

What Macroeconomic Conditions Lead Financial Crises?

Michael T. Kiley

The analysis and conclusions set forth are those of the authors and do not indicate concurrence by the Federal Reserve Board or other members of its staff.

Motivation

Financial crises are very costly

- Financial crises are more common, even in advanced economies, than was broadly appreciated a decade ago (e.g., Romer, 2013)
- Financial crises lead to large losses in macroeconomic activity (with estimates ranging from $\frac{1}{4}$ to $1\frac{1}{2}$ times a year's GDP)
- This revised view of frequency and costs implies crises are very costly

Anticipating crises is thus important

- Academic view: Credit a key indicator (e.g., Schularick and Taylor, 2012)
- Policy view: Credit is a key indicator (e.g., Basel Committee guidance on countercyclical capital buffer)
- But how strong is the supporting evidence?

Preview

The questions I ask

- How strong a signal about potential instability does credit provide?
- Are asset valuations and other macroeconomic factors better predictors of instability?
- What approach is useful when assessing these questions?

How I answer my questions

- Use the same econometric approach as Schularick and Taylor (2012)
- Compare intuitive measures of predictive power with other statistical measures (e.g., AUROC)
- Pay special attention to the factors that help predict recent crises

Preview of main results

- Asset valuations are substantially better predictors of financial instability than credit
- As is the current account deficit
- While finding owes partly to sample and variables considered, it also stems from the consideration of easy-to-understand measures of fit

Predicting financial instability

Data

- Macrofinancial history database (Jordà, Schularick, and Taylor, 2017)
- House price database (Knoll, Schularick, and Steger, 2017)
- Coverage:
 - 17 countries
 - 1870-2013
- Analysis will use entire sample, but focus on 1947-2013

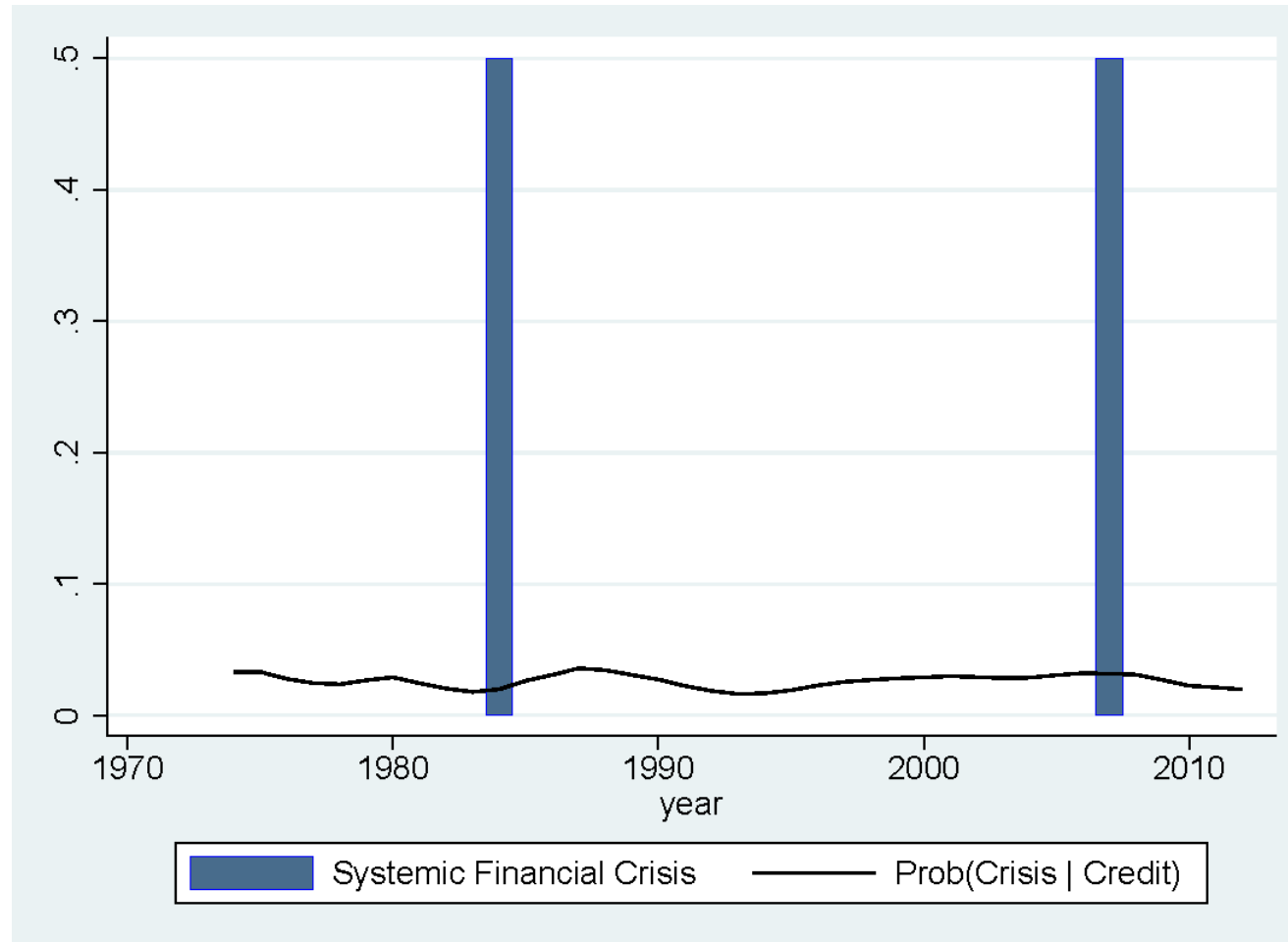
The approach of Schularick and Taylor (2012)

