Discussion of "*How the Central bank Talks to the Market: A Story from Switzerland*"

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Outline

1. Discuss underlying methodology (Lengwiler & Lenz, Journal of Econometrics 2010)

2. Relation to Term Structure Literature (particularly "theoretical models")

3. Application to Swiss Monetary Policy (current paper)

4. Concluding remarks, suggestions and questions

Outline

- **Methodology**
- Relation to Term Structure Literature
- Application to Swiss Monetary Policy
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"Intelligible factors for the yield curve" (JoE 10)

Specify model with two key features which make factors "intelligible":

1. Factors that have "clear meaning"

2. Factor innovations are independent

The second property distinguishes their model from purely descriptive methods (PCs, Nelson-Siegel, Svensson, etc. - more on this later)

Factors with "clear meaning"

Model with three factors, and impose restrictions of loadings on yields:

1. long factor: restrictions imposed imply long factor is not affected by movement on short rate (1 for infinite maturity bond)

   ↪I'm not sure I understand what a long factor that cannot be affected by the short factor is; sort of a deviations from expectations hypothesis factor?*

2. short factor: only loads on "short end" of the curve (1 for zero maturity bond)

3. curvature factor: doesn't load on zero and 'infinite maturity' rate

*This highlights the problem with these models: doesn't even make much sense to talk about EH in this setting.

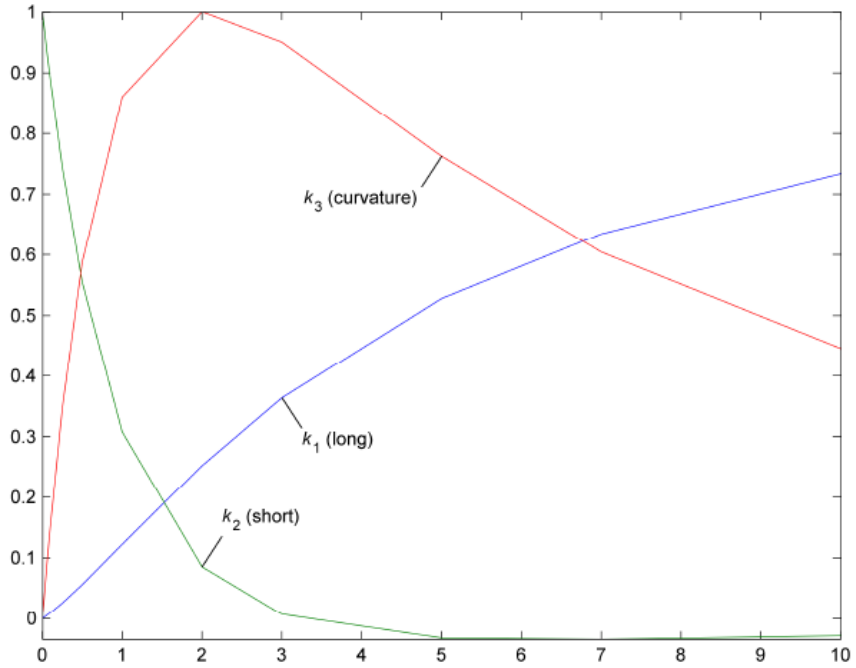
Factor innovations are orthogonal

Parameter restrictions imposed "identification" of factors: behavior at zero and infinity maturity of loadings

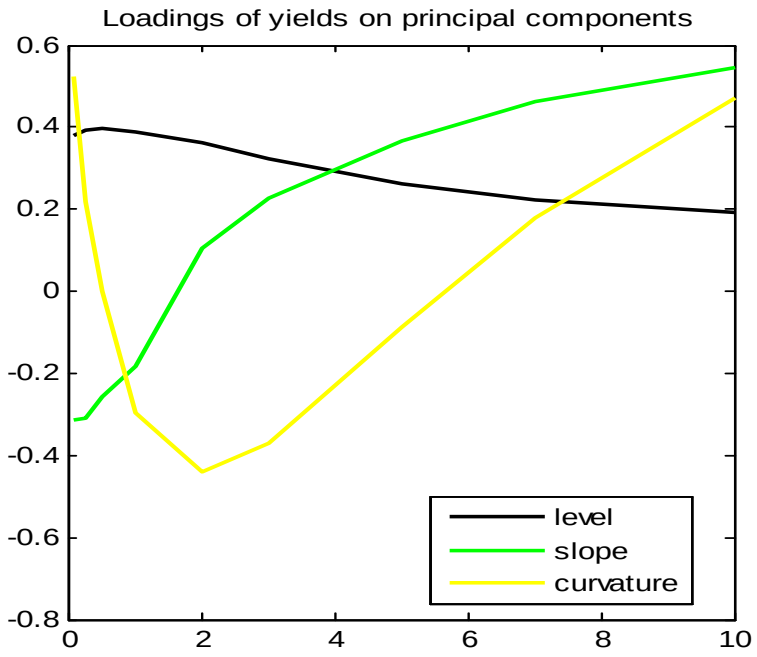
Additional parameter restrictions to guarantee the covariance matrix of VAR is orthogonal

