

Beyond Tomorrow ...

14th Biennial Aon Benfield Hazards Conference
September 21–23, 2015



AON
Empower Results®



Big Data and Insurance: Threat & Opportunity

Stephen Mildenhall
Aon Benfield
Aon Center for Innovation & Analytics, Singapore

Prepared at the Aon Center for Innovation and Analytics, Singapore
Presentation to 14th Biennial Aon Benfield Hazards Conference 2015

Global Real Estate

Australia is selling a ranch the size of New Jersey






 703



A piece of land the size of New Jersey is up for sale in Australia.

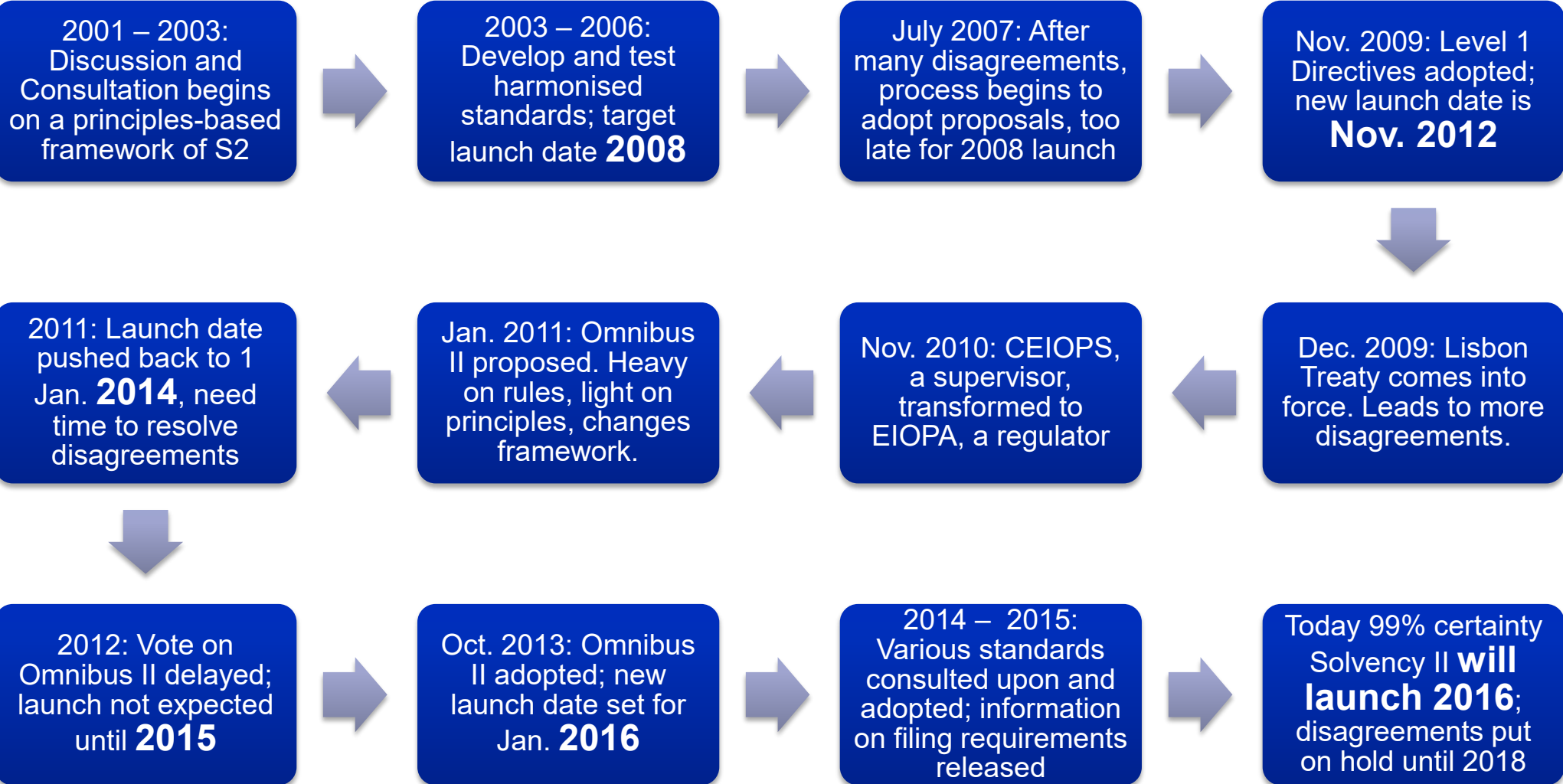
At a sprawling 23,000 square kilometers (14,000 square miles), the Anna Creek Station in South Australia is the world's biggest cattle ranch.

We live in amazing times, but we still face the well-known problem of prediction...

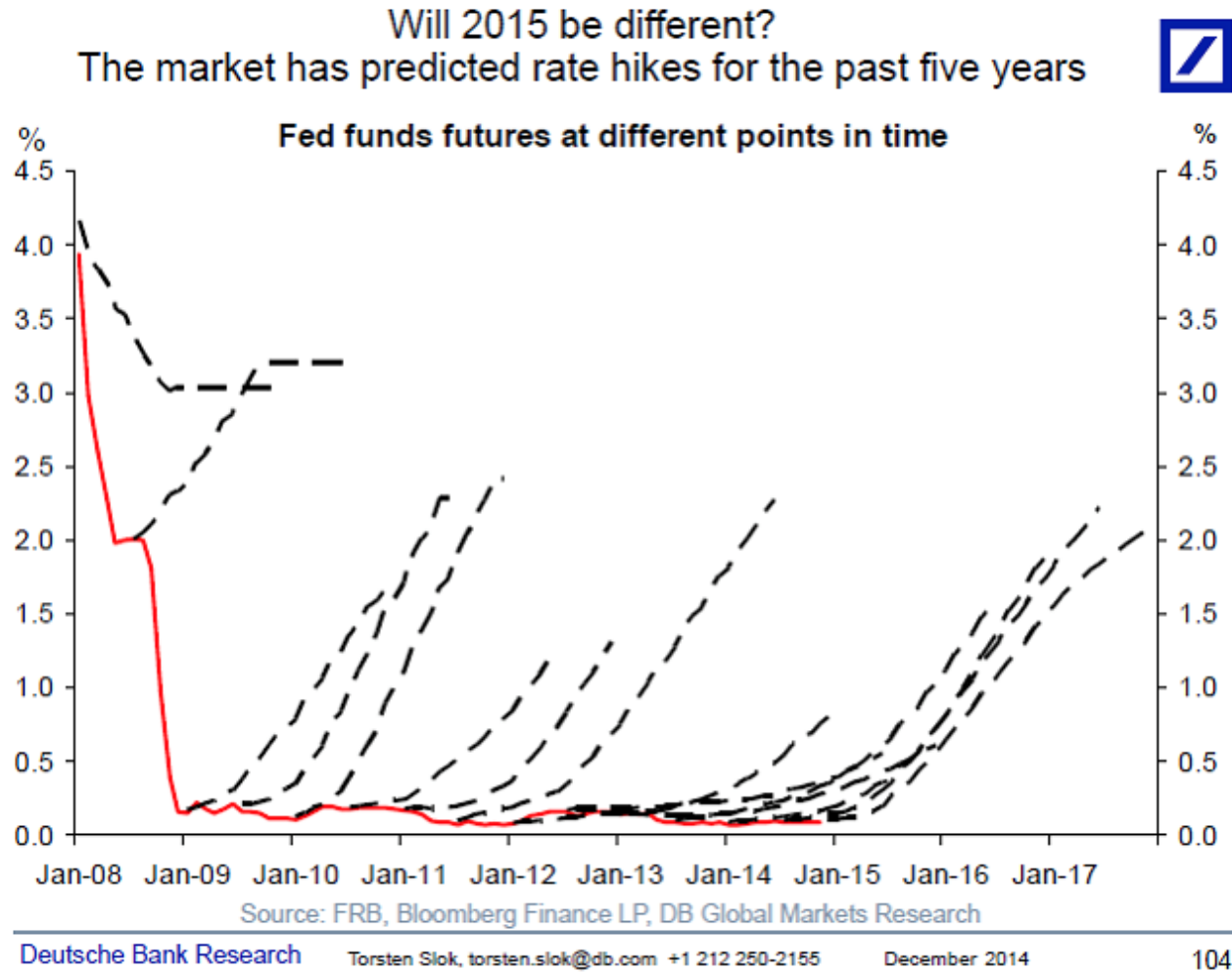
Prediction is very difficult,
especially if it's about the future.

Niels Bohr

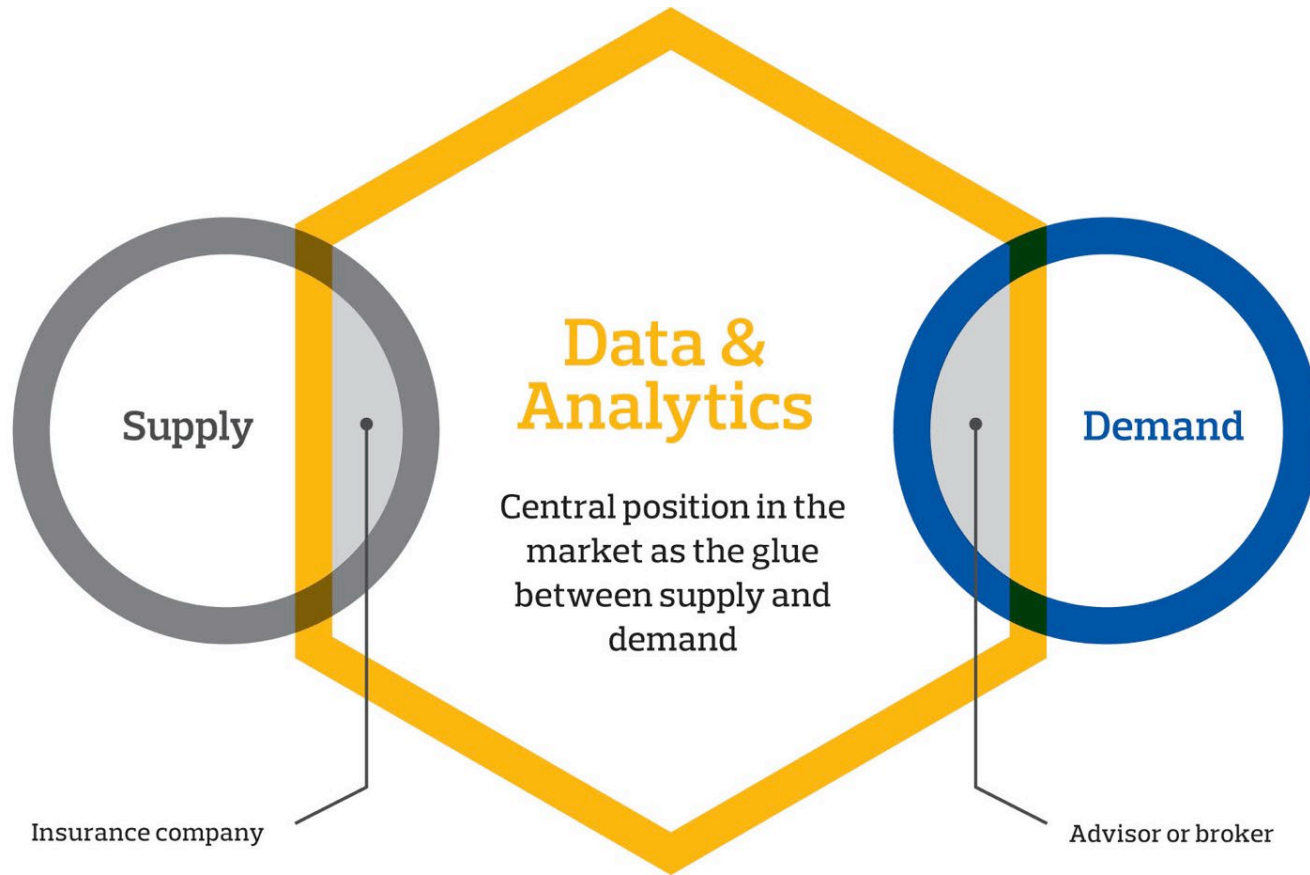
Regulators in error: predicting Solvency II implementation date



Markets in error: predicting future interest rates



The insurance market



Data: the raw ingredient of decision making

[Big] Data

Three Vs
Volume
Variety
Velocity
Value | Veracity

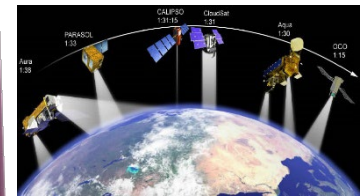
**BIG = hard to
manage on
existing
technology**

B = Behavioral

Data: the raw ingredient of decision making

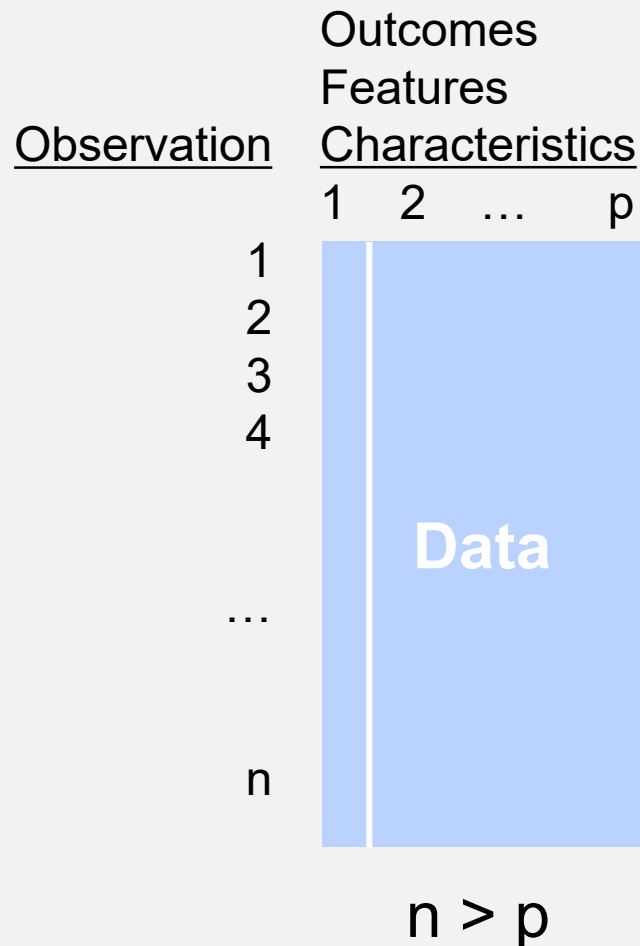
data

Big Data



What puts the Big in Big Data?

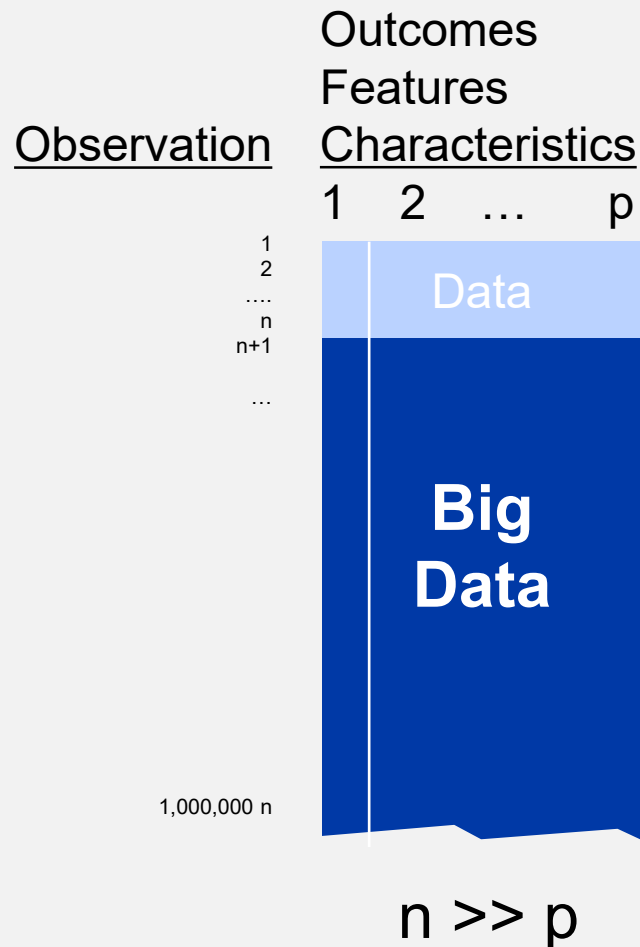
Traditional data



- Observations = insureds
- Observed quantities
 - Losses
 - Age
 - Sex
 - Marital status
 - Vehicle use
 - Accident history
 - Etc.
- Observations = sentences
- Observed quantities
 - Word frequencies

What puts the Big in Big Data?

