Where Is The Insurance Cycle?

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TL;DR

- Cycle = **predictable** up and down of market pricing and capacity
- Traditional cycle **never existed**
- Volatility = **un**predictable up and down of market pricing and capacity
- Volatility, obviously, does exist
- Underwriting volatility driven by supply-side considerations
  - Pricing techniques
  - Reaction to changing view of risk
  - Regulatory and structural considerations
  - Capital: adequacy and view of adequacy
- Changes in last decade have **lowered** but **not eliminated** volatility

The Traditional Underwriting Cycle

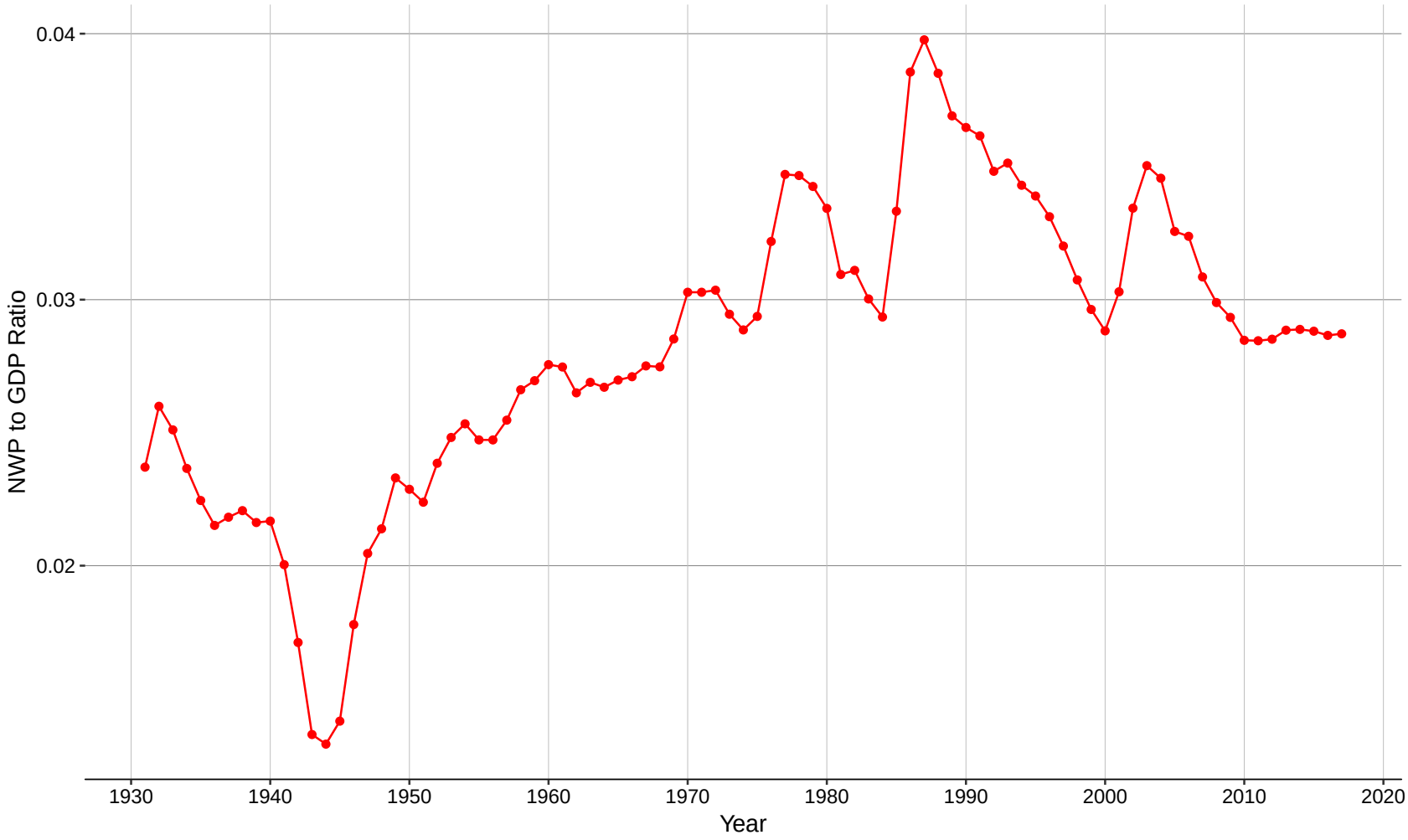
Underwriting cycle: a **predictable** pattern of hard and soft markets

Phase	**Pricing**	**Reserving**	**Profitability**	**Capacity**
Soft	Stable $\downarrow$	Favorable	Stable $\downarrow$	Plentiful
Hard	Rapid $\uparrow$	Unfavorable	Poor	Tight

Traditional cycle implies more than just market ups & downs

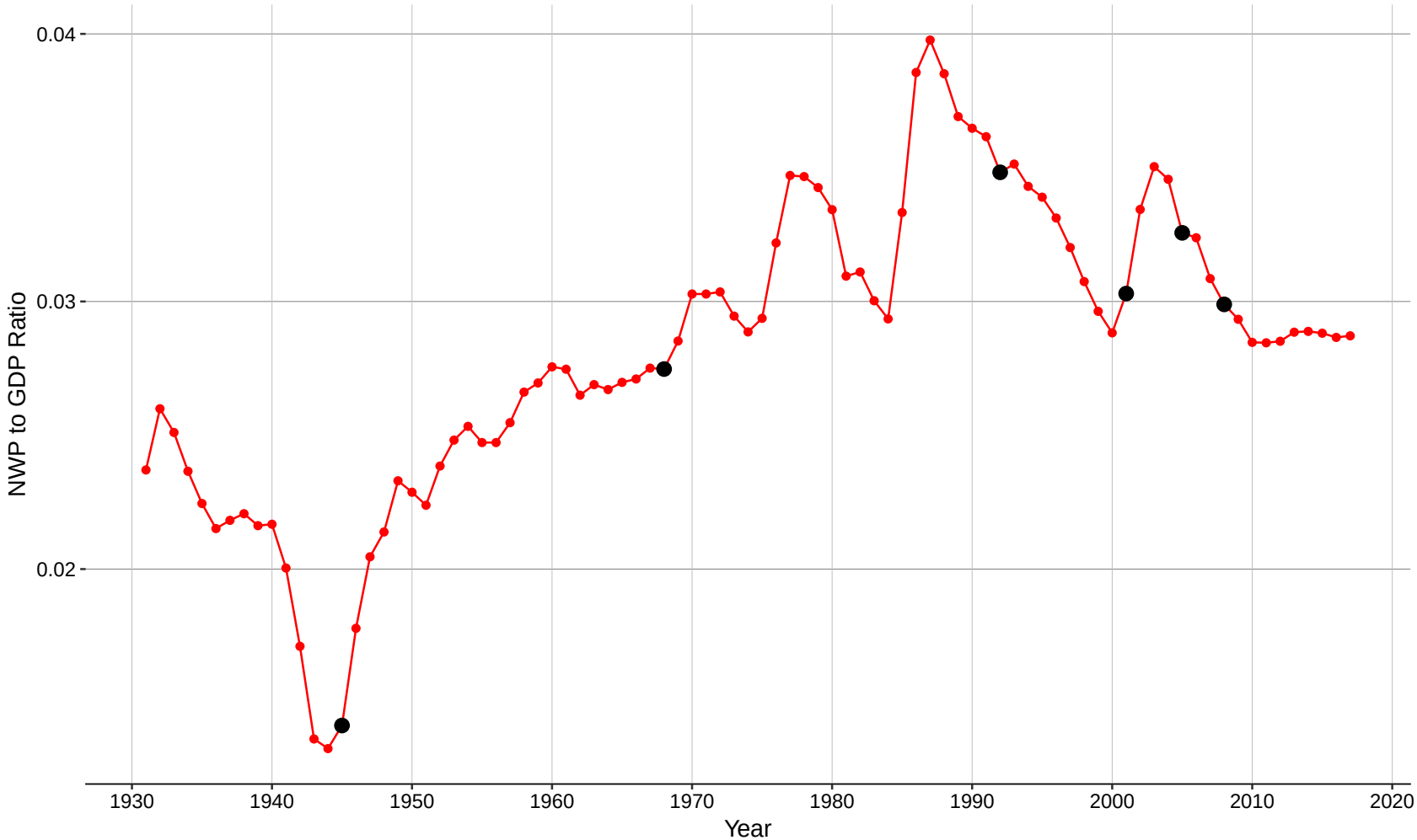
- **Predictable** process
- Implication underwriters can **profit** from and **manage** the cycle
- Implies a market **inefficiency**

Premium to GDP Ratio Since 1931



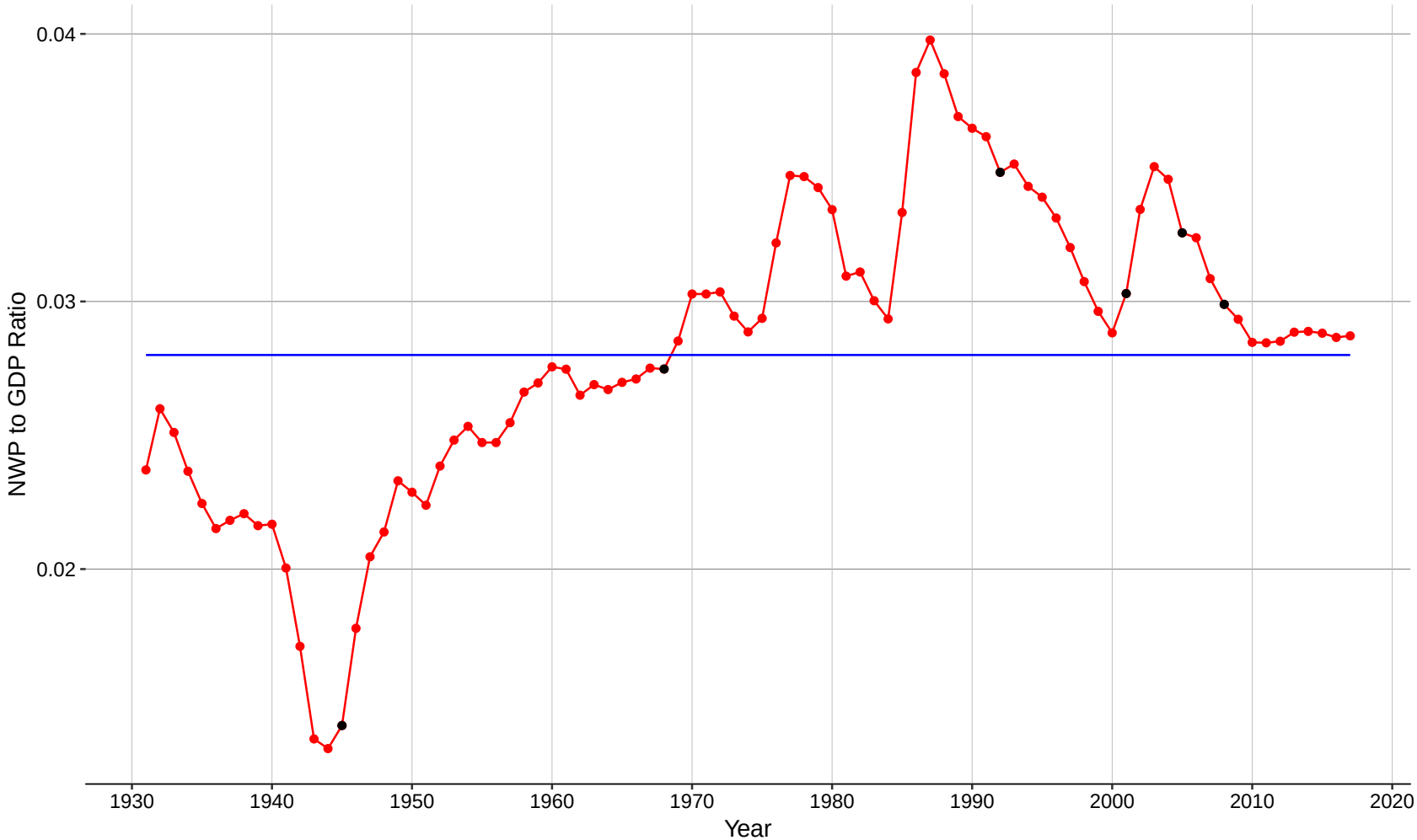
Nominal net written premium from A. M. Best; nominal GDP from FRED

