Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds

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Inflation Bets or Deflation Hedges? The Changing Risks of Nominal Bonds

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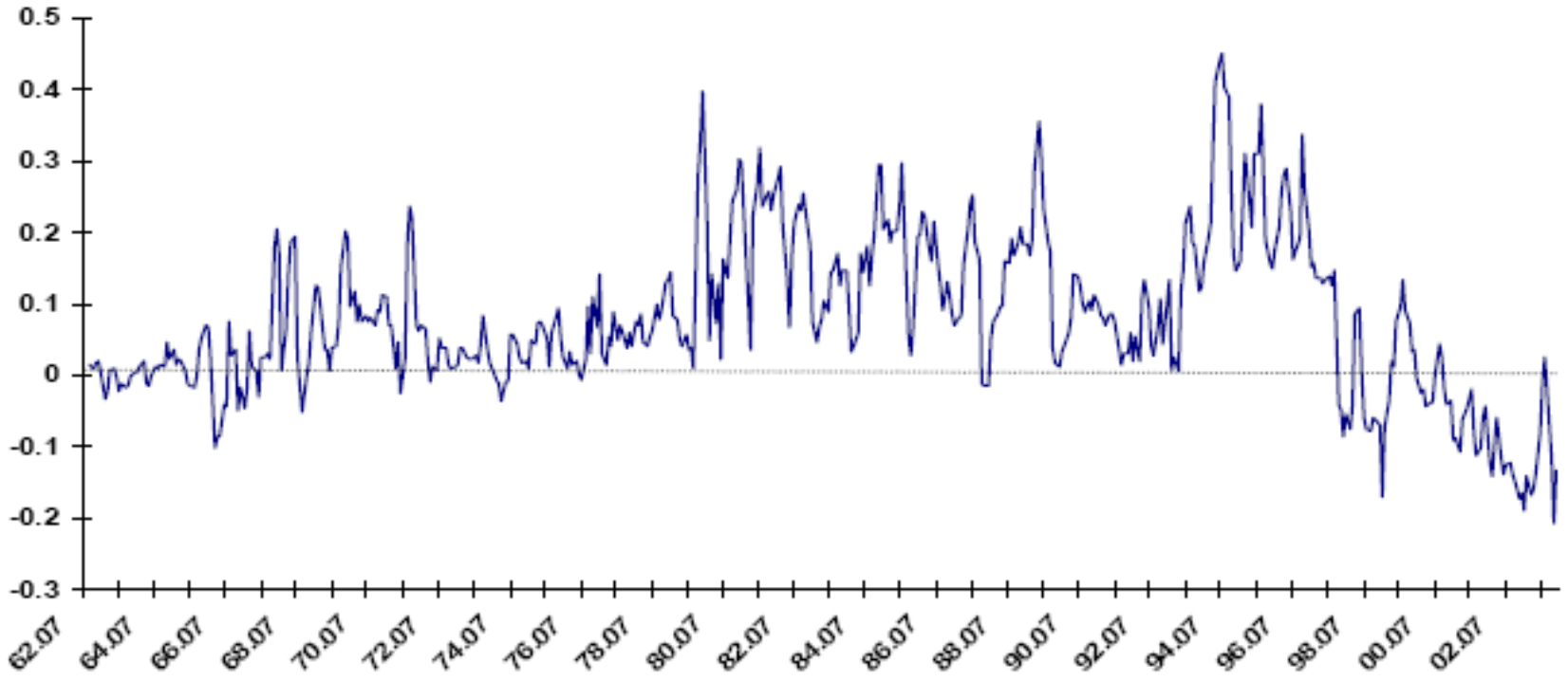
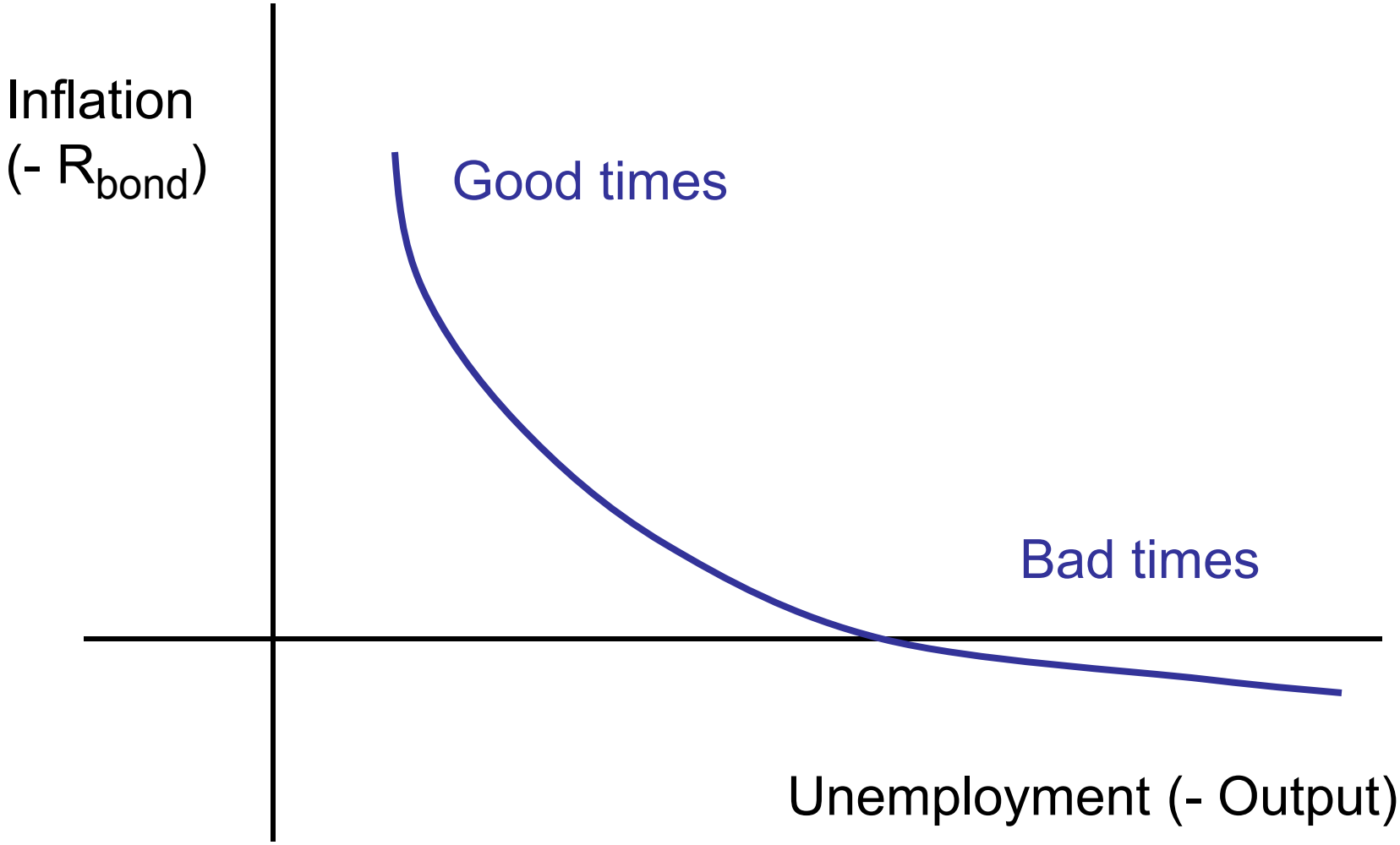
Figure 1
CAPM beta of bonds
(1962.07-2003.12)

Realized beta of bonds based on 3-months of daily returns on stocks and bonds.



