

NAIC Telematics

Outline

I. Introduction

Historically, auto insurance premiums have been developed using several behavior-based demographic proxy factors. This paper explores telematics-supported usage-based insurance (UBI) which utilizes causal risk factors to assess risk and price auto insurance. There are many implications on insurers, consumers, and state regulators which will be discussed.

In 1929, Paul Dorweiler recognized the need for better variables to price auto insurance like driver habits, speed, weather conditions, and mileage. In more recent years, telematics has allowed insurers to start incorporating more sophisticated variables that seemed **simplistic for years but were never practical** because they could not be measured or their accuracy was questioned.

The following items accelerated the development and use of telematics:

- New digital technology in cars
- Increase of mobile telephones
- GPS
- Reduced cost of technology

Long-distance trucking was the first industry to track and coordinate vehicle movements.

Telematics is defined by SAS as “The use of wireless devices to transmit data in real time back to an organization. The data recorded in telematics devices can be used to develop more accurate pricing, improve the granularity of risk management techniques and reduce losses by enabling better claims assessments.”

Telematics may also offer significant discounts to consumers while providing the following **ancillary services** that increase consumer loyalty:

- Car diagnostics

- Roadside assistance
- Emergency response
- Stolen vehicle location

The most common rating variables from telematics include:

- Where the Vehicle is Driven (location)
- How Often (number of trips)
- How Far (mileage)
- How Well (driver behavior like braking, acceleration, and cornering)

While there are many benefits, **data privacy** proves to be a major barrier for public acceptance. Insurers must ensure that rates are not unfairly discriminatory while providing appropriate disclosure and transparency.

II. Telematics Technology in the Automobile Industry

Data has always been a huge asset to insurers. Telematics provides even more data, so it is imperative to collect and analyze the data to remain competitive and profitable. The cost of telematics hardware has decreased significantly which allows programs to scale more rapidly.

Telematics data and analytics present the following challenges and barriers of entry:

- Large data sets
- Lack of standardization
- Lack of public data
- Existing patents on UBI technology

There are four types of telematics solutions available in the market:

- 1) **Dongle:** Self-installed device provided by the insurer to be used for a specified time

Advantages

- Low cost
- High reliability of data for location and driving style
- Installed by the driver

- Can be bundled with add-on services

Disadvantages

- Can only be used in modern vehicles
- Vulnerable to fraud
- Technology will soon be obsolete

2) **Black box:** Professionally installed device

Advantages

- Most secure and reliable
- Provides most detailed data on driving behavior
- Ideally suited for first notice of loss with theft and accidents since the device is fixed in car chassis

Disadvantages

- Not portable
- Most expensive

3) **Embedded:** Devices embedded within car manufacturing like OnStar

Advantages

- Product differentiation
- Improved customer relationship
- Lower cost in the case of recalls

Disadvantages

- High cost on consumer since subscription based
- Lack of standardization
- Compatibility with insurance solutions
- Obsolescence

4) **Smart Phone:** Transmit a variety of information to and from the car since devices are already manufactured with a host of sensors like GPS and accelerometers

Advantages

- Large data storage capacity, especially if using the cloud
- Superior communication capabilities

- No costs for device, installation, or data connectivity

Disadvantages

- Low quality of data which has been a huge hindrance to market adoption

Sensors from telematics devices can capture the following elements:

- Date
- Time
- Location
- Distance Driven
- Speed
- Lane Changing
- Cornering
- Acceleration
- Deceleration

There are several telematics programs within the market:

Company	Device	Data Collected	Other Notes
Progressive	Dongle	Time, Mileage, Speed, Harsh Braking	598 patents related to telematics UBI
Allstate	Dongle	Time, Mileage, Speed, Harsh Braking, Number of Trips, Location	Drivers can monitor behavior on smartphone app
State Farm	Embedded	Time, Mileage, Acceleration, Hard Braking, Sharp Turning	Pay annual subscription fee after first year; Additional services like roadside

Nationwide and Hartford are mentioned providing a dongle telematics UBI program, and National General is mentioned having an embedded one. While we expect that programs do not need to be memorized, it is worth noting that programs vary significantly as insurers compete in the market with different rating variables and goals.

