BRANDEIS INTERNATIONAL
BUSINESS SCHOOL

Data: Pitfalls & Opportunities

Stephen G Cecchetti

www.moneyandbanking.com

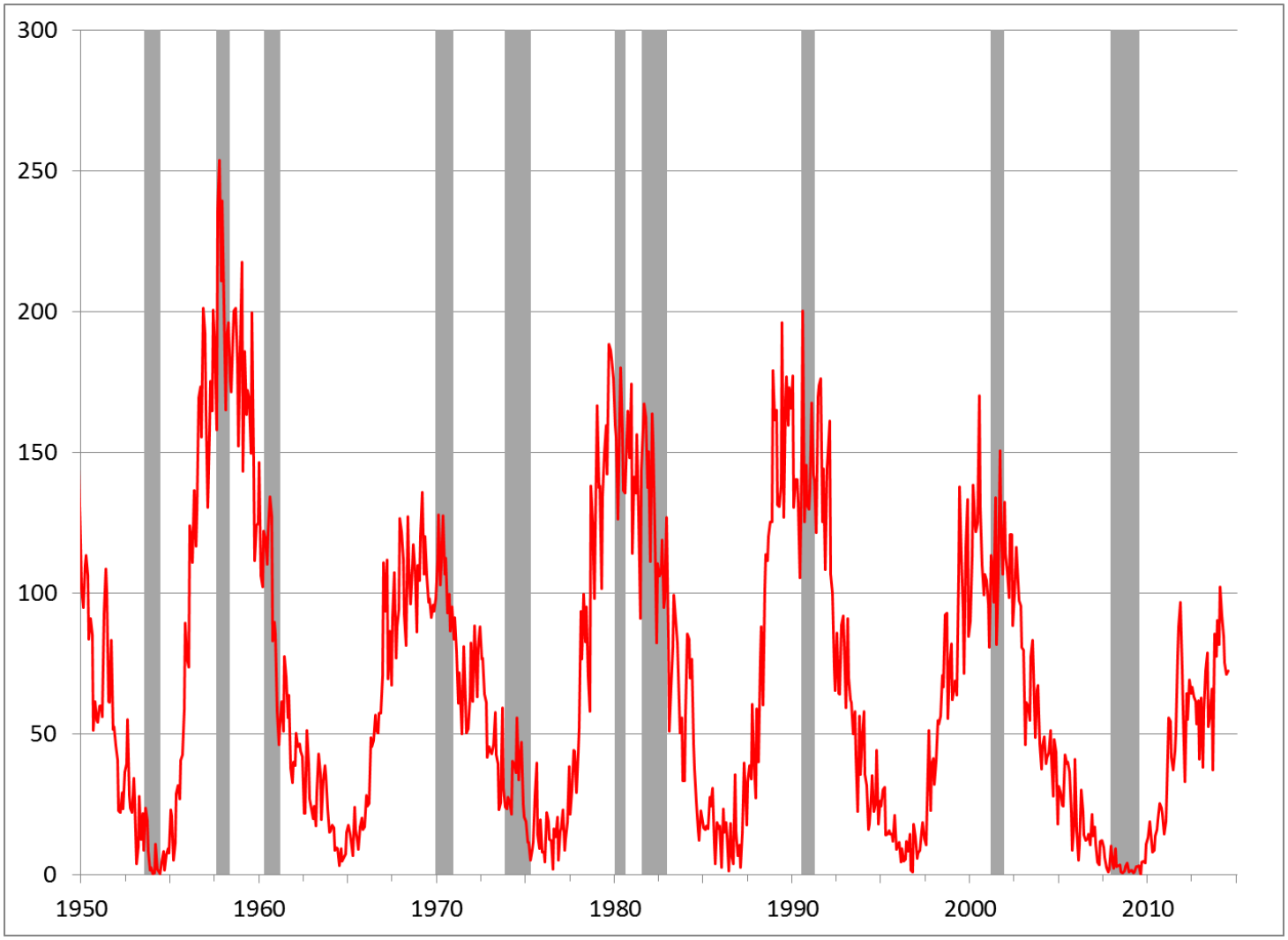
WORLD READY

Know your data

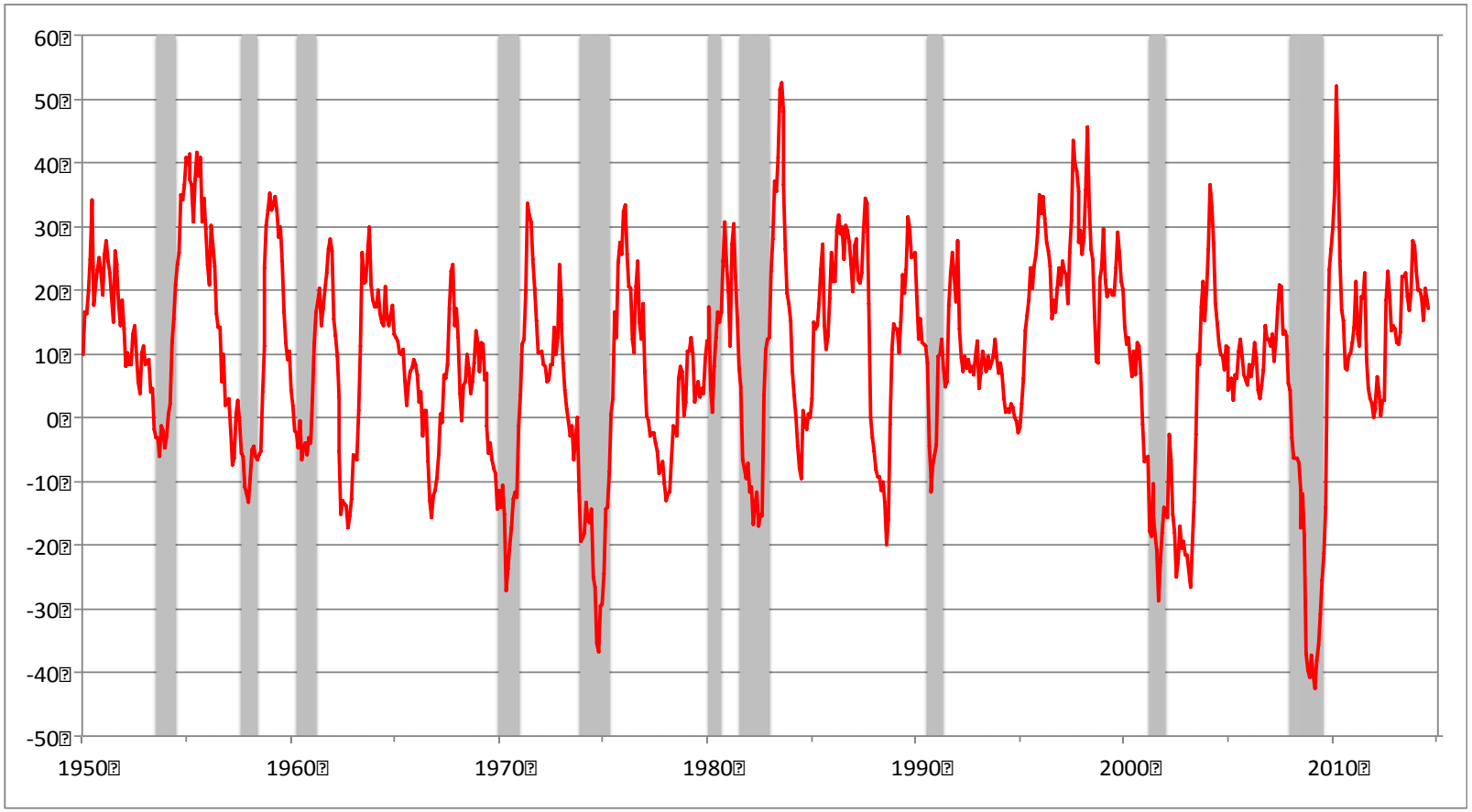
I. Pitfalls

II. Opportunities

Business Cycles: Chart 1



Business Cycles: Chart 2



Business Cycles: Which predicts better?