Luis Viceira, “Bond Risk, Bond Return Volatility, and the Term Structure of Interest Rates”, 2007

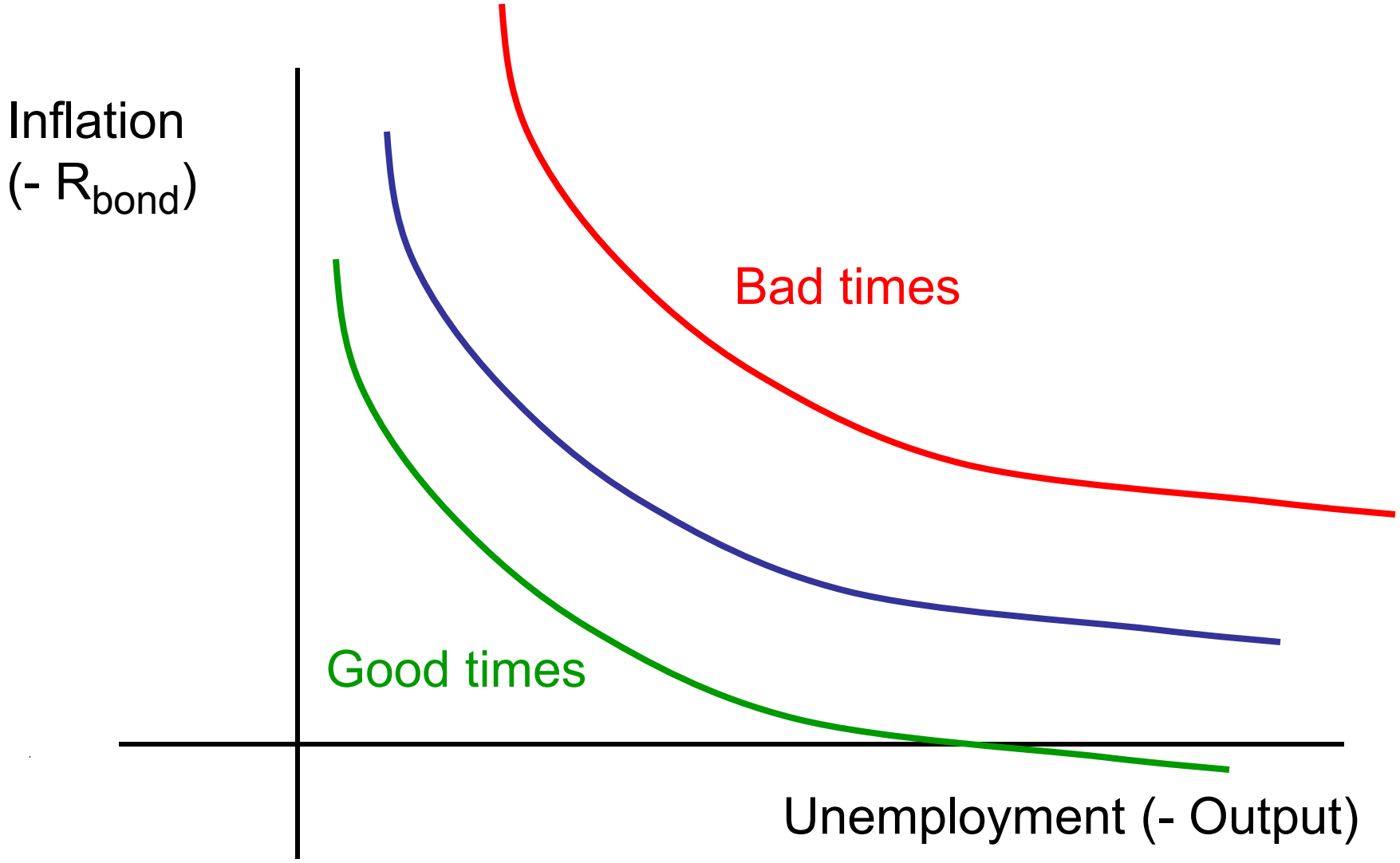
A Stable Phillips Curve



A Stable Phillips Curve

- Demand shocks and stable inflation expectations
- High inflation when the economy is strong and low inflation (deflation?) when it is weak
- Nominal bonds are countercyclical deflation hedges
- Risk premia are low or negative
- The yield curve is flat on average

