

ECONOMIC IMPACT OF TRANSPORTATION INNOVATION, TRANSIGHT 4.0

Transportation and the Economy



- Transportation and economic development are linked
- Networks enable the flow of workers, goods and services within regions and between regions



Technological Revolution



- Cutting edge technologies and disruptive business models are changing transportation
 - ▣ Ride-hailing apps
 - Uber, Lyft
 - ▣ Hybrid and electric vehicles
 - Electric trucks from Cummins, Tesla; hybrid from Volvo
 - ▣ Driverless vehicles
 - Tesla, Google, Daimler, Volvo, etc.

Driverless Vehicles

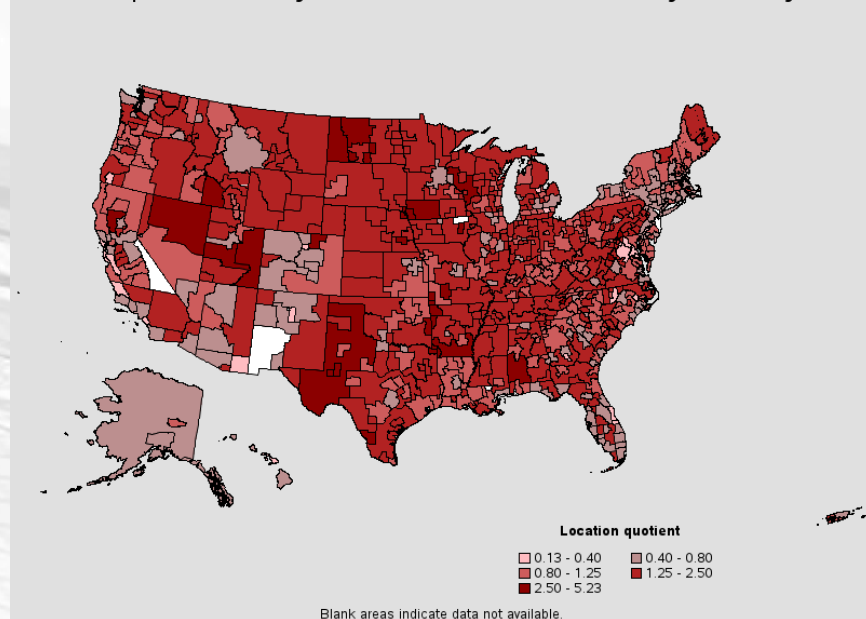
- Recent Legislation
 - House passed “Self Drive Act” for driverless cars
 - Preempt states from passing certain restrictions
 - Allow some driverless cars that don’t meet normal safety standards
 - Senate Commerce Committee to examine driverless trucks
 - Increase trucking productivity
 - Reduce fuel costs (MIT drafting study)
- Several impacts of driverless vehicles
 - Trucking productivity
 - Commuters and the structure of metro areas

Trucking

- Most common occupation in over half of U.S. states (2014)
- About 3.5 million truck drivers in U.S. (2015)
- \$726.4 billion in U.S. gross freight revenues (2015)

- Regional distribution:

Location quotient of heavy and tractor-trailer truck drivers, by area, May 2016



Transportation and Economic Development

**Driverless
vehicles**



Labor Accessibility



**Commuting; Labor
productivity**



Intermediates Accessibility



**Materials to
factories**

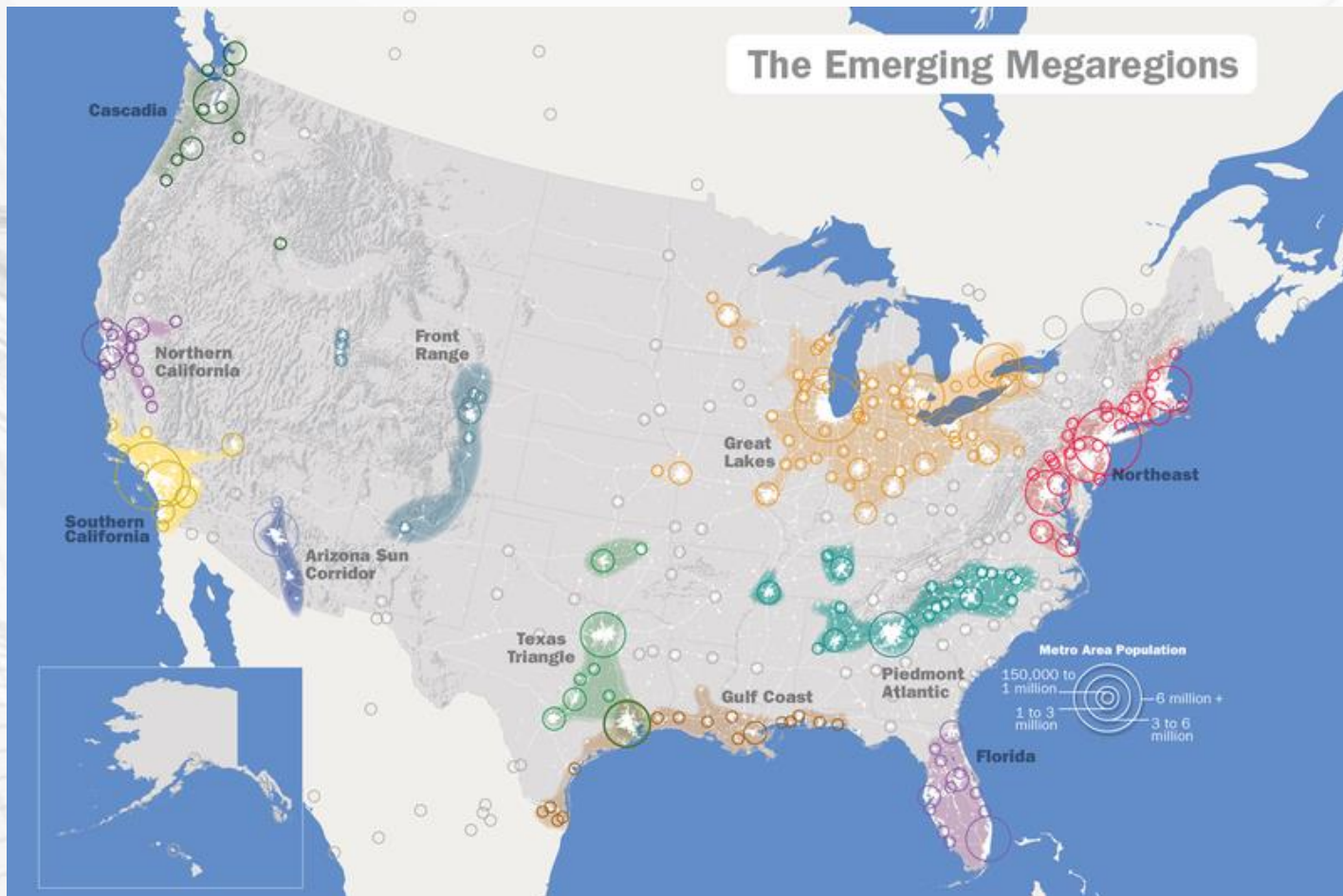
Final Goods Accessibility

**Goods and
services to
consumers**



what does REMI say? sm

Emerging Megaregions



what does REMI say? sm

Graphic: Regional Plan Association

What is TranSight 4.0?

- **TranSight** – *the next generation platform for estimating the total economic effects of changes to transportation systems.*
- TranSight allows users to understand how transportation networks increase economic competitiveness.

TranSight is also constructed with extensive data on:

