Economic Studies
at BROOKINGS

The Real Effects of Disrupted Credit

Evidence from the Global Financial Crisis

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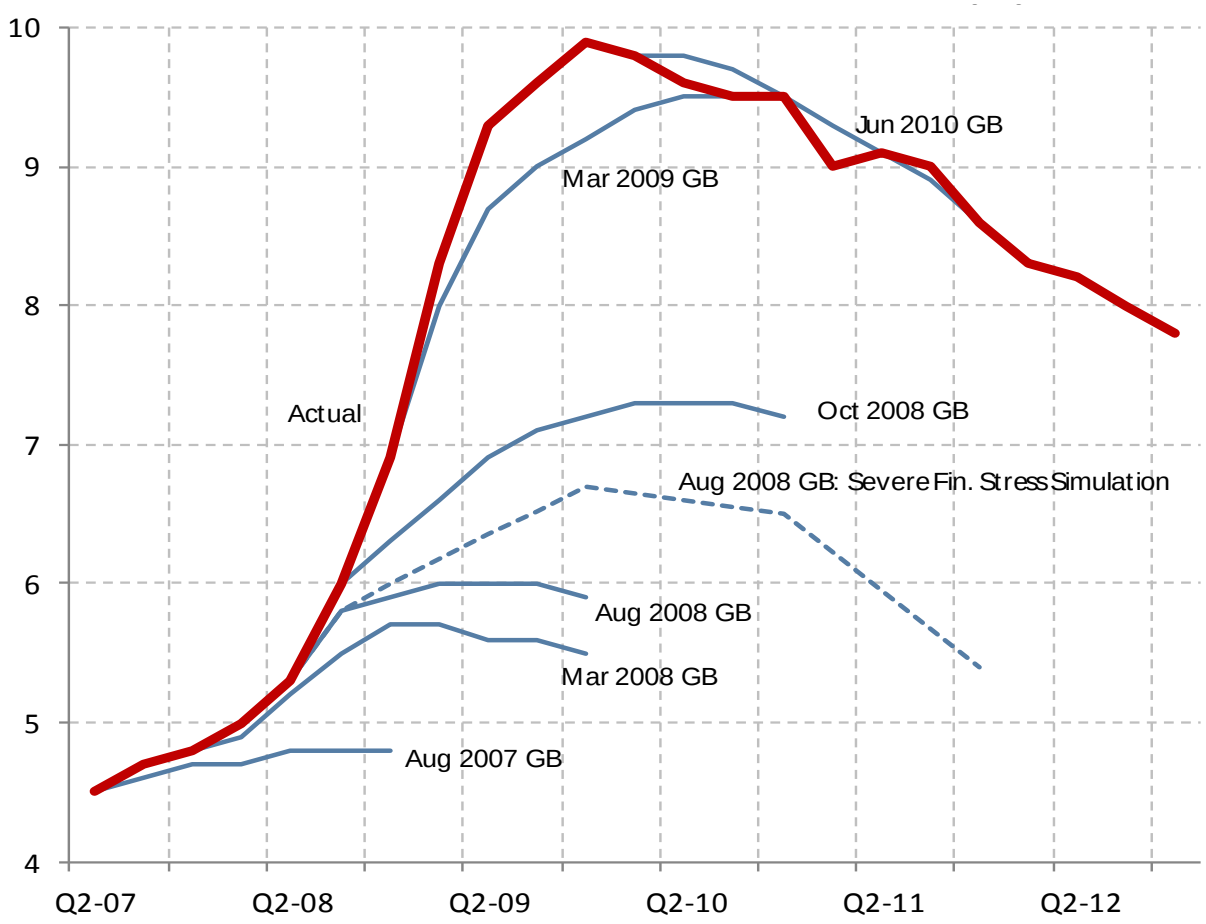
Brookings Papers on Economic Activity
September 13th, 2018

Unemployment Rate: Actual Outcome vs. Greenbook Forecasts (%)

