Disruption on the Horizon

2017 Actuarial Forum
August 29, 2017
Hartford, CT

James Lynch, FCAS MAAA, Chief Actuary
Insurance Information Institute • 110 William Street • New York, NY 10038
Tel: 212.346.5533 • jamesl@iii.org • www.iii.org
Politics

Divisiveness Makes Governing Difficult
Disruption is Everywhere
Catastrophes – Increases in frequency and severity

Natural Catastrophes

**Water**
2016 Flood Loss
6x Greater

**Fire**
2015: A Record

**Wind**
8 of 10 costliest since 2004
Tornadoes +40%

**Climate Change**
Disruption is Everywhere
Catastrophes – Increases in frequency and severity

Man-Made Catastrophes

**Autos**
- More cars on road
- Distracted driving

**Cyber**
- $445 million/year

**“Induced” Earthquakes**
- ~950 3.0+
- 60% in OK
Technology / Digitalization

Sharing Economy

Big Data

The Internet of Things
Economic Uncertainty

Global Growth...

*Since 2008 we’ve had the longest period of relative trade stagnation since World War II...

US Growth...

GDP 1.6%

Investment Growth

...Monetary vs. Fiscal Policy

- **Monetary**: Low interest rates mean insurers are struggling to meet interest rate guarantees for life insurance and annuities must diversify their investment portfolios
- **Fiscal**: Supply-side debate heating up, i.e., tax reform

* The Peterson Institute for International Economics
* Mainland purchases of insurance and related investment policies in the nine months ended September 2016 surged to a record high.
Stagnation’s Toll

Cumul Chg in Real Avg Income

Death Rates, 45-64

The Trust Gap

Average of trust in Government, NGOs, Media and Business.
SOURCE: Edelman Trust Barometer, 2017
Geopolitics – US
The ‘Bully Pulpit’ Evolution
Has Trump Changed the Game?

@USTreasSec where is #TaxReform? Get R done!
@USAG #Waterboarding will #MakeAmericaGreat!
Politicians Catch On
But Can They Overdo It?

Responses to Charlottesville
(Number in NJ House Delegation Tweeting Within x Hours Of Emergency Declaration)

<table>
<thead>
<tr>
<th>Hours</th>
<th>2</th>
<th>9</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Is President’s Use of Twitter a `Bad Thing?`
(Percentage Answering ‘Yes’)

<table>
<thead>
<tr>
<th></th>
<th>Republicans</th>
<th>Democrats</th>
<th>Independents</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Hrs</td>
<td>53%</td>
<td>82%</td>
<td>70%</td>
<td>69%</td>
</tr>
<tr>
<td>12 Hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 Hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: NJ-11 for Change; POLITICO/Morning Consult Poll, [http://www.politico.com/f/?id=0000015c-8041-d9ca-adfc-85c1c6990000](http://www.politico.com/f/?id=0000015c-8041-d9ca-adfc-85c1c6990000); Insurance Information Institute.
Insurance Industry ROE by Presidential Party Affiliation

1950-2016*

*2016 data is through Q3.
Source: S&P Global Market Intelligence, Insurance Information Institute.
Affordable Care Act
Going .... Going .... Maybe Not Going Anywhere
2017: Key Insurance Issues

- Taxes – Promises, promises

- Flood Insurance
  - NFIP reauthorization
  - A private role?

- Fiduciary Rule
  - Here today. . .
  - . . . gone tomorrow?
But State Politics Drives Insurance
And Every State is Different

Source: R Street Insurance Regulation Report Card, December 2016
Republicans Control Most States . . .
In The November Election They Lost One Legislature Overall

Seven chambers flipped control after the November 2016 elections.

Medical Marijuana
Insurers Caught in the Middle

Opioid Alternative?

https://www.nap.edu/catalog/24625/the-health-effects-of-cannabis-and-cannabinoids-the-current-state
Medical Marijuana

Insurers Caught in the Middle

- Fully legal
- Medical use legal and recreational use decriminalized
- Medical use legal
- Recreational use decriminalized
- Fully illegal

Congressional Cannabis Caucus

- Rohrbacher (CA)
- Bluemenauer (OR)
- Young (AK)
- Polis (CO)

Personal Auto
Rising Frequency, Severity Pinching the Largest P/C Line
Loss Ratios Have Been Rising for a Decade. 2015 Return on Net Worth is Likely Close to Zero or Negative.

