How Do Credit Supply Shocks Affect the Real Economy? Evidence from the United States in the 1980s

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Credit supply and business cycles

- Close connection between credit supply shocks and economic fluctuations
  - Theory: Schmitt-Grohé and Uribe (2016), Bahadir and Gumus (2016), Bordalo et al (2015), Justiniano et al (2015)
  - Empirical: Jordà et al (2013), Krishnamurthy and Muir (2016), Lopez-Salido et al (2016), Mian et al (2017)

- Lack of empirical research on the exact **mechanisms**
  - **Amplifying** business cycle?
  - Improving **labor productivity**?
  - Boosting **demand**, especially by households?

- Challenge: requires plausibly exogenous variation in credit supply at *macro* level, as micro level estimates may miss important GE effects

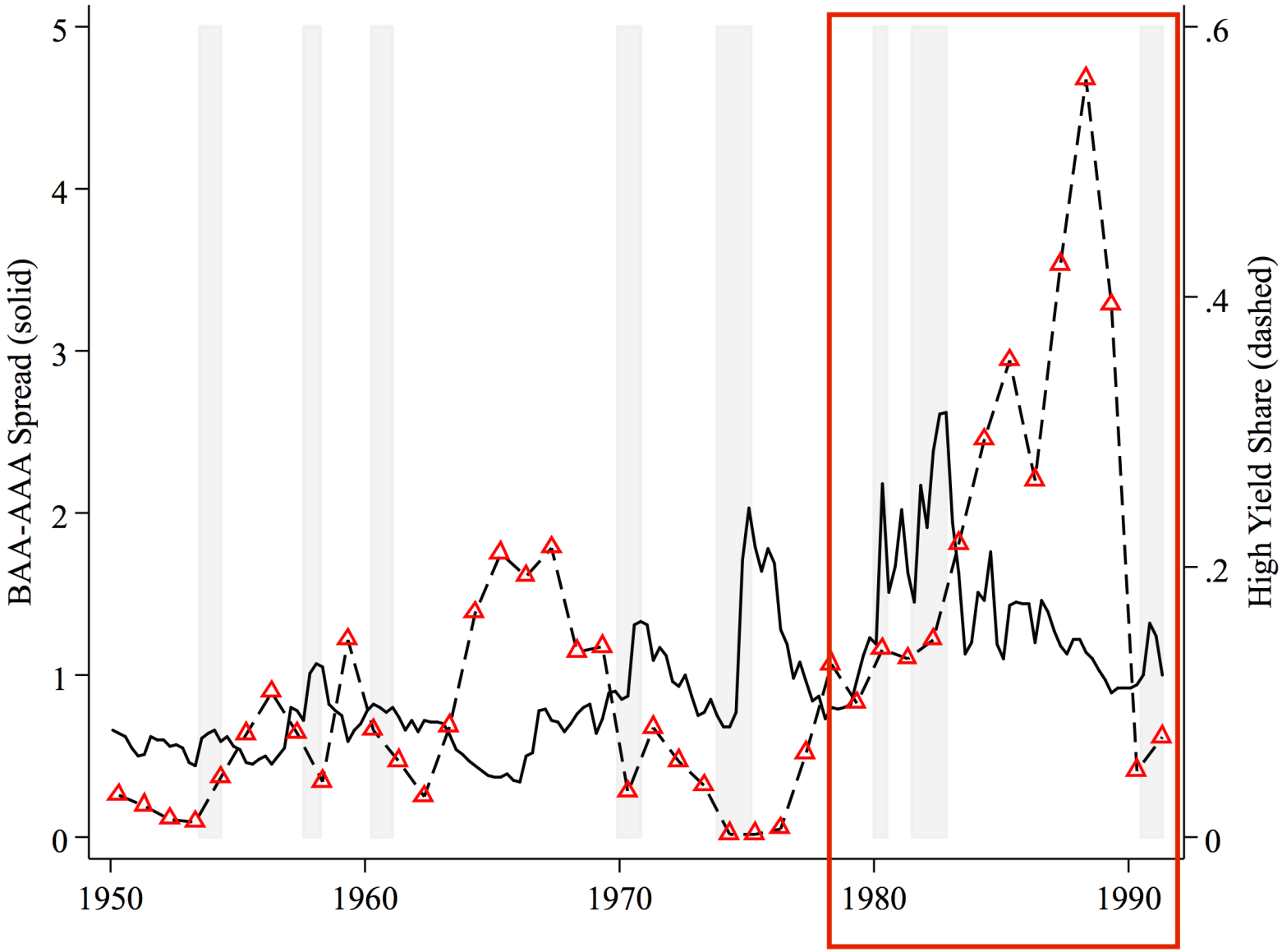
What we do

- Focus on the 1982 to 1992 business cycle in the United States
  1. Evidence of aggregate movements in credit supply
  2. Cross-state variation in extent of banking deregulation generates state-level credit supply shocks

- Examine both short-run and medium-run effects, allowing us to test for business cycle amplification

- Develop a simple empirical test to disentangle whether credit supply shocks primarily affect the real economy by improving firms' productive capacity or by boosting demand
  - Based on movements in sectoral employment and prices

Aggregate credit supply: Credit spreads and HYS



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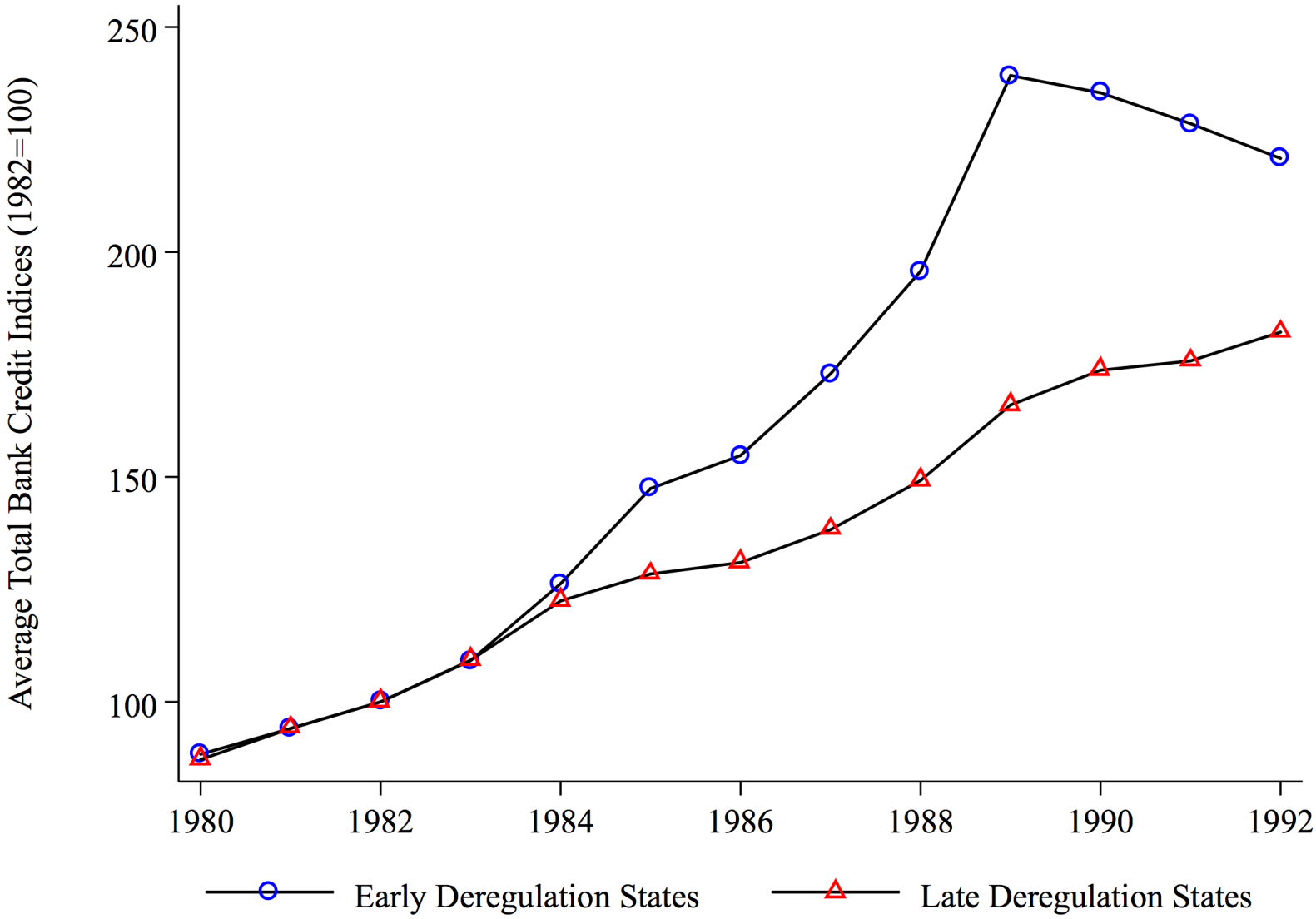


