

Traffic Volume and Aggregate Economic Activity: Implications for Taking the Pulse of the U.S. Economy

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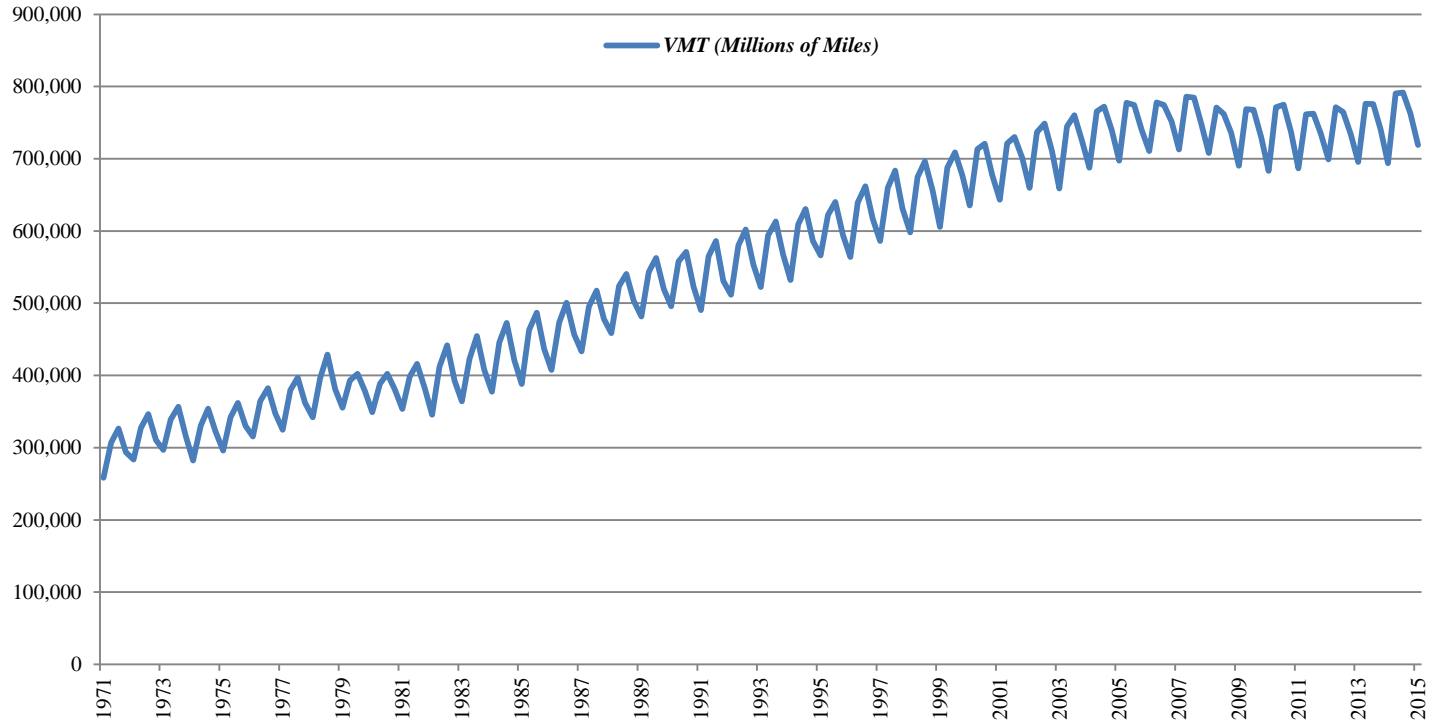
Research Question

- *What is the incremental relevance of real-time traffic volume data for “taking the pulse” of the U.S. economy?*
 - *Although prior research has identified a positive (bi-directional) link between traffic volume and economic activity, there is a dearth of evidence on the relevance of traffic volume information for taking the pulse of the U.S. economy*
 - *This is because, by and large, macroeconomics research has evolved independently from research in other disciplines, including transportation research*
- A contemporaneous link between aggregate traffic volume data and overall economic activity would suggest that such data can be relevant for **nowcasting** the U.S. economy
 - *Our study breaks new ground for interdisciplinary research by focusing on the relevance of aggregate traffic volume data for gauging fluctuations in economic growth*