Premium to GDP Ratio Since 1931



Nominal net written premium from A. M. Best; nominal GDP from FRED

Premium to GDP Ratio: Sea Change in 1968



1968 Watershed?

Then

. . . the expanding E&O market. . . As plaintiffs' lawyers grew **increasingly aggressive**, insurance policies, in tandem, became **more creative**. . . . if a big lawsuit arose. . . resulting in a big money judgment, underwriters at American Home, National Union, or New Hampshire would **develop insurance to cover it**.

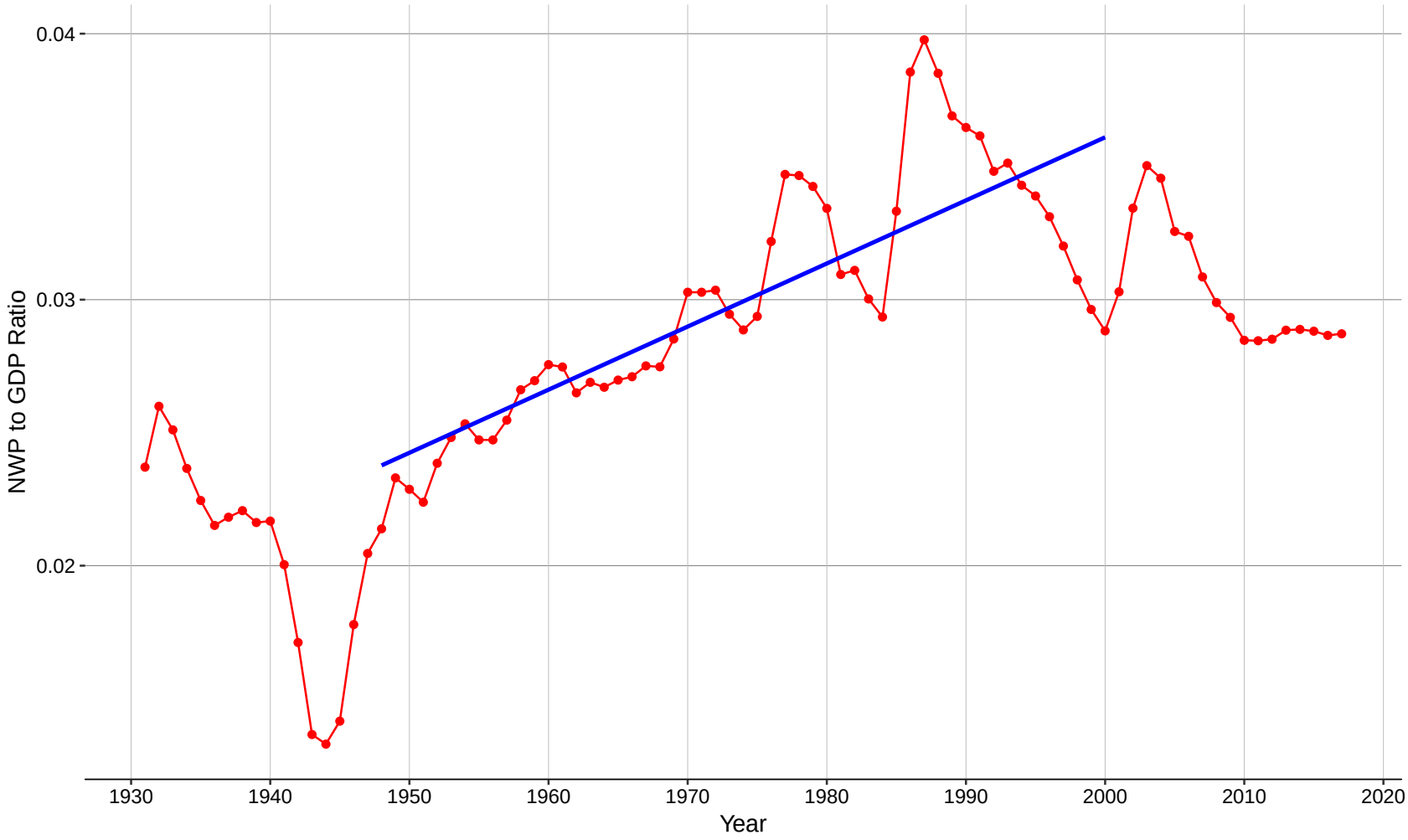
Hank Greenberg *The AIG Story* (2013)

Now

More broadly, the **excessive regulation** of the market is stifling the entrepreneurialism that has been Lloyd's hallmark. It's just gotten **too hard** to **create new products** . . . it won't be long until the day when Taylor Swift shows up to insure her legs and is turned away because the capital charge will be too high.

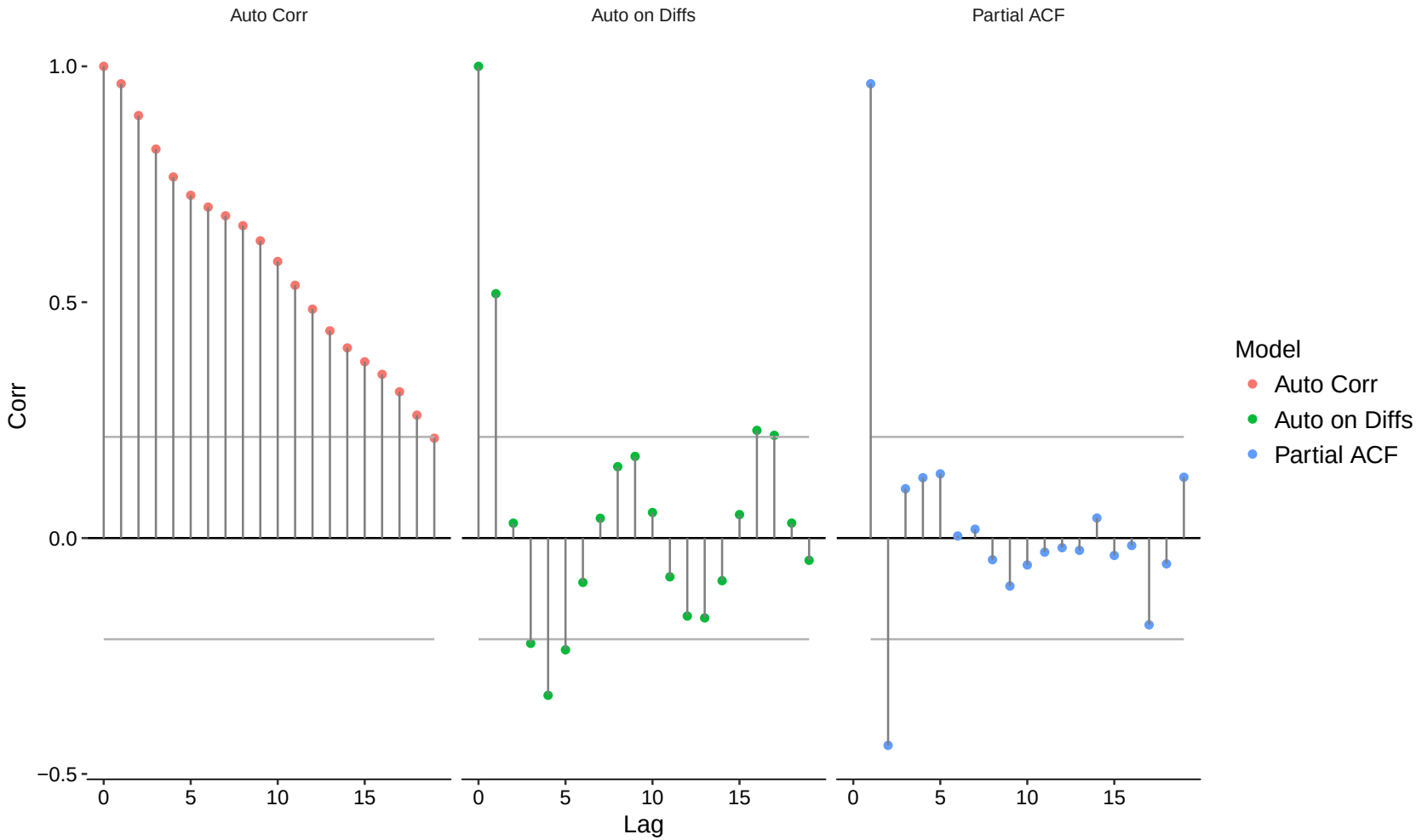
Ed Noonan, Validus Q2 2015 Earnings Conference Call

