Banking crises and recessions: What can leading indicators tell us?

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Outline

1. Introduction
2. Unconditional analysis of relationship between banking crises and recessions
3. Indicator models of banking crises and recessions
4. Predictive power of models
5. Conclusion

Jointly estimating banking crises and recessions

- We use a bivariate probit model, We set y_{it}=1 if there is a banking crisis and y_{it}=0 otherwise; z_{it}=1 if output falls in country *i* in year *t* and z_{it}=0 if it does not.
- The general specification of our bivariate model:

$$y_{it} = a_y + b_y x_{it} + \sum_1^k c_{yk} y_{it-k}^n + \sum_1^k d_{yk} z_{it-k}^n + \varepsilon_{yit}$$

, y_{it}=1 if y^*_{it}>0, 0 otherwise

$$z_{it} = a_z + b_z x_{it} + \sum_1^k c_{zk} y_{it-k}^n + \sum_1^k d_{zk} z_{it-k}^n + \varepsilon_{yit}$$

, z_{it}=1 if z^*_{it}>0, 0 otherwise

- where

$$\begin{pmatrix} \varepsilon_{yit} \\ \varepsilon_{zit} \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix} \right)$$

- We begin with a simple model with no exogenous variables so as to investigate the pattern of causality between the two types of events

Causality tests also indicate that banking crises do help predict recessions.

Table 3: Causality tests (Likelihood ratio test, all banking crises)

	χ^2-statistic	Probability> χ^2
Banking crises do not granger cause banking crises	4.53	(0.210)
Banking crises do not granger cause recessions	7.05	(0.070)
Recessions do not granger cause banking crises	3.64	(0.303)
Recessions do not granger cause recessions	9.71	(0.021)

Table 4: Causality tests (Likelihood ratio test, systemic banking crises)

	χ^2-statistic	Probability> χ^2
Banking crises do not granger cause banking crises	0.11	(0.991)
Banking crises do not granger cause recessions	8.27	(0.041)
Recessions do not granger cause banking crises	2.91	(0.406)
Recessions do not granger cause recessions	8.11	(0.044)

A Broader Model with Exogenous Variables

- We now introduce the explanatory variables discussed earlier.
- The aim is first to see how far they help us predict crises and recessions and secondly how they affect our conclusions about the interdependence between the two events.

Equation 3: Bivariate probit model of banking crises and recessions

	Coefficient	Standard error	z	P>|z|
Banking crises				
Change in liquidity$_{t-1}$	-12.80	7.32	-1.75	0.081
Leverage$_{t-1}$	-0.10	0.06	-1.73	0.084
Current account as % GDP$_{t-2}$	-0.23	0.07	-3.40	0.001
Constant	-1.48	0.32	-4.56	0.000
Recessions				
Two-year change in PCI$_{t-1}$	-0.28	0.08	-3.36	0.001
Two-year change in liquidity$_{t-1}$	-7.19	4.02	-1.79	0.074
Real house price inflation$_{t-1}$	-0.15	0.03	-4.57	0.000
Real house price inflation$_{t-2}$	0.08	0.03	2.9	0.004
Constant	-2.10	0.22	-9.55	0.000
ρ	-0.15	0.36		1.000
Number of observations:		322	Log likelihood:	-85.87

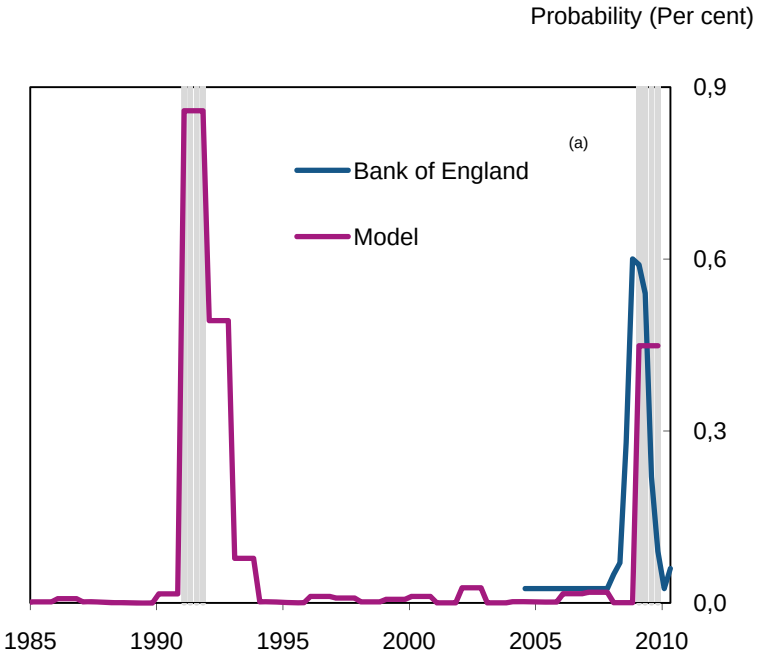
Jointly estimating banking crises and recessions