Extension I: Lots more observations



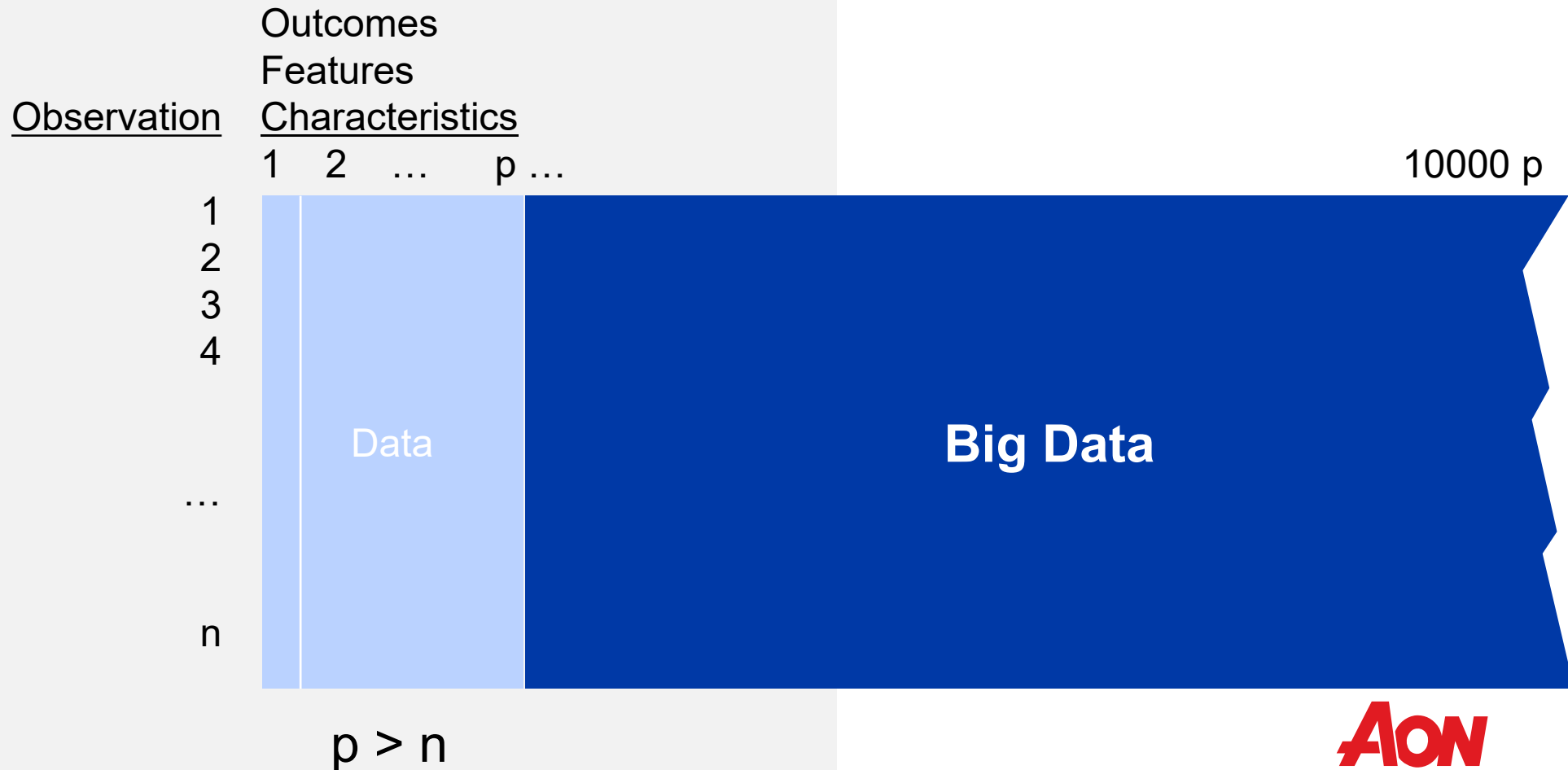
- Sentences, results radically improve with **billions** of test sentences
- Global satellite images
- Tick-level financial data

- Insurance examples
 - More years of **experience**
 - Some experience vs none!

- **Computing challenge**
- **Same modeling approaches**

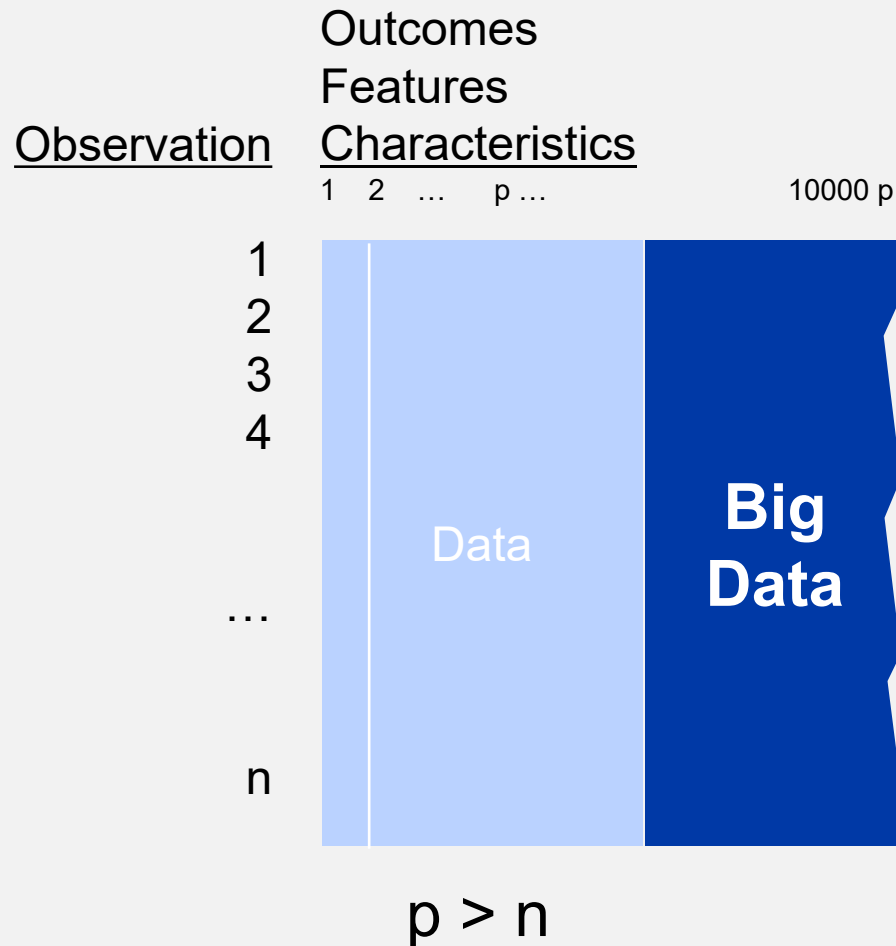
What puts the Big in Big Data?

Extension II: Lots more parameters



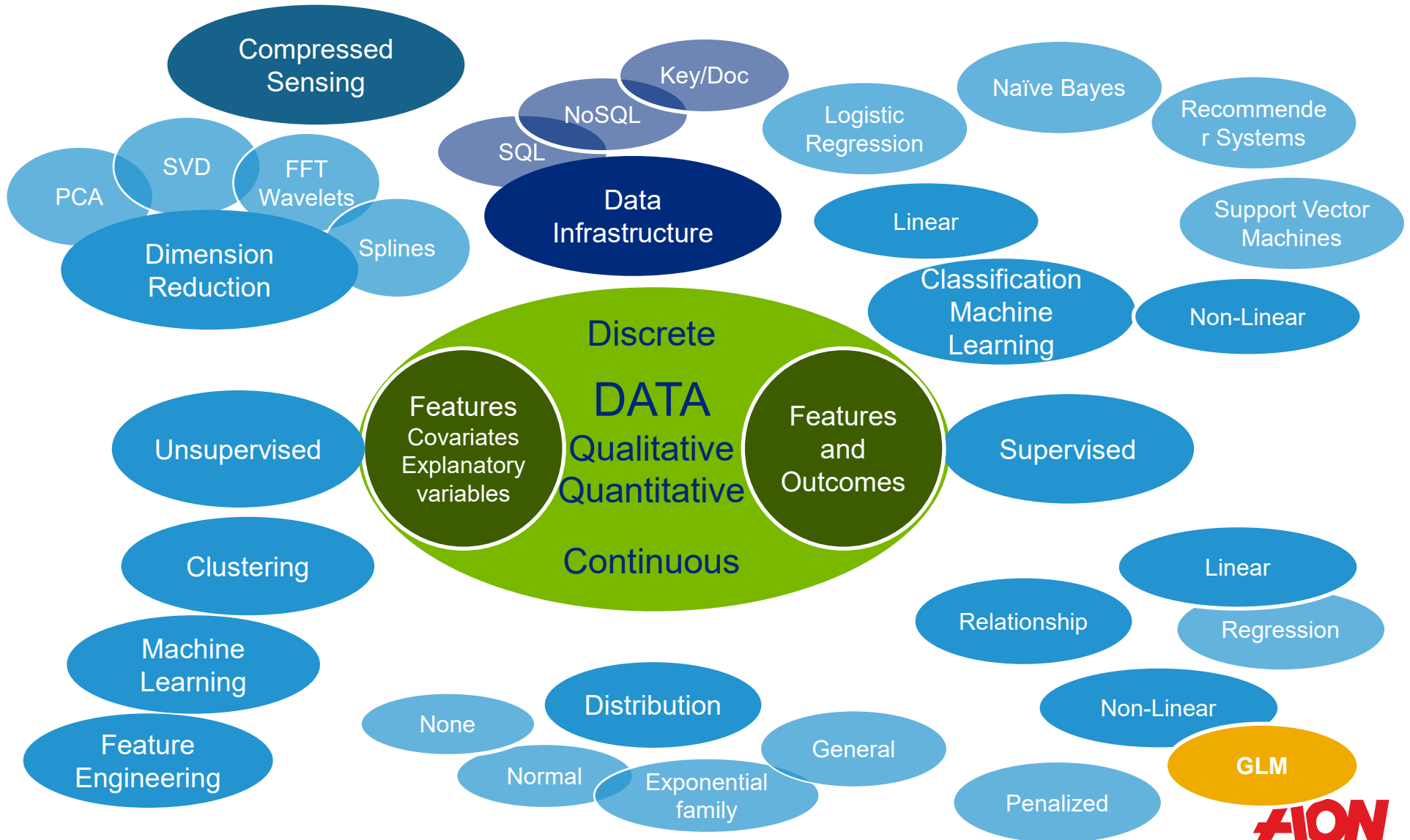
What puts the Big in Big Data?

Extension II: Lots more parameters



- Detailed credit history, in use since mid-1990s
- Minute by minute driving log, auto telematics
- Home telematics
- Genome information
- Hyperspectral image
- **Computing challenge**
- **New modeling challenge**

Schematic of analytic techniques and algorithms

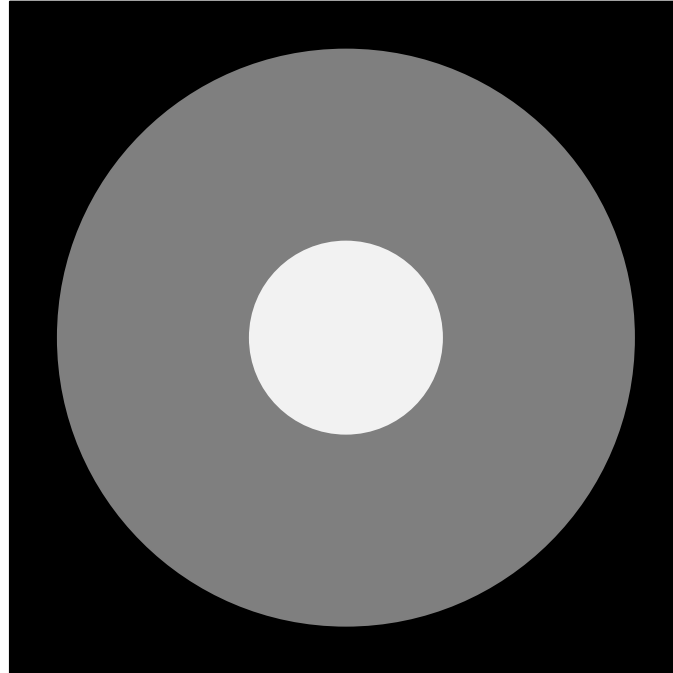


How does more data impact risk and insurance?

Unknown,
ignorance,
no insurance

Partial knowledge,
uncertainty, risk,
insurance

Complete knowledge,
certainty,
managed, retained

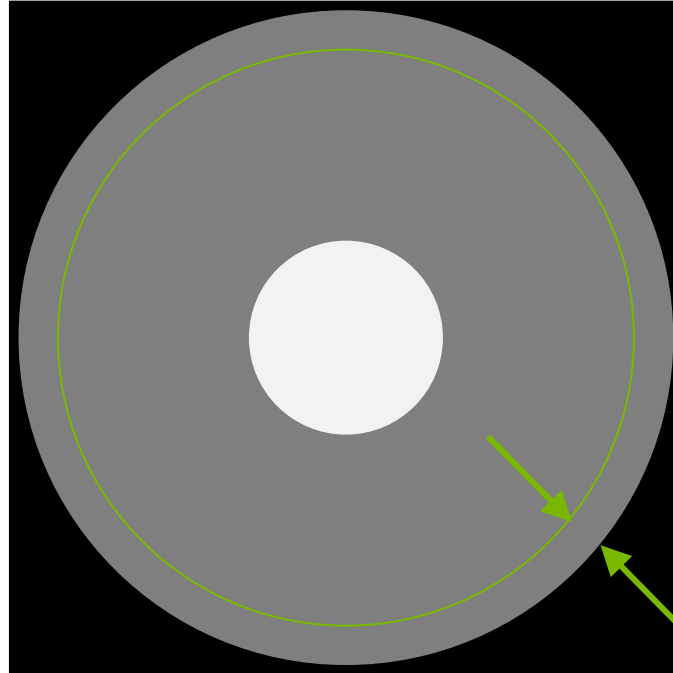


- **Incomplete understanding creates opportunities for insurance markets**
- Ignorance and certain knowledge generally rule out insurance

How does more data impact risk and insurance?

Extension I. More observations, bigger n

Insurance gain
from decreased
ignorance



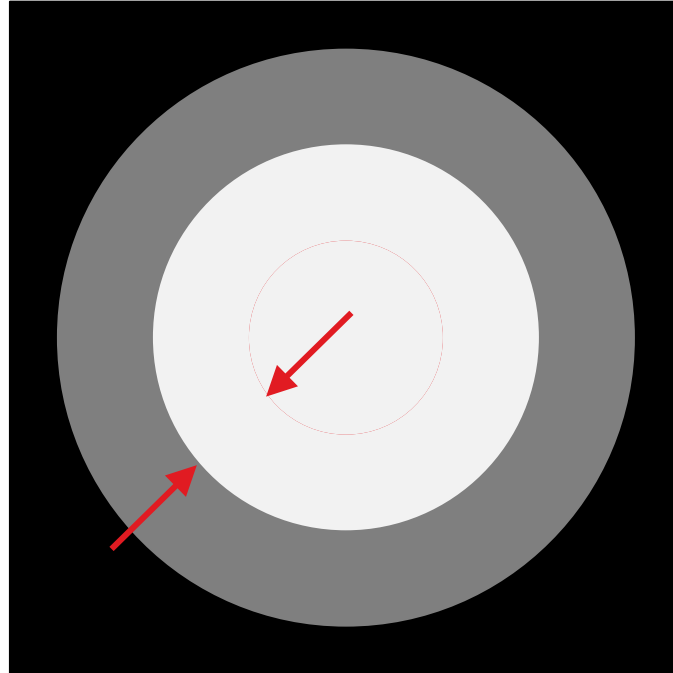
More data is a
GOOD THING
Emerging Risk

- **More observations can create markets**
- Risk measured by risk owners
- Measurement begets management
- Risk more quantifiable for insurers
- Property catastrophe
- Cyber
- Business interruption
- Terrorism
- Giga liability
- Brand

How does more data impact risk and insurance?

Extension II. More parameters, bigger p

Insurance loss
from greater
certainty



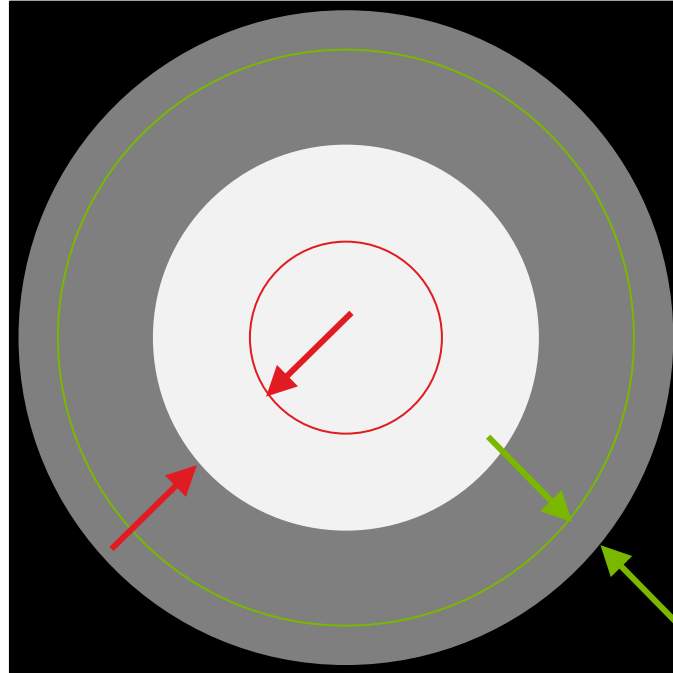
More data is a
BAD THING
Existing Risk

- **More parameters may destroy markets in the long run**
- More granular underwriting
- Less risk sharing
- Affordability and availability issues

- Genomics in health insurance
- Flood insurance

How does more data impact risk and insurance?

