

Socioeconomic and Regional Economic Modeling

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About Us

- Leading public policy analysis model since 1980
- Models:
 - Flagship PI+
 - TaxPI
 - Transight
 - E3+
- REMI models & DEI module add race/ethnicity, gender, education level, geography, income distribution dimensions to policy analysis

Transportation Accessibility



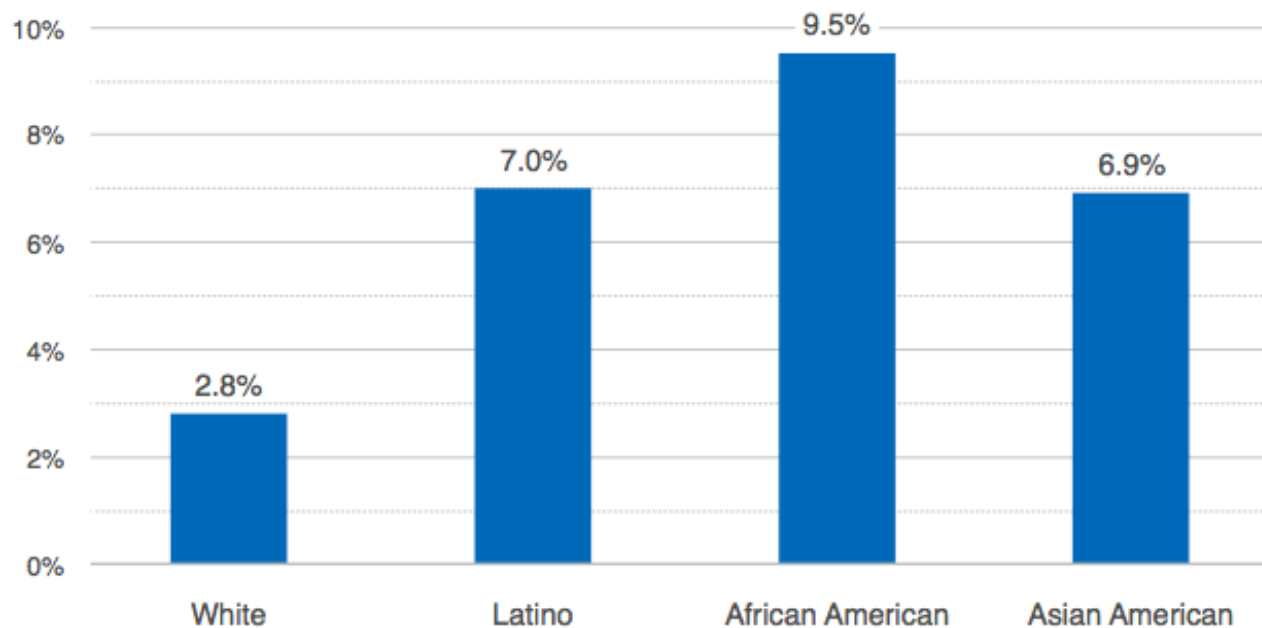
- DC metro area census map
- Points represent 25 people
 - red=white
 - blue=Black
 - green=Asian
 - orange=Hispanic
- Metro lines in brown, roads in gray



Transportation Accessibility



Figure 1. Percentage of Workers Without a Vehicle at Home by Race and Latino Ethnicity, 2011-2015



Note: Racial categories exclude Latinos.

Source: Author's analysis of American Community Survey data from IPUMS-USA, University of Minnesota, www.ipums.org.

Model Demo: Transportation Accessibility



- DC Metropolitan Area DEI Model
- Model Scenario:
 - Transportation improvement, showing only the accessibility component
- Model Input:
 - Increase labor access index by 0.5%
 - Year 2021-2030

Model Demo: Transportation Accessibility



Economic Summary

| Region | Comparison Type | Forecast | Comparison Forecast | | | | | | | | | | |
|--|---|--|---|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Washington metropolitan area | <input checked="" type="checkbox"/> Differences | <input checked="" type="checkbox"/> Transportation Accessibility Project | <input checked="" type="checkbox"/> Standard Regional Control | <input type="checkbox"/> | | | | | | | | | |
| Category | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | |
| Total Employment | Thousands (Jobs) | 0.000 | +7.601 | +9.609 | +10.747 | +11.254 | +11.270 | +11.149 | +10.962 | +10.753 | +10.660 | +10.549 | |
| Private Non-Farm Employment | Thousands (Jobs) | 0.000 | +7.315 | +9.092 | +10.057 | +10.438 | +10.372 | +10.198 | +9.976 | +9.746 | +9.634 | +9.510 | |
| Residence Adjusted Employment | Thousands | 0.000 | +7.449 | +9.261 | +10.330 | +10.828 | +10.879 | +10.807 | +10.673 | +10.516 | +10.464 | +10.390 | |
| Population | Thousands | 0.000 | +3.153 | +6.033 | +8.596 | +10.744 | +12.405 | +13.701 | +14.717 | +15.503 | +16.160 | +16.684 | |
| Labor Force | Thousands | 0.000 | +2.939 | +4.481 | +5.918 | +7.133 | +8.035 | +8.658 | +9.060 | +9.352 | +9.562 | +9.726 | |
| Gross Domestic Product | Billions of Fixed (2012) Dollars | 0.000 | +0.733 | +0.998 | +1.174 | +1.285 | +1.344 | +1.383 | +1.411 | +1.434 | +1.467 | +1.494 | |
| Output | Billions of Fixed (2012) Dollars | 0.000 | +1.201 | +1.640 | +1.928 | +2.108 | +2.199 | +2.257 | +2.296 | +2.327 | +2.371 | +2.406 | |
| Value-Added | Billions of Fixed (2012) Dollars | 0.000 | +0.733 | +0.998 | +1.174 | +1.285 | +1.344 | +1.383 | +1.411 | +1.434 | +1.467 | +1.494 | |
| Personal Income | Billions of Current Dollars | 0.000 | +0.547 | +0.759 | +0.922 | +1.038 | +1.112 | +1.169 | +1.217 | +1.264 | +1.311 | +1.364 | |
| Disposable Personal Income | Billions of Current Dollars | 0.000 | +0.471 | +0.650 | +0.793 | +0.896 | +0.962 | +1.004 | +1.040 | +1.084 | +1.127 | +1.177 | |
| Real Disposable Personal Income | Billions of Fixed (2012) Dollars | 0.000 | +0.991 | +1.061 | +1.152 | +1.216 | +1.255 | +1.278 | +1.300 | +1.337 | +1.369 | +1.409 | |
| Real Disposable Personal Income per Capita | Thousands of Fixed (2012) Dollars | 0.000 | +0.124 | +0.107 | +0.096 | +0.085 | +0.073 | +0.063 | +0.055 | +0.050 | +0.046 | +0.042 | |
| PCE-Price Index | 2012=100 (Nation) | 0.000 | -0.168 | -0.150 | -0.146 | -0.145 | -0.146 | -0.148 | -0.152 | -0.157 | -0.161 | -0.166 | |

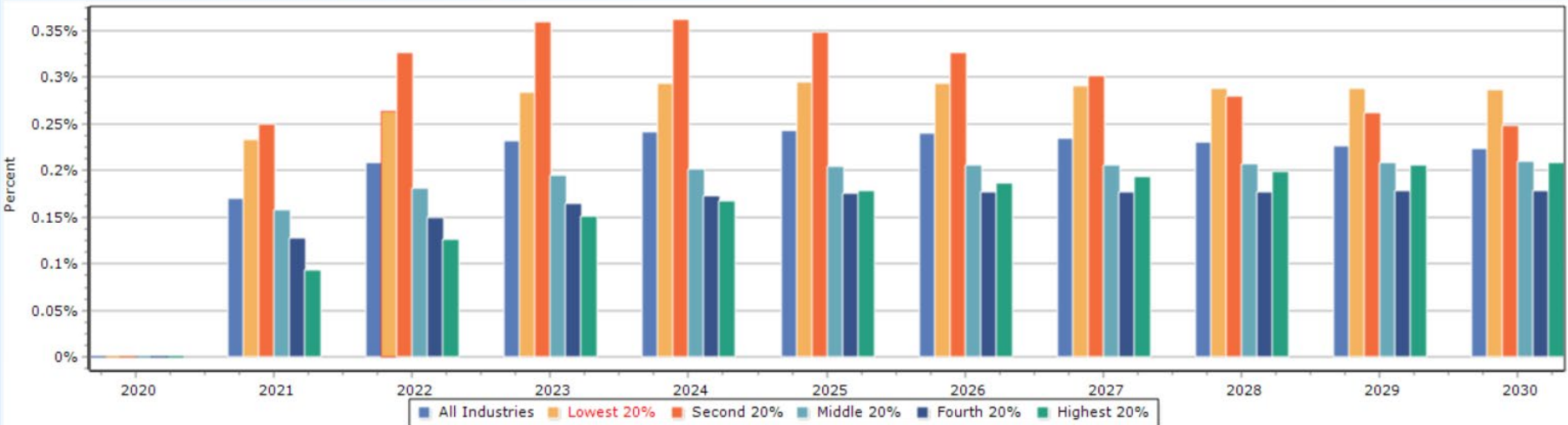
what does **REMI** say? sm

Model Demo: Transportation Accessibility



Employment by Industry

Region: Washington metropolitan area |
 Category: Employment |
 Comparison Type: % Change |
 Forecast: Transportation Accessibility Project |
 Comparison Forecast: Standard Regional Control



| Industry | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| All Industries | Percent | 0.000% | +0.169% | +0.208% | +0.231% | +0.241% | +0.243% | +0.239% | +0.235% | +0.230% | +0.227% | +0.224% |
| Lowest 20% | Percent | 0.000% | +0.233% | +0.263% | +0.284% | +0.293% | +0.294% | +0.293% | +0.291% | +0.288% | +0.287% | +0.286% |
| Second 20% | Percent | 0.000% | +0.249% | +0.326% | +0.359% | +0.362% | +0.349% | +0.326% | +0.302% | +0.280% | +0.262% | +0.248% |
| Middle 20% | Percent | 0.000% | +0.158% | +0.180% | +0.195% | +0.202% | +0.204% | +0.206% | +0.206% | +0.207% | +0.208% | +0.210% |
| Fourth 20% | Percent | 0.000% | +0.128% | +0.150% | +0.165% | +0.173% | +0.176% | +0.177% | +0.177% | +0.177% | +0.178% | +0.178% |
| Highest 20% | Percent | 0.000% | +0.094% | +0.127% | +0.151% | +0.167% | +0.178% | +0.186% | +0.193% | +0.199% | +0.205% | +0.209% |