How it Began: Cycles Around Trend Line, 1950-2000

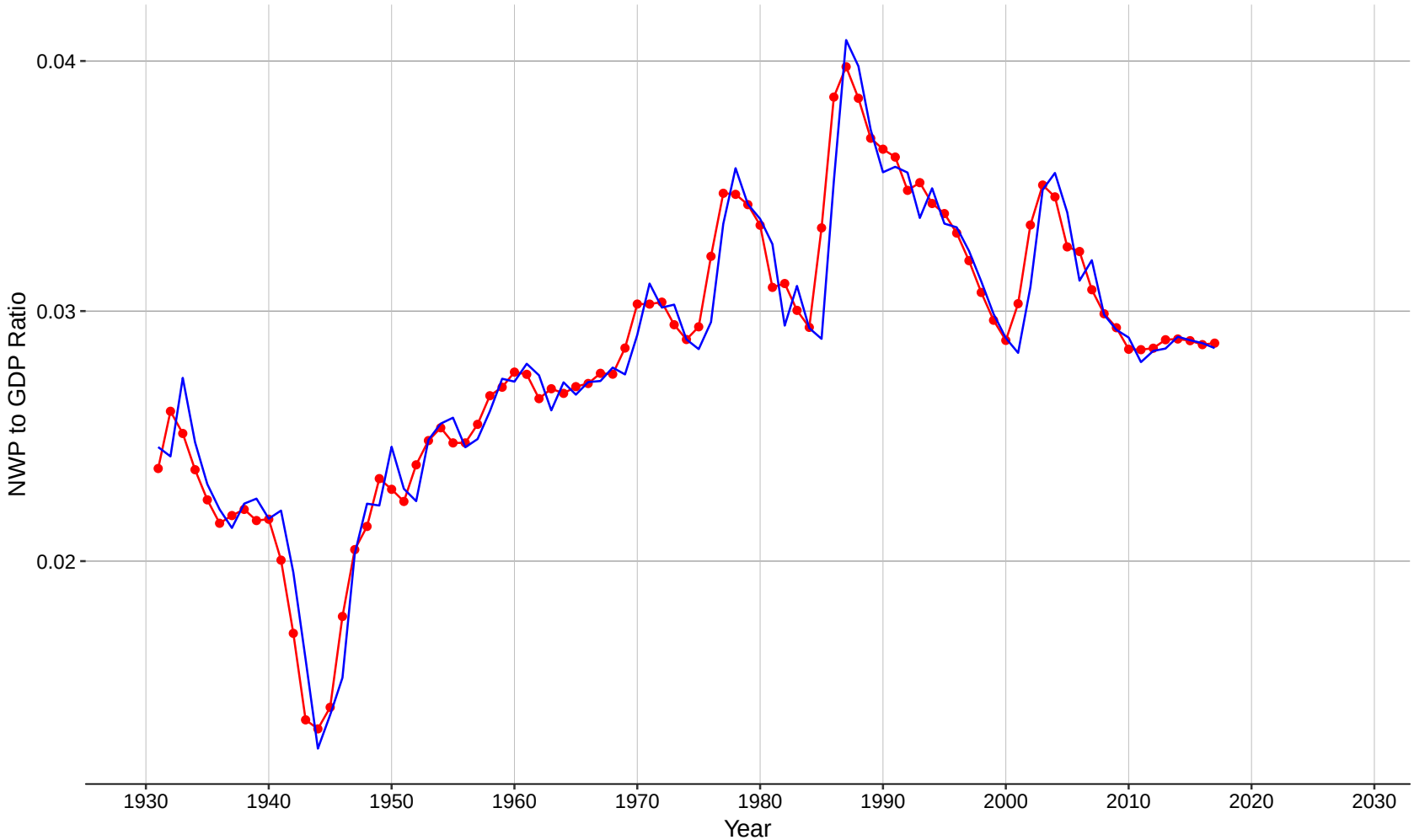


- Period of high-mass GDP!

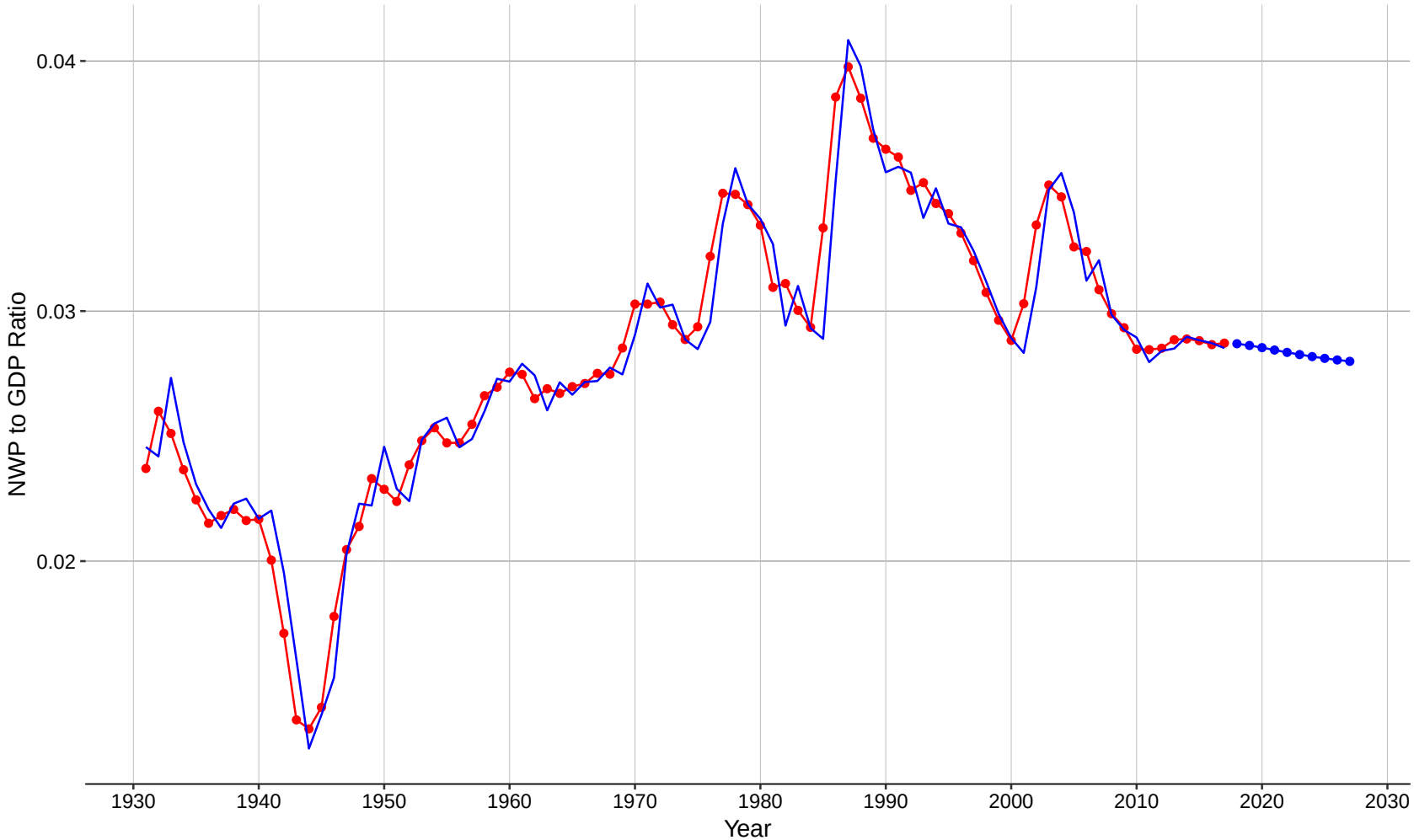
$AR(2)$ Autoregressive Time Series Indicated...



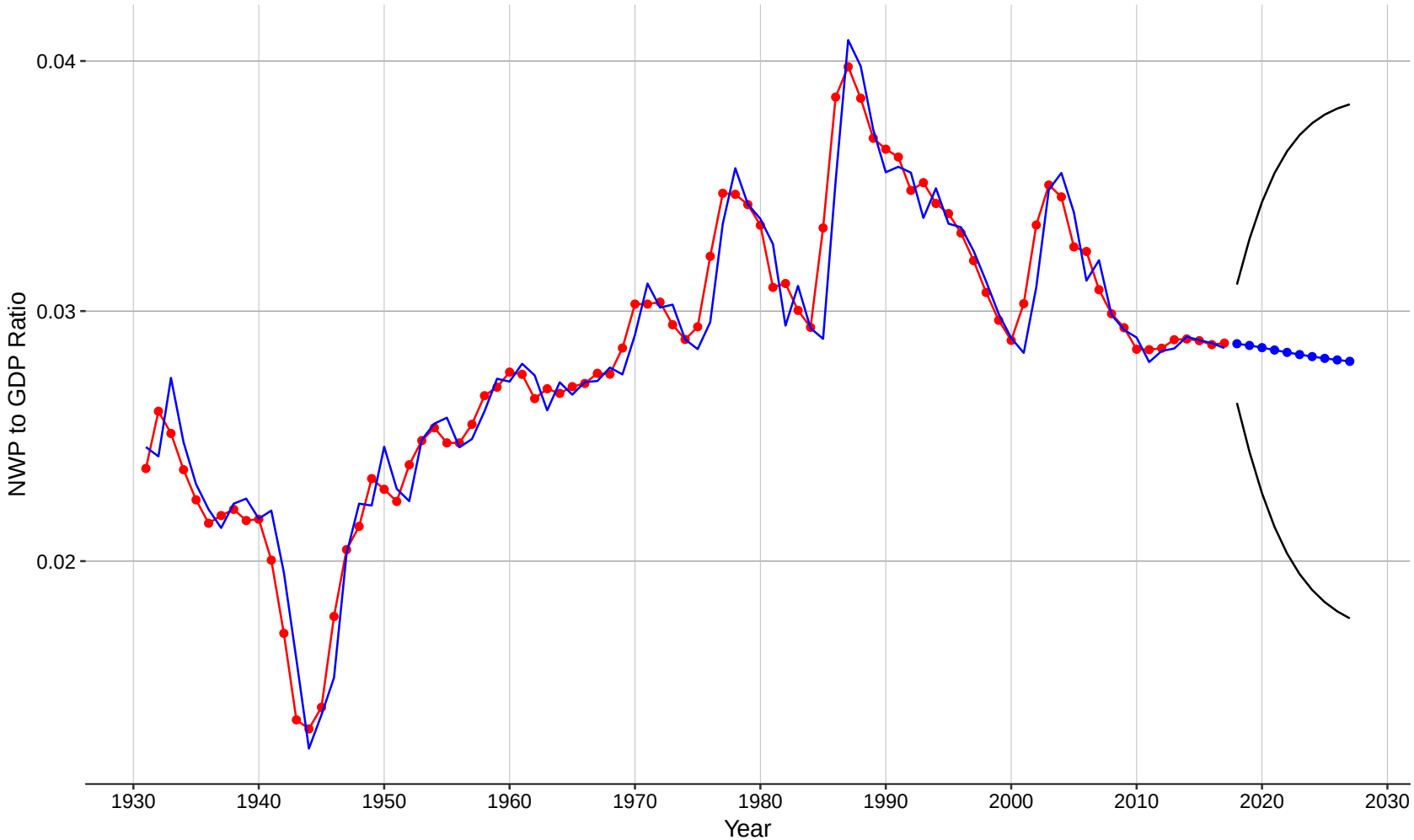
. . . and Fit Looks Great. . .



