Potential impacts of autonomous vehicles on the UK insurance sector – BOE Quarterly Bulletin 2017 Q1 and update on progress from IFoA AV Working Party

Chris Wiltshire, Nicholas Silk, Stefan Claus and Veekash Badal
Imagine a world where cars can drive themselves

Content removed for external publication
Where cars don’t look like cars?

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Where coffee houses transport you from A to B?

Content removed for external publication

Source: https://www.standard.co.uk/news/transport/revealed-vision-of-how-london-would-look-if-driverless-cars-were-used-by-the-masses-a3484231.html
Where you can do your shopping on the move?

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Source: https://www.standard.co.uk/news/transport/revealed-vision-of-how-london-would-look-if-driverless-cars-were-used-by-the-masses-a3484231.html
Where cars almost never crash?

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Source: https://iwsmt-content-ok2nbdvvyp8jbrhdp.stackpathdns.com/95201620215887528.gif
Quarterly Bulletin
2017 Q1

Topical article
Potential impacts of autonomous vehicles on the UK insurance sector
So why does the Bank of England care?
Assessment – individual, firm and whole-of-market

**Bank of England**
Top Down view of *whole market*:
impact of AV on motor insurance sector

**DfT / Catapult Transport system**
Quantify size & core economic impacts:
trade, gross output & investment, GVA and jobs

**Individual motor insurers**
Blended view for *single portfolio* of motor insurance: assumptions required

**OEMs, Research institutes, Tech Companies**
Assessment of safety impact for *individual vehicles*
Research key findings

• Uptake of autonomous vehicles likely to be gradual
  – but wide range of opinion
  – more rapid uptake possible
  – differing views on technological, ethical and regulatory hurdles

• Central forecast projects reduced motor insurance market
  – contraction of the UK motor insurance market of 21% by 2040.
  – but capital requirements only falling by 12%

• Insurers will need to transform their business models
  – expect future success to increasingly rely on partnerships with technology firms and manufacturers.
Currently some cars on the road have some Level 1 and Level 2 systems.

L1 – either steering or acceleration automated
L2 – steering and acceleration automated but only in narrow specific circumstances
L3 – car can drive itself but driver needs to remain alert
L4 – car can drive itself but only in defined uses e.g. on motorways
L5 – full end to end automation
Key observations – Overall Rate of Adoption

*Question One: time taken for AV sales to proliferate*

• Everyone raise a hand!!

• Keep in mind autonomous means the driver is able be completely ‘out of the loop’ for periods of time (L4 or L5)

• Keep your hand up if:

  1) you think there will be 10% or more AVs sold in 2030 in UK
  2) you think there will be 25% or more AVs sold in 2030 in UK
  3) you think there will be 50% or more AVs sold in 2030 in UK
Key Observations – Overall Rate of Adoption

- Great uncertainty as to when AVs will filter in to new car sales
- 30%/50% of new sales for Personal/Commercial are AVs by 2030
- Commercial expected to be adopted ahead of Personal
- Tech firms generally more optimistic on adoption

Question One: time taken for AV sales to proliferate
Key Observations – AV impact on insurance claims

Question Seven: estimated impact on claims

• On which type of accident do you think AV will have the greatest impact?

  1) Low speed accidents
  2) High speed accidents
  3) Fraud / staged accidents
  4) Vehicle theft
  5) Accidents with pedestrians / cycles
  6) Mechanical or software failure
Key Observations – AV impact on insurance claims

- Responses suggest a reduction in accidents of up to two thirds (& most consistent responses)
- 60% reduction in fraud; 50% reduction in vehicle theft
- Expected marginal increase in software failures, but mixed opinions

**Projected change by claim type from autonomous vehicles**

- Low speed accidents
- Fraud (e.g. staged accidents)
- High speed accidents
- Vehicle theft
- Accidents with pedestrians / cycles
- Mechanical or software failure

**Question Seven: estimated impact on claims**
Key Observations – AV impact on insurance claims

Changing claims profile: financial loss per mile per vehicle

- Driven vehicles
  - Accidental damage: 23%
  - Property damage: 21%
  - Bodily injury: 46%
  - Other: 10%

- AVs
  - Accidental damage: 16%
  - Property damage: 9%
  - Bodily injury: 60%
  - Other: 9%

Significant uncertainty

TODAY

INTRO - BACKGROUND - QUESTIONNAIRE - INSURANCE MODEL - KEY FINDINGS

17 May 2018
UK motor insurance market model

• Made no distinction between motor insurance and product liability insurance
• Used responses to questionnaire on:
  – Q1: When AVs enter the market
  – Q2: Number of total vehicles in 2030
  – Q3: Increase in number of miles travelled by AVs
  – Q7: Claim frequencies
• The risk premium (per policy) is based on the DV and AV mix each year
The BASE CASE (UK private car market)

This is our initial forecast assuming no AVs enter the market.