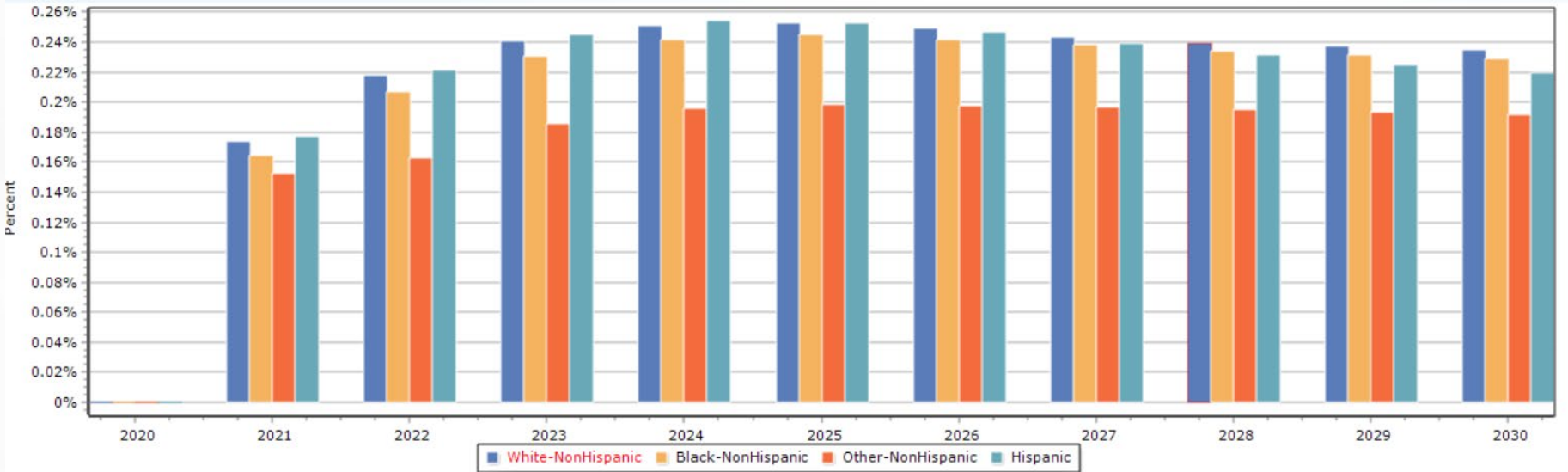
what does REMI say? sm

Model Demo: Transportation Accessibility



Employment by Demographics

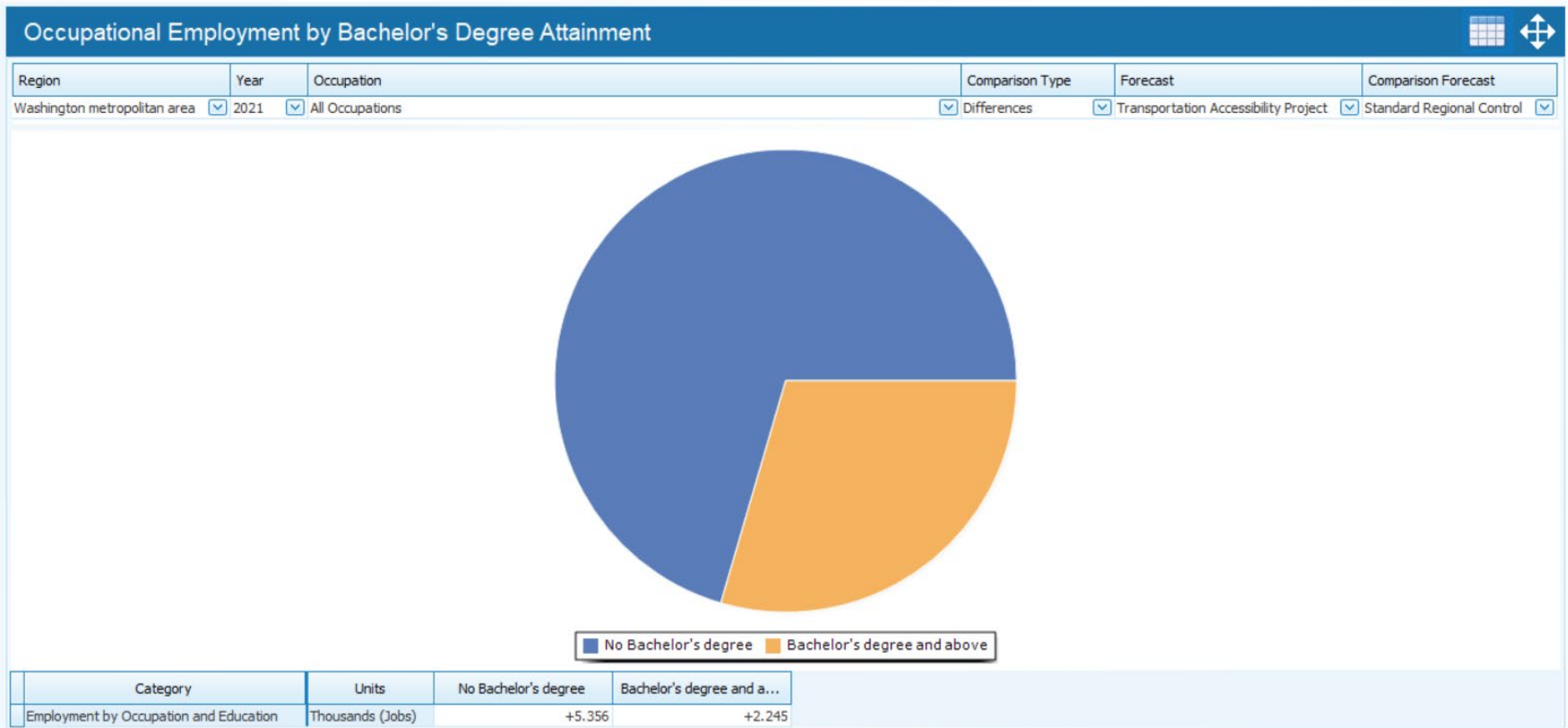
Region: Washington metropolitan area |
 Category: Employment by Demographics |
 Gender: Total |
 Comparison Type: % Change |
 Forecast: Transportation Accessibility Project |
 Comparison Forecast: Standard Regional Control



| Race | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-------------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| White-NonHispanic | Percent | 0.000% | +0.174% | +0.218% | +0.240% | +0.251% | +0.253% | +0.249% | +0.244% | +0.240% | +0.237% | +0.235% |
| Black-NonHispanic | Percent | 0.000% | +0.164% | +0.207% | +0.231% | +0.241% | +0.245% | +0.242% | +0.238% | +0.234% | +0.231% | +0.229% |
| Other-NonHispanic | Percent | 0.000% | +0.153% | +0.163% | +0.186% | +0.196% | +0.199% | +0.197% | +0.197% | +0.195% | +0.193% | +0.192% |
| Hispanic | Percent | 0.000% | +0.177% | +0.221% | +0.245% | +0.254% | +0.253% | +0.246% | +0.239% | +0.231% | +0.225% | +0.219% |

what does **REMI** say? sm

Model Demo: Transportation Accessibility



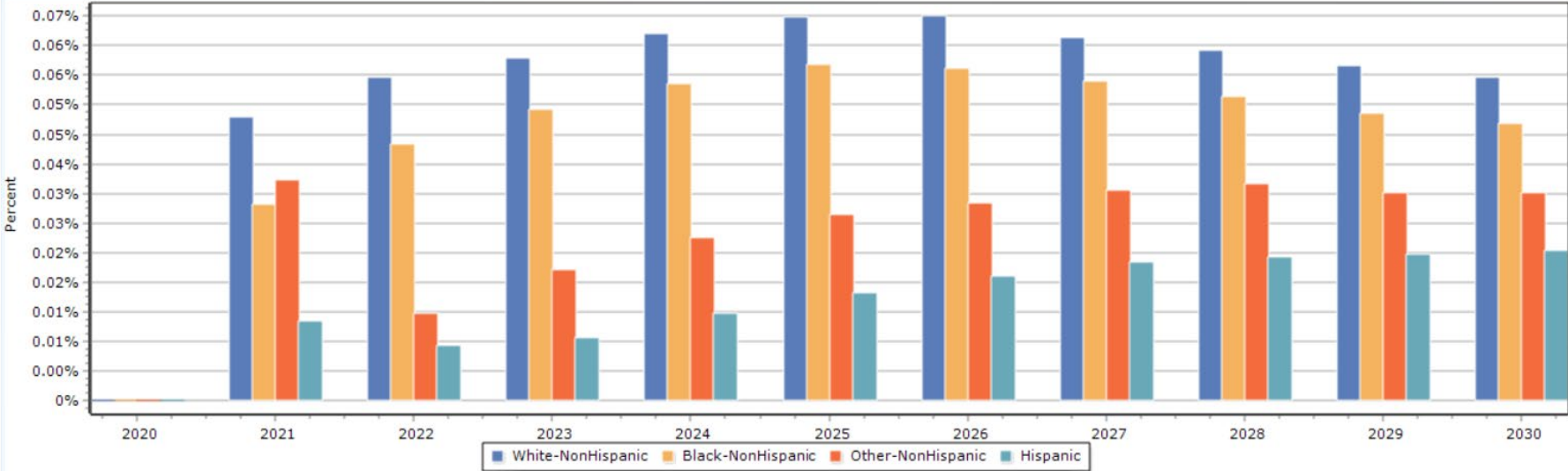
+5.356 +2.245

Model Demo: Transportation Accessibility



Participation Rates by Race and Gender

| Region | Category | Gender | Age | Comparison Type | Forecast | Comparison Forecast |
|------------------------------|--------------------|--------|-------|-----------------|--------------------------------------|---------------------------|
| Washington metropolitan area | Participation Rate | Total | Total | % Change | Transportation Accessibility Project | Standard Regional Control |



