The Global Economy

Business Cycle Indicators

NYU STERN

Where we're headed

- Short-term economic performance
- A series of topics
- On today's agenda
  - Indicators
  - Big inflations

The question

- How does the US economy look to you right now?
- How can you tell?

The idea

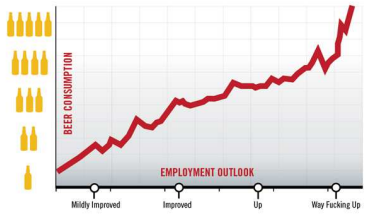
- Lots of indicators of economic activity
- We use their past patterns to assess
  - Current economic conditions
  - Near-term future economic conditions
- If (say) an increase in housing starts has been associated with good economic performance in the past …
- What if this time is different?

Joke of the day

- Why do economists add a digit after the decimal point to their forecasts?
- To show they have a sense of humor

Bonus joke of the day

- "Nation's Unemployment Outlook Improves Drastically After Fifth Beer," The Onion.



Forecasting

- Tim Harford
  - Economists have allowed themselves to walk into a trap where we say we can forecast, but no serious economist thinks we can. [True, that, but what does he mean by "we"?]
- John Maynard Keynes
  - You don't expect dentists to be able to forecast how many teeth you'll have when you're 80. You expect them to give good advice and fix problems.

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Courses related to this topic

- Real-world analysis of economic data (ECON-GB.2347)
  - Professor Peter D'Antonio, Citi, Director and Head of US Economic Forecasting, does this for a living
- Forecasting time series data (STAT-GB.0018)
  - Professor Cliff Hurvich, expert and pianist
  - Or Professor Rohit Deo, also an expert

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What's happening?

- Employment report released [late] October 22
  - Employment up 148k in September
  - Unemployment flat at 7.2%
  - October report due out Friday
  - Consensus: up 120k
  - More at Bloomberg calendar, FRED
- What do we learn from this?

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Roadmap

- Indicators
- The cross-correlation function
- The business cycle scorecard

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Indicators

Indicators of economic activity

- Hundreds of them, more all the time
- See resource page
- Also Bloomberg and WSJ calendars

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Indicators: terminology

- A variable is **procyclical** if it moves up and down with the economy, **countercyclical** if it moves in the opposite direction
- A variable **leads** the economy if its ups and downs come before, **lags** if its movements come after, **coincident** if they happen at the same time
- "The economy" = GDP growth

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Indicators: plan

- Look at monthly data (mostly yoy growth rates)
- Shift from GDP to industrial production
- For each one
  - Is it procyclical? Countercyclical?
  - Does it lead? Lag?
  - What does it suggest about current and future conditions?

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Indicators: FRED

- Plot and download data

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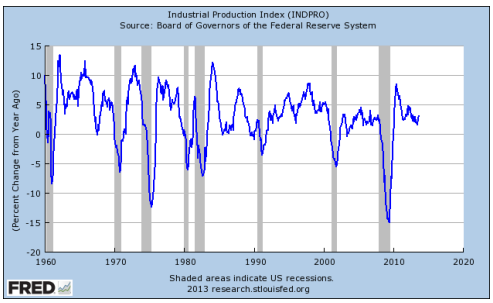
Industrial production (yoy growth)



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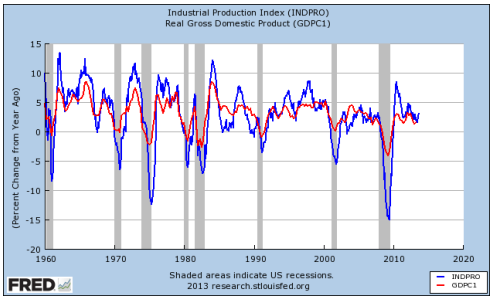
Industrial production and GDP (yoy)



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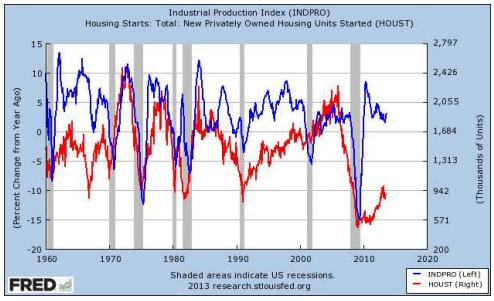
Housing starts (units, thousands)



