How Big Data Is Changing the Insurance Industry

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How Big Data is Changing the Insurance Industry
NYS Department of Financial Services ("DFS")

Established on October 3, 2011 by merging the former Departments of Insurance and Banking, DFS regulates insurance, banking and other financial services institutions with the goal of promoting robust financial services in New York, while safeguarding against financial crises and protecting both consumers and the industry from fraud. DFS supervises and regulates:

1400 insurance companies with assets more than $4.3 trillion

• 200 life insurance companies
• 1,100 property/casualty insurance companies
• approximately 100 health insurers and managed care organizations
• 300,000 insurance licensees

1500 Banking and other Financial Institutions totaling more than $2.6 trillion

• 139 state-chartered commercial banks, savings banks and bank holding companies
• 83 branches of foreign banks and 10 foreign agencies
• 16 credit unions
• 380 licensed financial services companies
• 7,600 mortgage loan originators and servicers
Big Data Does Not Necessarily Mean Better Data

• Big Data is an opportunity to improve service and efficiency

• Need to balance risk and consumer privacy against claimed benefits

• DFS is focused on encouraging innovation while protecting consumer privacy and strong underwriting standards
Key Consumer Protection Questions

- What data is being used? Is it existing underwriting criteria available in digital form or new and different data substituting for existing underwriting criteria?

- Does the new data have an actuarially supportable relationship to risk or is it just a correlation? Does the data bear a rational relationship to the risk being underwritten?

- How do insurers and vendors audit and prevent disparate impact and/or other forms of bias?

- What is the disclosure to the consumer that would permit the use of such data?

- What is the consumer’s recourse to see and challenge the data upon which an underwriting decision might be made?

- How is the data being obtained, secured and destroyed and on what timetables?
Accelerated Underwriting

- Many life insurers are currently offering an accelerated underwriting program for certain products or within certain ranges.

- DFS is reviewing all NY life insurer information regarding the use of data not provided by consumers in underwriting, i.e., credit scores, purchasing habits, home ownership, affiliations.

- DFS is seeking to ensure that use of external data in accelerated or algorithmic underwriting programs complies with NY law.
Education/Occupation

- Rates of more than 60% of New York private passenger automobile policyholders were impacted by one or more of these factors by 2015

- Drivers that present the same risks on the road could be treated differently, resulting in unfair discrimination in rate setting:
  - Loss or change of a job could cause a driver’s insurance premium to rise
  - A person who cannot afford to pay for higher education is denied the opportunity for a related premium discount

- Occupation often correlates to income, and New Yorkers with lower income were being charged more for auto insurance
New York’s Education/Occupation Regulation

• Education & Occupation shall not be used unless shown to be non-discriminatory

• Relationship between an occupation and driving must show risk of loss is predictable

• Income shall not be a risk characteristic

• Must submit new tier movement rules to comply

• As of today, the four major insurers, and almost all others who used E/O factors, have submitted materials in compliance so ~ 99% of NY’s market will no longer use education or occupation
Financial Products Marketing

- Marketers have created apps that rely on Big Data to push specific products to a particular consumer.

- Gating questions such as whether consumer has a threshold amount of annual income may ignore a consumer below the threshold who might benefit from product.

- DFS appreciates the value of using innovative automation to speed and boost sales but believes that judgments made by licensed professionals should continue to be a vital component in the sale of financial products.

- Need to balance benefits with regulatory guiderails to protect consumers.
Telematics

- Allows insurers to better understand risks to provide premium discounts
- Popular benefit that can lead to safer driving habits for the discount
- Must be accurate to merit the confidence placed on data collected
- Device used to collect data moving to smart phones. Untethering device from vehicle adds challenge to maintaining accuracy
- Needs monitoring and regulation for issues including data security, cost of data capture equipment, compatibility with older automobiles and limitations on the use of the data. All exacerbated by the fast moving nature of the changes in this space
Cybersecurity

- Collection of Big Data makes cybersecurity even more critical
- Robust cybersecurity is paramount and the goal of New York’s cybersecurity Regulation is to bolster our institutions’ cybersecurity programs, governance, policies and procedures against cyber attacks
- We need our financial institutions and the New York consumers they serve to be better protected against cyber criminals, which is what New York’s regulation is designed to accomplish
- New York’s focus is on prevention and improvement
- New York’s nation-leading cybersecurity Regulation has now been in effect for over 16 months, resulting in real progress against cyber threats
Big Data, Regulation and its use in the Insurance Industry

