Inflation and Individual Investors' Behavior: Evidence from the German Hyperinflation

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Discussion:

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Summary

How do individuals respond to inflation?

- Little to no evidence on how people change savings allocations in response to inflation
- People should hold more stocks to hedge against inflationary pressure
- But if they suffer from money illusion, this may not be the case
    - Under money illusion people adjust discount rates up, but ignore that firms' cash flows also grow proportionately with inflation

Summary

- This paper: set-up
  - Examines the impact of inflation expectations on individuals' portfolio rebalancing decisions in Germany between 1920 to 1924
  - Great archival data
    - Information from 2000+ clients of a German bank
      - client-level security portfolios from deposit books
    - Firm-level data hand-collected from Handbook of German Stock Corporations
    - Stock prices and dividends from Berlin exchange
    - Monthly local consumer prices from the German Statistical Office

Summary

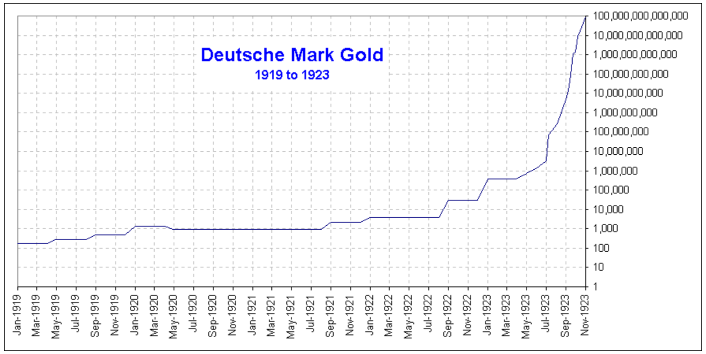
- This paper: findings
  - Investors who live in high-inflation areas buy less (sell more) stocks
    - 1% increase in local inflation associated with a 3.5% decline in the buy-sell imbalance for stocks
    - Effect stronger for less sophisticated investors
    - Positive relation between local inflation and forgone returns after stock sales
  - Instrumental variables analysis using local availability of paper (necessary for printing money) – very nice analysis!
  - Money illusion
    - Investments in real estates or foreign exchange or higher consumption needs unlikely to explain findings

Thoughts

- Fascinating paper
  - Inflation was extremely high and important during this period
  - The price of an egg rose 180-fold between 1914 and July 1922
  - A litre of milk climbed from 7 marks in April 1922 to 16 in August and 26 by mid-September
  - Money illusion would be particularly costly

Thoughts

- Fascinating paper
  - Historical context particularly useful
    - E.g., local experienced inflation proxy for expected inflation
      - Likely to be especially true in the 1920s before mass media
    - Very nice evidence on reversal when German economy stabilized
    - Other types of assets not popular
      - Foreign exchange banned
      - Real estate not a good option due to fixed rents
      - But what about gold/ jewelry?



Thoughts

- Clarification: discount-rate inflation vs. cash-flow inflation
  - Expected inflation is proxied by local inflation
    - Goes into discount rate
  - But cash-flow inflation is going to be determined by a difference between inflation in the firm's output market minus inflation in the firm's input market
  - In a model with heterogeneity, there is a wedge between inflation relevant to the discount rate and that relevant to the cash-flows

Thoughts

- Clarification: discount-rate inflation vs. cash-flow inflation
  - Example:
    - Suppose input & output market inflation same.
    - I live in Dresden. My inflation – and therefore expected inflation – is very high.
    - Company sells all over Germany, where inflation is lower than in Dresden.
    - Gordon growth model: $$\frac{D_{t+1}}{P_t} = \underbrace{R}_{\text{Dresden inflation}} - \underbrace{G}_{\text{Germany overall}}$$
    - For me in Dresden, stock is not going to be a good hedge
    - It's a better hedge for someone who lives in a lower-inflation city

Thoughts

- Hyperinflation, not high inflation

- Not sure I buy that these results are generally informative about how people behave during episodes of high – but not hyper- – inflation

  - E.g., money may not be neutral in hyperinflations if demand is destroyed
  - Not convinced by analysis in early sample – inflation still very high, and perhaps could have reasonably been expected to increase further