Safety Valuation Factors



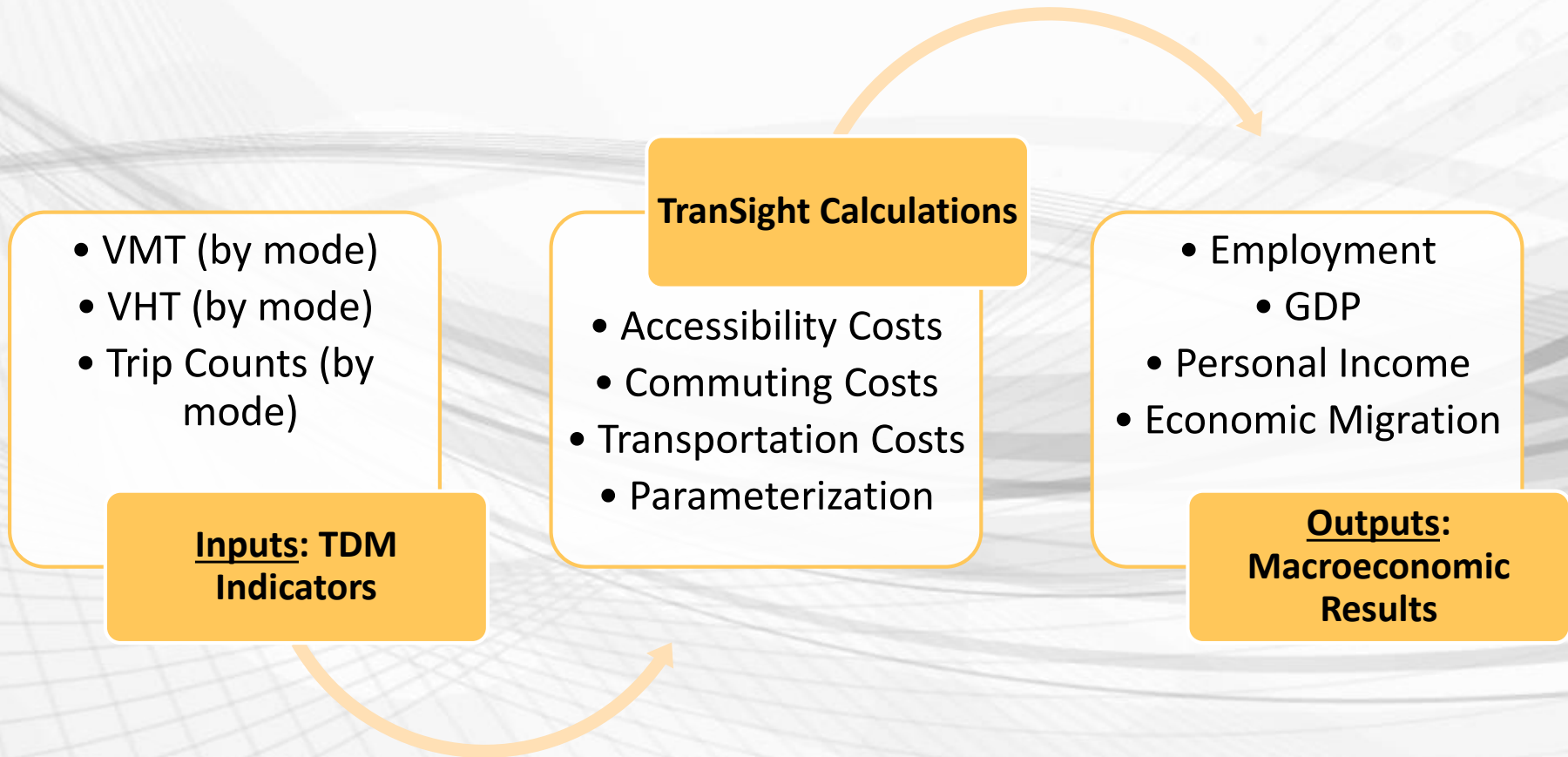
Fuel Efficiency



Emissions Factors



TranSight Process

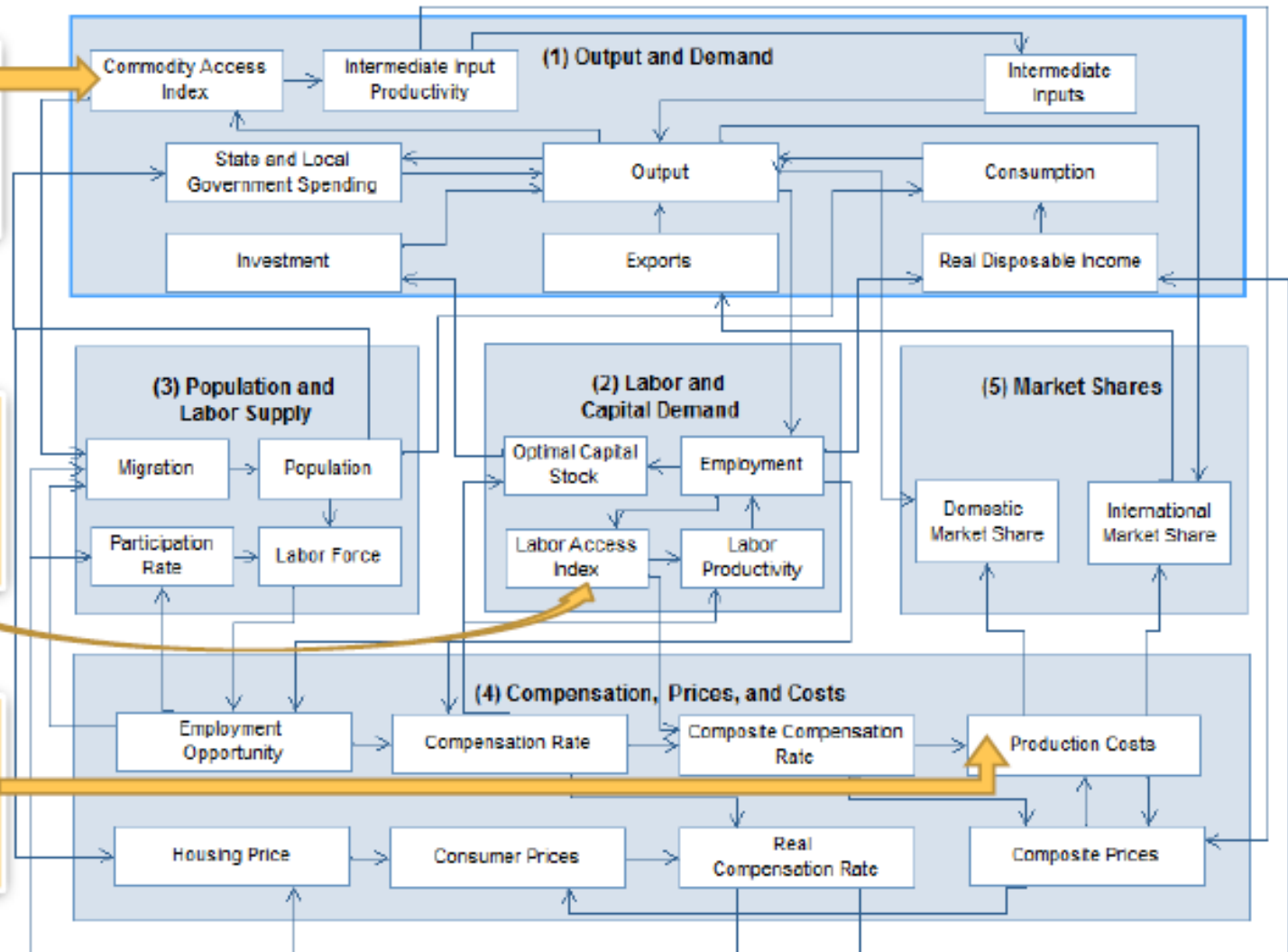


TDM Integration with REMI

Number of Truck Trips
per Hour
=
Accessibility Costs

Average Trip
Time Savings
=
Commuting Costs

Change in Overall
Network Speed
=
Transportation Costs



Static vs. Dynamic Analysis

Static Analysis

- Construction spending
- O&M spending

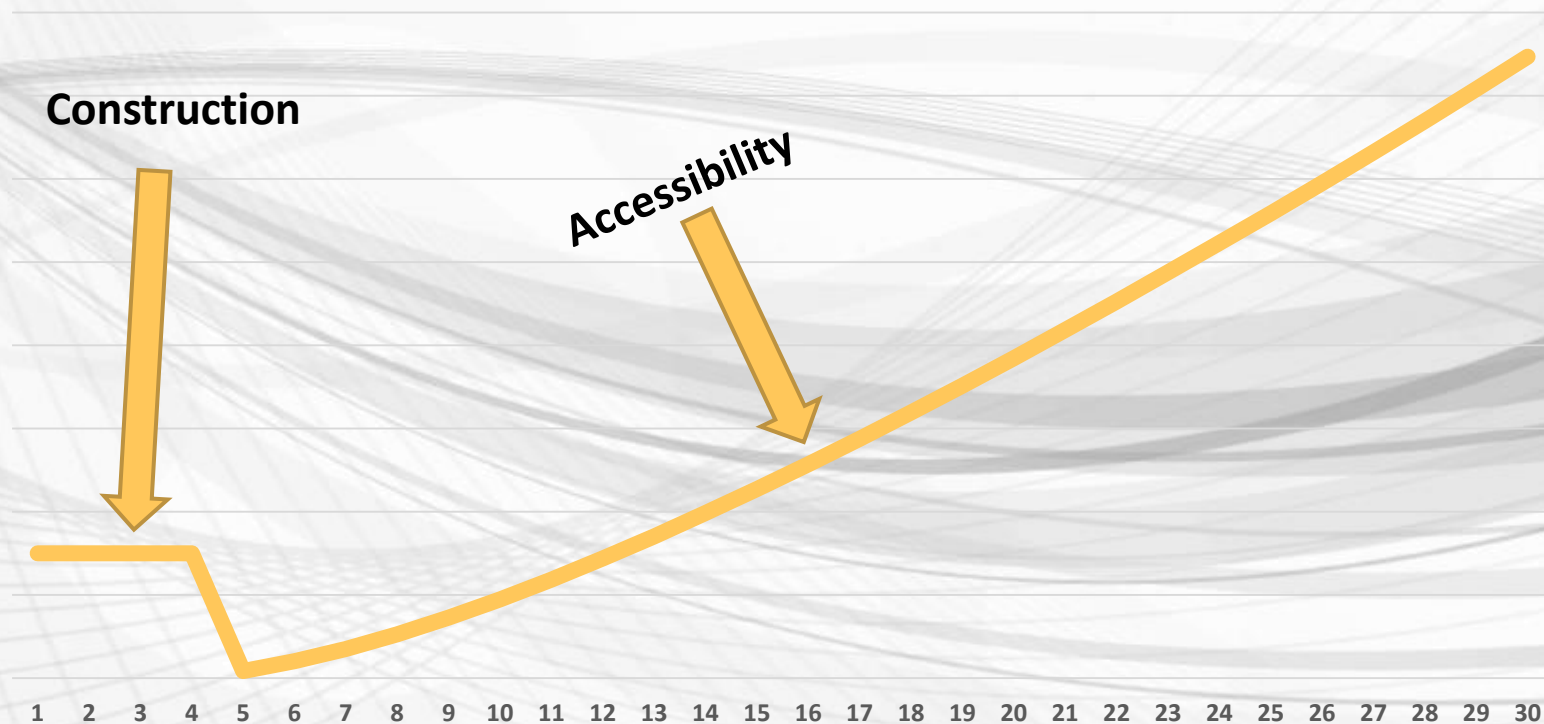
Dynamic Analysis

- 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”*

Economic Impact Over a Project's Life Cycle

Sample Project



Three Simulations

1. Increase in trucking labor productivity