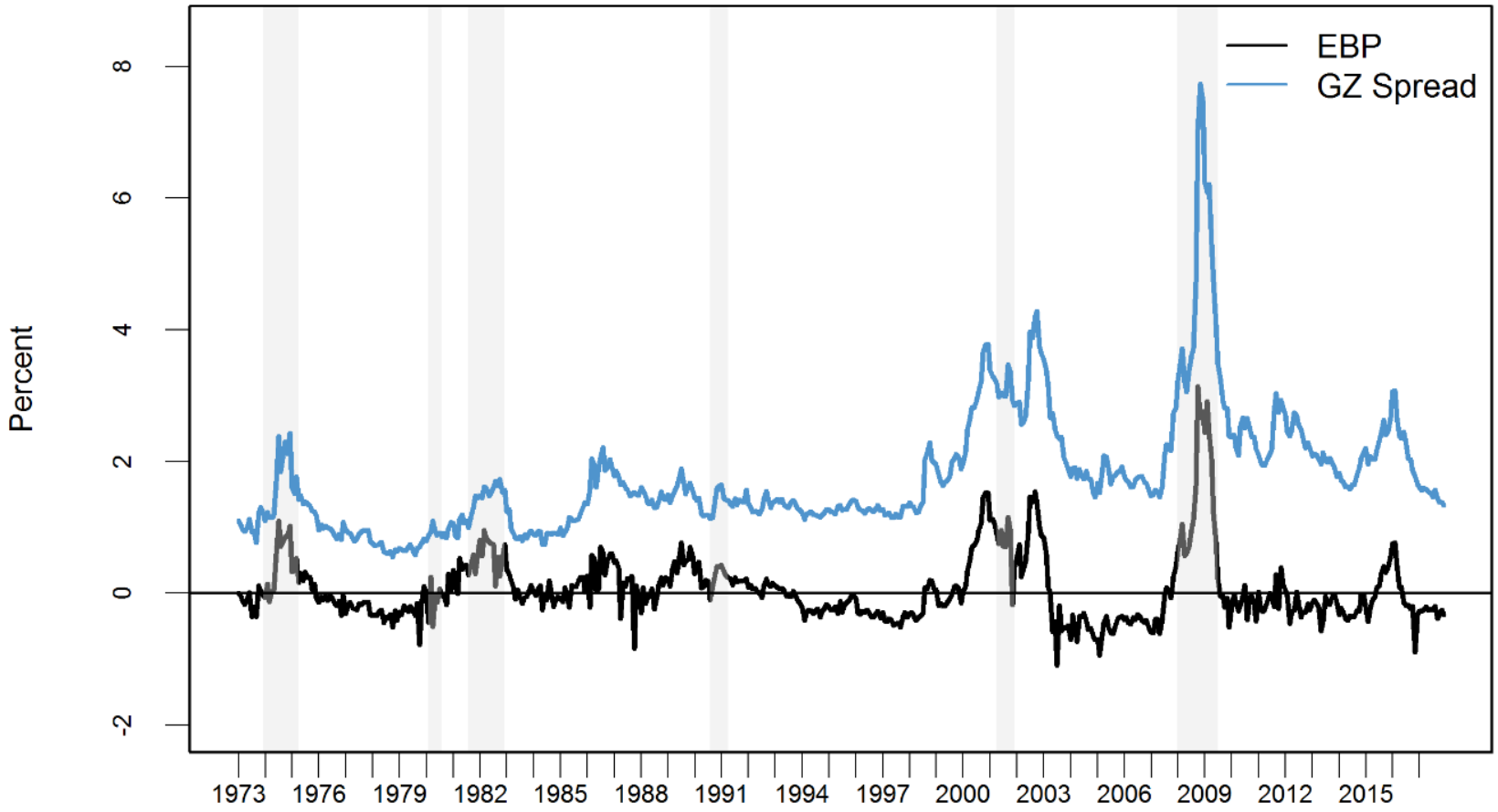


Source: Kohn and Sack (2018)

How can credit-market disruptions be incorporated into macro models?

- A key concept is the **external finance premium**, the all-in cost of private borrowing less the return to safe, liquid assets
- Developments that increase the external finance premium and impede credit flows ("credit factors"):
  - Deterioration of borrower balance sheets (households, nonfinancial firms)
  - Deterioration of lender balance sheets (banks)
  - Panics (which disintermediate lenders)
- In macro, increases in EFP help explain 1) ordinary cyclical dynamics and 2) the effects of crises. But these ideas mostly excluded from mainstream models before the crisis

Measures of the External Finance Premium



Source: Gilchrist and Zakrajšek (2012); updated data from Favara et al. (2016)

Objectives of this paper

1. Review the post-crisis literature on the role of credit factors
    a. In the behavior of households, firms and lenders
    b. In macroeconomic analysis

2. Provide new evidence on the links between the financial crisis and the Great Recession

Empirical analysis of credit effects: the problem of endogeneity

- For example, theory posits linkages between household leverage and household spending; or between firm cash flow and capital investment
- But pervasive endogeneity makes identification difficult
- Crisis provides not only motivation, but also a “natural experiment” to help identify effects

Large post-crisis literature confirms empirical relevance of credit factors

- Consumption of highly indebted households is much more sensitive to changes in wealth and income
- Firms that were more levered, in industries more dependent on external finance, or whose banks were relatively weaker, cut employment and investment by more
- Banks more exposed to mortgage losses or more dependent on wholesale funding cut non-mortgage lending by more
- Foreign banks exposed to US subprime or dependent on US wholesale funding cut lending by more in their own countries

Macroeconomics is also catching up

- Incorporating credit factors into dynamic macro models
- Incorporating banking panics and the large, nonlinear effects of crises
- Using the external finance premium and other measures of credit stress to forecast the economy

