Discussion of "The Cross Section and Time Series of Stock and Bond Returns" by Koijen, Lustig & Van Nieuwerburgh

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Summary

- Affine model in which:
  - 3 priced factors explain the cross section of bond and stock returns:

    level, CP, DP
  - 2 factors explain the time variation in bond and stock returns:

    CP, DP

- Affine model outperforms Fama-French 3 Factor model (market, size, value) in explaining the cross section of bond and stock portfolios

Discussion

- Brief review of the affine model

- Comments:

  (i) contribution of the paper

  (ii) outperformance relative to 3FF:
  stock portfolios versus bonds portfolios

  (iii) other model comparisons that I would find more interesting,
  justification/motivation for parsimony

  (iv) asset prices as factors, economic interpretation

Brief review of the affine model

state vector: $X_t = (\underbrace{\text{CP, level, slope, curvature}}_{\text{affine bond pricing model}} \vdots \text{DP})$

Cochrane & Piazzesi 2008

additional state variable for stocks

homoskedastic VAR dynamics of the state vector:

$$\begin{bmatrix} CP \\ \text{level} \\ \text{slope} \\ \text{curva} \\ \dots \\ \text{DP} \end{bmatrix}_t = \begin{bmatrix} \bigstar & \bigstar & \bigstar & \bigstar & 0 \\ \bigstar & \bigstar & \bigstar & \bigstar & 0 \\ \bigstar & \bigstar & \bigstar & \bigstar & 0 \\ \bigstar & \bigstar & \bigstar & \bigstar & 0 \\ \dots & \dots & \dots & \dots & \dots \\ ? & ? & ? & ? & \bigstar \end{bmatrix} \begin{bmatrix} CP \\ \text{level} \\ \text{slope} \\ \text{curva} \\ \dots \\ \text{DP} \end{bmatrix}_{t-1} + \begin{bmatrix} \bigstar & 0 & 0 & 0 & 0 \\ \bigstar & \bigstar & 0 & 0 & 0 \\ \bigstar & \bigstar & \bigstar & 0 & 0 \\ \bigstar & \bigstar & \bigstar & \bigstar & 0 \\ \dots & \dots & \dots & \dots & \dots \\ ? & ? & ? & ? & \bigstar \end{bmatrix} \varepsilon_t$$

autonomous subblock for bond pricing

DP appended

Brief review of the affine model

pricing kernel: $M_t = \exp\left(-r_t - \frac{1}{2}\lambda_t^\top \lambda_t - \frac{1}{2}\lambda_t^\top \varepsilon_t\right)$

$$\lambda_t = \begin{bmatrix} \bigstar \\ \bigstar \\ 0 \\ 0 \\ \cdots \\ \bigstar \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ \bigstar & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ \bigstar & 0 & 0 & 0 & \bigstar \end{bmatrix} \begin{bmatrix} CP \\ \text{level} \\ \text{slope} \\ \text{curva} \\ \cdots \\ \text{DP} \end{bmatrix}$$

rows 1-4: bond pricing model (Cochrane & Piazzesi 2008)

only level shocks get priced

time variation only because of CP

row 5: additionally for stock pricing

also CP and DP shocks get priced

time variation because of CP and DP

Comments: (i) contribution of the paper

- Joint pricing of bonds and stocks: "festival" approach

  Fama and French 1993, Mamaysky 2001 with affine model:

  MKT, SMB, HML + two bond factors

- Bekaert and Grenadier 2001, Bekaert, Grenadier & coauthors,

  Brennan, Wang and Xia 2004, Lettau and Wachter 2008:

  more parsimonious: mix of macro variables and bond factors

- This paper adopts state of the art for bonds:

