Karlsruher Institut für Technologie

Problem Set 4
Vector Autoregressive (VAR) Models

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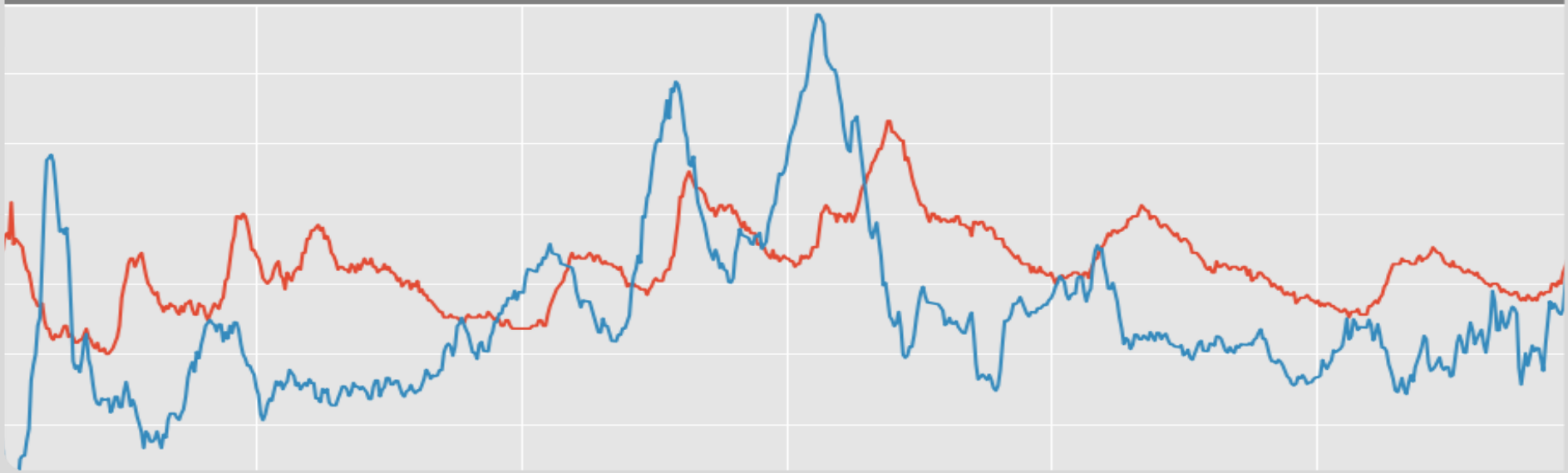
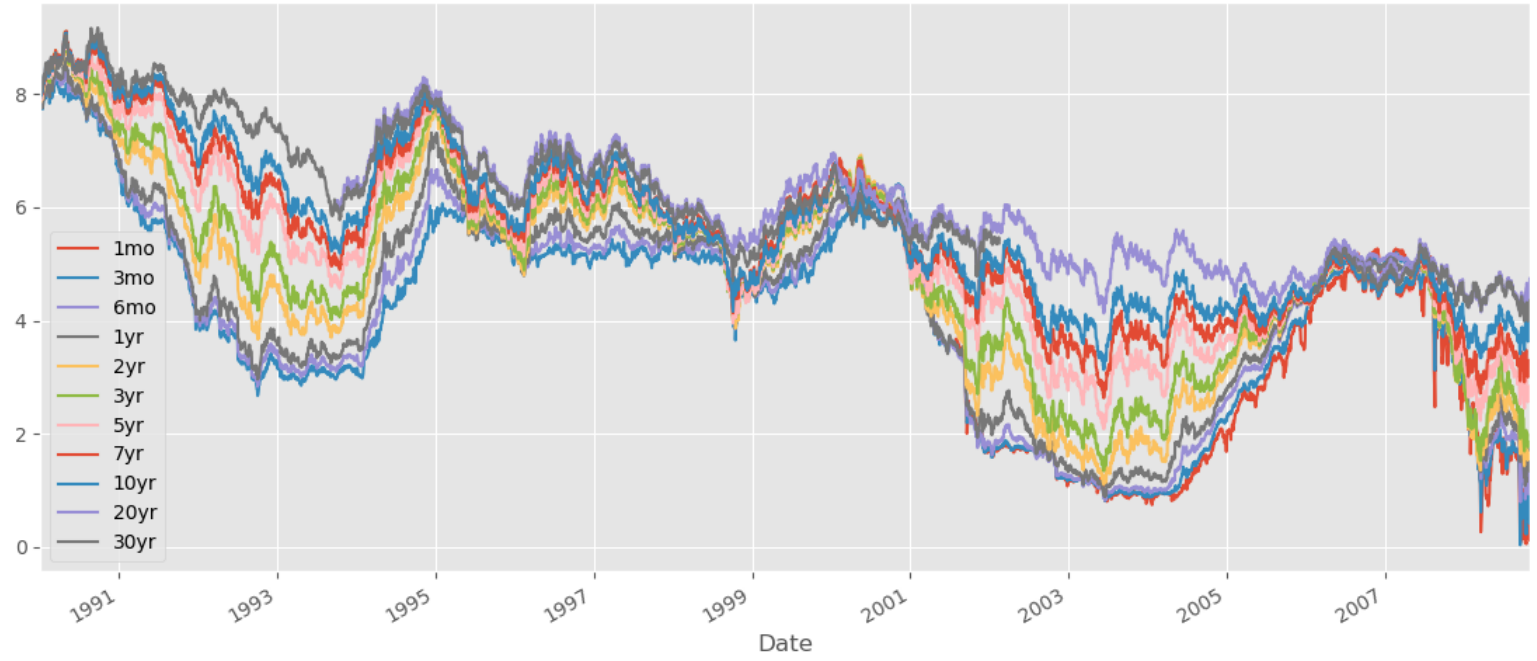
CRAM-Programming Lab WS 2017/18