- Recessions since 1950: 10
- Number predicted by Series 1: 6
- Number predicted by Series 2: 15

Business Cycles: Which predicts better?

- Recessions since 1950: 10
- Number predicted by Series 1: 6

  If series 1 forecasts a downturn, it happens every time.
- Number predicted by Series 2: 15

  If series 2 forecasts a downturn, it happens two out of three times
- What are these series?

Business Cycles: Which predicts better?

- Recessions since 1950: 10
- Number predicted by Series 1: 6
- Number predicted by Series 2: 15
- What are these series?
  - #1 is the number of sunspot
  - #2 is the S&P 500

Business Cycles: Which predicts better?

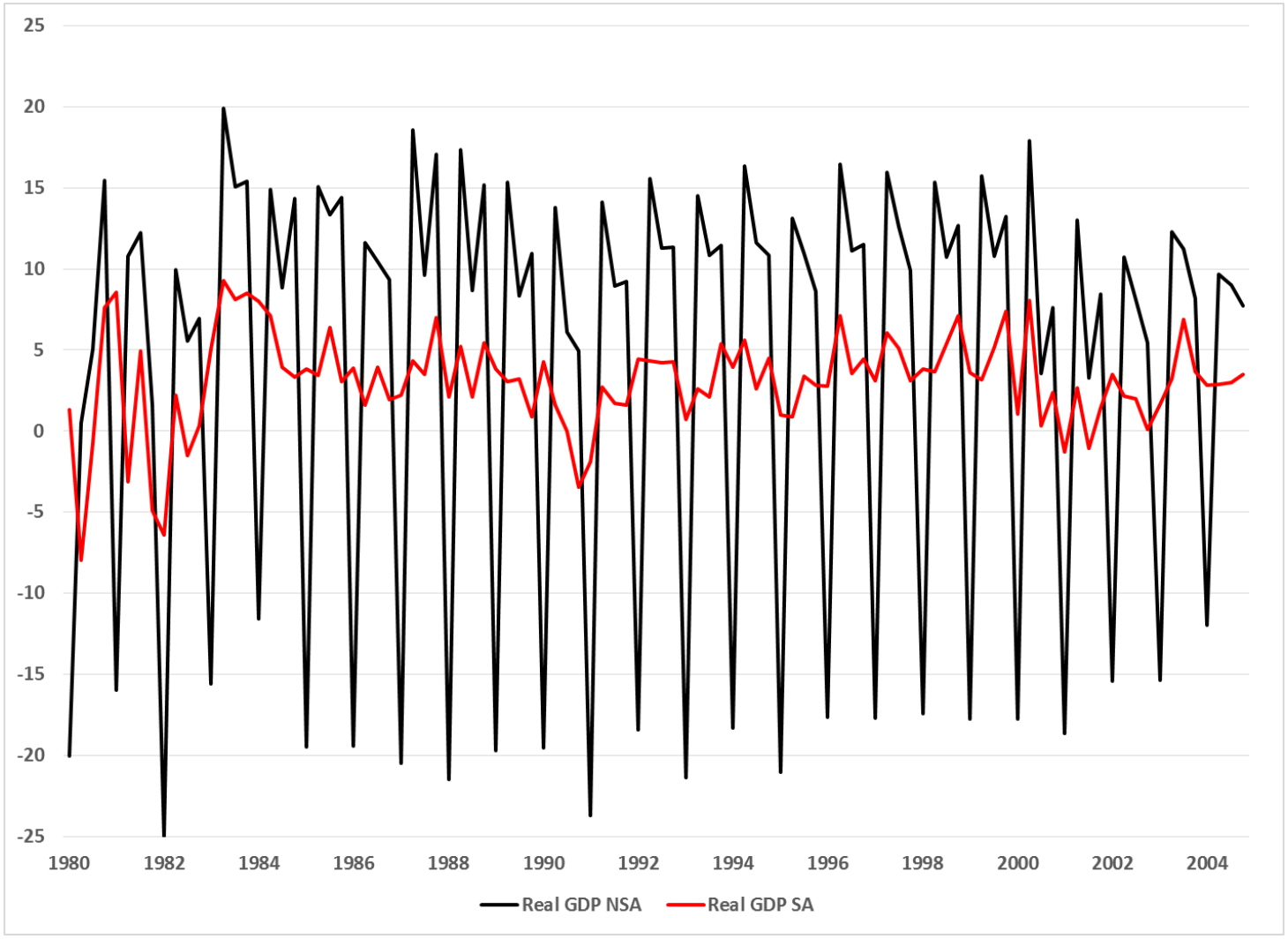
- Recessions since 1950: 10
- Number predicted by Series 1: 6
- Number predicted by Series 2: 15
- What are these series?
  - #1 is the number of sunspot
  - #2 is the S&P 500

Pitfall #1:
Beware Correlations!