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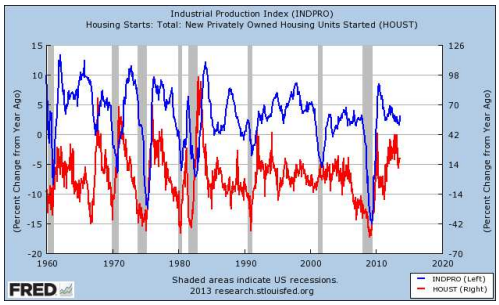
Housing starts (yoy growth)



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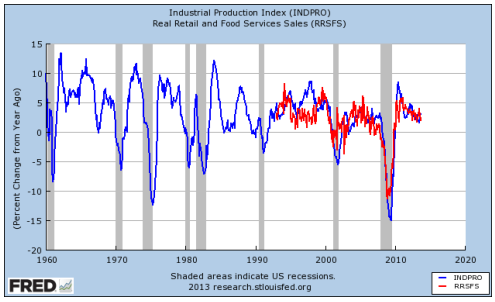
Retail sales (yoy growth)



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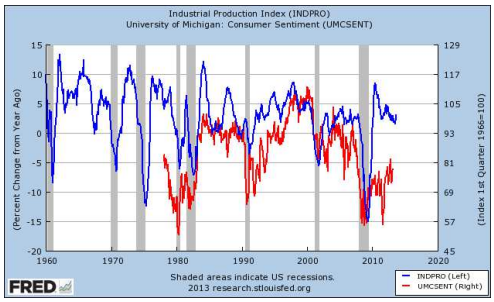
Consumer sentiment (index)



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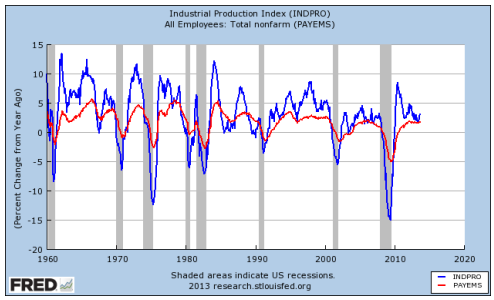
Employment (yoy growth)



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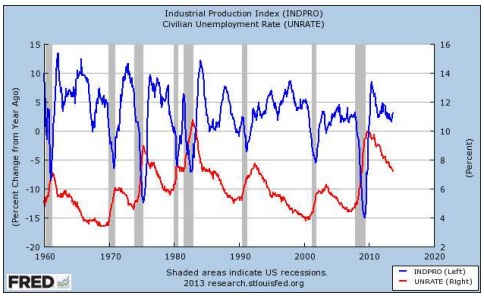
Unemployment rate



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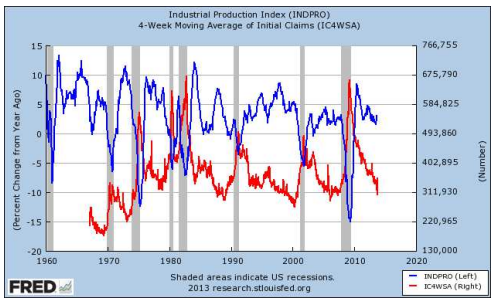
Initial claims for UI



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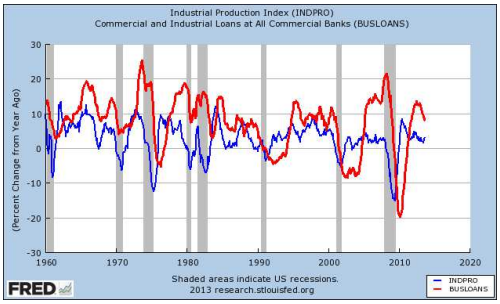
Commercial & industrial loans (yoy growth)