These additional restrictions are not possible in the Nelson-Siegel, Svensson type parameterization $\Rightarrow$ why parametric form slightly different and key to attaining orthogonality.

Comparing estimated loadings to those from simple PC analysis



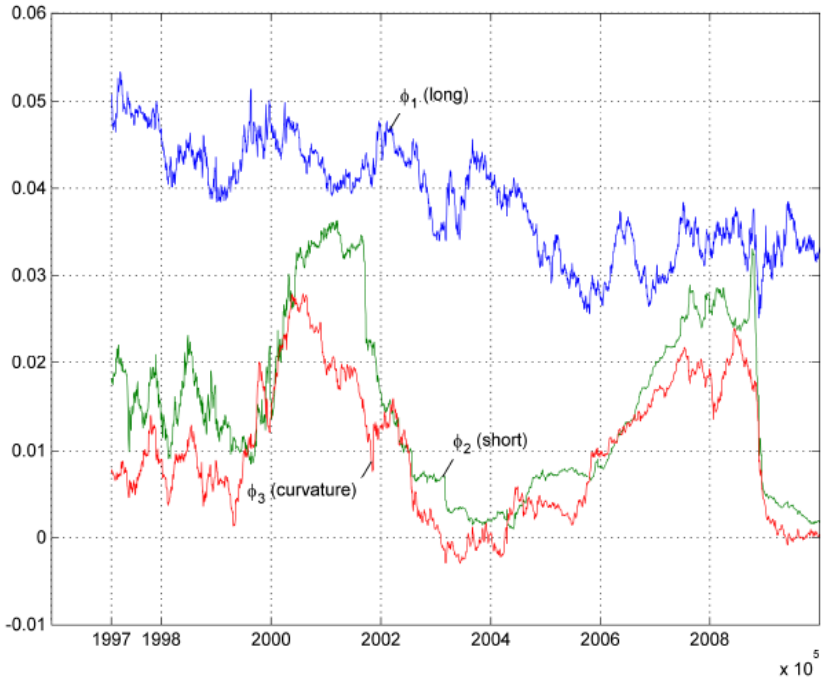
Estimated factor loadings (fig 1)



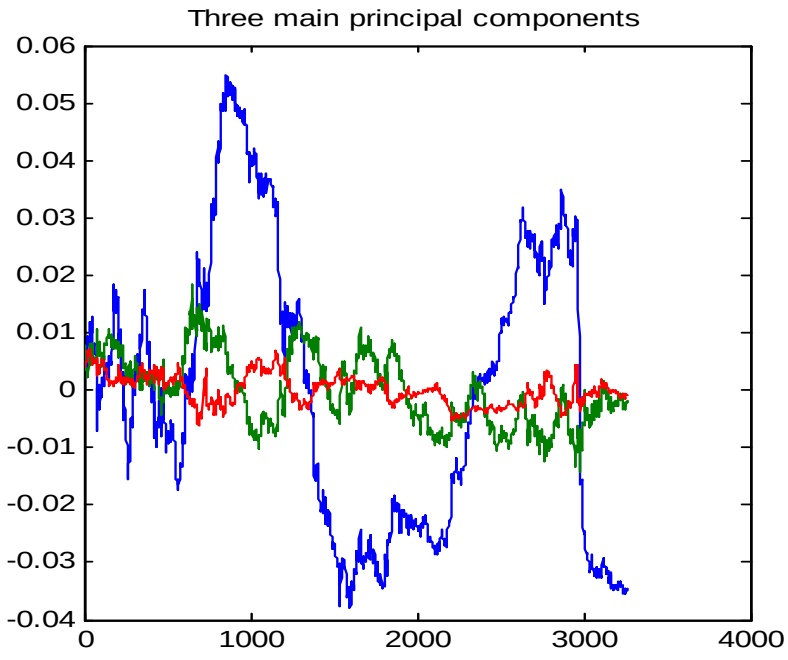
PC loadings

Refer to short factor as trading channel and curvature factor as talking channel - not sure I agree with interpretation

Comparing estimated factor time series to those from simple PC analysis



Estimated factors time series (fig 3)



PC time series

Are these factors more "intelligible" than PCs?