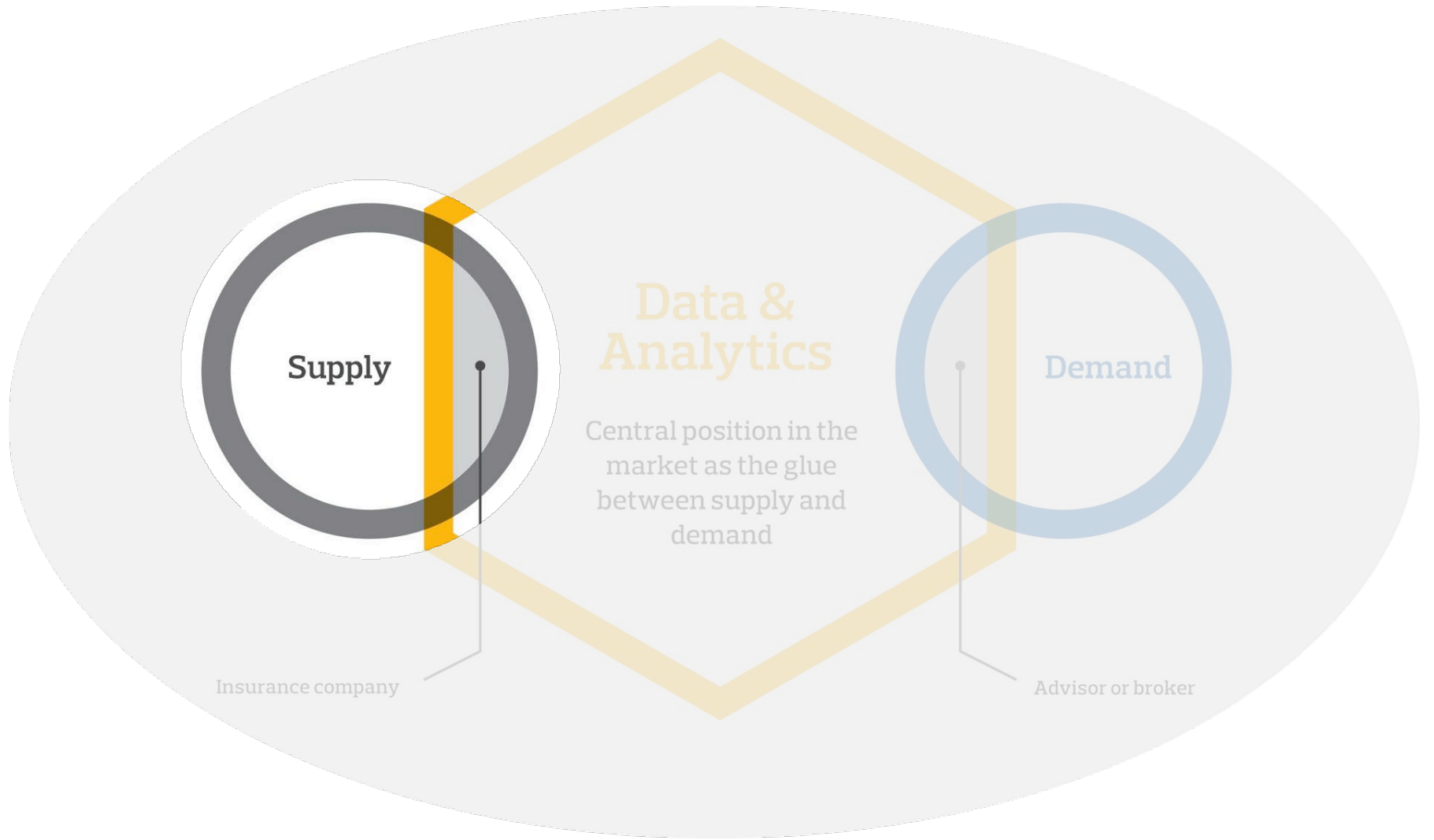
Indeterminate net growth effect



- Net growth impact on risk-transfer insurance indeterminate
- Different data models apply in different markets

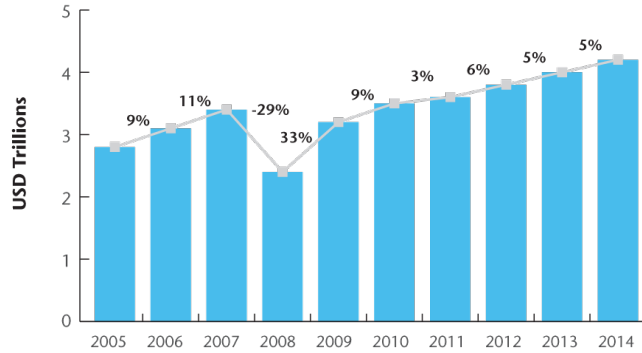
▪ **Disruption is certain**

More data is a
???
Disruption

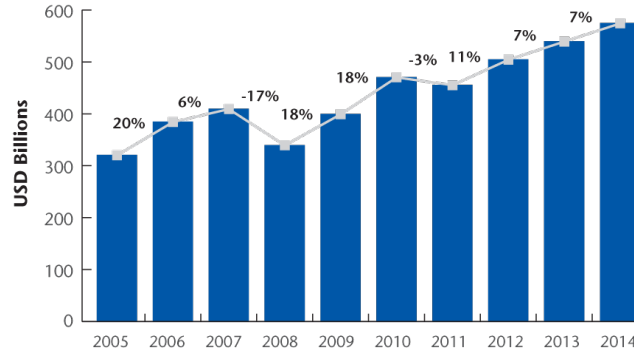


Supply & capital

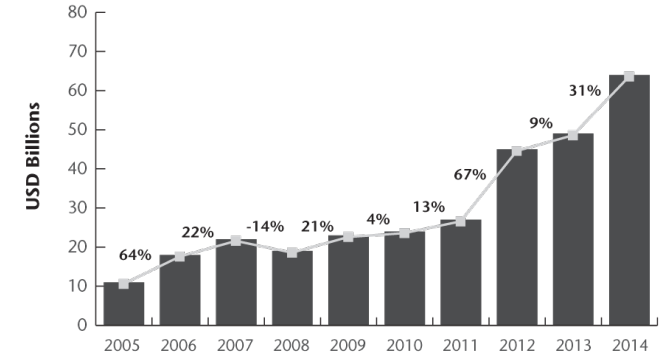
Global insurance capital since 2005



Global reinsurance capital since 2005



Alternative capital since 2005 (included in reinsurance capital)



“We believe abundant capital, providing capacity for existing and emerging risks, will be available to support significant growth in the insurance industry over the coming decade.”

To Uberize...



U B E R

We got there first

\$66B

Alternative Capital

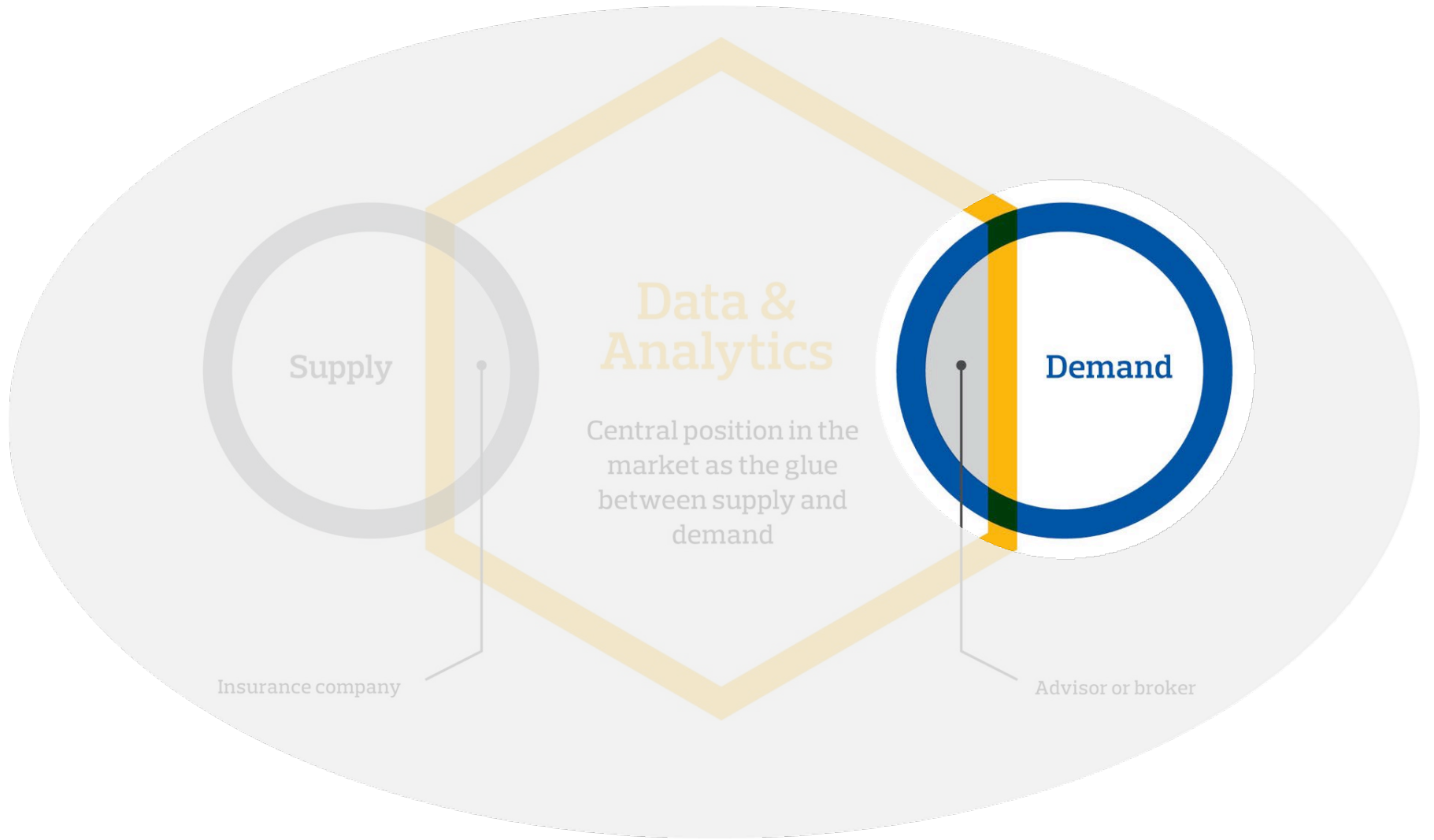
To “Uberize”, remove
the middleman, theme
of the times.

Nassim Nichol Taleb, tweet, 2014

Surge pricing

Supply competition is
the key to reaping the
benefits of markets.

John Cochrane, Grumpy Economist blog



Data & Analytics

Central position in the market as the glue between supply and demand

Supply

Insurance company

Demand

Advisor or broker

Demand: ARS 2015 global risk manager's top 53 risks

Damage to reputation/ brand	Economic slowdown/ slow recovery	Regulatory/ legislative changes	Increasing competition	Failure to attract or retain top talent	Failure to innovate/ meet customer needs	Business interruption	Third-party liability	Computer crime/ hacking/ viruses
Property damage	Commodity price risk	Cash flow/ liquidity risk	Technology failure/ system failure	Distribution or supply chain failure	Political risk/ uncertainties	Corporate governance/ compliance burden	Exchange rate fluctuation	Weather/ natural disasters
Capital availability/ credit risk	Directors & Officers personal liability	Failure of disaster recovery plan	Corporate social responsibility/ sustainability	Injury to workers	Crime/ theft/ fraud/ employee dishonesty	Loss of intellectual property/ data	Failure to implement or communicate strategy	Counter party credit risk
Merger/ acquisition/ restructuring	Environmental risk	Inadequate succession planning	Lack of technology to support business needs	Workforce shortage	Product recall	Accelerated change in market & geopolitics	Aging workforce and related health issues	Globalization/ emerging markets
Interest rate fluctuation	Outsourcing	Unethical behavior	Natural resource scarcity	Terrorism/ sabotage	Asset value volatility	Understaffing	Pandemic risk/ health crises	Climate change
Social media	Absenteeism	Joint venture failure	Share price volatility	Pension scheme funding	Sovereign debt	Kidnap and ransom/ extortion	Harassment/ discrimination	

Demand: where are the new product opportunities?

General Business Risk		Insurable & Generally Insured	Insurable & Not Enough	Insurance Design Challenges	Social or Global Risk	Financial Risk	
Economic slowdown/ slow recovery	Inadequate succession planning	Third-party liability	Business interruption	Damage to reputation/ brand	Environmental risk	Commodity price risk	Pension scheme funding
Regulatory/ legislative changes	Lack of technology to support business needs	Property damage	Computer crime/ hacking/ viruses	Failure of disaster recovery plan	Accelerated change in market & geopolitics	Cash flow/ liquidity risk	Sovereign debt
Increasing competition	Workforce shortage	Weather/ natural disasters	Technology failure/ system failure	Corporate social responsibility/ sustainability	Aging workforce and related health issues	Exchange rate fluctuation	
Failure to attract or retain top talent	Outsourcing	Directors & Officers personal liability	Distribution or supply chain failure	Loss of intellectual property/ data	Globalization/ emerging markets	Capital availability/ credit risk	
Failure to innovate/ meet customer needs	Unethical behavior	Injury to workers	Political risk/ uncertainties	Social media	Natural resource scarcity	Counter party credit risk	
Corporate governance/ compliance burden	Understaffing	Crime/ theft/ fraud/ employee dishonesty	Product recall		Pandemic risk/ health crises	Interest rate fluctuation	
Failure to implement or communicate strategy	Joint venture failure	Kidnap and ransom/ extortion	Terrorism/ sabotage		Climate change	Asset value volatility	
Merger/ acquisition/ restructuring			Absenteeism			Share price volatility	
			Harassment/ discrimination				

Demand: comparative advantage rationale for business insurance

Risk assessment and risk management

- **Lower loss cost**
- PML assessment, construction
- Risk control: WC, auto, liability, med mal, ...
- Building engineering
- Monitoring: surety, credit, political risk
- Insurance

Claims Handling

- **Lower cost of LAE**
- Lower ultimate cost of indemnity
- Insurance or reinsurance

Risk Financing

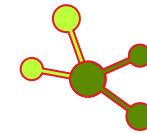
- **Lower cost of capital**
- Reinsurance

Non-market motivations

- Rating agencies & regulation “price” cat risk
- Regulation spurs demand for mortgage credit

Terrorism

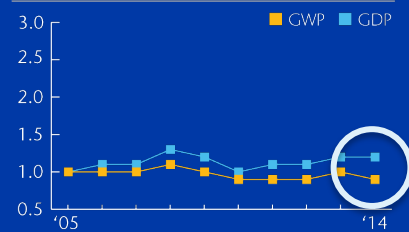
CYBER



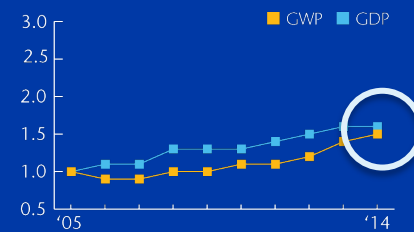
Facts and figures: insurance relevance to the economy

The graphs compare property-casualty premium and GDP over the last ten years. Six of the ten countries shown have achieved premium growth at or above GDP indicating an increased relevance for the insurance sector in the economy.