| Race | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-------------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| White-NonHispanic | Percent | 0.000% | +0.048% | +0.055% | +0.058% | +0.062% | +0.065% | +0.065% | +0.061% | +0.059% | +0.057% | +0.055% |
| Black-NonHispanic | Percent | 0.000% | +0.033% | +0.043% | +0.049% | +0.054% | +0.057% | +0.056% | +0.054% | +0.051% | +0.049% | +0.047% |
| Other-NonHispanic | Percent | 0.000% | +0.037% | +0.015% | +0.022% | +0.027% | +0.031% | +0.033% | +0.036% | +0.037% | +0.035% | +0.035% |
| Hispanic | Percent | 0.000% | +0.014% | +0.009% | +0.011% | +0.015% | +0.018% | +0.021% | +0.023% | +0.024% | +0.025% | +0.025% |

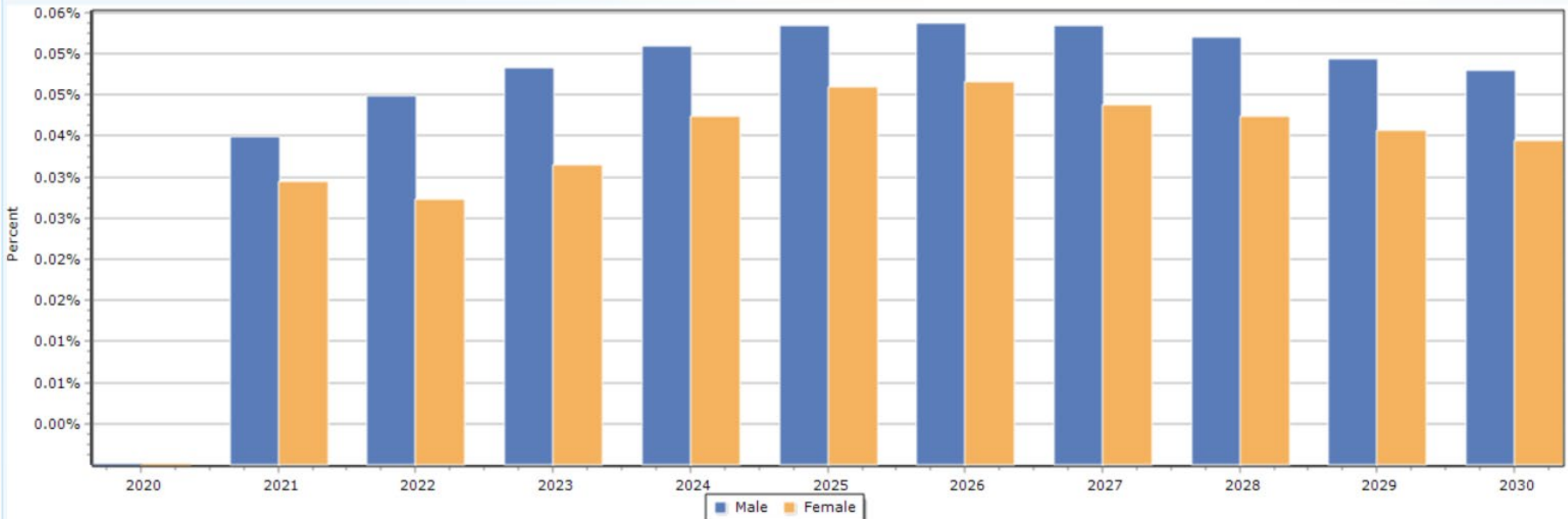
what does REMI say? sm

Model Demo: Transportation Accessibility



Participation Rates by Race and Gender

| Region | Category | Race | Age | Comparison Type | Forecast | Comparison Forecast |
|------------------------------|--------------------|-----------|-------|-----------------|--------------------------------------|---------------------------|
| Washington metropolitan area | Participation Rate | All Races | Total | % Change | Transportation Accessibility Project | Standard Regional Control |



| Gender | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Male | Percent | +0.000% | +0.040% | +0.045% | +0.048% | +0.051% | +0.053% | +0.054% | +0.053% | +0.052% | +0.049% | +0.048% |
| Female | Percent | 0.000% | +0.034% | +0.032% | +0.037% | +0.042% | +0.046% | +0.047% | +0.044% | +0.042% | +0.041% | +0.039% |

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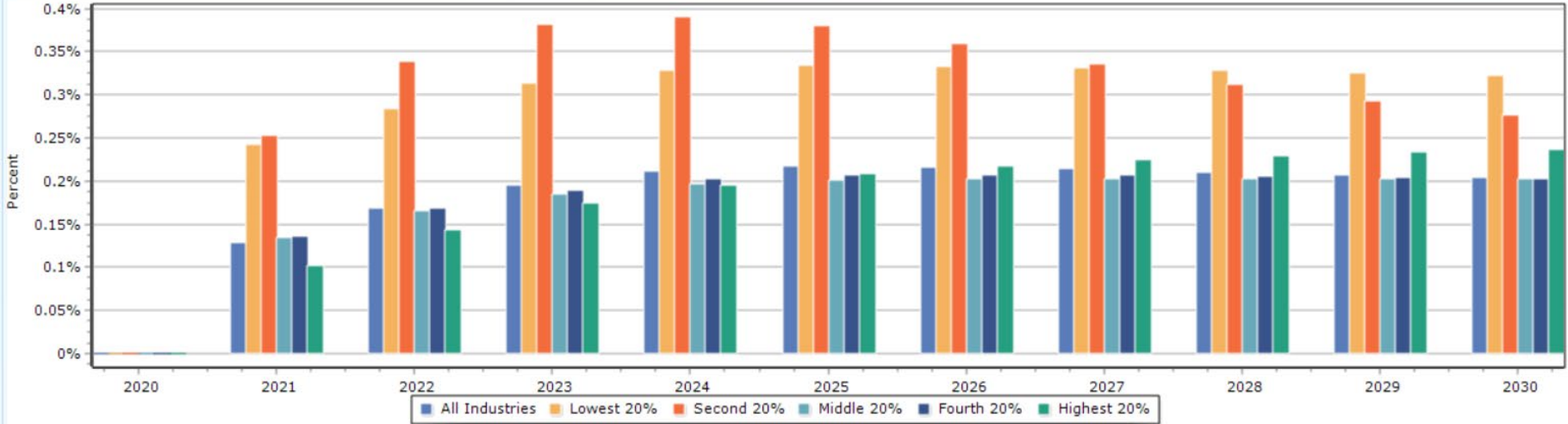
Model Demo: Transportation Accessibility



Compensation by Industry



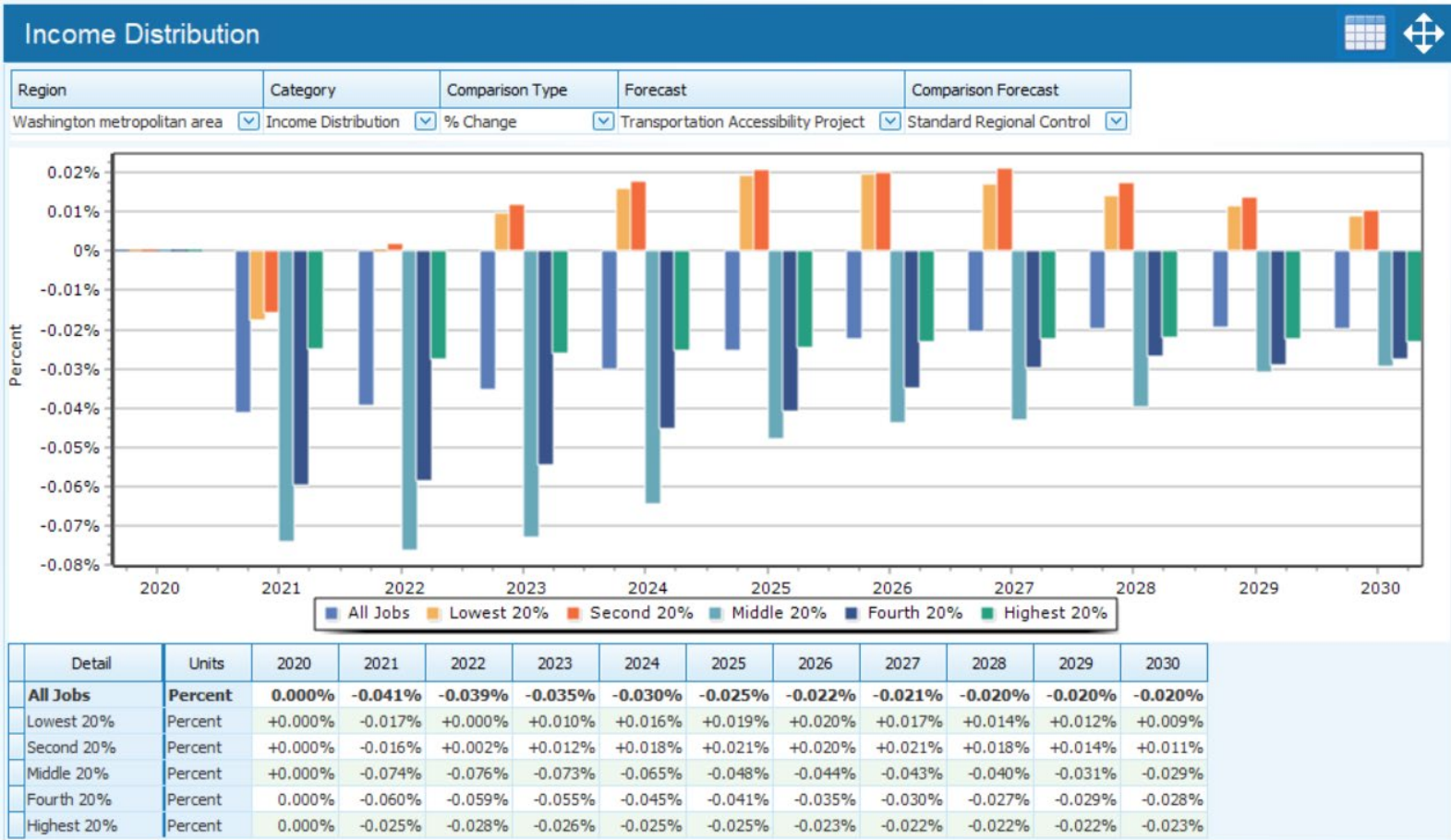
| Region | Category | Comparison Type | Forecast | Comparison Forecast |
|------------------------------|--------------|-----------------|--------------------------------------|---------------------------|
| Washington metropolitan area | Compensation | % Change | Transportation Accessibility Project | Standard Regional Control |



