

FLEETBEAT REPORT

*The Economy in Motion:
New Report from Fleetmatics Finds Fleet Activity a Strong Indicator of Economic Health*

In this issue...

What Small Business Services Companies Are Telling Us About Retail Sales

The Surprising Economic Growth Indicators Found in Small and Medium Sized Business

Compiled and presented by



In partnership with leading economist Dr. Stephen Fuller

April 2015 | Volume Two

FOREWORD

“A ground-breaking new report reveals that the performance of small business services companies can be a highly credible indicator of national and regional economic performance.” — Dr. Stephen Fuller

A Powerful New Approach to Studying Overall Economic Performance

*By Dr. Stephen Fuller, Dwight Schar Faculty Chair, University Professor
and Director of the Center for Regional Analysis at George Mason University*

“As goes small business, so goes the economy.”

A ground breaking new report reveals that old adage holds true, and something more interesting – that the performance of small business services companies can be a highly credible indicator of national and regional economic health. It's an approach that may be far easier to implement than attempting to directly measure the overall performance of small businesses, assuming that you have a credible, relevant and representative data source.

Recently I partnered with Fleetmatics to study its massive data set of retail delivery services, residential contractors and other local small businesses. Fleetmatics sits at the nexus of a tremendous amount of business intelligence. Recorded are the movements of hundreds of thousands of service vehicles operated by small businesses with employees in the field providing services.

Together we developed a data set representative of service-based small business activities and compared it to long-established retail sales data – a highly credible indicator of economic health. What we found was an extremely high correlation between the retail data at both the national and metropolitan area levels.

What's potentially most interesting about this type of data is the rate at which it is collected – in near-real time. It's far timelier than data that support the many established economic indicators that economists, investors and others use to inform their opinions.

Existing indicators typically report only monthly or quarterly. Even when a new report is released, the data are essentially already at least a month old and largely consist of estimated values. For example, business activity data are often collected through a qualitative survey, which can be unreliable due to poor response rates and lack of accuracy. Then as new data become available, subsequent revisions are necessary to ensure accuracy.

I have always felt there was a more efficient and less subjective way to track economic activity. This FleetBeat report, for which I am a supporting author, demonstrates the benefits of taking a fresh approach and tracking economic performance by analyzing real-time industry-related data.



BIO - DR. STEPHEN FULLER

Dr. Fuller joined the faculty at George Mason University in 1994 as Professor of Public Policy and Regional Development. He served as Director of the Ph.D. Program in Public Policy from July 1998 to June 2000 and from July 2001 to July 2002. In September 2001, he was appointed University Professor and in July 2002 he was named to the Dwight Schar Faculty Chair and Director of the Center for Regional Analysis. Prior to joining GMU, he served on the faculty at George Washington University for twenty-five years, including nine as Chairman of the Department of Urban Planning and Real Estate Development and one as Director of Doctoral Programs for the School of Business and Public Management.

Dr. Fuller was recently appointed to Joint Advisory Board of Economists by Governor McAuliffe. He served on the Governor's Advisory Board of Economists under Governors Kaine, Warner, Allen and Wilder. In 2003, he was a member of the Governor Warner's Tax Reform Working Group. He also is a member of the DC CFO Business Advisory Group of the District of Columbia, the Montgomery County Business Advisory Panel and the U.S Army Women's Foundation. His international assignments include Kazakhstan, Georgia, Hungary and China as well as on-going projects in Portugal. He served on the Board of Directors of Tompkins Builders Inc., a DC-based company, from 2004 to 2012, and currently serves on the Boards of the Global Environment and Technology Foundation and Northfield Mount Hermon School in Massachusetts.

Dr. Fuller's recent research has focused on the structure of the Washington metropolitan area economy, how this changed during the Great Recession and how it will change going forward as its federal-spending dependency diminishes. He has also undertaken research on the changing workforce requirements of the Washington area's emerging economy and the housing requirement of this future workforce. His current research involves the projected demographic changes over the next fifteen years and how these will impact the Washington area's workforce, housing market, and demand for public services.

He has authored more than 800 articles, papers, and reports in the field of urban and regional economic development including monthly reports on the Washington metropolitan area (2/91 to 2/11) and Fairfax County economies (6/97 to 6/09).

INTRODUCTION

A Real-Time View of Where the Economy is Moving

As a leading global provider of software-as-a-service (SaaS)-based mobile workforce and fleet management solutions for businesses of all sizes, Fleetmatics is home to a wealth of telematics data. With 74 billion data points and growing, Fleetmatics has unique access to near-real-time movements of approximately 552,000 residential and commercial service and delivery vehicles for over 25,000 businesses.

This second edition of FleetBeat was inspired in part by conversations with leading economist Dr. Stephen Fuller. After reviewing Fleetmatics' data set, he expressed that "the activity of Fleetmatics' customers seems to mirror the economy. I believe that you have something big here."