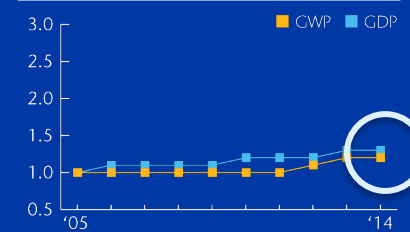
UK, indexed 2005 = 1.0



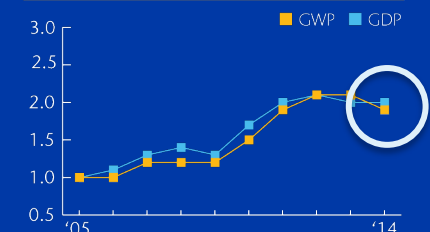
Hong Kong, indexed 2005 = 1.0



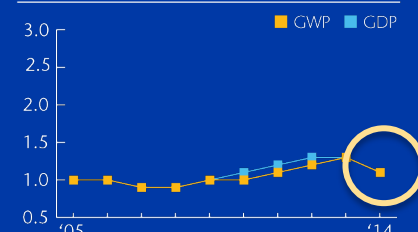
US, indexed 2005 = 1.0



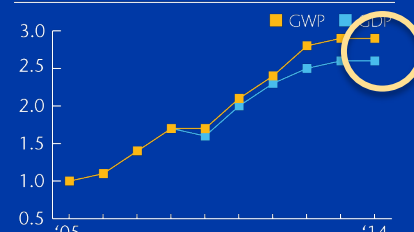
Australia, indexed 2005 = 1.0



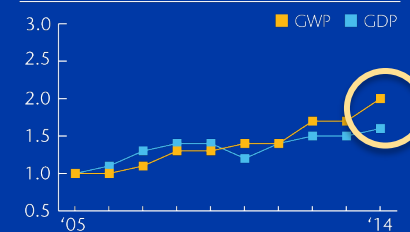
Japan, indexed 2005 = 1.0



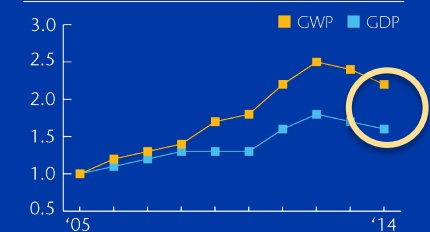
Colombia, indexed 2005 = 1.0



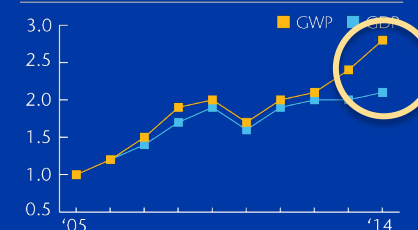
Mexico, indexed 2005 = 1.0



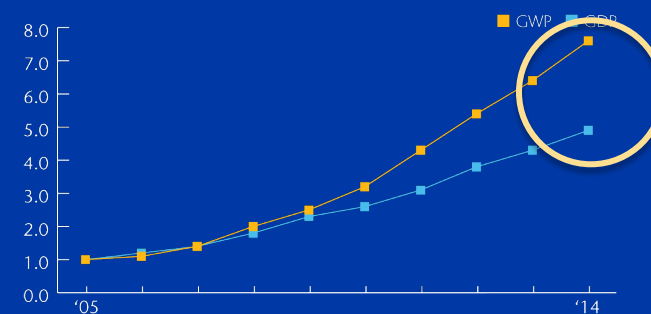
South Africa, indexed 2005 = 1.0



Turkey, indexed 2005 = 1.0



China, indexed 2005 = 1.0



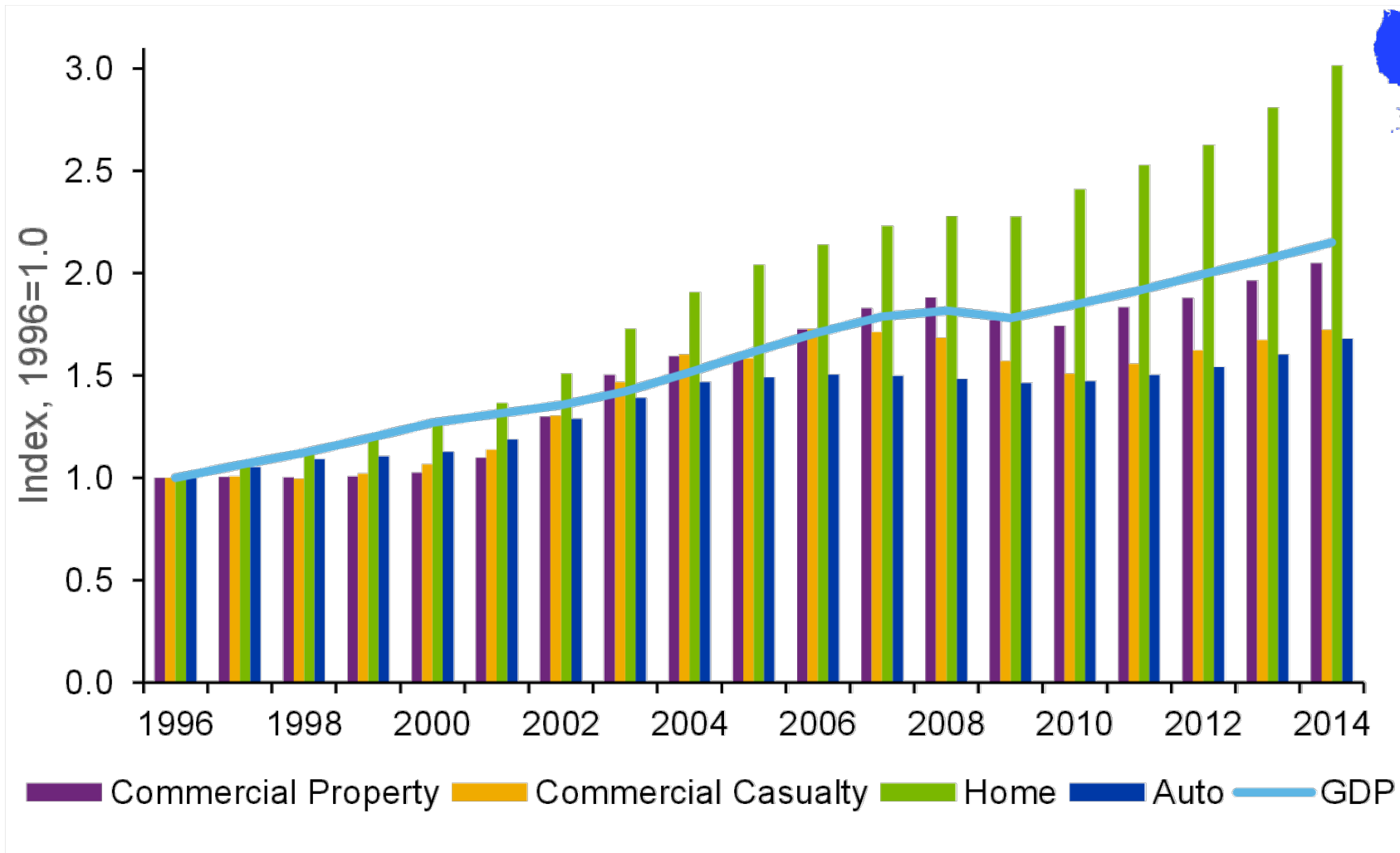
China's share

of global premium has increased more than

five-fold

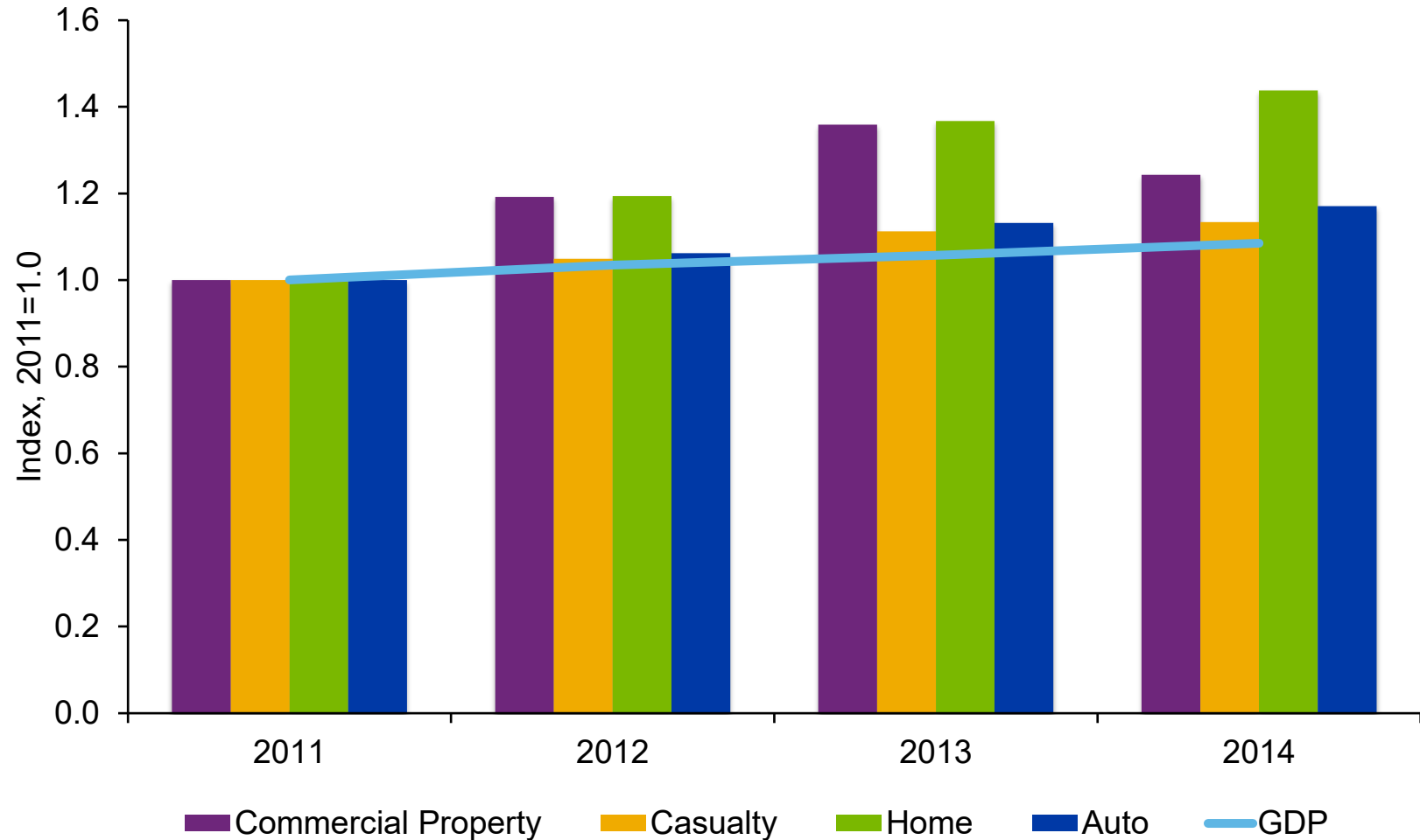
over the last decade

Homeowners premium has outstripped GDP since 1996 and commercial property has broadly matched it...



...while “existing-risk” personal auto and commercial liability have both lagged GDP growth

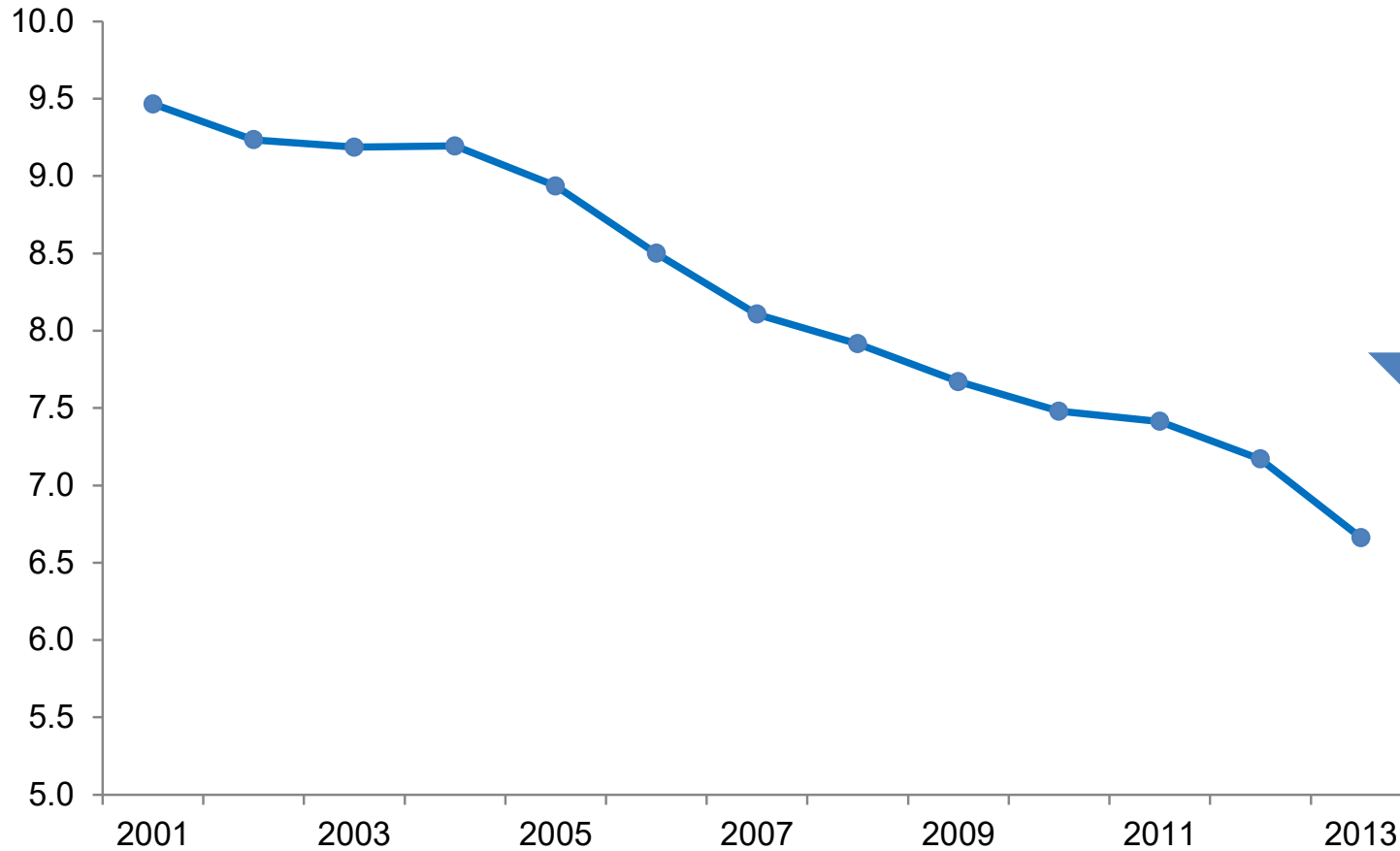
In Australia, commercial property and homeowners premiums have both outpaced GDP growth since 2011



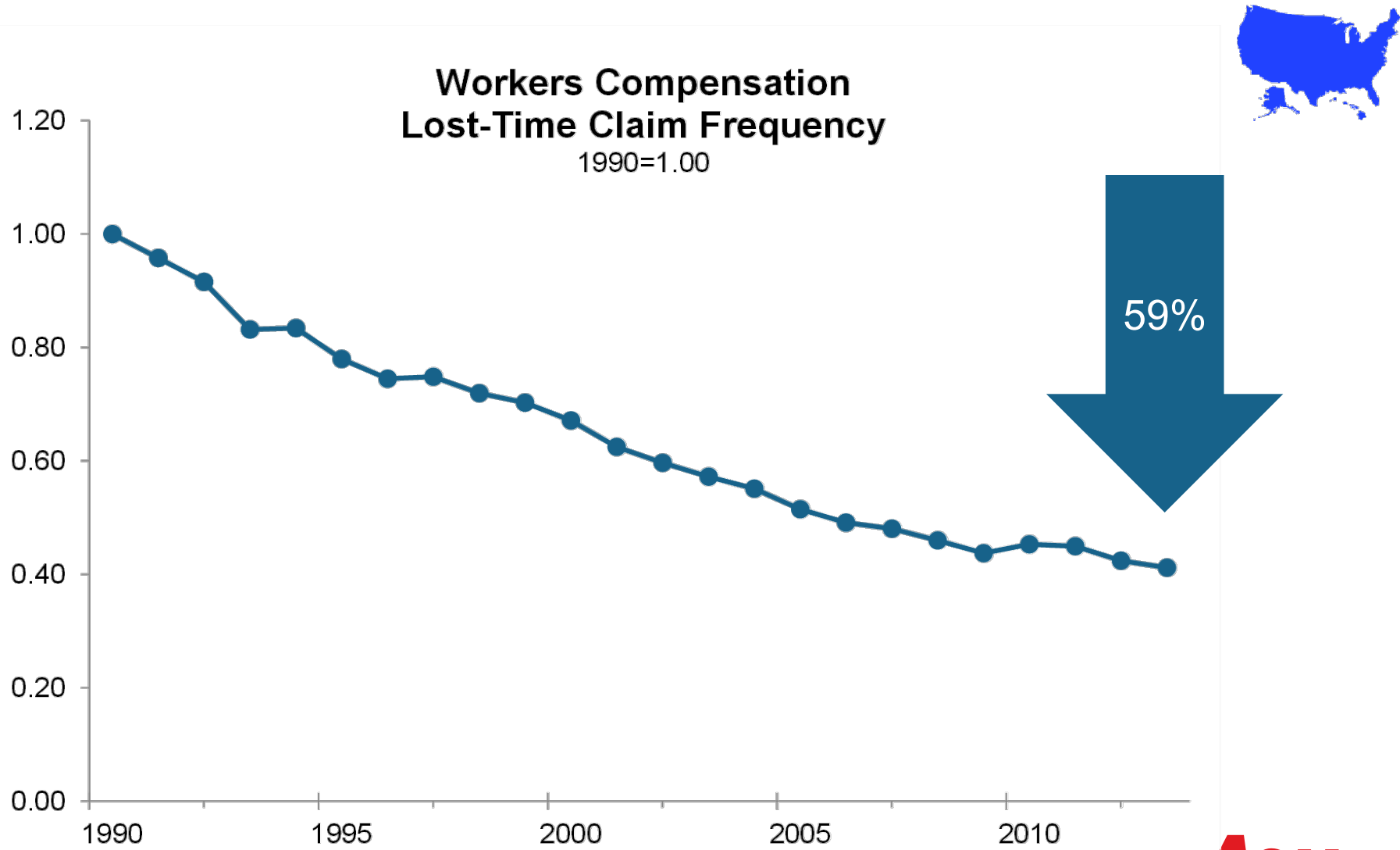
Workers compensation lost time frequency down 30% since 2001