**Table 1: Logistic Regression Predicting Financial Crisis
With Credit**

	(1)	(2)	(3)
VARIABLES	1876-2012	1947-2012	1974-2012
$\Delta^4 \ln(\text{credit}_{t-1})$	0.30461*** (3.25)	0.40181* (1.68)	1.01312*** (3.34)
Observations	2,071	1,032	624
Pseudo R ²	0.0317	0.0292	0.102
AUROC	0.653	0.651	0.746

But this approach has no predictive ability

Probability of a Crisis in the United States Implied by Logit Regression

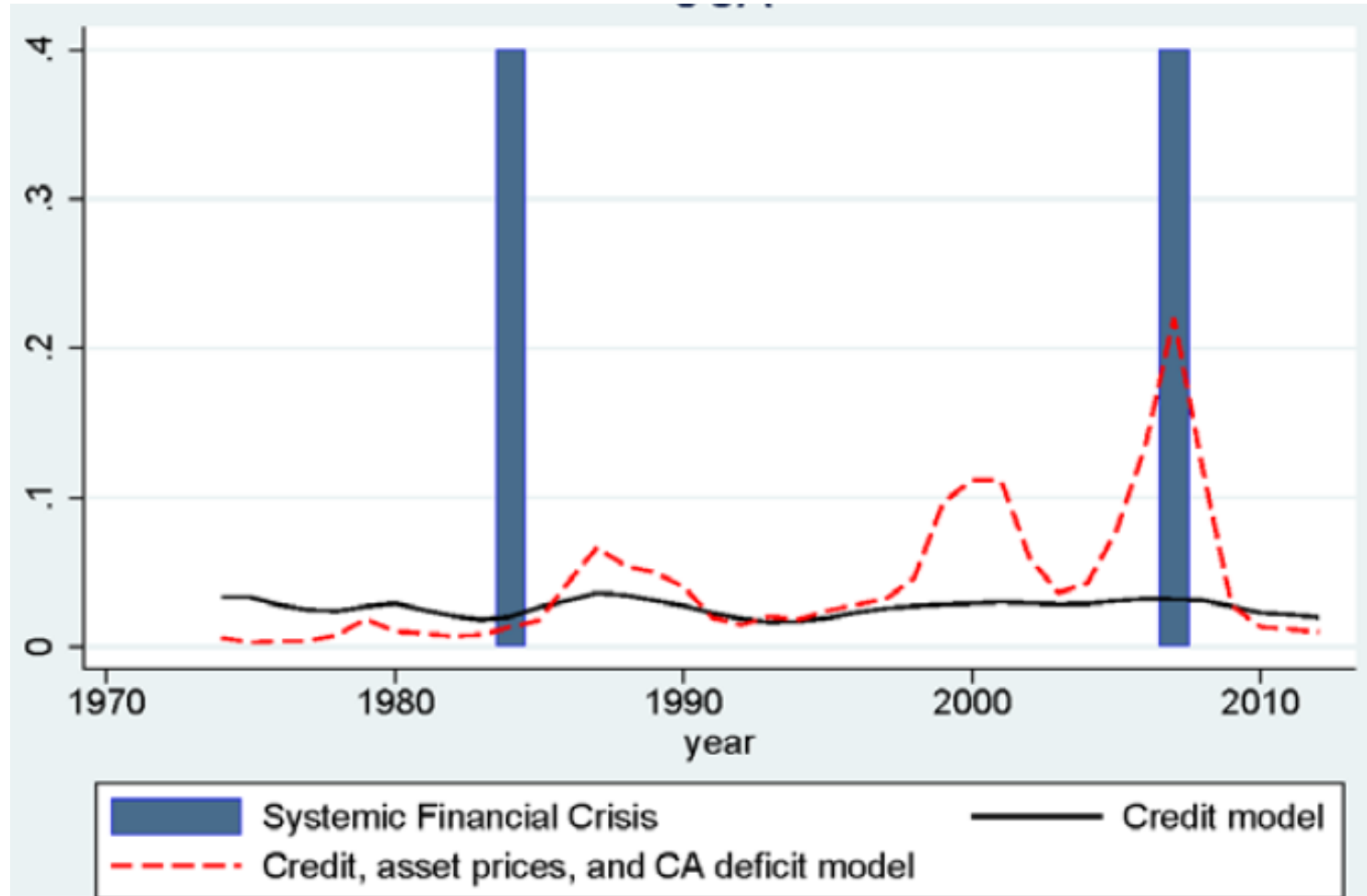


Alternatives: Valuations and current account

VARIABLES	(1) 1947-2012	(2) 1947-2012	(3) 1947-2012	(4) 1947-2012	(5) 1947-2012
$\Delta^4 \ln(\text{credit}_{t-1})$	0.40181* (1.68)	0.25786 (0.68)	-0.10523 (-0.32)	-0.18159 (-0.53)	0.30673 (1.51)
$\Delta^4 \ln(\text{house prices}_{t-1})$		0.68409** (2.15)	0.69453** (2.21)	0.75278** (2.34)	
$\Delta^4 \ln(\text{equity prices}_{t-1})$		0.74641*** (2.81)	0.85925*** (3.14)	0.90212*** (3.16)	
$\frac{CA_{t-1}}{GDP_{t-1}} (CA_{t-1} < 0)$			-1.2517*** (-3.25)	-0.8583*** (-4.09)	-0.7930*** (-4.37)
$\frac{CA_{t-1}}{GDP_{t-1}}$			0.48692 (1.43)		