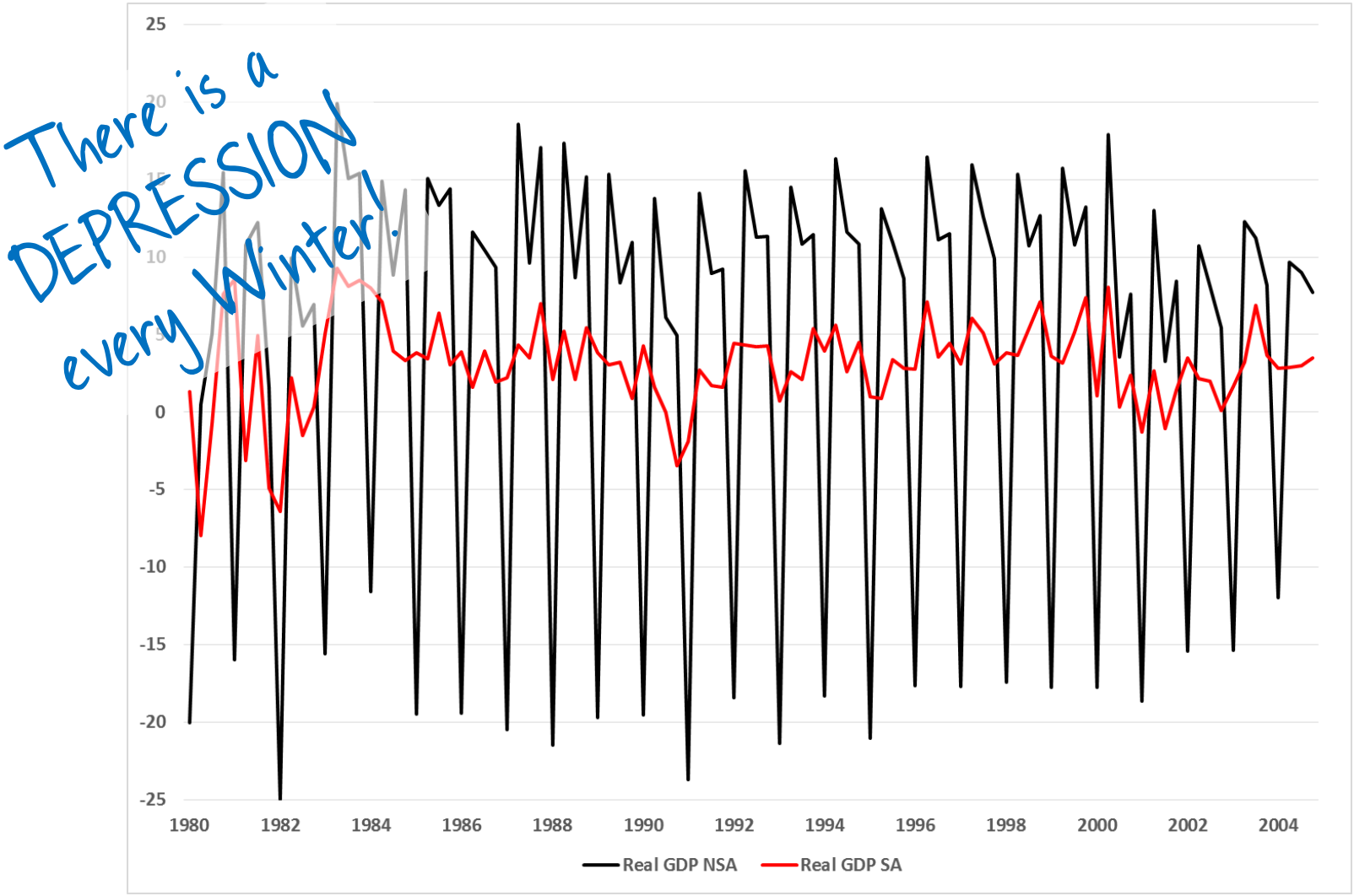
Signal versus Noise: Seasonality

- How big a change is meaningful?

Seasonality in GDP



Seasonality in GDP

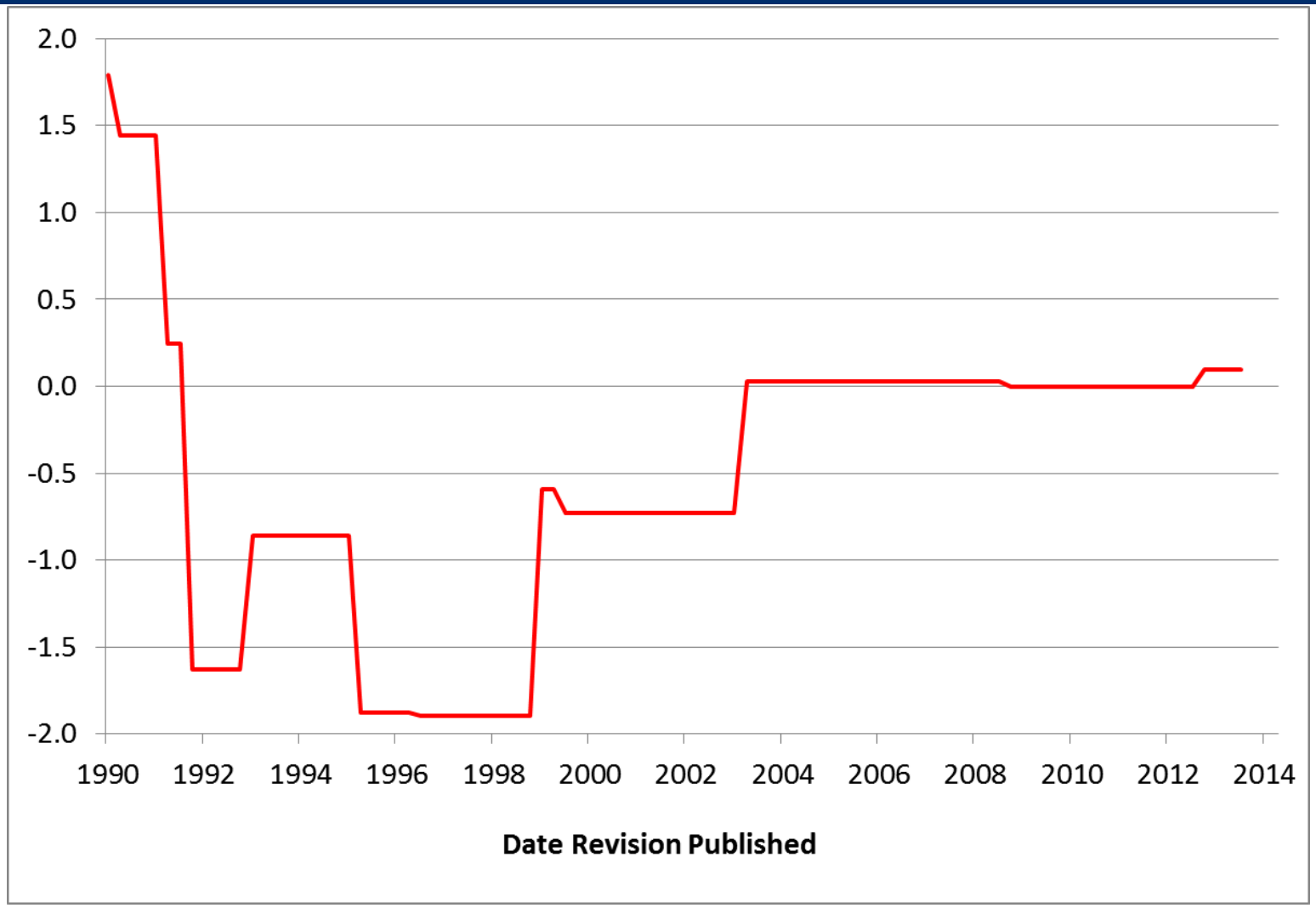


Signal versus Noise: Seasonality

- How big a change is meaningful?

Pitfall #2:
Seasonality is HUGE!

Revisions: GDP Growth 1990 Third Quarter



Revisions: GDP Growth 1990 Third Quarter

Signal versus Noise: Revisions

- Revisions:
  - Tax data
  - Benchmark surveys

Signal versus Noise: Revisions

- Revisions:
  - Tax data
  - Benchmark surveys

Pitfall #3:
Revisions can be
large and frequent.