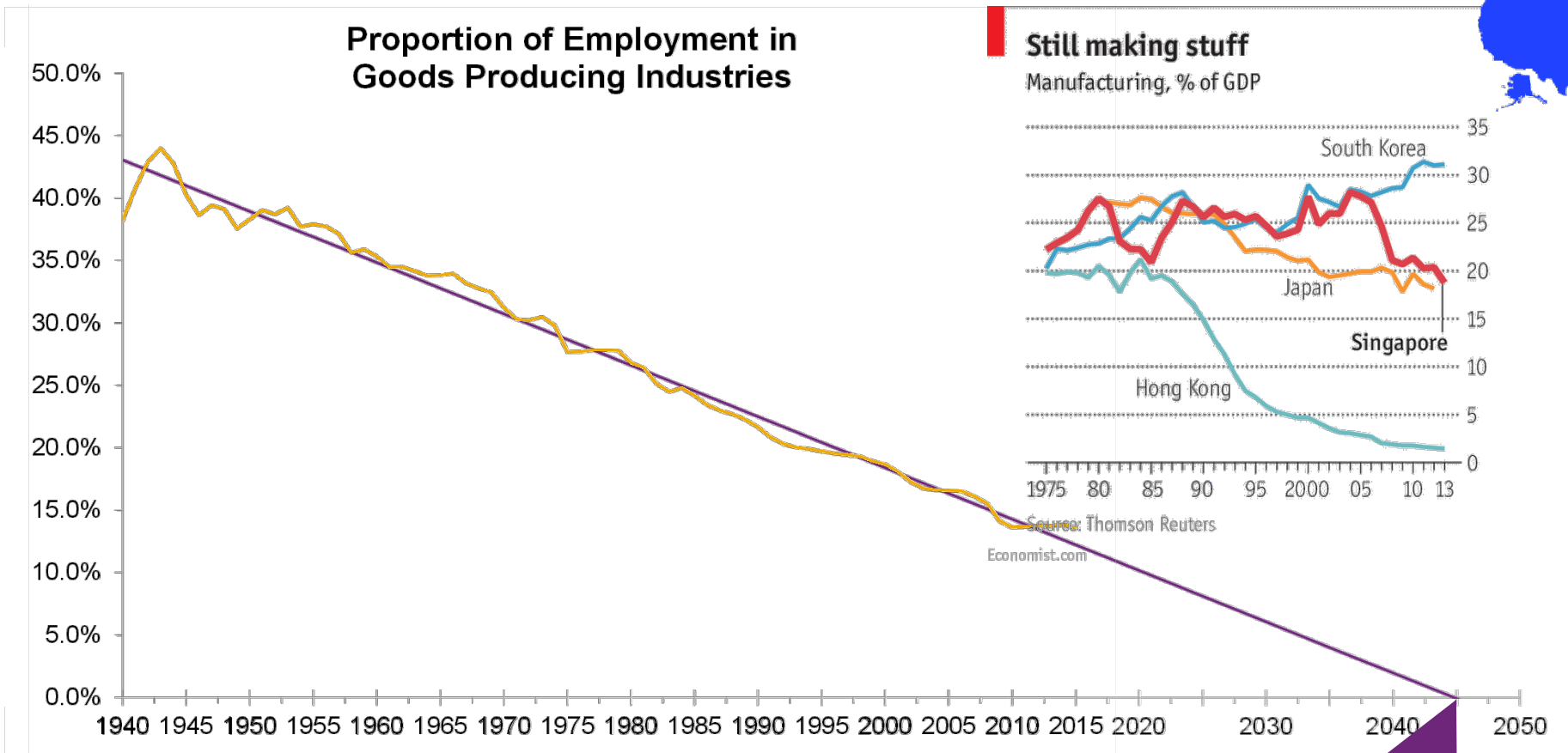
Workers Compensation Lost-Time Claim Frequency



Workers compensation lost time frequency down 59% since 1990



Partial driver of lower frequency: “lighter” nature of commerce

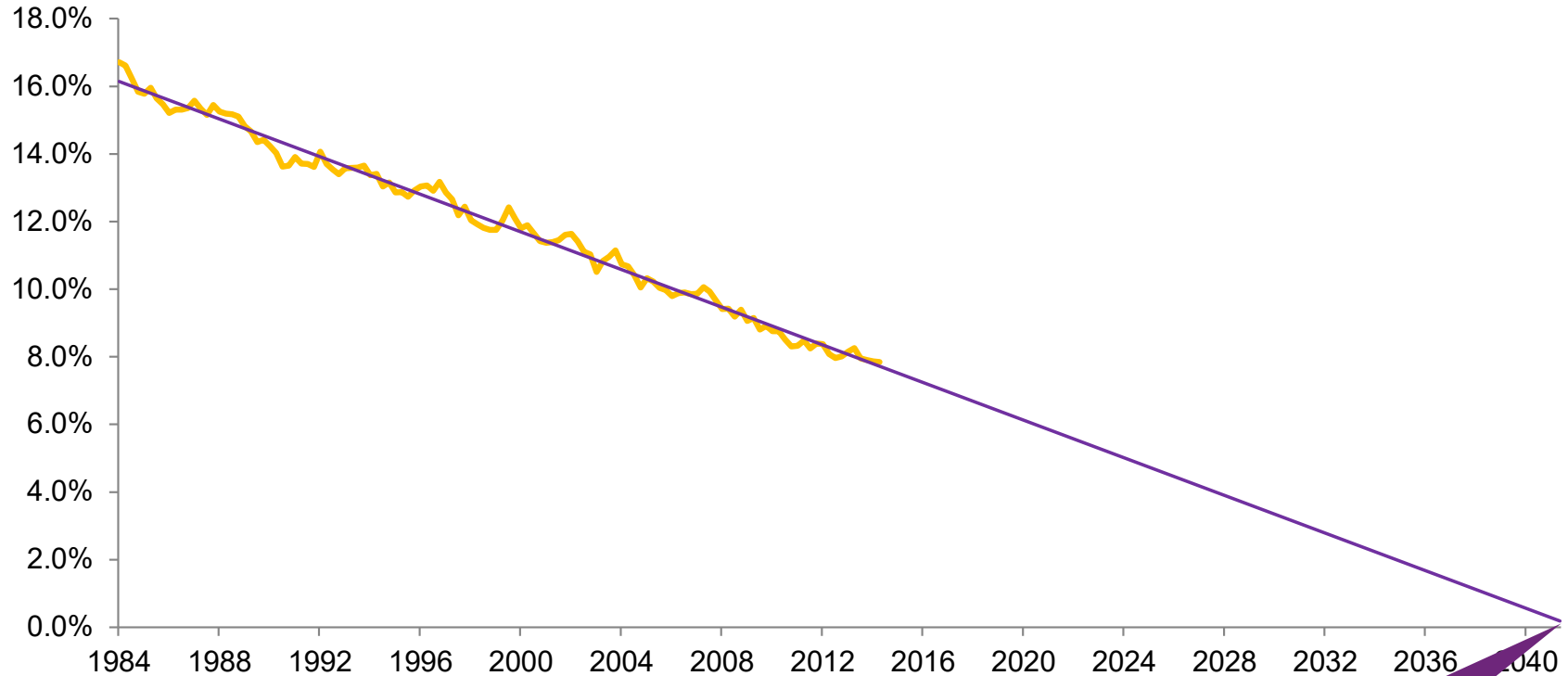


Last US manufacturing job disappears: 2045

Partial driver of lower frequency: “lighter” nature of commerce

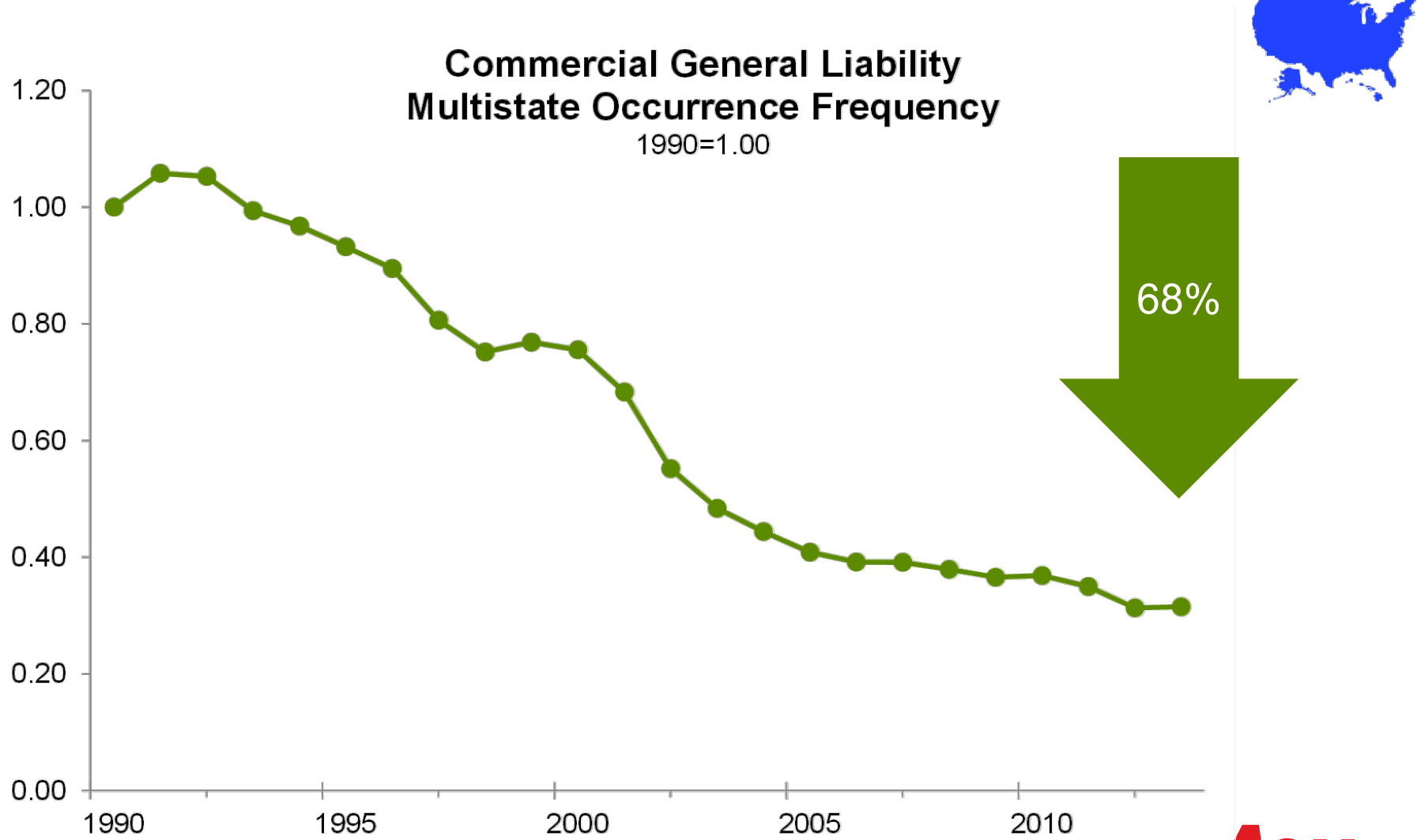


Proportion of Employment in Manufacturing Industries



Last AU manufacturing job disappears: 2042

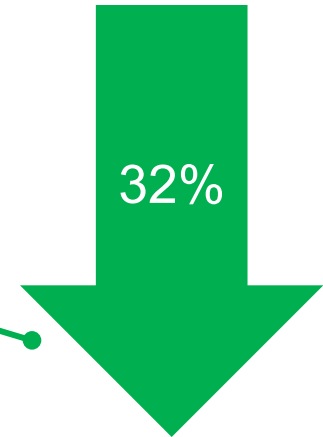
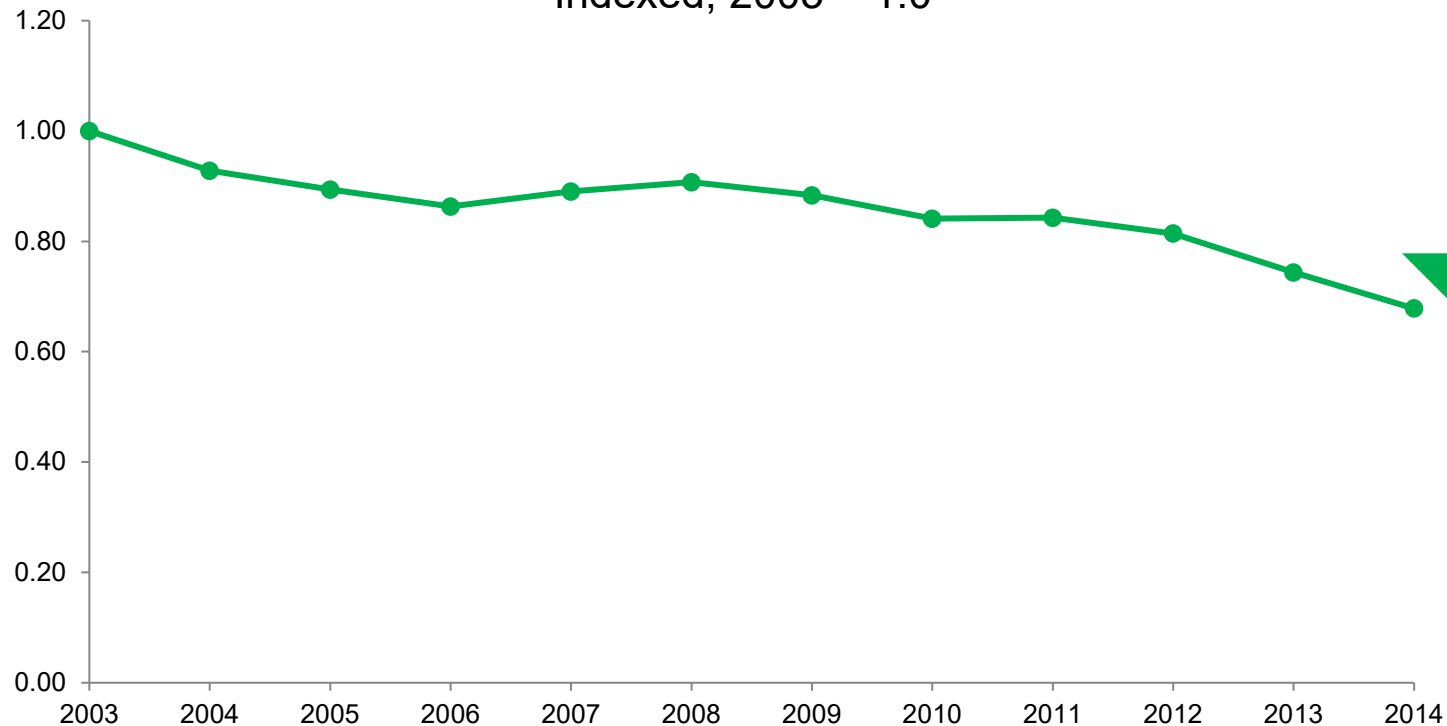
General Liability frequency down 68% since 1990



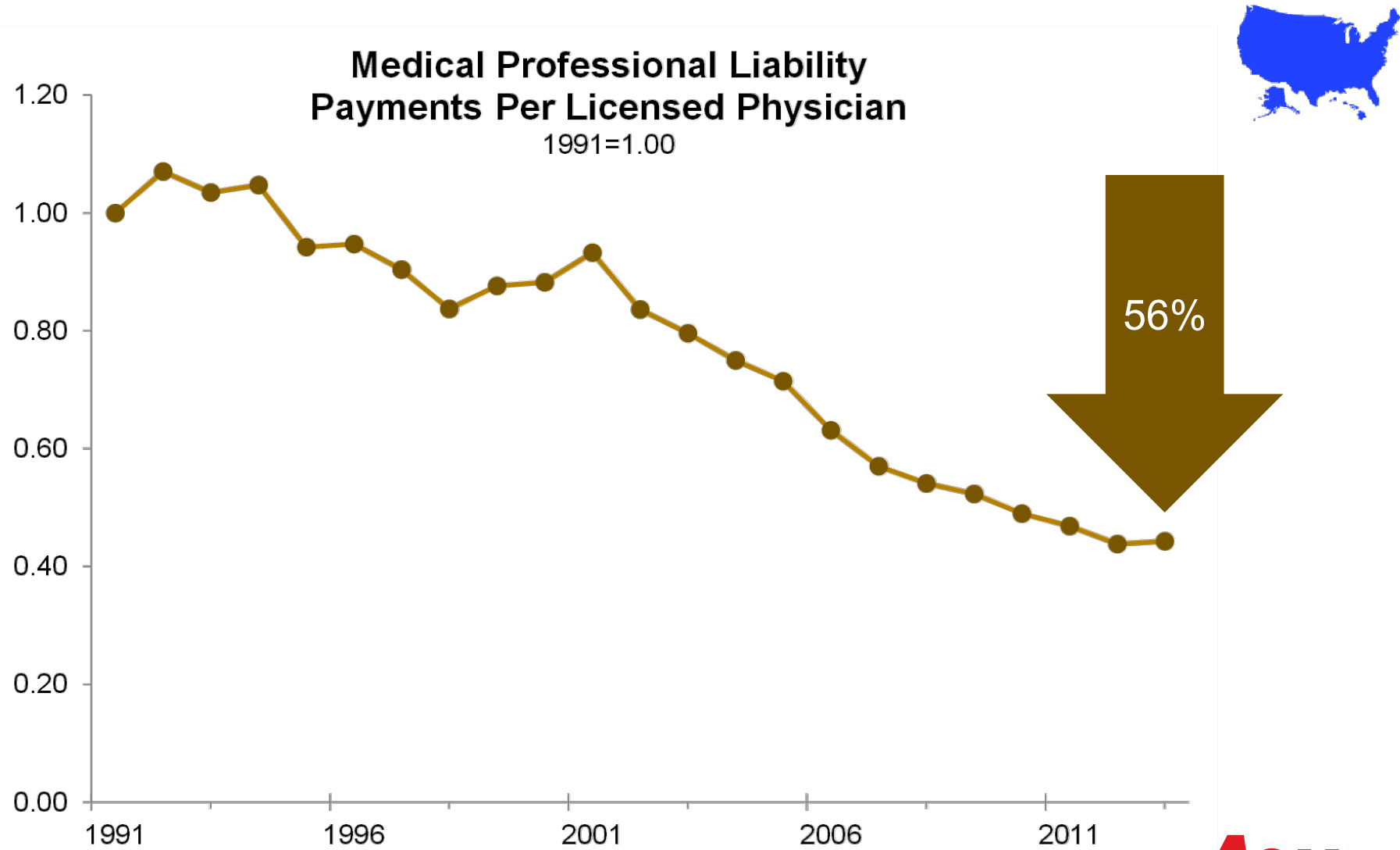
General Liability frequency down 32% since 2003