Collecting the right data is necessary to understand and subsequently model the driving behavior. The **standardization** of telematics data is a necessary step for effective analytics and widespread

adoption. This allows analytic consistency and reduces the need to support multiple data interfaces. Even if the data is delivered, actuaries must also analyze and interpret it. No one event is the same since the real environment is complex. For example, a quick braking event is riskier than a slow braking event. Thus, counting events is not the most predictive measure.

III. Telematics UBI Modeling and Analytics

Insurers are usually not solely basing the entire premium on just driving behavior. Rather, insurers are building predictive loss models to incorporate into the rating algorithm.

The paper discusses two common modeling approaches.

- 1) Insurers utilize mileage, time, and a set of predetermined events. The event counter is limited because a few events do not constitute the entire universe of behavior
- 2) Insurers collect granular data on a second-by-second basis which is then used to research the predictive power of vehicle operation in a contextual basis. Researchers will identify predictive events over time which improves the model, but it comes at the cost of collecting and saving extremely granular data while also using location. Additional benefits include the ability to identify new predictive variables more quickly while also identifying risky behaviors that vehicle operators can reduce through coaching

Regulators have the challenge to balance privacy protection of consumers with the value of voluntarily allowing consumers to join programs. These programs provide data to improve models which leads to behavior changes resulting in lower costs, improved fuel consumption, and saved lives.

IV. Insurer Benefits of Telematics-Based UBI

Insurers benefit from more accurate risk assessment which leads to better pricing and underwriting. By using more granular predictors of risk, insurers can integrate telematics-based UBI into current rating structures but need to ensure they do not duplicate existing model predictions.

Insurers can better control risk exposure thus raising risk tolerances and reaching more consumers. Since there are strong incentives for consumers to improve driving behavior to lower premiums,

insurers should see lower loss costs associated with improved driving. People tend to modify their behavior when being watched, so there are also incentives for consumers to drive fewer miles.

Telematics-based UBI offers these competitive advantages:

- 1) Identifies and rewards lower risk drivers thus improving retention for preferred segments
- 2) Attracts new customers by offering all drivers to pay less for auto insurance
- 3) Influences young drivers who are riskier but can be coached to modify behavior
- 4) Provides new communication channels with consumers thus increasing interaction and building stronger relationships
- 5) Enhances claims management practices through efficient claims processing, more accurate damage estimation, fraud reduction, and stolen vehicle recovery

Early adopters will likely have a competitive advantage since they will have a head start on collecting data for analyses. Collected data is proprietary so competitors will not have historical data to price appropriately if they are late to adopt.

V. Consumer Benefits of Telematics-Based UBI

A **benefit** for consumers is the ability to reduce insurance premiums through participation discounts, improved driving performance, or reductions in mileage driven. Consumers also fundamentally understand the link between premium and driving behavior which increases transparency. Since insurers have improved risk classification systems, the subsidy between low and high risk drivers is reduced which benefits the majority of consumers. Even if high risk drivers do not benefit initially, they are able to control future premiums.

Consumers benefit from incentives to increase safety, especially young drivers. Young drivers can incorporate feedback, and parents remain informed of their young driver's performance.

Here are some ancillary benefits to the consumer:

- 1) More efficient claims settlement
- 2) Continuous communication between drivers and insurers which builds a personal connection

- 3) Insurers now able to provide benefit programs like faster emergency response, road-side assistance, stolen vehicle recovery, fuel efficiency reports, and vehicle maintenance reports

VI. Societal Benefits of Telematics-Based UBI

Consumer benefits also overlap societal benefits. Consumers are incentivized to reduce total driving mileage which leads to the following:

- Fewer cars on the road
- Less road congestion
- Lower infrastructure costs
- Lower overall fuel consumption and vehicle emissions

UBI programs will likely increase the number of insured drivers on the road by creating more affordable premiums. This is especially important for low-income earners. The previously mentioned reduction in subsidy between low and high risk drivers also benefits society because it is more equitable.