An Unstable Phillips Curve

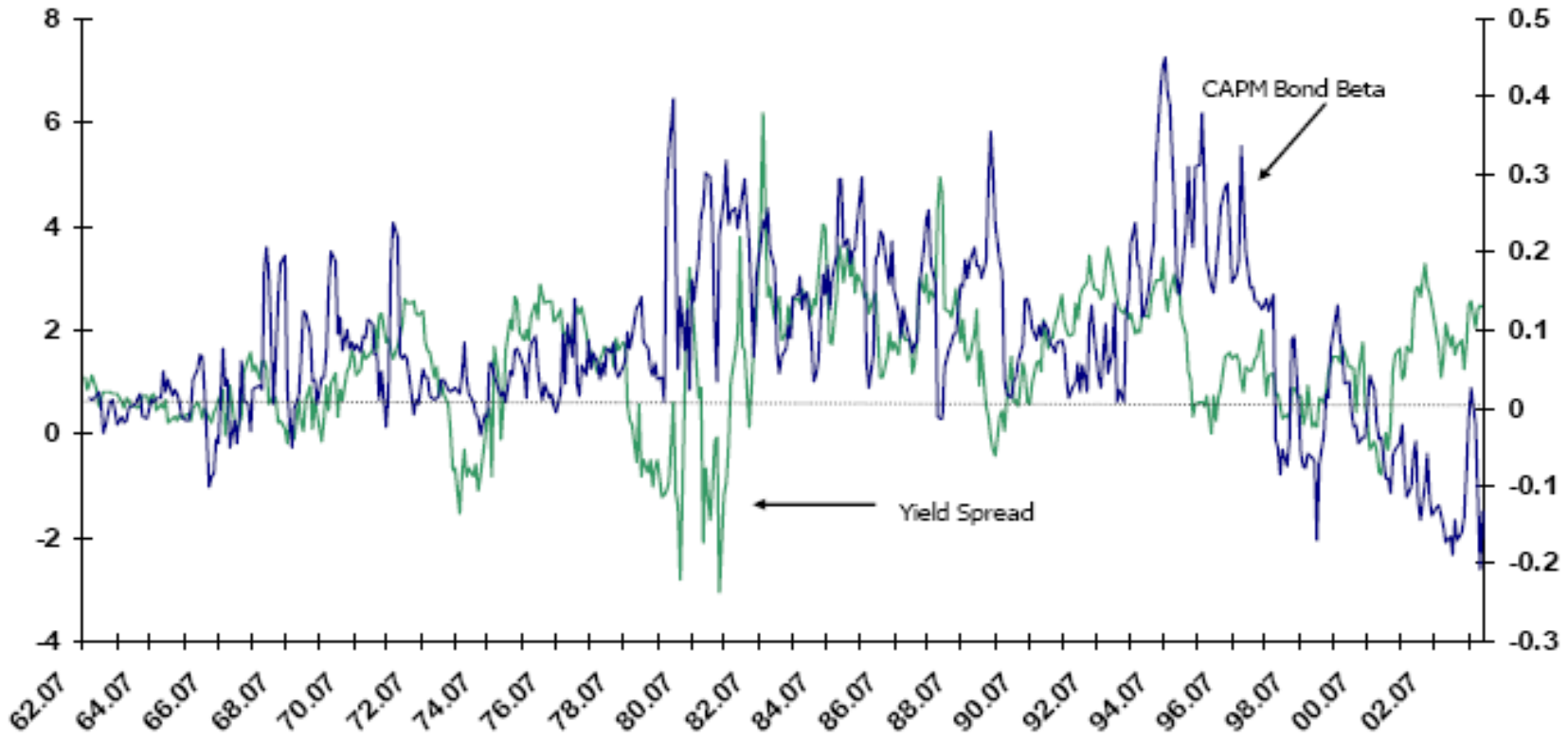


An Unstable Phillips Curve

- Supply shocks and/or unstable inflation expectations
- High inflation when the economy is weak (stagflation)
- Nominal bonds are procyclical inflation bets
- Risk premia are high
- The yield curve is steep on average

Figure 3
CAPM beta of bonds and the yield spread
(1962.07-2003.12)

Realized beta of bonds based on 3-months of daily returns on stocks and bonds (right axis), and annualized log yield spread (right axis)



Luis Viceira, “Bond Risk, Bond Return Volatility, and the Term Structure of Interest Rates”, 2007

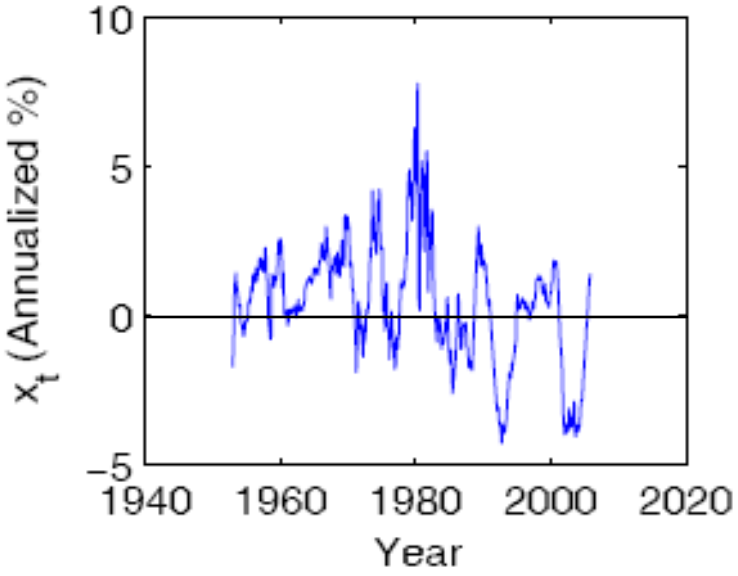
A Bond Pricing Model

- Four factors:
  - Real interest rate x_t (mean-reverting)
  - Risk aversion z_t (persistent)
  - Expected inflation ξ_t (persistent)
  - Covariance of nominal and real variables ψ_t (persistent, can change sign)
- Log inflation-indexed yields are affine, log nominal yields are quadratic in the state variables

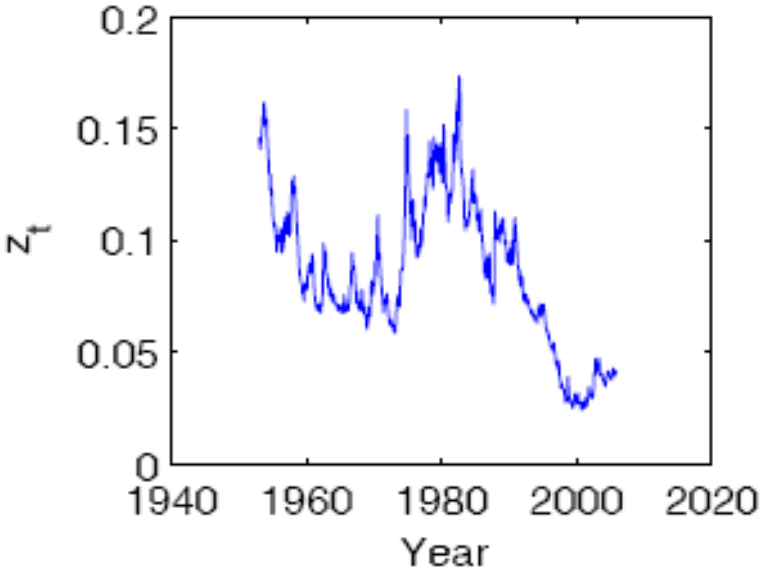
Estimation

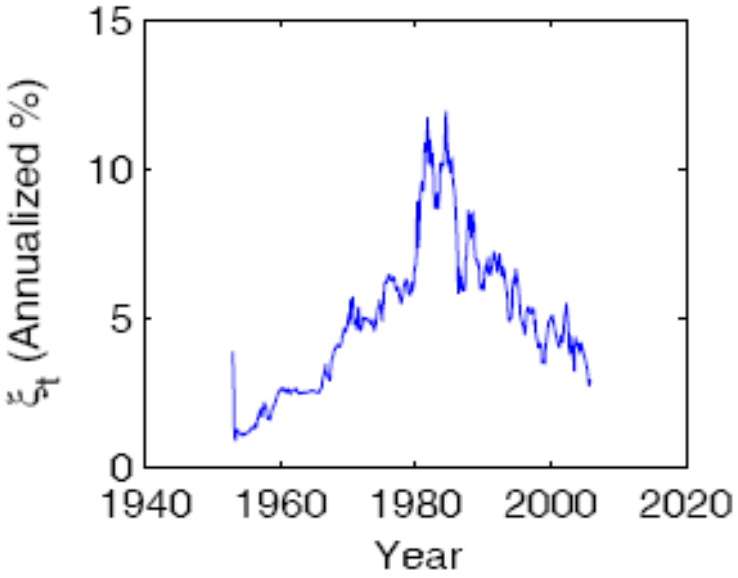
- Kalman filter approach because state variables are unobserved
- Observed variables:
  - Nominal yield curve at maturities 3 months, 1 year, 3 years, 10 years
  - Realized inflation
  - Equity returns and D/P (proxy for risk aversion)
  - Realized covariance of nominal bonds and equities in daily data