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Term structure literature

Models applied to dynamics of yield curves can be broken into two :

1. Models based on economic theory:

↪→Affine DTSM (including macro-finance), GE production/endowment models

2. Descriptive ad-hoc parametric functionals

↪→this model, Diebold & Li, Nelson-Siegel, Svensson

Theory based models

- Allows decomposition into expectations and risk premia components
  - important to meaningfully talk about expectations
  - dynamics of risk premia has policy relevant information
- Models have "recognizable" factors: either observables (macro-finance) or can be rotated into understandable quantities
  - Taboga & Pericolli (08), Duffee (RFS 11), Joslin, Priebisch & Singleton (10), Ferman & Guimarães (11) are a few examples of affine models that use rotations of latent factors to study behaviour of clearly understood quantities of interest

Theory based models

- Models shocks are "meaningful": either fully specified (DS)GE model or can do simple (G-ADTSM) structural identification
  - reduced form GADTSM imply factors follow VAR, can use Cholesky decompositions
  - Dai & Philippon (04), Kaminska (10)
- Risks of overparametrisation vs cost of estimating
  - recent advances (Joslin, Singleton and Zhu RFS 11) have cut estimation costs
  - lot of effort into understanding better the behaviour of these models $\Rightarrow$ role for atheoretical models to provide stylised facts!

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Use "intelligible" factor model with 3 factors and 27 (!) lags, applied to daily Libor-Swap data Feb 97 - Dec 09

Main claims of the paper

1. Curvature is the most important driver (*talking channel*)

2. CB inflation forecasts influence curvature factor

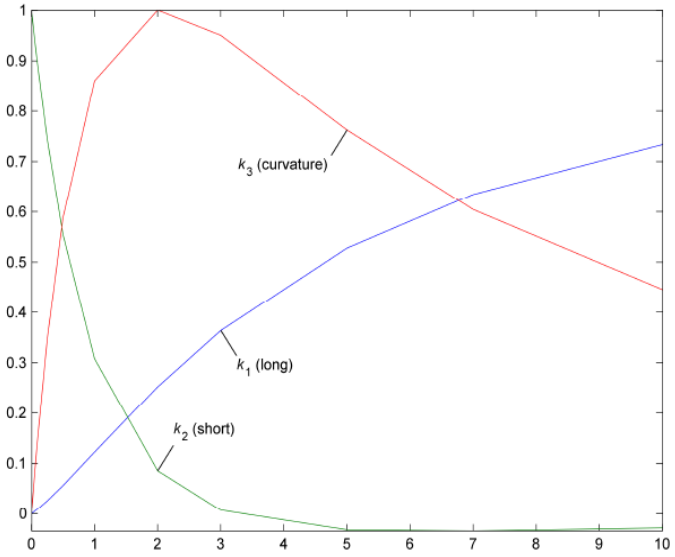
I next take a look at the evidence for these two claims.

Yields correlation matrix

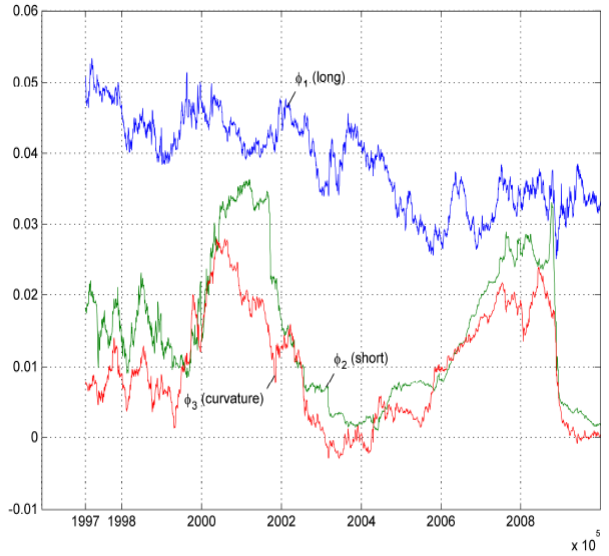
1m	3m	6m	1y	2y	3y	5y	7y	10y
1.00	0.99	0.98	0.96	0.93	0.90	0.84	0.77	0.67
	1.00	1.00	0.98	0.94	0.91	0.85	0.78	0.68
		1.00	0.99	0.96	0.93	0.87	0.80	0.69
			1.00	0.97	0.95	0.89	0.81	0.70
				1.00	0.99	0.96	0.89	0.79
					1.00	0.98	0.93	0.84
						1.00	0.98	0.92
							1.00	0.98
								1.00