Main Results

1. Evidence of business cycle amplification; higher growth during expansion, significantly worse recession during contraction due to:
    - Downward nominal wage rigidity
    - Banking sector losses
    - Household debt overhang

2. During expansion phase, on net credit supply boosts *local demand* (especially by households) rather than improving *production capacity* of firms
    - Increase in all measures of debt, especially household debt
    - Rise in non-tradable employment, no change in tradable employment, even for small firms
    - Rise in non-tradable goods prices relative to tradable goods prices
    - Strong wage growth across all industries

Theory

Theory

- Model of a small open economy in a currency union with tradable and non-tradable production sectors (Bahadir and Gumus 2016; Schmitt-Grohe and Uribe 2016)
- Households, non-tradable firm, and tradable firm borrowing all potentially constrained
- Study positive credit supply shock, modeled as reduction in credit spread
- Key question: can we deduce which constraints are most important, and therefore the sector through which credit supply shocks operate?

Setup

- T/NT sector, downward nominal wage rigidity, monetary union, and temporary credit supply shock (i.e. reduction in credit spread) for household borrowing as in Schmitt-Grohé and Uribe (2016)
- Add borrowing on the firm side as well (e.g. Bahadir and Gumus (2016))
- Mean reverting credit supply shock creates a boom-bust cycle in the presence of downward wage rigidity
- Key question: How can we deduce whether the boom-bust cycle is driven by credit flowing to households on the demand side versus firms on the supply side?

Credit expansion: Demand or labor productivity?

1. Credit shock that works through **tradable sector** firms:
   - Boosts productivity of tradable firms, given working capital constraint
   - Tradable employment ↑; price of non-tradable goods ↑

2. Credit shock that works through **non-tradable** sector firms
   - Boosts productivity of non-tradable firms
   - Non-tradable employment ↑; price of non-tradable goods ↓

3. Credit shock that works though **households**
   - Boosts household demand
   - Can import tradable goods, but need to produce more non-tradables
   - Non-tradable employment ↑; price of non-tradable goods ↑

Model predictions

Data and Summary Statistics

Data

- State-year level panel from 1975 to 1995 with information on bank credit (Call reports), household debt, house prices (Corelogic), retail sales, employment by industry (CBP), unemployment (BLS), residential construction (Census), inflation (Del Negro, BLS), wages (CPS), and GDP (BEA)
- State-year level household debt (from IRS and HMDA) and retail sales data (from Census) are new to literature for this time period
- More on household debt measure:
  - Use capitalization methodology of Saez and Zucman (2016) for mortgage interest payments from IRS filings
  - HMDA data prior to 1991, which is applications, not originations
  - Use Call report data, which ignores securitization
  - None of these are perfect, so we try to extract principal component to get cleanest measure

