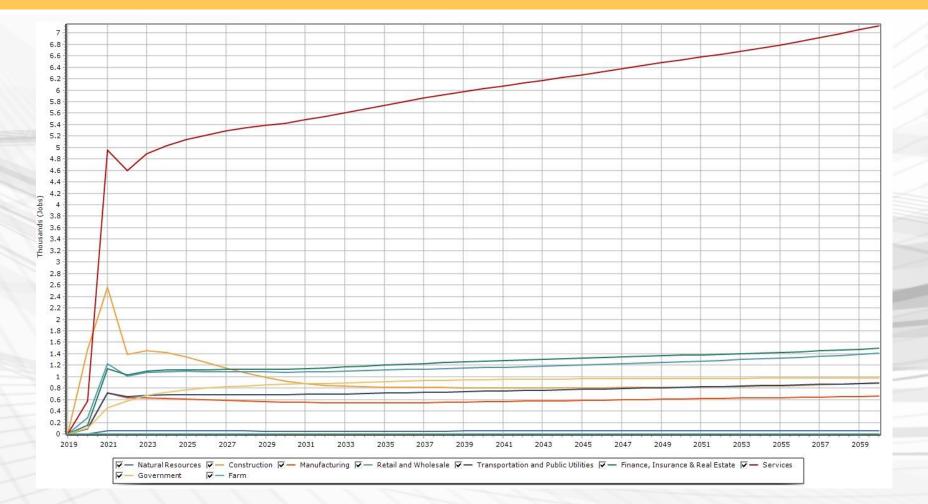
GDP & Output After Investment





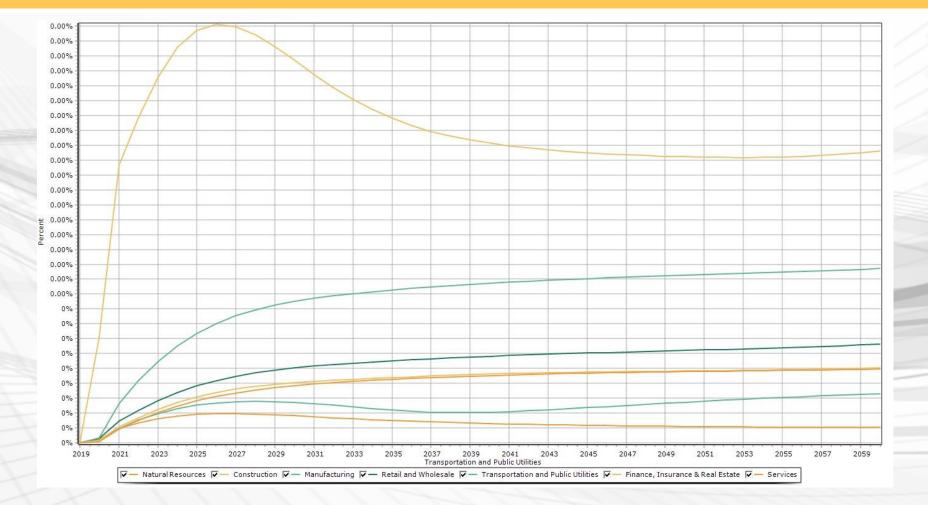
Employment by Industry





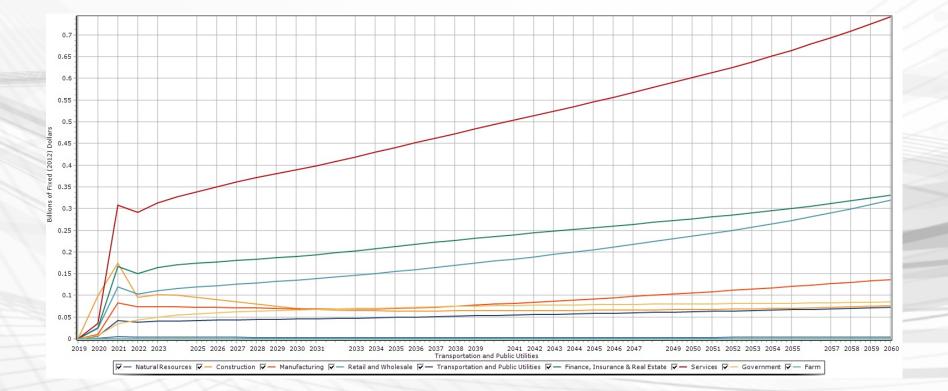
Commodity Access Index





Value Added by Industry





Economic Summary



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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
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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