| Industry | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| All Industries | Percent | 0.000% | +0.128% | +0.169% | +0.196% | +0.211% | +0.217% | +0.217% | +0.214% | +0.210% | +0.207% | +0.204% |
| Lowest 20% | Percent | 0.000% | +0.243% | +0.284% | +0.313% | +0.329% | +0.334% | +0.334% | +0.331% | +0.328% | +0.325% | +0.323% |
| Second 20% | Percent | 0.000% | +0.253% | +0.340% | +0.381% | +0.391% | +0.381% | +0.359% | +0.335% | +0.312% | +0.292% | +0.276% |
| Middle 20% | Percent | 0.000% | +0.135% | +0.166% | +0.186% | +0.197% | +0.202% | +0.203% | +0.203% | +0.203% | +0.203% | +0.202% |
| Fourth 20% | Percent | 0.000% | +0.136% | +0.168% | +0.190% | +0.202% | +0.207% | +0.208% | +0.207% | +0.205% | +0.204% | +0.203% |
| Highest 20% | Percent | 0.000% | +0.102% | +0.144% | +0.175% | +0.196% | +0.209% | +0.218% | +0.225% | +0.229% | +0.234% | +0.236% |

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Model Demo: Transportation Accessibility



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Model Demo: Transportation Accessibility



| Compensation Rate Inequality | | | | | | | | | | | | |
|--|-----------------|--------------------------------------|---------------|----------------|----------------|----------------|---------------------------|---------------|---------------|---------------|----------------|----------------|
| Category | Comparison Type | Forecast | | | | | Comparison Forecast | | | | | |
| Compensation Rate Inequality | % Change | Transportation Accessibility Project | | | | | Standard Regional Control | | | | | |
| Region | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| All Regions | Percent | 0.000% | 0.000% | -0.001% | -0.001% | -0.001% | -0.001% | 0.000% | 0.000% | 0.000% | +0.000% | +0.000% |
| District of Columbia County, DC | Percent | 0.000% | +0.025% | +0.027% | +0.025% | +0.021% | +0.017% | +0.014% | +0.011% | +0.008% | +0.005% | +0.004% |
| Maryland Counties | Percent | 0.000% | -0.016% | -0.028% | -0.033% | -0.034% | -0.033% | -0.031% | -0.028% | -0.026% | -0.023% | -0.022% |
| West Virginia and Virginia Counties/Cities | Percent | 0.000% | +0.010% | +0.005% | +0.001% | -0.001% | -0.001% | -0.001% | -0.001% | 0.000% | +0.000% | +0.001% |
| Rest of U.S. | Percent | +0.000% | 0.000% | 0.000% | 0.000% | 0.000% | +0.000% | +0.000% | +0.000% | +0.000% | +0.000% | +0.000% |

what does **REMI** say? sm

Achieving broad-based prosperity:

Competing economic narratives

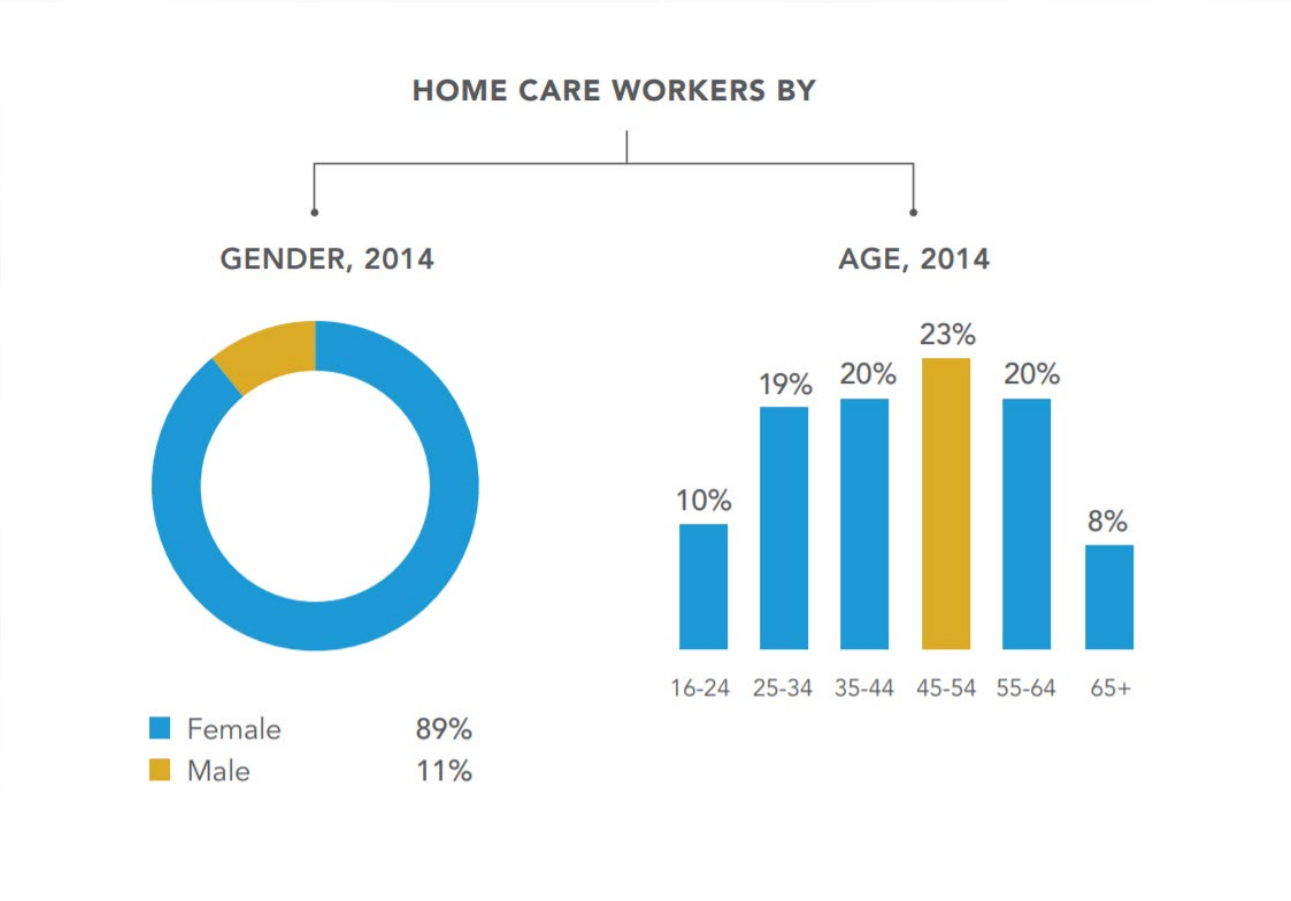
- Limited government (low taxes and regulations):
 - Following Trump Tax Cut and Jobs Act
 - Stimulus to the economy by deficit-funded tax cuts, along with reforms
 - Q42019: Unemployment rate to 3.5%, lowest rate since 1969
 - Unemployment rate for Black and Latinx groups at record lows
- Active government (higher taxes, government services and regulations):
 - Growth rate in the big-government post-war economy (1946-1980) was faster and more widely distributed than the post-Reagan era

Home Healthcare Subsidies Example



- Quickly growing demand for home healthcare
 - Aging population
 - Options other than nursing homes, care at hospitals
 - Subsidies to this industry intended to be job creators
- Women already disproportionately affected by elderly relatives need for care at home (unpaid, not participating in labor force)
- Policy goals to create jobs for groups most impacted by covid pandemic (women, Black, Latinx)

