Discussion of the paper

"Sustainable Financial Obligations and Crisis Cycles"

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Summary

- Idea: *sustainable debt* (economic stability) versus *excessive debt* (economic instability)
- Authors propose to distinghuish these based on financial obligations ratios (measure of aggregate liquidity constraints)
- Smooth transition regression model
- Above threshold, interaction between credit loss and the business cycle intensifies
- Empirical results: threshold exceedances 1–2 years prior to recession (3/3 for business loans, 2/3 for household loans)

Main lessons

- *Leverage ratios* may not be the most suitable variables to signal impending crises
- Confirmed empirically to the extent that measures of leverage lead to poor fits and/or threshold estimates outside data range
- *Financial obligations ratios* seem more relevant, as they appear to be associated with regime shifts in the dynamics in the credit loss rates accompanying financial distress
- Role of nonlinearity pointing towards *bounded rationality* and *heterogeneity*
- Possible basis for Early Warning Systems (EWSs)

Data mining?

Tests of linearity vs. regime shifts

1985Q1-2006Q2

$\tilde{cl}_t^j \setminus \tau_t$	$\tilde{i}_t^T$	$\tilde{i}_t^S$	p_t^R	l_t^{HT}	l_t^{HR}	l_t^{BT}	l_t^{BR}	f_t^{HT}	f_t^{HR}	f_t^{BT}	f_t^{BR}
$\tilde{cl}_t^T$	0.244	0.170	0.918	0.828	0.719	0.535	0.419	0.963	0.406	0.780	0.570
$\tilde{cl}_t^R$	0.330	0.085	0.187	0.363	0.597	0.489	0.688	0.108	0.085	0.221	0.583
$\tilde{cl}_t^B$	0.559	0.582	0.249	0.370	0.408	0.072	0.256	0.132	0.929	0.141	0.420

1985Q1-2010Q2

$\tilde{cl}_t^j \setminus \tau_t$	$\tilde{i}_t^T$	$\tilde{i}_t^S$	p_t^R	l_t^{HT}	l_t^{HR}	l_t^{BT}	l_t^{BR}	f_t^{HT}	f_t^{HR}	f_t^{BT}	f_t^{BR}
$\tilde{cl}_t^T$	0.819	**0.021**	**0.034**	**0.016**	**0.013**	**0.011**	**0.012**	0.181	**0.041**	0.411	**0.037**
$\tilde{cl}_t^R$	0.617	**0.015**	0.168	0.059	**0.042**	0.052	**0.021**	0.738	**0.018**	0.940	0.054
$\tilde{cl}_t^B$	0.784	0.338	0.068	**0.048**	**0.049**	**0.006**	**0.029**	0.058	0.151	**0.021**	0.064

Table 2: Tests of linearity against a STR alternative. Boldface values indicate rejection of the null hypothesis at the 5% significance level.

Model estimates presented are selected based on

- Significance of test for linearity against a smooth transition regression (STR) alternative (Table 2)
- Estimated threshold variable being within data range
- Higher likelihood (better fit)

Combining indicators?

The authors sequentially try different financial obligations ratio's as threshold variables

Why not model the threshold variable as a linear combination of (some of) the available obligation ratio's?