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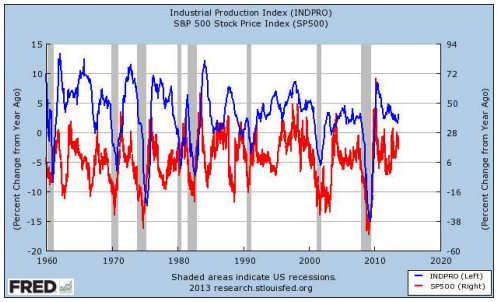
S&P 500 (yoy growth)



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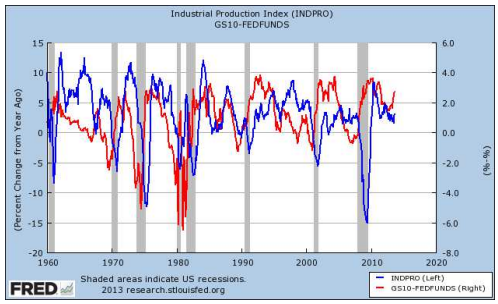
Term spread (10y – fed funds)



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Indicator summary

- Think about which indicators are
  - Procyclical
  - Countercyclical
  - Leading
  - Lagging
  - Coincident
- Which ones do you like best?

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Cross-correlations

Review: correlations

- Correlations: a measure of (linear) association between two variables
- Conveniently scaled between –1 and +1
- The farther from zero, the stronger the association
- Link to nontechnical guide on Course Outline

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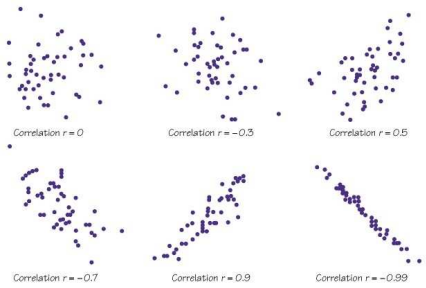
Review: correlations



The cross-correlation function

- Look at the correlation between x and y
- Think of x as the indicator
- **Plus: shift y back and forth in time (to see leads and lags)**
- Formally

$$ccf(k) = corr[x(t),y(t-k)]$$

  - If k<0: x leads y [or y lags x]
  - If k>0: x lags y [or y leads x]
- Why? Makes a great picture

Contemporaneous correlation

Date	x(t)	y(t)
1	2.43	8.47
2	1.19	2.29
3	0.13	7.36
4	0.56	6.39
5	0.38	6.02
6	0.96	0.22
7	1.87	3.60

Reminder:
- ccf(k) = corr[x(t),y(t-k)]

For k = 0:
- ccf(0) = corr[x(t),y(t)]

Use data marked
- Red for x
- Blue for y

Lagging correlation

Date	x(t)	y(t-1)
1	2.43	8.47
2	1.19	2.29
3	0.13	7.36
4	0.56	6.39
5	0.38	6.02
6	0.96	0.22
7	1.87	3.60

Reminder:
- ccf(k) = corr[x(t),y(t-k)]

For k = +1:
- ccf(1) = corr[x(t),y(t-1)]
- Means: x lags y

Use data marked
- Red for x
- Blue for y
- Note lost observation

Leading correlation

Date	x(t)	y(t+1)
1	2.43	8.47
2	1.19	2.29
3	0.13	7.36
4	0.56	6.39
5	0.38	6.02
6	0.96	0.22
7	1.87	3.60

Reminder:
- ccf(k) = corr[x(t),y(t-k)]

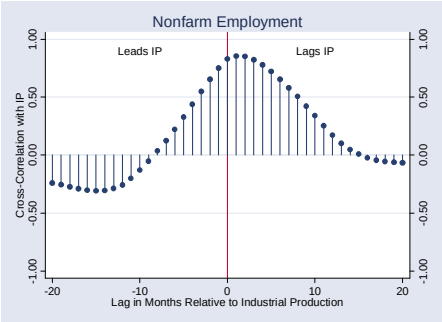
For k = -1:
- ccf(1) = corr[x(t),y(t+1)]
- Means: x leads y

Use data marked
- Red for x
- Blue for y
- Note lost observation

Cross correlation graphs

- Pictures: plot ccf(k) against k
  - y = IP growth
  - x = indicator
- Sample period: 1960 to present [why?]
- Most variables are yoy growth rates [why?]
- Does indicator lead or lag IP growth?

