Expectations and Bank Lending

Yueran Ma — Chicago Booth
Teodora Paligorova — Federal Reserve Board
José-Luis Peydró — UPF/Imperial

Federal Reserve Stress Testing Research Conference

Motivation

- Supply of credit a central issue in macro-finance
- Beliefs of lenders thought to be key, but mainly indirect evidence
  - **Limited data** on lenders' beliefs & connections to economic outcomes
  - Research on lending: mostly focuses on bank balance sheets
- Previous expectations research: mostly beliefs of central tendencies
  - But beliefs about tails are also central, esp for lending
  - **Limited data** on beliefs about tails

This paper: granular data on beliefs of largest lenders in US (FR Y-14A)

- Baseline + Tail (severely adverse)
- For each MSA by year: house price index growth, unemployment rate
- Link to US "credit registry": loans & firm outcomes (FR Y-14H1)

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Data Sources

FR Y-14A: projections of house price index (HPI), unemployment rate

- **By 392 MSAs**, each year: 2014—2019
- For both **severely adverse scenario** and **baseline scenario**
  - Severely adverse: describes hypothetical adverse economic conditions
  - Baseline: similar macro condition to average Blue Chip projections
  - Over nine quarter horizon

FR Y-14H1: loan-level data à la credit registry

- Both outstanding loan amount and new loan issuance
- We focus on C&I lending
  - In this period, relatively limited risky lending in residential mortgages

example

Summary Statistics: Bank Projections

	# MSAs	# Banks	N	mean	p50	sd	25th	75th
SA HPI Drop	392	11	17,423	19.43	19.64	9.36	13.68	25.12
Baseline HPI Drop	392	8	12,794	-0.62	-0.67	1.35	-1.14	-0.15
SA Unempl Incr	392	8	9,467	4.80	4.80	2.12	3.55	5.97

- SA: severely adverse. HPI: house price index.
- HPI drop: (jumpoff HPI − min HPI)/jumpoff HPI
- Unempl incr: (max unemployment rate − jumpoff unempl rate)
- All units in percentages. Larger value means worse outcome.

- Unemployment projections have less coverage
  - One fewer year. Not as many banks.

Properties of Economic Projections

What Shapes the Projections?

		SA HPI	Baseline HPI	SA Unempl
Persistence	Lagged Projection	✓	✓	
Past MSA Conditions	Lagged MSA Conditions			
	MSA HPI Growth 06—09	✓	✓	
	MSA Unempl Increase 06—09			✓
Capital & Exposures	Bank Tier 1			
	Risky Loan Exposure			
	Tier 1 * Risky Loan Exposure			

Determinants of the Projections

	HPI Drop		Unempl Incr
	SA	Baseline	SA
Lagged Projection	0.616***	0.359***	-0.268
	(0.069)	(0.110)	(0.390)
L.MSA HPI Growth	0.106	0.007	
	(0.112)	(0.024)	
L.MSA Unempl Rate			0.049
			(0.159)
HPI Growth 06-09	-0.151***	0.008***	
	(0.034)	(0.002)	
Unempl Increase 06-09			0.010***
			(0.002)
L.Bank Non-IG Ratio in MSA	-0.004	0.001	0.005
	(0.009)	(0.001)	(0.003)
L.Bank Tier 1	-0.592*	0.050	0.176
	(0.350)	(0.048)	(0.106)
L.Bank ROA	-0.310	0.067	-0.335
	(0.632)	(0.041)	(0.230)
L.Log (Bank Assets)	-1.157	0.568	0.116
	(2.330)	(1.130)	(0.310)
Observations	9,414	7,952	6,436
R^2	0.552	0.171	0.106