FBV, Chair of Financial Economics and Risk Management

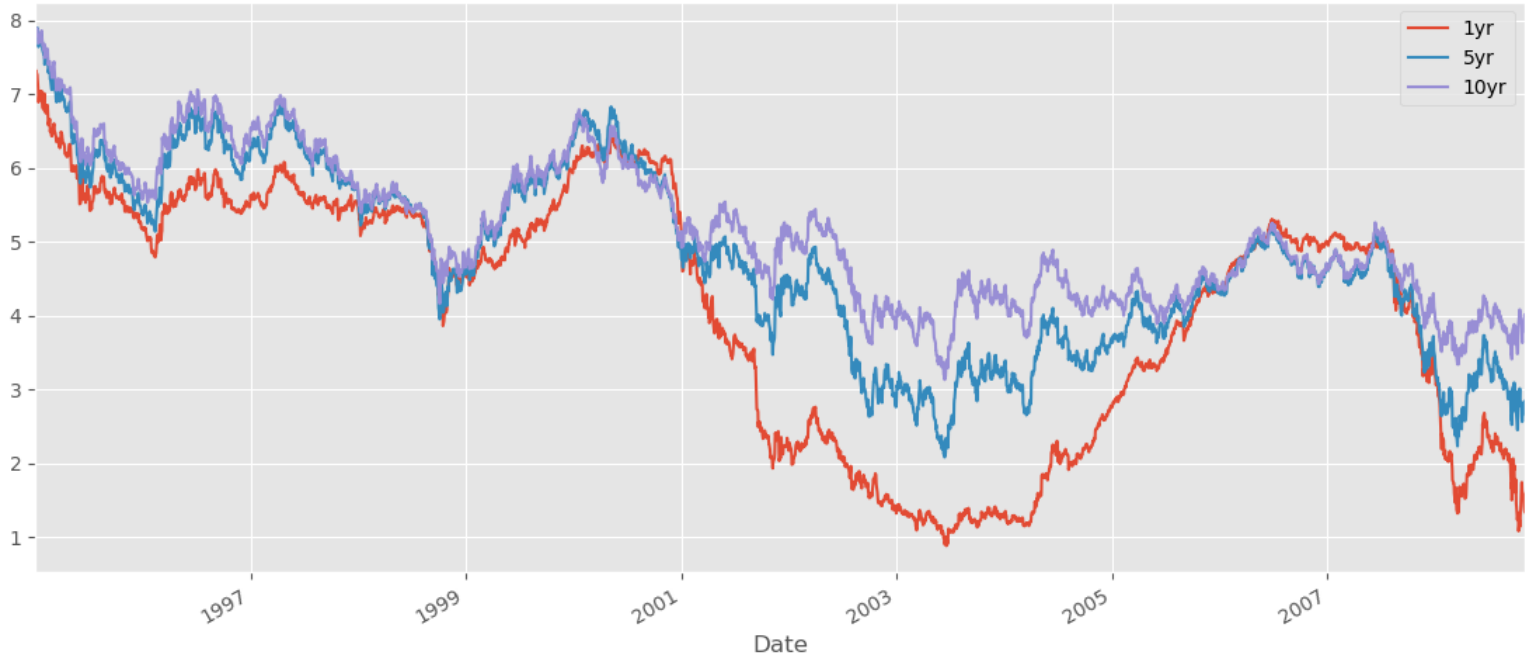


Question 1a: Treasury Yields