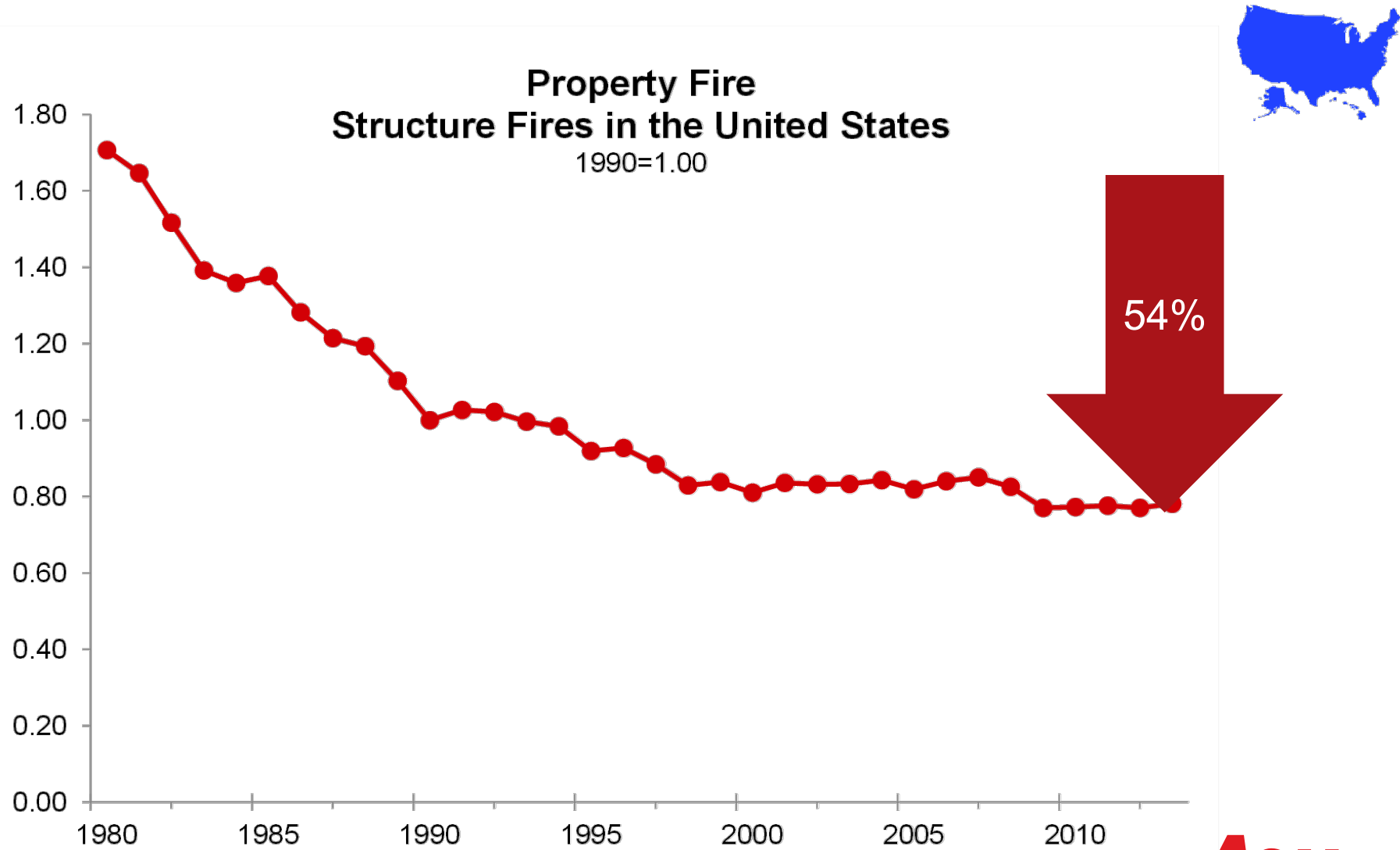
**General Liability
National Occurrence Frequency**
Indexed, 2003 = 1.0



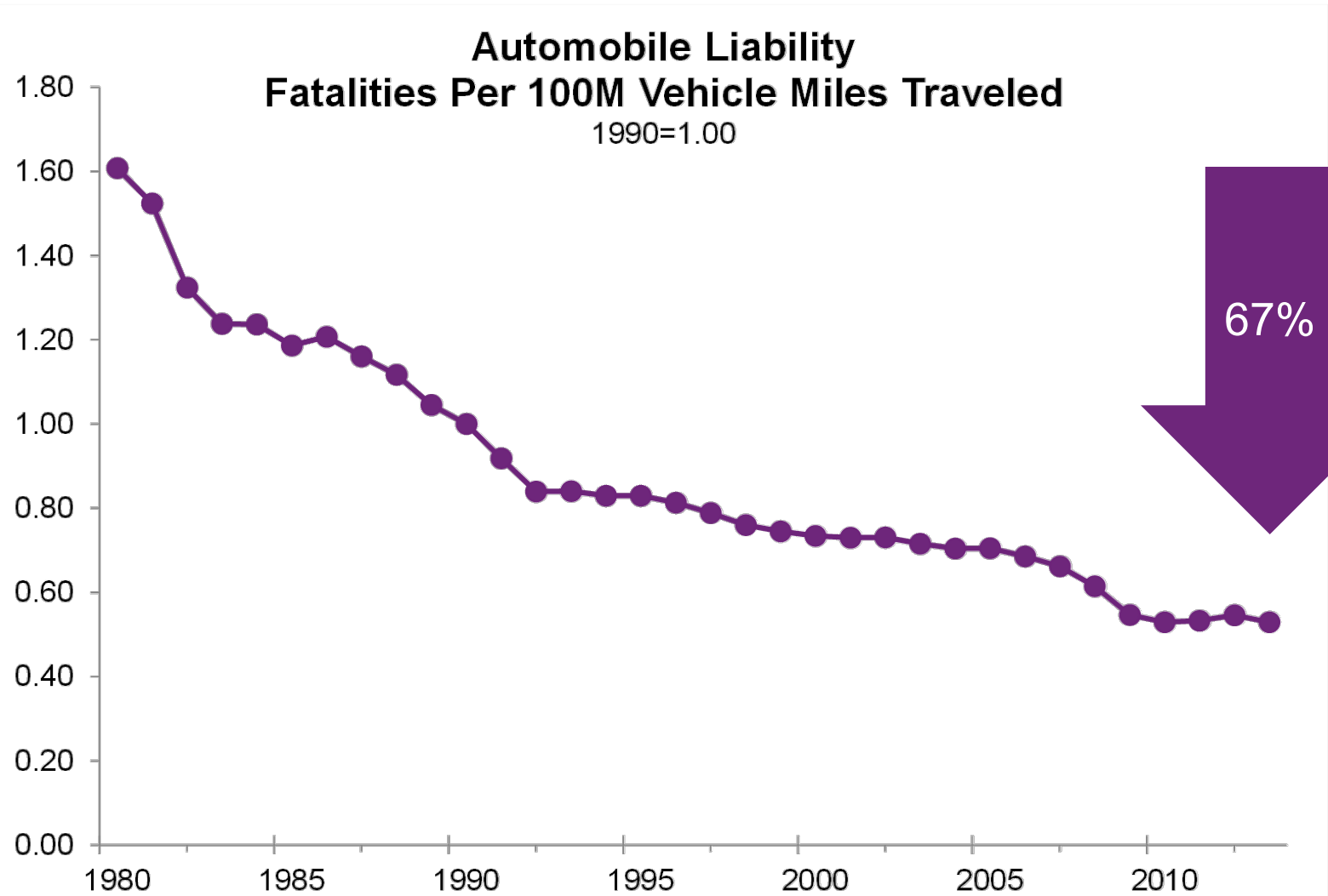
Medical Professional payment frequency down 56% since 1991



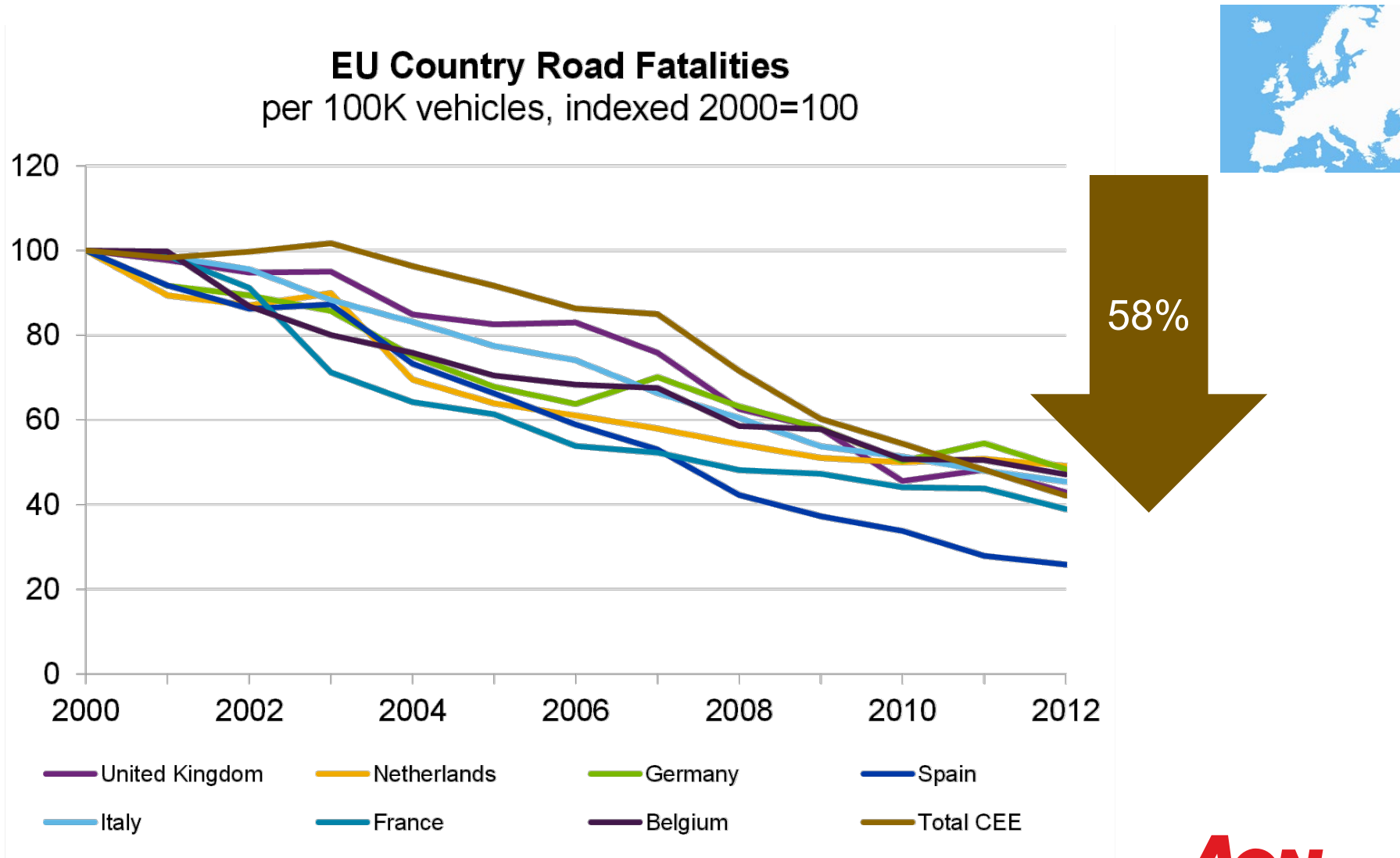
Structure fire loss frequency down 22% since 1990, and 54% since 1980



Auto severe accident frequency down 47% since 1990 and 67% since 1980

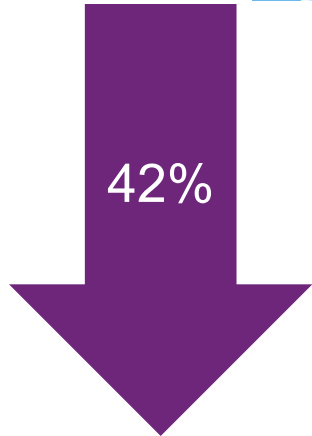
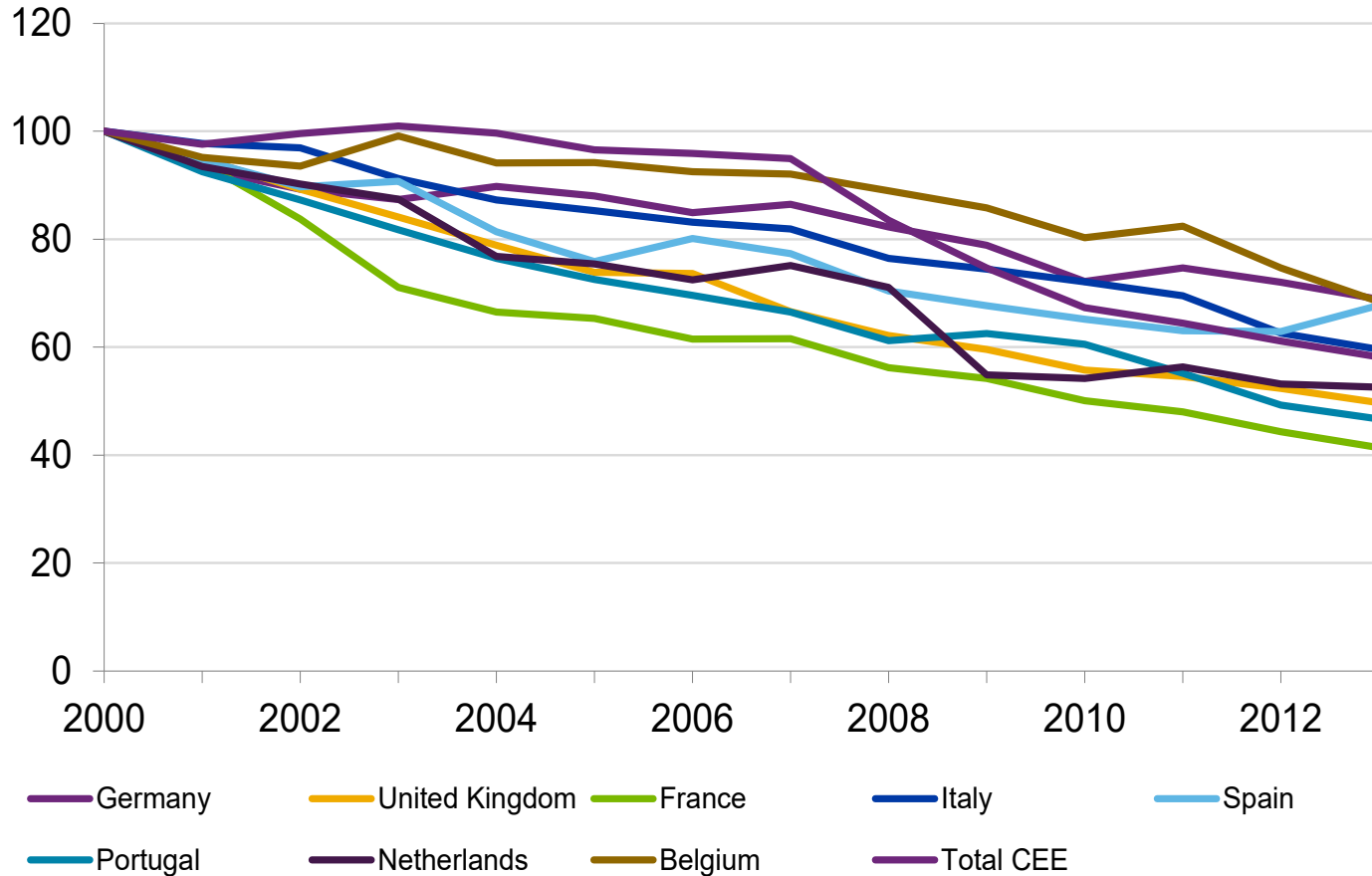


European motor fatalities down 58% since 2000



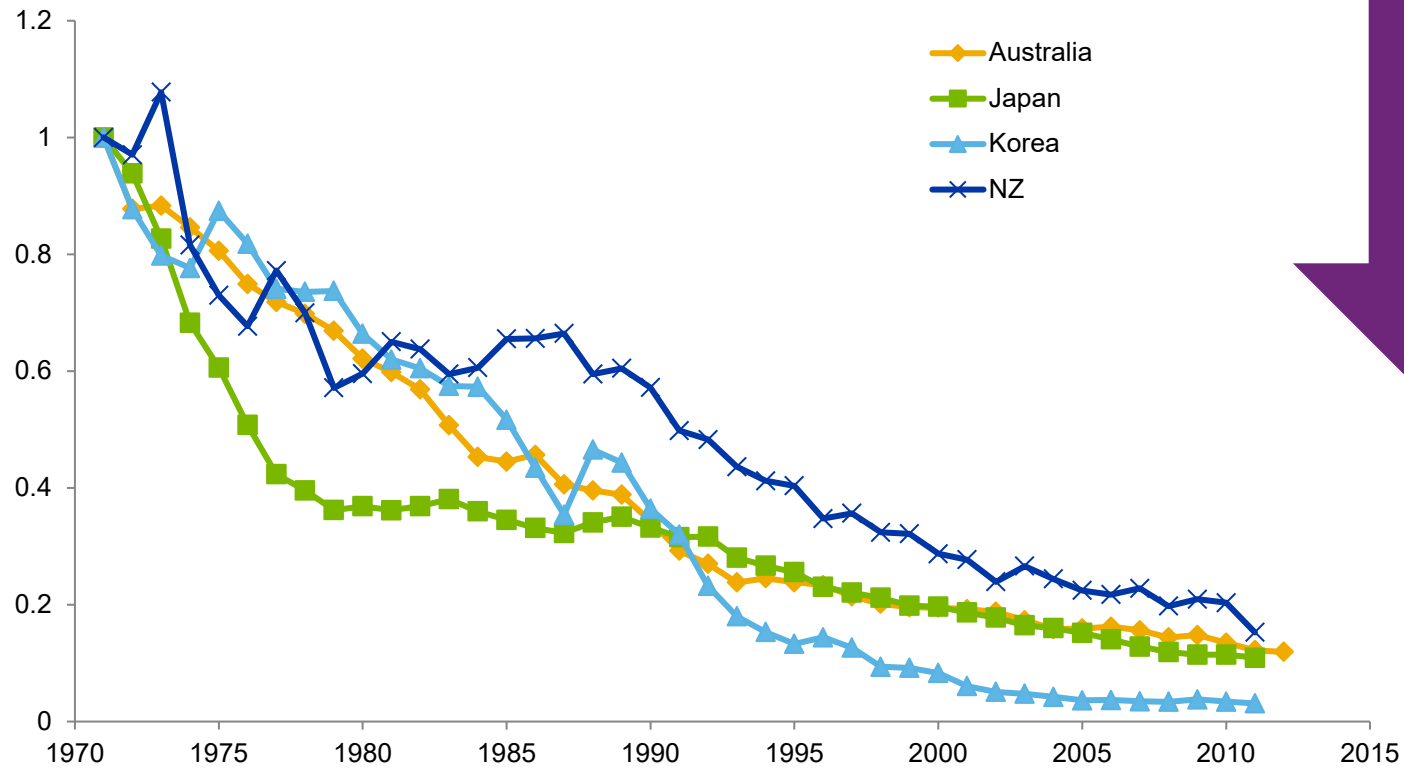
European motor injuries down 42% since 2000