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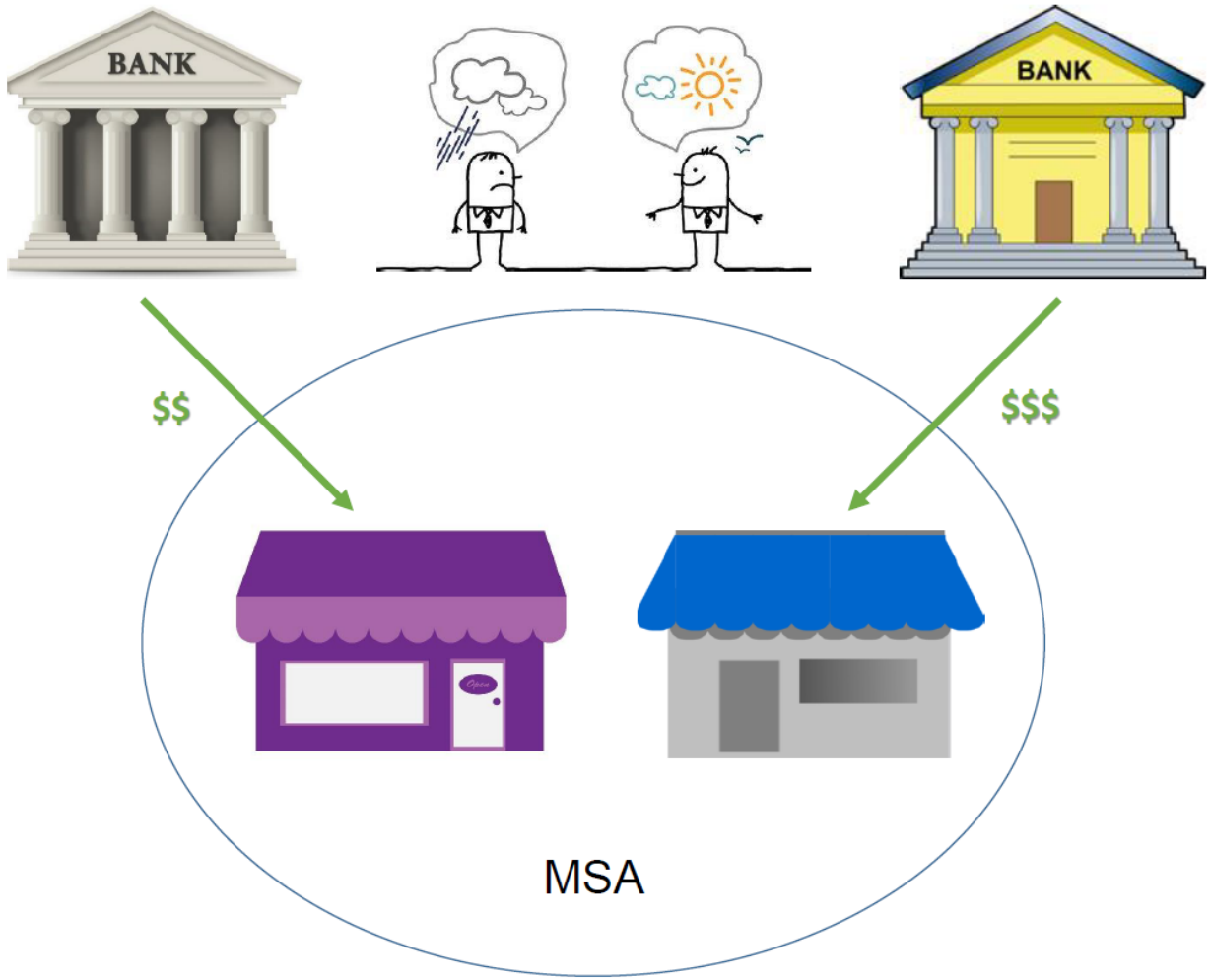
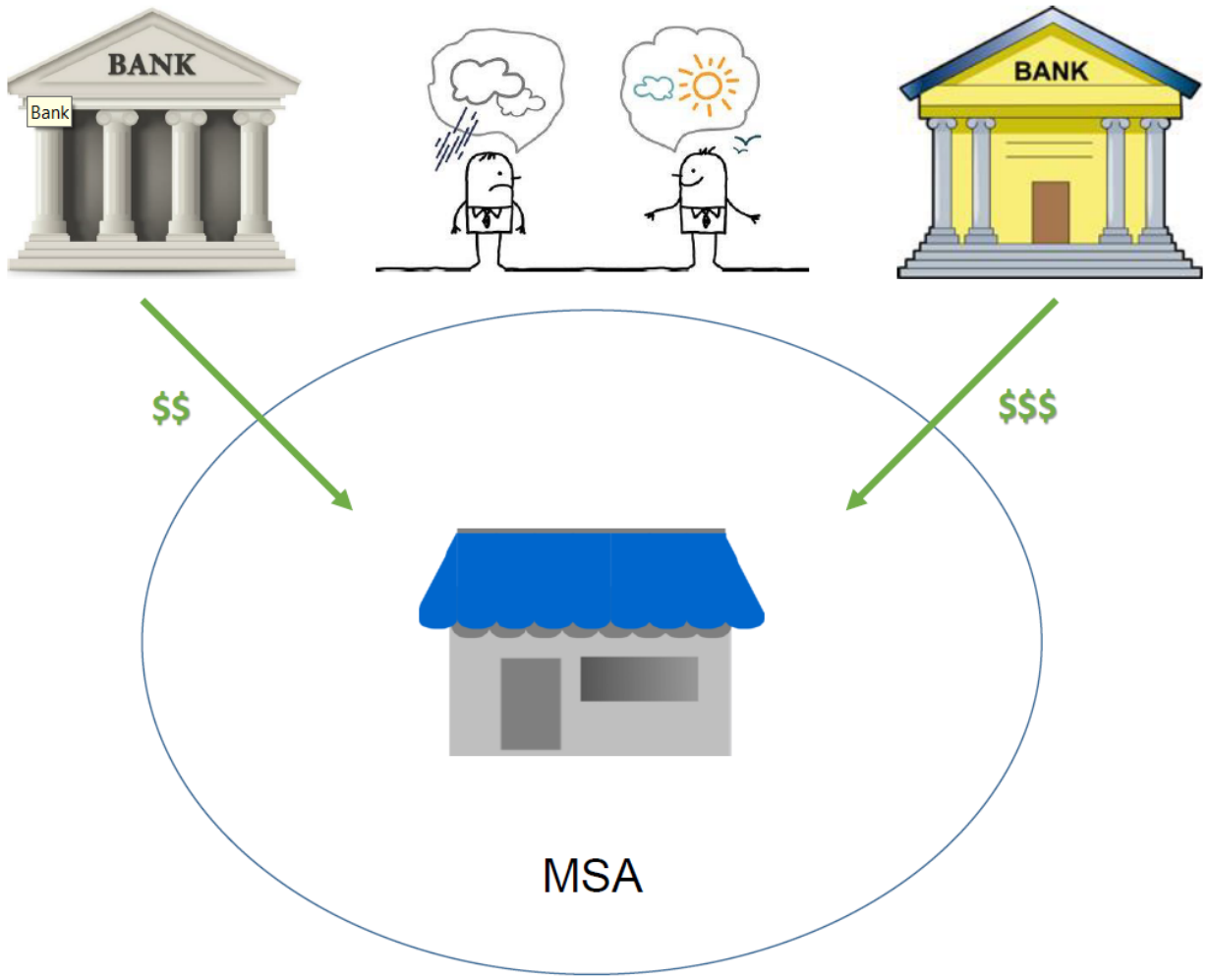
Expectations and Bank Lending