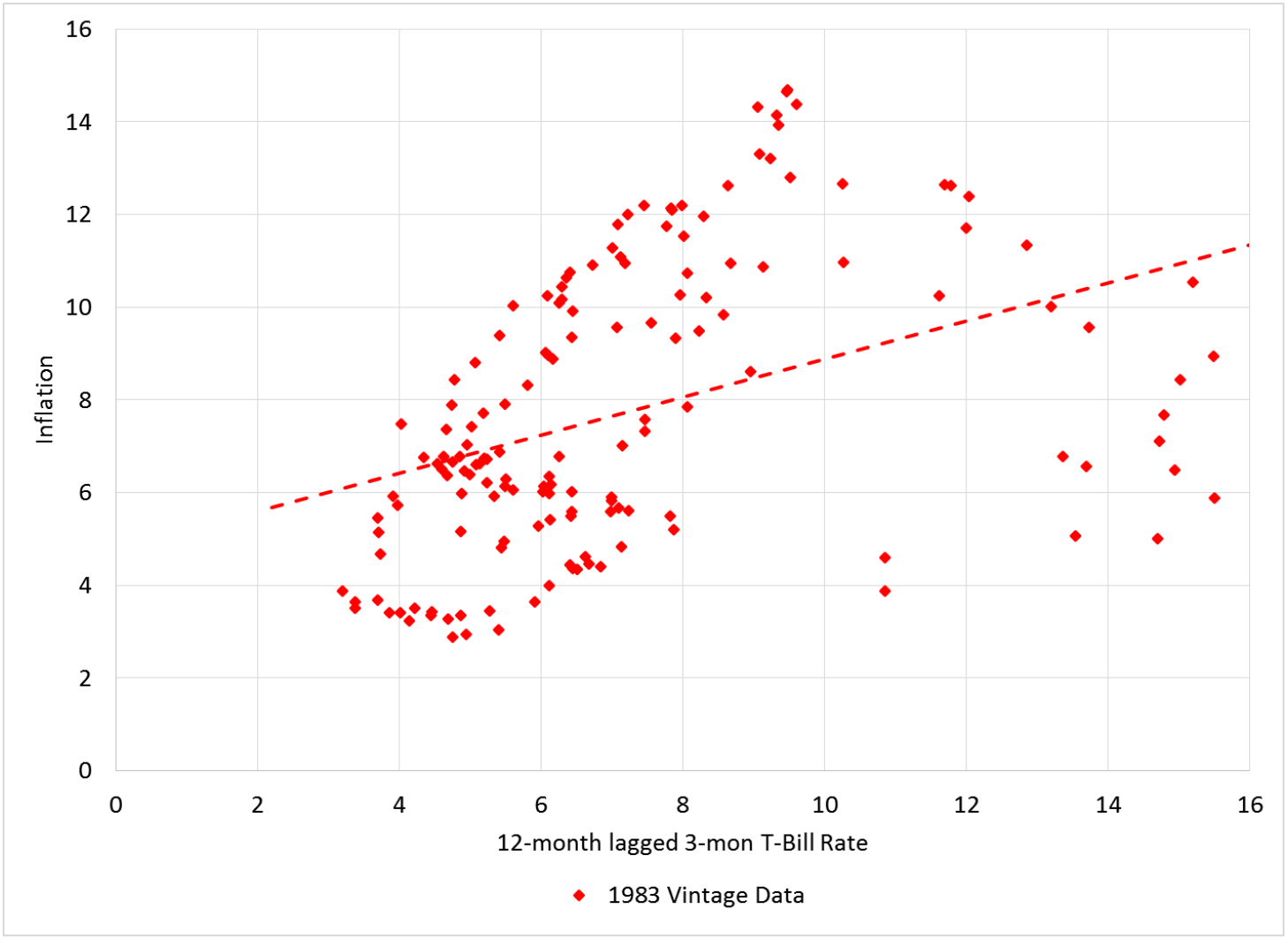
Leads people to prefer employment to output
because revisions tend to be smaller & faster

Data construction

- Do the data mean what you think?
- Example: Owner-occupied housing
  - Before 1983:

    House prices
    mortgage interest rates
    property taxes
    insurance
    maintenance costs

Interest Rates and Inflation



Data construction

- Do the data mean what you think?
- Example: Owner-occupied housing
  - Before 1983:

    House prices
    mortgage interest rates
    property taxes
    insurance
    maintenance costs
  - Implication: Interest rates $\Uparrow \Rightarrow$ Inflation $\Uparrow$!

Data construction

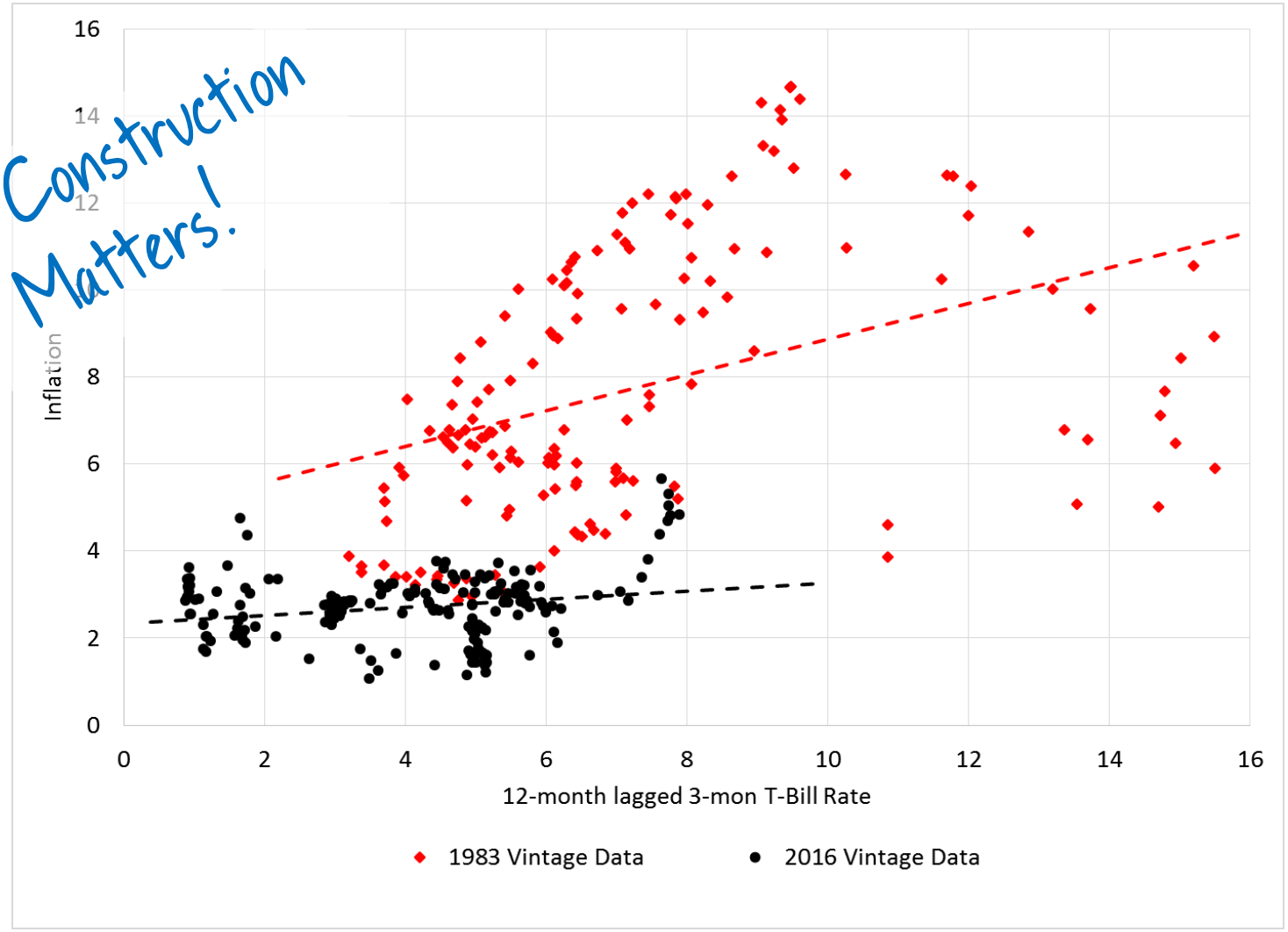
- Do the data mean what you think?
- Example: Owner-occupied housing
  - Before 1983:

    House prices
    mortgage interest rates
    property taxes
    insurance
    maintenance costs

  - Implication: Interest rates $\Uparrow$ $\Rightarrow$ Inflation $\Uparrow$!
  - After 1983: rental equivalence

Interest Rates and Inflation

Data Construction Matters!