  level of interest rates determines bond returns, CP their predictability

  DP and CP determine stock returns, both their predictability

Comments: (ii) outperformance relative to 3 FF: bonds versus stocks

- 3 FF: market, size, value, designed for the cross section of stocks

	RN SDF	**Our Model**	Level	Level-only bonds	DP	Level + DP	FF
			Panel A: Pricing Errors (in % per year)				
1-yr	1.11	-0.43	-0.41	0.69	1.00	0.68	0.91
2-yr	1.31	-0.55	-1.62	0.50	1.15	0.53	0.97
5-yr	1.69	-0.19	-4.10	0.09	1.43	0.19	1.08
7-yr	1.99	0.38	-4.82	0.11	1.61	0.15	1.22
10-yr	1.62	0.17	-6.02	-0.49	1.09	-0.54	0.56
Market	6.00	-0.74	4.22	5.51	-1.55	-0.06	-0.06
BM1	4.97	0.02	3.38	4.53	-3.28	-3.15	0.53
BM2	5.86	-0.36	3.79	5.29	-1.85	-1.85	0.07
BM3	6.65	0.04	4.52	6.06	-0.83	-0.86	0.03
BM4	6.37	-0.06	4.39	5.82	-0.99	-0.99	-0.84
BM5	7.30	0.79	5.39	6.77	0.55	0.52	-0.17
BM6	7.35	0.25	5.08	6.72	0.40	0.31	-0.30
BM7	7.32	-1.17	5.13	6.72	0.76	0.66	-1.01
BM8	9.10	0.28	7.20	8.58	2.34	2.32	0.05
BM9	9.69	0.70	7.94	9.20	2.76	2.78	0.95
BM10	10.12	0.27	9.25	9.88	2.35	2.61	0.41
MAPE	**5.53**	**0.40**	**4.83**	**4.81**	**1.50**	**1.23**	**0.57**

Comments (iii) other model comparisons

- Q: "Which 3 factor model does better on bonds, on stocks, on everything jointly?"

  3 FF use market, size, value designed for the cross section of stocks

  model here uses CP, level, DP

  A: on bonds, model here wins; on stocks, 3FF wins;

  on everything jointly, model here wins

- Q: "Which factor model does better on bonds, on stocks, on everything jointly?"

  add **two bond factors** for the cross section of bonds, *5 factor models*

  Fama-French 1993: excess return on a long bond, default spread

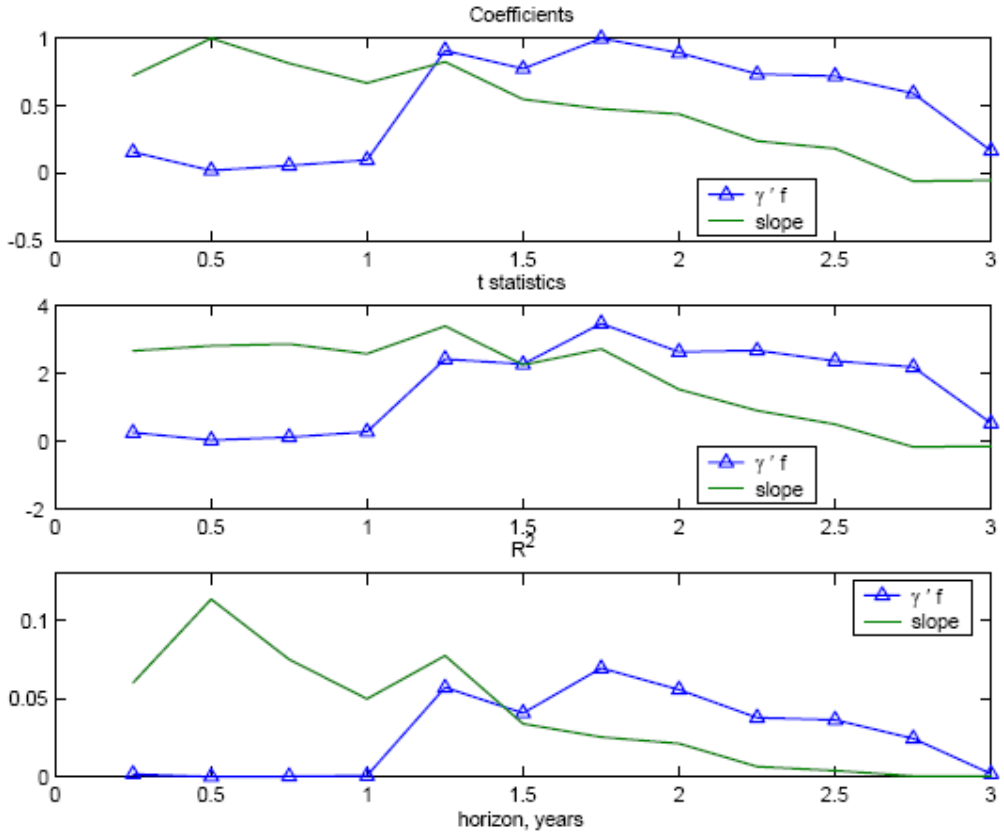
  Mamaysky 2001: short bond yield, long bond yield

  A: ?