Source: National Association of Insurance Commissioners data, sourced from S&P Global Market Intelligence; Insurance Information Institute.
State Issues

Auto Insurance

Increase in Loss Costs, 2015:Q1–2017:Q1

- Bodily Injury: 15.3%
- Property Damage: 15.0%
- Personal Injury Protection: 14.1%
- Collision: 13.2%
- Comprehensive: 22.5%

From 2015 to 2017, the cost of accidents has risen dramatically. By contrast, consumer prices overall rose 3.9 percent during 2014 and 2015.

Source: Fast Track Monitoring System.
Claim Trends by Coverage

Focus on Collision
Collision Claims: Frequency Trending Higher in 2010s

Annual Change, 2006 through 2017

For a Long Time, Claim Frequency Was Falling, But Since 2010 This Trend Seems to Have Reversed.

*Four Quarters Ending in March.
Source: ISO, a Verisk Analytics company; Insurance Information Institute.
Collision Claims: Severity Trending Higher in 2010-2017

The Great Recession and High Fuel Prices Helped to Temper Claim Severity, But These forces Have Clearly Reversed, Consistent with Experience from Past Recoveries.

*Four Quarters Ending in March.
Source: ISO, a Verisk Analytics company; Insurance Information Institute.
What’s Driving These Trends?
Frequency; Severity; Distraction?
America is Driving More Again: 2000-2017

Percent Change, Miles Driven*

<table>
<thead>
<tr>
<th>Year</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1.7%</td>
</tr>
<tr>
<td>2003</td>
<td>2.1%</td>
</tr>
<tr>
<td>2005</td>
<td>1.5%</td>
</tr>
<tr>
<td>2007</td>
<td>2.2%</td>
</tr>
<tr>
<td>2009</td>
<td>-2.1%</td>
</tr>
<tr>
<td>2011</td>
<td>0.8%</td>
</tr>
<tr>
<td>2013</td>
<td>0.1%</td>
</tr>
<tr>
<td>2015</td>
<td>1.9%</td>
</tr>
<tr>
<td>2017*</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Fastest Growth in More Than a Decade

Tremendous Growth In Miles Driven. The More People Drive, The More Frequently They Get Into Accidents.

*Moving 12-month total vs. prior year through March.
Sources: Federal Highway Administration; Insurance Information Institute.
Why Are People Driving More Miles? Cheap Gas?

Gas Prices Don’t Seem Correlated With Miles Driven.

Sources: Federal Highway Administration; Energy Information Administration (All Grades All Formulations Retail Gas Prices); Insurance Institute for Highway Safety; Insurance Information Institute.
People Drive to and from Work and Drive to Entertainment. Out of Work, They Curtail Their Movement.

Sources: Federal Highway Administration; Seasonally Adjusted Employed from Bureau of Labor Statistics via FRED; Insurance Institute for Highway Safety; Insurance Information Institute.
Comparing Gas Prices, Employment on Collision Frequency Through 2015

Sources: Seasonally Adjusted Employed from Bureau of Labor Statistics; Energy Information Administration; Rolling Four-Qtr Avg. Frequency from Fast Track Monitoring System; Insurance Information Institute.
Severity: Driving Fatalities are Rising

Annual Change in Motor Vehicle Deaths

Driving Has Been Getting Safer for Decades, But Recent Trend is Discouraging—38,300 Deaths in 2015.

Sources: National Safety Council, Insurance Information Institute.
Does Spending on Vehicles Affect Claim Severity?

Annual Change, 2005 through 2016

As the Economy Has Gotten Better, People Are Spending More on Vehicles – When Those Cars Wreck, Severity Increases.

Fixing a Bumper

. . . On an Entry-Level Luxury Car (~$35K)

2014 Cost vs. 2016 Cost

<table>
<thead>
<tr>
<th>Parts</th>
<th>2014</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grille: Distance Sensor</td>
<td>$1,225</td>
<td>$2,818</td>
</tr>
<tr>
<td>Headlamp Assembly</td>
<td>$394</td>
<td>$918</td>
</tr>
<tr>
<td>Mechanical Labor</td>
<td>0</td>
<td>108</td>
</tr>
</tbody>
</table>

What Has Changed?

<table>
<thead>
<tr>
<th></th>
<th>2014</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parts: 130% Higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor: 18% Higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cost: $1,705 higher</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2016 vehicle has LED headlights and adaptive cruise control.
SOURCE: Liberty Mutual Insurance.
What About Distractions?
It’s A Problem. Is It Growing?