Real interest rate

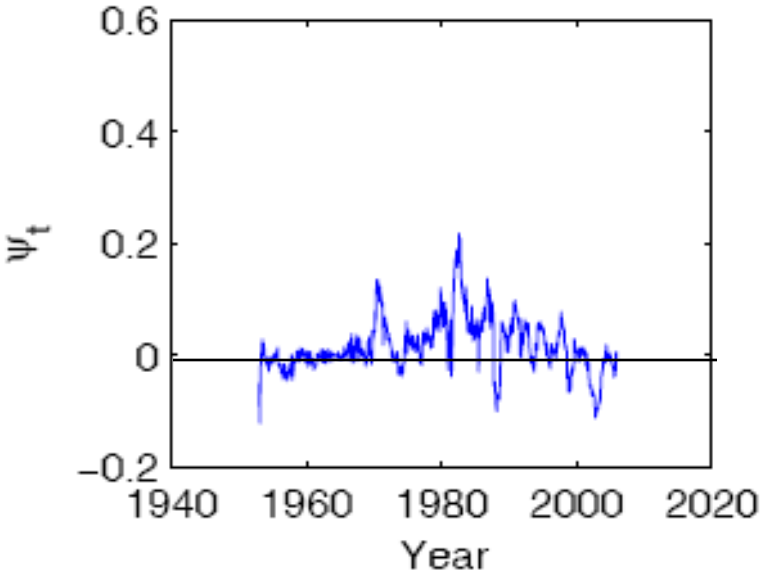


Risk aversion

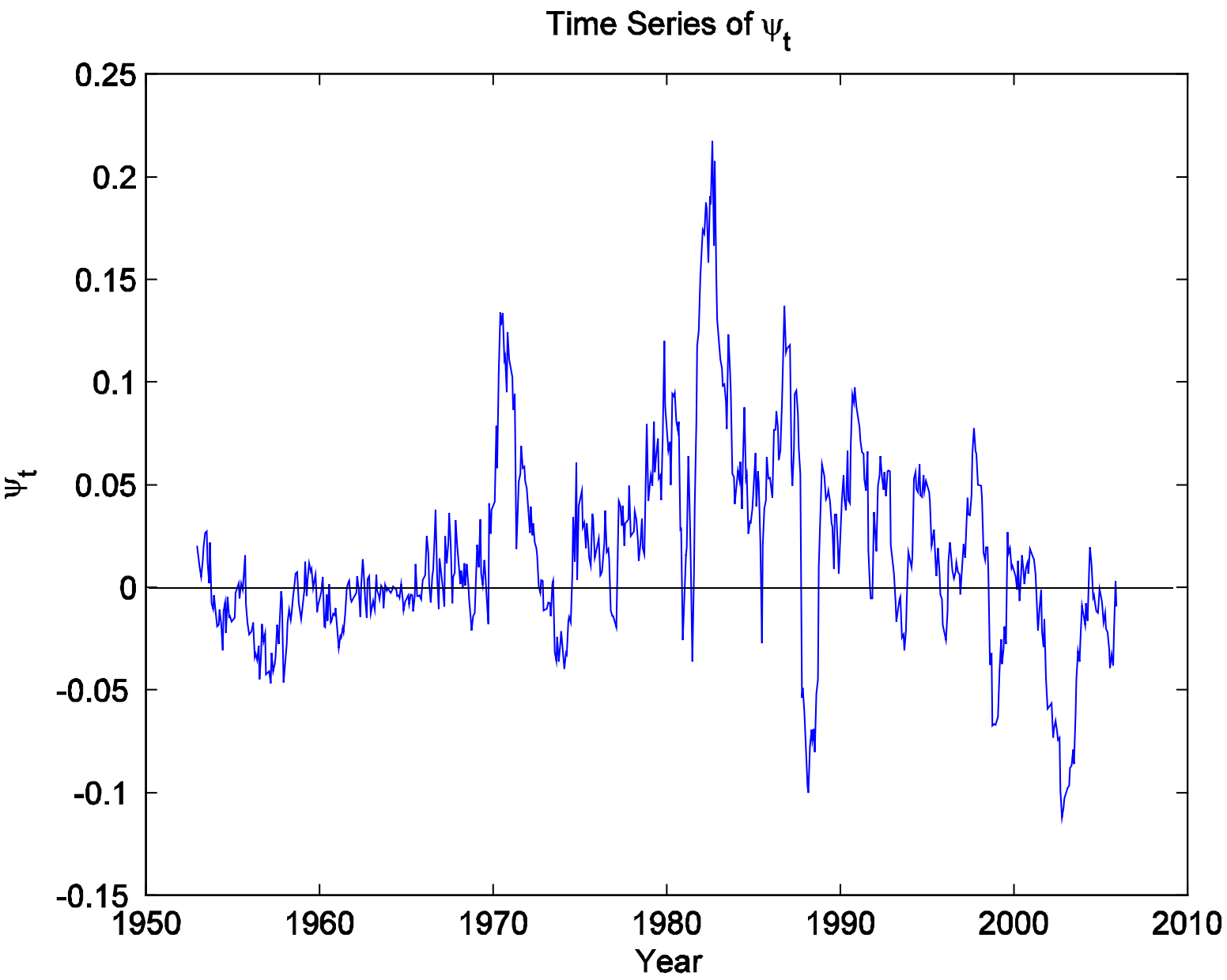




Expected inflation

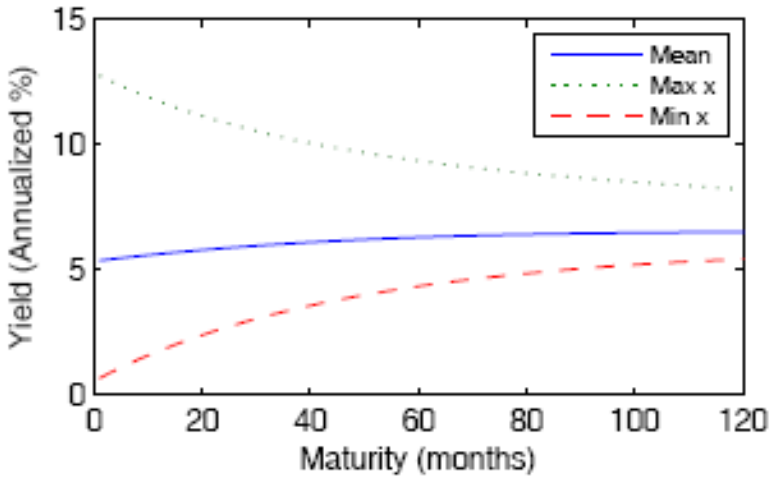


Nominal-real covariance