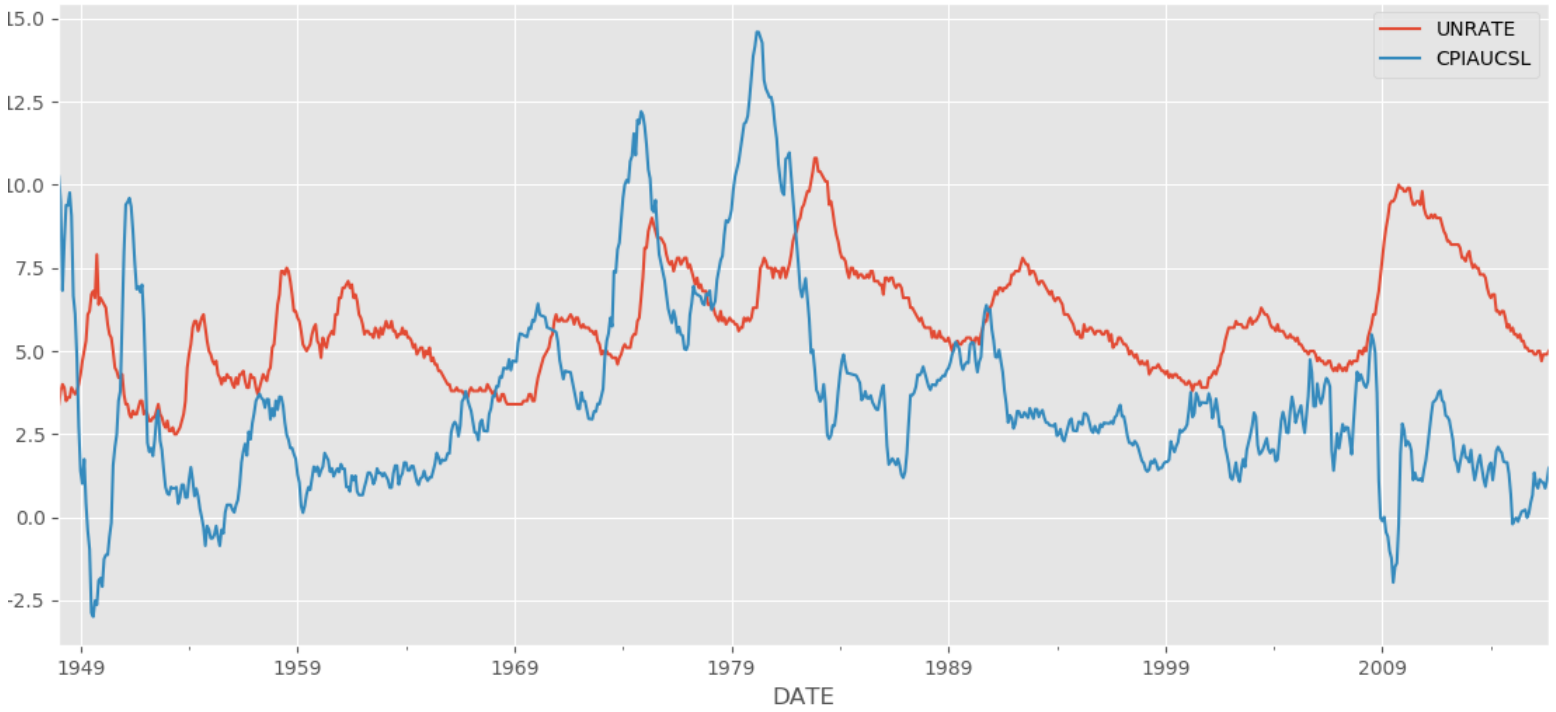
- Time series shows overall decreasing trends in yields to maturity over time