Does employment lead or lag?



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How to tell

- Find the largest correlation
- Procyclical or countercyclical?
  - If positive, procyclical
  - If negative, countercyclical
- Leading or lagging
  - If to the left, leading
  - If to the right, lagging

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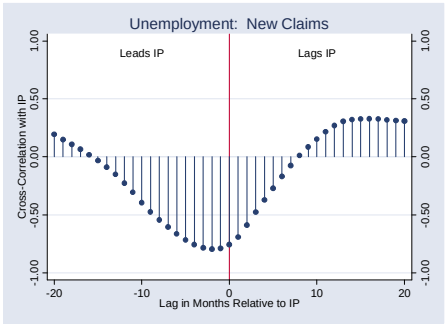
Initial ("new") claims for UI (yoy growth)



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Housing starts (yoy growth)

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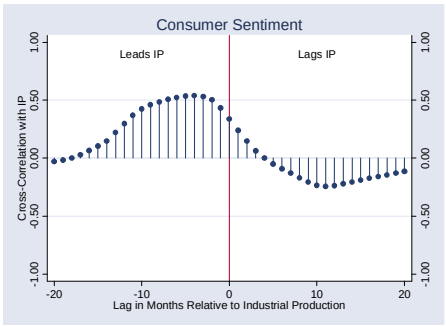
Consumer sentiment (yoy growth)



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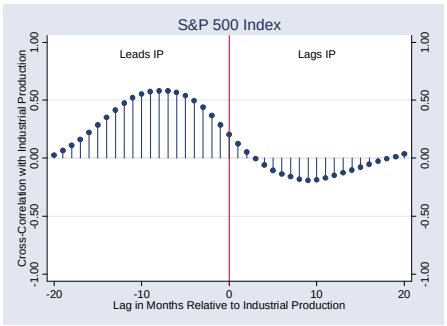
S&P 500 (yoy growth)



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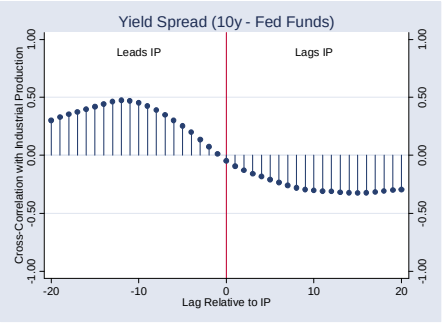
Yield spread



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Good indicators

- Which ones have high correlations?
- Which ones lead?
- Which ones do you like best?
- Warning: even the best indicators forecast the future imperfectly [poorly?]

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Computing cross-correlations

- How do we compute them?
  - Method 1: use Excel to calculate each point [see link]
  - Method 2: use some kind of statistical software [R?]

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Business cycle scorecard

Business cycle scorecard

- Useful summary of lots of indicators
- For each one:
  - Graph indicator over time
  - Add lines for mean, +/- one std deviation
  - Rate indicator as strong positive, positive, negative, strong negative

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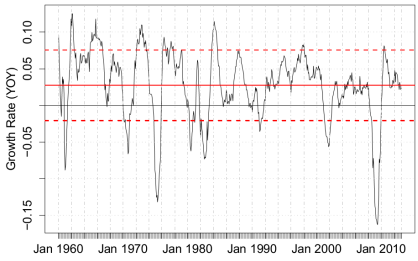
Business cycle scorecard: example



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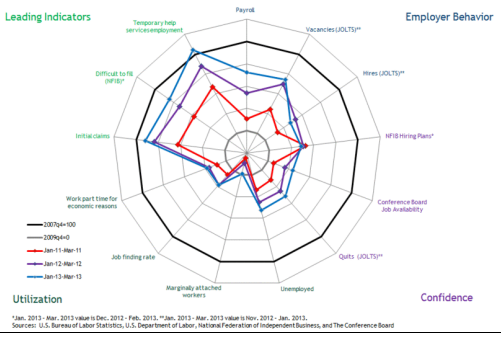
Business cycle scorecard

Indicator	Strong Negative	Negative	Positive	Strong Positive
Ind. Prod.				
Total				

Business cycle scorecard

- Coming up: Problem Set #3 due next week
  - Download indicators from FRED
  - Compute cross-correlation functions
  - Construct business cycle scorecard
  - Start soon!