Financial Market Commission of Chile
Washington, May 2018
From 100% of the premium it is shown that 40.9% could be affected by the application of BIG DATA
### Non-Life Insurance:
#### Premium by product and by distribution channel 2017

#### NON-LIFE PREMIUM

<table>
<thead>
<tr>
<th>Classification by channel</th>
<th>MMUSD</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Insurance</td>
<td>922</td>
<td>22.5%</td>
</tr>
<tr>
<td>Group Insurance</td>
<td>162</td>
<td>3.9%</td>
</tr>
<tr>
<td>Consumer Portfolio</td>
<td>360</td>
<td>8.5%</td>
</tr>
<tr>
<td>Mortgage Portfolio</td>
<td>191</td>
<td>4.6%</td>
</tr>
<tr>
<td>Other Portfolio</td>
<td>812</td>
<td>19.8%</td>
</tr>
<tr>
<td>Industry, Infrastructure and Commerce</td>
<td>1668</td>
<td>40.6%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>4104</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

#### NON-LIFE PREMIUM

<table>
<thead>
<tr>
<th>Classification by segment</th>
<th>MMUSD</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage to Property</td>
<td>1426</td>
<td>34.7%</td>
</tr>
<tr>
<td>Other Damage to Property</td>
<td>1066</td>
<td>25.7%</td>
</tr>
<tr>
<td>Liability Insurance</td>
<td>394</td>
<td>9.4%</td>
</tr>
<tr>
<td>Transportation</td>
<td>128</td>
<td>3.1%</td>
</tr>
<tr>
<td>Engineering</td>
<td>117</td>
<td>2.8%</td>
</tr>
<tr>
<td>Guarantee and Credit Insurance</td>
<td>208</td>
<td>5.1%</td>
</tr>
<tr>
<td>Health and Personal Injury</td>
<td>241</td>
<td>5.9%</td>
</tr>
<tr>
<td>Others</td>
<td>543</td>
<td>13.2%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>4104</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
In Chile, since the end of 2016, a company offers insurance based on the use of the vehicle (Ubimatics) that, through a device installed in the vehicle, monitors variables of driving behavior of those who have contracted this insurance.

To the extent that safely driving behavior is observed, the policyholder earns points that translate into quarterly discounts on the premium to be paid.

We asked for other regional initiatives related to Big Data but in countries such as Colombia, Mexico and Peru the topic is still under development.

The Chilean Insurance Regulator is doing a research on Insurtech, including BIG Data.

Possible regulatory modifications to promote Insurtech, but always safeguarding the welfare of the policyholders.
Data Protection Law in Chile

- The current law, from 1998, regulates the communication, transmission, storage and use of all information that serves to identify a natural person: ID, address, genetic chain and fingerprint, among others.

- For the current context of data management and protection of the privacy of people, the current legislation is outdated.

- On March 13, 2017, a bill was sent to the Senate.

- Objective: To elevate the protection of privacy to international standards, in line with the guidelines issued by the OECD and the new European regulation on data protection (GDPR).
Data Protection Law in Chile

The following points of the bill stand out:

• It establishes new principles that regulate the use of personal data and new rights of the holders of the data.

• Consent: Has to be a free, specific, unequivocal and informed manifestation.

• It regulates in more detail the sensitive data.

• Restricts decisions made based on automated data processing.

• Creates a Personal Data Protection Agency.
It gives instructions regarding principles of Market Conduct (CdM) for insurance and reinsurance entities.

Principles:

➢ Fair treatment to customers
➢ Management of conflicts of interest
➢ Protection of customer information
➢ Promotion of market development through transparency

In this regard, principle No. 3 on Protection of Customer Information indicates:

“The safeguarding of financial and personal data is one of the main responsibilities of the financial services industry”
Current Regulation related: Rule N°420

- The regulation states that all necessary measures must be adopted to protect the personal and financial information of its clients, safeguarding their confidentiality.

- Insurance entities should:
  - Develop adequate policies and procedures to safeguard information.
  - Train the staff.
  - Implement internal controls to verify compliance.
  - Have adequate technology.
  - Identify and manage the risks and threats to the security and integrity of the information.
  - Have contingency plans to mitigate the risks and the impact of any leaks or improper use of information.
  - The companies, regarding the outsourcing of activities, should verify that the service providers have adequate mechanisms to protect the confidentiality of the information.
Current Regulation related: Rule N°325

• It provides instructions on the risk management system of insurers, whose management strategy must be approved by the company's Board of Directors, sent to the CMF and reviewed annually.