2. Decrease in commuting costs
3. Commuters move to suburbs

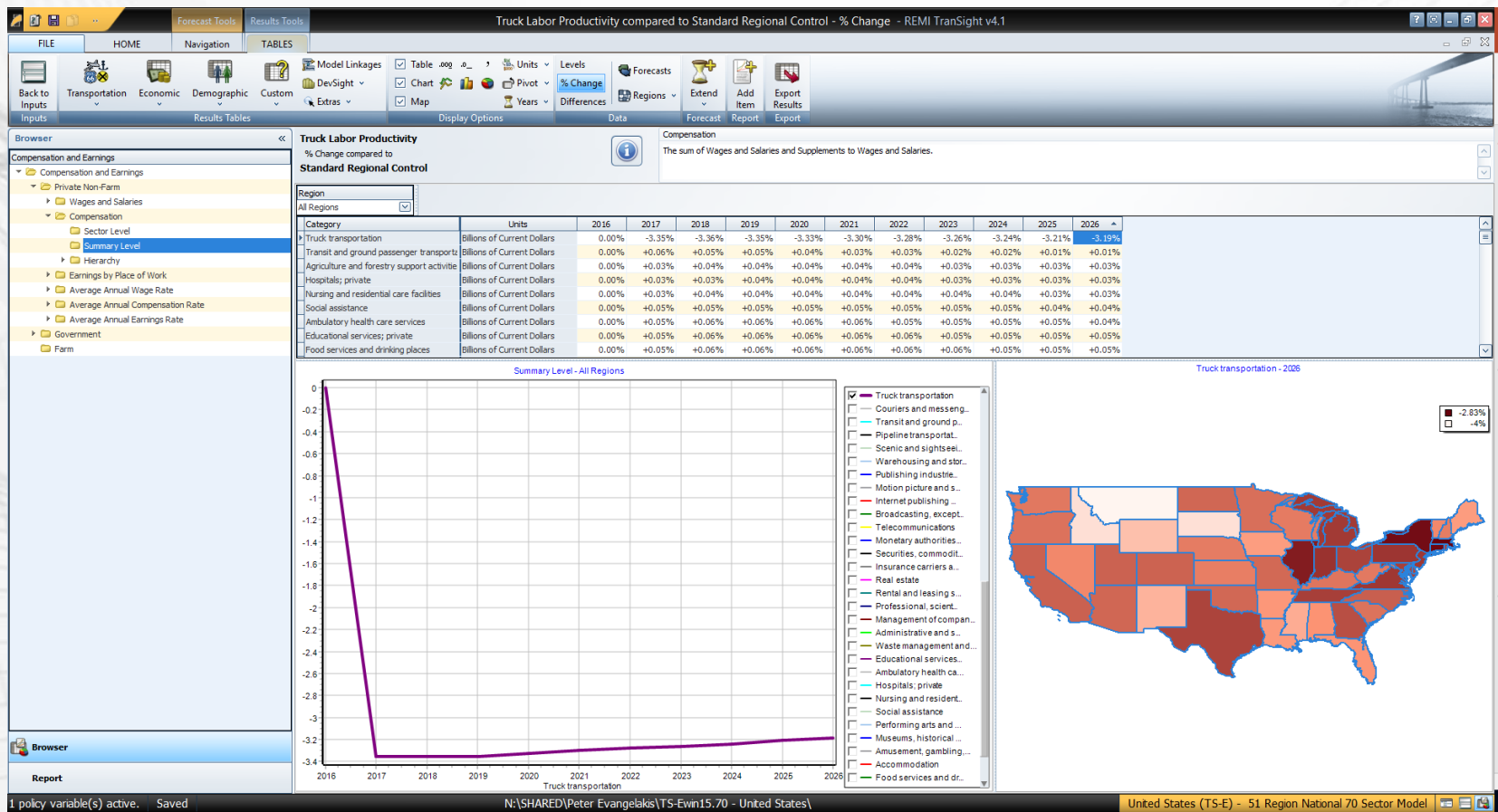
Trucking Labor Productivity



- Autonomous vehicles increase labor productivity in truck transportation by 10%
- Boon for trucking industry & U.S. economy, but trucking employment over 3% lower than baseline

Trucking Labor Productivity

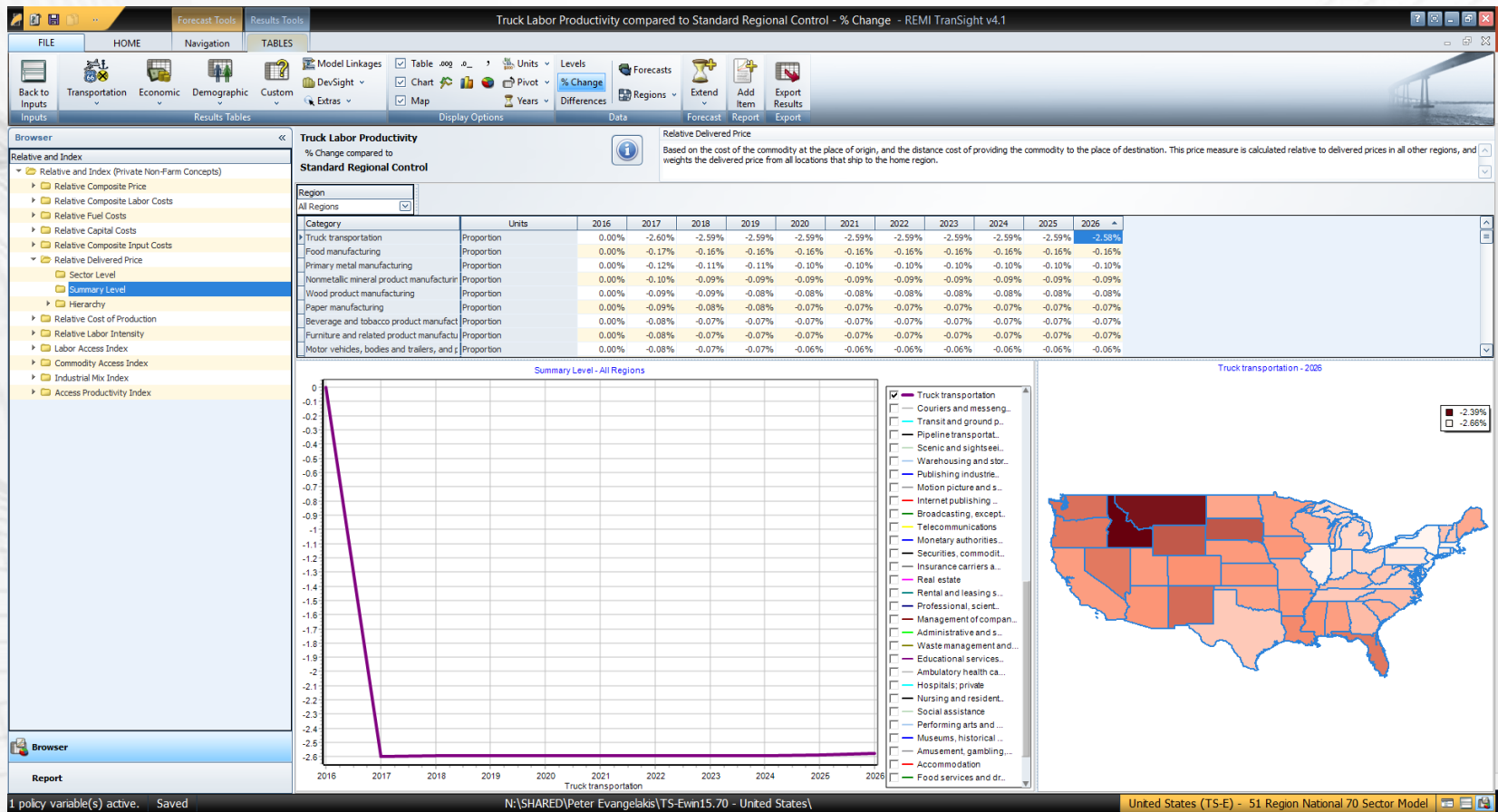
- Productivity increase lowers trucking employment relative to baseline, labor costs fall



what does REMI say? sm

Trucking Labor Productivity

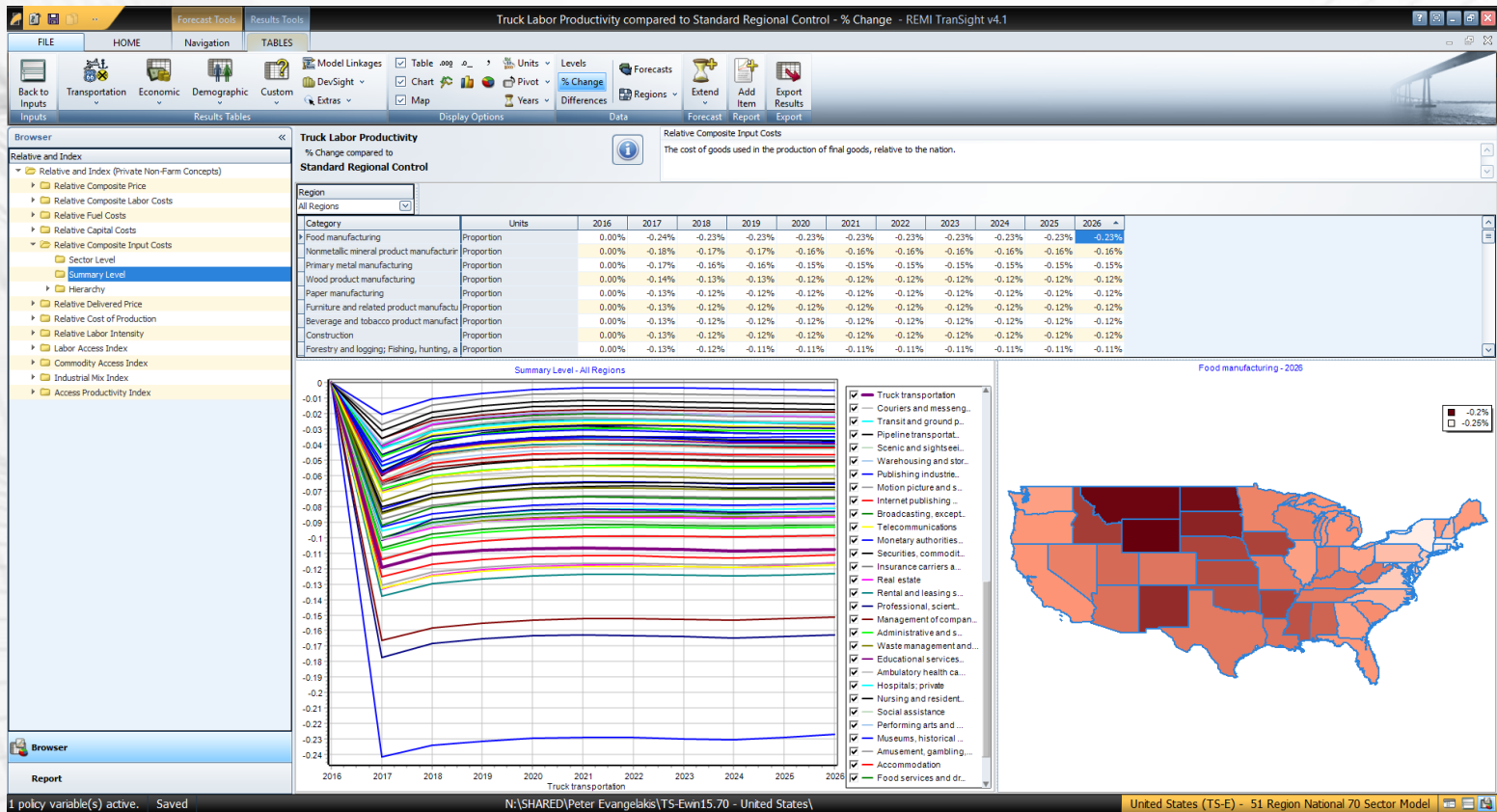
- Lower labor costs reduce delivered price of trucking as intermediate input



