INNOVATIVE INSURANCE SCHEMES: PAY AS /HOW YOU DRIVE

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Objective

· Critically review existing literature regarding the most popular and often implemented methodologies related to Usage-based motor insurance (UBI)
· Identify existing research gaps

The main **concept** of Usage Based Insurance (UBI) is:
· Drivers with similar characteristics such as **age**, **gender**, **location**, **accident record** etc. pay approximately the same premiums no matter
· Instead of a fixed price, drivers have to pay a premium based on their:
  · Driving **behaviour**
  · Degree of **exposure**

UBI is proven to be a very promising practice with a significant potential impact on traffic safety.

UBI is enhancing traffic safety as it is:

· an award for good drivers for driving safely
· a strong motivation for risky drivers to
  · improve their **driving behaviour** and
  · reduce their **degree of exposure** by being charged higher insurance premiums
· providing receiving feedback and monitoring their driving performance and exposure

Driver exposure and behaviour risk indicators

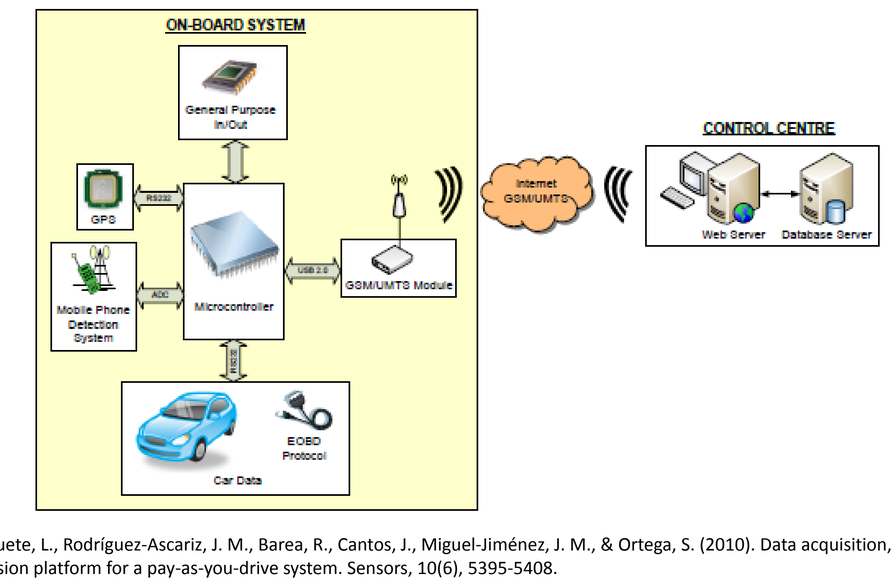
PAYD	PHYD
Total distance driven by the user (the higher the mileage the higher the risk)	Speeding expressed either as a percentage of kilometres/time driving over the speed limit or a percentage of speeding
Road network type (increased accident frequency in the cities, increased accident severity outside)	Harsh braking/ acceleration
Risky hours driving (increased accident frequency during a particular hours range).	Driver's accident history (severity of accidents, the circumstances of the accident)
Trip frequency (a driver is more likely to cause an accident during an infrequent trip)	Seatbelt use
Vehicle type	Mobile phone use

Results

Reference	Model Type	Speeding	Road Network	Risky hours	Rush hours	Harsh acceleration	Mileage	Harsh braking	Manoeuvre	Harsh Cornering	Day of the week	Visibility	Gender	Territory	Vehicle type	Passengers	Trip duration	Weather	Smoothness	Trip distance	Jerk Energy	Mobile phone use	Energy consumption	Fuel	Gender	Class
Khazzoom (2000)	Linear																							√		
Bordoff & Noel (2008)	Linear						√																			
Ferreira & Minikel (2010)	Non-Linear (Poisson)						√																			
Ferreira & Minikel (2010)	Linear						√																			
Buxbaum (2006)	Linear						√																			
Zantema et al. (2008)	Linear						√																			
Litman (2005)	Linear						√																			
Ferreira & Minikel (2010)	Non-Linear (Poisson)						√																		√	√
Ferreira & Minikel (2010)	Linear																								√	√
Ferreira & Minikel (2010)	Linear						√																		√	√
Kantor & Stárek (2014)	Non-Linear (algorithm)		√	√	√		√																			
Iqbal & Lim (2006)	Non-Linear	√	√		√							√						√								
Boquete et al. (2010)	Non-Linear	√		√		√	√							√		√						√				
Handel et al. (2014)	Non-Linear (algorithm)	√	√	√	√	√		√	√	√							√		√	√			√			
Paefgen et al. (2013)	Non-Linear	√	√	√	√		√				√															
Chowdhury et al .(2014)	Non-Linear																				√					
Hultkrantz & Lindberg (2011)	Non-Linear	√																								

Driver exposure and behaviour data collection

Manufacturer	Data recorded: Distance, speed, time	Method of transmission	Installation cost	Monthly/yearly fee
CarChipFleetPro	Distance, time, acceleration, speed, GPS location, fuel, Engine speed	USB cable/port (customer loaded)	$149 (plus a $395 charge for software, one per fleet) Can also be used wirelessly with a $200 base unit	None
Sky-meter	time, distance, place, speed, acceleration of all driving, and the location and time of all parking	GPRS/CDMA (other protocols available at extra charge)	$50 - $250 activation fee	$5 per month plus 5%–8% of monthly premium (depending on volume)
OnStar	Distance, speed, time, (incl. other features)	Automatic through GPS S	First year free for new GM cars (only available for GM)	$18.95 per month after one year
Freematics	Speed, distance, time, location, acceleration, engine RPM	Built-in Bluetooth Low Energy and SPP module for wireless data communication or via microSD card (32GB)	99$ (Plus $30 for GPS module, plus $10 for MEMS MPU-9150 (9-axis) module, plus $10 for DUO BLE-BT 2.1 and plus 5$ for 32GB microSD)	None
Progressive (MyRate Device)	Distance, speed, time, location, acceleration, trip frequency	Wirelessly	None but $75 fee if not timely returned at end of policy	Varies



Ref: Boquete, L., Rodríguez-Ascariz, J. M., Barea, R., Cantos, J., Miguel-Jiménez, J. M., & Ortega, S. (2010). Data acquisition, analysis and transmission platform for a pay-as-you-drive system. Sensors, 10(6), 5395-5408.

Conclusions

· There is a multiplicity and diversity of several research studies accumulated in modern literature
· Most studies examine the correlation between PAUD and PHUD schemes and traffic risk
· UBI implementation would eliminate the cross-subsidies phenomenon which implies:
  · less insurance costs for goods and
  · less exposed drivers to accident risk
· More driving indicators should be considered in the future
· PHYD appears not to be exhaustively modelled thus far
· Hybrid UBI models incorporating both behavioural and exposure characteristics should also be tested

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