

Discussion of:

**”Risk Premiums in Dynamic Term Structure
Models with Unspanned Macro Risks”**

by

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Toulouse School of Economics, May 21, 2010

Main Results

- ▶ Introduce a new class of Gaussian DTSMs with macroeconomic variables that are not spanned by bond yields.
 - ▶ Solves a theoretical problem of traditional Macro-DTSMs: Macro variables do not have to be redundant!
 - ▶ Evidence that unspanned macro risks affect bond risk premium (Ludvigson and Ng, 2009)
- ▶ Use the new models to analyze the impact of macro variables in forward term premiums, and the impact of shocks on term premiums in macro variables.

Are Unspanned Macro Risks Really Priced?

- ▶ Evidence in favor: Ludvigson and Ng (2009); Cooper and Priestley (2008).
- ▶ Higher number of factors (5-factors) in yields-only models strongly improves predictability of bond excess returns: Cochrane and Piazzesi (2005), Duffee (2009).
- ▶ In this paper: JPS run regressions of expected bond returns on Principal Components and Macro Variables.
 - ▶ Show that although PC4 and PC5 improve forecasting power (above other PCs), they have less predictive power than macro variables...
 - ▶ and become statistically insignificant once macro variables are included in the regressions.

Priced Unspan. Macro Risk: Convincing Arguments

- ▶ Benchmark: A 5-factor yields-only model with reduced risk-premium rank.
 - ▶ According to Joslin, Singleton and Zhu (2010) in reduced-rank risk premium GDTSMs, no-arbitrage matters for forecasting purposes.
 - ▶ My suggestion is to allow the that PC4 and PC5 affect risk premiums of lower order PCs but PC4 and PC5 are not priced (have zero market prices)
- ▶ Compare the predictability of this new model with that of the corresponding Unspanned Macro-DTSM in this paper.
- ▶ Another robustness check: Compare the predictability of the filtered 5-factor model by Duffee (2009) with the model in the current paper.
- ▶ Adopt formal model selection procedures to justify the existence or not of priced unspanned macro risk.

Traditional Macro-DTSMs x Yields-Only Models

- ▶ JPS (2010) argue that all \mathcal{R} -factor models have the same bond pricing and the same bond priced risks.
- ▶ This is true for cross sectional bond pricing, but what about for bond priced risks?
 - ▶ Market prices of risks in Macro-DTSMs (AP, 2003) can depend on macro variables (and latent factors).
 - ▶ Although in theory, macro variables should be inverted from yields, they follow their own VAR dynamics.
 - ▶ Therefore, changes in macro variables that are unspanned by yields can affect bond premiums.
 - ▶ Conclusion: Traditional macro-DTSMs differ from yields-only models in what regards bond premiums.
- ▶ Compare the current model and a tradit. macro-DTSM with market prices of lat. variables depending on macro variables to clarify the differences in bond premiums.

Advantages of the new approach with respect to traditional Macro-DTSMs

- ▶ In traditional Macro-DTSMs, macroeconomic variables follow a separate VAR:
 - ▶ To quantify the effect of shocks of yields on macro variables, should invert macro from yields: Inconsistent with empirical stylized facts!
 - ▶ With the general feedback between \mathcal{P}_t and M_t of JPS under the historical measure, it allows to capture the correct effect of yields on macro variables.

JPS x Diebold, Rudebusch and Aruoba (2006)

- ▶ DRA (2006) propose a NS macro finance model with no imposition of no-arbitrage.
 - ▶ There, by construction, macro variables are unspanned by yields because the TS satisfies a NS function.
 - ▶ and they also propose a general feedback relationship between yields and macro variables under the historical measure.
- ▶ Question: How different is the current paper from DRA?
 - ▶ As JSZ (2010) show that no-arbitrage does not affect forecasting ability in GDTSMs...
 - ▶ it should be interesting to verify if this indifference property does not extends to the macro-Gaussian case.

Model Misspecification

- ▶ There is strong evidence that volatility is time-varying on interest rate markets (Dai and Singleton, 2003), and that it is priced (Joslin, 2007).
- ▶ There is also evidence that macro variables directly affect the volatility of interest rates (Andersen and Benzoni, 2009).
- ▶ If the goal is to explain bond premiums it would be more realistic to have a stochastic volatility model with unspanned macro risks.
- ▶ Could adopt the same structure as JPS but with SV models under the pricing measure Q .
- ▶ Macro variables would only influence the dynamics of the latent factors under historical measure including the one(s) driving SV.