This approach has predictive ability

Probability of a Crisis in the United States Implied by Logit Regression

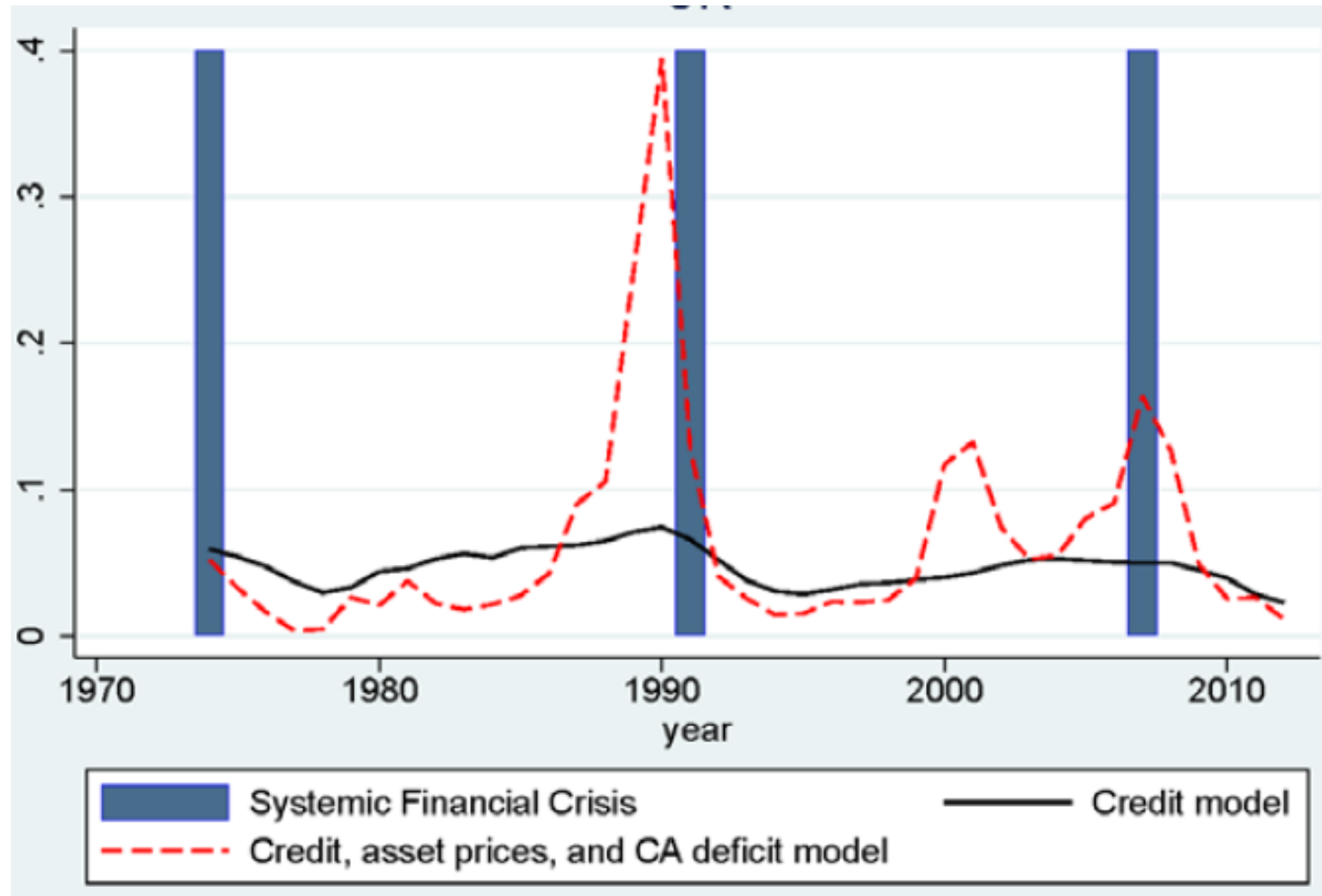


Predictive ability more generally

- Asset prices and the current account signaled elevated risks
 - Across European countries during 2000s (e.g., risks more elevated in Italy, Portugal, and Spain than in France and Germany), whereas credit does not
 - In the Nordics during late 1980s-early 1990s
 - In the UK during early 1990s
- But also signaled elevated risks in late 1990s/early 2000s
 - Is this a feature or a bug?