• In the case of Operational Risk Management and the Outsourcing of Services (example Cloud Computing), regulation establishes that companies should consider explicit procedures and methodologies for the management of operational and technological risk.
Current Regulation related: Rule N°171

• The Rule establishes minimum security requirements and conditions necessary for the insurance trade and intermediation by electronic means.

• Insurers and insurance brokers must ensure that the sites they use for the offer, intermediation and subscription of insurance contracts have, at least, the following security systems: access control, confidentiality, integrity and non-repudiation.

• It will be understood by systems of:
  • **Authentication**: The one in which the insurer and insurance broker must verify and ensure the identity of their customers.
  
  • **Access control**: The one that has as objective to guarantee that only people with the necessary authorization can have access to the system and only with respect to the areas that correspond to them or in those that are authorized.

  • **Confidentiality**: The one that guarantees that the information contained in the transactions can only be seen by the recipient of the message.
• It will be understood by systems of:
  • **Integrity**: The one that guarantees that the information will not be altered during its transmission.
  • **Non-repudiation**: One who guarantees that the sender of the information can not deny its authorship and content.

• Insurers and brokers must have a secure website certificate, issued by a certification service provider. The certificate will certify that the information is transmitted in encrypted form. The mentioned certificate must be updated, at least, every 12 months.

• In any case, insurers and insurance brokers must safeguard the privacy of the information they manage in accordance with the provisions of the Law on the protection of personal data.

• All documents necessary for the formation of consent or for granting rights to customers must be fully registered in a durable medium, and this circumstance must be reported to the client.

Current Regulation related: Rule N°171
Big Data, Regulation and its use in the Insurance Industry

Financial Market Commission of Chile
Washington, May 2018
How Big Data is Changing the Insurance Industry

2018 International Insurance Forum

Dr. Frank Grund  Chief Executive Director of Insurance and Pension Funds Supervision, BaFin
Digitalization is affecting the Insurance Sector

Supervisory Regulatory Framework

- Technological Progress
- Rising Cyber Risks
- Changed Customer Needs
- Increasing Competition
- Market Entry of Tech-Firms

Insurance Sector

Other Legislation (e.g. Data Security)

2018 International Insurance Forum
BaFin’s Mandate and Key-Principles of Supervision

- Proper functioning, stability and integrity of the German financial system
  - Solvency Supervision
  - Market Supervision
  - Collective Consumer Protection

- Principle-based Regulation
- Same Business, Same Risks, Same Rules
- Principle of Proportionality
- Technological Neutrality of Regulation
What is BaFin doing?

Analysing risks and benefits of Big Data and AI and assessing the necessity to adapt supervisory regulation and procedures by

- Permanent Market Monitoring
- Establishment of an Innovation Hub
- BaFin Project on Big Data and AI
- Studying the use of SupTech
Benefits and Risks of Big Data & AI

**Benefits**

- More accurate risk determination allowing personalized products and prices
- Insurance as a service and reduction of risks via prevention
- Faster processing and better accessibility to a wider range of insurance products
- Lower production costs due to higher degree of automation

**Risks**

- Unsupervised platform providers may become systemically relevant
- Nontransparent use of private data and insurer’s decision-making process
- Question if self-learning algorithms are supervisable is raised
- Ethical issues might occur (e.g., use of social media data in pricing)
Big Data Challenges to Insurance Market Regulation

NAIC International Insurance Forum

May 15, 2018

Birny Birnbaum
Center for Economic Justice
The Center for Economic Justice

CEJ is a non-profit consumer advocacy organization dedicated to representing the interests of low-income and minority consumers as a class on economic justice issues. Most of our work is before administrative agencies on insurance, financial services and utility issues.

On the Web:  www.cej-online.org
Why CEJ Works on Insurance Issues

Insurance Products Are Financial Security Tools Essential for Individual and Community Economic Development:

CEJ works to ensure *fair access* and *fair treatment* for insurance consumers, particularly for low- and moderate-income consumers.