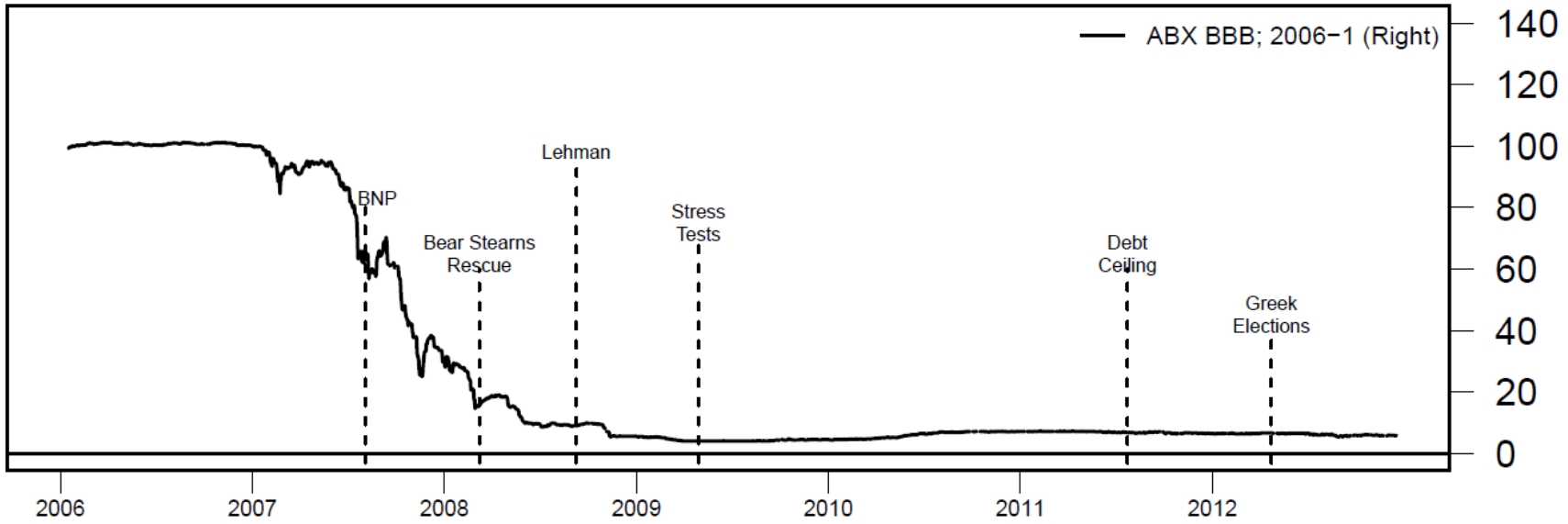
How did the financial crisis most affect the real economy?

Hypotheses

1) Household balance sheets → Effective demand for credit
2) Panic in wholesale funding, fire sales → Effective supply of credit

The two hypotheses have very different policy implications

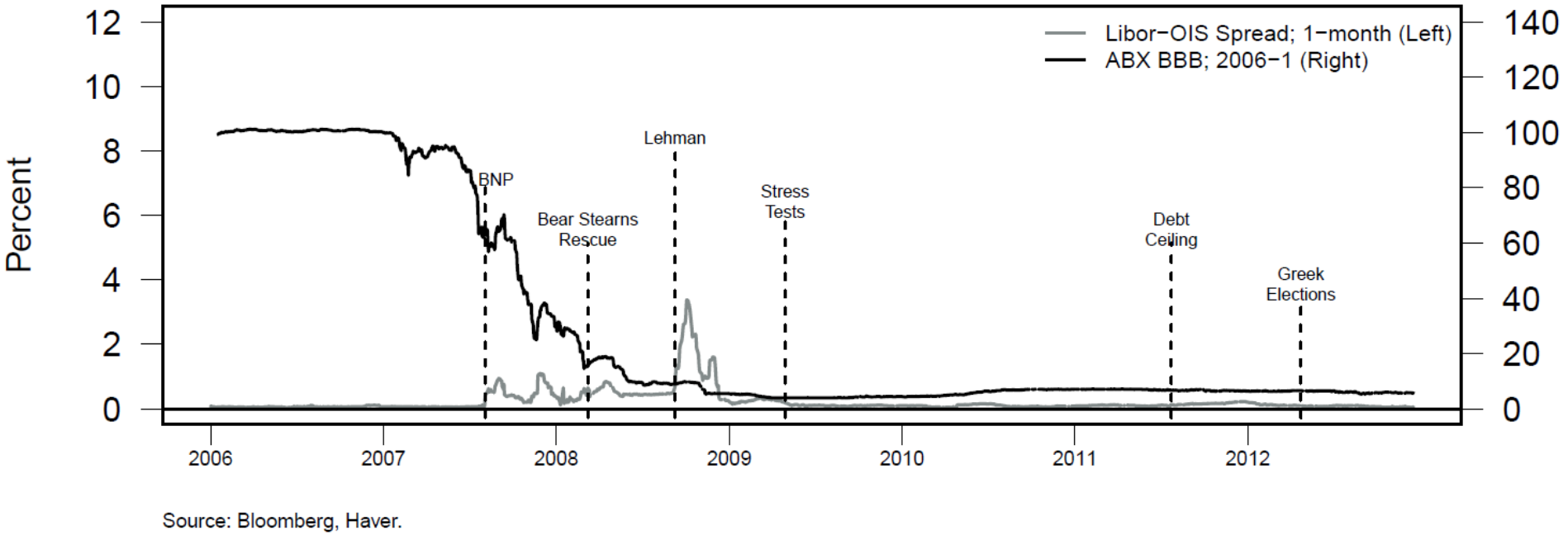
Figure 5. Stages of the Financial Crisis



Source: Bloomberg, Haver.

ABX BBB (black, right scale) is an index of the value of BBB-rated, 2006-vintage **subprime mortgages**. It shows the market's sharply declining assessment of housing/mortgages beginning in mid-2006. The decline in mortgage values reflected the deterioration of household balance sheets; damaged the balance sheets of banks and investment banks; and ultimately triggered the panic.