Scorecard: my goal



Source: Macroblog, April 2013.

What have we learned?

- Lots of things move up and down with the economy
- We can use these patterns to assess current and near-term future conditions
- Useful tools
  - Cross-correlation function
  - Business cycle scorecard
- Where can I learn more?
  - Indicators course: ECON-GB.2347, D'Antonio
  - Forecasting course: STAT-GB.0018, Deo and Hurvich

The Global Economy

Inflation and Monetary Policy

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The Global Economy

Hyperinflation

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Terminology

- The **price level** is a measure of average prices
  - We label it P
  - Measured in units of currency (how many dollars to buy…)
- **Inflation** is the rate of growth of the price level
  - Buying goods takes more currency
  - Or: a unit of currency buys less (same thing, of course)
- We call it **deflation** if growth rate is negative
- **Hyperinflation** is inflation > 100% per year

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The idea

- Tom Sargent, interview
  - The way to start a hyperinflation is run sustained government deficits and then have the monetary authority print money to pay for it. That always works. How do you stop a hyperinflation? You stop doing it. This isn't high economic theory.
- What is he saying? Does it make sense to you?

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The idea

- La Nacion, via Google translate, March 25, 2012
  - [Argentina's] Central Bank president, Mercedes Marco del Pont, said it "is totally false to say that the issue [of money] generates inflation." She continued: "only in Argentina does the idea remain that the expansion of the money [supply] generates inflation."
- What is she saying? Does it make sense to you?

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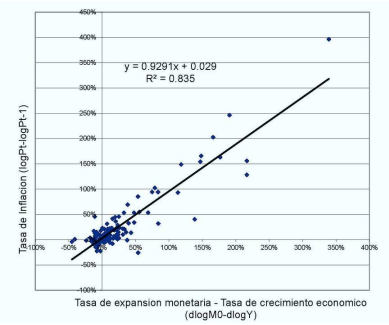
The idea: Argentine data



Source: Foco Economico, March 2012.

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Roadmap

- Terminology
- Hyperinflation show and tell
- Money and inflation: the quantity theory
- Money supply mechanics
- How deficits enter the picture

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Hyperinflation show and tell

German currency

October 1923: 20 USD = 1 billion RM

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Argentine currency

This note dates from 1980s. What's it worth now?

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Turkish currencies

After 2008

Before 2008

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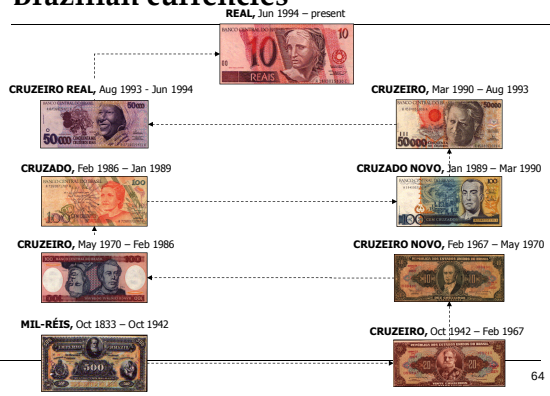
Brazilian currencies



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Highest inflation rates ever

Example	Highest Daily Inflation
Hungary, Jul 1946	207%
Zimbabwe, Nov 2008	98%
Yugoslavia, Jan 1994	65%
Germany, Oct 1923	21%

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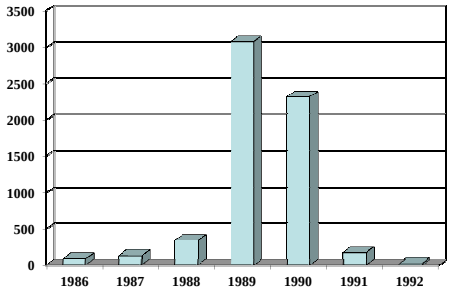
Inflation in Argentina (annual %)



Source: EIU database.