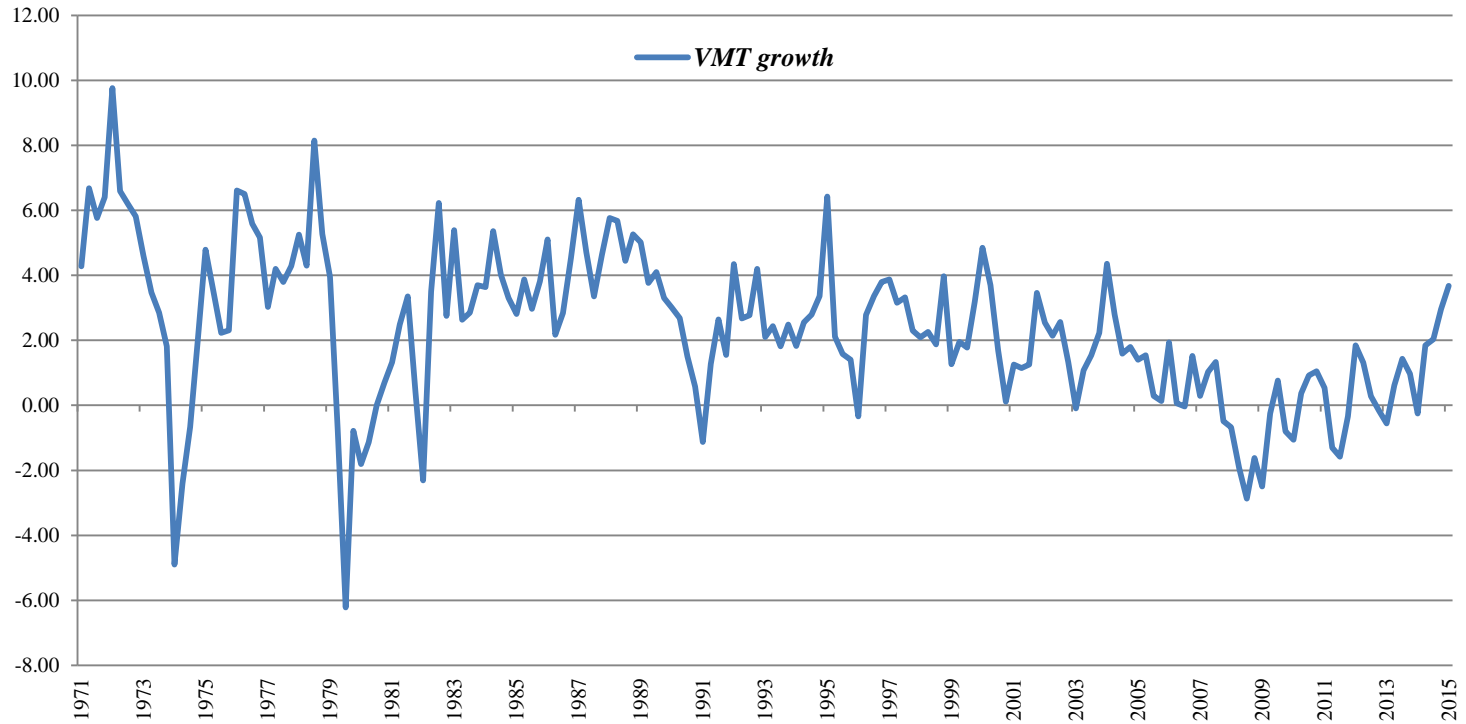
Research Design: Traffic Volume Data

- *Starting point*
 - Traffic Volume Trends (TVT) reports: Monthly publication by the Federal Highway Administration (FHWA) Office of Highway Policy Information, U.S. Department of Transportation
- *TVT reports*
 - Vehicle Miles Traveled (VMT) on all U.S. public roads on a monthly basis
 - Reports are based on traffic data from the Highway Performance Monitoring System and on data submitted to the FHWA by State highway agencies throughout the entire U.S. The State highway agencies collect the data through permanent automatic traffic recorders (ATR) on public roadways.
 - Monthly permanent traffic recorder data should be submitted to the FHWA within 20 days after the closing of the month. For example, the January 2016 data should be submitted to FHWA no later than February 20, 2016.