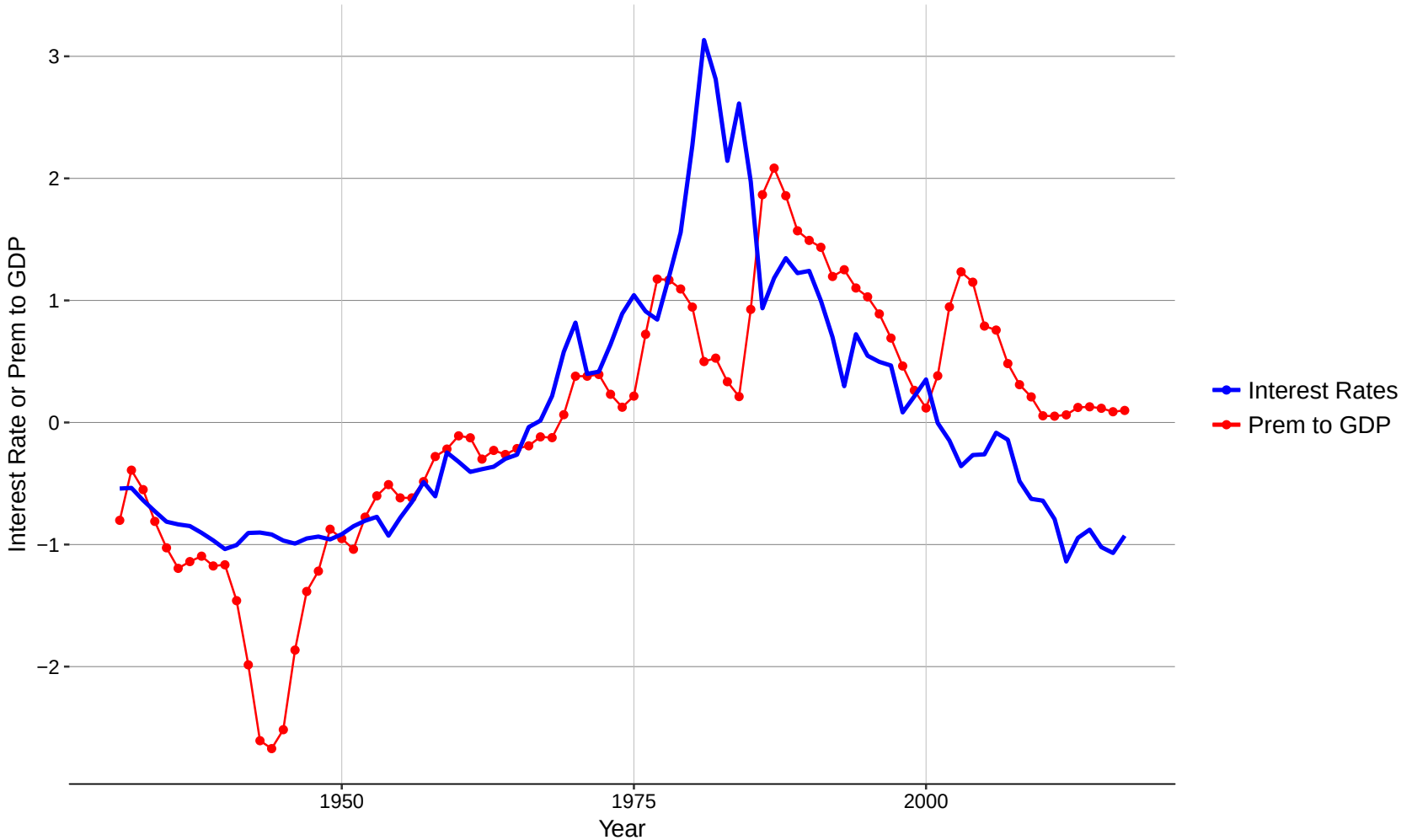
. . . but it Predicts Nothing



. . . and Approximate Confidence Intervals Not Helpful

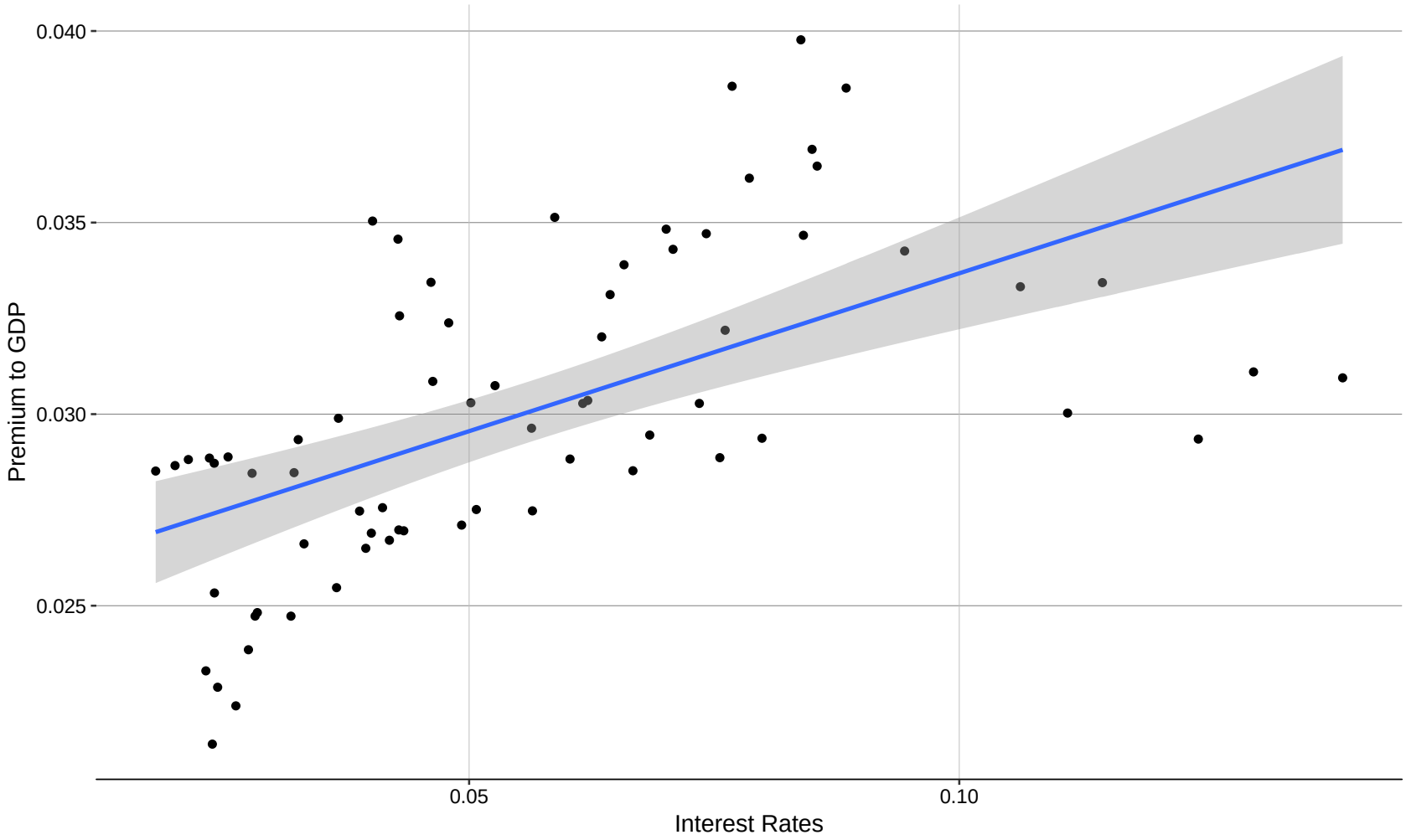


Premium to GDP Ratio Correlated With Interest Rates

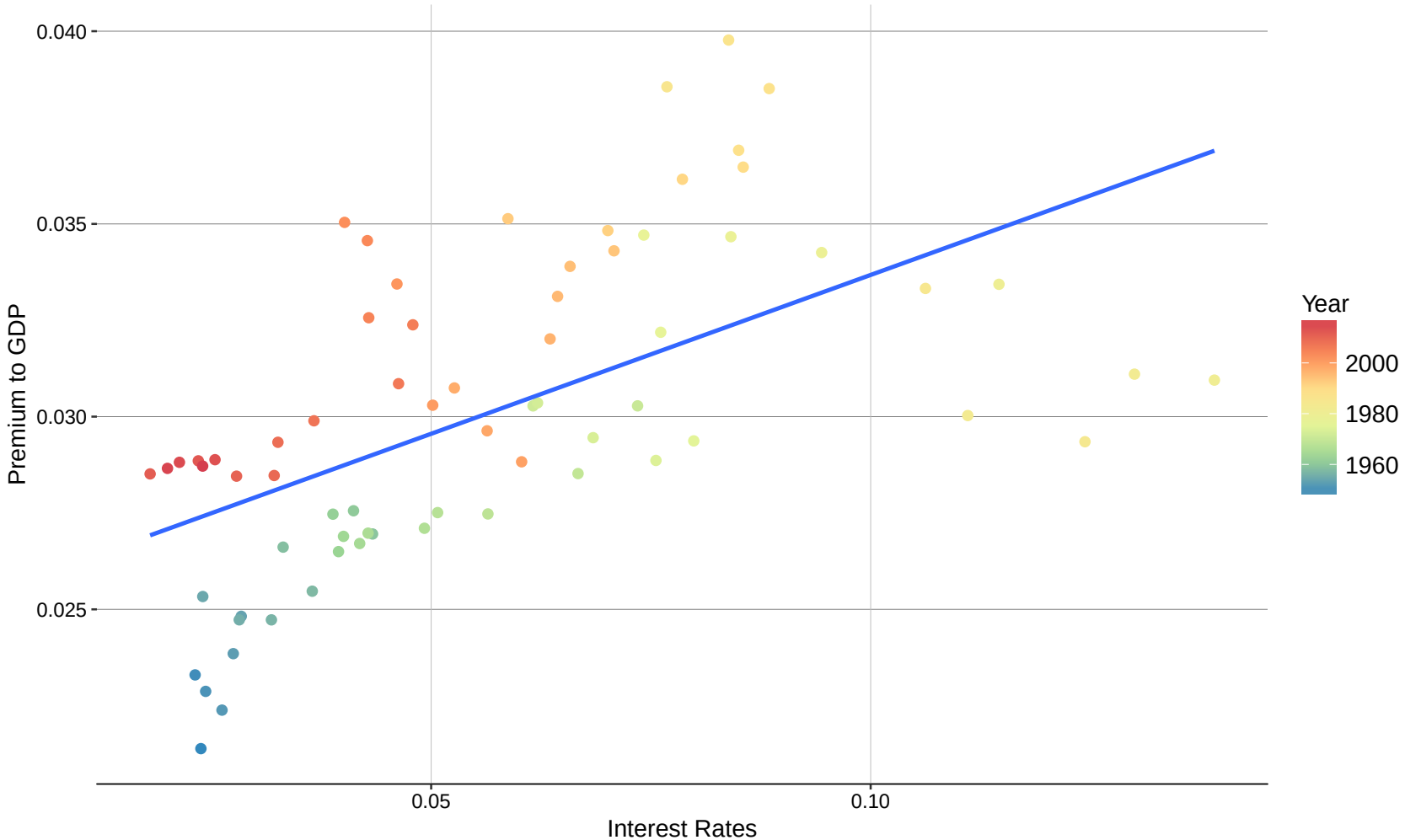


Plot of **whitened** variables: normalized to mean zero and standard deviation one

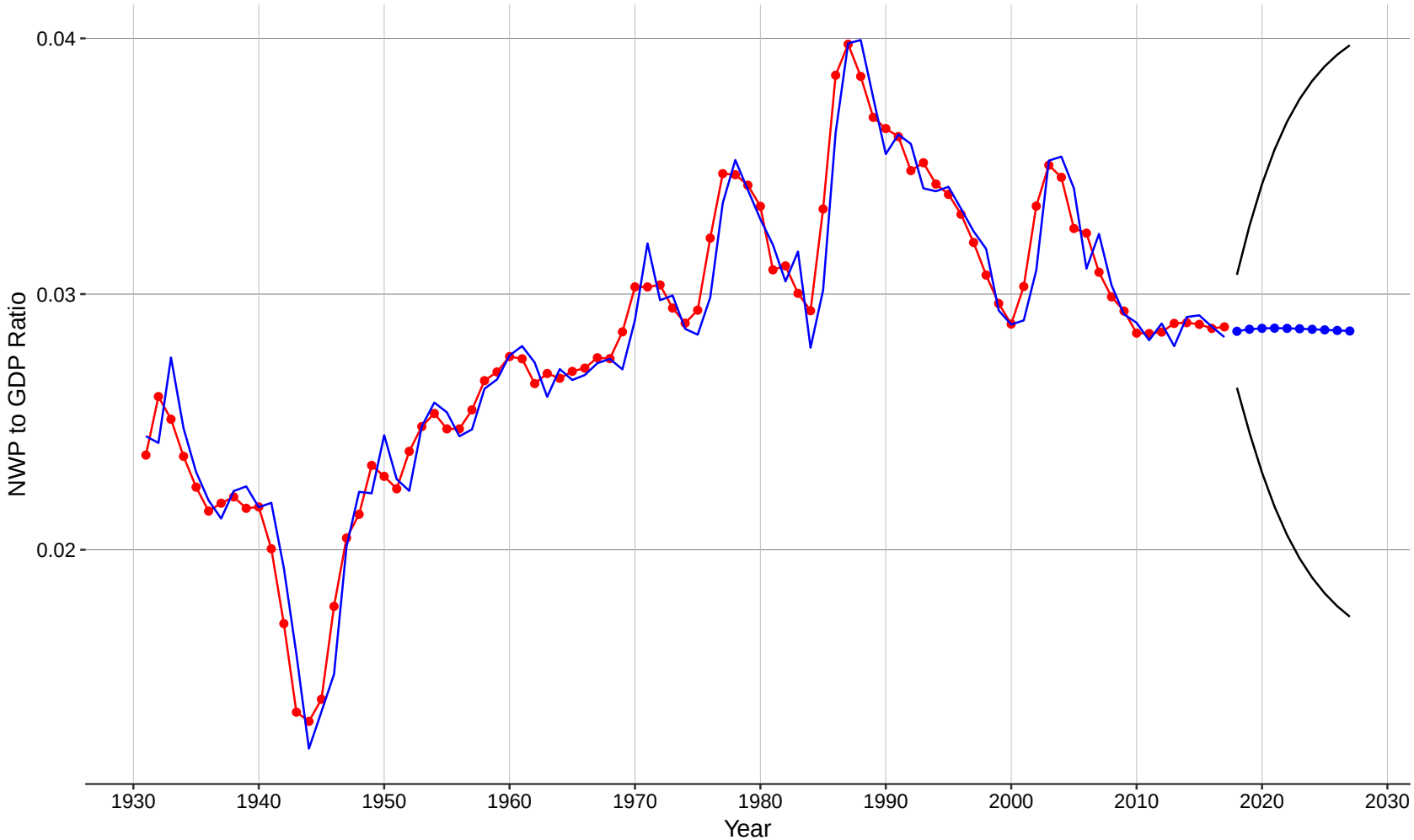
Premium to GDP vs. Interest Rates, Since WW2



Premium to GDP vs. Interest Rates, Since WW2 Colorized



Add Interest Rates to ARIMA Model: No Impact