Setting the Stage: Home Healthcare Subsidies



Setting the Stage: Home Healthcare Subsidies

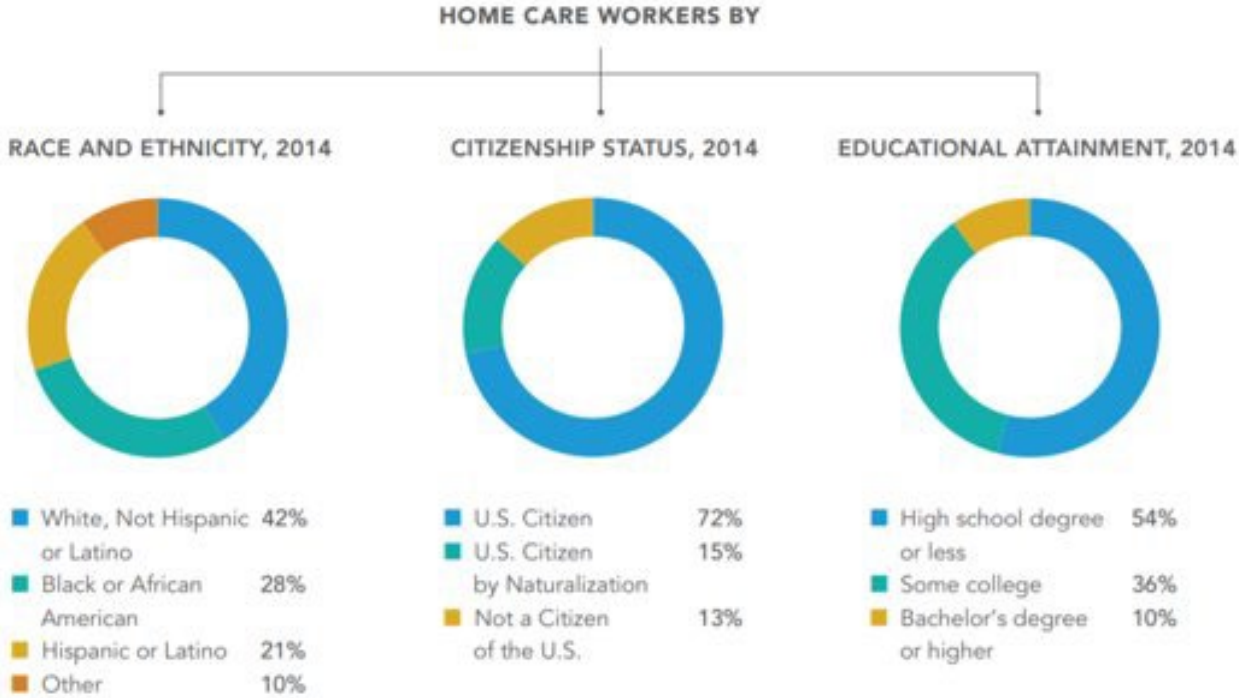


Chart Source: PHI analysis of the American Community Survey, U.S. Census Bureau (2015). 2014 ACS 1-year PUMS. Retrieved from <http://www.census.gov/programs-surveys/acs/data/pums.html>

Setting the Stage: Home Healthcare Subsidies



- Policy intentions/expectations
 - Increase employment for women
 - Increase employment for Black and Latino demographic groups
 - Create more jobs that don't require bachelor's degrees
 - Create more jobs for lower income quintiles
- Focusing on impacts on city of St. Louis

Model Demo: Home Healthcare Subsidies

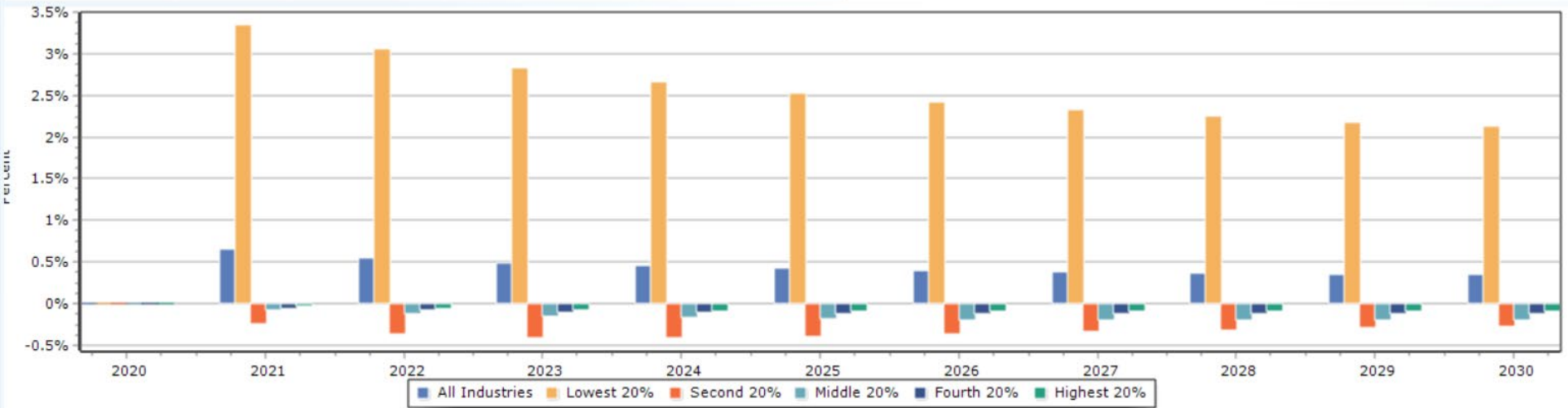
- Greater St. Louis Metro Area DEI Model
- Model Scenario:
 - Fund Home Healthcare Subsidies with Property Tax
- Model Inputs:
 - \$100M Home Healthcare Subsidies in St. Louis City
 - \$100M Property Tax Increase in St. Louis City
 - Year 2021-2030

Model Demo: Home Healthcare Subsidies



Employment by Industry

Region: St. Louis City, MO
 Category: Employment
 Comparison Type: % Change
 Forecast: Regional Simulation 1
 Comparison Forecast: Standard Regional Control



| Industry | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|----------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| All Industries | Percent | 0.000% | +0.655% | +0.553% | +0.492% | +0.450% | +0.421% | +0.399% | +0.383% | +0.370% | +0.357% | +0.348% |
| Lowest 20% | Percent | 0.000% | +3.348% | +3.064% | +2.830% | +2.656% | +2.524% | +2.414% | +2.325% | +2.246% | +2.181% | +2.126% |
| Second 20% | Percent | 0.000% | -0.249% | -0.368% | -0.409% | -0.411% | -0.393% | -0.367% | -0.341% | -0.316% | -0.295% | -0.276% |
| Middle 20% | Percent | 0.000% | -0.071% | -0.117% | -0.150% | -0.171% | -0.185% | -0.193% | -0.198% | -0.200% | -0.201% | -0.200% |
| Fourth 20% | Percent | 0.000% | -0.055% | -0.084% | -0.102% | -0.114% | -0.121% | -0.124% | -0.125% | -0.125% | -0.123% | -0.121% |
| Highest 20% | Percent | 0.000% | -0.034% | -0.060% | -0.076% | -0.087% | -0.092% | -0.095% | -0.095% | -0.093% | -0.091% | -0.087% |