From there, the hypothesis for this report was developed – that the performance of small businesses in the services industry directly reflects the health of the economy. To support this, Fleetmatics data would be compared to retail sales data, a well-established leading economic indicator. The two data sets were compared over the same time periods dating back to January 2011, spanning nearly four years, and the results revealed a forecast much closer to reality than what was predicted by many prognosticators.

KEY INSIGHTS

- Retail sales data are an acknowledged, leading indicator of economic health
- Fleetmatics' small business services telematics data strongly correlates with national and regional retail sales data
- Telematics data suggest that small business services activity can be a viable gauge of economic health
- Distinct regional factors drive the correlation with retail sales data in key Metropolitan Statistical Areas

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METHODOLOGY

“FleetBeat findings go beyond simple association – the data suggest that the performance of small businesses in the services industry may impact retail sales.”

— Dr. Stephen Fuller

Starting with a data set of over 10.7 billion telematics-generated data points from over 400,000 commercial vehicles within and outside major Metropolitan Statistical Areas (MSAs) in the US, regression analysis was used to compare Fleetmatics data with monthly retail sales data nationally and in major MSAs, including New York, Chicago, San Francisco and Miami ⁽¹⁾⁽²⁾⁽³⁾.

There were eight telematics-derived, independent parameters considered in this analysis, both in aggregate and at the per vehicle level, including those related to mileage, number of vehicle stops, mileage per stop, number of active vehicle days per month, number of vehicles active in a month, among others ⁽⁴⁾⁽⁵⁾. The data were drawn from small business customers defined as entities having fleets from 5 to 100 vehicles – the actual average was 14 vehicles per fleet.

To maintain an “apples-to-apples” comparison and exclude non-organic growth, only small businesses that incepted their telematics service before 2011 were included in the analysis ⁽⁶⁾. Only fleets from business types that were related to or supporting the retail and service sectors were considered; this includes businesses such as those involved in delivery, home & business field service and light contractors, among others.

In performing the regression analysis, retail sales data were designated as the dependent variable and the aforementioned Fleetmatics monthly telematics metrics were designated as explanatory variables ⁽⁷⁾. Parameter estimates and output statistics were used in analyzing the best model characteristics that support the strongest linear relationship between retail sales and specific telematics-derived data ⁽⁸⁾. The regression analysis was performed for each scenario nationally and respectively for each MSA ⁽⁹⁾. This approach was used to identify differences among the various regions which have different types of economic profiles along with different types of business behavior.

With at least two million total miles tracked per month in each of the sampled four regional markets, their levels of tracked vehicle critical mass made them suitable for a representative report.

Fleetmatics found the greatest correlations among all data in the markets with the most available data (or where Fleetmatics has the greatest market penetration). Based on this finding, Fleetmatics expects correlations to rise over time in additional regions as the company’s business continues to grow.

The research model for each market varied slightly as explained in each market-specific section in the report. Custom analytical regression models were necessary to be fully representative of each market given unique business and operational behaviors.

Beyond Association to Causal Inference

Fleetmatics findings suggest that the performance of small businesses in the services industry may have an impact on retail sales. We believe this is because in order to generate retail sales, there first needs to be economic activity that allows for the retail sales to take place – most notably delivery of goods but also business and home services.

From market to market, operational conditions of small business services change as well as the research models used to study them. However, Fleetmatics data maintain a correlation between national and local retail sales, even under changing conditions, thus suggesting some level of causation between the data being studied. That said, this report is not intended to draw a direct causal relationship between small business services fleet activity and overall retail sales.



NATIONAL PERSPECTIVE

WHAT YOU'RE ABOUT TO SEE

- A **strong correlation** exists between small business vehicle telematics data and retail sales
- The movements of retail- and service-related small businesses as a **leading indicator** of retail sales

COUNTRY PERSPECTIVE

After the Great Recession of 2008-2009, the United States has seen consistent economic growth in jobs and retail sales often linked to an increase in small business activity ⁽¹⁰⁾. Employment rates and a subsequent increase in retail sales have long been considered a tenet of economic productivity. However, retail sales data can be difficult to examine, as it is often limited and incongruent with employment data – generally spiking three to four months after changes in employment rates.