Empirical Setup: Firm Level



Expectations of banks & firm outcomes

Empirical Setup: Loan Level



Expectations of banks & loan attribute
(subsample of firms with multiple banks à la Khwaja-Mian 08)

Firm Level Results

	Firm Level Loan Growth		
	(1)	(2)	(3)
SA HPI Drop	-0.272***		-0.293***
	(0.037)		(0.049)
Baseline HPI Drop		0.187	-0.032
		(0.293)	(0.324)
SA Unempl Incr			
L.Bank Tier 1	-0.159	-1.243***	-0.592**
	(0.155)	(0.274)	(0.269)
L.Bank ROA	0.082***	0.048***	0.104***
	(0.013)	(0.018)	(0.021)
L.Log (Bank Assets)	-15.039***	-21.894***	-25.025***
	(2.704)	(2.767)	(3.908)
Firm Controls			Yes
Fixed Effects		Firm, MSA*Year, Industry*Year	
Observations	333,714	241,162	239,558
R^2	0.188	0.209	0.210

Firm Level Results

	Firm Level Loan Growth				
	(1)	(2)	(3)	(4)	(5)
SA HPI Drop	-0.272***		-0.293***		-0.186**
	(0.037)		(0.049)		(0.090)
Baseline HPI Drop		0.187	-0.032		
		(0.293)	(0.324)		
SA Unempl Incr				-1.873***	-1.722***
				(0.335)	(0.392)
L.Bank Tier 1	-0.159	-1.243***	-0.592**	-0.252	-0.217
	(0.155)	(0.274)	(0.269)	(0.350)	(0.389)
L.Bank ROA	0.082***	0.048***	0.104***	-0.226***	-0.179***
	(0.013)	(0.018)	(0.021)	(0.026)	(0.039)
L.Log (Bank Assets)	-15.039***	-21.894***	-25.025***	-21.959***	-21.327***
	(2.704)	(2.767)	(3.908)	(3.835)	(3.384)
Firm Controls			Yes		
Fixed Effects			Firm, MSA*Year, Industry*Year		
Observations	333,714	241,162	239,558	209,524	182,853
R^2	0.188	0.209	0.210	0.240	0.281