We have developed this using the following key assumptions:

Private Car projection graph

• Number of cars on the road following DfT projections until 2030 and then follows ONS population growth forecasts

• Losses are taken from ABI market information and scaled up to cover the full population of cars

• Driven cars are assumed to improve to become 30% safer by 2030

• Long term bodily injury inflation is assumed to be 2% above inflation (higher in short term). Inflation is assumed to be 0%.

Note on Ogden Discount Rate

• In light of impending consultation that will revisit the process by which the discount rate is set, and the focus of the Bank’s work on the longer-term view, we have decided not to revise our projections at this point in time.
Population growth projection from the ONS
Risk premium falls initially due to the electronic safety features on driven cars.
It then begins to increase again due to assumption about bodily injury inflation. (RHS)
Total private cars initially grows in line with DfT projections until 2030 (forecasting 17% growth) and then in line with the growth in population.
Size of the UK private car insurance market falls from £11.7bn to £10.8bn in 2023 as cars become safer to use. It then grows again as BI inflation persists. In 2040 GWP grows to £13.4bn.
No AVs as part of the Base Case
As before the risk premium falls initially due to the electronic safety features on driven private cars. (Right Axis)

Introduction of AVs result in falls in the underlying risk premium.

A fall of 0.5% in the total private cars in 2030 relative to 2015

UK private car insurance market falls from £11.7bn to £9.35bn in 2040.

AVs will make up 47% of all private cars by 2040 with 2.2m new AVs being sold in 2040.
Gross Written Premium UK car – alternative projection

From Today
- 15% up
- 21% fall
- 41% fall

From 2040 BASE
- N/A
- 31% fall
- 49% fall

REDUCTION IN SIZE OF INSURANCE MARKET WITH SIGNIFICANT UNCERTAINTY
Other studies – Percentage of new vehicle sales are AV
Risk and Opportunities to Consider
Are insurers considering their business models?

• Admiral – “Admiral ready for the age of the driverless car as it pursues diversification strategy”

• Direct Line – Researching the possible effects of driverless cars

• Aviva – “In talks with driverless car developers as it faces up to the future”

• ABI – “Contrary to what some people might expect, insurers are not standing in the way of this development but actively looking to support progress and innovation,” James Dalton, director of general insurance policy at the ABI.
Includes: Admiral, Ageas, Allianz, Aviva, AXA, Co-operative Insurance, Covea, Direct Line Group, esure, LV, Markerstudy, RSA, Zurich, the Lloyd’s Market Association and the Motor Insurers’ Bureau.
Where there’s blame...
Liability Issues

Software and Other Updates
Should they be necessary?
Mandatory?
Who is responsible for availability/installation?

Crash Responsibility Vehicle
designer or manufacturer?
Software designer or manufacturer?
Vehicle operator?
Passenger?
Jurisdiction?

Inclement Weather
Who is responsible for inability to function in severe weather?
Before we wrap up...

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Pre-CIGI survey results

2) To what extent has your insurer (or the insurers you work with) started to consider and define additional data requirements to help understand and analyse the potential change in risk profile?

a) Too early
b) There is a working group
c) Already have a list of additional information required
d) We are already collecting new information to track this (e.g. vehicle tech on-board)
e) Other

Other: Don’t work in this area (x6)
Pre-CIGI survey results

3) From an actuarial perspective what do you see as the biggest challenge relating to the emergence of autonomous vehicles in 5-10 years?

   a) Not expecting any; disruption likely to be beyond 2030
   b) Access to reliable and interpretable information
   c) Ability to have systems capable of storing and analysing the new information
   d) Ability to evaluate new sources of risk - e.g. cyber related
   e) Uncertainty created in establishing ultimate liability for claims
   f) Other

Other: What to do with all the data
Pre-CIGI survey results

4) What do you see as the key challenge for motor insurer business models when the technology starts to become common place?

a) Competition from non-insurance entities taking ever more of the profits out of the ins. value chain
b) Reducing risk pool
c) Change from personal to commercial liability
d) Increase in systemic risk
e) Other

![Bar chart showing responses to the survey question.](image_url)
Pre-CIGl survey results

5) How involved do you think the Bank of England should be in supporting the insurance market to prepare for new technologies?

a) The Bank should be passive and restrict itself to challenging firms on how changes in risk profile are captured in the capital requirements
b) The Bank should be reasonably proactive in contributing to the debate by providing independent research
c) The Bank should be highly proactive, providing research but also engaging with industry and government bodies (such as the DfT, TfL) to ensure an orderly uptake of the technology
d) Other
Key Takeaways

• Uptake of autonomous vehicles likely to be gradual
  – but wide range of opinion
  – more rapid uptake possible
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• Central forecast projects reduced motor insurance market
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• BUT… will developments in electric vehicles, the social acceptability for accidents and concerns about emissions speed up the adoption of more efficient and safer autonomous vehicles?