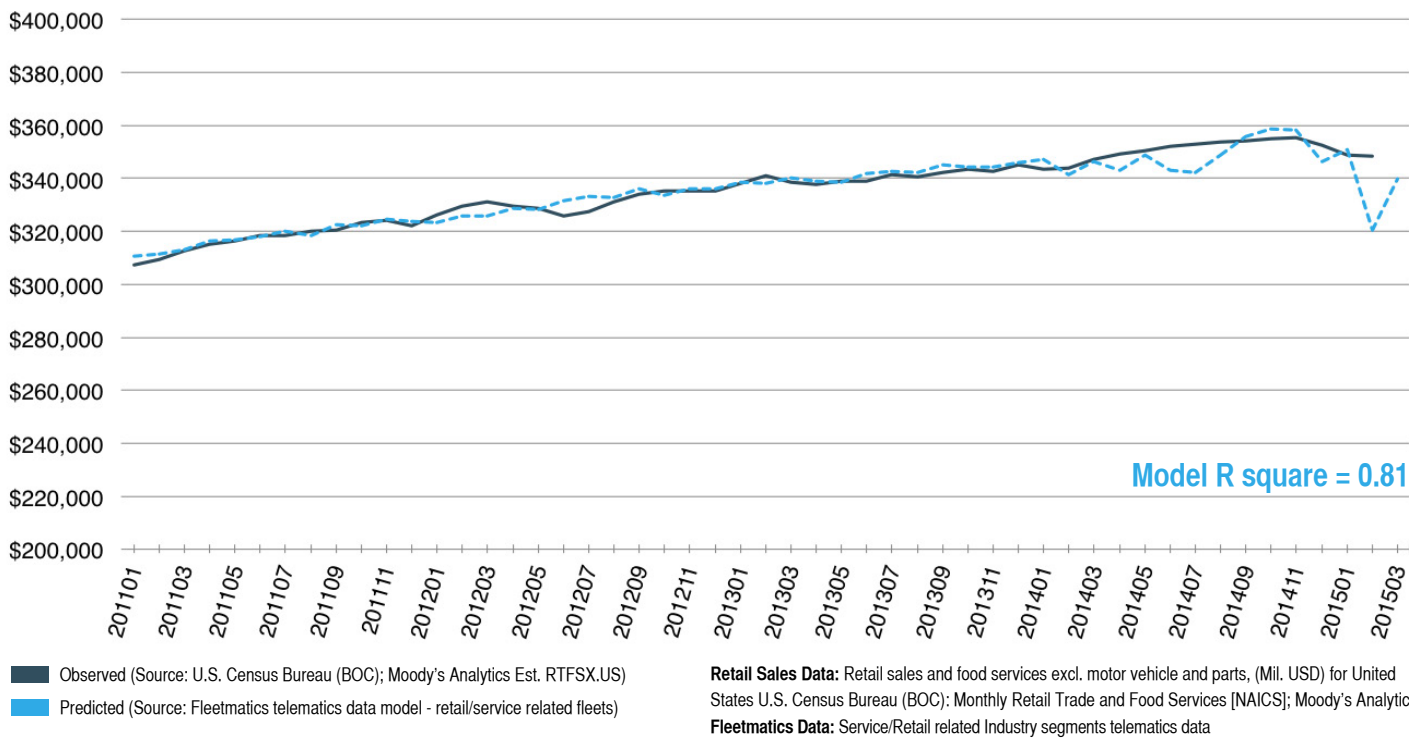
In analyzing small business services companies' performance, we found a better approach to gaining insights on U.S. economic performance by directly measuring the overall vehicle activity of small businesses ⁽¹¹⁾. In fact, we could measure those activities in practical real-time, based on telematics data collected from a diverse customer base.

These findings further support the importance of small businesses' contribution to economic activity in general. Specifically on a national basis, the data suggest that as the total number of miles driven by small business services companies increases, so do retail sales.

In the chart below, Fleetmatics' telematics data are tightly coupled with nationwide retail sales changes ⁽¹⁴⁾. While updated Census data continues to be collected, Fleetmatics' data suggest an increase in retail sales in March 2015. For all other fluctuations in data correlation, reasons could vary from unusually poor weather conditions to gift card usage, etc.

For example, for the first two months of 2015, fleet activity – as measured by total miles driven, total number of active vehicle days and number of unique vehicles that experienced movement – decreased approximately 30 percent compared to the same period last year. In certain instances, this can be attributed to the unusual bad weather many regions experienced in early 2015 as was demonstrated by internal Fleetmatics research studies of those affected regions.

Retail Sales and food services excl. motor vehicle and parts
US Census Bureau vs. Fleetmatics Predicted (retail sector related fleet activity)



METROPOLITAN STATISTICAL AREA (MSA) PERSPECTIVE

WHAT YOU'RE ABOUT TO SEE

- Small business services company performance and retail sales in New York, Chicago, San Francisco and Miami
- Regional differences that drive activities of small business services companies