Data construction

- Do the data mean what you think?
- Example: Owner-occupied housing
  - Before 1983:

    House prices
    mortgage interest rates
    property taxes
    insurance
    maintenance costs

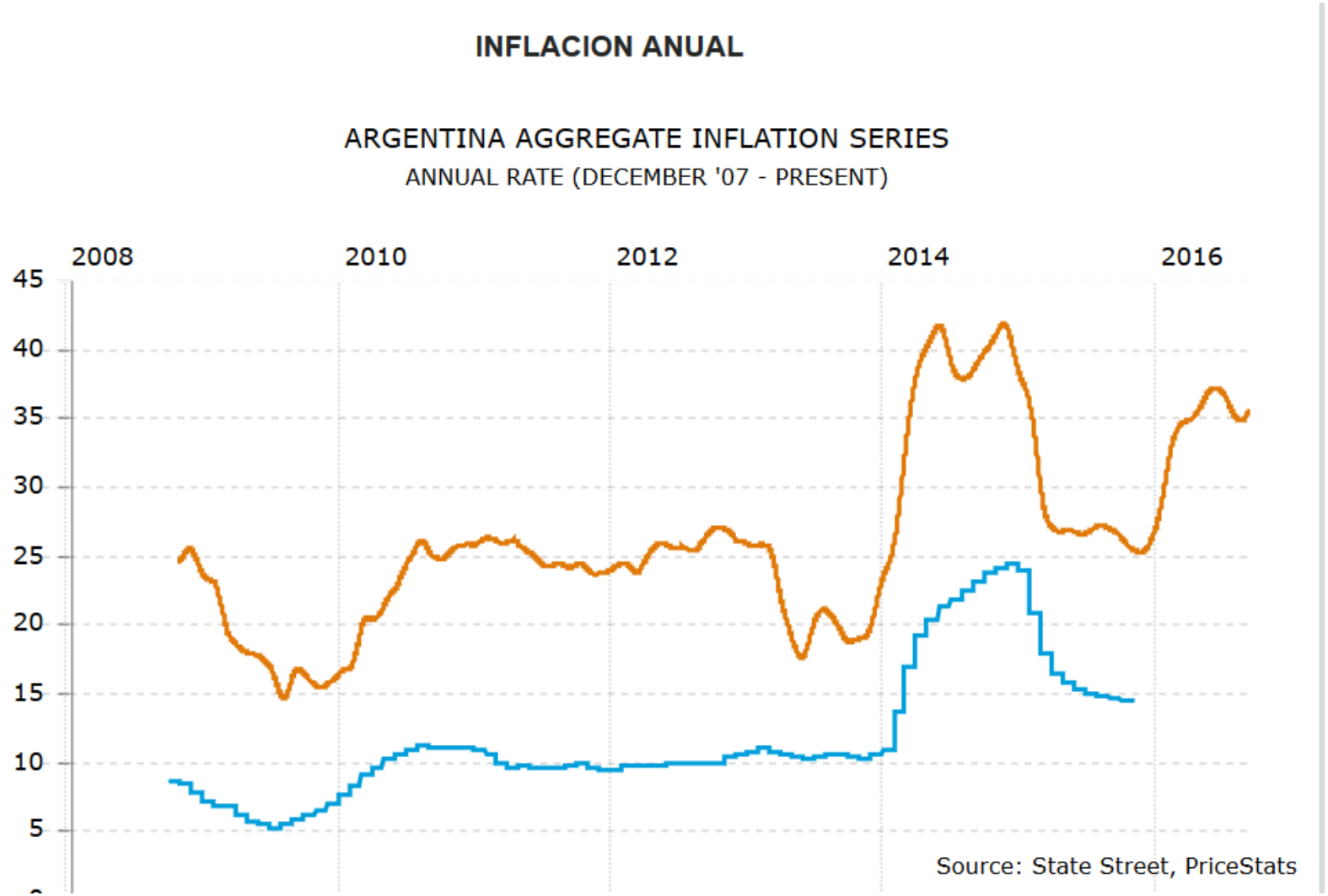
  - Implication: Interest rates $\Uparrow$ $\Rightarrow$ Inflation $\Uparrow$!
  - After 1983: rental equivalence

Pitfall #4:
Know how your data are constructed.

Pitfalls

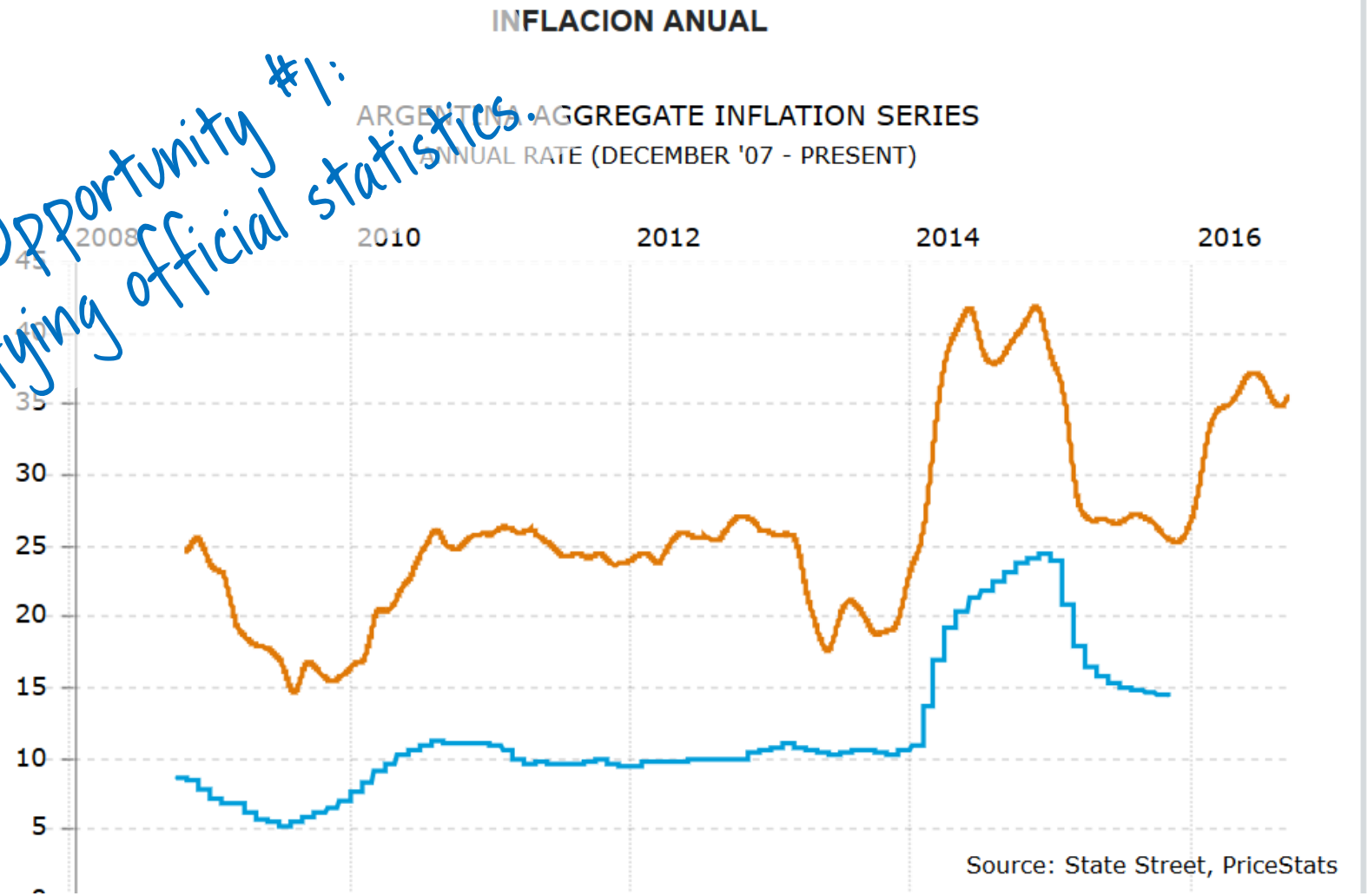
1. Beware correlations
2. Seasonality is huge
3. Revisions can be big
4. Know how your data are constructed