What We Do Behind The Wheel

- **Talking Less...**
  - 65% in 2009
  - 51% in 2015

- **Typing More**
  - 31% in 2009
  - 36% in 2015

- **Surf the Net**
  - 13% in 2009

But Impact Is Not Clear

Percentage of Crash Types Involving Distraction

- **Total Crash**
  - 2010: 20%
  - 2011: 15%
  - 2012: 10%
  - 2013: 5%
  - 2014: 0%
  - 2015: 5%

- **Fatal Crash**
  - 2010: 15%
  - 2011: 10%
  - 2012: 5%
  - 2013: 0%
  - 2014: 5%
  - 2015: 10%

- **Injury Crash**
  - 2010: 10%
  - 2011: 5%
  - 2012: 0%
  - 2013: 5%
  - 2014: 10%
  - 2015: 15%

- **PDO* Crash**
  - 2010: 5%
  - 2011: 0%
  - 2012: 5%
  - 2013: 10%
  - 2014: 15%
  - 2015: 20%

*Property Damage Only.*
SOURCES: State Farm, National Highway Transportation Safety Administration (distraction.gov)
Disruption and Insurance
Challenges and Opportunities
All Along the Value Chain
Insurance Disruption
Technology / Digitalization

**Fundamental Changes**
- Future of Auto
- Future of Reduced Risk Pools

**Opportunities**
- Automation / Efficiencies
- New Product Lines (Cyber)
- Emerging Technologies

**Challenges**
- Consumer Trust – Demonstrate the Societal Value
- Big Data vs. Individual Privacy

**New Market Entrants “Uber of Insurance”?**
- Lemonade
  - Offered in CA, IL, NJ, NY

**Regulatory Opportunities/Threats**
- Barrier to Entry
- US vs. Other Less Regulated Regions
- Trust Pull-back – the Sandbox Approach
Greatest Threats, Opportunities
Whither Silicon Valley?

Greatest Opportunity
- Advanced Analytics: 32%
- Mobile Apps: 19%
- Big Data: 18%
- Tight Value Chain: 12%
- Gig Economy: 6%
- IoT: 6%
- ILS: 4%
- Insurer VC: 2%
- Insurtech: 1%

Greatest Threat
- Insurtech: 17%
- Mobile Apps: 16%
- Tight Value Chain: 14%
- ILS: 12%
- Big Data: 10%
- Advanced Analytics: 9%
- Insurer VC: 8%
- Gig Economy: 8%
- IoT: 6%

Insurance Technology Financing – Change Is Coming

Investment ($ Millions)

Investment In Insurance Tech Is Rising. Number of Deals Set A Record Last Year.

SOURCES: CB Insights, Insurance Information Institute.
The (Re)Insurance Value Chain
Where Could Disruption Lie?

Most Links in the Value Chain Have the Potential to Be Disrupted in Next 10 Years.
Alternative Capital
Potentially Disrupting the Bank Account

(Billions of USD)

Alternative capacity has grown 350% since 2006. It has more than tripled in the past six years.

Source: Aon Benfield Analytics; Insurance Information Institute.
Life Underwriting

- Lower underwriting costs
- 20 minutes vs. 1 month
- Mainly for under 45s
- Policies at $1 million limit
- Motor Vehicle Records – Surprisingly important!
One-Day Auto Insurance

Pre-register → Buy → Pay

Read QR Code (agency code embedded)

Register
- Name
- Birthday
- Address
- e-mail address
- Driver’s License No.
- License expiry date

Input
- License plate No.
- Date of driving

Premium is added on the monthly mobile phone bill
Claims Disruptor
Artificial Intelligence + Behavioral Economics

Lemonade

CLAIM APPROVED
We reviewed your claim and found it valid. A payment will be sent to you right away.

$729
3 Seconds

Awesome! Five stars!

Great! We’re happy to hear that

BACK TO HOME
Peer-to-Peer (P2P) Insurance
Taking on the *Entire* Value Chain

A Typical P2P Model

- Resembles Mutuals/Reciprocals
- People Join Small Group of Friends to Prefund Deductible or Bear Other Small Risk.
- Leftover Deductible $$ Rolled Forward.
- May Deter Fraud – You Wouldn’t Cheat Your Friends!


CEO Daniel Schreiber

Our Chief Behavioral Officer, Professor Dan Ariely, says that “If you tried to create a system to bring out the worst in humans, it would look a lot like the insurance of today.”
InsurTech Disruption: Threat or Opportunity?