EU Country Road Injuries
per 100K vehicles, indexed 2000=100



APAC road fatalities per 100m vehicle miles travelled

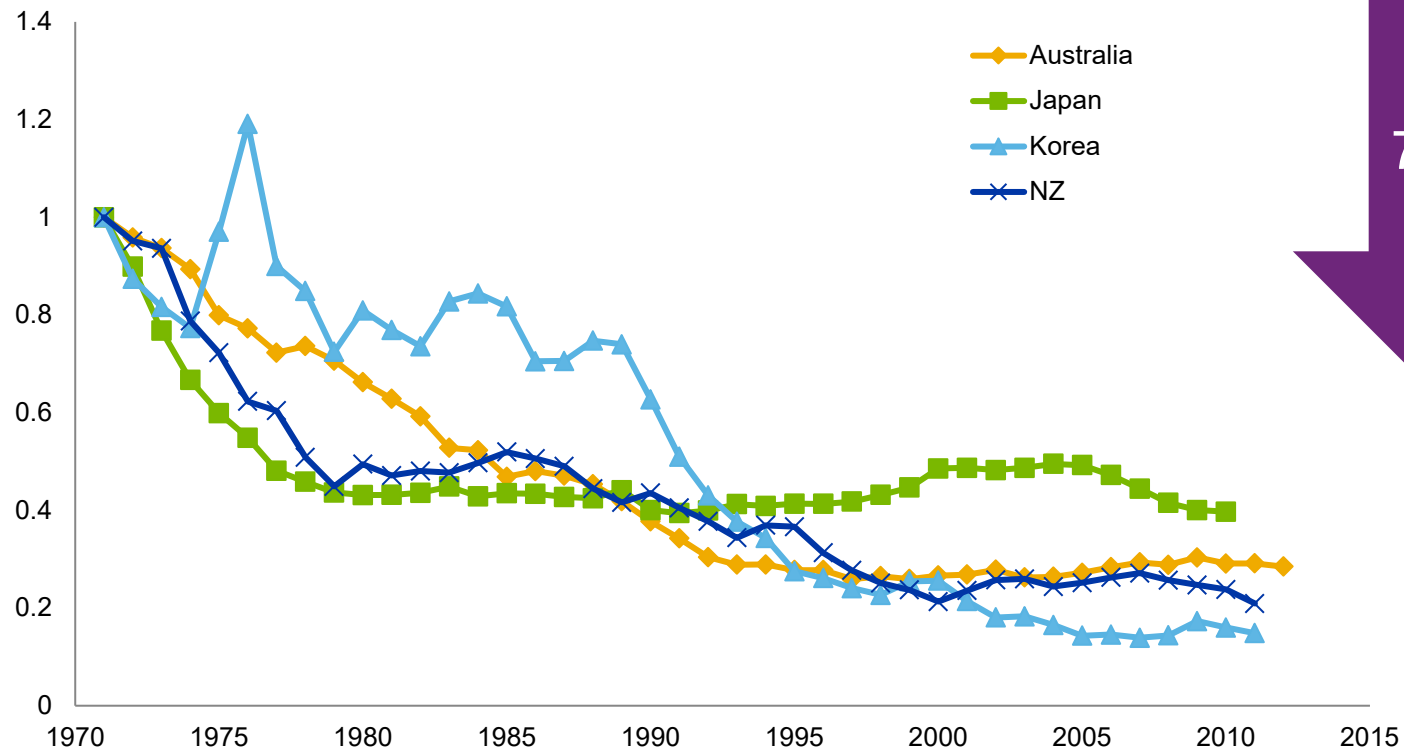
Road Fatalities Per 100M Vehicle Miles Travelled Indexed, 1971=1.0



APAC road injuries per 100m vehicle miles travelled

Road Injuries Per 100M Vehicle Miles Travelled

Indexed, 1971 = 1.0

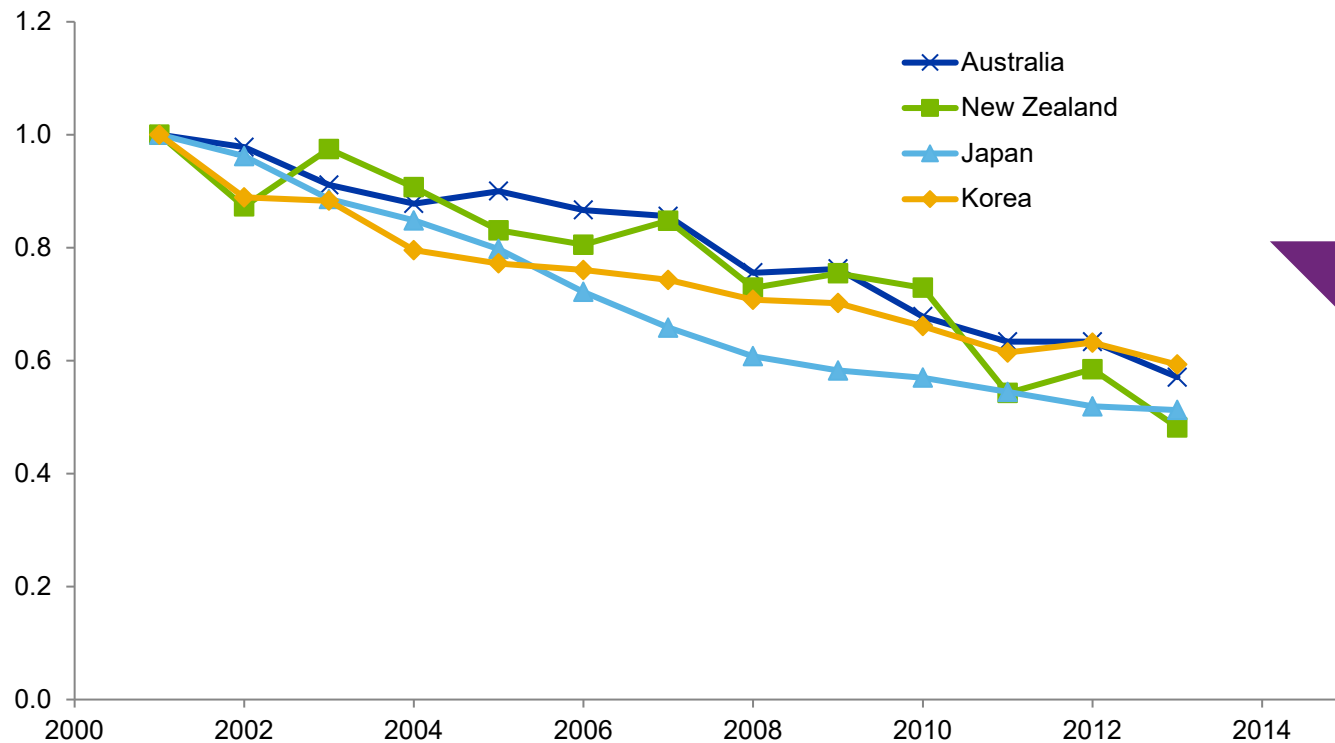


77%



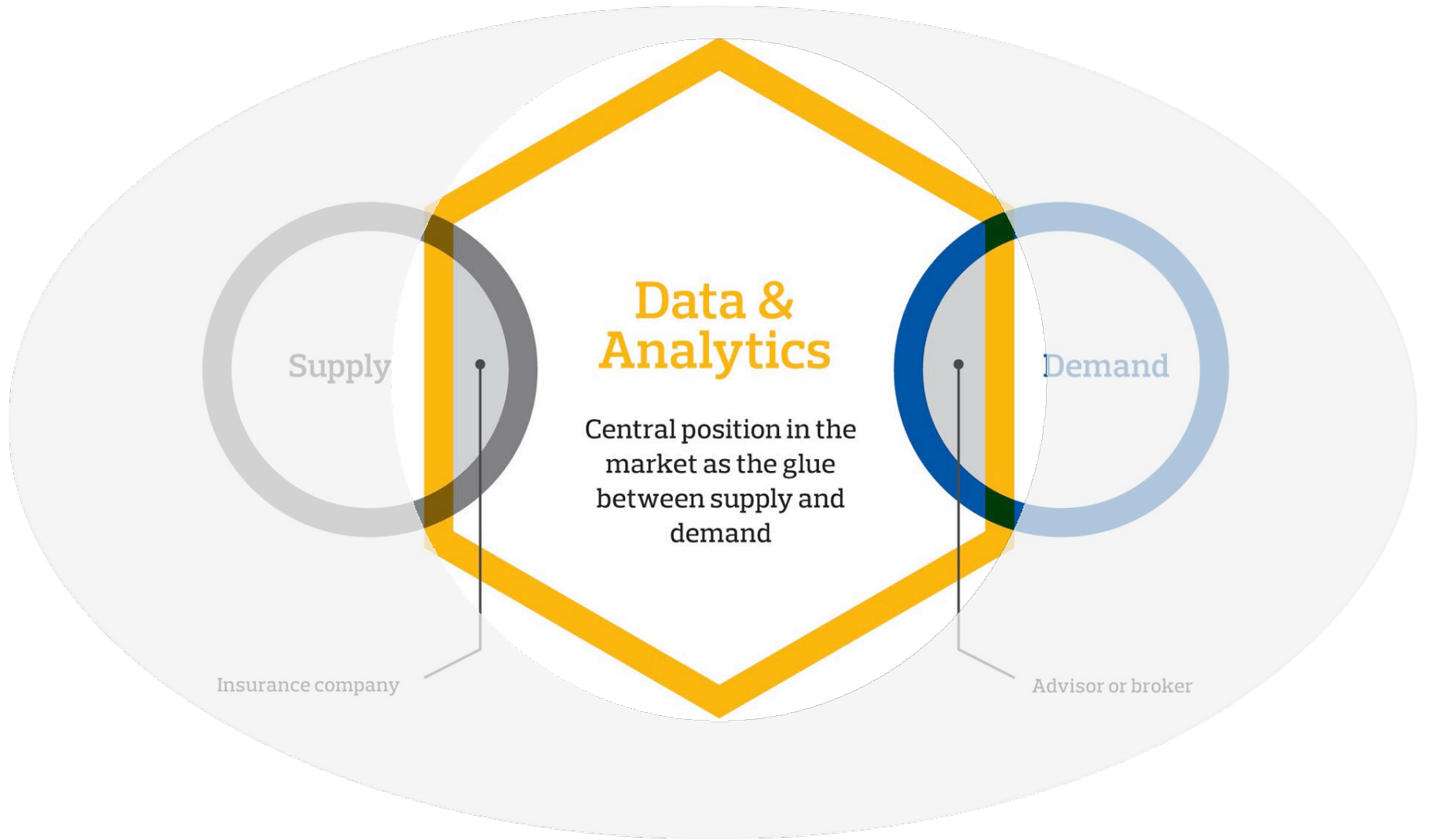
APAC road fatalities per 100,000 population since 2001

Road Fatalities Per 100,000 Population
Indexed, 2001 = 1.0



40%





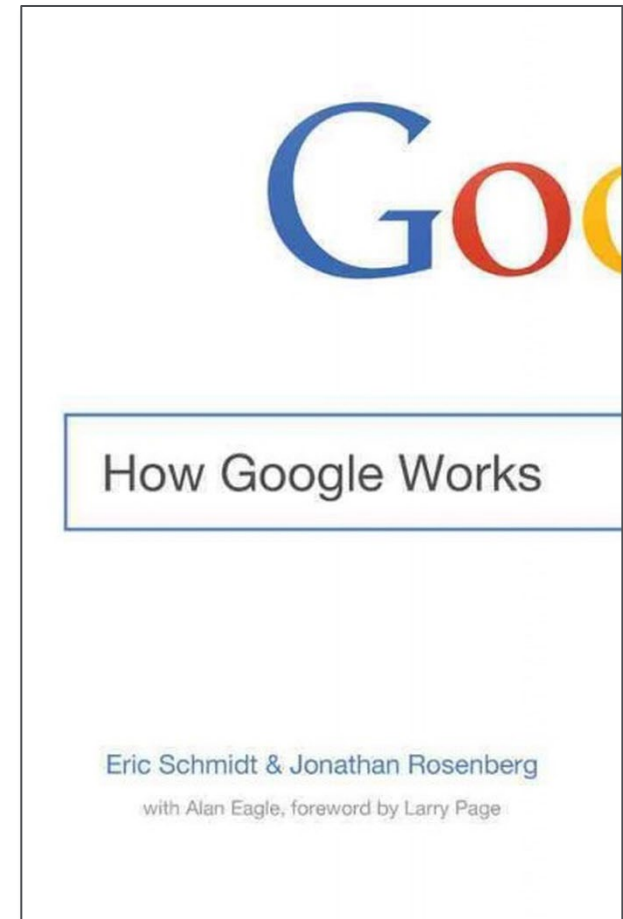
Technology, Big Data, & analytics are changing everything

Features of the new world

- Cheap or free data, free distribution and free duplication
- Mobil connectivity, location aware
- Cheap and scalable cloud computing

Product excellence is paramount, not

- Control of information
- Stranglehold on distribution
- Overwhelming market power
- Vested interest



- Success = “10X” a product...not 10% growth

Can the old value chain produce new ideas?

“Advocates of the strategy calculate that, by providing a **better service** than incumbents, and by portraying their critics as defenders of **vested interests**, they can **mobilize public opinion and get the rules changed**”

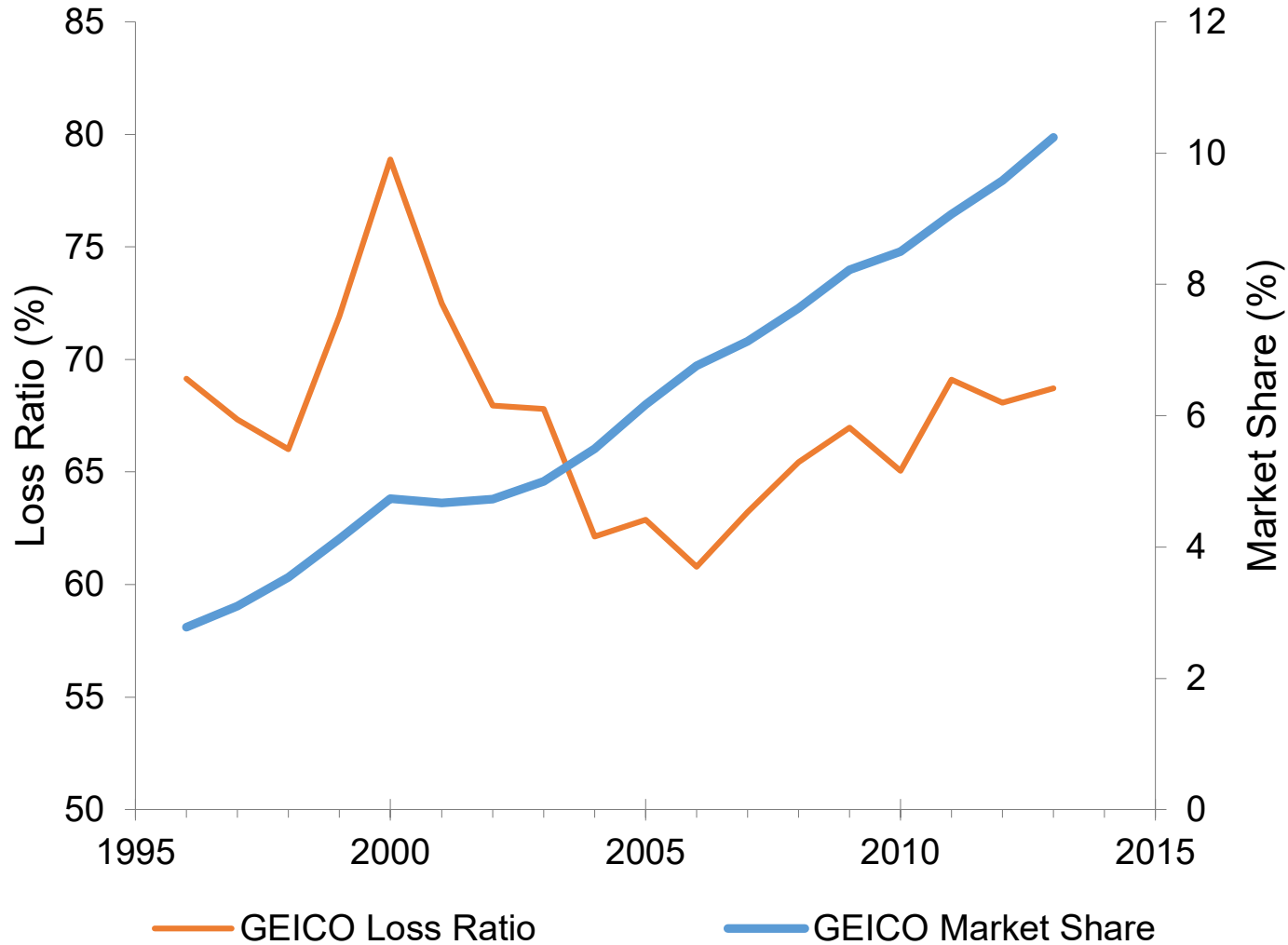
“**A striking number of innovative companies have business models that flout the law**”