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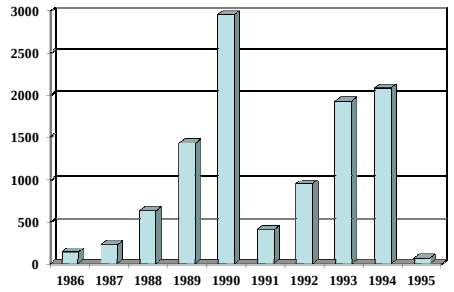
Inflation in Brazil (annual %)



Source: EIU database.

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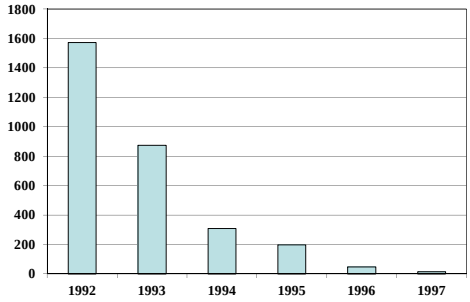
Inflation in Russia (annual %)



Source: EIU database.

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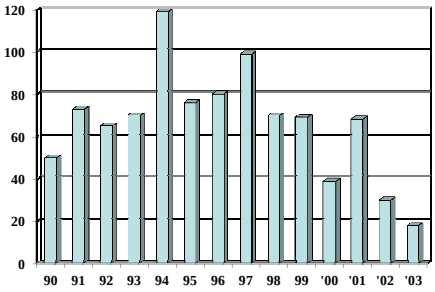
Inflation in Turkey (annual %)



Source: EIU database.

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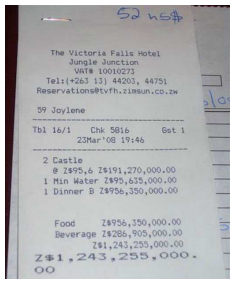
Buying lunch in Zimbabwe



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Zimbabwe timeline

- December 2006: inflation over 1000%
- February 2007: inflation ruled illegal
- October 2008: inflation over 200 million percent!
- January 2009:
  - Transactions permitted in foreign currency
  - Soldiers and teachers to be paid in USD
- February 2009: 12 zeros knocked off
- April 2009: government abandons currency, people use USD (also South African rand – ZAR)

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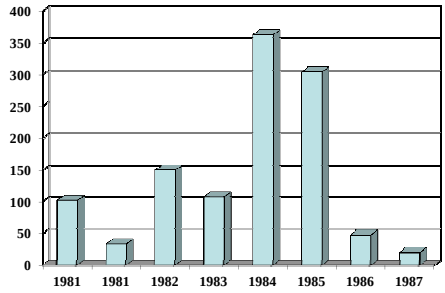
Inflation in Israel (annual %)



Source: EIU database.

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Israel in the 1980s

- American Rabbi visiting Israel:
  - During Israel's hyperinflation, I had a mortgage at a 5% fixed annual interest rate. As inflation increased, fixed rate mortgage payments became laughably easy to make, because salaries more or less kept pace with inflation. Finally, I received a notice canceling my mortgage, because the cost of record-keeping had become more than the monthly payment.

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Iran

- Graeme Wood, "Hyperinflation vacation," The Atlantic, April 2013:
  - The Iranian rial was hovering under 40,000 to one U.S. dollar, weaker by nearly half compared with six months earlier. Authorities tried to ban currency trading for a few weeks in October, when the inflation rate peaked.
  - Wood's First Rule of Budget Travel: where there is runaway inflation, there are great deals for travelers with hard cash. So in January, I boarded a flight from Dubai to Kish, an Iranian holiday resort in the Persian Gulf.

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Other examples

- Personal experiences with hyperinflation?