- Assumes interest rates of 3 percent going forward
- Coefficient of interest rates is **negative**—wrong?!

Conclusions from Statistics and Academia

There is **no statistical** or **economic support** for the **existence of underwriting cycles**

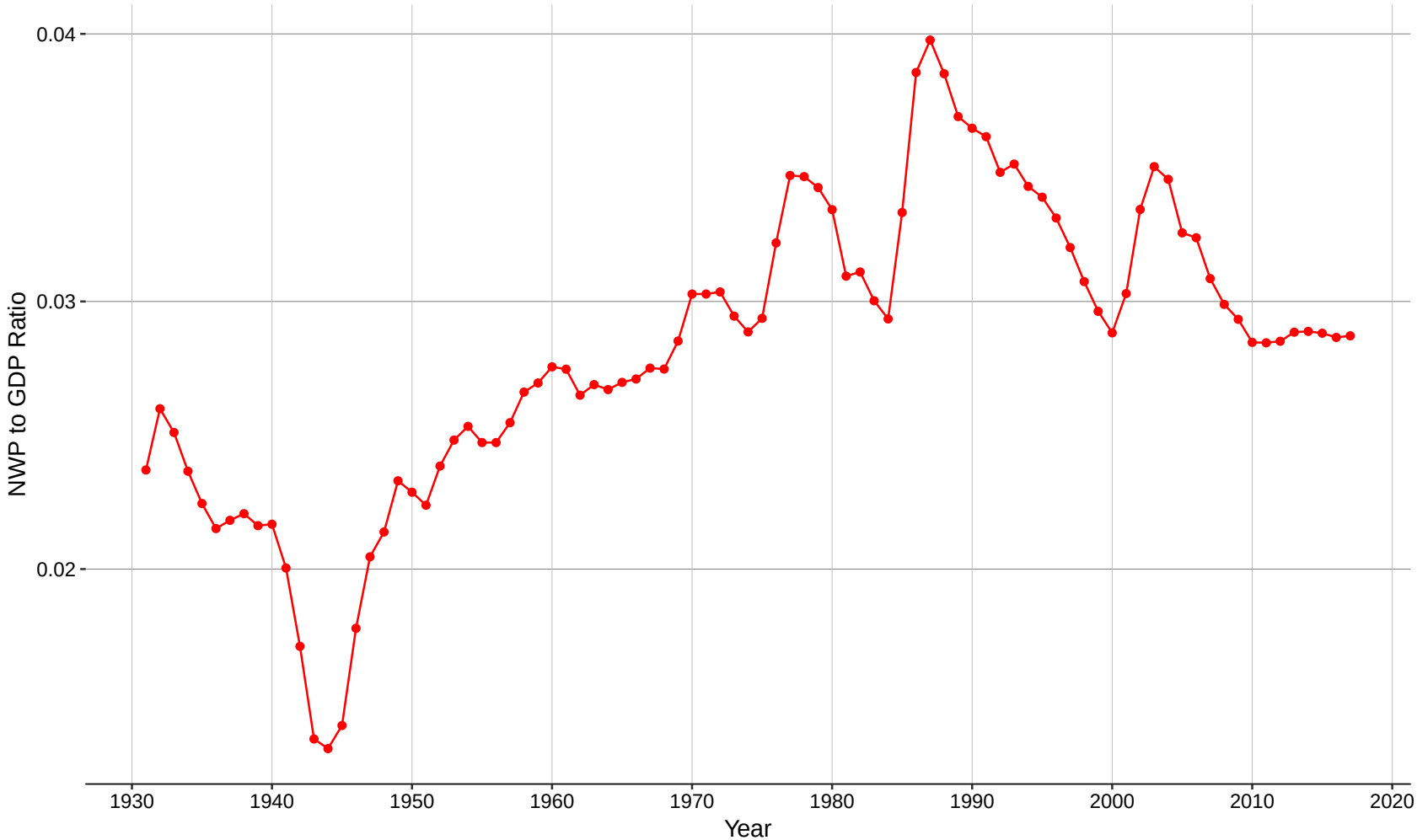
. . . profitability. . . is **not cyclical**

we observe profitability going up or down with **no meaningful pattern**

Pricing in the property and casualty insurance industry is **compatible** with a **competitive market**