Loan Level Results

	Loan Growth			
	(1)	(2)	(3)	(4)
SA HPI Drop	-0.278**		-0.337**	
	(0.107)		(0.127)	
SA Unempl Incr		-1.016***		-1.330***
		(0.187)		(0.231)
L.Log (Bank Assets)	-8.575	3.520	-14.701**	-8.163
	(6.568)	(11.887)	(6.853)	(9.057)
L.Bank Tier 1	-0.248	1.078	-0.397	1.203
	(0.813)	(0.909)	(0.933)	(1.275)
L.Bank ROA	10.327	-2.095	12.508	-7.307
	(8.567)	(10.674)	(10.967)	(15.945)
Fixed Effects	Bank*MSA, MSA*Year			
	Firm, Industry*Year		Firm*Year	
Observations	169,884	80,446	165,773	77,580
R^2	0.002	0.003	0.354	0.478

Magnitude

SA HPI Drop:

- Point estimate: ~ -0.3
- Inter-quartile range: ~ 12pp
- Implied difference in loan growth: -3.6pp

SA Unemployment Increase:

- Point estimate: ~ -1.5
- Inter-quartile range: ~ 2.4pp
- Implied difference in loan growth: -3.6pp

Average loan growth: 0.11pp. Raw inter-quartile range: 8.5pp.

Firm Level Real Outcomes: Total Leverage & CAPX

	Total Leverage			CAPX		
	(1)	(2)	(3)	(4)	(5)	(6)
SA HPI Drop	-0.044***			-0.017***		
	(0.014)			(0.005)		
Baseline HPI Drop		0.099***			0.055	
		(0.034)			(0.057)	
SA Unempl Incr			-0.040			-0.002
			(0.058)			(0.029)
L.Bank Tier 1	0.016	0.004	0.107***	-0.024***	-0.015*	-0.000
	(0.017)	(0.016)	(0.037)	(0.002)	(0.009)	(0.012)
L.Bank ROA	0.187***	0.252***	0.031	-0.010	-0.145	0.043
	(0.059)	(0.076)	(0.093)	(0.044)	(0.094)	(0.063)
L.Log (Bank Assets)	-0.775	-0.600	-1.501***	-0.232	-0.780	0.153
	(0.601)	(0.915)	(0.564)	(0.600)	(0.856)	(0.339)
Firm Controls			Yes			
Fixed Effects			Firm, MSA*Year, Industry*Year			
Observations	190,328	140,661	100,134	126,397	90,731	82,002
R^2	0.798	0.794	0.798	0.466	0.521	0.508

Firm Level Real Outcomes: Total Leverage & CAPX

	Total Leverage		CAPX	
	Non-IG	IG	Non-IG	IG
	(1)	(2)	(3)	(4)
SA HPI Drop	-0.037***	-0.026	-0.029**	0.006
	(0.012)	(0.033)	(0.012)	(0.011)
L.Bank Tier 1	0.005	-0.017	-0.035***	-0.006
	(0.014)	(0.019)	(0.010)	(0.007)
L.Bank ROA	0.084	0.097	-0.027	0.004
	(0.071)	(0.123)	(0.058)	(0.041)
L.Log (Bank Assets)	-2.228***	-2.581***	0.384	0.812
	(0.790)	(0.915)	(0.873)	(0.768)
Firm Controls	Yes			
Fixed Effects	Firm, MSA*Year, Industry*Year			
Observations	142,688	45,097	66,986	30,161
R^2	0.830	0.905	0.428	0.510

Real effects esp strong for risky firms w/ limited financing sources

Regional Aggregate Impact

Granular Instrumental Variable (GIV) of Gabaix-Koijen 20

For each MSA (i) and year (t), use projections of banks j (η_{ijt}):

$$G_{it} = \sum_{j=1}^{N} m_{ijt-1}\eta_{ijt} - \frac{1}{N}\sum_{j=1}^{N} \eta_{ijt}$$

- Take residuals of projections η_{ijt} after MSA$\times$Year FE; value weight the residuals using bank market shares.
- Use idiosyncratic variations in beliefs. Weight by market share (m).

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One IQR change in MSA-level SA HPI projections
$\Rightarrow$ ∼0.8pp lower MSA GDP growth in next year

COVID-19

Major *negative* shock

- Does bank credit supply matter? If so, how?