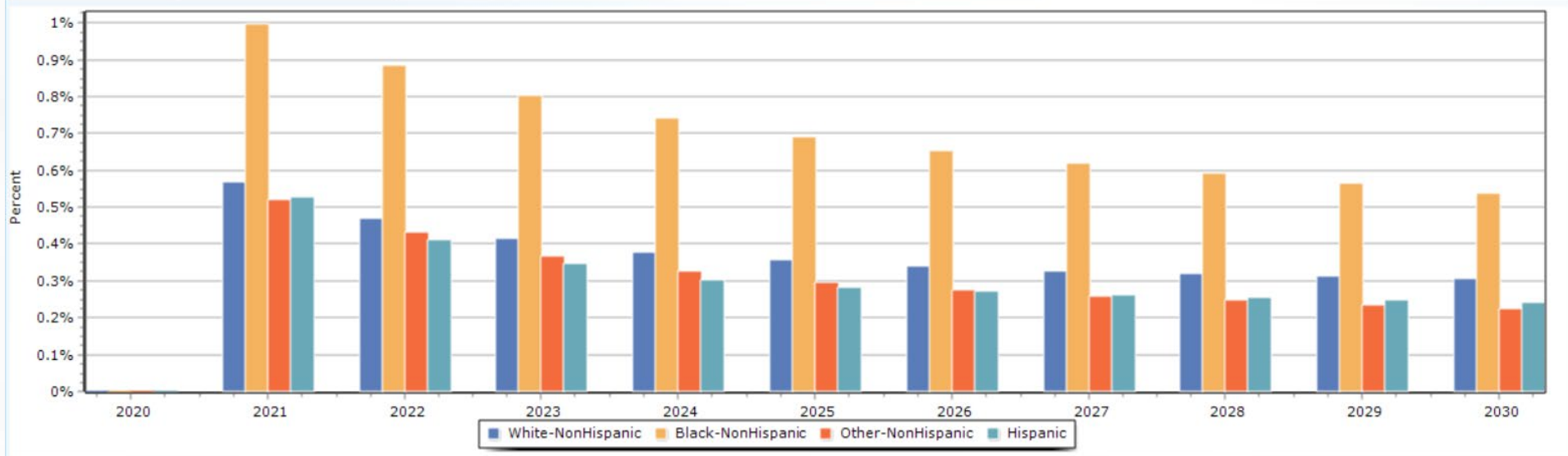
what does REMI say? sm

Model Demo: Home Healthcare Subsidies



Employment by Demographics

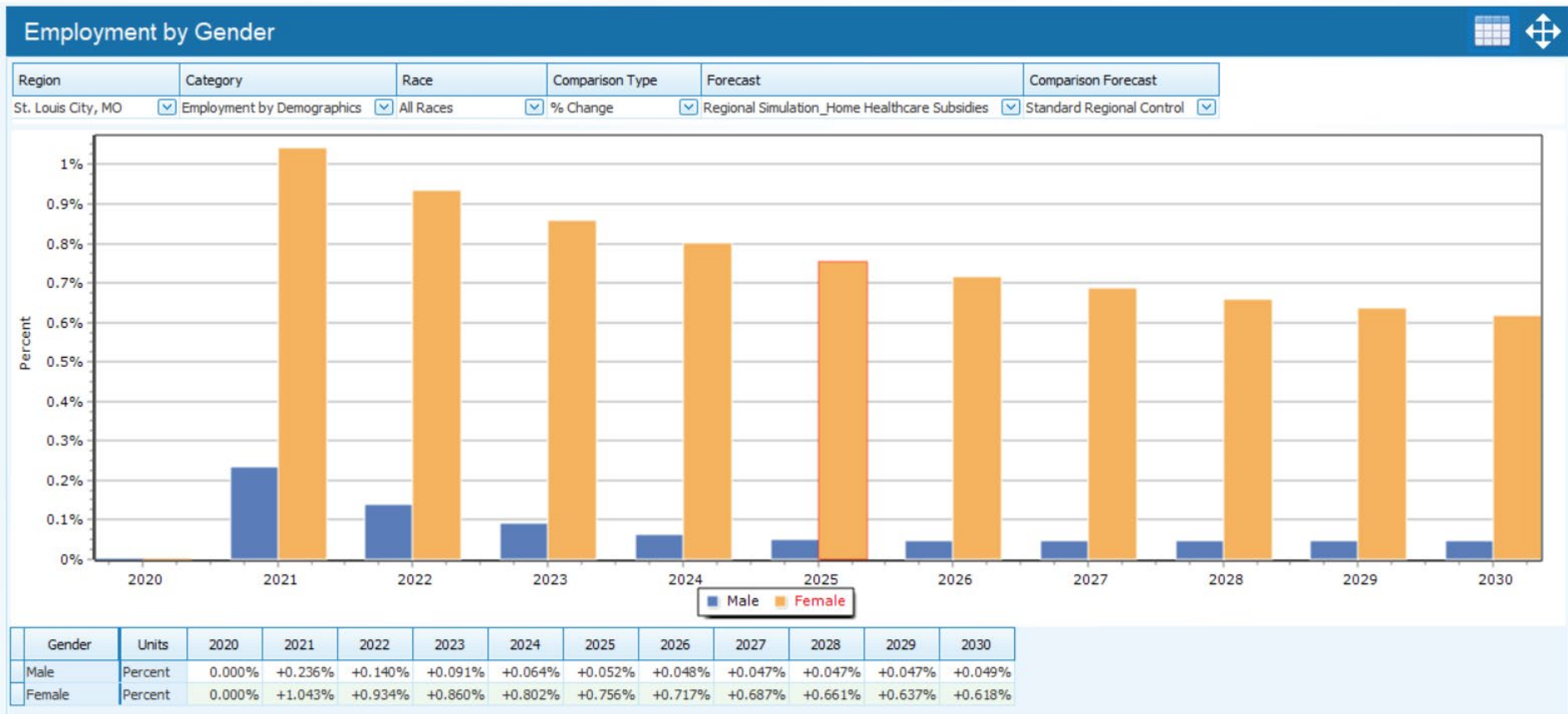
Region: St. Louis City, MO |
 Category: Employment by Demographics |
 Gender: Total |
 Comparison Type: % Change |
 Forecast: Regional Simulation 1 |
 Comparison Forecast: Standard Regional Control



| Race | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-------------------|---------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| White-NonHispanic | Percent | 0.000% | +0.567% | +0.470% | +0.415% | +0.379% | +0.356% | +0.339% | +0.328% | +0.319% | +0.311% | +0.307% |
| Black-NonHispanic | Percent | 0.000% | +0.997% | +0.883% | +0.803% | +0.740% | +0.691% | +0.653% | +0.620% | +0.590% | +0.564% | +0.539% |
| Other-NonHispanic | Percent | 0.000% | +0.522% | +0.432% | +0.369% | +0.326% | +0.296% | +0.277% | +0.260% | +0.247% | +0.235% | +0.226% |
| Hispanic | Percent | 0.000% | +0.526% | +0.411% | +0.346% | +0.304% | +0.283% | +0.271% | +0.262% | +0.255% | +0.248% | +0.243% |