what does REMI say? sm

Trucking Labor Productivity

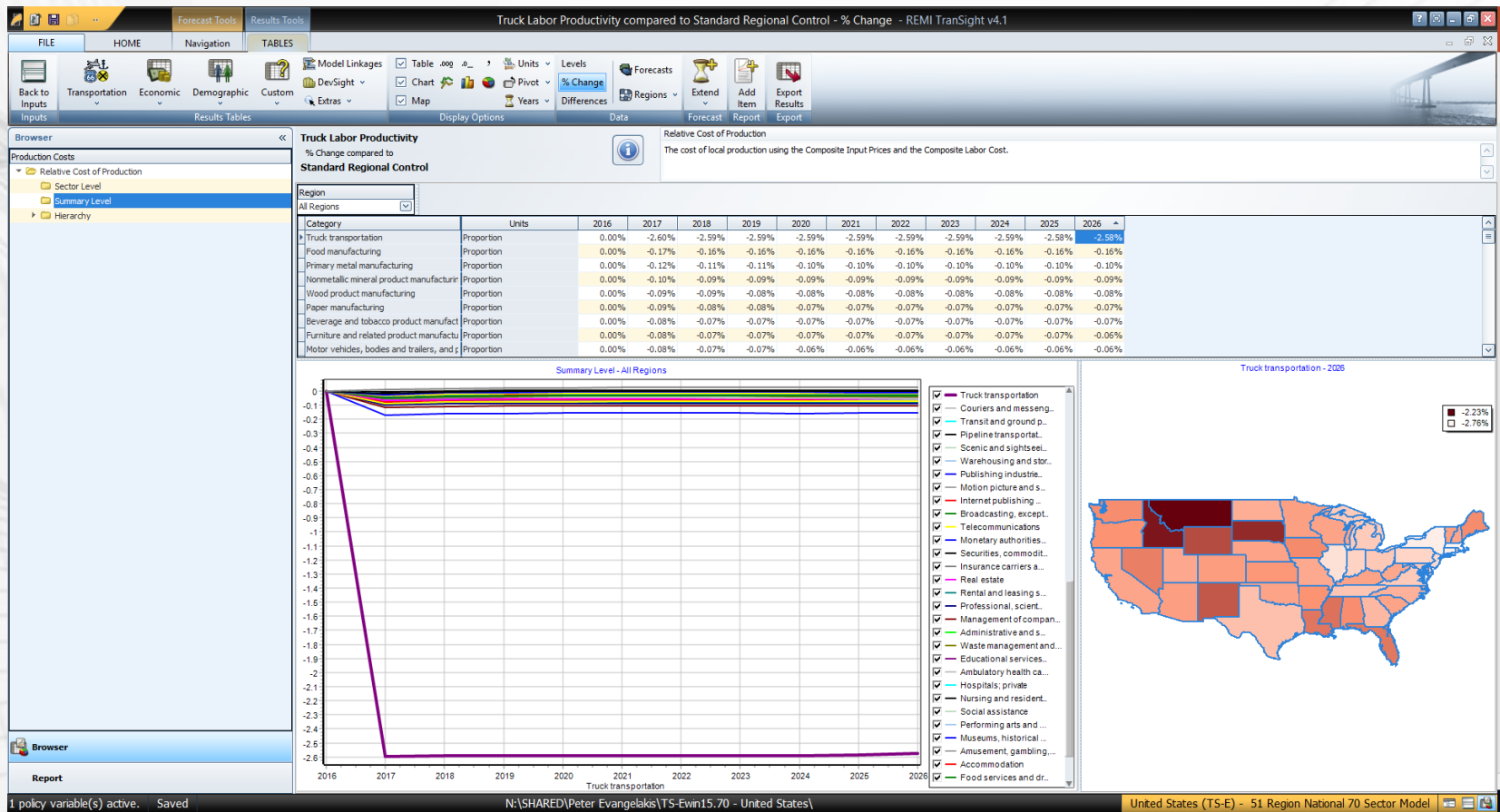
- This lowers input costs for trucking and industries that rely on trucking (esp. manufacturing)



what does REMI say? sm

Trucking Labor Productivity

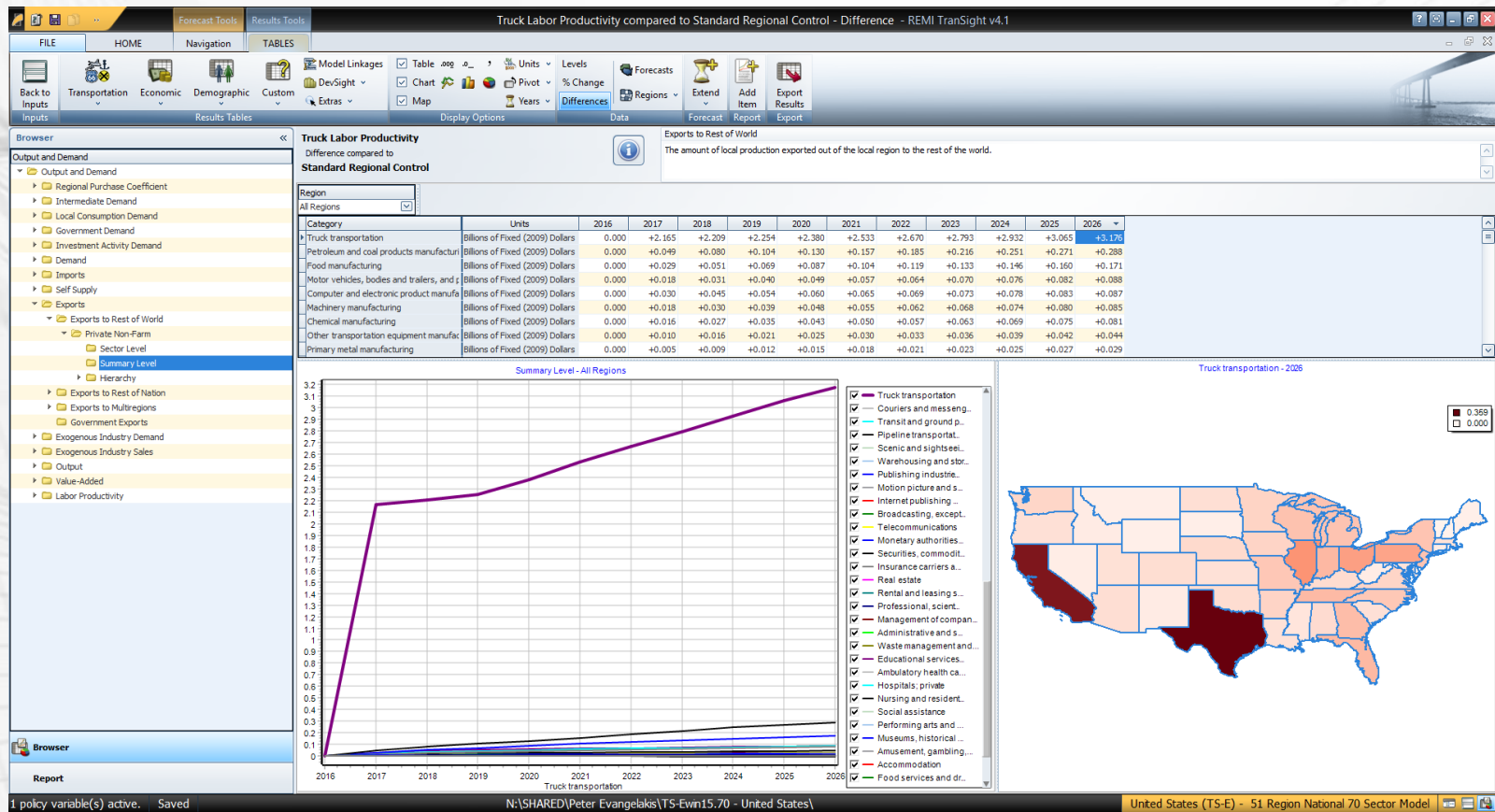
- In turn, this lowers production costs across the economy