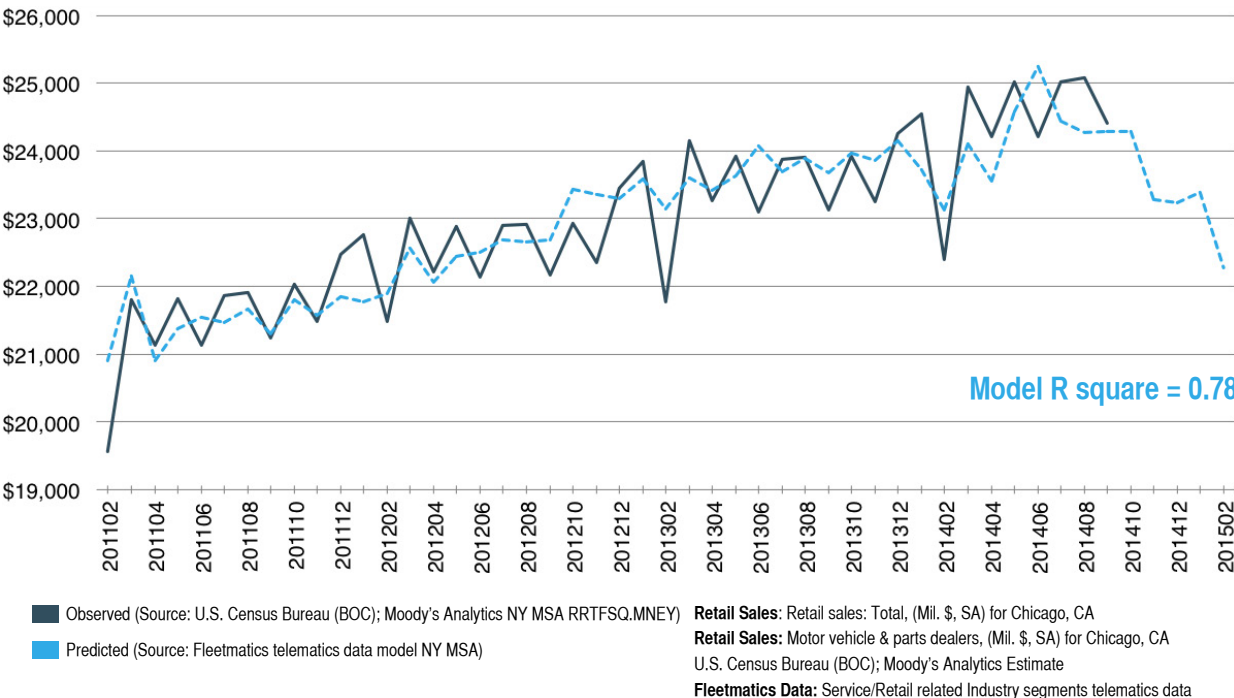
FOCUS ON THE NEW YORK MSA

As one of the most densely populated regions in the United States, the report found that the total number of stops (e.g., deliveries or service calls) is the most indicative metric when correlating retail sales in the New York City metropolitan area ⁽¹⁵⁾.

Results from the Fleetmatics data model for New York are reflected in the below chart, showing a significantly tight linear relationship between the total number of stops that small business services companies made each month and the corresponding retail sales for that respective month.

The analysis suggests that, as goes small business services' vehicle stops (deliveries and service calls), so goes New York retail sales volume. Amount of distance driven is not an issue for New York small businesses, more important is the best utilization of their capacity – the number of stops they have to make in a day and how many days they keep their vehicles active in a month.

NY MSA - Retail Sales and food services excl. motor vehicle and parts
US Census Bureau (BOC) vs. Fleetmatics Predicted



NY MSA - CORRELATION OF SMALL BUSINESS ACTIVITY ON RETAIL SALES

Source: Fleetmatics telematics data model of NY MSA retail sales

increase in...	correlation with retail sales	telematics data type
Monthly number of stops	↑	business activity
Number of stops per vehicle day	↓	business activity
Monthly number of active days per vehicle	↓	fleet efficiency indicator

LINKAGE BETWEEN NEW YORK SMALL BUSINESS PERFORMANCE AND RETAIL SALES

Fleet activity metrics specific to the New York market include number of stops per vehicle per day and number of active days per vehicle in a given month.

The activity metrics are slightly different than those used in the national model as they are focused more on the capacity of vehicles to drive an optimal number of active days per vehicle and to deliver an optimal number of stops per vehicle day.

Therefore, the concentrated business activity in New York's metropolitan area appears to

be driven more by the number of stops within a small area rather than large distances between stops (mileage) ⁽¹²⁾.

Given the close correlation between aggregate number of stops and retail sales, you could infer that an overall increase in the number of stops for small businesses in the NY MSA will indicate a higher productivity and revenue, thus contributing to overall retail sales growth.

FOCUS ON THE CHICAGO MSA

The report results for the Chicago market provide an interesting contrast with the insights from the New York market and speak to the difference in flow of goods and services activity that takes place in two of the top economic markets in the U.S. In the case of Chicago, as the total miles small business services vehicles travel in a month rise and the number of vehicles they have in the field rises, retail sales rise at a significantly proportional rate ⁽¹⁶⁾.

