The World Interest Rate

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Motivations

- The "world interest rate" is a reflection of this broad global price of capital and plays a central role in open-economy macroeconomics.
- How does the world interest rate look like?
- Neither a weighted average nor a simple dynamic factor model provides satisfactory measure of the world interest rate.
- What can we learn from the world interest rate?

Main Takeaways

- Adopts a two-level dynamic factor model and obtains both global and regional factors from over 70 countries across the world.
- To select the best model, we try a variety of groupings according to geography, exchange rate anchors, or level of economic development.
- Propose practical rules of groupings for practitioners using multi-level dynamic factor models that help guide other analysis.
- The global rate is on a long run secular downward trend. It is lined up with the movement of the world asset prices
- The U.S. rate plays an important role on the world rate, but U.S. rates do not pass fully or immediately into the world rate.
- The world interest rate plays a major role in countries' interest rates, but also that regional and local factors matter.
- Capital account openness strongly affects both the co-movements of local–regional and local–world rates.

Model and Groupings

Model:

$$\begin{aligned} Y_t &= \beta F_t + \Gamma_t \\ \Gamma_t &= \Psi(L)\Gamma_t + U_t \\ F_t &= \Phi(L)F_t + V_t \end{aligned}$$

- $F = [F^{world}, F^{regional}]$, Γ_t is the idiosyncratic component.
- Estimation is based on Bayesian methods in Jackson et al. (2016), variance decomposition follows Del Negro and Otrok (2007).
- Data spans from 1996Q2 to 2016Q4, with 74 countries in the sample.

Grouping Methods:

model 1: One global factor

model 2: Two global factors

model 3: EU and nonEU

model 4: EU, nonEU OECD, and other

model 5: EU, nonEU OECD, and Latin America Emerging, Asian Emerging, and other

model 6: EU OECD, nonEU OECD, EU Emerging, Latin America Emerging, Asian Emerging, and other.

model 7: random grouping based on model 6

model 8: Dollar base, Euro base, and other

model 9: random grouping based on model 8

model 10: Dollar base, EU, and other

model 11: Dollar base non peg, Dollar base peg, Euro base peg, Euro base non peg, and other

model 12: Dollar base non peg OECD, Dollar base non peg Emerging, Dollar base peg, Euro base peg, Euro base non peg OECD, Euro base non peg Emerging, and other

model 13: random grouping based on model 12

We assume a model is preferred if it substantially reduces the average share of variance explained by idiosyncratic factors. Model 8 gives the best results. Robustness based on GDP or capital control weighted idiosyncratic factors.

Movements of the world interest rate

	Germany rate	US rate	G7 rate
1 global factor	0.96	0.66	0.94
2 global factors	0.92	0.58	0.88
2 regional factors (regional grouping)	0.71	0.8	0.86
3 regional factors (regional grouping)	0.61	0.93	0.79
5 regional factors (regional grouping)	0.59	0.95	0.78
6 regional factors (regional grouping)	0.61	0.94	0.79
random 6 regional factors	0.97	0.66	0.94
3 regional factors (base country grouping)	0.72	0.51	0.77
random 3 regional factors	0.95	0.64	0.94
3 regional factors (mixed grouping)	0.71	0.49	0.75
5 regional factors (base country grouping)	0.86	0.62	0.90
7 regional factors (base country grouping)	0.76	0.51	0.78
random 7 regional factors	0.97	0.65	0.94
1 global factor (OECD only)	0.98	0.60	0.92
1 global factor (Dollar base only)	0.61	0.96	0.78

Table 1: Correlations with the world interest rate

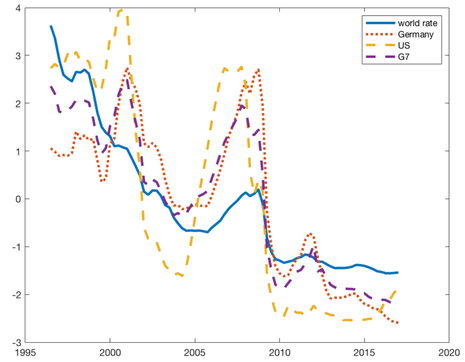

Figure 1: Scaled world interest rate (Model 8)

	full sample	1996-2007	2008-2016
US rate	0.51	0.44	0.67
Germany rate	0.72	0.63	0.96
G7 rate	0.77	0.72	0.91

Table 2: Correlations (Model 8)

- Following Del Negro and Otrok (2007), scale the world interest rate with the nominal GDP.
- Estimate a proxy VAR model using the high frequent FF4 as the instrument of the US rate.

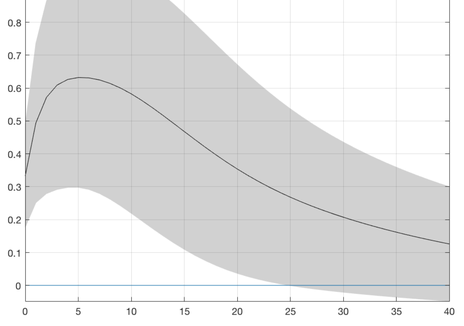

Figure 2: Impulse response to 1% shock on the US rate

Factor shares and the open economy trilemma

	(1) idiosyncratic	(2) regional	(3) world	(4) idiosyncratic	(5) regional	(6) world
kaopen	-0.36***	0.15**	0.21**	-0.29**	0.13**	0.16*
	(0.11)	(0.06)	(0.09)	(0.10)	(0.05)	(0.09)
Shambaugh peg	-0.08	0.07	0.02			
	(0.09)	(0.05)	(0.07)			
IRR peg				-0.19**	0.08*	0.12*
				(0.08)	(0.04)	(0.07)
constant	0.70***	0.02	0.28***	0.69***	0.03	0.28***
	(0.08)	(0.04)	(0.07)	(0.08)	(0.04)	(0.07)
R^2	0.15	0.11	0.08	0.17	0.12	0.09
N	71.00	71.00	71.00	73.00	73.00	73.00

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Regressions on factor shares (Model 6)

	(1) idiosyncratic	(2) regional	(3) world	(4) idiosyncratic	(5) regional	(6) world
kaopen	-0.36***	0.28***	0.08	-0.30***	0.23***	0.07
	(0.09)	(0.07)	(0.09)	(0.08)	(0.07)	(0.09)
Shambaugh peg	-0.16**	0.26***	-0.10			
	(0.07)	(0.06)	(0.07)			
IRR peg				-0.24***	0.26***	-0.02
				(0.07)	(0.06)	(0.07)
constant	0.69***	-0.09	0.40***	0.67***	-0.04	0.37***
	(0.07)	(0.06)	(0.07)	(0.06)	(0.05)	(0.06)
R^2	0.25	0.33	0.04	0.29	0.33	0.01
N	71.00	71.00	71.00	73.00	73.00	73.00

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Regressions on factor shares (Model 8)