- 6 of the 9 yields (1m to 3yrs) are very highly correlated
- 5 to 10yr yields display much lower correlation with short rates, though still high overall

1. Curvature is the most important driver (*talking channel*)

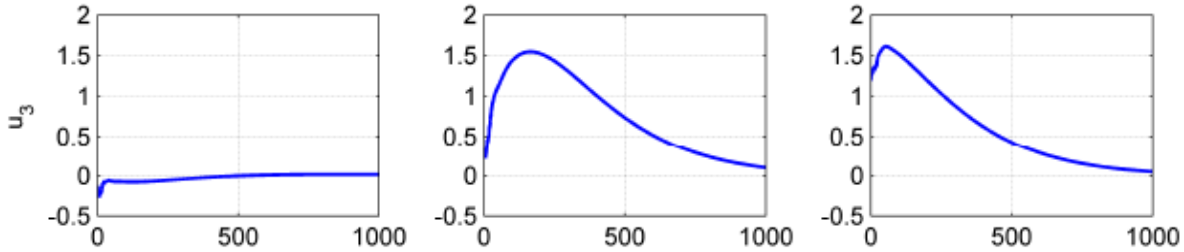


Factor loadings

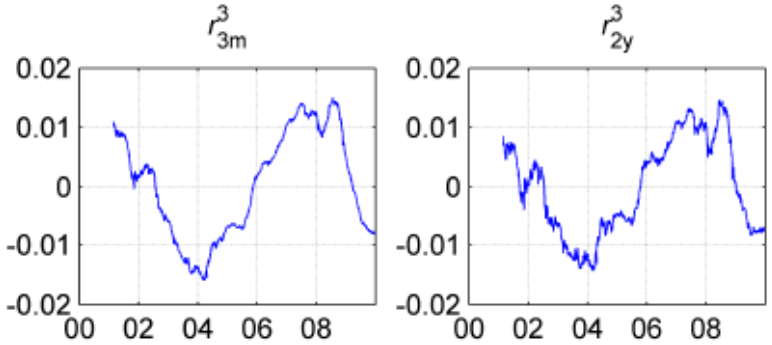


Estimated factors

Since yields are highly correlated (particularly up to 3 years), **factor loadings almost implies the curvature factor has to be the main driver**? Would explain estimated short and curvature factors having such high correlation.



Impulse response to shock to curvature on long, short and curvature factors (from fig 4)



Contribution of curvature factor to 3mth and 2yr yields (from fig 6)

Hard to distinguish the short and curvature factors...

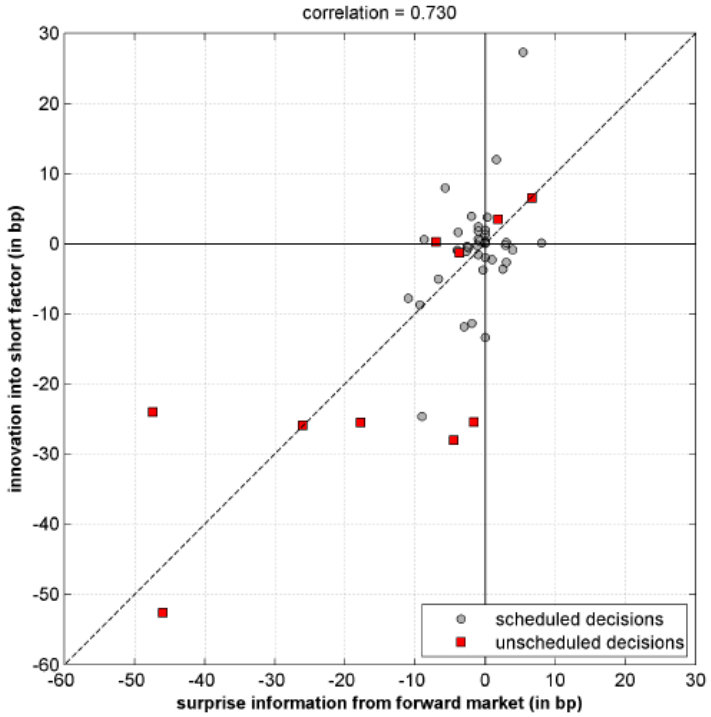


fig 9

Correlation with changes in PCs

	PC1	PC2	PC3
All	0.71	-0.59	0.63
Scheduled	0.53	-0.20	0.11
Unscheduled	0.70	-0.64	0.69