- if festival approach does better, give good justification/motivation for parsimony

Comments (iv) asset prices as factors, economic interpretation

- CP factor predicts real GDP growth one — three years ahead



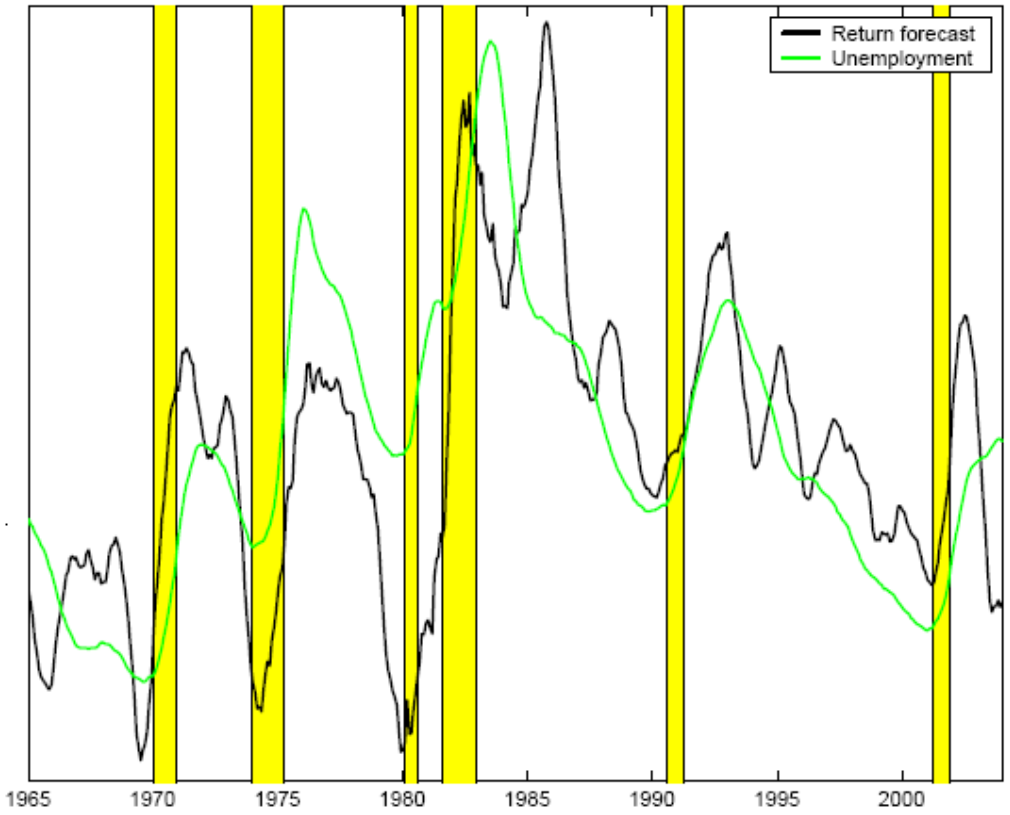
paper here: Chicago Fed National Activity Index

Comments (iv) asset prices as factors, economic interpretation

- CP high in recessions:

  CP predicts growth, activity with a positive sign

  CP predicts excess returns on bonds with a positive sign



Comments (iv) asset prices as factors, economic interpretation

- CP high in recessions, forecasts better times

- estimated model here: shock that raises CP is interpreted as "good times"

  (e.g., market price of risk is positive, value stocks are risky because their returns covary with CP shocks)

- "good times" here: "good news about *future* consumption",

  not current consumption

- can't replace CP with macro variables

  - financial data is clean, macro variables are dirty

  - leading indicators (e.g., summer 2007: default spreads were high although GDP growth was still high)

Conclusion

- nice paper

- main insight:

  CP is a factor that helps with the cross section of stock returns!

  (it also predicts stock returns)

- more comparisons with "festival approach" that throws everything in

- economic interpretation:

  CP itself is bad (high in recessions, looks like unemployment),

  but indicates better times to come