Time-series of VMT (1971:Q1 to 2015:Q1)



Seasonally-Adjusted VMT Growth



Research Design: Real Economic Growth Data

- Our sources for macroeconomic series include:
 - *Bureau of Economic Analysis: Real GDP growth realizations*
 - *Department of Labor Statistics: Employment growth realizations*
- Realization vintages
 - Initial releases one month after the end of the quarter (*Advance Estimate*)
 - Values available one quarter after initial release
 - Values available five quarters after initial release
 - Values available nine quarters after initial release (*Final Estimate*)
- A key aspect of our research design is to carefully consider the timing of the macro releases and align the traffic volume series and macroeconomic series in time
 - *This is a key aspect of our research because our objective is to search for now-casting benefits using information that can be available to the BEA and the BLS in real time.*

Revisions in macroeconomic growth

- The initial estimates of macroeconomic growth are based on incomplete data and are subject to revisions
- The revised estimates are more reliable representations of the state of the economy
- The revisions can be substantial especially around turning points in the business cycle

VMT and real economic activity

- Significantly positive link between VMT growth and real economic growth
- The link *strengthens* as we get “closer to the truth”
 - VMT growth explains 14% (20%) of the variation in the initial (final) estimate of real GDP growth
 - VMT growth explains 21% (25%) of the variation in the initial (final) estimate of employment growth

Explaining time-series variation in economic growth

Realization	Dependent Variable = Real GDP growth			
	Initial	2	3	Final
Intercept	1.28***	1.33***	1.30***	1.06***
<i>t</i> -statistic	3.65	3.45	3.48	2.84
<i>p</i> -value	0.00	0.00	0.00	0.01
VMT growth	0.51***	0.55***	0.55***	0.63***
<i>t</i> -statistic	5.24	5.26	5.49	6.25
<i>p</i> -value	0.00	0.00	0.00	0.00
Adj. R ²	14.4%	14.7%	14.9%	19.9%

Realization	Dependent Variable = Employment growth			
	Initial	2	3	Final
Intercept	0.51***	0.51***	0.44***	0.42***
<i>t</i> -statistic	2.08	2.05	1.71	1.61
<i>p</i> -value	0.04	0.04	0.09	0.11
VMT growth	0.41***	0.42***	0.45***	0.47***
<i>t</i> -statistic	5.63	5.63	5.95	6.22
<i>p</i> -value	0.00	0.00	0.00	0.00
Adj. R ²	21.3%	21.7%	24.4%	25.1%

Predictability of macroeconomic growth revisions

- Consistent evidence that revisions in estimates of economic growth are predictable based on VMT growth
- VMT growth is incrementally relevant after controlling for the content of other predictors including the level of the initial estimate as well as stock returns

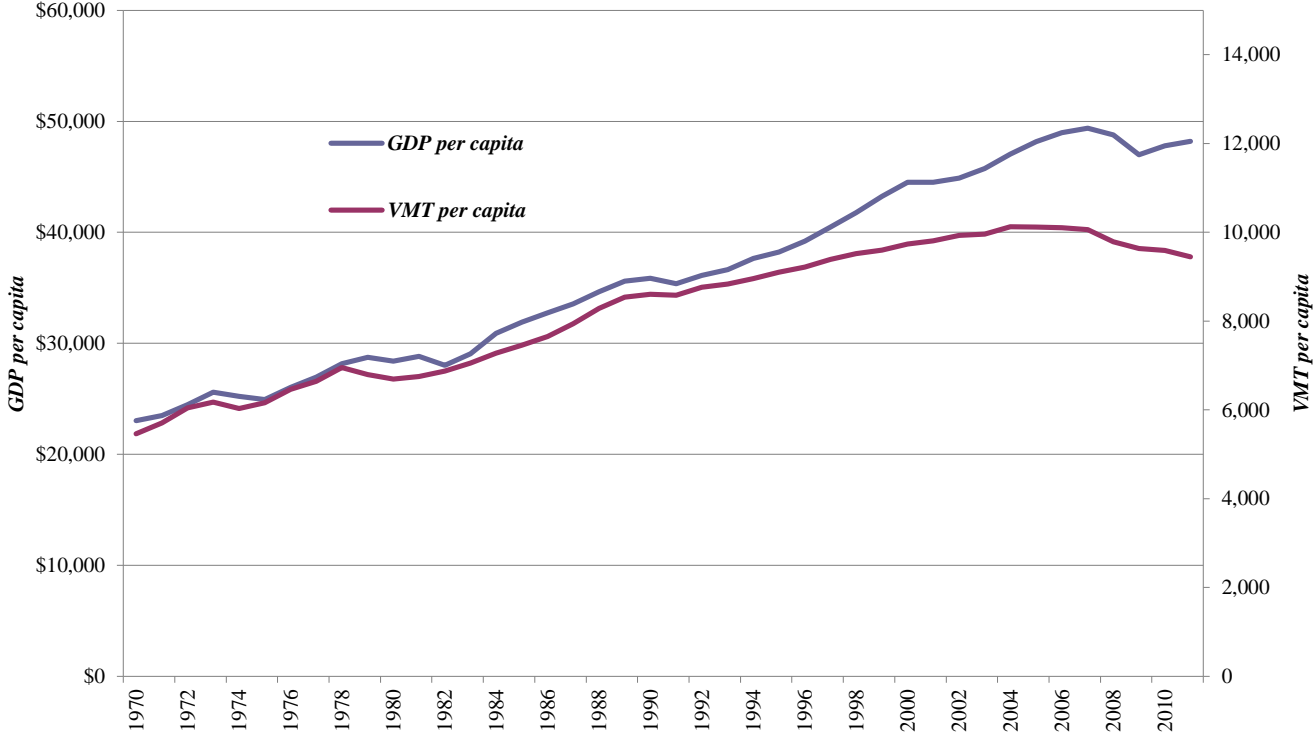
Explaining time-series variation in economic growth revisions