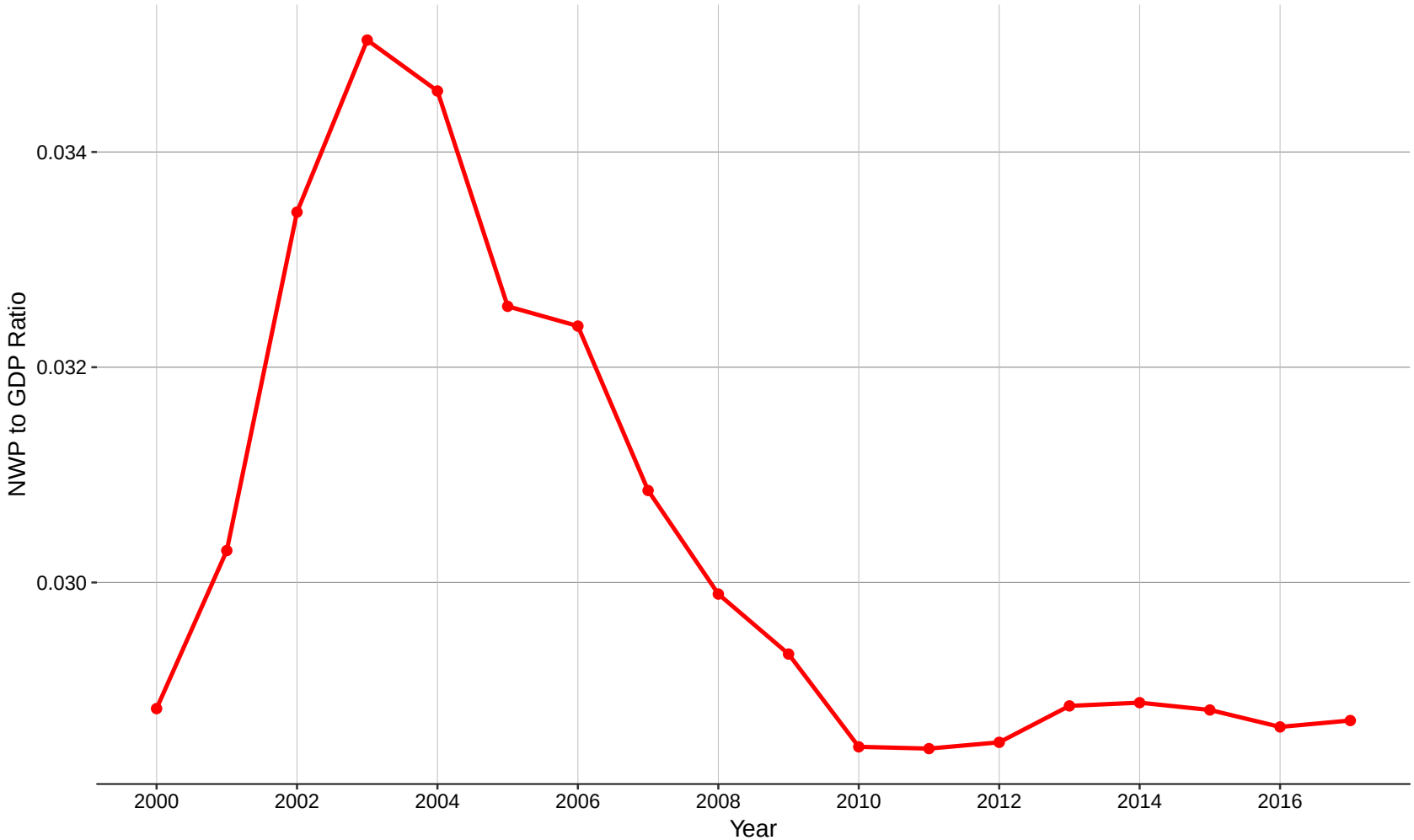
M. Martin Boyer, *Underwriting Apophenia and Cryptids: Are Cycles Statistical Figments of our Imagination?* (2012)

Where Is The Cycle?



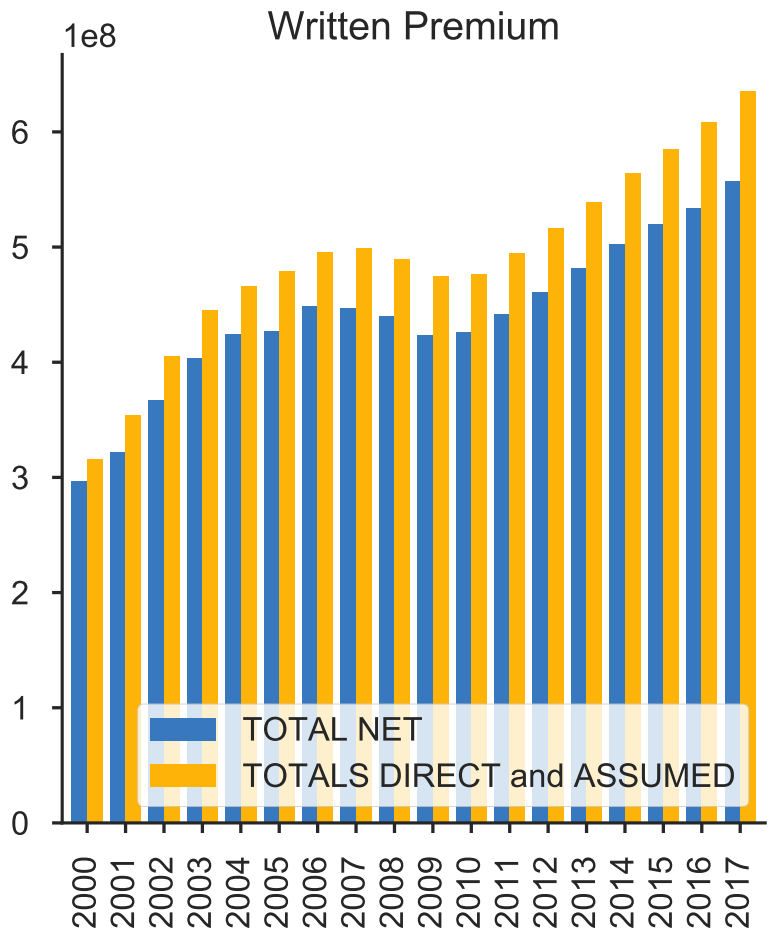
- Unusual period of **stability** since 2010

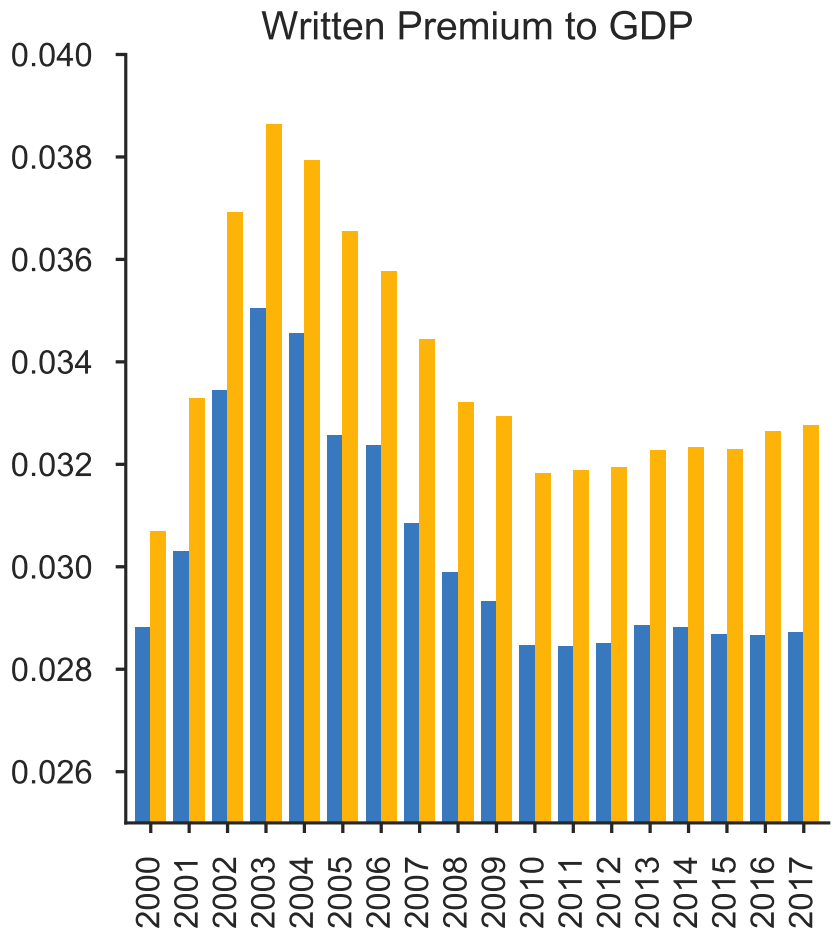
Unusual Period of Stability Since 2010



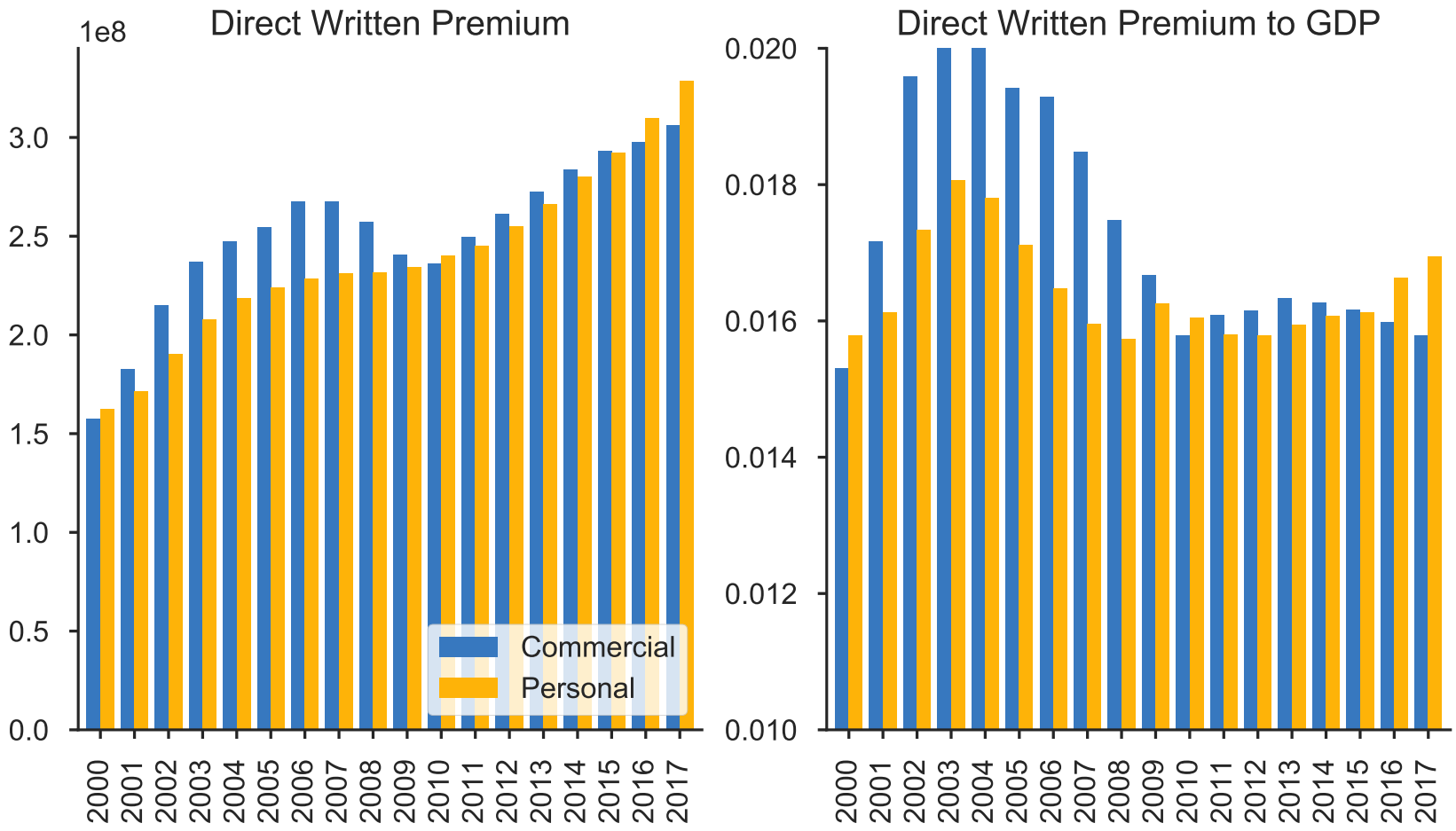
- 2000 lowest premium ratio over period 1970-2009