Figure 5. Stages of the Financial Crisis



Source: Bloomberg, Haver.

LIBOR – OIS (grey, left scale) is the one-month inter-bank lending rate less an indicator of expected safe rates; it measures the risk of short-term lending. Sharp increases in LIBOR – OIS indicate **panic in wholesale funding**. As Gorton-Metrick (2012) point out, this variable remained stable even as ABX declined, rising only after BNP Paribas announced it couldn't value subprime mortgages in August 2007. It rose around the Bear Stearns episode, spiked during the Lehman crisis, then declined with the passage of TARP and Fed interventions in fall 2008.

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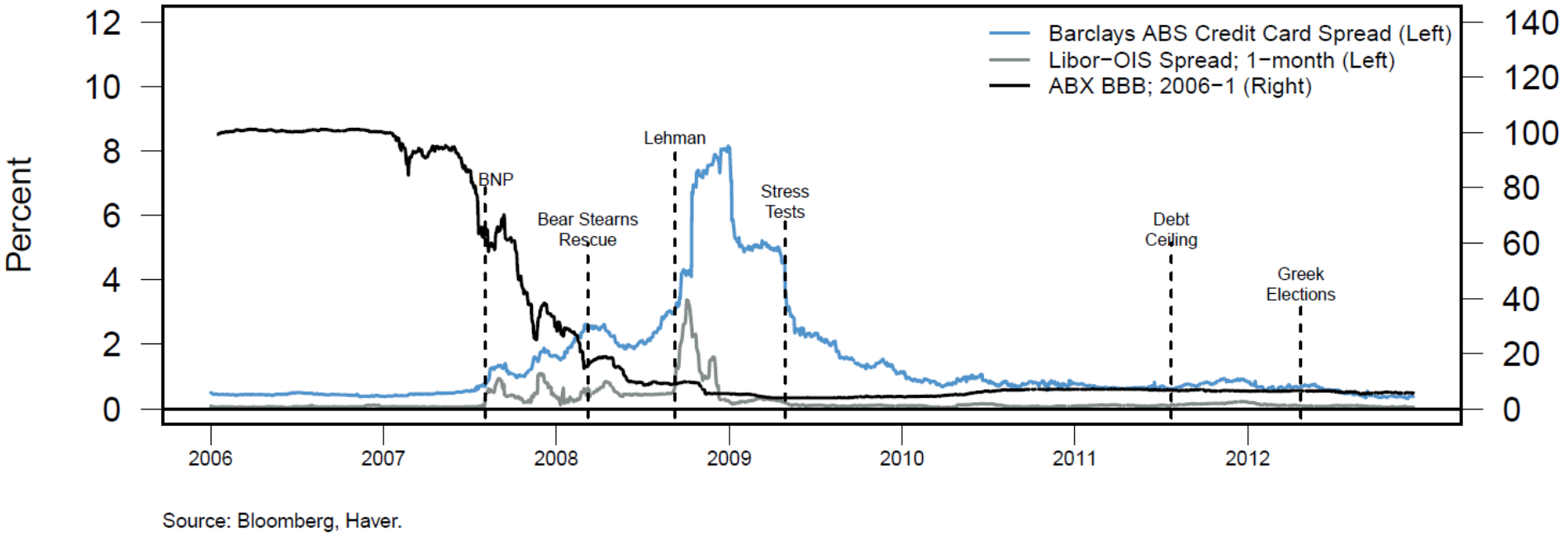
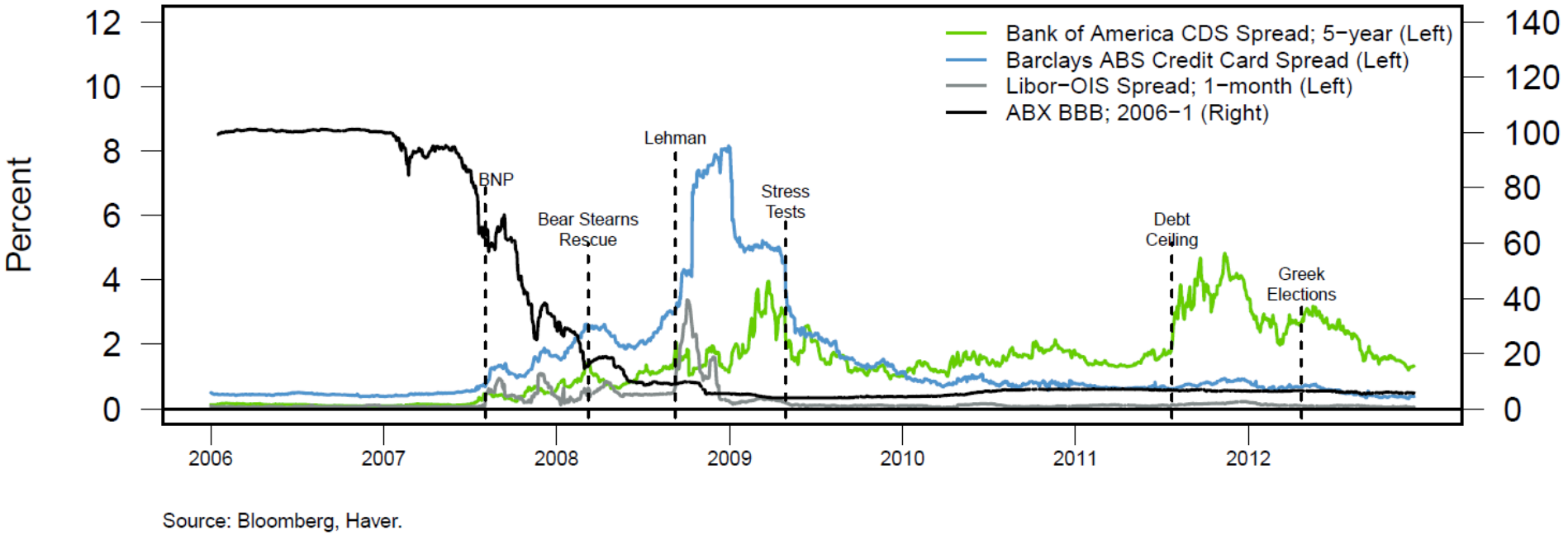


