Discussion of *The Term Structure of Interest Rates in a Heterogeneous Monetary Union* by James Costain, Galo Nuño, and Carlos Thomas

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Summary

- The authors integrate sovereign default risk into a microfounded Affine Term Structure Model of bond yields
- The overwhelming source of bond yield spread between Periphery and Core eurozone coutries is the credit risk premium
- Asset purchase programs act mostly trough default risk extraction, by lowering the probability of sovereign default in case of rollover crisis
- The model is able to well replicate the changes in German and Italian yield curves at the beginning of Covid19 crisis and after the introduction of PEPP
- Great laboratory for the design of the Transmission Protection Instrument
- Excellently written, a pleasure to read

ATSM: Bond yield decomposition

Core (*) and Peripery bond yields can be decomposed into

$$y_t^*(\tau) = y_t^{EX*}(\tau) + y_t^{TP*}(\tau)$$
$$y_t(\tau) = y_t^{EX*}(\tau) + y_t^{TP}(\tau) + y_t^{DL}(\tau) + \boldsymbol{y_t^{CR}(\tau)}$$

Expected rates: $y_t^{EX*}(\tau) = \frac{1}{\tau}\mathrm{E}_t \int_0^\tau r_{t+s}\,\mathrm{d}s$

Term premium: $y_t^{TP}(\tau) = \frac{1}{\tau}\mathrm{E}_t \int_0^\tau \underbrace{A_{t+s}(\tau - s)}_{\text{"duration"}} \underbrace{\lambda_{t+s}}_{\text{interest risk price}} \,\mathrm{d}s$

Expected default loss: $y_t^{DL}(\tau) = \frac{1}{\tau}\mathrm{E}_t \int_0^\tau \delta \underbrace{\psi_{t+s}}_{\text{default probability}} \,\mathrm{d}s$

Credit risk premium: $y_t^{CR}(\tau) = \frac{1}{\tau}\mathrm{E}_t \int_0^\tau \underbrace{\xi_{t+s}}_{\text{credit risk price}} \,\mathrm{d}s$

Credit risk premium

$$\xi_t = \gamma \psi_t \delta^2 \int_0^\infty X_t(\tau)\, \mathrm{d}\tau$$

depends on

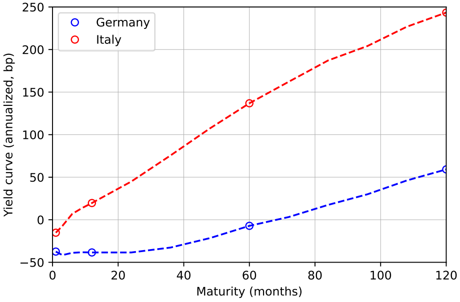
- risk aversion γ
- (endogenous) default probability ψ & size of haircut δ
- bonds held by arbitrageurs

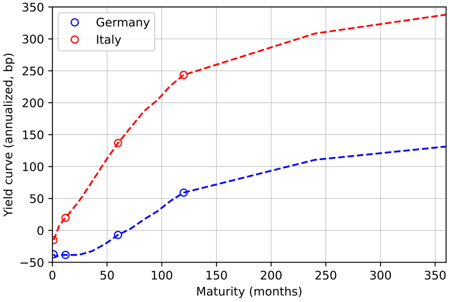
$$X_t(\tau) = f_t(\tau) - f_t^{CB}(\tau) - Z_t(\tau)$$

where

- $f_t(\tau)$ is supply of bonds of maturity τ
- $f_t^{CB}(\tau)$ is purchases by the central bank
- $Z_t(\tau)$ is amount held by preferred habitat investors

Is the model still well applicable for higher maturities?

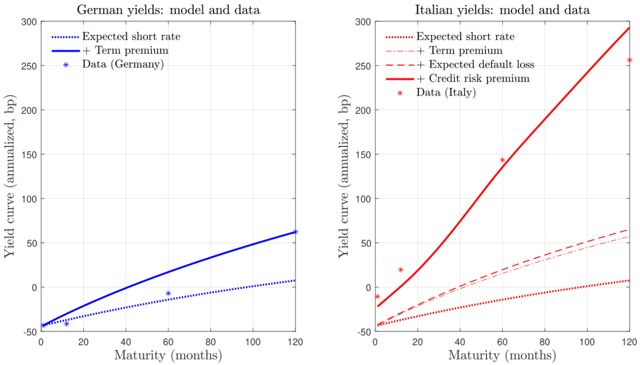




- Yield curves flatten over the 10Y-30Y horizon
- All yield components increase with τ
- Model already overshoots Italian 10Y yields relative to data

Calibration / estimation nitpicks

Figure 2: Decomposing model-generated yield curves: Germany and Italy



Risk aversion γ calibrated to match the 1M-10Y slope of DE yield curve, what if you minimized distance along the entire DE (&IT) curve?