Question 1a: Treasury Yields



- Time series shows overall decreasing trends in yields to maturity over time
- Overall 10yr higher yield to maturity than 1yr
- 1yr shows bigger volatility than 10yr

Question 1b: Macroeconomic Data



Question 1b: Macroeconomic Data – Inflation Rate

- High in 1947 because of impact of the post–World War II
- Reached its bottom in 1949 owing to the Recession from 11/1948-10/1949. The figure then recovered, largely because of the outbreak of the Korean War
- Decreased again and remained stable because price control's strategy before increase in the 1970s due to the energy crisis (and, to a lesser extent, food shocks) .The decade of the early 1980s sees inflation reach its highest peaks since the 1940s.
- Inflation rates in 2009 fell dramatically, even becoming negative because of the effect of the global financial crisis in September 2008

Question 1b: Macroeconomic Data – Unemployement Rate

- Volatility, especially from 1979-1989. By March 1982 it had reached 9%, and in December of that year the unemployment rate peaked at 10.8% because of the recession. The unemployement rate fell to 7.2% by the 1984 presidential election. The figure did not fall below 6% until September 1987.
- Most recently, the unemployment rate fluctuated wildly, from a low of 4.7% in 2008 to a peak of 10.1% in 2009, after the U.S. housing bubble burst and Wall Street saw collapses.

Question 1c: Class ‚VAR‘

- *See code.*

Question 1d: VAR Estimation

Betas: [0.917 0.03 0.094 -0.179 0.094]
t-stats: [33.42 2.45 2.64 -3.01 2.64]
Betas: [-0.059 0.906 -0.007 -0.012 -0.007]
t-stats: [-0.77 26.8 -0.07 -0.07 -0.07]
Betas: [0.032 -0.018 0.394 0.132 0.394]
t-stats: [0.59 -0.77 5.6 1.12 5.6]
Betas: [0.004 -0.025 -0.059 1.053 -0.059]
t-stats: [0.06 -0.92 -0.74 7.89 -0.74]
Betas: [0.032 -0.018 0.394 0.132 0.394]
t-stats: [0.59 -0.77 5.6 1.12 5.6]
Corr of residuals: [[1. 0.043 -0.037 -0.077 -0.037]
[0.043 1. 0.048 0.047 0.048]
[-0.037 0.048 1. 0.956 1.]
[-0.077 0.047 0.956 1. 0.956]
[-0.037 0.048 1. 0.956 1.]]

Question 1e: Impulse Response Functoin

- *See code.*

Question 1f: Economic Analysis