	Dependent Variable = Revision from Advance to Final Estimate	
	Real GDP growth	Employment Growth
Intercept	-0.20	-0.11*
<i>t</i> -statistic	-1.23	-1.88
<i>p</i> -value	0.22	0.06
VMT growth	0.17***	0.06***
<i>t</i> -statistic	3.15	3.67
<i>p</i> -value	0.00	0.00
Intial Estimate	-0.15***	-0.01
<i>t</i> -statistic	-3.56	-0.22
<i>p</i> -value	0.00	0.82
Stock Returns	0.02***	0.00
<i>t</i> -statistic	2.83	0.84
<i>p</i> -value	0.01	0.40
Adj. R ²	10%	7%

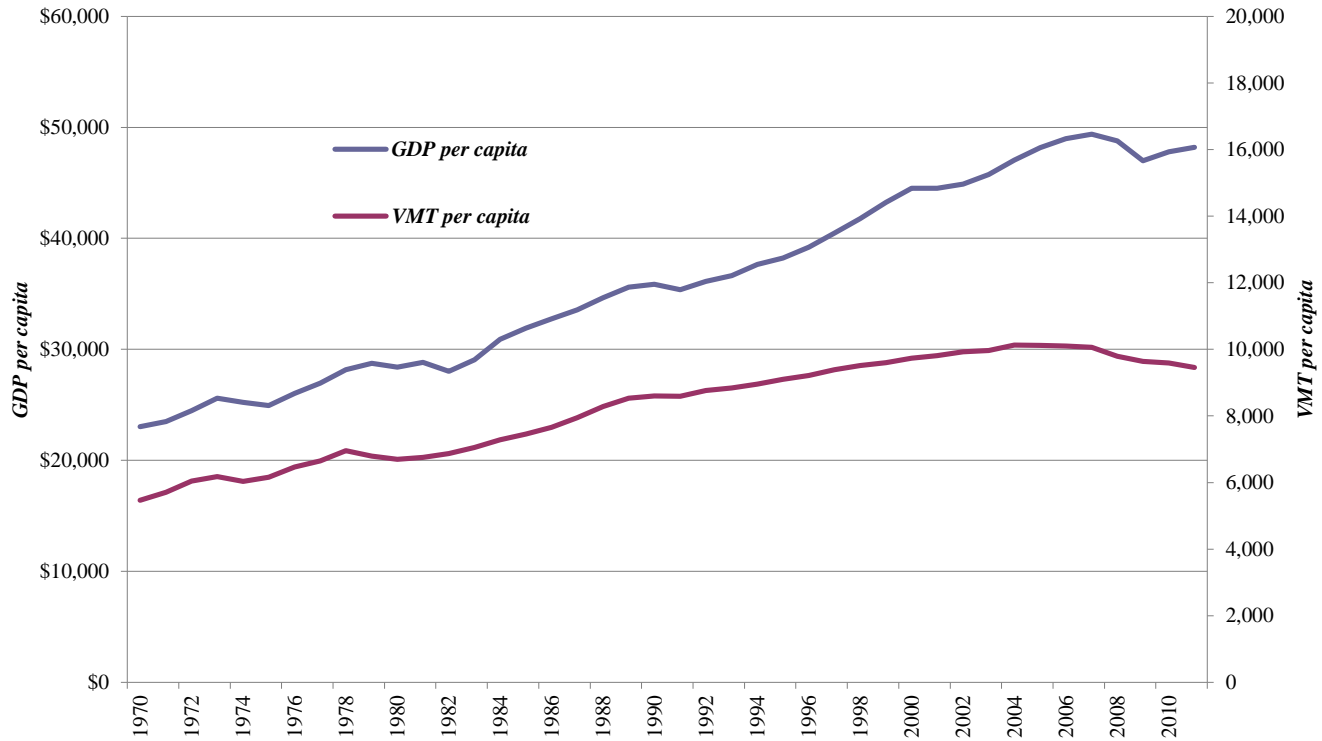
Contributions

- VMT growth is closely related to real GDP growth and employment growth
 - *This relation strengthens as we move from the initial to more recent vintages of the macro series, i.e., as we get closer to the truth*