Source: Bloomberg, Haver.

ABS spreads for credit card debt (blue, left scale) shows the yield spread on a **non-mortgage securitization**. The ABS spread began to rise in late summer 2007 but jumped sharply after Lehman. Gorton-Metrick interpret the spike as the "run on repo," in which investors would not lend against securitizations except with very high haircuts. Relatedly, the spike probably also reflects **fire sales**, as assets that could not be financed were dumped and disintermediated.

Figure 5. Stages of the Financial Crisis



Source: Bloomberg, Haver.

The CDS spread of a large bank (green, left scale) shows the effect of mortgage deterioration, funding shocks, and declines in the value of credit products on the **solvency of banks**. Bank health worsens through early 2009, improves following the spring 2009 stress tests, then worsens again about the time of the U.S. government's downgrade and continuing pressures in Europe.

- Figure 5 illustrates the stages of the building crisis
- Each stage of the crisis potentially affected real activity, by damaging balance sheets and disrupting credit markets
- Although there is a causal sequence, there are evidently sharp discontinuities and nonlinearities, which may allow for separate identification of the effects of each stage

Factor analysis

75 financial variables, daily, 2006-2012

- Confirms the patterns in Figure 5 describe a larger set of variables
- Estimated factors appear to be economically interpretable
- Orthogonality of factors:
  - Stages are discontinuous and nonlinear, not predictable by linear methods
- Testing whether factors (aggregated to monthly) forecast macro variables

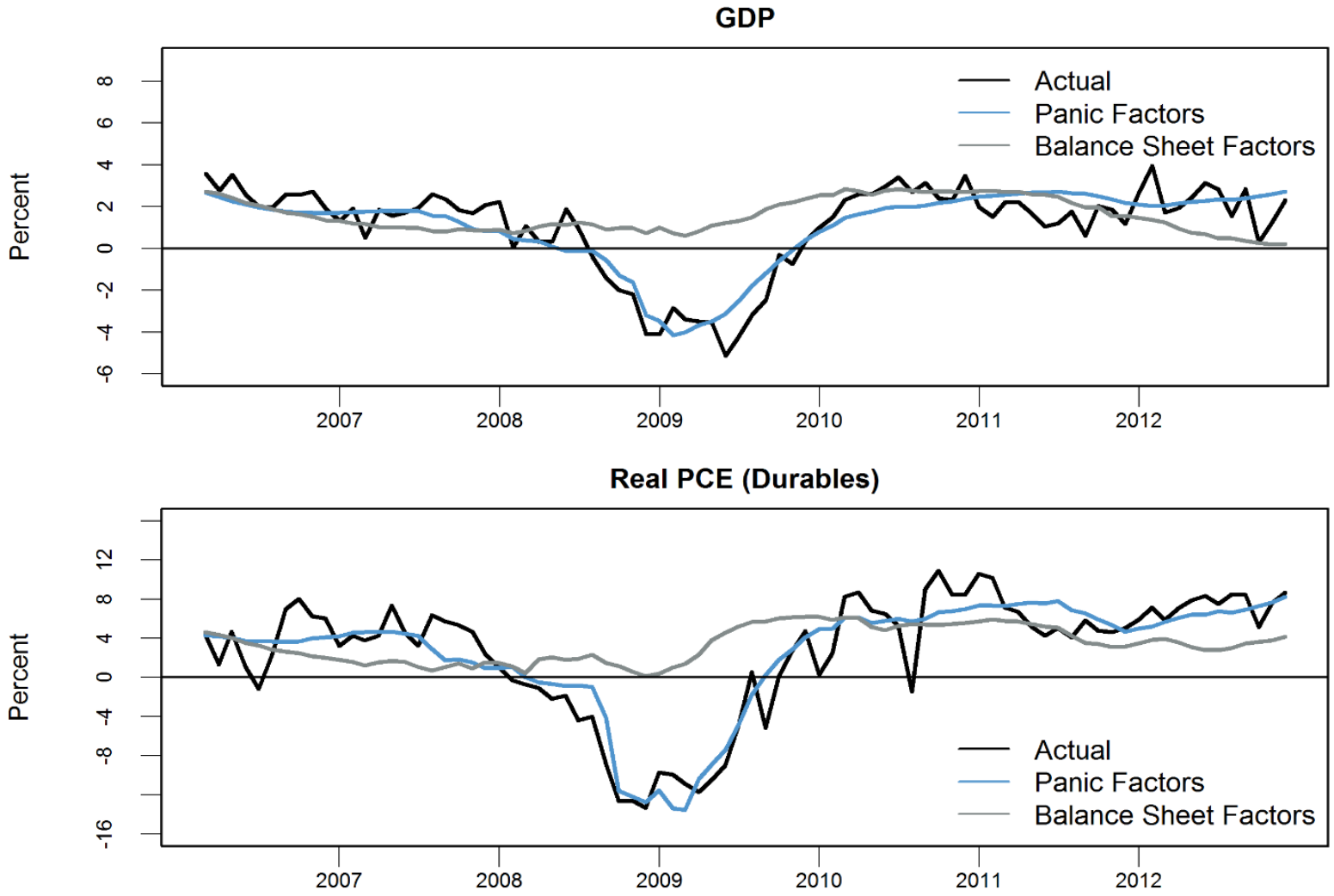
Table 2. F-stats for prediction equations, full sample factors