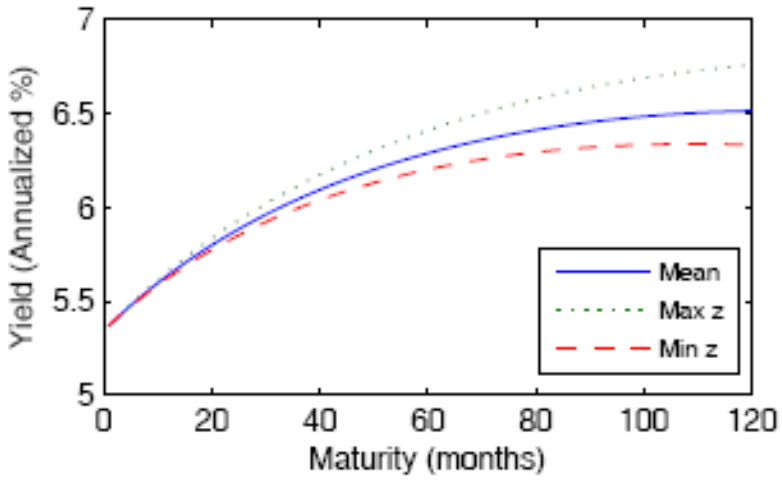


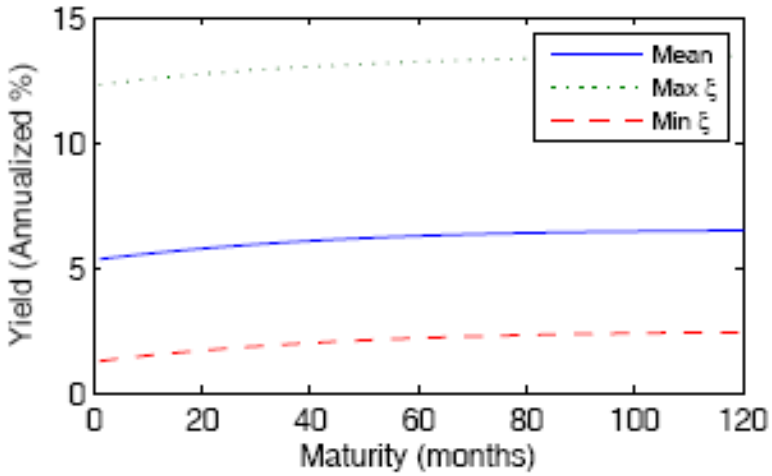
Nominal-real covariance

Real interest rate

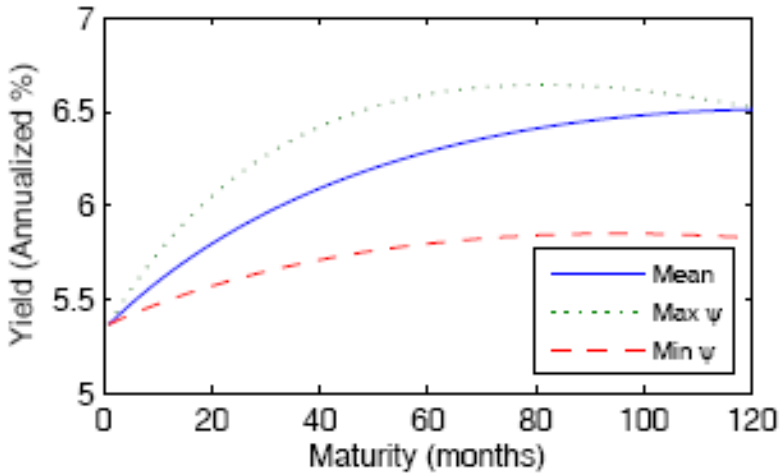


Risk aversion



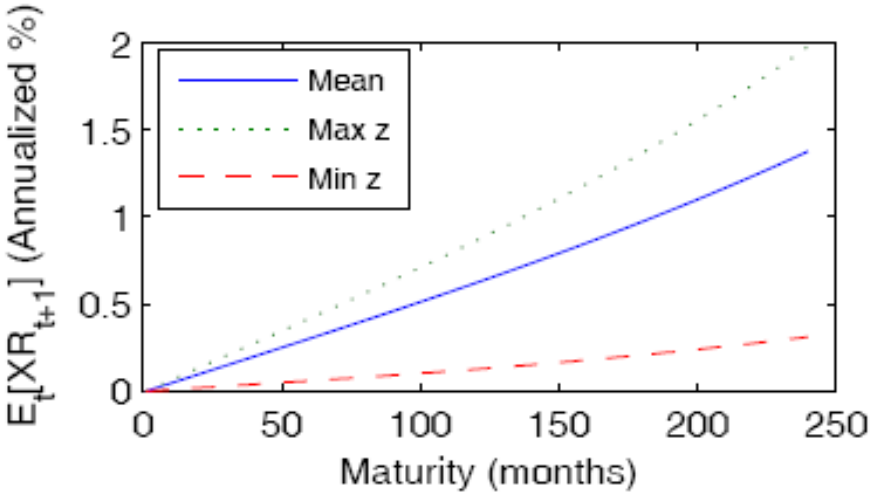


Expected inflation