Insurance is the Primary Institution to Promote Loss Prevention and Mitigation, Resiliency and Sustainability:

CEJ works to ensure insurance institutions maximize their role in efforts to reduce loss of life and property from catastrophic events and to *promote resiliency and sustainability* of individuals, businesses and communities.
Big Data Defined

Insurers’ use of Big Data has transformed the way they do marketing, pricing, claims settlement and their approach to risk management. For purposes of my talk, Big Data means:

- Massive databases of information about (millions) of individual consumers
- Associated data mining and predictive analytics applied to those data
- Scoring models produced from these analytics.

The scoring models generated by data mining and predictive analytics are algorithms. Algorithms are lines of computer code that rapidly execute decisions based on rules set by programmers or, in the case of machine learning, generated from statistical correlations in massive datasets. With machine learning, the models change automatically. Coupled with the increased volume and granularity of data is the digital technology to generate, access, process, analyze and deploy big data and big data algorithms in real time.
What’s So Big About Big Data?

1. Insurers’ use of Big Data has huge potential to benefit consumers and insurers by transforming the insurer-consumer relationship and by discovering new insights into and creating new tools for loss mitigation.

2. Insurers’ use of Big Data has huge implications for fairness, access and affordability of insurance and for regulators’ ability to keep up with the changes and protect consumers from unfair practices.

3. The current insurance regulatory framework generally does not provide regulators with the tools to effectively respond to insurers’ use of Big Data. Big Data has massively increased the market power of insurers versus consumers and versus regulators.

4. Market forces alone – “free-market competition” – cannot and will not protect consumers from unfair insurer practices. So-called “innovation” without some consumer protection and public policy guardrails will lead to unfair outcomes.
Current Regulatory Framework Challenged in Era of Big Data 1

Old, Old School Big Data and the Current Regulatory Framework:

- Oversight of Statistical Plans and Data Collection
- Licensing and Oversight of Advisory Organization Providing Pricing Assistance to Insurers
- Filings and Statistical Data Contain and Reference Almost All Information Insurers Use for Pricing and Claims Settlement
- Complete Transparency to Regulators; Mostly Transparent to Consumers
- Market Regulation Based, Generally, on Auditing Model
Current Regulatory Framework Challenged in Era of Big Data 2

Old School Big Data: Credit-Based Insurance Scores

- Limited Consumer Protections for Completeness and Accuracy of Data via the Fair Credit Reporting Act
- Limited Oversight of Modelers and Models; Failure to Enforce or Amend Advisory Organization Statutes
- Limited Transparency to Regulators, Little or None to Consumers
- Consumer Protections in Name Only
- Failure to Address Disparate Impact
- Regulators’ – and the Public’s – Lack of Data for Evaluation of Scoring Models and their Impact on Affordability and Availability Exposed
New School Big Data:

- Predictive Modeling of Any Database of Personal Consumer Information.
- No Consumer Protections for Completeness and Accuracy of Data
- No Oversight of Modelers and Models,
- Little or No Transparency to Regulators, None to Consumers
- Problems That Emerged with Credit Scoring Grow
  - Lack of Data to Monitor Market Outcomes
  - Lack of Oversight of Collective Pricing Activities
  - Lack of Tools to Address Disparate Impact
  - Insurer Opposition to Providing Data
  - Big Data Issues with Anti-Fraud and Claim Settlement
Current Regulatory Framework Challenged in Era of Big Data

- Insurers now using data not subject to regulatory oversight or the consumer protections of the FCRA. Regulators have no ability to ensure the accuracy or completeness of these new data sets.

- Concept of unfair discrimination – consumers of similar class and hazard treated differently – becomes meaningless when insurers submit rating plans with millions of rate classes.

- New risk classifications and anti-fraud/claim settlement algorithms can be proxies for protected classes, but with no recognition of disparate impact, risk classifications and algorithms that have the effect of discriminating against protected classes are permitted. Big Data amplifies this problem.
Insurance Is Different from Other Consumer Products

1. **The insurance is required** – by law and by lenders requiring protection of home or vehicle collateralizing the loan.

2. **Contract is a promise for future benefits** if an undesirable event occurs. If the product “fails” – the consumer learns the insurance policy won’t cover the loss – she is stuck and can’t purchase another policy that would protect her against a known loss.

3. **Consumers have little or no information about the insurers’ performance.**

4. **Cost-based pricing is required by actuarial standards of practice and financial solvency.** The requirement for cost-based pricing is to protect insurer financial condition and prevent intentional or unintentional unfair discrimination.

5. **There is profound public interest in broad coverage** – failure or inability of consumers and businesses to access insurance has implications not just for individual families and businesses, but for taxpayers, communities and the nation.
1. Articulate What the Future of Insurance Should Look Like.