CHICAGO - CORRELATION OF SMALL BUSINESS ACTIVITY ON RETAIL SALES

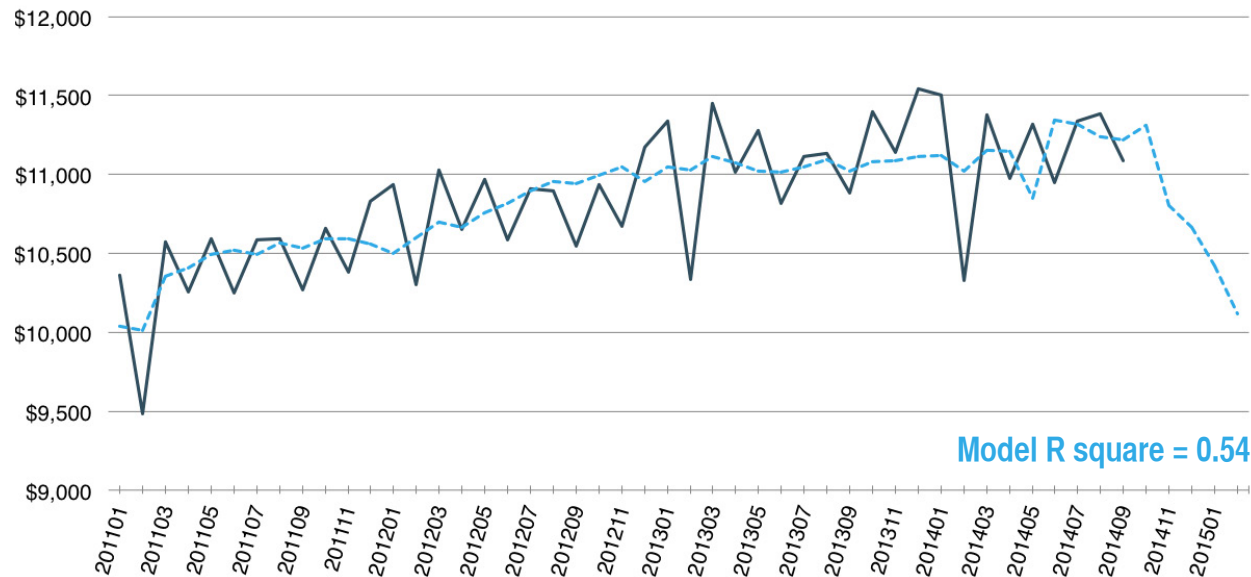
Source: Fleetmatics telematics data model of Chicago MSA retail sales

increase in...	correlation with retail sales	telematics data type
Monthly number of vehicles	↑	business activity
Monthly total milage per vehicle	↑	business activity
Monthly number of stops	↓	fleet efficiency indicator
Milage traveled per vehicle stop	↓	fleet efficiency indicator

Because of Chicagoland's larger geography, distance traveled is more prominent as an indicator of small business economic activity and correlation to retail sales, contrasting with the New York market where vehicle stops are more prominent as an indicator of small business economic activity and correlation to retail sales, which can be attributed to the high population density and its more compact area.

Chicago MSA - Retail Sales and food services excl. motor vehicle and parts

US Census Bureau (BOC) vs. Fleetmatics Predicted



Observed (Source: U.S. Census Bureau (BOC) Chicago MSA; Moody's Analytics Est. RRTFSQ.MCHI)
Predicted (Source: Fleetmatics telematics data model Chicago MSA)

Retail Sales: Total, (Mil. \$, SA) for Chicago, IL
Retail Sales: Motor vehicle & parts dealers, (Mil. \$, SA) for Chicago, IL
U.S. Census Bureau (BOC); Moody's Analytics Estimate
Fleetmatics Data: Service/Retail related Industry segments telematics data

LINKAGE BETWEEN CHICAGOLAND SMALL BUSINESS PERFORMANCE AND RETAIL SALES

When examining similar markets nationwide, geographic features can significantly define regional small business activity profiles. From a retail sales standpoint, telematics data can show a clear correlation to the performance of the regional economy ⁽¹³⁾.

For a broad geographic region like Chicago, total miles traveled per vehicle per month can be considered positive fleet activity indicators, although efficient driving in the form of miles traveled per stop can be a factor since this tends to have a negative correlation with corresponding retail sales volume.