 - *VMT growth has incremental predictive content for economic growth revisions*
- Implications
 - *Our findings can inform the BEA and the BLS when measuring the U.S. economy*
 - *It can inform the Federal Reserve when using macro data to devise monetary policy*
 - *It can inform capital market participants when setting stock and bond market prices based on their beliefs about the state of the U.S. economy*

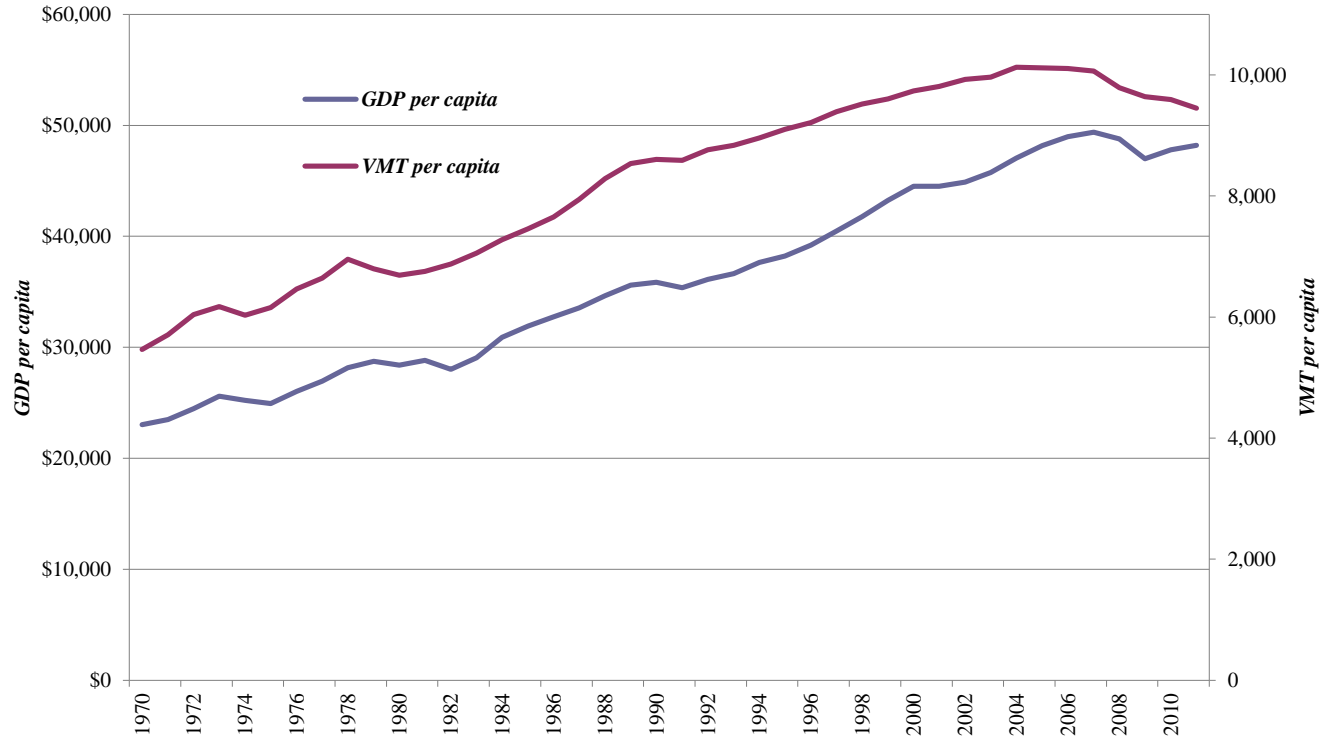
A Note on the Decoupling



A Note on the Decoupling



A Note on the Decoupling



THANK YOU

Please send your comments at panos@haas.berkeley.edu