“Before we choose our tools and techniques, we must first choose our dreams and our values, for some technologies serve them while others make them unobtainable.” Tom Bender

Our Dreams and Values for Insurance:

Empowered consumers and businesses partnering with risk management and sustainability companies who also provide insurance.

Greater, not less, transparency in insurance pricing, sales and claims settlements.
The Needed Shift in the Insurance Market Regulation Paradigm

The current regulatory paradigm is that, by monitoring all of the inputs into insurer marketing, pricing and claims settlement practices, regulators can ensure good consumer outcomes. While it is debatable whether the “good inputs ensure good outcomes” is a reliable approach to consumer protection, it is simply no longer feasible for regulators to monitor the massive increase in volume and complexity of inputs to insurer models in an era of Big Data.

The insurance market regulation paradigm needs to shift from attempting to monitor all inputs for insurer pricing and claim settlement to collecting and robustly analyzing data on actual consumer market outcomes. Stated differently, there is a need for Regulatory Big Data – massively increased collection of granular insurer transaction data accompanied by regulatory data mining and big data analytics. The regulatory approach must move from an auditing model to an analytics model.
2. **Modernize Insurance Market Regulation.**

   a. Monitor Markets More Comprehensively and Efficiently
   b. Develop Tools and Skills to Analyze Regulatory Big Data
   c. Rules for Consumer Disclosure, Access, Ownership and Protection of Personal Consumer Information Used by Insurers
   d. New Tools to Empower Consumers –
      i. Insurer Performance Data from Actual Consumer Outcomes
      ii. Loss Prevention Partnerships
      iii. Track Record for Protecting Personal Consumer Information
   e. Modernize Oversight of Risk Classification – Ethical Algorithms to Minimize Disparate Impact and Emphasize Loss Prevention

3. **Assist, Not Criminalize, Low-Income Consumers to Obtain Essential Insurance.**

4. **Develop / Improve / Reinvigorate Capabilities for Economic Analysis of Markets, Competition and Anti-Trust.**
2. Modernize Insurance Market Regulation

   a. Monitor Market More Comprehensively and Efficiently

      i. What data are insurers using for what purposes?
         Routine collection – and publication – by regulators of the types, sources and uses of data by insurers for marketing, sales, pricing, claims settlement and loss mitigation.

      ii. What consumer outcomes are insurers producing?
         Routine collection and analysis by regulators of granular consumer insurance market outcomes, including transaction-detail data on quotes, sales and claim settlements.

      iii. Public data to empower consumers. Routine publication of insurer-specific anonymized consumer market outcomes.
2. Modernize Insurance Market Regulation

b. Develop Skills and Tools to Analyze Regulatory Big Data

i. NAIC resources to assist states with market outcome data collection, management and analysis comparable to NAIC tools for financial regulation and principles-based reserving.

ii. Shift states’ market regulation from primarily audit capability to primarily analytic capability by adding statisticians, economists, data scientists and big data modelers.
2. Modernize Insurance Market Regulation

c. Consumer Disclosure, Access, Ownership and Protection
Rules for Personal Consumer Information Used by Insurers

i. **Insurers’ disclosures and consumer protections** modeled after those in the Fair Credit Reporting Act – disclosure, consent, adverse action notice, access to data used, opportunity to correct erroneous data, life events exception

ii. **Ownership and consumer protections for consumer-generated data related to insurance** – ownership by consumers and licensing to insurers of consumer-generated data, disclosure, affirmative opt-in, access, symmetrical use, transferability and standards for all industry databases, uses limited to agreed uses.
2. Modernize Insurance Market Regulation

d. New Tools to Empower Consumers

i. What data about me are you collecting and how well are your protecting my personal information? Insurers’ and producers’ transparency about and use and protection of consumers’ personal information;

ii. What is your actual history of treating consumers? Insurers’ and intermediaries’ performance based on actual market outcomes for consumers; and

iii. What types of tools and assistance do you offer to help me manage my risk and control my premium? Insurers’ and intermediaries’ tools and partnerships for loss mitigation, loss prevention and consumer empowerment for risk management to control premium costs
2. Modernize Insurance Market Regulation
   e. Modernize Oversight of Risk Classification

*Big Data Algorithms Can Reflect and Perpetuate Historical Inequities*

Barocas and Selbst: *Big Data’s Disparate Impact*

Advocates of algorithmic techniques like data mining argue that they eliminate human biases from the decision-making process. But an algorithm is only as good as the data it works with. Data mining can inherit the prejudices of prior decision-makers or reflect the widespread biases that persist in society at large. Often, the “patterns” it discovers are simply preexisting societal patterns of inequality and exclusion. Unthinking reliance on data mining can deny members of vulnerable groups full participation in society.