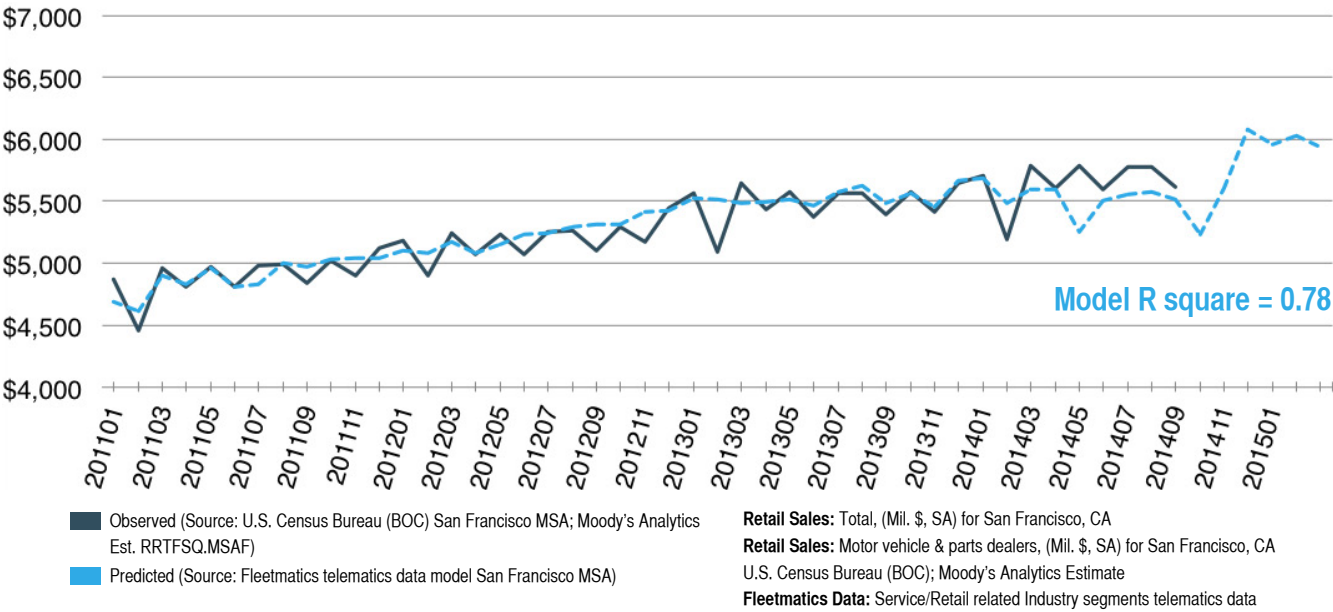
Thus, more efficient small services businesses – those that optimize routes to minimize miles driven between stops, or those who optimize the number of stops required per vehicle through smarter planning – may have higher sales revenue.

FOCUS ON THE SAN FRANCISCO MSA

The San Francisco market comprises the fastest growing large county in the United States, with a 6.1 percent increase in employment from 2011 to 2012 (triple the national growth rate of 2 percent) ⁽¹⁷⁾. The growth is driven by the IT sector which accounts for 30% of employment, usually at higher wages typical for the sector, which also fuels healthy volumes of retail sales in addition to housing and other consumer spending ⁽¹⁸⁾⁽¹⁹⁾. Given what we know about its geography and economy, it is no surprise that San Francisco is different from other regions analyzed.

San Francisco small business fleets are different – increased retail sales in a densely populated area is a matter of maximizing the number of deliveries and service calls per vehicle while keeping a lid on how many times customers are serviced. Unlike New York, Bay area small business vehicle fleets may need to keep their vehicles active more days on the road to increase retail sales.

San Francisco MSA - Retail Sales and food services excl. motor vehicle and parts
US Census Bureau (BOC) vs. Fleetmatics Predicted



SAN FRANCISCO - CORRELATION OF SMALL BUSINESS ACTIVITY ON RETAIL SALES

Source: Fleetmatics telematics data model of San Francisco MSA retail sales

increase in...	correlation with retail sales	telematics data type
Mileage	↑	business activity
Monthly number of stops	↓	business activity
Monthly number of active days per vehicle	↑	business activity
Number of stops per vehicle day	↑	fleet efficiency indicator
Monthly total mileage per vehicle	↓	fleet efficiency indicator

LINKAGE BETWEEN BAY AREA SMALL BUSINESS PERFORMANCE AND RETAIL SALES

What stands out for San Francisco is that miles traveled per stop has a negative relationship to retail sales in the region. Therefore, given what we know about the geography and economy of San Francisco, results suggest that small businesses in the Bay area should focus on reaching the highest number of customers (stops) per day with lowest miles per stop.”

Though similar in dense population as the New York MSA, on average San Francisco small businesses service 12 stops per vehicle per day at an average of 8 miles per stop (compared to New York’s 8 stops per vehicle per day at an average of 10 miles per stop). Therefore, San Francisco small businesses must be even more dynamic than in New York in their productivity to drive sales volumes.

FOCUS ON THE MIAMI MSA

The Miami MSA comprises most of South East Florida including Broward, Miami-Dade and Palm Beach counties. With a strong tourism-based economy, the Miami MSA attracts nearly 14 million visitors annually—a clear driver of the local retail sector ⁽²⁰⁾.

The report results for the Miami market suggest that small business vehicle fleet activity may be a driver or indicator of retail sales while being balanced by how efficiently miles are driven by each vehicle. This again suggests that for small businesses, generating revenue has to be done in a smart way in order to maximize economic impact and retail sales volume.