Banks which were more pessimistic in good times:

- Have less pass due (maybe more capacity to lend)
- Still they lend less, because pessimism is persistent

Summary

- Large literature on bank capital/liquidity & credit supply
  - Credit supply shocks not just about bank balance sheet
- Collect granular data on banks' economic projections
  + Match with lending decisions
- Banks' expectations, especially about downside, are important
- Beliefs about tails much less understood
  - May be shaped in different ways than beliefs about average outcomes
  - Past tail events may "scar" beliefs about downside
- Implications for bank lending during COVID-19

Thank You

Example

Wells Fargo Regional Analysis of Raleigh, NC

Special Commentary

Mark Vitner, Senior Economist
mark.vitner@wellsfargo.com • (704) 410-3277
Charlie Dougherty, Economist
charles.dougherty@wellsfargo.com • (704) 410-6542
Matthew Honnold, Economic Analyst
matthew.honnold@wellsfargo.com • (704) 410-3059

Raleigh Economy Remains on Track

Executive Summary

- Raleigh remains one of the nation's fastest growing economies, with payrolls rising at a more than 3% annual pace—well ahead of the national and statewide rates. Durham-Chapel Hill also continues to post solid gains, with payrolls rising 0.8% in 2019.
- The Triangle region is anchored by three major research institutions which fuel an ecosystem of innovation and collaboration with the private sector and government. Many graduates stay in the region, which ranks near the top of many quality of life rankings, including best places to live, do businesses, raise a family or start a career.
- The Triangle has one of the nation's most highly educated workforces and one of the highest concentrations of high-paying STEM jobs. The Triangle's median income is over $70,000 and Wake County's per capita income is the highest in the state.

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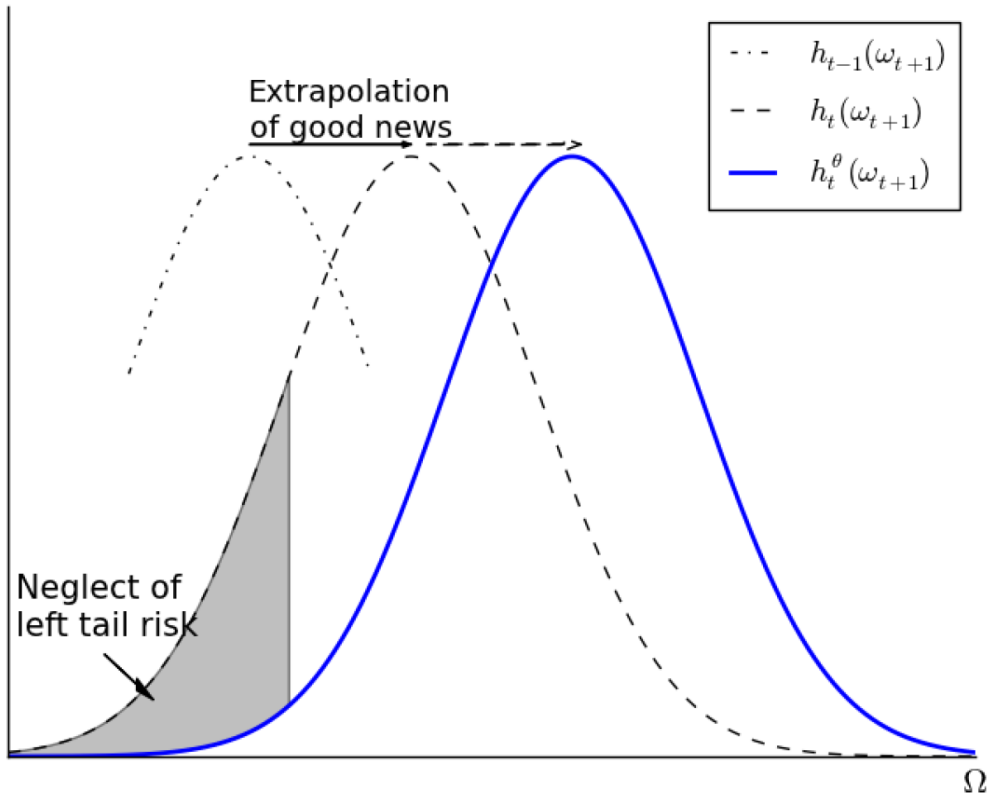
Difference with Diagnostic Expectations

Diagnostic Expectations: Belief in Response to Recent Shocks



Our data:

- Past tail events have different impact on tail vs baseline projections
- Most recent shock is not the primary driver

back