Forecasted variable	Factor 1 (Housing)	Factor 2 (Non-mortgage Credit)	Factor 3 (Funding)	Factor 4 (Banks)
GDP	0.06	4.89***	3.27**	0.63
Industrial Production	0.40	7.06***	4.87***	1.50
Employment Ex Construction	1.29	9.61***	2.52*	0.61
Unemployment	1.60	11.33***	2.56*	1.26
Real PCE	0.58	3.68**	3.76**	0.78
Real PCE (Durables)	0.33	3.51**	3.66**	0.44
Retail Sales	0.14	10.36***	4.59***	3.29**
Housing Starts	1.89	1.72	0.93	1.73
Capital Goods Orders	0.71	7.99***	2.96**	3.85**
ISM Manufacturing Index	2.40*	22.69***	13.00***	2.16*
Core PCE Inflation	0.88	1.55	0.85	0.42
df	(3;76)	(3;76)	(3;76)	(3;76)

Table 4. F-stats of panic versus balance sheet factors

Forecasted variable	Panic Factors (Factors 2 and 3)	Balance Sheet Factors (Factors 1 and 4)
GDP	3.57***	0.37
Industrial Production	5.29***	1.20
Employment Ex Construction	5.07***	1.46
Unemployment	8.09***	1.99*
Real PCE	3.75***	0.88
Real PCE (Durables)	6.00***	0.36
Retail Sales	8.50***	1.94*
Housing Starts	1.48	1.63
Capital Goods Orders	4.55***	2.46**
ISM Manufacturing Index	15.66***	2.05*
Core PCE Inflation	1.01	0.72
df	(6;73)	(6;73)

Figure 11. Dynamic simulations



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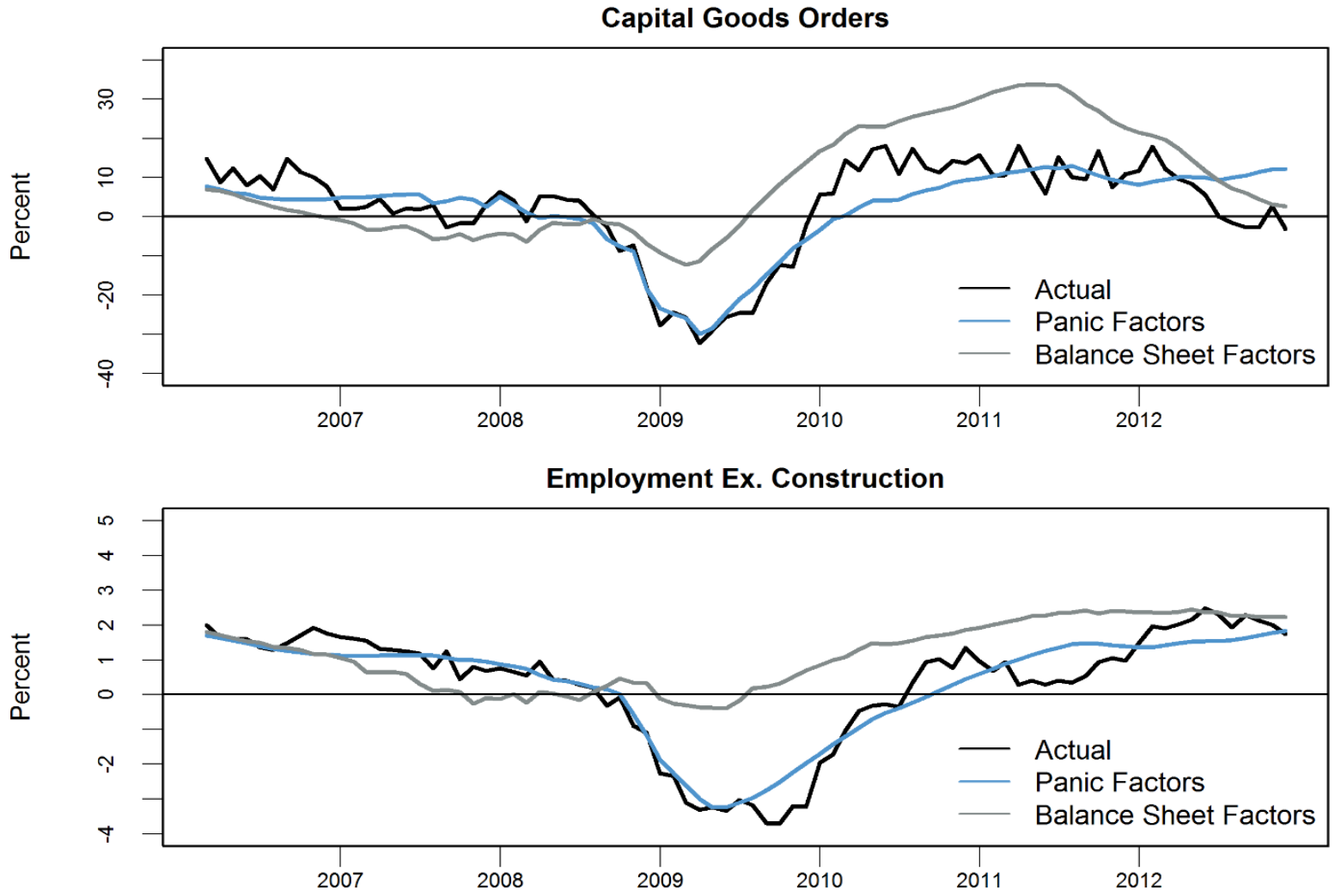