what does REMI say? sm

Trucking Labor Productivity

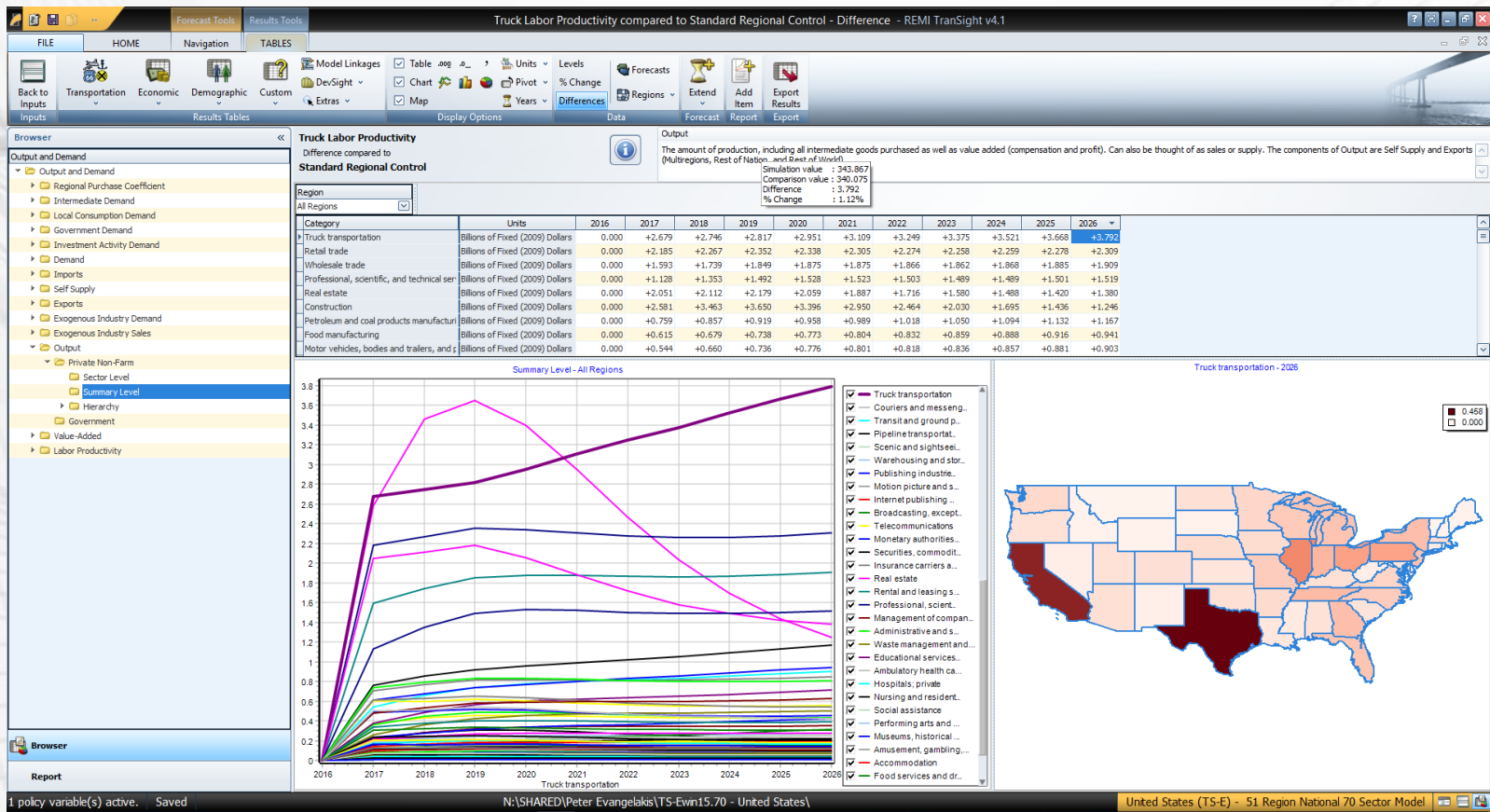
- U.S. businesses more competitive, exports and self-supply rise



what does REMI say? sm

Trucking Labor Productivity

- This raises U.S. output, both in the trucking industry and overall



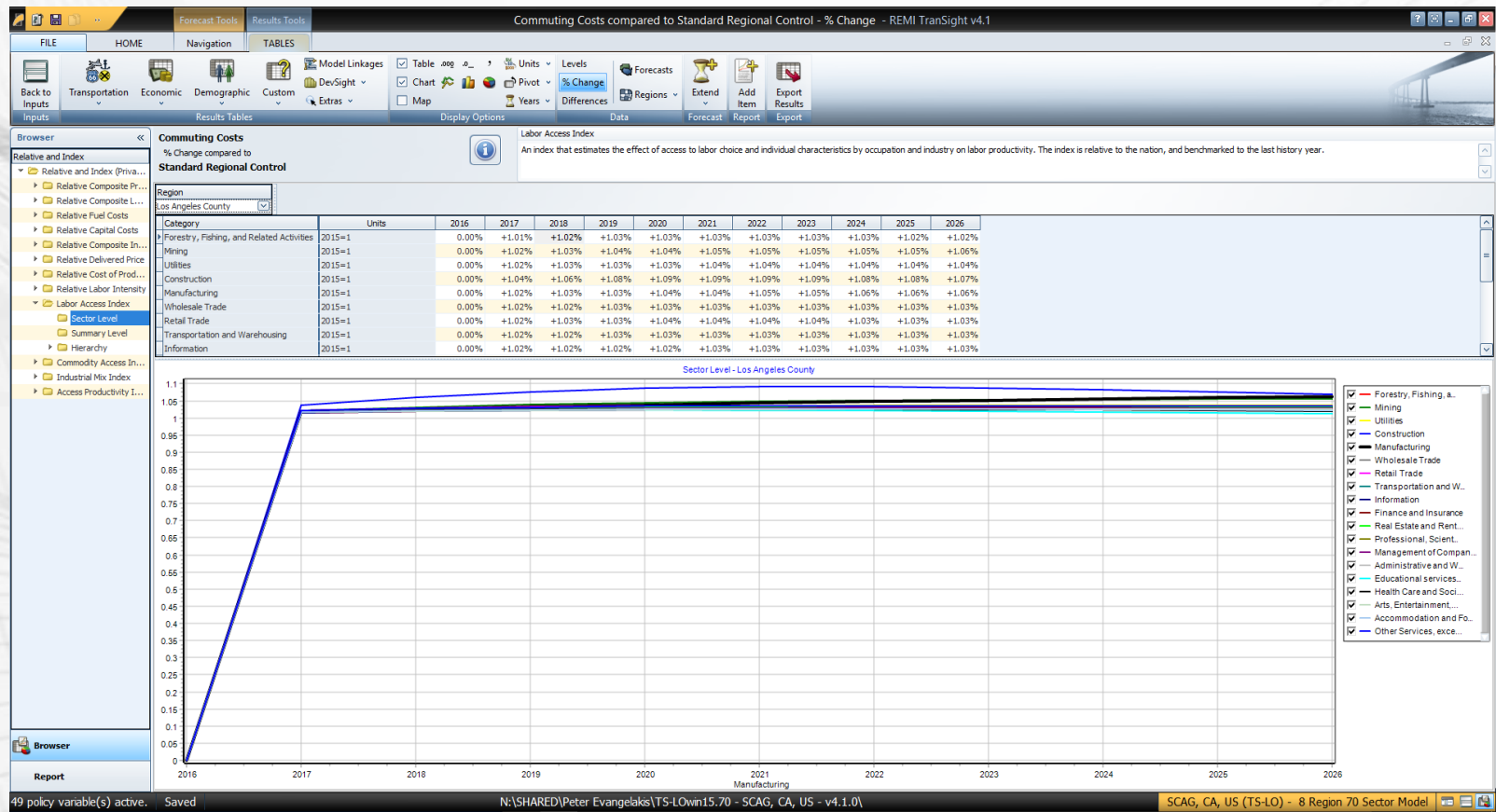
what does REMI say? sm

Commuting Costs

- ▣ 1% decrease in commuting costs among SoCal counties
- ▣ Increased access to labor lowers production costs, making business more competitive and raising output across the economy

Commuting Costs

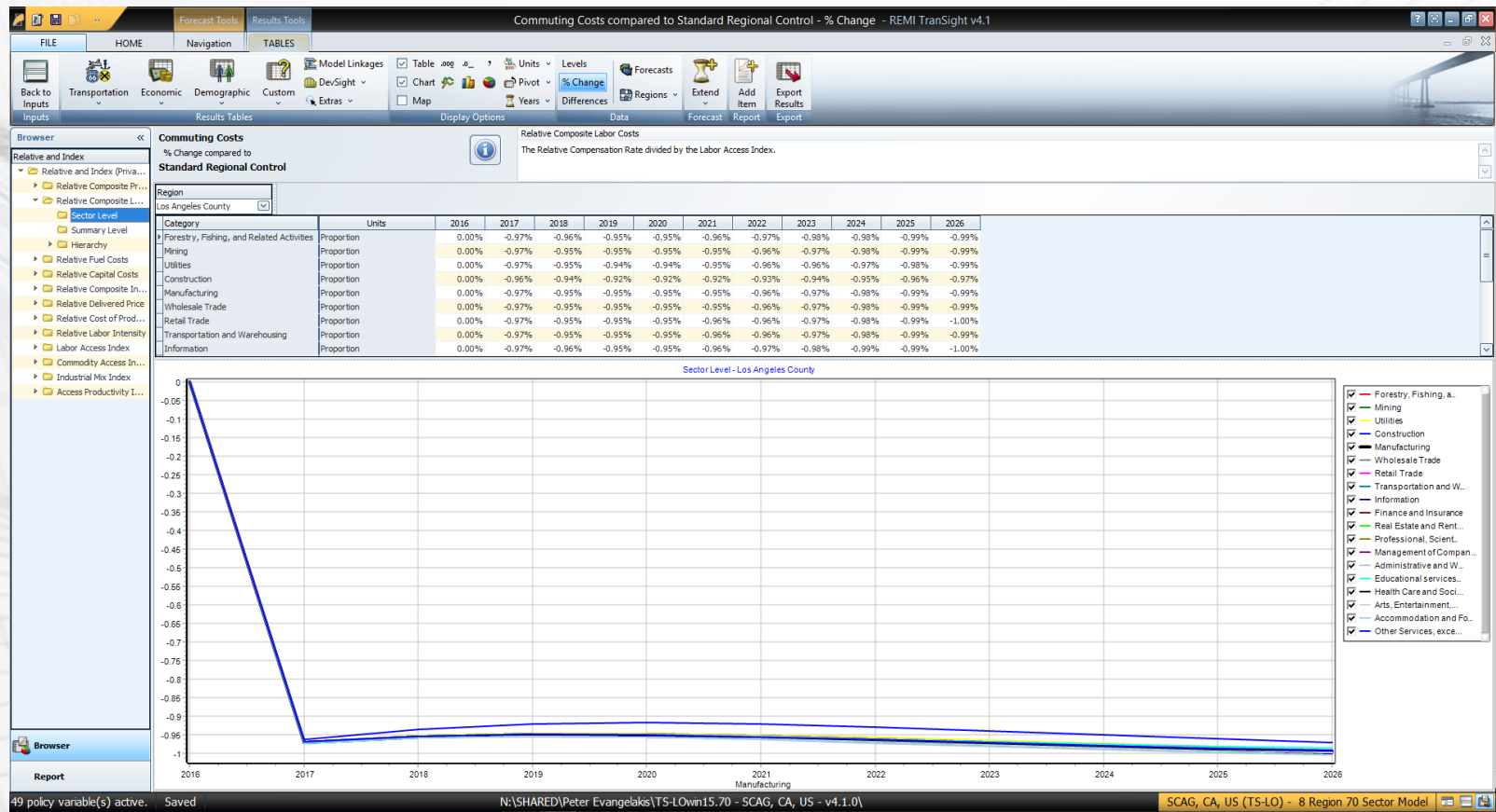
Lower commuting costs increase access to labor