Nominal-real covariance

Risk aversion



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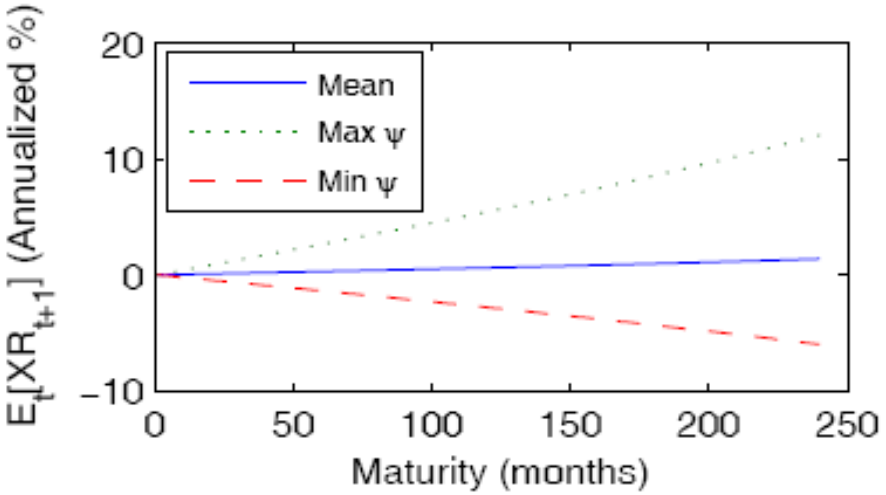
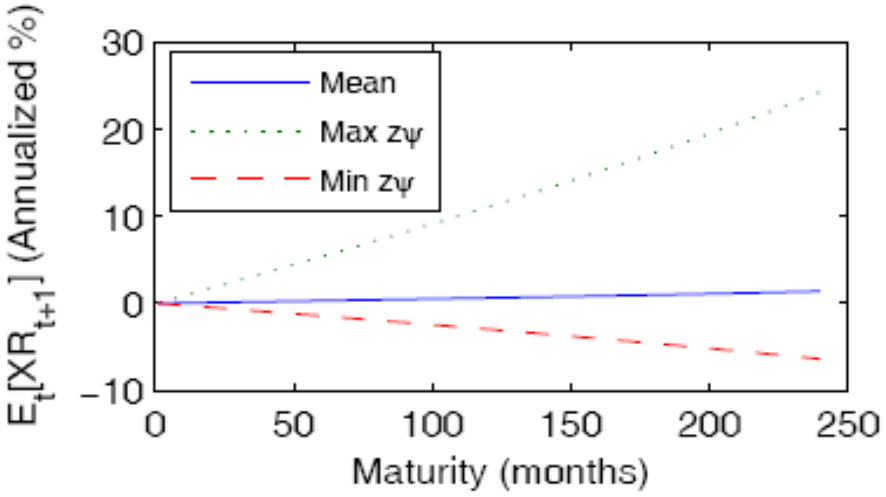
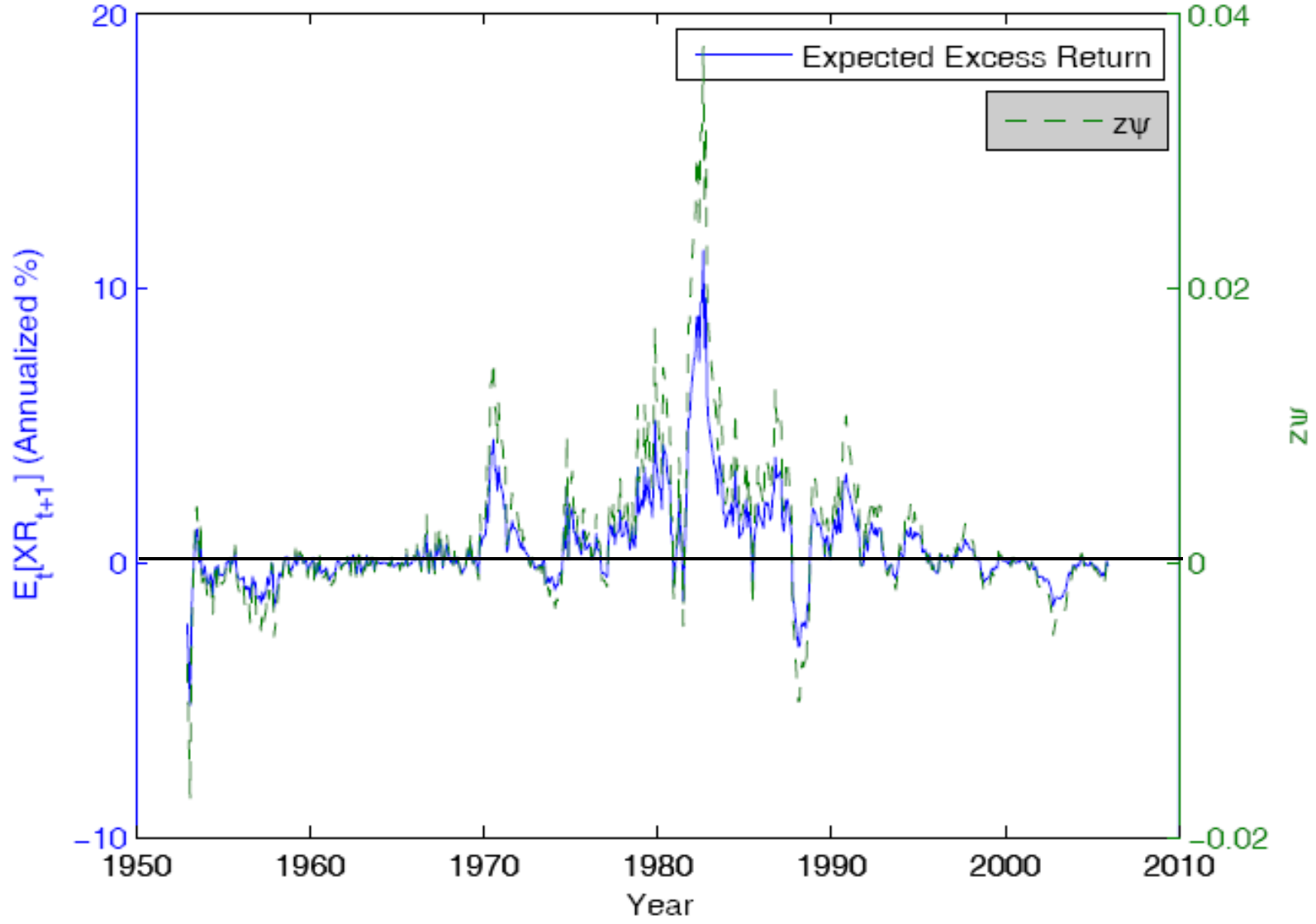