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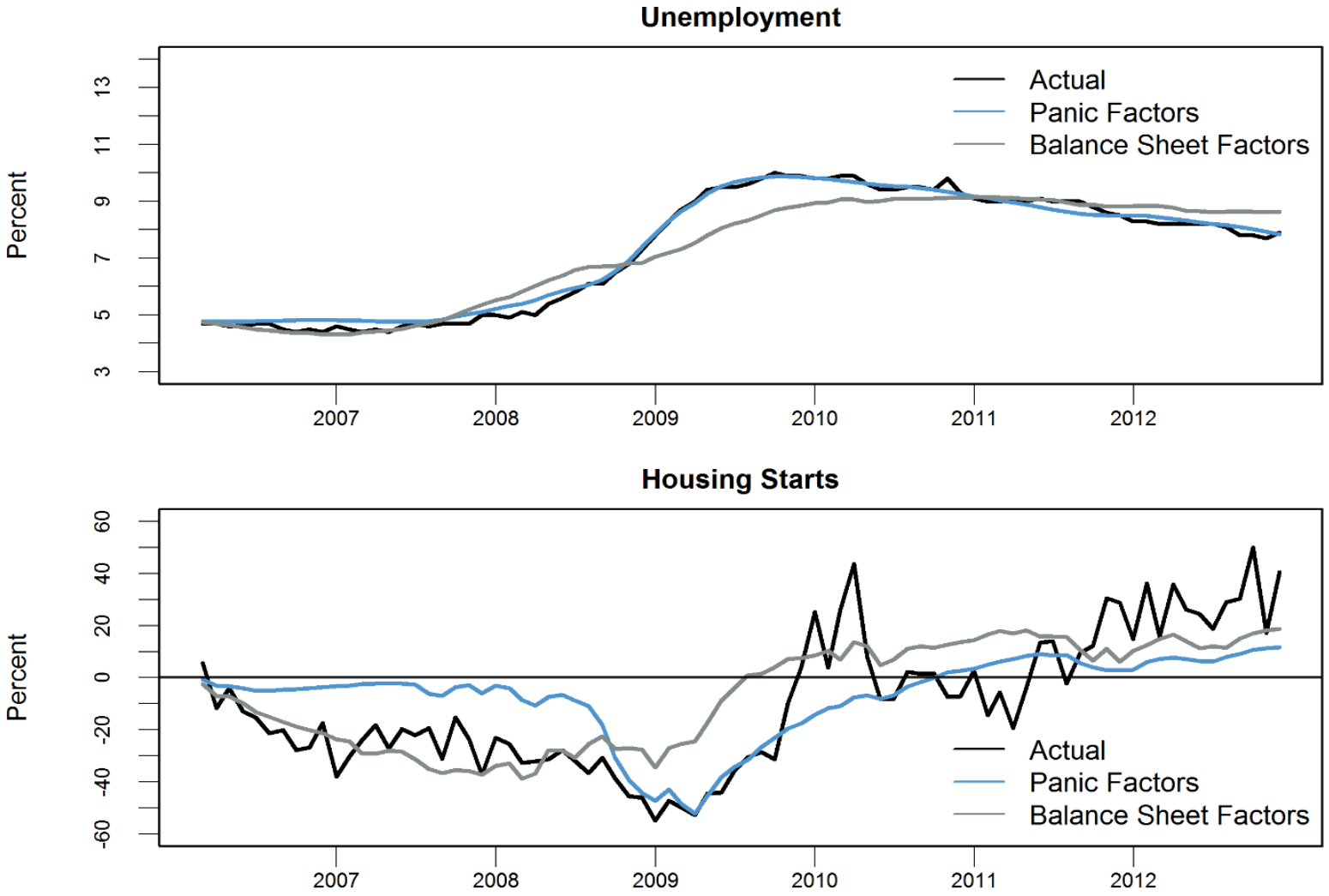
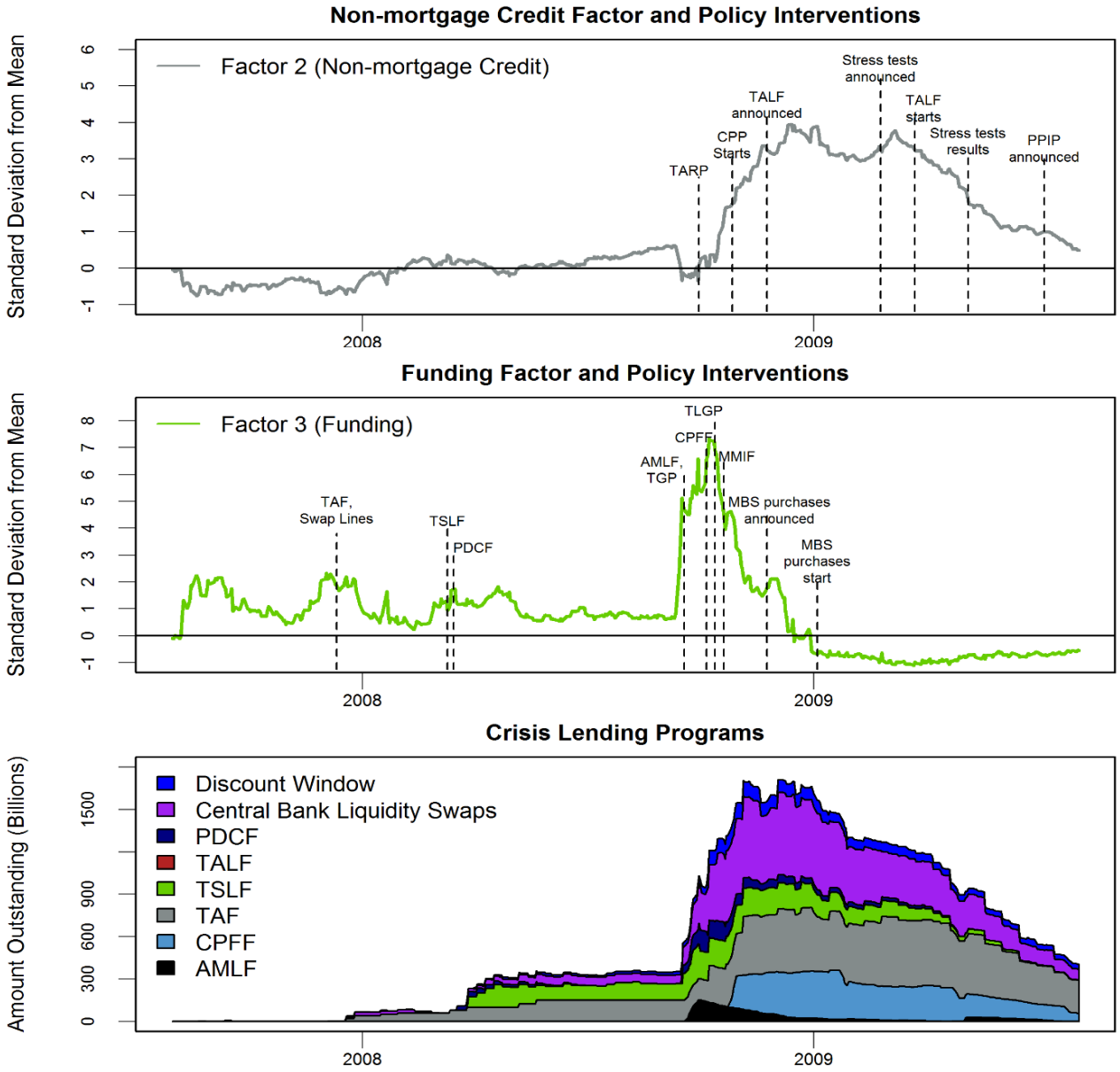