what does REMI say? sm

Commuting Costs

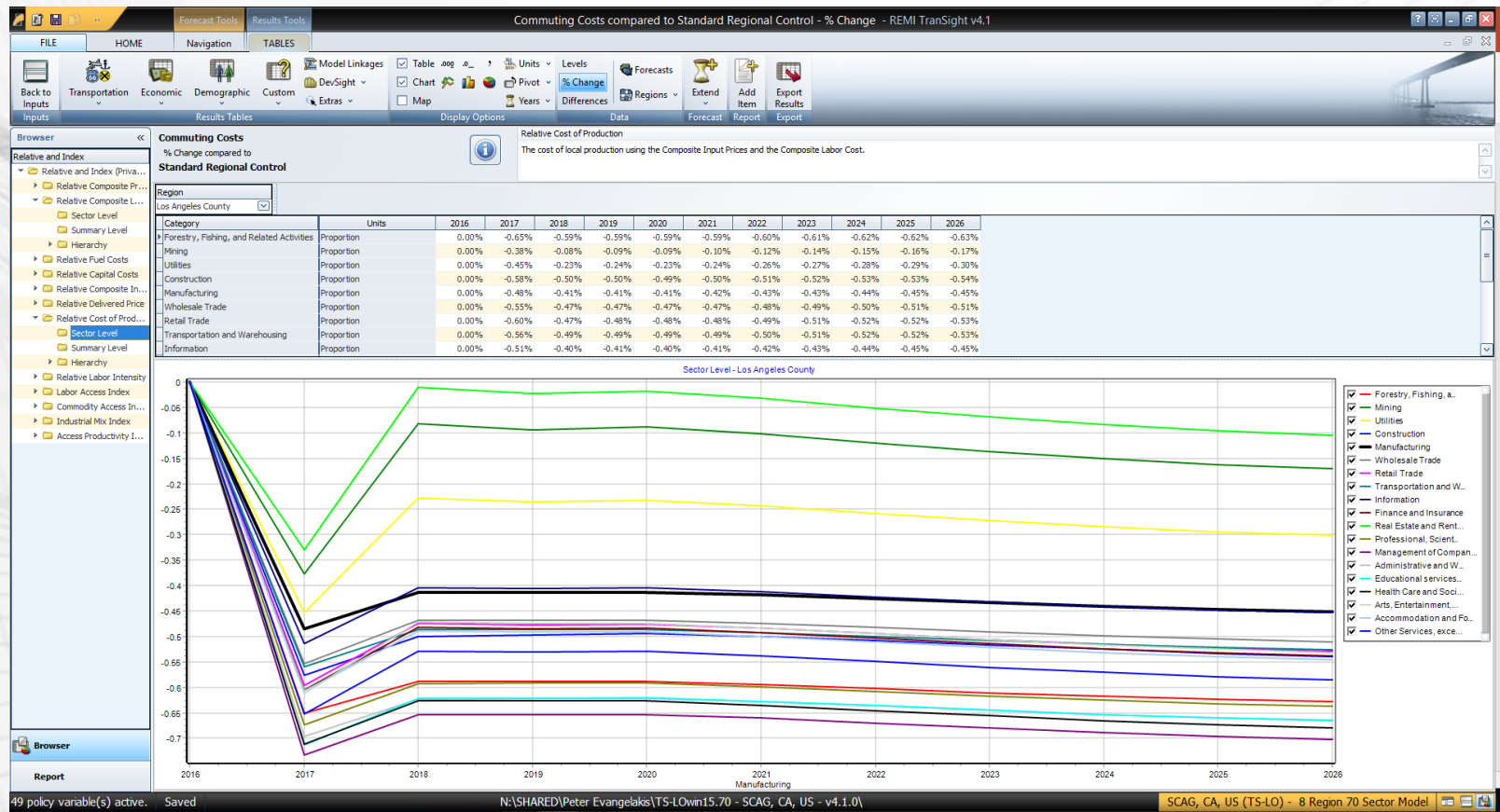
- Reduce labor costs by improving pool of potential employees