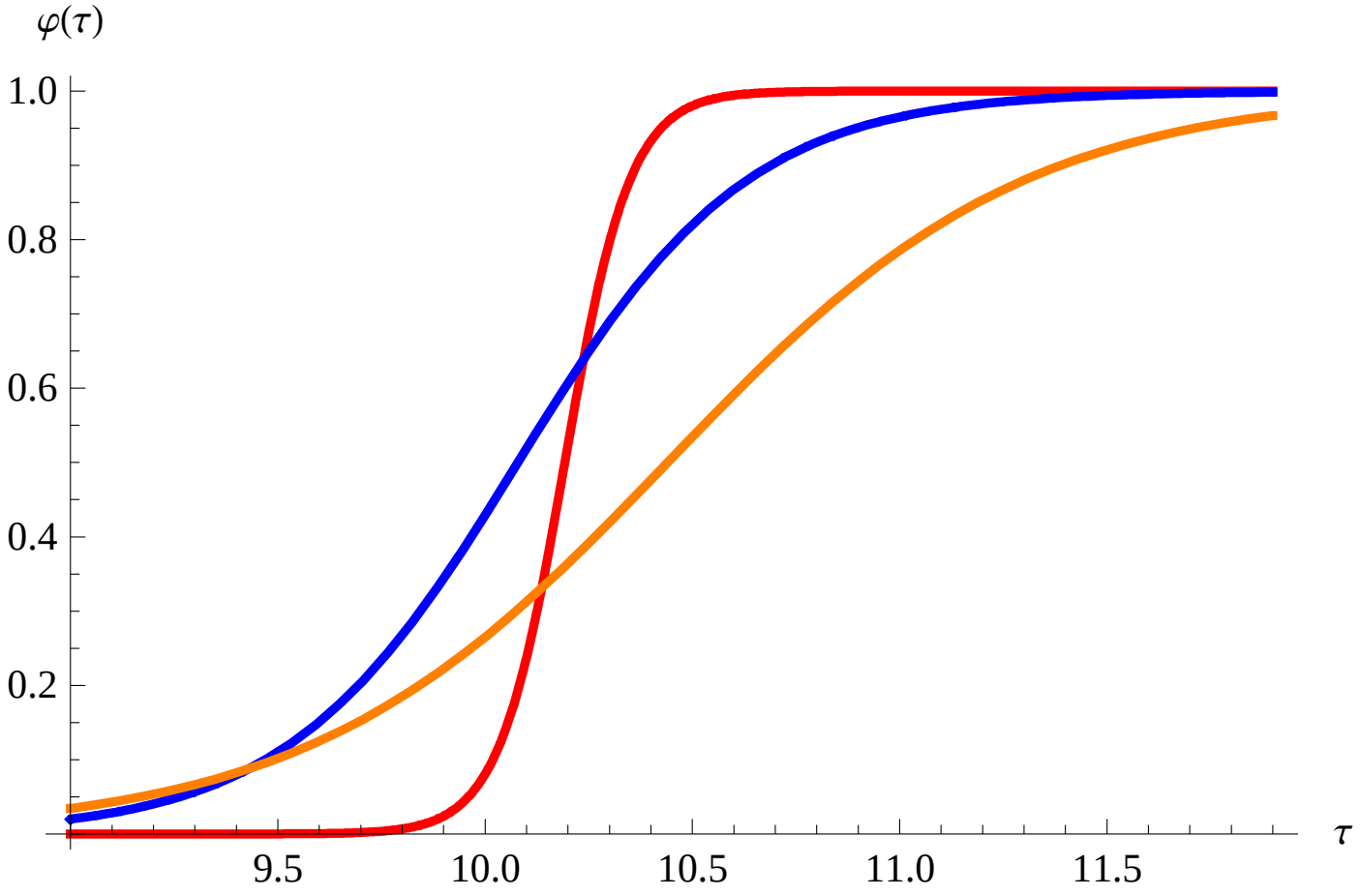
Threshold model parameter estimates

STR estimates							
		Transition parameters		Regime 1		Regime 2	
$\tilde{cl}_t^i$	τ_t	κ_1	κ_2	$\gamma_{\tilde{i}S}$	$\gamma_{\tilde{y}}$	$\gamma_{\tilde{i}S}$	$\gamma_{\tilde{y}}$
$\tilde{cl}_t^T$	f_t^{HR}	**12.678** (5.630)	**10.192** (0.056)	−0.063 (0.034)	0.002 (0.045)	**−0.276** (0.094)	**−0.224** (0.051)
$\tilde{cl}_t^R$	f_t^{HR}	**3.609** (1.128)	**10.079** (0.106)	−0.023 (0.041)	−0.051 (0.038)	**−0.267** (0.099)	**−0.243** (0.049)
$\tilde{cl}_t^B$	f_t^{BT}	**2.318** (0.968)	**10.44** (0.199)	**−0.249** (0.085)	–	**−0.619** (0.119)	–

Table 3: Estimated transition parameters and regime coefficients from STR-models of the adjusted credit loss rates. Boldface values indicate significance at the 5% level (standard errors in parenthesis).

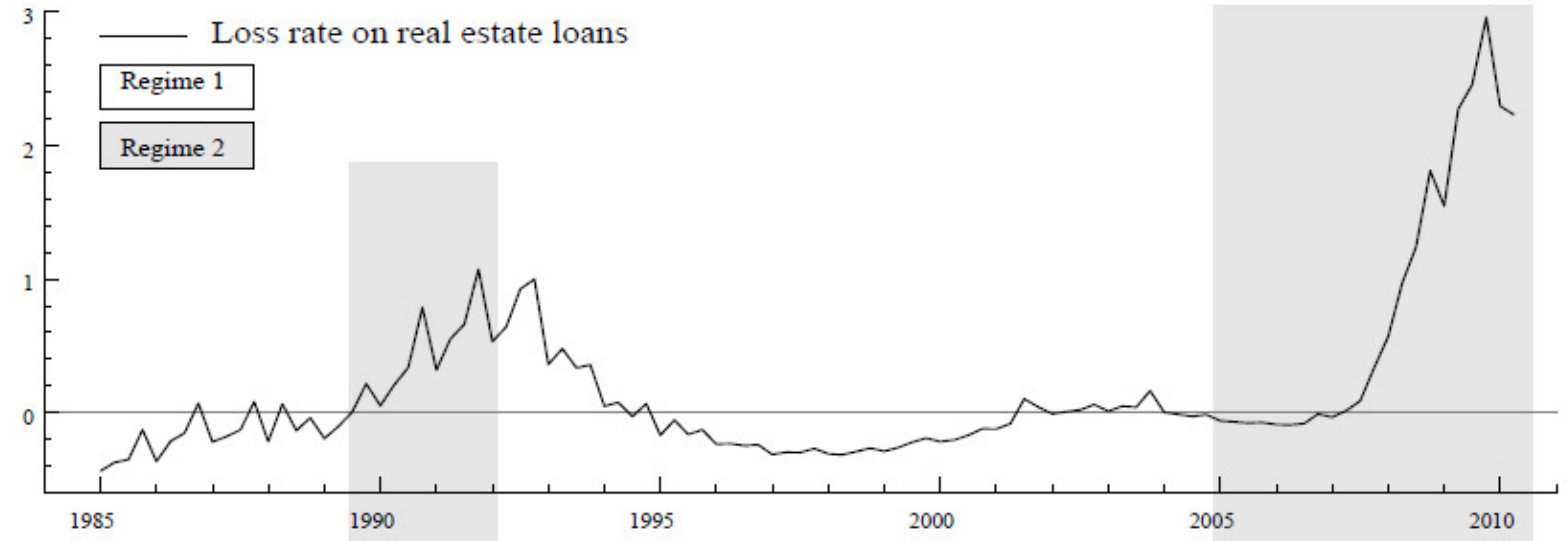
- Why are the estimates for κ_2 in Table 3 so close? Is there some universal principle underlying these values?
- The transitions between regimes are claimed to be ‘rather fast’. But how can we judge that just from κ_1? This would depend on the range of the threshold variable.
- A scatterplot of $(\tau_t, \varphi(\tau_t))$ might be helpful to judge how fast the regime transition is relative to the spread in τ_t.