Thoughts

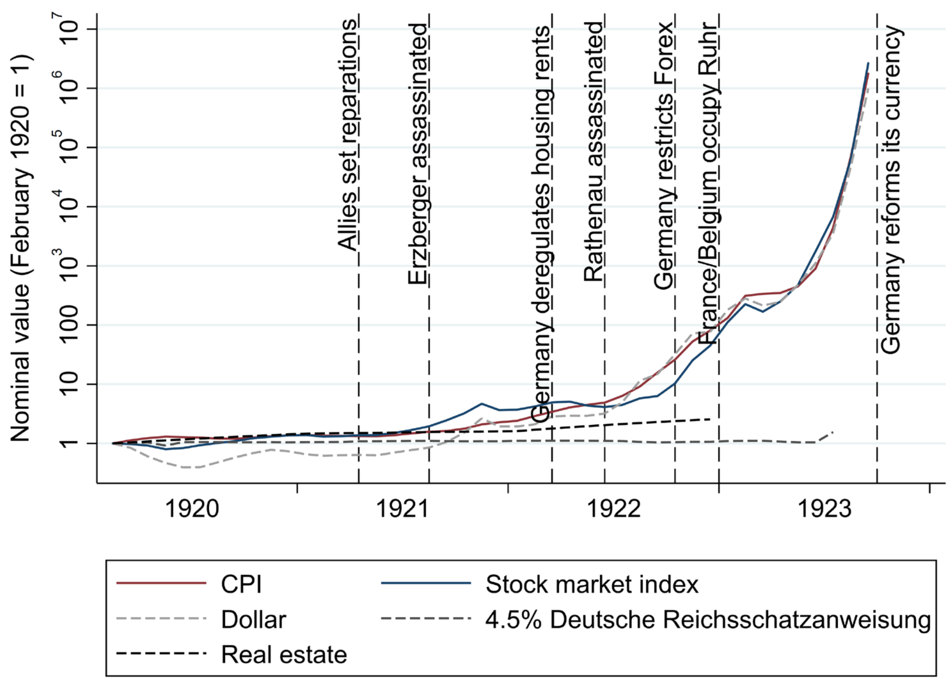
- Hyperinflation, not high inflation
- But also not sure why I need to generalize to normal-but-high inflation for the paper to be interesting
  - Studying how people behave during periods of extreme inflation also fascinating

Country	Date of Hanke Measurement	Hanke Annual Measured Inflation Rate[1]	Date for Last Official Inflation Rate	Last Recorded Offical Inflation Rate
Venezuela†	09/30/20	2,025%	July 2020	2358.50%[2]
Zimbabwe	09/30/20	431%	August 2020	761.02%
Lebanon	09/30/20	401%	August 2020	120.00%
Syria	09/30/20	262%	December 2019	34.50%
Sudan	09/30/20	255%	August 2020	166.83%
Iran	09/30/20	161%	September 2020	26.00%
Libya	09/30/20	41%	April 2020	1.30%
Turkey	09/30/20	37%	August 2020	11.77%
Brazil	09/30/20	37%	August 2020	0.36%
Argentina	09/30/20	36%	August 2020	40.70%
Nigeria	09/30/20	31%	August 2020	13.22%
Turkmenistan	09/30/20	27%	December 2018	13.30%

Thoughts

- Were stocks a good deal

- Should I have invested in stocks in Weimar Germany if I did NOT suffer from money illusion?



THE GERMAN STOCK MARKET.

Course of Prices in 1920 on Berlin's Stock Exchange.