what does REMI say? sm

Commuting Costs

■ This lowers production costs across all sectors

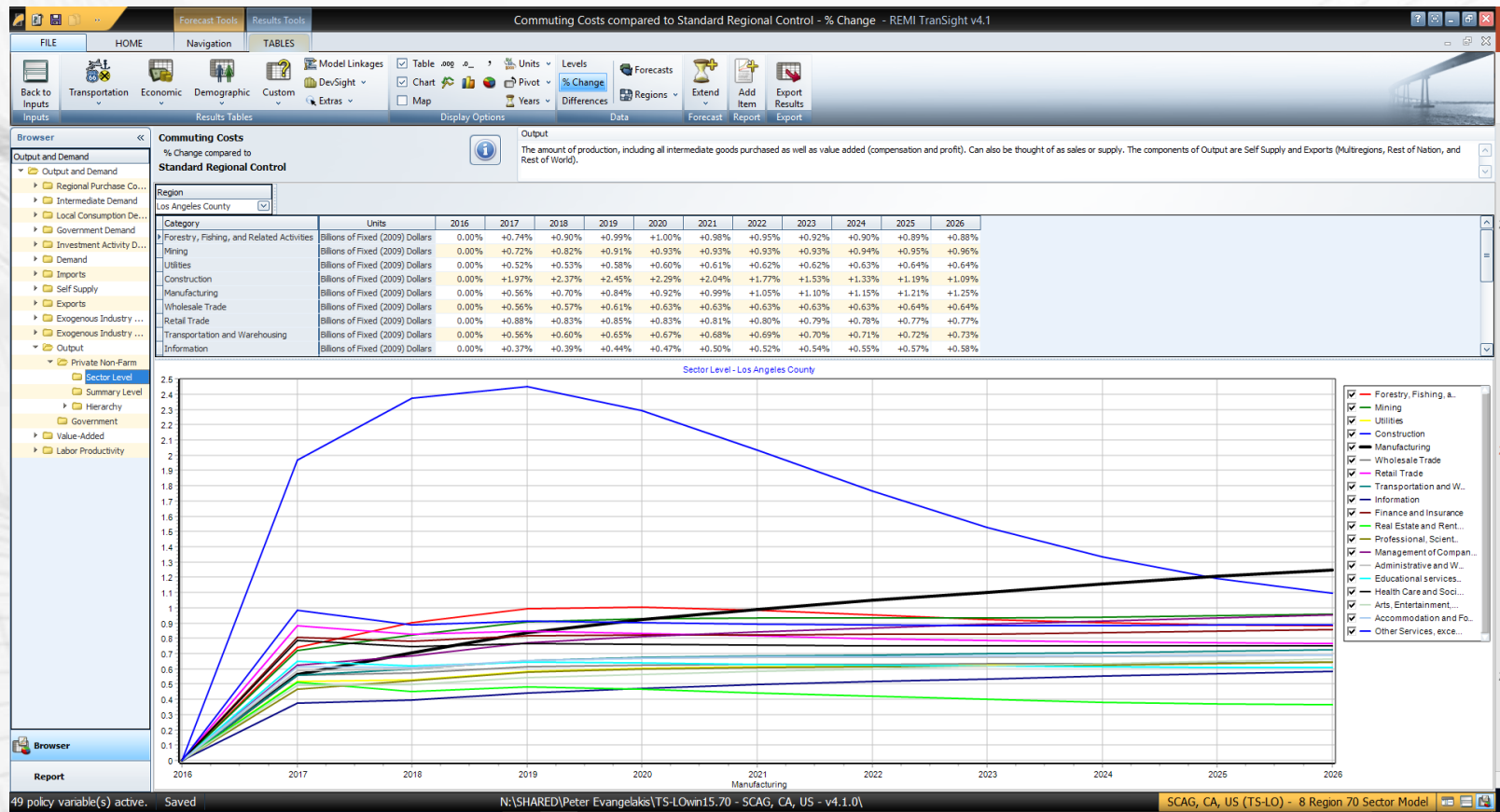


what does REMI say? sm



Commuting Costs

...which raises output



what does REMI say? sm

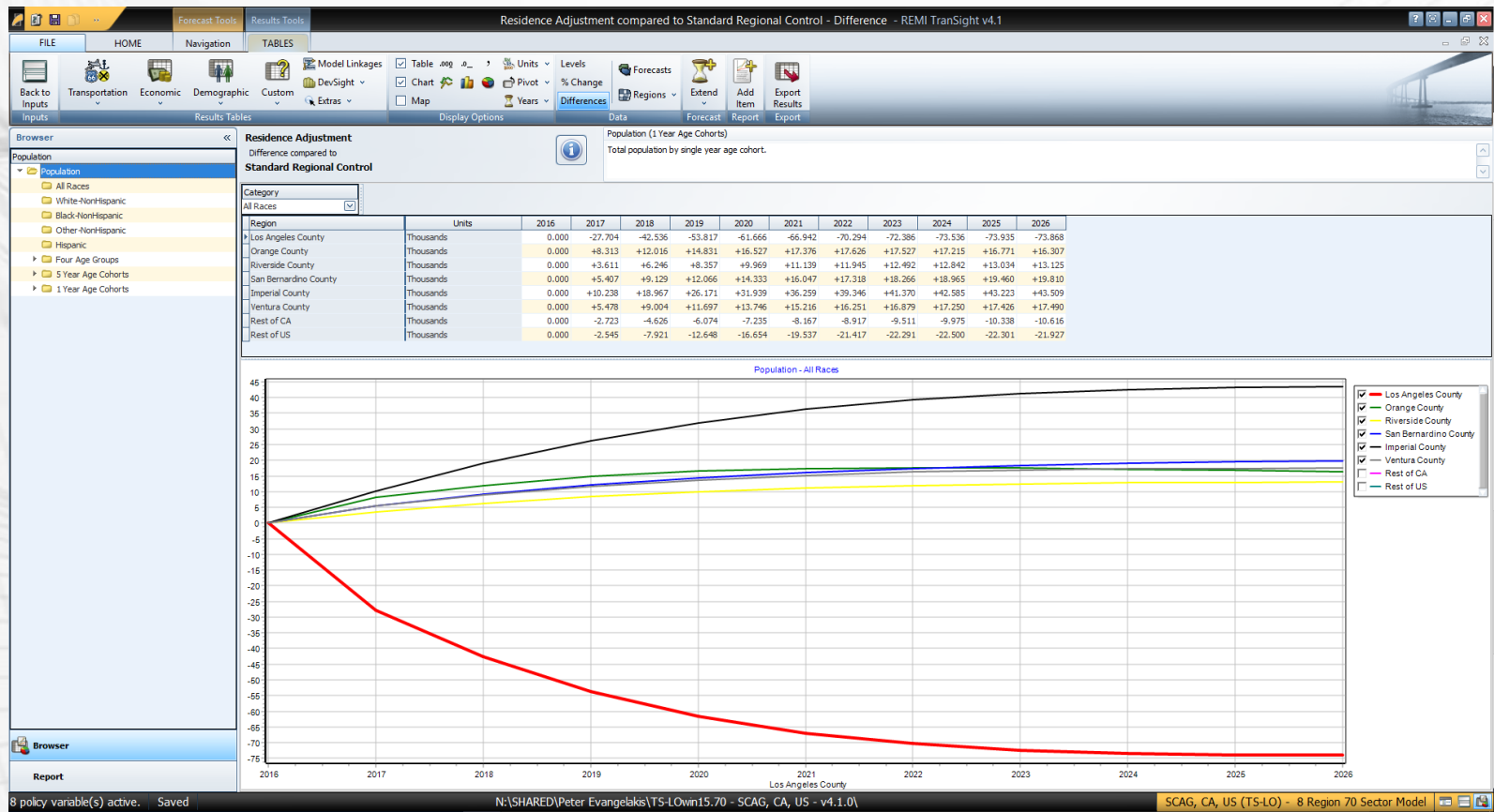
Commuters To The Suburbs



- \$5 billion of commuter personal income from L.A. to surrounding counties
- In surrounding counties, temporary construction booms and permanent increases in population-reliant industries such as real estate, retail trade, health care

Commuters To The Suburbs

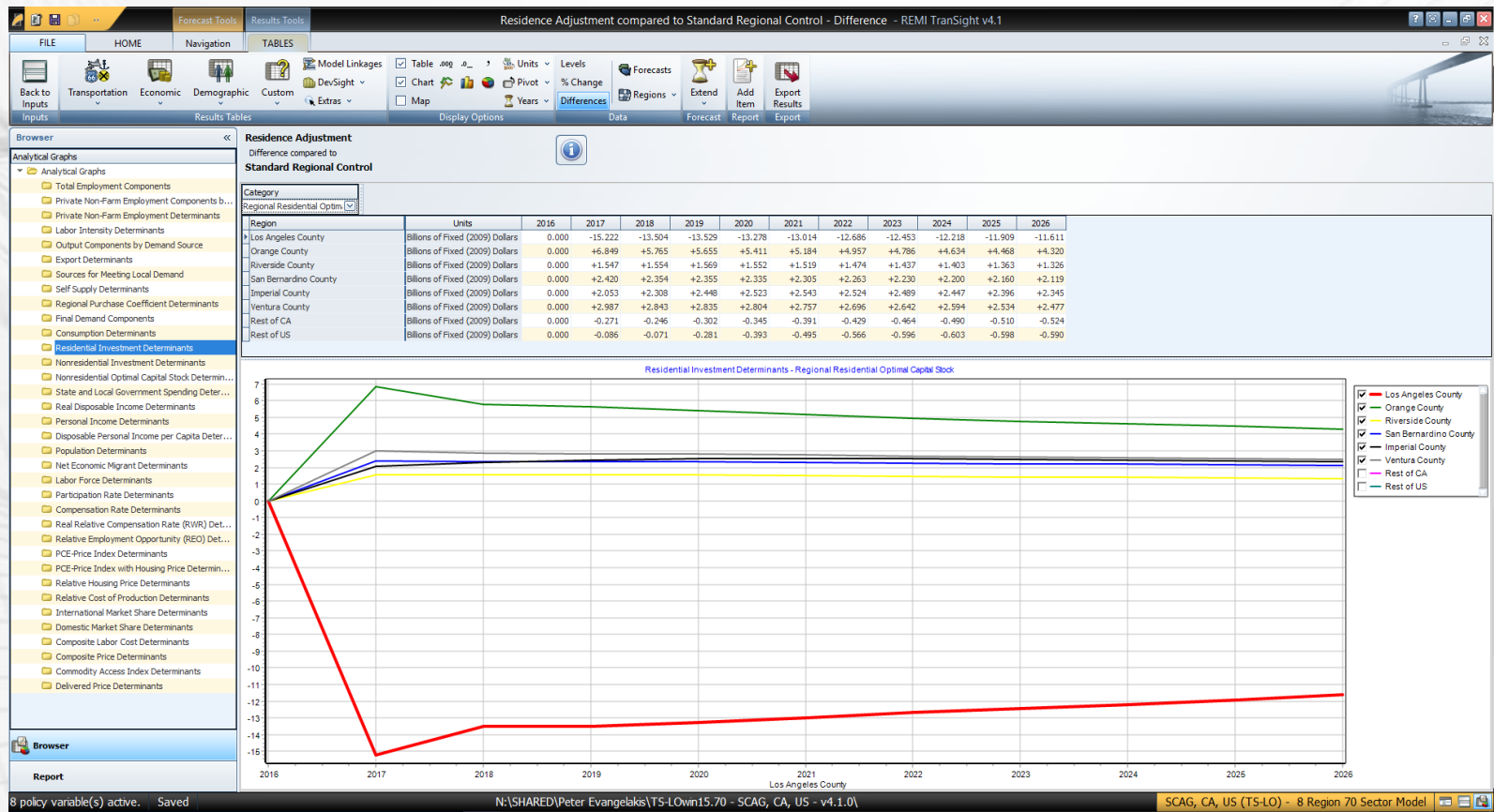
□ Population shift from L.A. to surrounding counties



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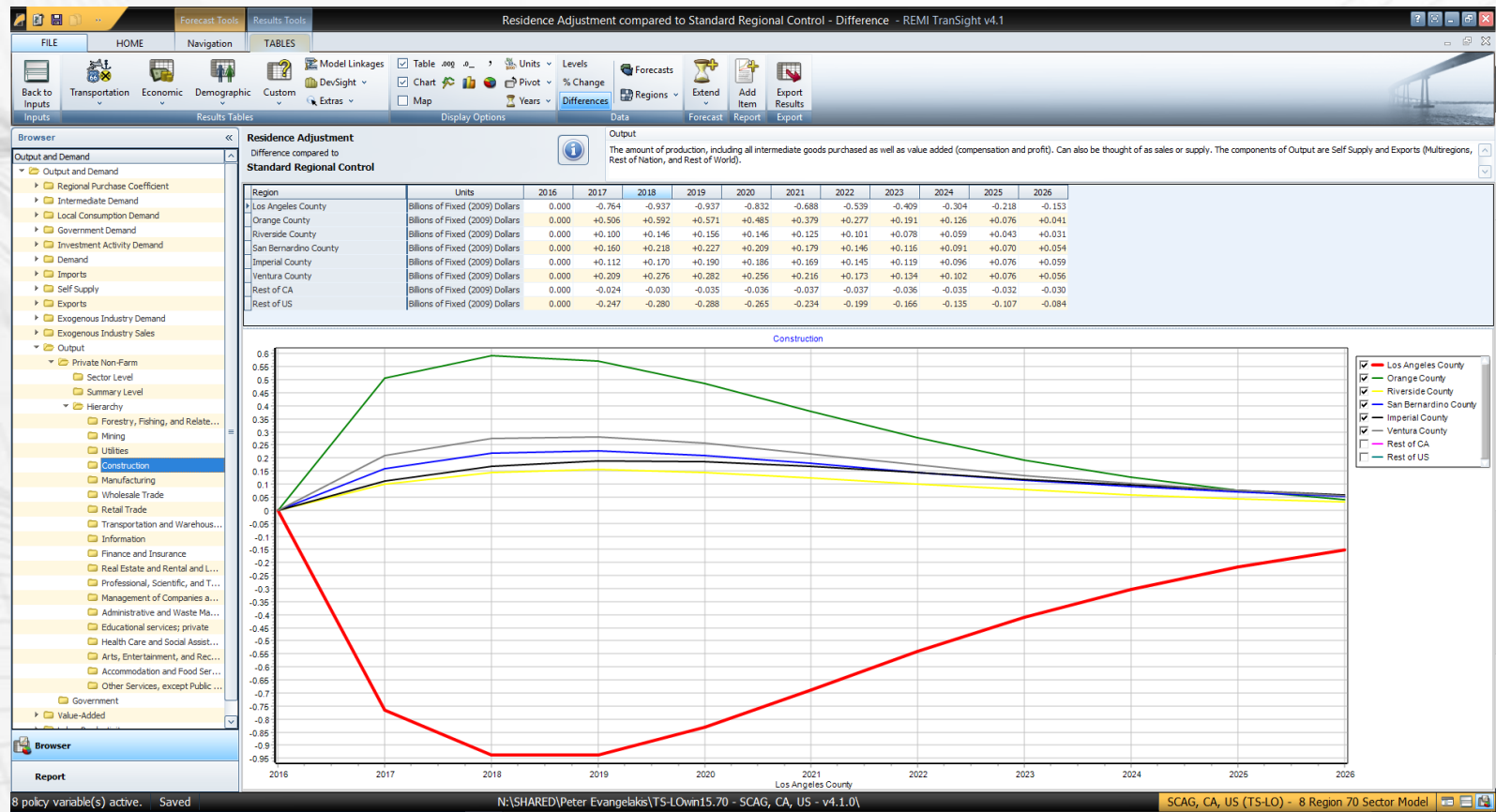
Commuters To The Suburbs