Also, see Hamilton & Wu (2012) on efficient estimation & identification of ATSMs

Proposition 4 vs August hike surprise

Proposition 4: Core yields are more sensitive to changes in the policy rate:

$$\frac{\partial y_t^* (\tau)}{\partial r_t} - \frac{\partial y_t (\tau)}{\partial r_t} = -\frac{\Xi}{\tau \hat{\kappa}} \gtrsim 0$$

Would actually be nice to discuss the results of a rate hike in the model

Hike expectations on 21.08.22 leaning toward 25 bp, ECB delivered 50 bp

1M yields	20.08 C	21.08 H	21.08 C	21H - 20C	21C - 20C	5y CDS
Netherlands	-0.550	-0.430	-0.430	0.120	0.120	13.8
Germany	-0.501		-0.346		0.155	16.8
France	-0.461	-0.276	-0.288	0.185	0.173	28.4
Belgium	-0.410	-0.218	-0.230	0.192	0.180	18.4
Spain	-0.308	0.010	-0.117	0.318	0.191	65.7
Italy	-0.240	-0.082	-0.140	0.158	0.100	160.8

Stochastic process for interest rate allowing for discrete jumps

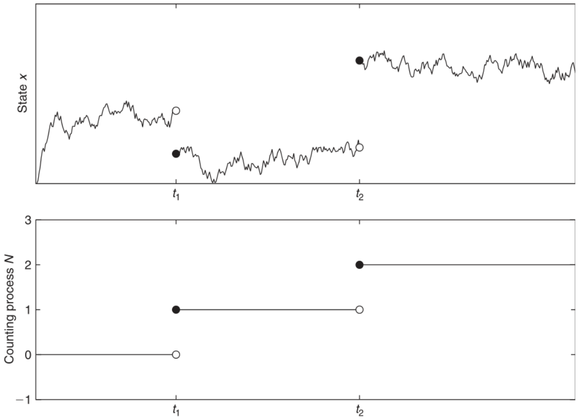
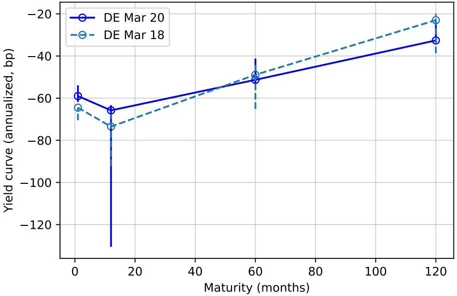
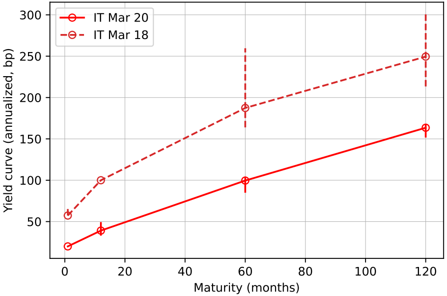


Figure 12.1 The upper graph illustrates jumps in the state variable x at jump arrival times t_1 and t_2. The lower graph illustrates the corresponding counting process N.

Piazzesi (2010): $\mathrm{d}r_t = \kappa\left(\bar{r} - r_t\right)\mathrm{d}t + \sigma \mathrm{d}B_t + \mathbf{d}\boldsymbol{J_t}$

Noise in daily bond price and yield data





Sometimes the ’Close’ price can be quite noisy as well, especially for CDSs that are less liquid
– allow yourself some leeway in measurement

Interactions of monetary and fiscal policies

- Government budget constraint:

  Primary deficit + Debt maturing = Bond issuance + Seignorage + Emergency taxation

- Paths are perfectly known in advance with commitment (barring rollover crisis)

- Constant probability of rollover crisis, fiscal authority then endogenously decides whether to raise emergency taxes or to default

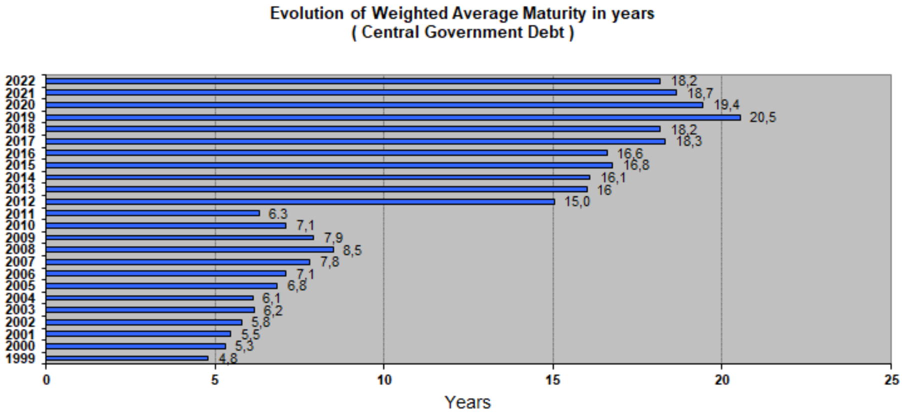
- Some issues:
  - Independence of movements in r and rollover crisis probability crucial for obtaining ATSM
  - Primary deficits tend to be endogenous with respect to “fiscal space”
  - Ignores moral hazard, especially important in context of TPI

Debt restructurings

- Cruces & Trebesch (2013): haircuts of ~50% typical for emerging, not advanced economies, but:
  - Greece 2012: nominal haircut of 53.5%
  - Cyprus 2013: 47.5% haircut on all deposits above 100 000 EUR
- Assumed that (partial) default affects all maturities equally, but:
  - Schlegl et al. (2019): haircuts depend on bondholder type
  - Asonuma et al. (2017): haircuts on shorter term debt are larger

Debt maturity structure after partial default in Greece

Weighted Average Maturity



Thank you!

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