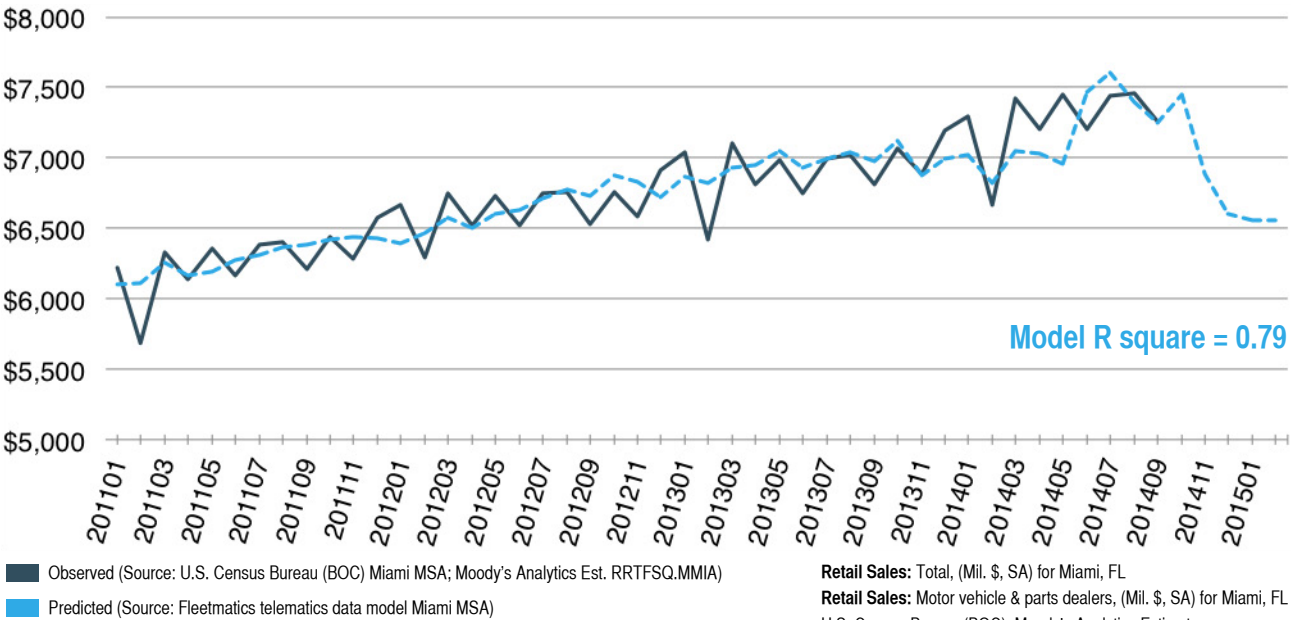
MIAMI - CORRELATION OF SMALL BUSINESS ACTIVITY ON RETAIL SALES

Source: Fleetmatics telematics data model of Miami MSA retail sales

increase in...	correlation with retail sales	telematics data type
Mileage	↑	business activity
Monthly total mileage per vehicle	↓	fleet efficiency indicator

Miami MSA - Retail Sales and food services excl. motor vehicle and parts

US Census Bureau (BOC) observed vs. Fleetmatics Predicted



LINKAGE BETWEEN MIAMI SMALL BUSINESS PERFORMANCE AND RETAIL SALES

Results of our analysis suggest that two important factors derived from small business activity tracking in the Miami MSA have a linear relationship with retail sales ⁽²²⁾. Specifically, the monthly total volume of miles that are driven by all vehicles in the Miami MSA has a positive relationship with retail sales while the monthly mileage traveled per vehicle has a negative relationship with retail sales.

A perspective on the data is that small business vehicle fleet activity could be a driver or indicator of retail sales while being balanced by how efficiently those miles are driven by each vehicle. This again illustrates that small business fleet activities to generate revenue have to be managed in a smart way in order to maximize economic impact, in this case retail sales potential volume.

CONCLUSION

The analysis of Fleetmatics' small business services fleet activity data and retail sales data from Moody's and the U.S. Bureau of Census confirmed the hypothesis that the two data sets exhibit an extremely high correlation.

Based on the report, at both national and regional levels, Fleetmatics data explain much of the variation and growth in retail sales. Correlations at the major market regional level are also high and tend to be higher in those markets where Fleetmatics has the greatest level of market penetration, such as New York, Miami, Chicago and San Francisco.

The findings of the report indicate that the activities of small business services companies can reflect the overall health of the economy, if studied using representative data at the proper scale. The ability to analyze real-time telematics data can now be considered an accurate data source on the small business flow of goods and services, which support or are part of the retail sector.

By confirming the correlation between the two data sets, we now have a much more efficient and timely way to report retail sales data. Then, from both reported census data and real-time telematics data, we can provide a near-immediate metric for analyzing economic growth.