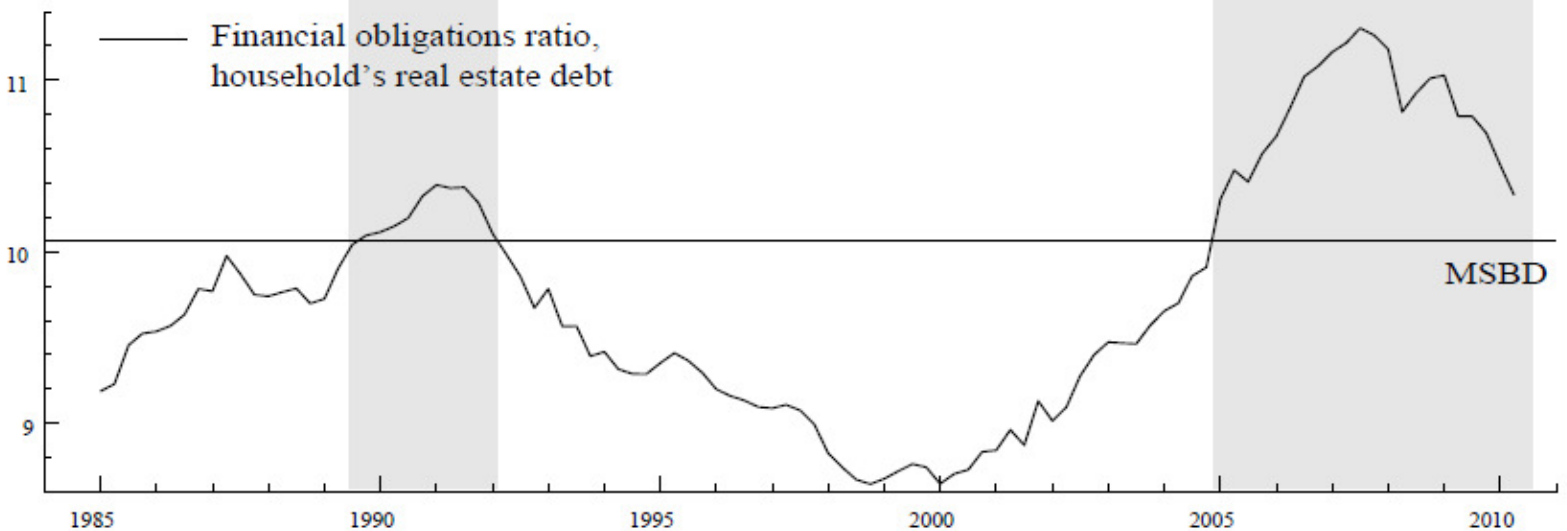
The estimated transition functions



Horizontal axis: financial obligation ratio τ (%)

Where are we now?





How to construct an operational Early Warning System based on the results?

- Most of the threshold exceedances discussed are in-sample
- What would be the out-of-sample performance of an Early Warning System based on the proposed methodology, i.e. using only info available at the time?
- One tentative test of the out-of-sample performance is mentioned (prediction of the deep recession of the early 80's)
- However, no details are given regarding e.g. how to deal with the (non-causal) Hodrick-Prescott filtering in a real out-of-sample setting
- Timing: even if a build-up of tension can be detected, it may be hard to predict when the system will collapse

Conclusions/policy implications

- *Financial obligations ratios* may be more suited to monitoring the build-up of instabilities than leverage ratios
- Empirical evidence for *nonlinearity* in the interaction between credit loss and the business cycle (different dynamic regimes)
- Recurrent nature of debt accumulation inconsistent with most theoretical models
- Models explicitly taking into account *bounded rationality* and *heterogeneity* are promising
- Financial obligations ratios may be used as Early Warning indicators, but implementation requires further work, in particular regarding out-of-sample evaluation