Product of risk aversion and nominal-real covariance

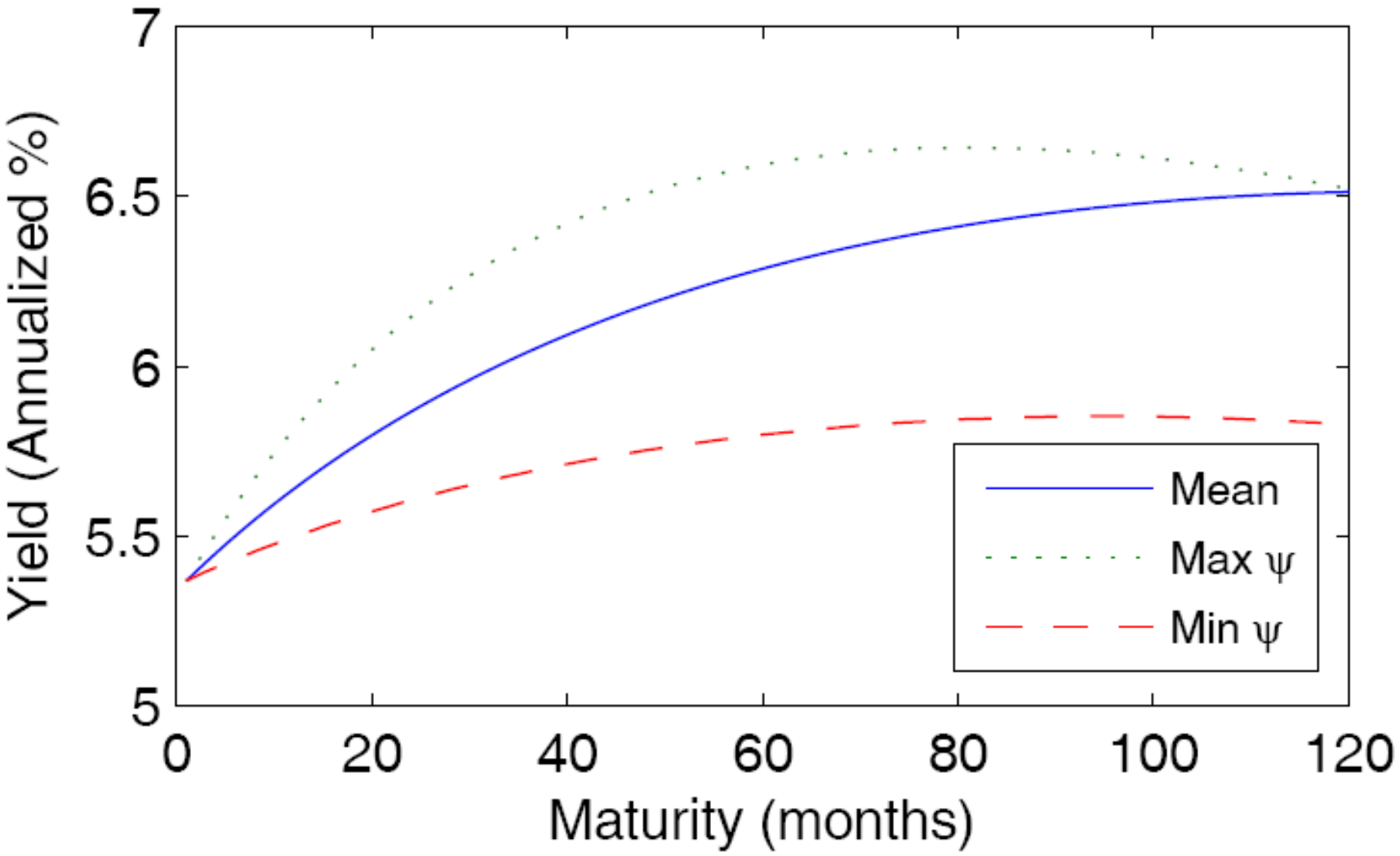

Expected Excess Return
zψ
20
10
0
−10
0.04
0.02
0
−0.02
1950
1960
1970
1980
1990
2000
2010
Year
$E_t[XR_{t+1}]$ (Annualized %)
zψ

Spread vs. Tent

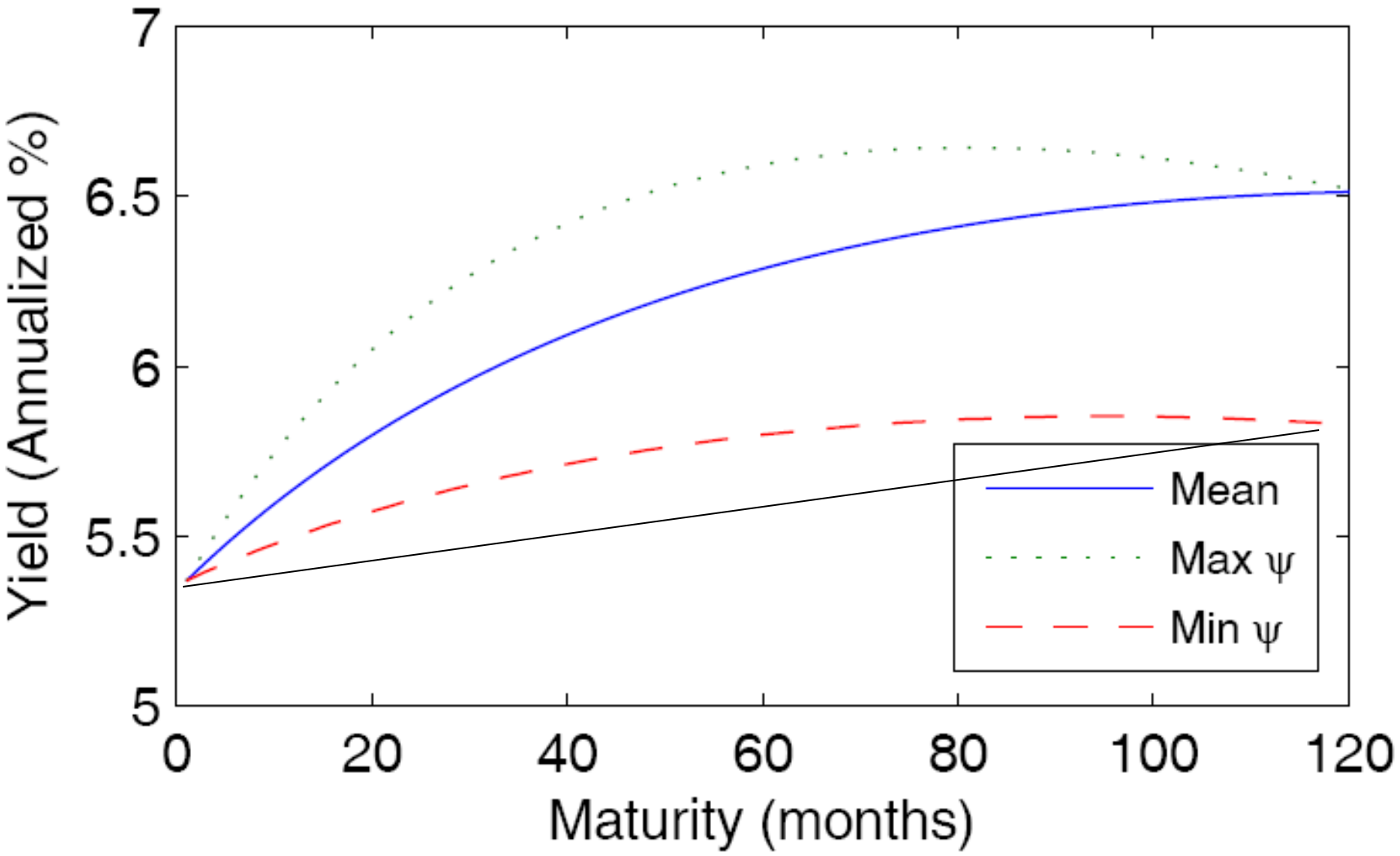
- Cochrane and Piazzesi (2005) find that a tent-shaped linear combination of forward rates predicts excess bond returns better than yield spreads
- Their tent variable is high when 3-year yield is high relative to the average of short-term and 10-year yields
- Thus it captures the concavity (curvature) of the yield curve

Spread vs. Tent

- Our model's explanation:
  - Nominal-real covariance ψ increases the risk premium, which raises the yield spread
  - But ψ also raises bond volatility, which lowers the yield spread through Jensen's Inequality (convexity of long bonds)
  - The two effects cancel at 10 years, but the risk premium effect dominates at 3 years
  - Thus ψ increases the 3-year yield relative to long and short yields, making the yield curve more concave