*A computer algorithm reflects historical biases of the data and the developers.*
Ethical Algorithms: 
Minimizing Bias in Insurance Pricing and Claims Settlement Models

Industry Trade Arguments against Disparate Impact in Insurance:

- Insurers don’t consider race, religion or national origin, so there can be no unfair discrimination on the basis of these factors.

- Regulators have no authority to consider disparate impact:

  Absent discriminatory treatment or failing to match price to the risk, the issue is whether they are even appropriate inquiries to apply to insurance rating. This is especially the case since some states prohibit even asking about the applicant’s or policyholder’s race or some other protected class status. As a result, the rating for a particular risk is truly color blind.

AIA and NAMIC Comments to NAIC Big Data Working Group, January 26, 2018
Industry Arguments on Disparate Impact Flawed

The industry claim that their algorithms are “color blind” is, of course, nonsense to anyone familiar with algorithms because algorithms can reflect and perpetuate the historical biases of the data and the developers.

Further – if intentional discrimination against protected classes is prohibited, why would we ignore or permit unintentional discrimination that has the same effect be permitted?
Why Is Disparate Impact Relevant for Insurance Pricing?

TransUnion Criminal History Score

“TransUnion recently evaluated the predictive power of court record violation data (including criminal and traffic violations)

“Also, as court records are created when the initial citation is issued, they provide insight into violations beyond those that ultimately end up on the MVR—such as violation dismissals, violation downgrades, and pre-adjudicated or open tickets.”

What is the likelihood that TU Criminal History Scores have a disparate impact against African-Americans? Consider policing records in Ferguson, Missouri.
US DOJ Investigation of the Ferguson Police Department

Ferguson’s approach to law enforcement both reflects and reinforces racial bias, including stereotyping. The harms of Ferguson’s police and court practices are borne disproportionately by African Americans, and there is evidence that this is due in part to intentional discrimination on the basis of race.

Ferguson’s law enforcement practices overwhelmingly impact African Americans. Data collected by the Ferguson Police Department from 2012 to 2014 shows that African Americans account for 85% of vehicle stops, 90% of citations, and 93% of arrests made by FPD officers, despite comprising only 67% of Ferguson’s population.
US DOJ Investigation of the Ferguson Police Department (2)

FPD appears to bring certain offenses almost exclusively against African Americans. For example, from 2011 to 2013, African Americans accounted for 95% of Manner of Walking in Roadway charges, and 94% of all Failure to Comply charges.

Our investigation indicates that this disproportionate burden on African Americans cannot be explained by any difference in the rate at which people of different races violate the law. Rather, our investigation has revealed that these disparities occur, at least in part, because of unlawful bias against and stereotypes about African Americans.
Example: Propensity for Fraud

“Unstructured data has become an opportunity instead of a problem. Many insurers have the ability to change unstructured information into structured data and actively mine this for the opportunities available therein.”

“This [propensity] modelling is used to determine the likelihood of a new policy holder to commit a fraudulent act and it can be done in real-time … Fraud detection has changed in its location relative to the insured. Insurers are now able to run predictive and entity analytics during multiple touch points, essentially as each new piece of information is added. This not only improves detection capabilities in the event of fraud, but it also allows an insurer to assess a fraud-risk. Some have begun providing risky policy holders with high-priced policies in order to drive them to other service providers.”

“The Role of Data and Analytics in Insurance Fraud Detection,”
www.insurancenexus.com, June 2016 (UK)
2. Modernize Insurance Market Regulation

e. Modernize Oversight of Risk Classification

i. Ethical Algorithms: Employ best practices to identify and eliminate disparate impact against protected classes. Commonly used by lenders and used by some insurance service organizations. Practices are consistent with cost-based pricing.

ii. Emphasize Loss Mitigation: Deep commitment to cost-based pricing to ensure proper economic signals for cost of protection and loss mitigation investment. Emphasize risk classifications that empower consumers, prohibit use of socio-economic factors and credit scoring.