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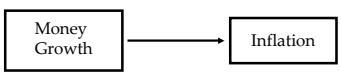
The quantity theory of money

Quantity theory: picture



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Quantity theory: words

- The more currency (money) in circulation, the less each unit is worth

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Quantity theory: math

- One equation (a production function for transactions)

$$M V = P Y$$

  - M = stock of money in circulation (amount of currency)
  - V = velocity (how often a unit of currency is used in a year)
  - P = price level (the GDP deflator or other price index)
  - Y = real GDP

Quantity theory: math

- One equation (technology for transactions)

$$M V = P Y$$

- In growth rates

$$\gamma_M + \gamma_V = \gamma_P + \gamma_Y$$

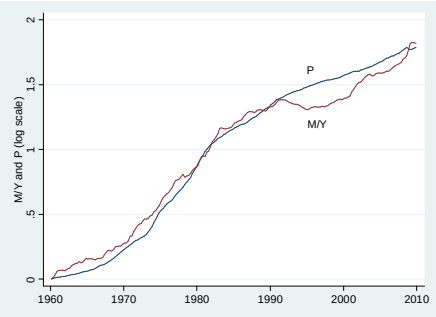
  - γ_M = growth of money supply (think: currency)
  - γ_V = growth of velocity
  - γ_P = growth of price level (the inflation rate)
  - γ_Y = growth of real GDP

Quantity theory

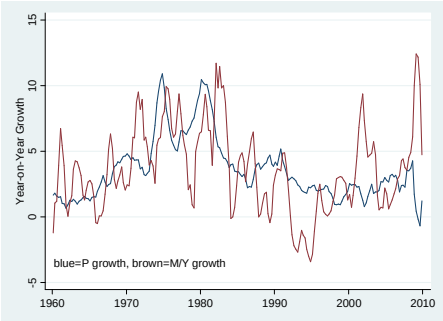
- Two hypotheses
  - V is constant ($\gamma_V = 0$)
  - Y not affected by changes in M
    [Or: changes in Y small relative to changes in M]
- One conclusion
  - Money growth causes inflation

$$\gamma_P = \gamma_M - \gamma_Y$$

Quantity theory: long-run evidence



Quantity theory: short-run evidence



Quantity theory: small inflations

- Lots of other things relevant in small inflations
- Link between money and prices not as tight
- More on this next week

Money supply mechanics

Money supply mechanics

- How the central bank manages the money supply
  - Money = currency for our purposes
  - Supply changed by buying/selling bonds in market
- Works through balance sheets for
  - Treasury
  - Central bank
  - Private agents (households and firms)

Money supply mechanics

Treasury

Assets		Liabilities	
		Bonds	200

Central bank

Assets		Liabilities	
Bonds	20	Money	20

Households and firms

Assets		Liabilities
Money	20	
Bonds	180	

- Where does treasury debt come from?
- How does central bank increase money supply?
- Why do households go along?

Money supply mechanics

Treasury

Assets		Liabilities	
		Bonds	200

Central bank

Assets		Liabilities	
Bonds	20	Money	20

Households and firms

Assets		Liabilities
Money	20	
Bonds	180	

- Where do deficits come in?
- Does there need to be a connection with money growth?
- Why so in hyperinflations?

Quantity theory: revised picture

Hyperinflation recap

- Hyperinflations – always! – stem from
  - Lack of fiscal discipline [= government deficit]
  - Accommodation by central bank [= printing money]
- How to end them: "stop doing it"
  - Balance government budget
  - Make central bank independent, prohibit it from buying debt directly from Treasury

Fiscal dominance in the US and EU

- **Fiscal dominance** means
  - Government debt and deficit are so large that the only alternative to explicit default is printing money
- US/Fed view of the world
  - Need aggressive monetary policy to recover from crisis
- EU/ECB view of the world
  - Need to resist inflation with tight monetary policy
  - US guilty of "soft fiscal dominance"

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What have we learned?

- Hyperinflation comes from
  - Large increases in money supply
  - Triggered by government deficits
- Solution: Stop doing it.
- Essential tools
  - Quantity theory
  - Central bank balance sheet

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For the ride home

- Question 1
  - Would Argentina be better off using USD?
  - Would the US be better off with gold?
- Question 2
  - Unexpected inflation hurts creditors [why? why unexpected?]
  - Does this violate property rights?

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