Nominal-real covariance



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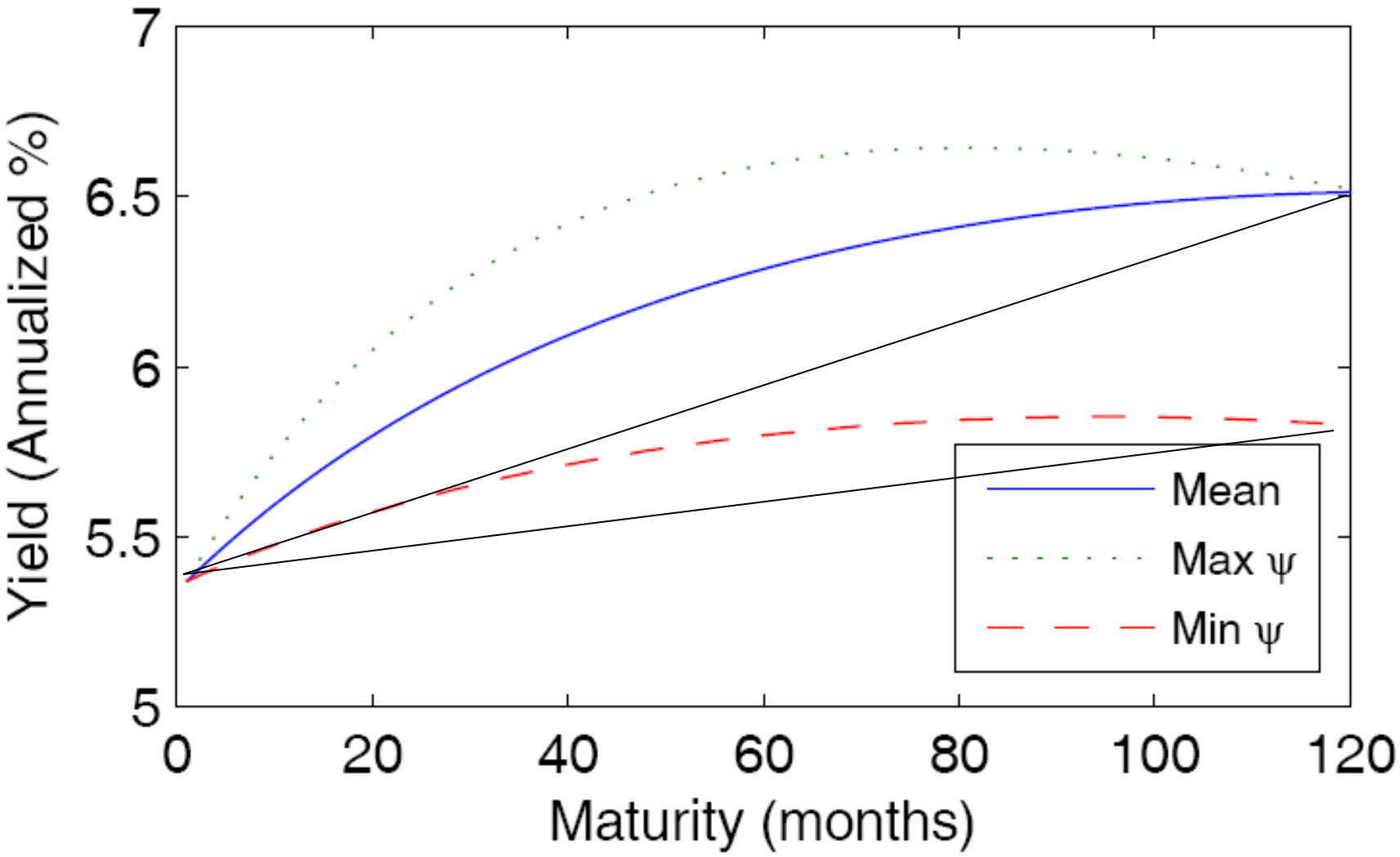

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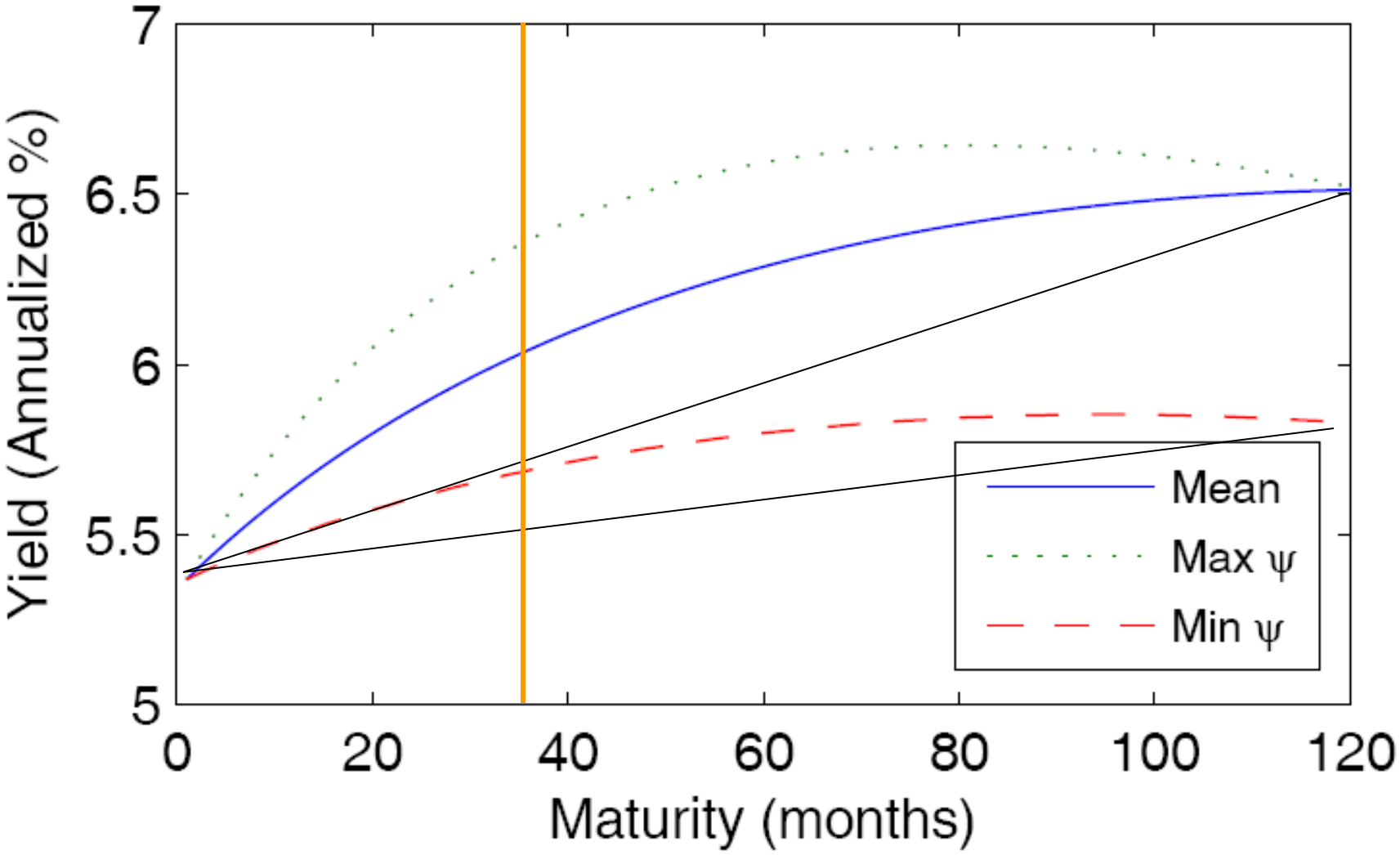

Nominal-real covariance

Conclusion

- Asset allocation analysis typically assumes stable risks of asset classes
- For nominal bonds, this is a mistake
- Nominal bonds hedge investors against deflation, but expose them to stagflation
- Which is the greater risk depends on the economic and monetary policy environment