Data: Pitfalls & Opportunities

Stephen G Cecchetti

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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?

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- What are these series?
  - #1 is the number of sunspot
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Pitfall #1: Beware Correlations!
Signal versus Noise: Seasonality

- How big a change is meaningful?
Seasonality in GDP
Seasonality in GDP

There is a DEPRESSION every Winter!
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

History is constantly changing!
Signal versus Noise: Revisions

- Revisions:
  - Tax data
  - Benchmark surveys
Revisions:
- Tax data
- Benchmark surveys

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

12-month lagged 3-mon T-Bill Rate

1983 Vintage Data
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:
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- After 1983: rental equivalence
Interest Rates and Inflation

Data Construction Matters!

![Graph showing the relationship between 12-month lagged 3-mon T-Bill Rate and Inflation, with 1983 Vintage Data in red diamonds and 2016 Vintage Data in black circles.](image-url)
Data construction

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

ARGENTINA AGGREGATE INFLATION SERIES
ANNUAL RATE (DECEMBER '07 - PRESENT)

Source: State Street, PriceStats
Billion Prices Project

Opportunity #1: Verifying official statistics

INFLACION ANUAL

ARGENTINA: AGGREGATE INFLATION SERIES
ANNUAL RATE (DECEMBER '07 - PRESENT)

Source: State Street, PriceStats
Growth of noncash payments

Debit, credit, and prepaid card trends include general-purpose and private-label payments.
Value of card payments
Opportunity #2: Improve consumption data.

Value of card payments

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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

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- Measure non-market activity
- Create credit records
Payments and Credit

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Prices and Productivity

- Information Technology

2013 iPhone 5s

1975 Cray-1
Prices and Productivity

- Information Technology

2013 iPhone 5s

1975 Cray-1

= 1000 times power \(\Rightarrow\) (just the graphics card!)

\(\Leftarrow 100,000\) times price =

(that's a 35+\% annual deflation)
Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      \[ \Rightarrow \text{Overall inflation 0.1 pp too high} \]
Prices and Productivity

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  - Health Care
Value of Health Care

Personal consumption expenditures: Services: Health care/Personal Consumption Expenditures

federalreserve.gov

fred.stlouisfed.org myf.red/g/7rVv
Prices and Productivity

- Information Technology
  - Consumption
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      ⇒ Overall inflation 0.1 pp too high
  - Health Care
    17% of consumption!
    Quality adjustment is very difficult
    Digital medical records ⇒ improve measurement.
Prices and Productivity

- **Information Technology**
  - **Consumption**
    - Less than 1%
    - If IT inflation overstatement 10 p.p.
      ⇒ Overall inflation 0.1 pp too high
  
- **Health Care**
  17% of consumption!
  Quality adjustment is very difficult
  Digital medical records ⇒ 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
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  - Are we overestimating inflation in health care?

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<td>2. Seasonality is huge</td>
<td>2. Improve consumption data</td>
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<td>3. Revisions can be big</td>
<td>3. Track payments &amp; credit in low-income countries</td>
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<td>4. Know how your data are constructed</td>
<td>4. Improve price and productivity measurement</td>
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