The Economist
May 2nd 2015

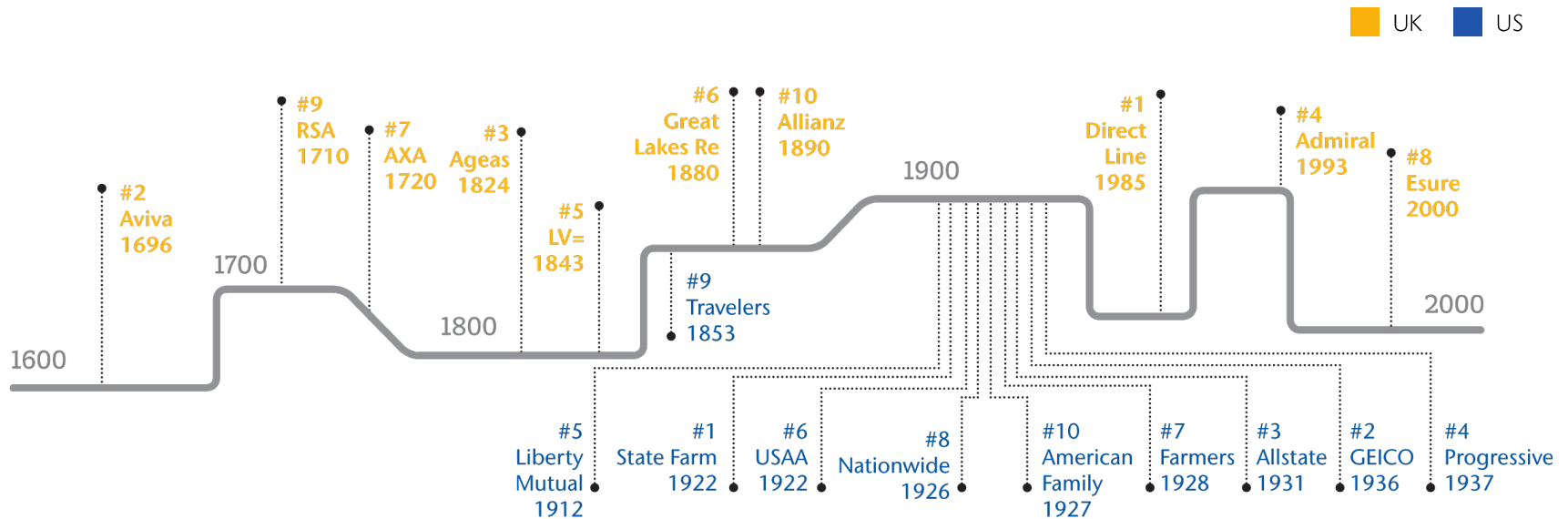


US auto market, 1996-2013

GEICO becomes #2 ranked carrier



Founding dates of top ten motor writers: UK and US



- Two of the top four UK motor writers were founded since 1985
- In contrast, all of the top 10 US writers were founded before 1940
- Speed of change indicates that the industry is capable of moving quickly

Customization: personalize the service and disaggregate the risk pool



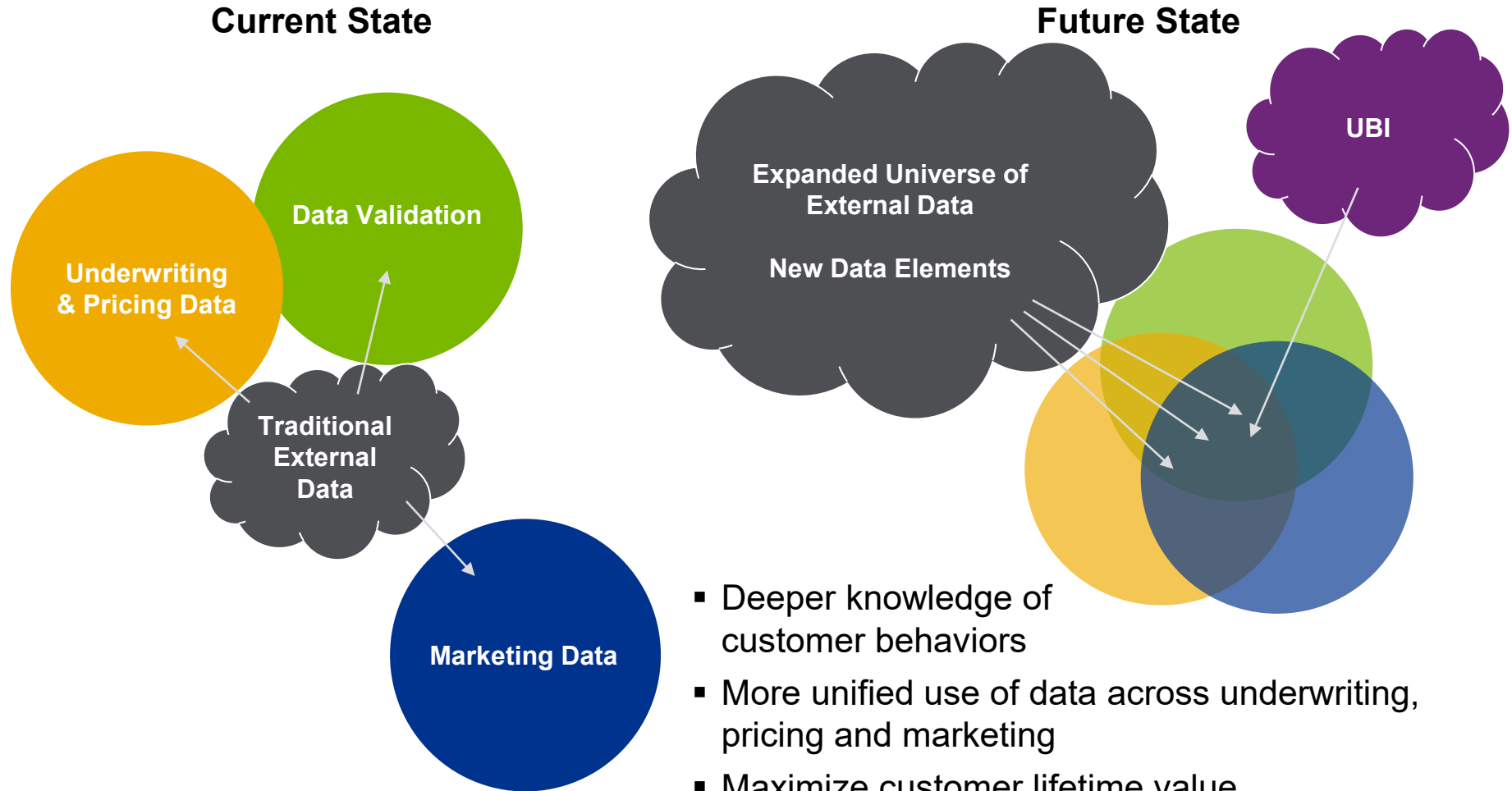
Customized
Service

Veracity
Anti-Fraud

Personalized
Coverage








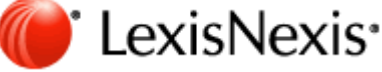


































Customized
Pricing

Customization: Aon Benfield predictive data streams project



- Deeper knowledge of customer behaviors
- More unified use of data across underwriting, pricing and marketing
- Maximize customer lifetime value
- Level the data playing field with larger carriers

Greatly expanded universe of external data providers

Traditional Insurance Data Providers	AB Uncovers Broad Universe of Potential New Insurance Data Providers
         	                               

Growth outside traditional insurance

1. Existing risk

The shrinking risk transfer market

2. Grow emerging risk

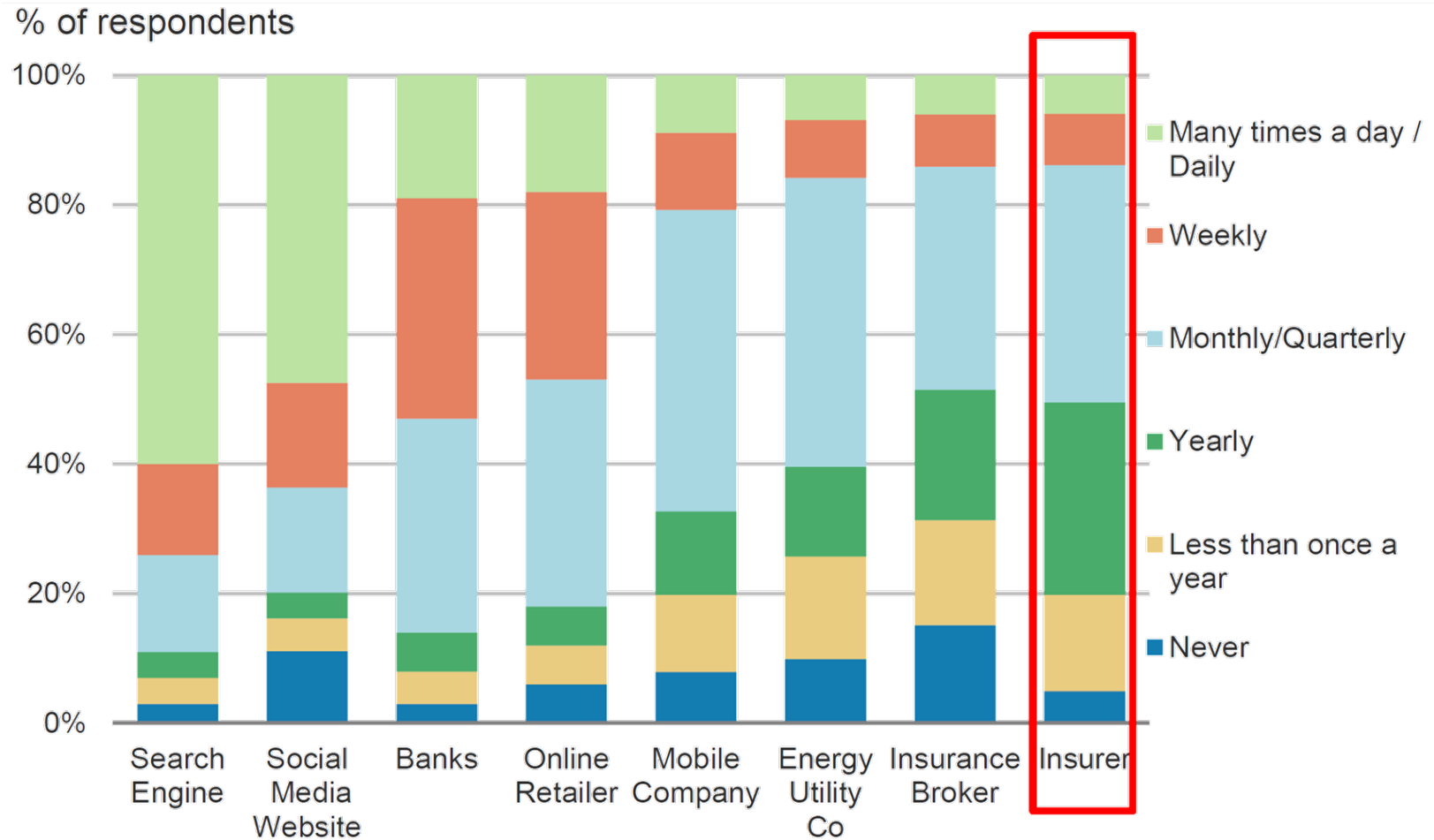
- US mortgage credit
- Cyber
- Reputation and brand
- Microinsurance
- Corporate liability
- Sharing economy
- Terrorism

3. Expand in adjacent products & services

- Risk design
- Risk feedback
- Behavior coaching
- Security



Insurance customer interactions: lacking quantity...



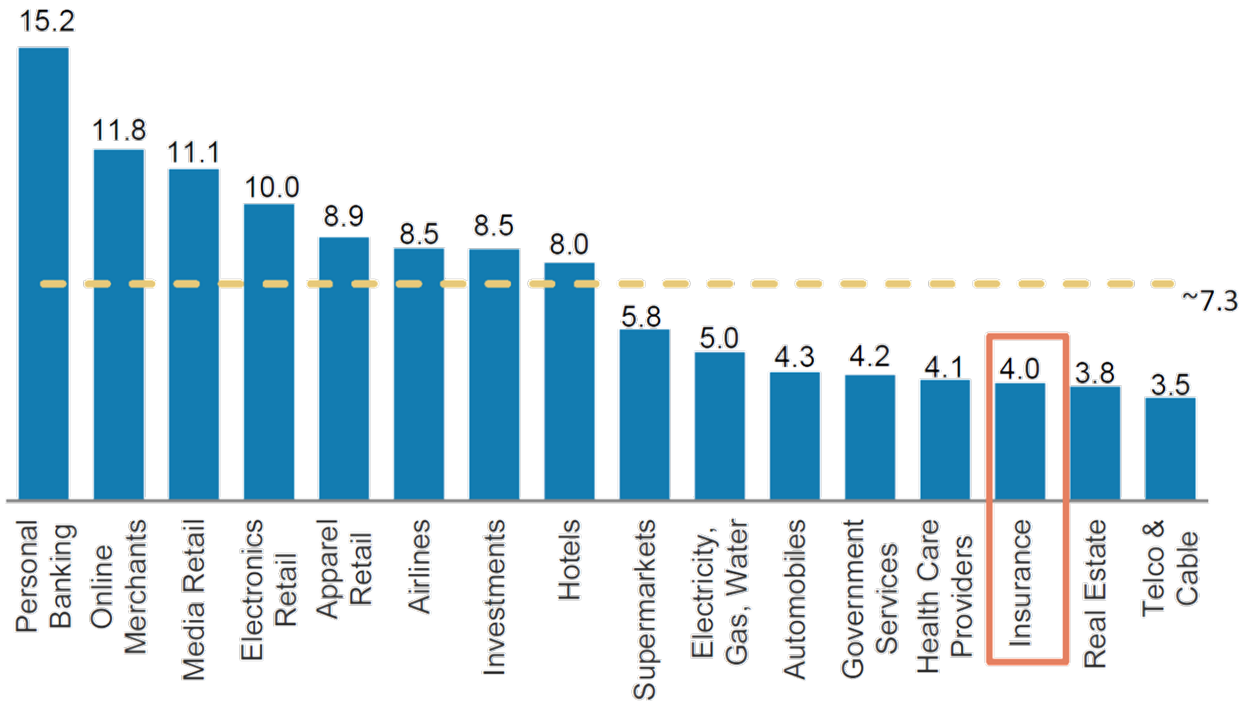
Source: Morgan Stanley/BCG Global Consumer Survey 2014, BCG e-intensity index

...and quality

Insurance online experience lags other industries

Consumer satisfaction with online experience, by industry

Relative satisfaction utility score



Source: BCG digital satisfaction survey March 2013, Morgan Stanley Research.

Note: Relative satisfaction utility score based on MaxDiff technique: consumers distributed 100 utility points across segments according to how positive they felt their online experiences were.

Behavior monitoring and risk-feedback, stable, recurring non-risk income...and a reason for regular customers interact



“Safety, control and protection for themselves, their loved ones, their homes and businesses”



IP Access Control



Fire Alarms



Intrusion Alarms



Event Management



Energy Management

Connected world
>\$70B market by 2020

Only 19% market penetration today

Selling security...just like insurers

Target same customer behavioral traits

Ten trends will define the next ten years

Ten trends will define the next ten years

<p>1. The Big Data technology connected world revolution will continue to grow</p>	<p>2. We will collect more detailed underwriting data</p>	<p>3. We will continue to improve risk management</p>	<p>4. Existing risk lines will continue to shrink relative to GDP</p>	<p>8. Capital will continue to be plentiful</p>	<p>9. New players will drive creative destruction</p>
	<p>5. We will collect more loss experience</p>	<p>6. We will demand more effective risk management</p>	<p>7. New opportunities will arise from emerging risks</p>		<p>10. Tomorrow's winners will provide holistic risk management services</p>

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Thank you!

Contact information



Stephen Mildenhall

Global Chief Executive Officer of Analytics

stephen.mildenhall@aon.com

Singapore +65 6872 7668

US +1 312 381 5880

Stephen Mildenhall is global CEO of Analytics for Aon. He leads the Aon Center for Innovation and Analytics in Singapore, which leverages Aon's data assets to provide analytically driven solutions for clients across all of Aon's businesses.

Steve joined Aon in 2003. Prior to Aon, he held various actuarial positions at Kemper Insurance, CNA Re Facultative and CNA Personal Lines, all in Chicago. He started in the insurance industry in 1992.

Steve is a Fellow of the Casualty Actuarial Society, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries. He is a Chartered Enterprise Risk Analyst. He received his Masters and PhD degrees in Mathematics from the University of Chicago, and a BSc in Mathematics from the University of Warwick in England.

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