Correlation of estimated short factor with policy shock (from Ranaldo & Rossi (10)) doesn't prove model is picking up short rate process - similar correlation with PC-level & curvature factors (**interestingly, more significant change with PC curvature factor**)

2. CB inflation forecasts influence curvature factor

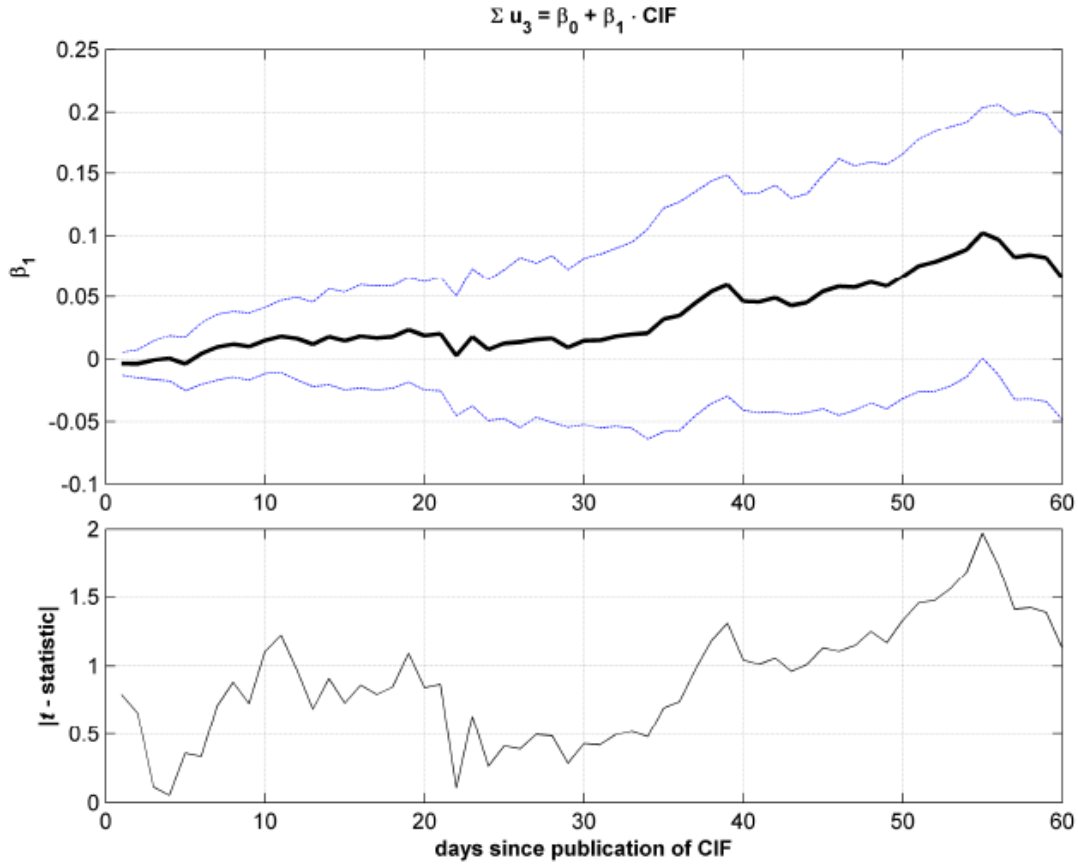


fig 8

Not particularly strong evidence...but given doubts on interpretation, not sure it would make much difference

Question: how does the fact that price stability is defined as $\leq$ 2% impact regression design?

Should use indicator to condition on CIF $>$2%?

Does the market react asymmetrically to forecasts of inflation above/below 2%?

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1. Can be used to communicate to less theoretically minded public (some practitioners/policy makers)

2. Tricky to talk about very long rates without using rates longer than 10yrs in estimation (lesson learned in ADTSM)

3. Concerned results may be driven by excessively restricted loading constraints

   (a) Use PC-type loadings and compare (would clear some of my interpretation issues)

   (b) Use 4 (or more) factors specification (where DTSM literature is going)

4. Potentially useful atheoretical benchmark to assist selection of theoretical models?

   (a) Think about properties that can be used to check theoretical models

   (b) **What can we learn about time series dynamics?** Useful for forecasting?

5. What is it that we gain from having orthogonal shocks in the estimation stage?

   (a) short rate innovations tell same story as PCs

   (b) curvature innovations used mainly for result 2

   (c) IRFs are only enlightening if interpretation of factors is clear