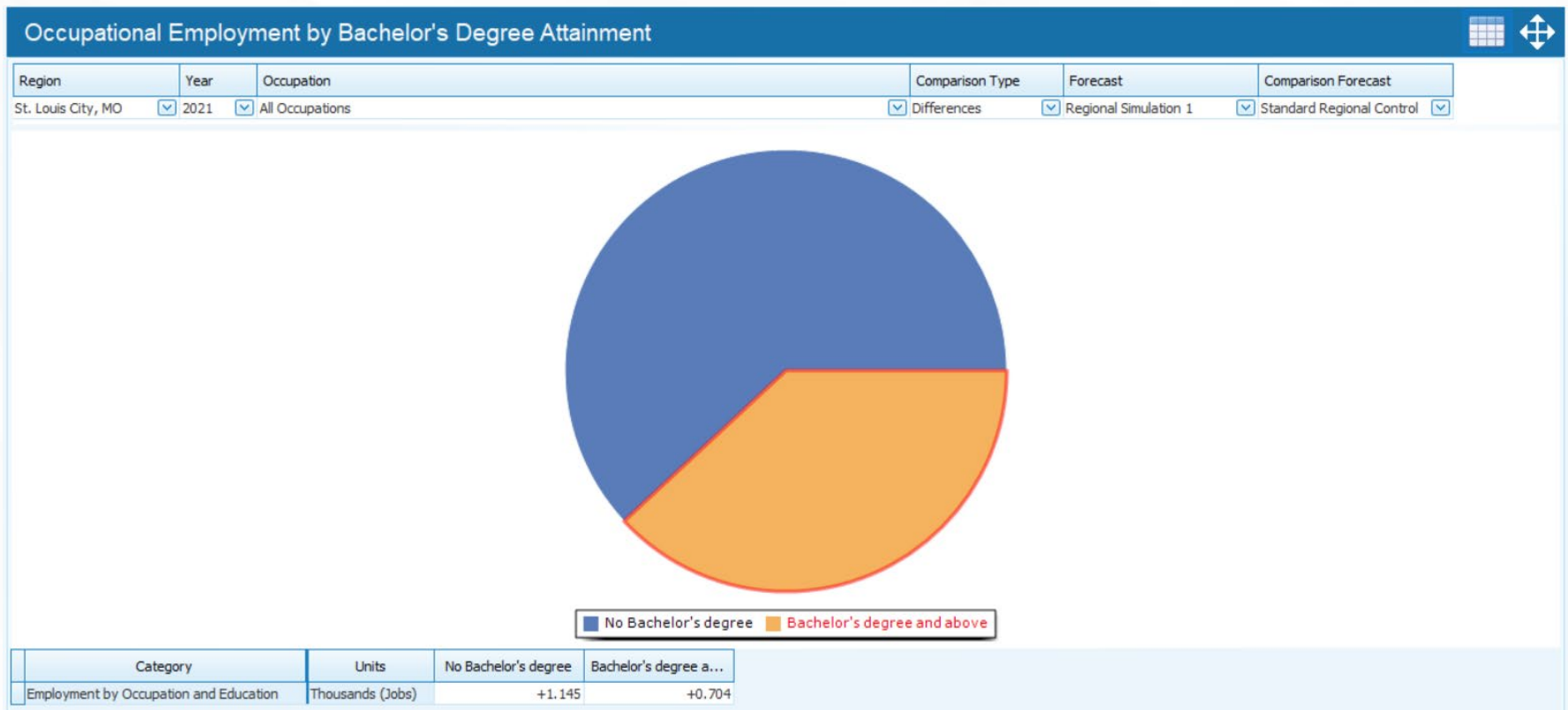
what does REMI say? sm

Model Demo: Home Healthcare Subsidies



what does REMI say? sm

Model Demo: Home Healthcare Subsidies



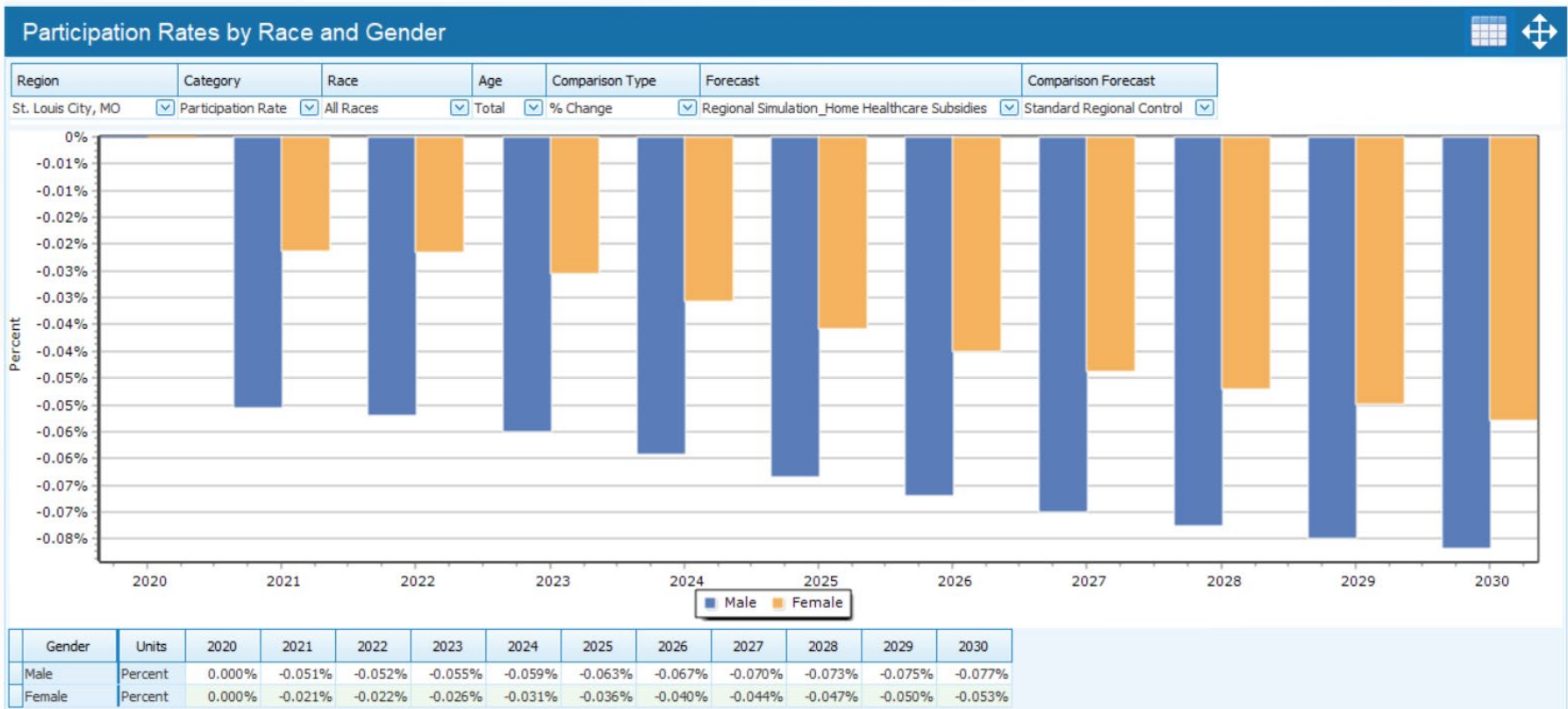
+1.145 +0.704

what does REMI say? sm

Model Demo: Home Healthcare Subsidies



Model Demo: Home Healthcare Subsidies



what does **REMI** say? sm

Model Demo: Home Healthcare Subsidies

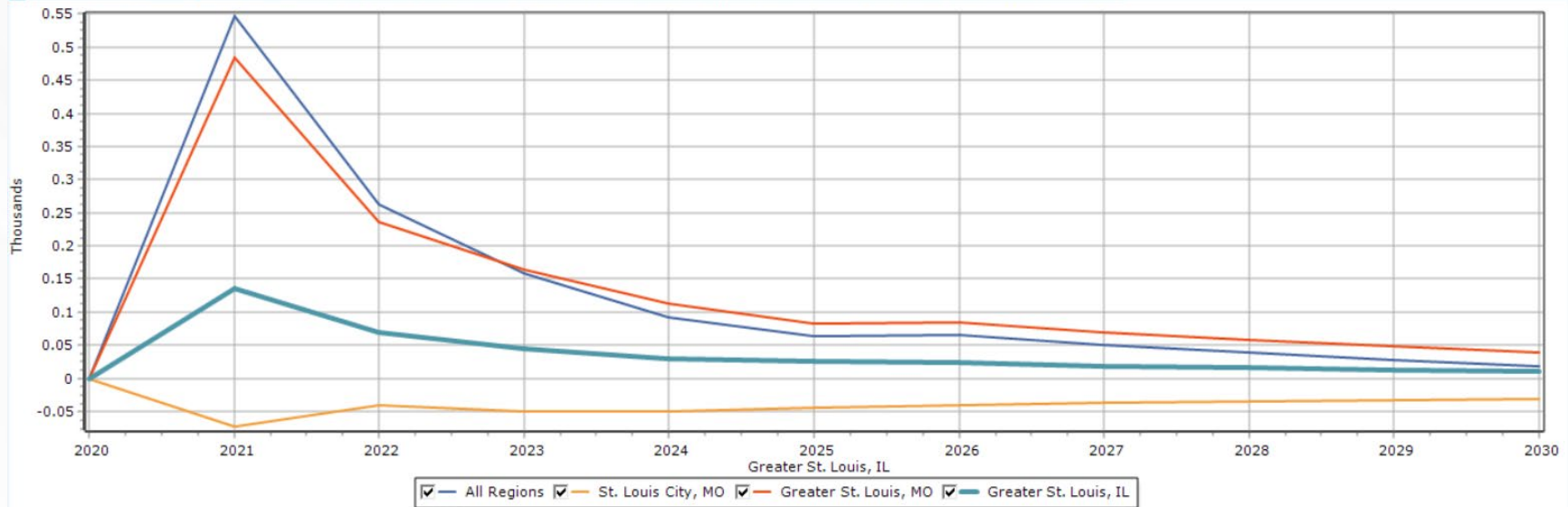


Detailed Economic Migrants Profile

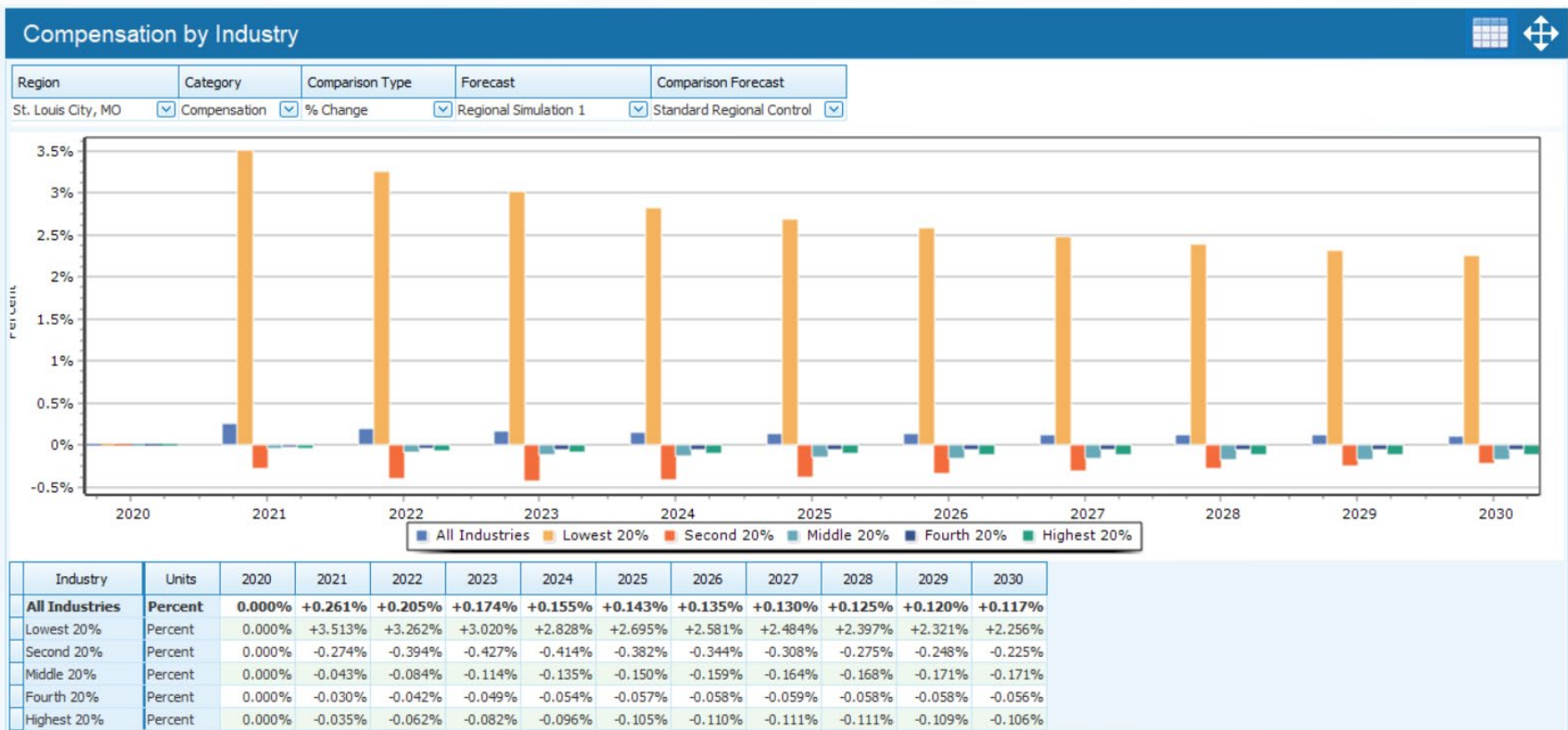


| Category | Race | Gender | Age | Comparison Type | Forecast | Comparison Forecast |
|-------------------|-----------|--------|----------|-----------------|---|---------------------------|
| Economic Migrants | All Races | Total | All Ages | Differences | Regional Simulation_Home Healthcare Subsidies | Standard Regional Control |

| Region | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|-----------------------|------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| All Regions | Thousands | 0.000 | +0.547 | +0.263 | +0.158 | +0.093 | +0.063 | +0.066 | +0.050 | +0.038 | +0.028 | +0.019 |
| St. Louis City, MO | Thousands | 0.000 | -0.073 | -0.041 | -0.050 | -0.050 | -0.045 | -0.041 | -0.037 | -0.035 | -0.033 | -0.031 |
| Greater St. Louis, MO | Thousands | 0.000 | +0.485 | +0.235 | +0.164 | +0.113 | +0.082 | +0.084 | +0.070 | +0.057 | +0.049 | +0.040 |
| Greater St. Louis, IL | Thousands | 0.000 | +0.135 | +0.070 | +0.044 | +0.030 | +0.026 | +0.023 | +0.017 | +0.016 | +0.012 | +0.010 |