Prices on the Berlin Boerse at the end of 1920 for some of the principal shares compare as follows with the quotations at the end of 1919:

	Dec. 31, 1920.	Dec. 31, 1919.
Deutsche Bank...........	327	265
Disconto Ges.............	248	170
Hamburg-America	194.37	124
General Electric Co.......	332	245
Phoenix Iron..............	655.25	298
Bismarckhutte Iron.......	735	256
Badische Aniline..........	570	360
Schultheiss Brewery......	338	242
Daimler Motor............	294.75	262.50
Deutsche Erdoel (oil).....	2,000	515
Otavi (colonial)...........	718	528.75

The fact that every one of these stocks ended at a substantial advance for the year, notwithstanding the reaction in values in nearly all other countries, is ascribed to the enormous inflation and great depreciation of the German paper currency during 1920. The Frankfurter Zeitung calculates that the combined value of twenty-five stocks on the Boerse was 5,424 in September, 1919, rising to 7,792 at the beginning of January, 1920, to 8,533 at the beginning of last June, and to 15,362 at the end of last December.

The New York Times
Published: February 6, 1921

Thoughts

- Were stocks a good deal

- What if I denominated German stocks in USD during this time

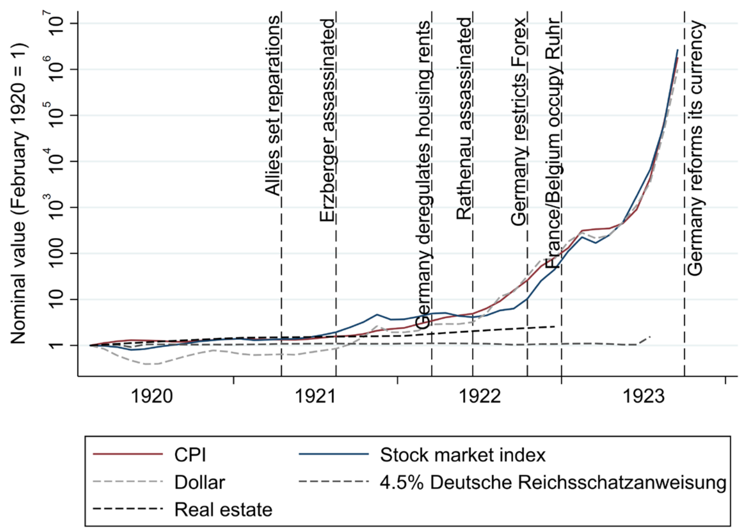
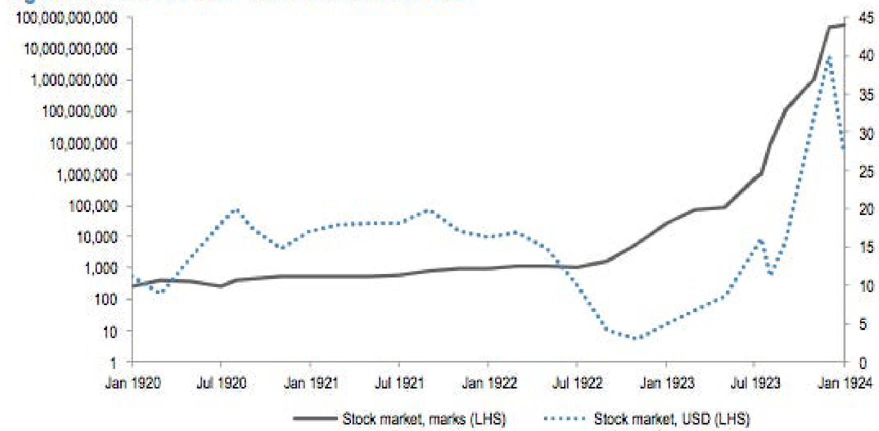


Figure 20: German stock market: in marks and USD



Source: J.P. Morgan estimates, "The Economics of Inflation", by Constantino Bresciani-Turroni

- At the peak of hyperinflation, even stocks were not a perfect hedge
  - But they certainly might have been a better hedge than, say, bonds