Billion Prices Project

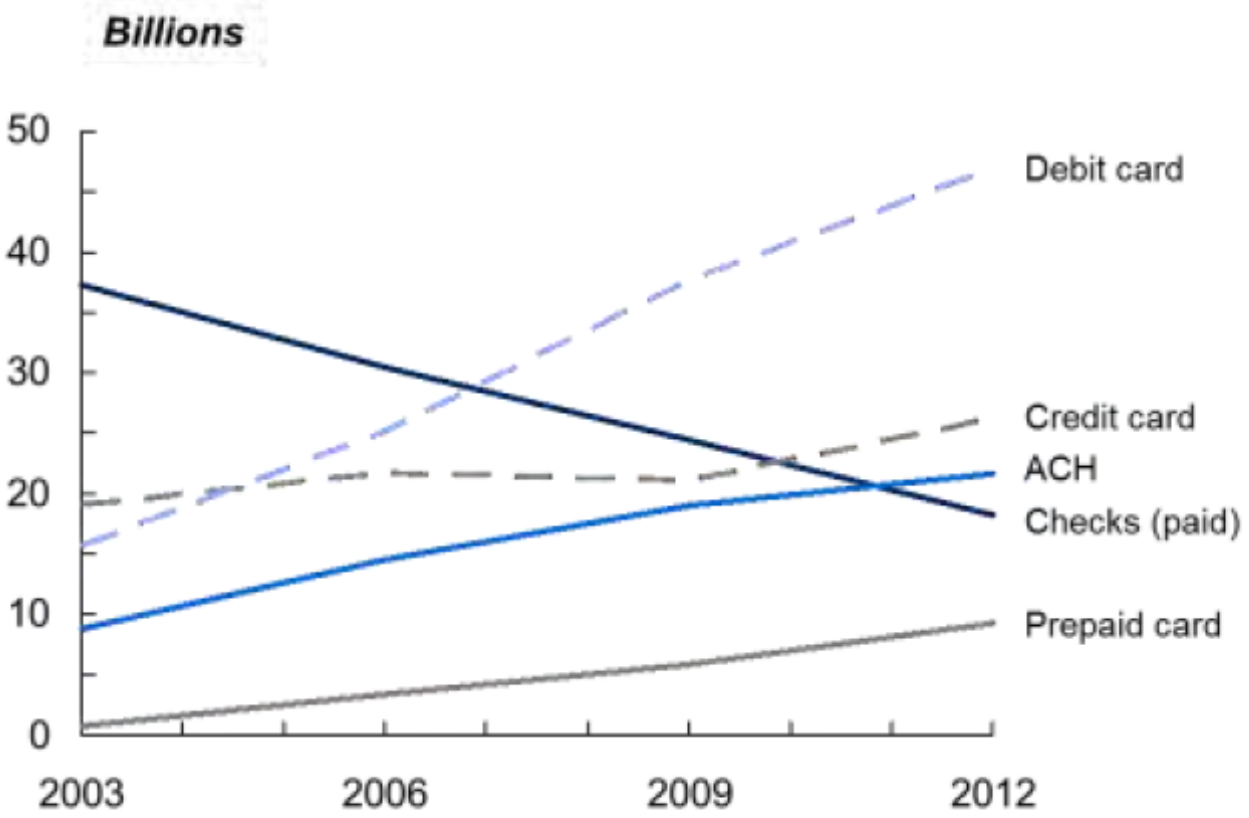


Billion Prices Project

Opportunity #1:
Verifying official statistics.