- Optimal housing stock falls in L.A., rises in surrounding counties



Commuters To The Suburbs

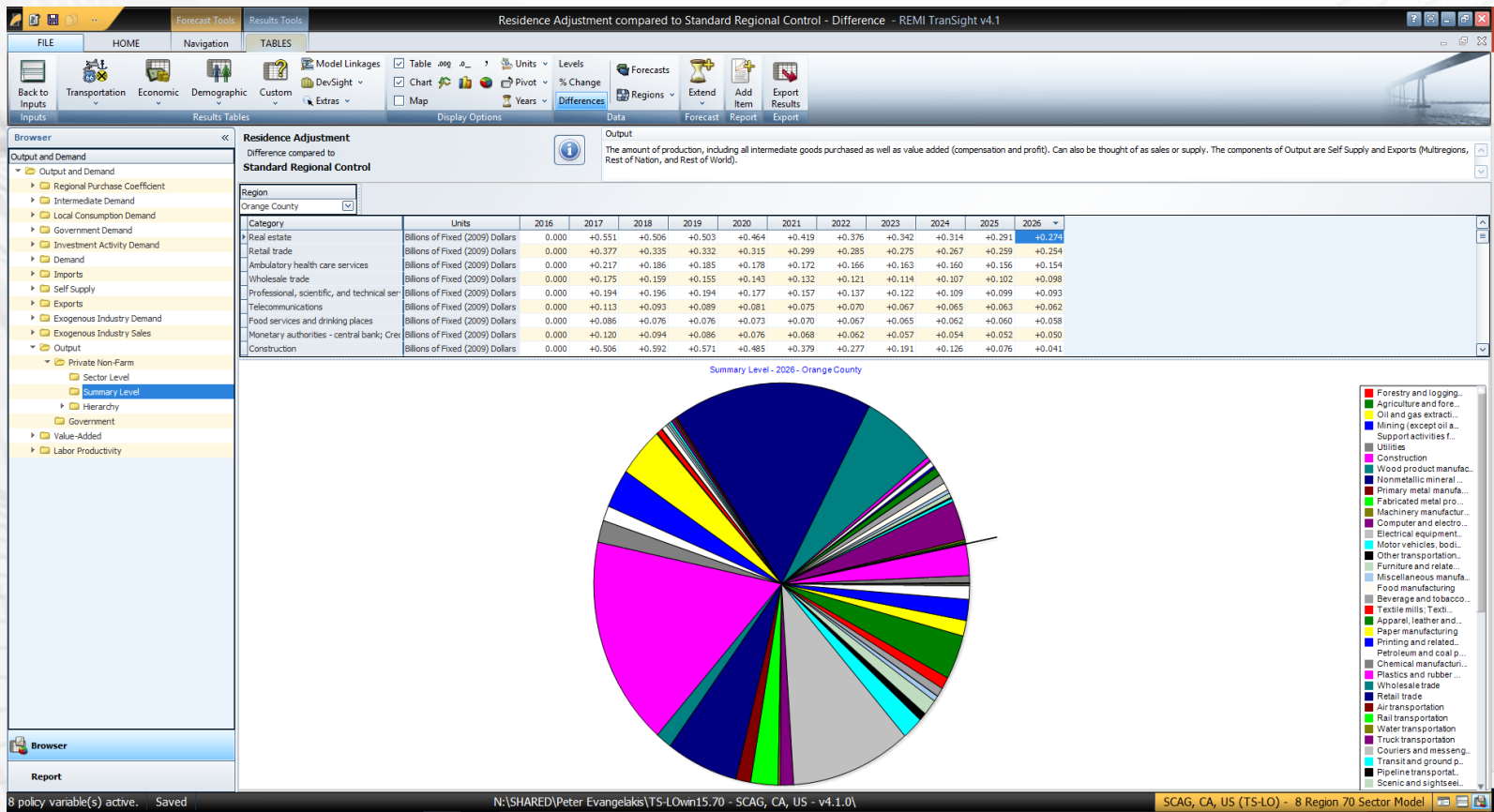
- Construction slowdown in L.A., boom in surrounding counties



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Commuters To The Suburbs

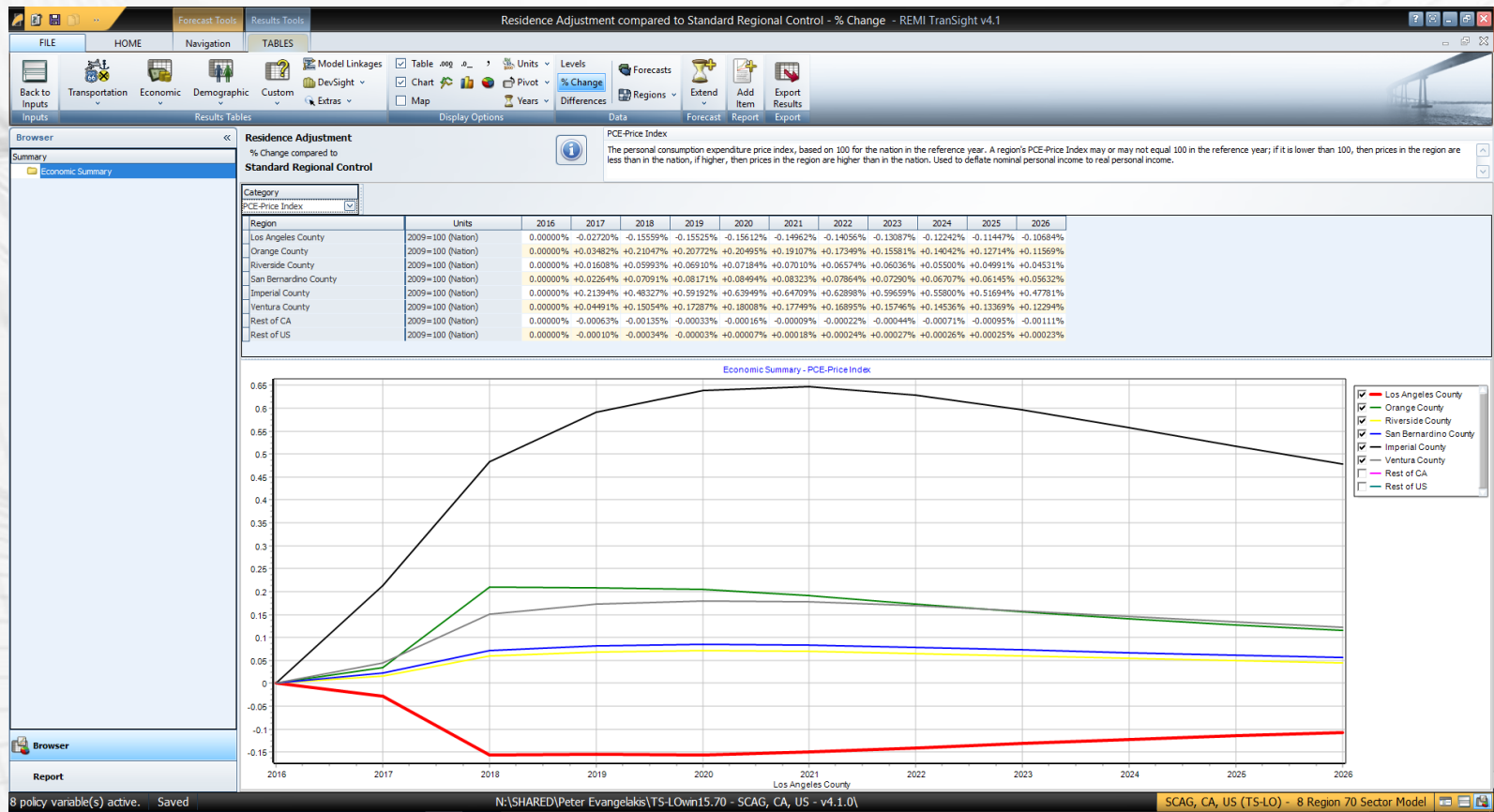
- Permanent geographic shift in population-reliant industries



what does REMI say? sm

Commuters To The Suburbs

- L.A. cheaper cost of living, surrounding counties more expensive



what does REMI say? sm

Conclusion

- Transportation and the economy are closely linked
- Innovations can have significant national and regional effects
 - ▣ Ride hailing apps, low emissions vehicles, driverless vehicles*
- Using TranSight, we comprehensively evaluate the impacts of:
 - ▣ Increased trucking labor productivity
 - ▣ Decreased commuting costs
 - ▣ Changing structure of metro areas