iii. Apply Disparate Impact Standard to Insurance: If intentional discrimination against protected classes is prohibited, unintentional discrimination that has the same effect should be prohibited and minimized – see Ethical Algorithms.
Ethical Algorithms: Reasonable and Necessary for Insurance Pricing and Claims Settlement Models

1. Minimizes Disparate Impact – Stop the Cycle of Perpetuating Historical Discrimination.
2. Promotes Availability and Affordability for Underserved Groups
3. Improves Cost-Based Insurance Pricing Models
4. Improve Price Signals to Insureds for Loss Mitigation Investments
5. Help Identify Biases in Data and Modelers / Improve Data Insights
6. Improve Consumer Confidence of Fair Treatment by Insurers
3. Assist, Not Criminalize, Low-Income Consumers’ to Obtain Essential Insurance

- Cost-Based Pricing Essential. Don’t use insurance pricing to address affordability problems – no subsidies through pricing.

- Prohibit risk classifications that penalize consumers because of economic status.

- Put greater resources into assisting low-income consumers than to tracking, enforcement, penalizing, criminalizing and jailing consumers who cannot afford insurance.

- Create new product and pricing options to assist low-income consumers – low-cost auto product, pay-by-the-mile insurance.

- Federal, state and local government and insurer investments in resilient structures instead of subsidies to achieve affordable premiums.

Inconsistent and sporadic enforcement of advisory organization oversight – many organizations now providing pricing tools as advisory organizations without oversight as advisory organizations.

Will future success in insurance market be determined by quality of products and services or by amount of consumer data the insurer/intermediary/service organization controls?

The largest insurers – with the most data – have a profound competitive advantage over small- and medium-sized insurers because of far greater data assets.

Regulatory Intervention to align market forces with consumer interest, when needed. Regulatory data and economic analysis skills need to meaningfully monitor structure and competitive nature of insurance markets.
Data as a Decision Tool

Elizabeth Ward
Executive Vice President, Chief Financial Officer and Chief Actuary

MassMutual
MassMutual at a Glance

- Founded in 1851, a mutual life insurance company that operates for the benefit of its members and participating policyowners
- A leading provider of Life Insurance, Annuities, Disability Income, Long-term Care Insurance, Retirement Plans and Workplace Benefits
- 5.6 million customers – notably over 118,000+ policies have been with MassMutual for 50+ years
- $5 billion Life Insurance and Annuity benefits delivered to customers in 2017
- $560 billion Life Insurance protection in force
- 9,500 MassMutual advisors
- Key subsidiaries and affiliates include Barings, OppenheimerFunds and MassMutual International LLC
- Awards:
  - Human Rights Campaign 2017 Best Place to Work
  - 2018 World's Most Ethical Company by the Ethisphere Institute
  - 2018 Top Company for Executive Women (National Association of Female Executives)
  - Working Mother 100 Best Company in 2017
  - Disability Equality Index 2017 Best Place to Work for People with Disabilities
Life Insurers and Big Data

“Data is a fundamental input to insurance, and underwriters have used data and analytics to conduct business ever since the industry started.”

-NAIC Center for Insurance Policy and Research, November 2017 Newsletter
Why Use Big Data?

- Customer expectations are continually evolving, we must provide the customer options for how they want to shop for and purchase life insurance

- LIMRA research shows only 15 percent of U.S. households shop for life insurance in a 24-month period

- In a January 2018 survey of 2,000+ individuals:
  - 52% are more likely to purchase life insurance without a physical exam
  - 72% find simplified underwriting appealing because it is “fast and easy”
  - Almost 3 in 10 would shop and buy completely online, up 26% from the prior year

Source: LIMRA and Life Happens 2018 Insurance Barometer Study
Data Science at MassMutual

- Team: 70+ data scientists and data engineers with a range of Masters and Ph.D. credentials across various industries and STEM backgrounds

- Data Science Mission: To create knowledge and build services from data that enable enterprise-wide data-driven decision-making through science and applied research

- Focus:
  - Risk analytics – methodology and mechanism for accurately estimating life insurance risk
  - Interactive data visualizations
    - Internal decision tools – financial analysis
    - Customer tools including financial calculator visualizations
Oversight and Validation

- The use of “big data” in underwriting is subject to the same internal oversight as our existing underwriting program
- A multi-disciplinary approach including:
  - underwriters
  - medical team
  - actuaries
  - law and compliance
  - externally via reinsurance
- Implementing in a risk-focused, incremental approach