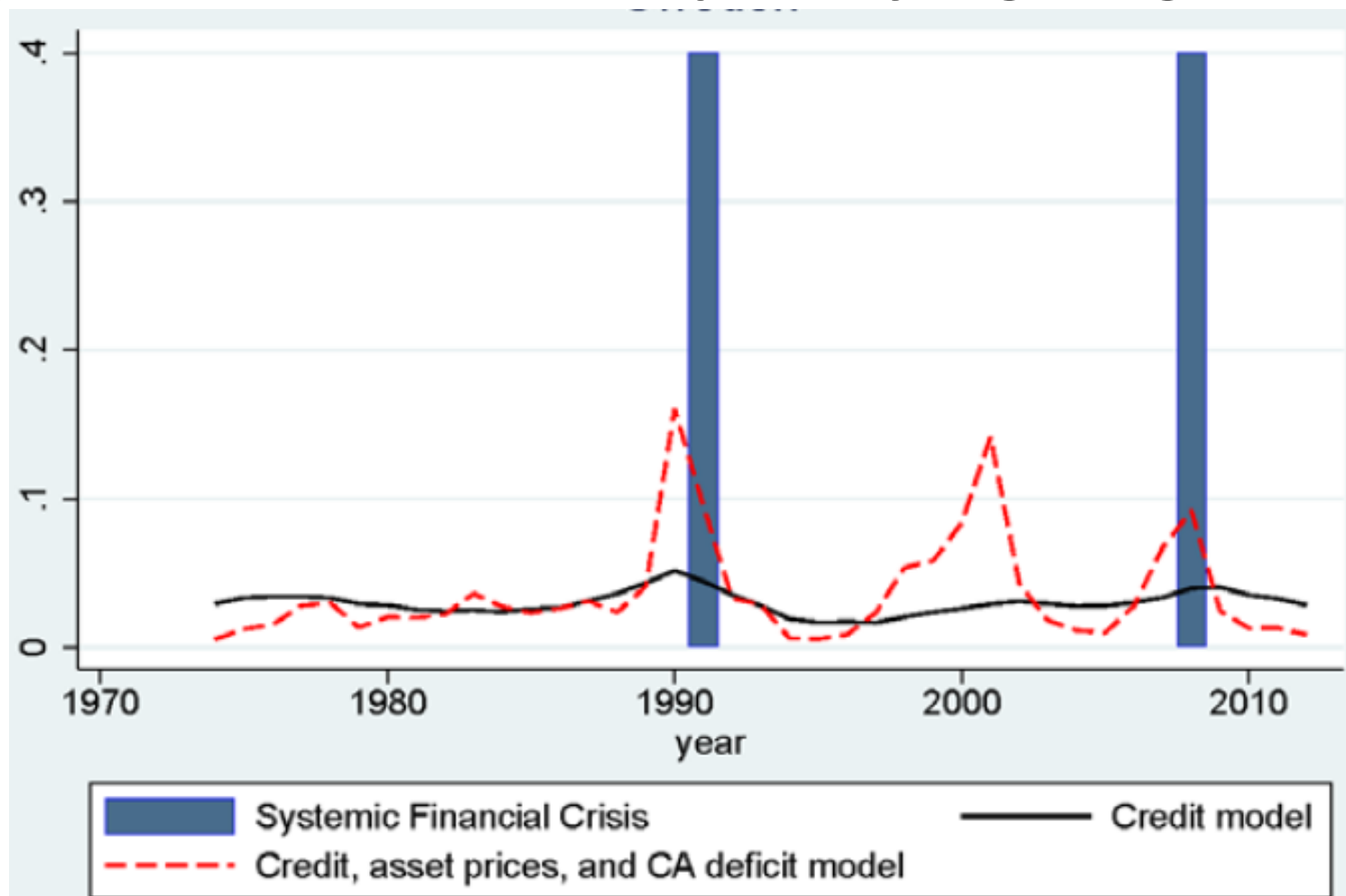
Predictive ability: UK example

Probability of a Crisis in the UK Implied by Logit Regression