Underlying Turmoil? Direct vs. Net

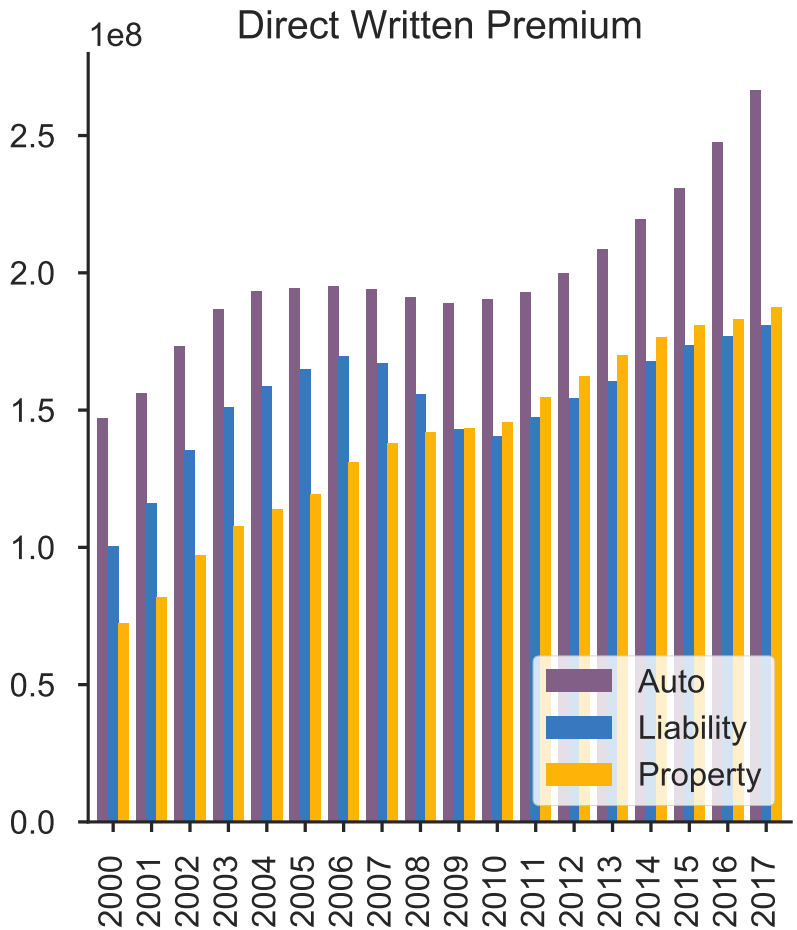


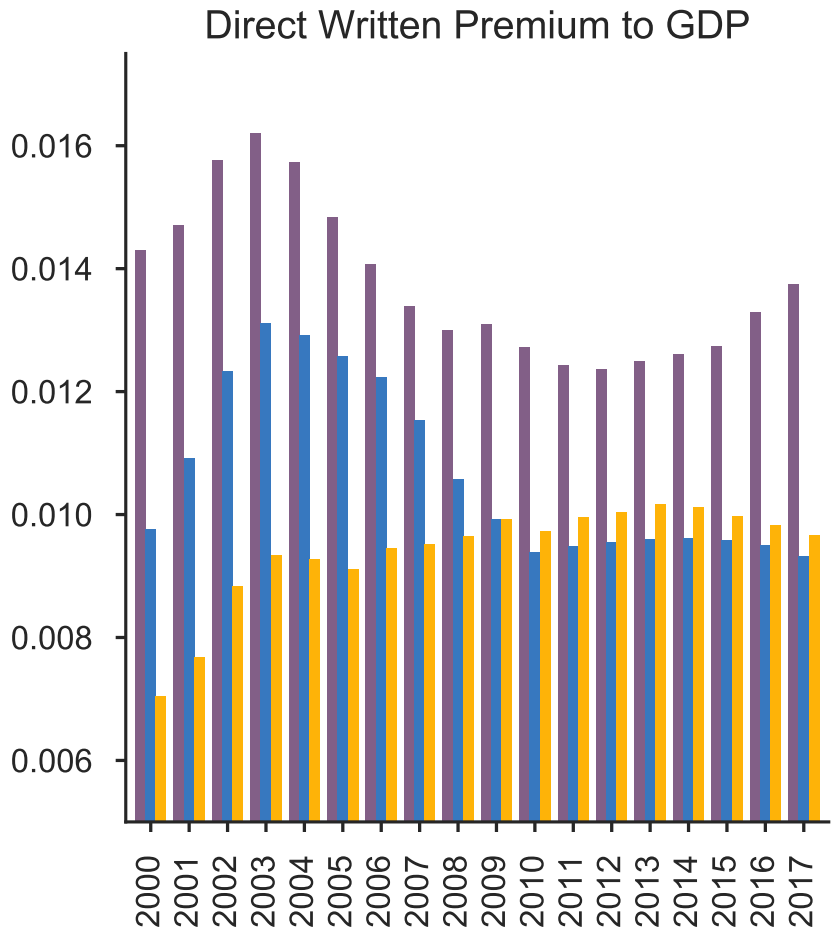


Underlying Turmoil? Personal vs. Commercial

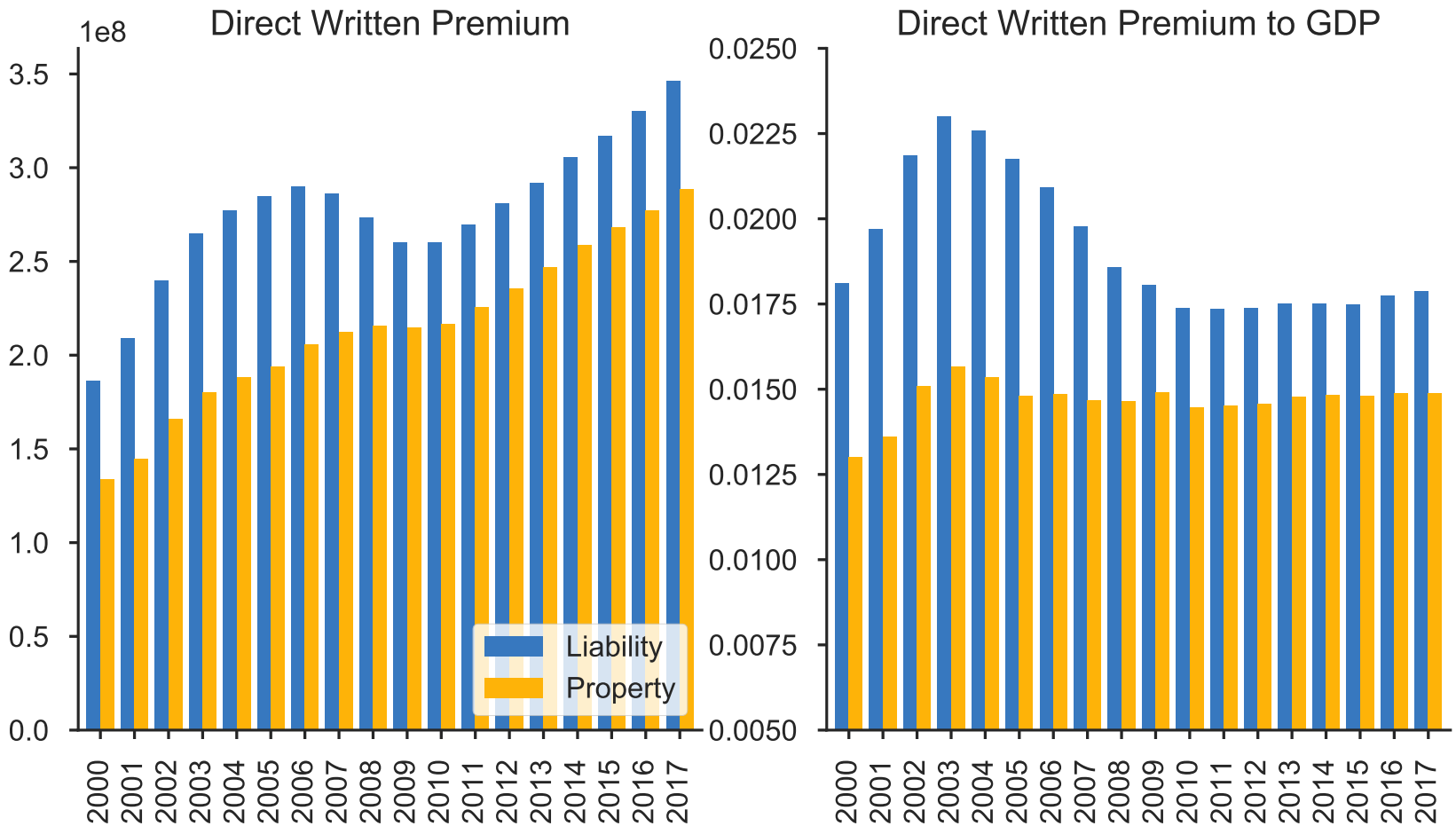


Underlying Turmoil? Property vs. Liability vs. Auto





Underlying Turmoil? Property vs. Liability



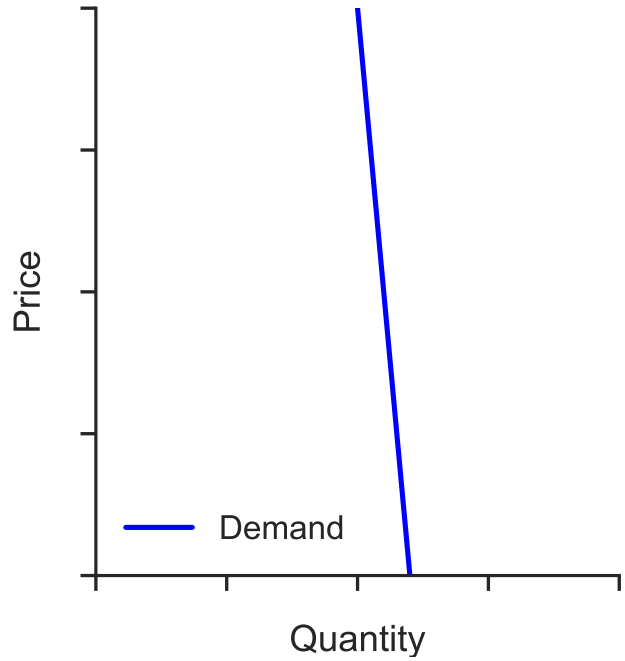
Conclusions

- You can fit an $AR(2)$ process to anything stationary
- Analysis of underlying data reveals no underlying turmoil
  - Direct and net premium to GDP ratios similar
  - Commercial lines more volatile than personal
  - Personal lines now larger than commercial lines
  - Auto large and surprisingly volatile
- Since 2010 property and liability **essentially flat** in aggregate
- Question: **What changed since late-2000s?**

Insurance Supply and Demand

Three drivers of insurance demand

- **Satisfying**: highly inelastic
- **Risk transfer**: inelastic
- **Risk financing**: elastic



Inelastic demand = **steep** demand curve: bigger price swings, smaller change in quantity demanded

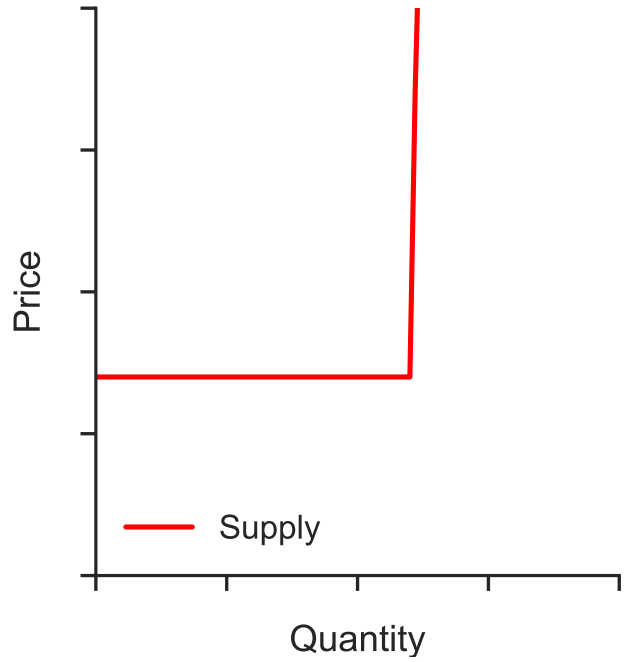
Insurance Supply and Demand

Five determinants of supply

Price = EPV(Loss + Expns) + Profit

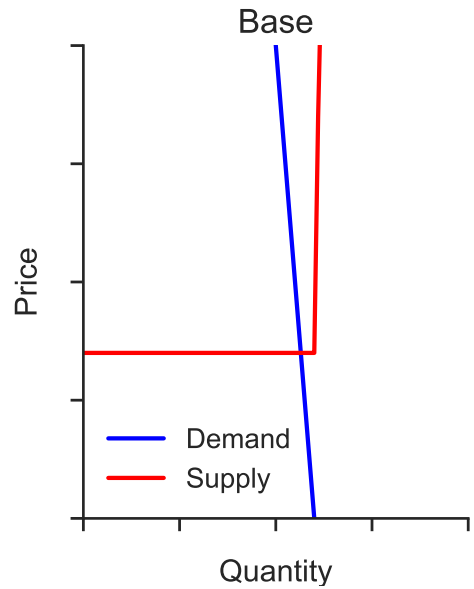
Price = reservation price

1. Loss estimation in a stable environment
2. Loss estimation in a changing environment
3. Institutional factors
4. Profit and surplus adequacy
5. Profit and view of surplus adequacy



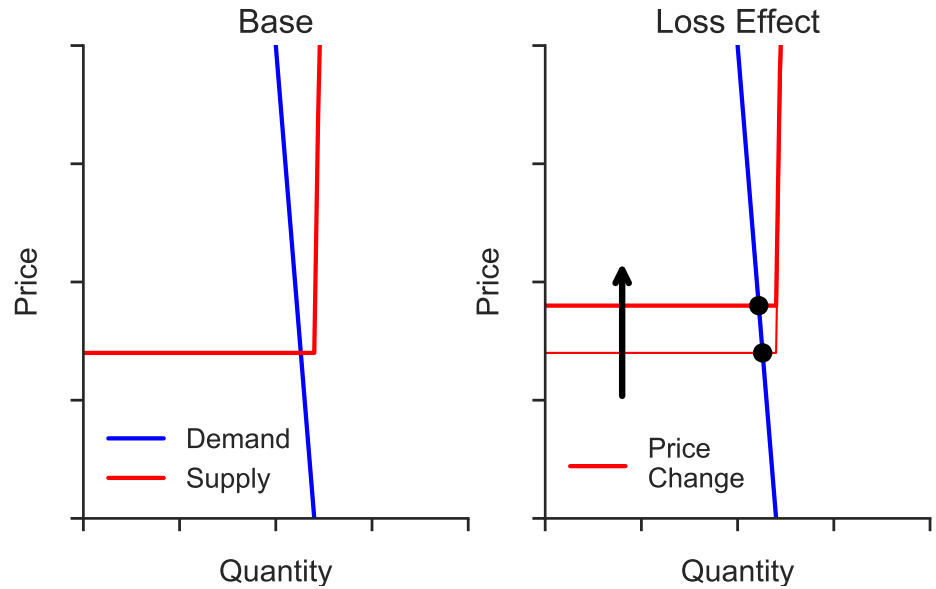
Insurance short-run supply very elastic up to underwriting capacity; then almost perfectly inelastic. Cat market experience post-Katrina.
Long-run supply flat.

Distinct Impact of Loss and Capital Driven Hardening



- Insurance demand inelastic
- Supply elastic up to capacity then inelastic

Distinct Impact of Loss and Capital Driven Hardening



- **Price impact** (middle) upward shift in supply curve; insureds pay appropriate price for coverage received

Distinct Impact of Loss and Capital Driven Hardening

- **Capital impact** (right) left shift in supply curve; material price increases if capacity constrained

1. Loss Estimation in a Stable Environment

Historical perspective

- Basic actuarial methods are inherently autoregressive
- Reporting and settlement lags
- Venezian's model of cycle

Today's reality

- Powerful predictive analytics leverage new **big** data sources
- Granular pricing lowers pricing risk and uncertainty
- Decrease in residual markets
- No excuses for naive capital
- Cyber illustrates difficulties absent loss data

2. Loss Estimation in a Changing Environment

Historical perspective

- New information or events **abruptly** changes industry view of risk
  - Cat models in early 1990s + Andrew/Northridge
  - WTC, terrorism
  - Distracted drivers

Today's reality

- General financial sanity prevailed post-GFC compared to late 1990s magical thinking
- External models incorporate external, non-loss data into underwriting
- Pause before global warming storm?
- Change of view will still be disruptive