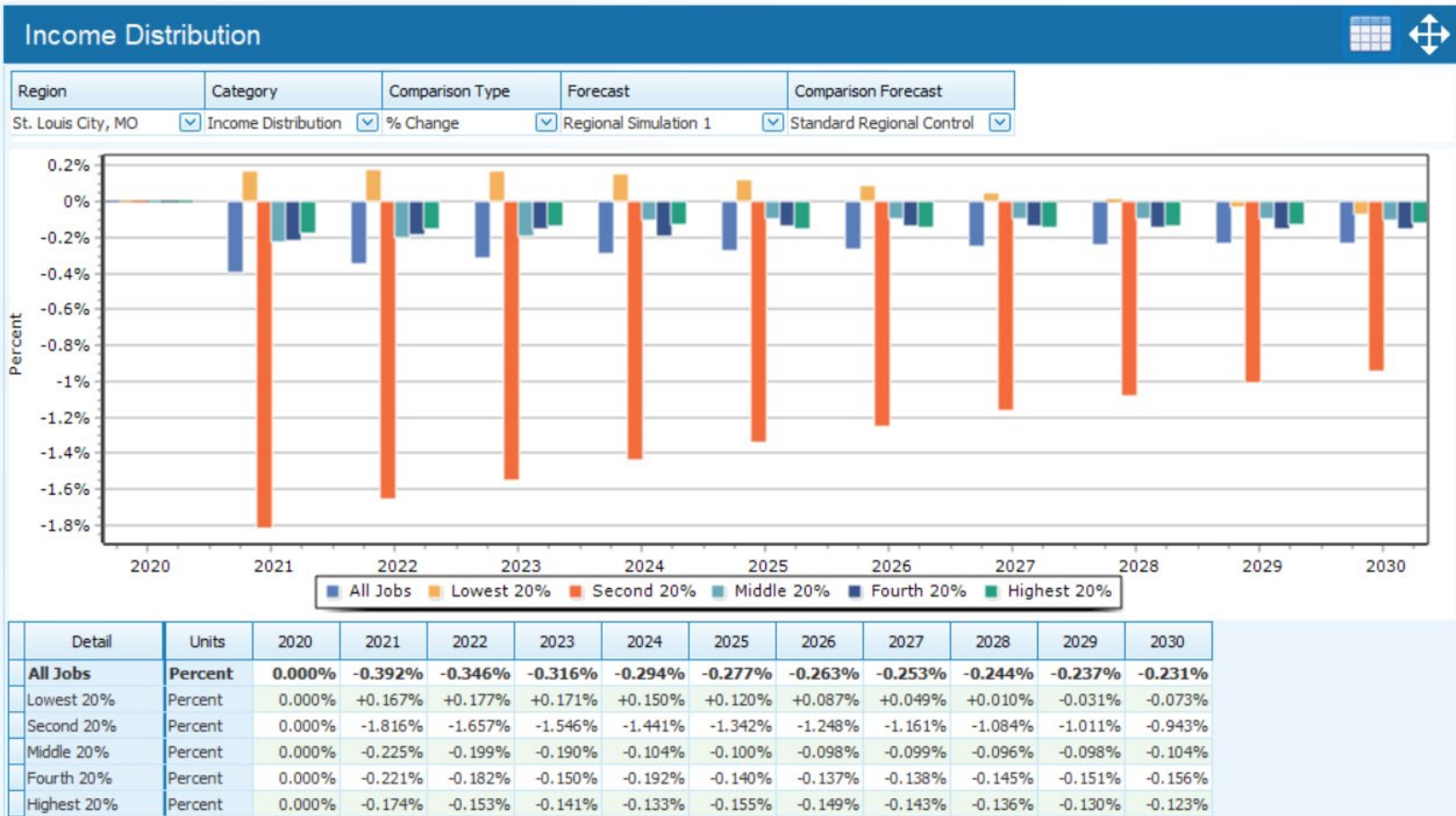


Model Demo: Home Healthcare Subsidies



what does REMI say? sm

Model Demo: Home Healthcare Subsidies



what does REMI say? sm

Model Demo: Home Healthcare Subsidies



Compensation Rate Inequality

| Category | Comparison Type | Forecast | | | Comparison Forecast | | | | | | | |
|------------------------------|-----------------|---|----------------|----------------|---------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Compensation Rate Inequality | % Change | Regional Simulation_Home Healthcare Subsidies | | | Standard Regional Control | | | | | | | |
| Region | Units | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| All Regions | Percent | 0.000% | +0.039% | +0.036% | +0.032% | +0.029% | +0.027% | +0.025% | +0.024% | +0.023% | +0.023% | +0.022% |
| St. Louis City, MO | Percent | 0.000% | +0.425% | +0.381% | +0.339% | +0.307% | +0.282% | +0.265% | +0.253% | +0.242% | +0.233% | +0.227% |
| Greater St. Louis, MO | Percent | 0.000% | -0.001% | -0.001% | +0.000% | +0.001% | +0.001% | +0.001% | +0.001% | +0.001% | +0.001% | +0.001% |
| Greater St. Louis, IL | Percent | 0.000% | -0.002% | -0.003% | -0.003% | -0.003% | -0.002% | -0.002% | -0.002% | -0.002% | -0.001% | -0.001% |

what does **REMI** say? sm

Complexities & Trade-Offs: Home Healthcare Subsidies

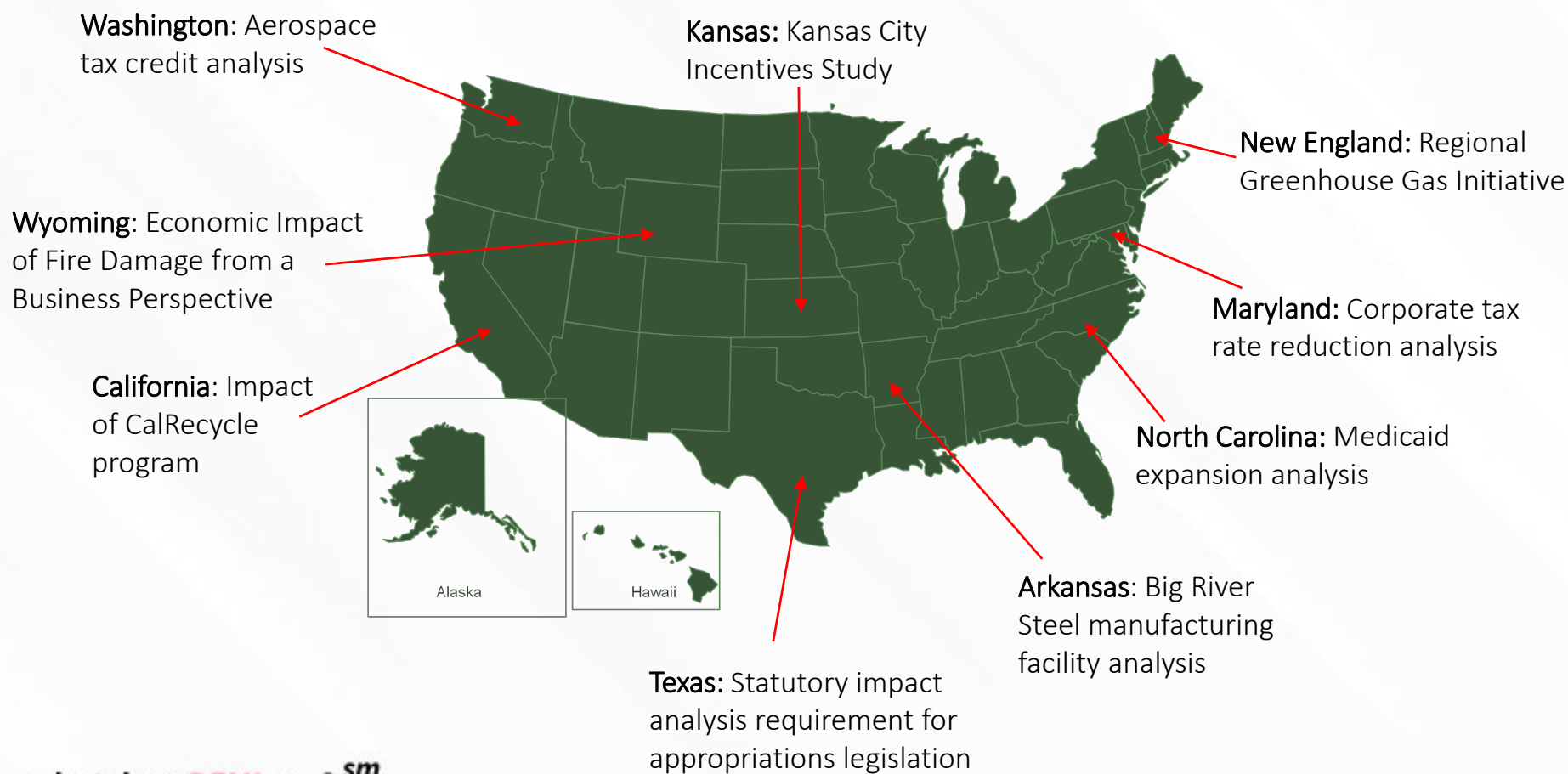


- Migration out of city of St. Louis to surrounding metro region
 - Labor force participation decreases across demographic groups in city of St. Louis; increases for greater St. Louis region
 - Shift away from city to avoid tax
- Compensation by industry increases for lowest income quintile and increases slightly overall—lowest 20% see the benefits of the subsidies
- Compensation rate drops for second lowest income quintile, rises slightly for lowest income quintile
- Increase in compensation rate inequality coefficient
 - Second lowest quintile does not see benefits of the subsidy but does face costs of the higher tax
 - Benefits of subsidy to lowest quintile are not big enough to offset costs of tax

Demo Discussion

- Transportation accessibility example is win-win hypothetical scenario, uses federal funds without costly trade-offs
- Home healthcare subsidies example illustrates real world phenomenon of winners and losers in policy change
 - Also shows possible unintentional effects of policies, value of economic modeling to help policymakers understand impacts before implementation

Model Applications



Economic Modeling: Why it matters



- Inform policy with standard metrics rather than ideology or intention
- Address stakeholders with evidence that communicates how policy benefits or disadvantages their communities broadly
- Understand economic and demographic implications of policies before implementing them
 - Ensure that public policy serves the broad-based interests of the public

Q&A

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