Table 7. F-stats for inclusion of alternative crisis measures

Forecasted variable	House Prices	Delinquencies	EBP	EBP (Ortho.)
GDP	2.62*	1.54	7.85***	7.72***
Industrial Production	1.98	1.37	11.12***	15.89***
Employment Ex Construction	0.75	1.49	8.44***	8.33***
Unemployment	1.71	3.74**	15.24***	9.31***
Real PCE	2.51*	1.10	7.56***	7.42***
Real PCE (Durables)	2.55*	1.02	6.1***	5.06***
Retail Sales	1.30	0.85	8.93***	10.08***
Housing Starts	3.52**	1.68	1.71	2.04
Capital Goods Orders	1.08	1.39	7.91***	10.19***
ISM Manufacturing Index	1.81	1.04	15.47***	12.39***
Core PCE Inflation	1.01	1.71	1.86	1.21
df	(3;76)	(3;76)	(3;76)	(3;76)

Figure 13. Policy Interventions



On the role of credit factors in macroeconomics

- Empirical work since the crisis has tended to confirm the importance of credit factors in the behavior of households, firms, and banks
- New modeling techniques show how to incorporate these factors into macro analysis
- Macro modeling and forecasting should pay greater attention to changes in credit conditions

On the real effects of the Global Financial Crisis

- Financial distress of households, firms, and banks certainly played a role
- However, the financial panic explains the extraordinary severity of the initial downturn
- This finding justifies strong actions to control panics before they sink the economy