- We find that banking sector capital and liquidity ratios and the current account deficit are useful predictors of banking crises, but leading indicators of GDP growth do not appear to be significant.
- Sharp falls in OECD leading indicators of GDP growth helps predict recessions, as do movements in real house price inflation, and declines in banks' liquidity ratios.
- These factors appear to explain the observed correlation between banking crises and recessions.

Model performance - recessions

- Accurately predicts whether an economy will be in recession or not over 80% of the time
- But is prone to over-predict recessions, with 75% of predictions of recessions turning out to be inaccurate.
- But for some countries it would have provided a clear indication of recession in 2008.

Chart 2: Year-ahead predictions of recession in the United Kingdom

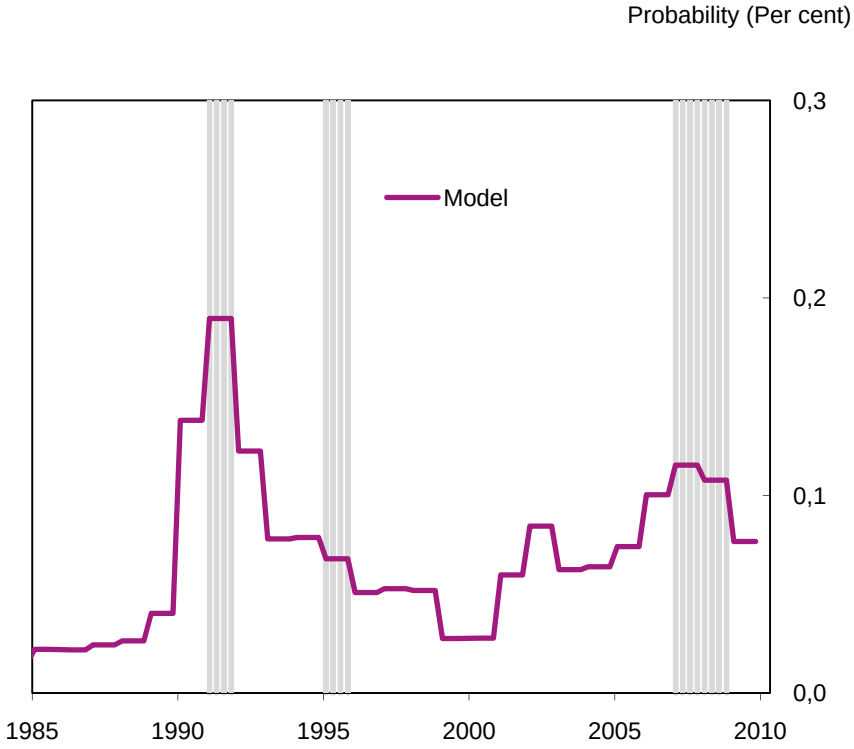


(a) Probability of zero four-quarter growth as implied by MPC GDP growth fanchart. Probabilities below 5% are not published and are assumed to be 2.5% in the chart above.

Model performance – banking crises

- Equations for banking crises had a lower probability of being correct overall (at around 50-70%),
- The probability of a predicting a crisis when none occurred was over 90%.
- But still useful tool to policymakers as flags changes in the risk of a banking crisis.

Chart 3: Year-ahead predictions of banking crises in the United Kingdom



Conclusions

- Evidence for interdependency between recessions and banking crises –reflecting common underlying factors.
- Banking sector capital and liquidity ratios and the current account deficit are useful predictors of banking crises.
- Sharp falls in OECD leading indicators of GDP growth helps predict recessions, as do movements in real house price inflation, and declines in banks' liquidity ratios.
- Our models tend to over-predict recessions and banking crises.
- But they still provide policymakers with useful information on changing risks of crises and recessions.