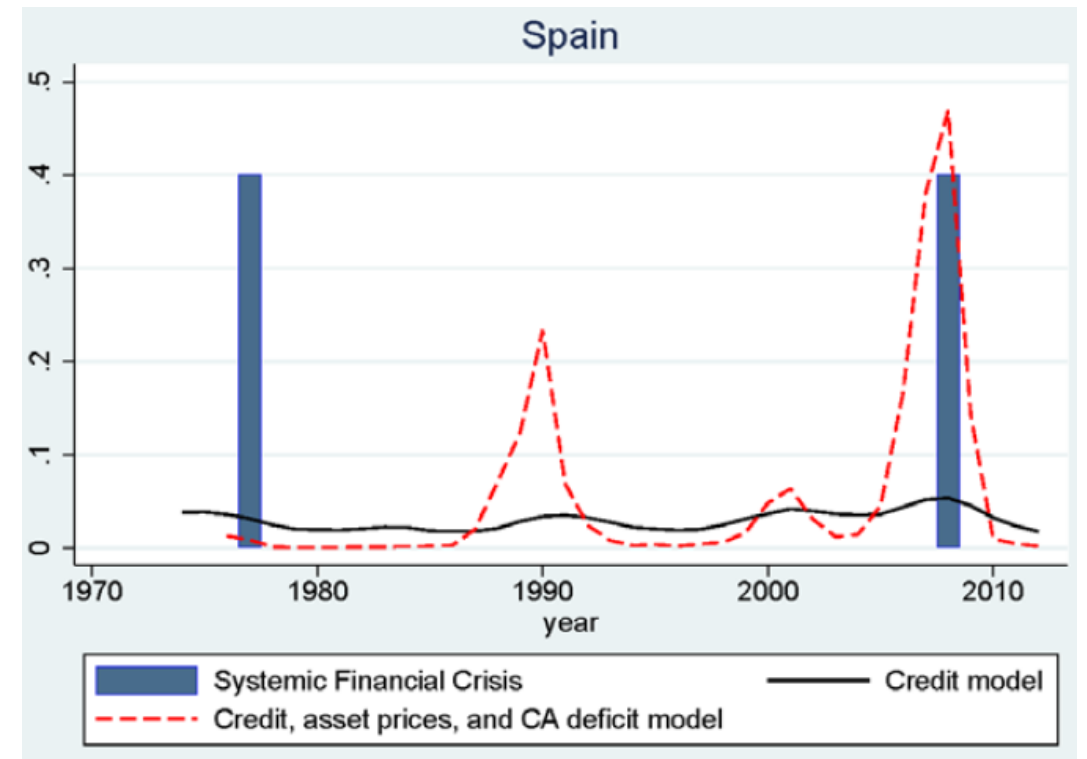
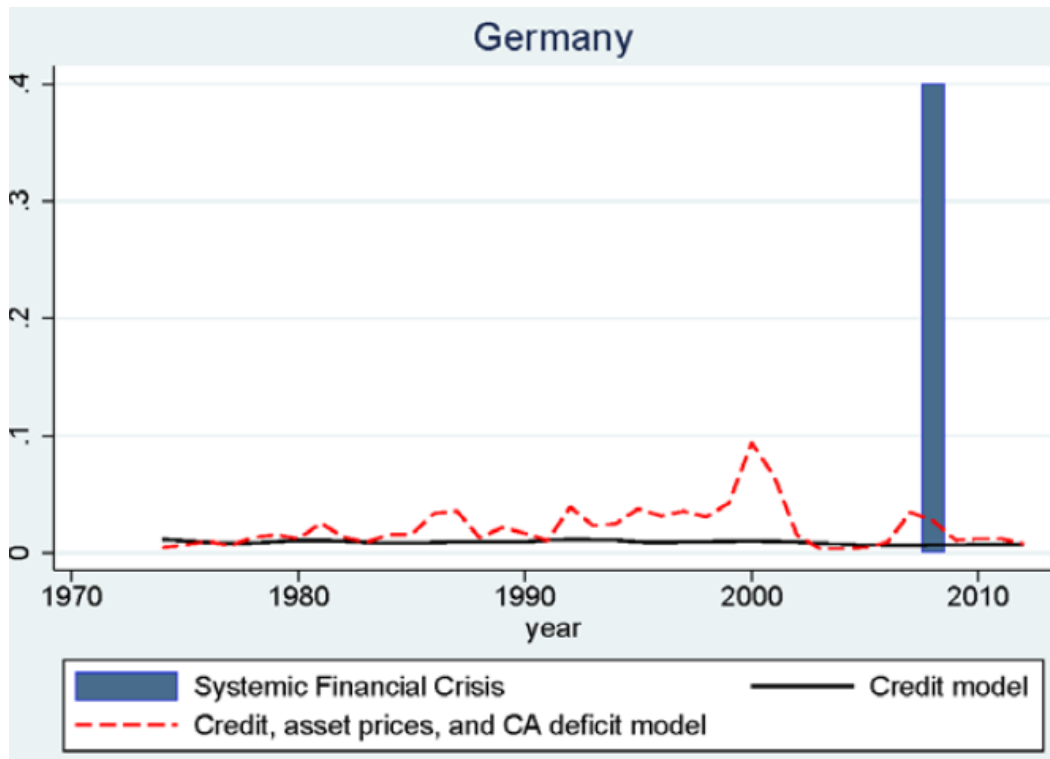
Predictive ability: Swedish example