Automation efficiencies can have powerful impact on industry

Focus of InsurTech in the insurance value chain

- Disrupting the value chain: 61%
- Enabling the value chain: 30%
- Disintermediating incumbents from customers: 9%

Future profits as a % of today’s profits

- Short-term gain
  - Today's profits: 120-200
  - 2025 profits: 220-300
- Long-term decline
  - 2035 profits: 155-195

Only nine percent of InsurTechs aim to oust incumbents

Digitizing the business, auto insurance example

1. Insurtechs are insurance businesses, usually startups, that use technologically innovative apps, processes, or business models; 2016 data based on some 500 commercially well-known cases.
2. Assumes a 3 to 5 percentage point improvement in loss ratio, a 2 to 4 percentage point improvement in operating expenses, and a 6 to 8 percentage point improvement in direct sales conversions.
3. Includes growth in investment income as well premiums. Investment income modeled as a flat percentage of premium in each year.
4. Includes impact of semi- and fully autonomous vehicles.
5. Assumes a 25 percent reduction in premiums as a result of telematics and sensors and a 50 percent risk transfer to commercial product liability.

### InsurTech Startups Have Broad Range…BUT…

<table>
<thead>
<tr>
<th>Risk</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insurance Marketplace</strong></td>
<td></td>
</tr>
<tr>
<td>CoverHound</td>
<td>GetInsured</td>
</tr>
<tr>
<td>policybazaar.com</td>
<td>HealthSherpa</td>
</tr>
<tr>
<td>turtlemint</td>
<td></td>
</tr>
<tr>
<td>Coverfox</td>
<td>policygenius</td>
</tr>
<tr>
<td><strong>Digital Brokers</strong></td>
<td></td>
</tr>
<tr>
<td>insureon</td>
<td>EMBROKER</td>
</tr>
<tr>
<td>EMBROKER</td>
<td>coverwallet</td>
</tr>
<tr>
<td>Fondershield</td>
<td></td>
</tr>
<tr>
<td><strong>Peer to Peer</strong></td>
<td><strong>Health Navigators</strong></td>
</tr>
<tr>
<td>friendsurance</td>
<td>Welltok.</td>
</tr>
<tr>
<td>Lemonade</td>
<td>TELADOC,</td>
</tr>
<tr>
<td>GUEVARA</td>
<td>Accolade</td>
</tr>
<tr>
<td>YYY PEERCOVER</td>
<td></td>
</tr>
<tr>
<td><strong>Micro-duration Coverage</strong></td>
<td></td>
</tr>
<tr>
<td>trov</td>
<td>omada,</td>
</tr>
<tr>
<td>Slice</td>
<td>TRUVEN HEALTH ANALYTICS</td>
</tr>
<tr>
<td><strong>Telematics</strong></td>
<td>KYRON,</td>
</tr>
<tr>
<td>TrueMotion</td>
<td>castlight health</td>
</tr>
<tr>
<td>Metromile</td>
<td>GRAND ROUNDS</td>
</tr>
<tr>
<td>Zendrive</td>
<td></td>
</tr>
</tbody>
</table>

Source: Aon.
...With Broad Incumbent Support

<table>
<thead>
<tr>
<th>Company</th>
<th>Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metromile</td>
<td>$205M</td>
</tr>
<tr>
<td>Intact Insurance</td>
<td></td>
</tr>
<tr>
<td>Chubb</td>
<td></td>
</tr>
<tr>
<td>American Family</td>
<td></td>
</tr>
<tr>
<td>Ventures</td>
<td>$57M</td>
</tr>
<tr>
<td>Coverhound</td>
<td></td>
</tr>
<tr>
<td>ONE, Inc.</td>
<td></td>
</tr>
<tr>
<td>MassMutual Ventures</td>
<td></td>
</tr>
<tr>
<td>AXA Strategic Ventures</td>
<td>$37M</td>
</tr>
<tr>
<td>Policygenius</td>
<td></td>
</tr>
<tr>
<td>MassMutual Ventures</td>
<td></td>
</tr>
<tr>
<td>Transamerica</td>
<td></td>
</tr>
<tr>
<td>AXA Strategic Ventures</td>
<td></td>
</tr>
<tr>
<td>$21M</td>
<td></td>
</tr>
<tr>
<td>Slice</td>
<td></td>
</tr>
<tr>
<td>Munich RE</td>
<td>$4M</td>
</tr>
</tbody>
</table>

Note: Total funding. Source: Aon.
What Makes an Actuary?

It’s More Than Math
Actuary Saves Kitties!!!
Advises No-Kill Shelter
How to Win at Jeopardy!
Summary

- The political scene is defined by divisiveness, and this makes it difficult to achieve progress.

- Disruption provides opportunities and challenges throughout the value chain

- Personal auto costs are rising (both frequency and severity), linked closely to the improving economy.

- Actuaries have value far beyond the numbers.
Thank you for your time and your attention!

Read our auto White Paper on Rising Personal Auto Costs at www.iii.org