Thoughts

- Stocks vs bonds

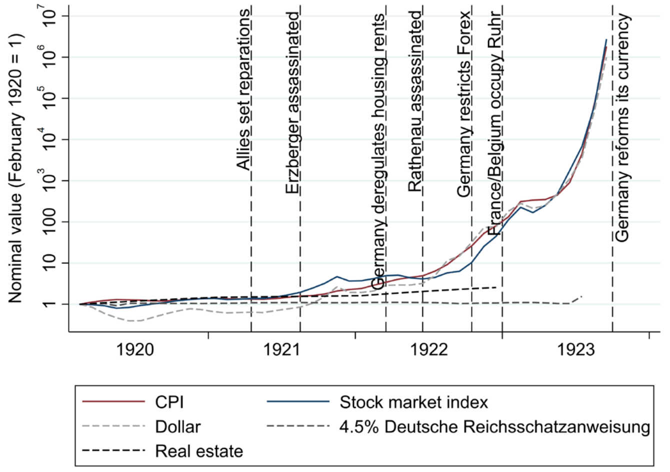
- While bonds also protect against expected inflation, they do not protect against unexpected inflation (unlike stocks)
- But buy-sell imbalances on bonds were positively related to local inflation
  - Not sure money illusion can explain this
  - Yes, relative to their rational benchmarks, no first-order money illusion for bonds, but much of the inflation was perhaps unexpected – and therefore bond losses likely to be large – at this time
    - After a point, people should have learned bonds were not great

Thoughts

- Stocks vs bonds

- What about the ultimate "arbitrageurs" of these markets – companies themselves?
  - If bonds were getting full value, but stocks were not, were corporations raising cash through debt rather than equity?

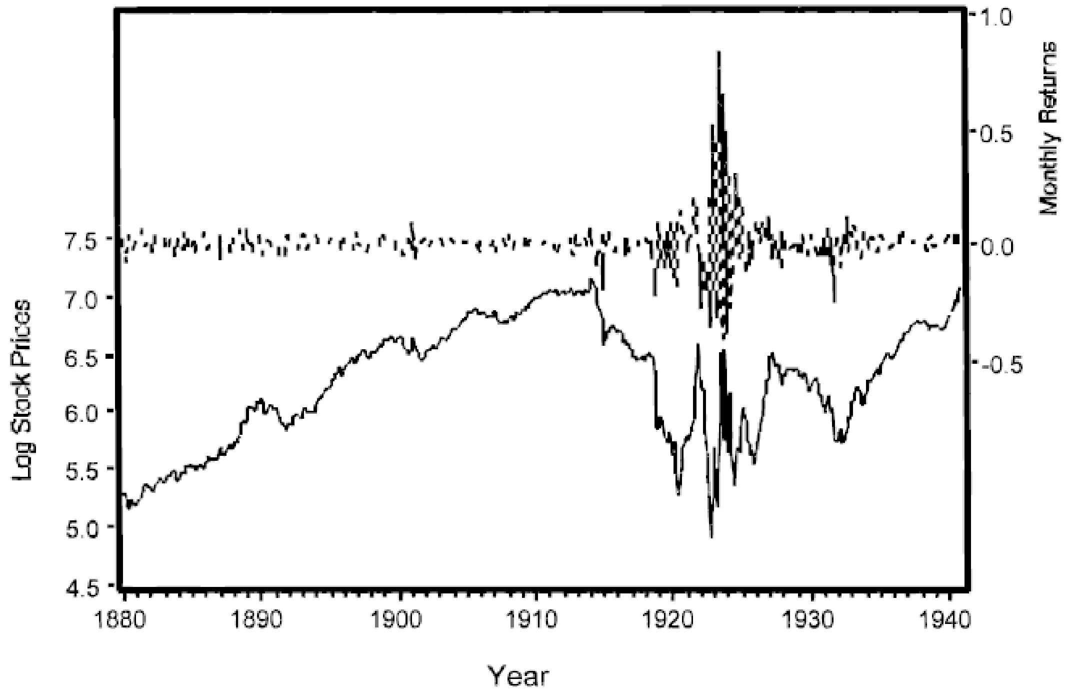
- If you were completely unsophisticated, and simply extrapolated, still stocks looked better in Weimar Germany



- Why would I buy bonds over stocks?

Thoughts

- Why not stocks?
- Volatility



  - Authors show that similar effects for low-vol and high-vol stocks, but how low is "low-vol" during such a period?
  - To be clear, may or may not be rational, but may or may not be money illusion

Conclusion

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- Fascinating paper on an important topic
  - If I were the referee I would definitely like to see the paper published
  - All the best!