Flattening the Curve by Telework: Changes in Activity-Travel during the Pandemic

Major Takeaway:
Pandemic $\Rightarrow$ Teleworking Increase $\Rightarrow$ Peak Hour Demand Decrease

Research Questions

1. What was the pandemic impact on telework?

2. How did telework impact activity and travel during the pandemic?

3. How did changes in activity and travel impact peak hour traffic?

4. Did (can?) this sequence of change lead to changes in VMT?
**Study Time Frame**

COVID-19 infections in the U.S.: March 2020 to March 2021


**WFH Increased 6-fold during the Pandemic**

**Work From Home (WFH)** increased by a factor of 6 in the U.S.

Before pandemic WFH = 4.7%
During pandemic WFH = 32.2%

Data: Maryland Transportation Institute (2020)
**Changes in Activity Visits by Land Use**

**U.S. Countrywide** (Baseline value is from Jan 3 - Feb 6 2020)

- Initial sharp decline for all activities.
- Workplace visits declined the most and remained lower.
- Grocery and park visits increased after the initial decline and approached the baseline.
- Park visits decreased significantly when the infection rate spiked.

Data: Google LLC (2020)

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**Changes in Travel by Distance**

**U.S. Countrywide** (Baseline is the same-day in 2019)

- Distances are person-mile traveled by all modes.
- Trips under 25 miles had the greatest reduction.
- Long distance trips (>50) increased during summer and fall and then decreased after the holidays.
- All trip length categories increased in frequency over the last few months.

Data: Bureau of Transportation Statistics (2020)
**Changes in Hourly Demand**

- Baseline activity purposes on weekdays in 2019
- Worker types for all activities by weekdays in 2019 and 2020
- People traveling by time of day in four years including 2020

Participation rate is the percentage of people traveling by time of day

Data: ATUS 2019 and 2020

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**Teleworking and Changes in VMT**

- Spring outbreak 2020
- Summer 2020
- Fall 2020
- Post-vaccine 2021

Note: Red and Blue dots indicates Red and Blue states based on the 2020 U.S. presidential election

The higher the percentage of working from home (x-axis), the lower the VMT per worker per month (y-axis) across 50 states in the four defined study periods.

Data: Federal Highway Administration, 2019-2021 and Maryland Transportation Institute (2020)
Key Takeaways

- A primary public and private sector response to the pandemic was an increase in working from home (telework).
- Working from home changed activity and travel behavior, including changes over time in work and non-work activity levels and distance traveled.
- These behavioral impacts were most significant in the peak periods, particularly in the AM peak period when work (and school) tours dominate.
- Each of these changes varied both spatially, between and within states, and temporally over duration of the pandemic.
- These behavioral changes should continue to be tracked and modeled.

Recommended Policy Actions

- Telecommuting can be good for transportation:
  - Fewer commute trips, fewer peak hour miles traveled, thus, policies that promote all forms of telecommuting should be encouraged.
- The impacts of telecommuting on business are uncertain:
  - Work productivity may be impacted, as could associated work & non-work activities, thus, policy incentives may be needed to compensate for these impacts.
- Any reduction in commuting may impact public transit:
  - New demand patterns need to be assessed, then new supply policies developed.
- WFH may change demand for commercial and residential space:
  - Ramifications on local, regional, and state land use policies are uncertain.
Equity Considerations

- Not all workers are employed in telecommutable jobs, thus, the level of opportunity will not be equal (e.g., savings in commuting costs, reduced advancement at work).
- Reduced congestion may benefit highway commute but could impact transit commuters as service adjusts to changes in spatial and temporal demand.
- Changes in residential location may have equity impacts since telecommuters have more location opportunities and reduced housing costs than those who still commute.
- Land use patterns could change fundamentally if significant telecommuting becomes the new normal, impacting local and regional development.
- Relationships between policy, performance, and equity need to be examined.

VMT Reduction Potential

Teleworking can reduce peak hour congestion and thus can reduce VMT, however, telework could increase or decrease VMT in several other ways:

- Teleworkers may have fewer work trips but may make more non-work trips due to flexible work schedules.
- Teleworking may reduce long distance commutes but can increase short distance trips.
- Hybrid teleworkers who change residential location may have fewer but longer commutes.
- Commute trips not taken may free a vehicle for making additional trips by other members of the household.
- Relationships between demand (frequency, mode) and performance (distance, speed, and emissions) need to be both monitored and modeled for future impacts.
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Thank You

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