3. Institutional Factors

Historical perspective

- Regulatory rate stickiness exacerbates cycle
- Opaque multi-line companies
- Trapped capital

Today's reality

- Commercial less regulated but more pronounced cycle than personal
- Post 2001-New Cos: transparency through simplicity
- Transparent reporting to regulators, rating agencies, investors
  - Cat loss PMLs and reinsurance arrangements
  - ERM review and rating, risk tolerance disclosures
  - Rate level and rate change reporting
  - Sarbanes-Oxley
- Harder to be an irresponsible competitor

4. Profit and Surplus Adequacy

Historical perspective

- Shocks to capital trigger hard market, e.g. unpredictable catastrophe losses, legacy loss development
- Underwriting shocks have more impact than systematic asset shocks
- Capital market frictions slow infusion of new capital
  - Institutional
  - Information asymmetry, especially around reserve development

Today's reality

- Capital market frictions almost entirely disappeared; dampens impact of catastrophe losses
- Underwriting talent operational constraint

5. Profit and View of Surplus Adequacy

Historical perspective

- Change in **perception** of adequacy of capital has quick and profound effect on market sentiment
- Catastrophe risk, terrorism risk
- Post-Katrina changes to rating agency cat stress test

Today's reality

- Unchanged

End of History: Ten Counterpoints

1. A generation of actuaries raised on favorable development
2. A generation of actuaries raised on low inflation and interest rates
3. Group-think that cat models are right
4. Liberal courts uphold big-company-hate
5. Cyber risk explodes when court finds coverage for mass quasi-cyber event
6. Predictive modeling backfires with massive discrimination class action damages
7. Predictive modeling undermines basis of insurance
8. Opioid crisis just keeps getting worse
9. Preventable illnesses just keep getting worse
10. Massive pandemic/meteorite/terror loss

11. . . . driverless cars

TB;DL

There is not (and never was) a predictable traditional cycle, but underwriting has always been volatile

Since the mid-2000s several trends. . .

- Big data has replacing basic data
- Predictive analytics has replacing low tech pricing
- Cat and capital models have replacing poor understanding of risk
- Stable interest rates replacing decades of volatility
- Rate, cat and reserve disclosures replacing opacity
- Free-flowing capital replacing structural barriers

. . . have combined to **lower** underwriting volatility

$\Longrightarrow$ **Beware**: man controls liability but God controls property

Anticipating The First Question...

...What will trigger the next hard market?

- Which we now understand as a change in perceived rate adequacy, or actual or perceived capital levels
- An **extremely large** $200 billion plus loss from an **expected** cause
- A moderately large **unexpected** loss that changes current view of risk; impact on rate more important than size
- How do you model the unknown fault-lines?
- Something **entirely different**