In order for telematics programs to benefit society, consumer behavior must change, therefore it is important for consumers to understand telematics programs. However, insurers use complex rating algorithms. The proprietary nature of these models reduces understandability. Increased transparency would benefit consumers and society even more.

VII. Consumer Concerns and the Promise of UBI

There are two public policy goals to keep in mind:

- 1) Ensure consumers have access to essential insurance products
- 2) Insurance is a core institution for loss reduction and risk mitigation

Consumer advocates have long pushed for pay by the mile insurance as it is fairer. In addition to the already mentioned benefits, UBI could eliminate the use of many socio-economic variables like education, occupation, prior insurance, credit scoring, and other proxies for race and income. For all the benefits, there are many concerns outstanding, as the author of this section states that telematics has taken a wrong turn. Here are the concerns:

- 1) Insurers have a lack of transparency with their programs thus creating a black box effect which reduces loss mitigation
- 2) Privacy issues and distribution of data for purposes other than mitigation and pricing
- 3) Insurers use data for claims settlement when helpful to insurer but not consumer
- 4) Disproportionate impact of offer and sale in low-income and minority communities
- 5) Limited regulatory oversight to date

This section states that the interests of insurers do not always align with consumers. Industry representatives have requested regulators not impede progress of telematics through regulation. There are concerns that lack of regulation could lead to abuse as seen with credit scoring and price optimization.

This section specifies that telematics has been a market failure to consumers and public policy. There are several recommendations to improve telematics through the regulatory framework which would increase transparency, ensure fairness, and promote more confidence that consumer data would not be used against them:

- Establish data ownership and privacy standards
- Establish standards for permitted and prohibited uses of consumer data
- Establish standards for disclosure of telematics results and rating programs to ensure consumers receive feedback necessary to alter behavior

By implementing standards, the author expects consumer use and confidence in UBI would grow more quickly, thus resulting in increased loss reduction and fairness.

VIII. Regulatory Implications of Telematics UBI

Initially, telematics appeared straightforward as there was little concern about data accuracy, discount application, and understanding. However, there are varied methods now for collecting and reporting data.

Regulators are concerned with methods related to recording, transmitting, and reporting driving data especially if insurers have an agreement with third parties. Here are questions to consider:

- How does a vendor process raw data before forwarding to insurer?

- Does the vendor scrub the data for accuracy?
- How will it be formatted, stored, and protected from misuse?

Regulators are also concerned with the different types of telematics equipment. With a wide variety of methods available, regulators should confirm the same data is obtained for every program participant. Furthermore, all potential discounts should be made available to all participants.

Regulators should also consider the frequency and duration of data transmission as some carriers collect data continuously throughout the policy term while others only collect for a specified period.

Driving behavior is understandable as a predictor of risk, but this section continues to push for **transparency** so that consumers can use information to reduce premiums. Here are some suggestions to increase transparency:

- Disclose information to regulators in a filing
- Clearly identify each driving factor being measured to consumers
- Explain why a factor is being measured (ex. explain why driving at certain times of day presents a greater risk)
- Provide access to mobile applications or websites that track driving history and identify driving improvements

Regulators should request the following during filing review to protect data privacy:

- Data collection
- Data use
- Data storage
- Data protection

Market conduct exams and consumer complaint investigations will also allow regulators to ensure telematics UBI programs are used appropriately.

Regulators must ensure that rates developed through these programs are not excessive, inadequate, or unfairly discriminatory. There is potential for discrimination on certain classes of drivers if time of day is utilized since specific occupations work during the night.

Insurers may classify models as confidential information which can preclude proper review of the models. Regulators need to have appropriate access to review models and also be able to ask the correct questions.

The industry still believes that telematics-based UBI increases affordability. The segments that will **benefit the most** include consumers that pay higher than average premiums relative to income such as high-risk territories, inexperienced operators, and low-income individuals.

Here are a few outstanding concerns:

- 1) How do programs link driving behavior to the actual operator in every scenario?
- 2) Do programs discourage people from engaging in activities in specific zones if higher rates result?

Regulators ultimately need to determine whether insurer programs comply with rating laws and ask questions during filing review.