"It's an approach that may be far easier to implement than attempting to directly measure the overall performance of small businesses, assuming that you have a credible, relevant and representative data source. Findings from this report will likely be extremely interesting and exciting to economists and others that closely follow economic indicators." — Dr. Stephen Fuller

APPENDIX

SUMMARY OF STATISTICAL SUPPORT

¹ Time period covered 45 months for national and 43 months for local. The time period for local was two months shorter because of data availability at the time of the report.
² Retail Sales and Food Services data.
³ Trebing, Michael E, Nakamura, Leonard "What Does the Philadelphia Fed's Business Outlook Survey Say About Local Activity?" Business Review, Federal Reserve Bank of Philadelphia (December 2008) http://www.phil.frb.org/research-and-data/publications/research-rap/2008/business-outlook-survey-local-activity.pdf
⁴ Johnston, Jack, Dinardo, John "Econometric Methods", McGraw-Hill/Irwin (1997)
⁵ The statistical methodology used was backward stepwise General Linear Model regression (proc GLM) in SAS for national and each MSA region. The output statistics considerations in judging specific model fit was Type III SS indications, coefficient of determination R-squared, analysis of parameter estimates, among others, to keep in the regression model only the predictors that are statistically significant. These specific model fit statistics were used to judge the credibility of the sample and of the "goodness of fit" of the resultant model. The charts plot the BOC Observed vs. Fleetmatics predicted results (model derived) which, in almost all cases, trend very closely.
⁶ Retail Sales monthly performance was obtained from Moodys Analytics Data Buffet online databases that are originally sourced from the U.S. Census Bureau (BOC) and for purposes of this analysis comprise Retail sales excluding Motor vehicle & parts dealers.
⁷ Regional monthly Fleetmatics telematics derived variables included in the model were: <ul style="list-style-type: none"> • aggregate mileage per region per month, • aggregate stops per region per month, • aggregate active vehicle days per region per month, • aggregate number of vehicles per region per month, • average daily number of stops per vehicle, • average miles per stop per vehicle, • average active days per vehicle per month, • average mileage per vehicle per month.
⁸ Only data from Fleetmatics accounts' fleets that inceptioned and had telematics active vehicles before 2011. This effectively excludes from the aggregate data any growth or change that may have been due to addition of new fleets from Fleetmatics sales which have experienced annual growth of around 30%.
⁹ Number of months used in analysis – for national, 45 months and for regional analysis, 43 months because of data availability
¹⁰ Number of retail and service related small business fleets that inceptioned before 2011 – 4,445
¹¹ Total number of active vehicle days of retail and service related small business fleets that inceptioned before 2011 – 57.9 million active vehicle days
¹² Diversity of retail and retail service related types of businesses comprises mostly businesses in the Delivery of goods, but also those involved in supporting retail activities such as home and business field service, HVAC and plumbing, passenger transportation such as shuttle service and taxis, and small contractors. <small>This EXCLUDES fleets from utilities, large enterprises, industrial type movers, and long distance for hire transportation.</small>
¹³ "Small Business GDP: Update 2002-2010", Economic Consulting Services, LLC (January 2012) https://www.sba.gov/sites/default/files/rs390tot_1.pdf
¹⁴ National Retail Sales regression model (proc GLM) parameter estimates and output statistics
¹⁵ New York MSA Retail Sales regression model (proc GLM) parameter estimates and output statistics
¹⁶ Chicago MSA Retail Sales regression model (proc GLM) parameter estimates and output statistics
¹⁷ Bureau of Labor Statistics data http://www.spur.org/blog/2014-02-27/forecasting-san-francisco-s-economic-fortunes
¹⁸ San Francisco MSA Retail Sales regression model (proc GLM) parameter estimates and output statistics
¹⁹ Federal Reserve District, "Current Economic Conditions, October 2014" http://www.federalreserve.gov/monetarypolicy/beigebook/files/BeigeBook_20141015.pdf
²⁰ Greater Miami Convention and Visitors Bureau "Greater Miami 2013 Visitor Industry Overview", 2013 http://partners.miamibeaches.com/~media/files/gmcbv/partners/research%20statistics/annual_report_2013

The research and data analysis for the FleetBeat report was led by Michael Mocanu, Business Intelligence and Analytics Manager at Fleetmatics. Mocanu has over a decade of industry experience and is a graduate of the Massachusetts Institute of Technology, Sloan School of Management's International Management Program, and holds an MBA in Operations Research and Finance and a Master of Science in Biochemistry from Case Western Reserve University. Mocanu is also the inventor or co-inventor on a number of existing and pending Fleetmatics patents related to GPS and location-based algorithms. Research and data analysis was supported and verified by Dr. Stephen Fuller, who also served in a co-author role for the report. His bio appears in the Foreword.



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