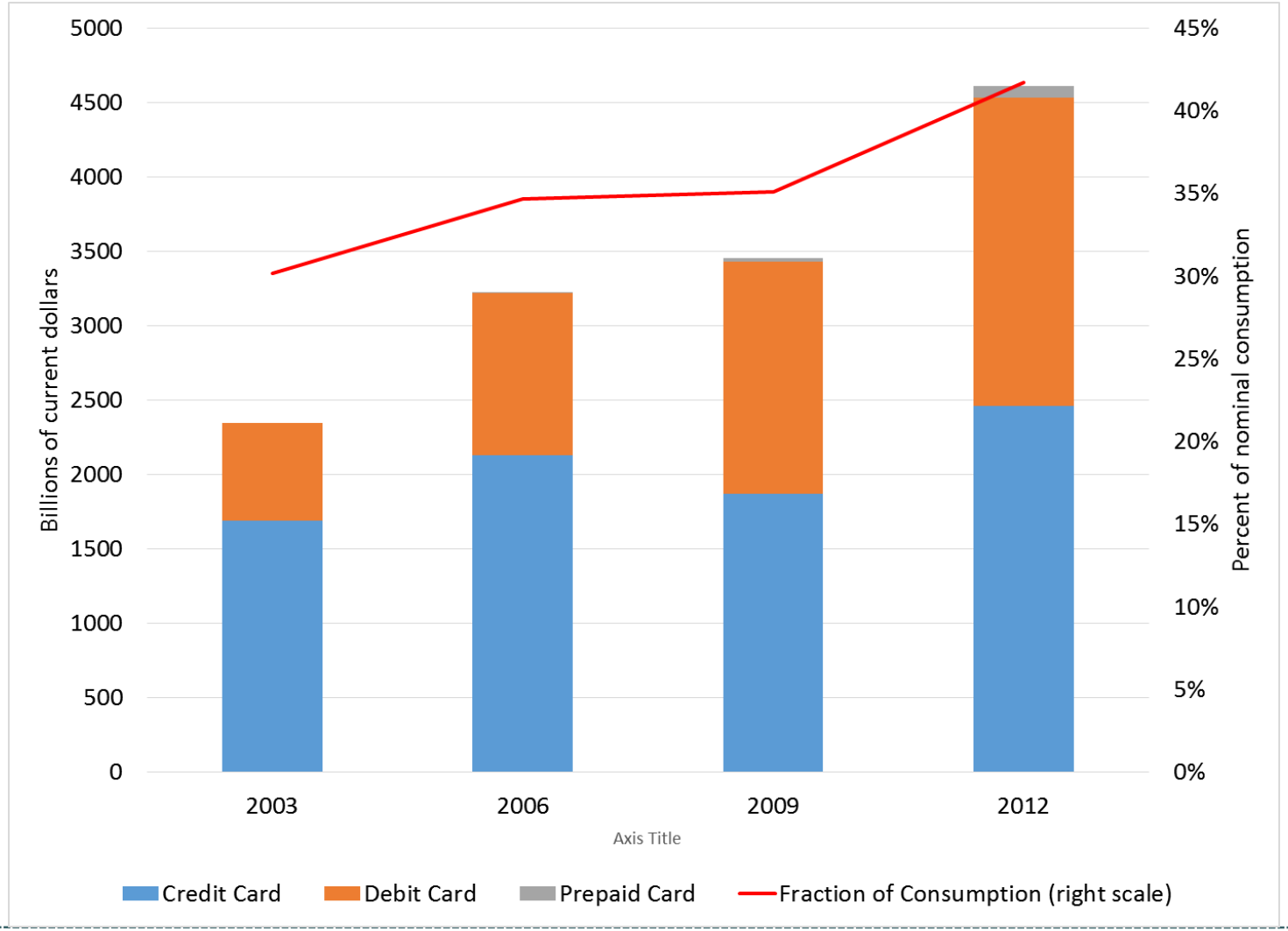


Growth of noncash payments

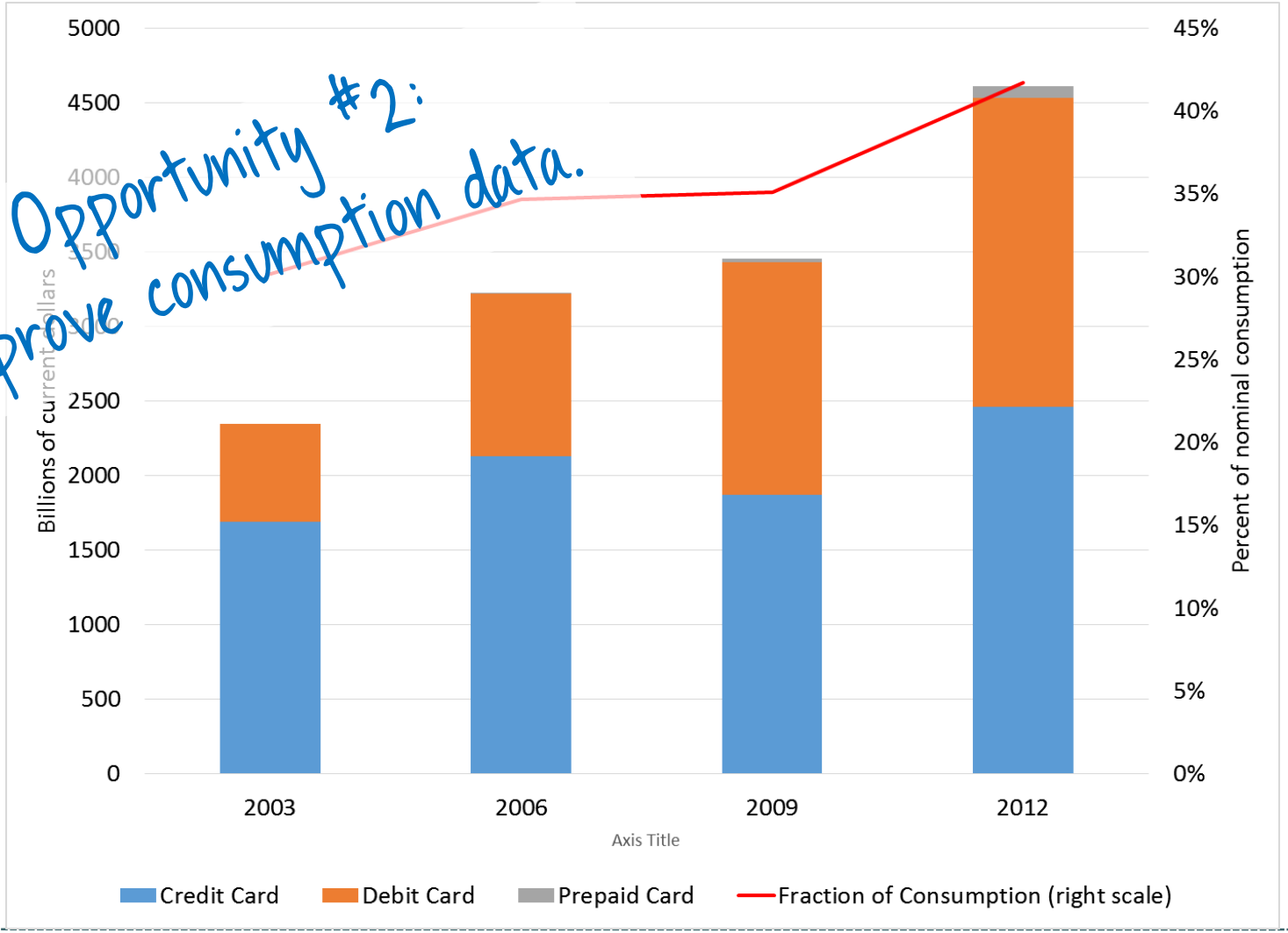


Debit, credit, and prepaid card trends include general-purpose and private-label payments.

Valve of card payments



Valve of card payments



Payments and Credit

- Using technology in low-income countries
  - M-Pesa: Money transfer using mobile phones

    (Started in Kenya in 2007, 17 mn users by 2012)
  - AADHAAR: Unique biometric ID with bank account

    (Started in India in 2016, has nearly 1 bn registrants)

Payments and Credit

- Using technology in low-income countries
  - M-Pesa: Money transfer using mobile phones

    (Started in Kenya in 2007, 17 mn users by 2012)
  - AADHAAR: Unique biometric ID with bank account

    (Started in India in 2016, has nearly 1 bn registrants)

- Measure non-market activity
- Create credit records

Payments and Credit

- Using technology in low-income countries
  - M-Pesa: Money transfer using mobile phones
    (Started in Kenya in 2007, 17 mn users by 2012)
  - AADHAAR: Unique biometric ID with bank account
    (Started in India in 2016, has nearly 1 bn registrants)
- Measure non-market activity
- Create credit records

Opportunity #3:
Payments & Credit in
Low Income Countries

Prices and Productivity

- Information Technology

2013 iPhone 5s

1975 Cray-1

Prices and Productivity

- Information Technology

= 1000 times power ⇒
(just the graphics card!)

⇐ 100,000 times price =

(that's a 35+% annual deflation)

2013 iPhone 5s

1975 Cray-1

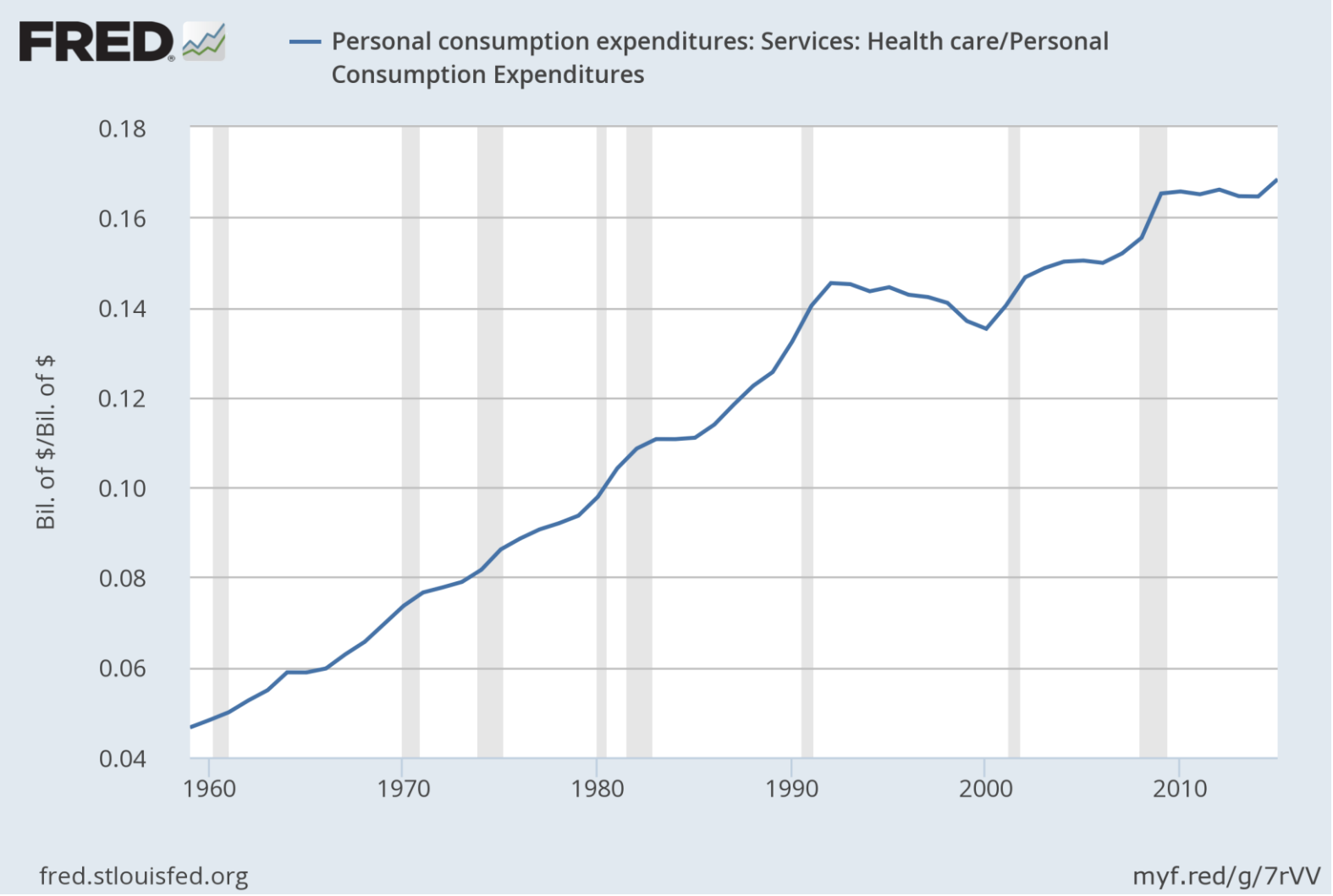
Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      $\Rightarrow$ Overall inflation 0.1 pp too high

Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      $\Rightarrow$ Overall inflation 0.1 pp too high
  - Health Care

Valve of Health Care

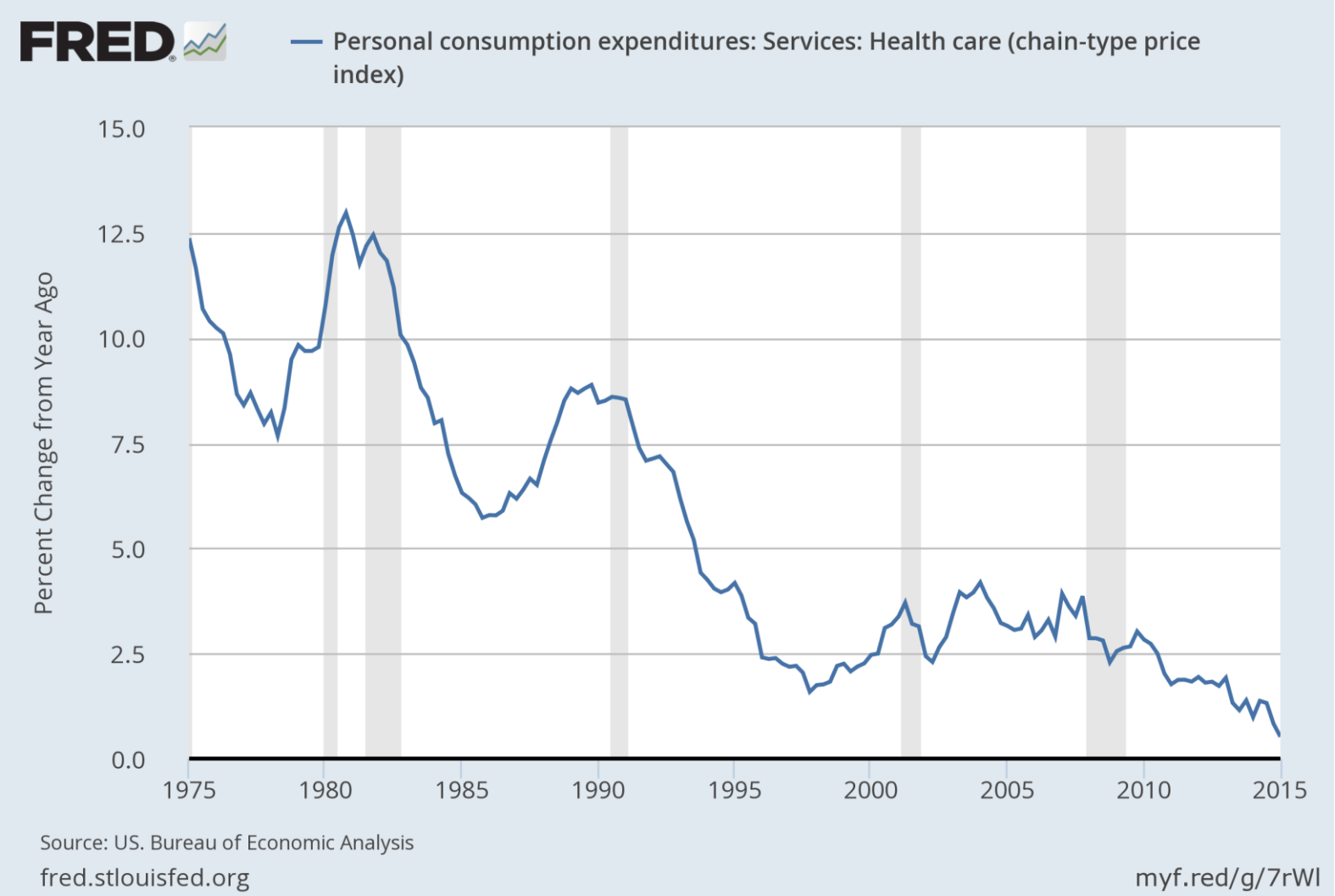


Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      $\Rightarrow$ Overall inflation 0.1 pp too high
  - Health Care

    17% of consumption!
    Quality adjustment is very difficult
    Digital medical records $\Rightarrow$ improve measurement.

Health Care Price Index



Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      $\Rightarrow$ Overall inflation 0.1 pp too high
  - Health Care

    17% of consumption!
    Quality adjustment is very difficult
    Digital medical records $\Rightarrow$ improve measurement.

Are we overestimating inflation in health care?

Prices and Productivity

- Information Technology
  - Investment & productivity
    - 16% is IT hardware & software
    - Investment = 16.1% of GDP
    - If IT inflation overstatement 10 p.p.

      $\Rightarrow$ Investment understated 1.6 pp

      $\Rightarrow$ GDP & productivity understated 0.256pp!!

Prices and Productivity

- Prices:
  - IT is less than 1% of consumption
  - Health care is 17% of consumption
    Quality adjustment is difficult
    Are we overestimating inflation in health care?
- Productivity:
  - 16% is IT hardware & software
  - Investment = 16.1% of GDP
  - If IT inflation overstatement 10 p.p.
    $\Rightarrow$ Investment understated 1.6 pp
    GDP & productivity understated 0.256pp!!

Prices and Productivity

- Prices:
  - IT is less than 1% of consumption
  - Health care is 17% of consumption
  - Quality adjustment is difficult
  - Are we overstating inflation in health care?
- Productivity:
  - 16% is IT hardware & software
  - Investment = 16.1% of GDP
  - If IT inflation overstatement 10 p.p.

    $\Rightarrow$ Investment understated 1.6 pp

    GDP & productivity understated 0.256pp!!

Opportunity #4:
Improve price and productivity measurement.

Pitfalls

1. Beware correlations
2. Seasonality is huge
3. Revisions can be big
4. Know how your data are constructed

Opportunities

1. Verifying official statistics
2. Improve consumption data
3. Track payments & credit in low-income countries
4. Improve price and productivity measurement

BRANDEIS INTERNATIONAL
BUSINESS SCHOOL

Data: Pitfalls & Opportunities

Stephen G Cecchetti

www.moneyandbanking.com

WORLD READY