Probability of a Crisis in Sweden Implied by Logit Regression



Predictive ability: Euro-area example

Probability of a Crisis Implied by Logit Regression

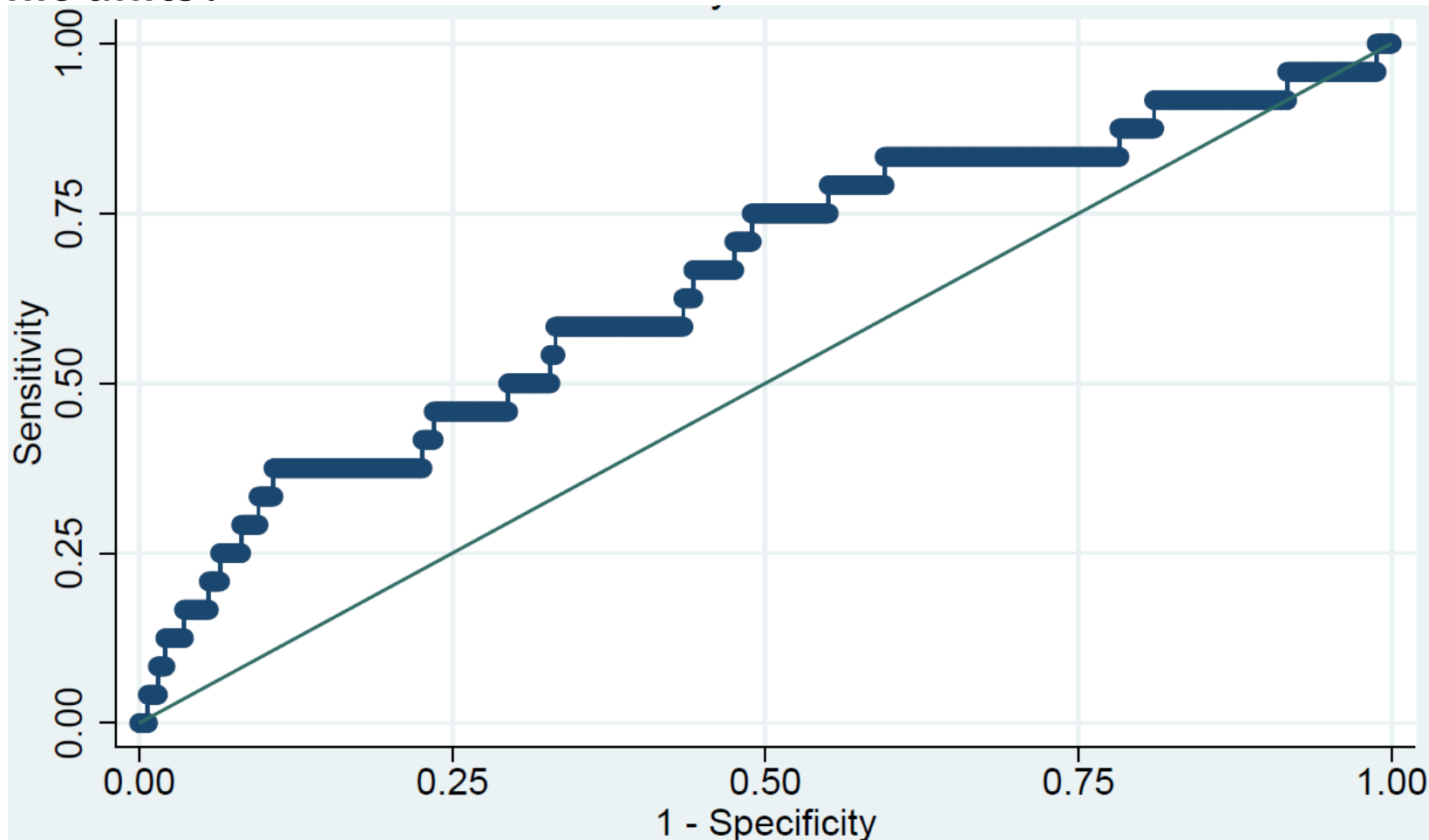


Robustness

- Robust to other post-WWII sample splits
- Pre-WWII: Only current account statistically significant
- Robust to inclusion of other predictors such as inequality and productivity (predictors suggested in, for example, Paul, 2017)
- Robust to other credit (gap) measures and interactions with credit
- Did not consider some predictors from literature (e.g., Daniélsso, Valenzuela, and Zer, 2018)

Why visual fit (Pseudo-R²) rather than AUROC?

AUROC curve for credit-only model: Do you know how to translate this into *economic units*?



Area under ROC curve = 0.6507

Wrap up

Takeaways

- Credit may not be a very good predictor of financial instability
- Asset valuations – equity prices and house prices – appear to be more strongly and robustly related to subsequent instability based on a standard approach
- The current account deficit also appears to be a good indicator
- Use measures of fit that readers can understand