Summary Statistics

Table: Summary Statistics

	N	Mean	Median	SD
Years deregulation	49	2.82	3.00	1.94
Years dereg. intra	49	4.92	4.00	4.19
Dereg. measure	49	-0.02	-0.35	1.01
Dereg. measure (1983 dummy)	49	0.45	0.00	0.50
Δ_{82-89} HH Debt to income	49	0.21	0.20	0.09
Δ_{82-89} HH leverage index	49	-0.06	-0.35	1.19
Δ_{82-89} ln(House prices)	49	0.37	0.30	0.33
Δ_{89-92} ln(House prices)	49	0.04	0.05	0.11
Δ_{82-89} Unemployment	49	-4.09	-3.80	1.88
Δ_{89-92} Unemployment	49	1.77	1.70	1.40
Δ_{82-89} ln(Real GDP per capita)	49	0.17	0.22	0.17
Δ_{89-92} ln(Real GDP per capita)	49	-0.01	-0.01	0.05
Δ_{82-89} ln(Housing unit permits)	49	0.14	0.35	0.81
Δ_{89-92} ln(Housing unit permits)	49	0.03	0.04	0.46
Δ_{82-89} ln(Total employment)	49	0.20	0.22	0.12
Δ_{89-92} ln(Total employment)	49	0.03	0.04	0.07
Δ_{82-89} ln(Tradable employment)	49	0.02	0.06	0.12
Δ_{89-92} ln(Tradable employment)	49	-0.04	-0.04	0.09
Δ_{82-89} ln(Non-tradable employment)	49	0.23	0.24	0.11
Δ_{89-92} ln(Non-tradable employment)	49	0.03	0.04	0.08
Δ_{82-89} ln(Construction employment)	49	0.20	0.30	0.31
Δ_{89-92} ln(Construction employment)	49	-0.05	-0.01	0.25
Δ_{89-92} ln(Retail sales)	19	0.10	0.10	0.06
Δ_{84-89} ln(Loan appl. volume)	49	2.39	2.24	0.99
Δ_{84-89} ln(Loan appl. number)	49	1.78	1.75	0.55
Δ_{82-89} ln(Total loans)	49	0.58	0.56	0.41
Δ_{82-89} ln(Commercial & ind. loans)	49	0.42	0.42	0.48
Δ_{82-89} ln(Household loans)	49	0.72	0.69	0.36
Δ_{82-89} ln(Consumer loans)	49	0.70	0.71	0.46
Δ_{82-89} ln(CPI) (Del Negro)	48	0.24	0.23	0.04
Δ_{82-89} ln(CPI Tradables)	25	0.12	0.12	0.02
Δ_{82-89} ln(CPI Non-Tradables)	25	0.24	0.22	0.06
Δ_{82-89} ln(Average wages)	49	1.24	-0.75	7.57
Δ_{82-89} ln(Resid. wages)	49	-0.52	-1.07	7.99
Δ_{82-89} ln(Tradable resid. wages)	49	-1.44	-2.04	9.05
Δ_{82-89} ln(Non-tradable resid. wages)	49	0.32	1.87	10.23
Δ_{82-89} ln(Construction resid. wages)	49	-4.02	-7.40	12.25

Empirical Methodology

State banking deregulation in the 1980s

- There was an aggregate credit supply "push factor" in the 1980s
- How does a more deregulated banking system transmit this shock into lending and real outcomes?
- Construct state deregulation index using *intra-state branching* and *inter-state banking* deregulation dates:

$$DEREG_s = \frac{1}{2} \sum_{j \in \{inter, intra\}} \min\{\max\{1989 - DeregYear_{j,s}, 0\}, 10\}$$

  - Connecticut deregulated intra and inter-state banking in 1980 and 1983, respectively, giving it a high $DEREG_s$ score
  - Highly correlated with indicator for whether deregulated by 1983

Specifications

- First difference cross-sectional regressions in the "boom" and "bust"

$$\Delta_{82,89} Y_s = \alpha^{boom} + \pi^{boom} \cdot DEREG_s + \Gamma^{boom} \cdot Z_s + \epsilon_s^{boom}$$

$$\Delta_{89,92} Y_s = \alpha^{bust} + \pi^{bust} \cdot DEREG_s + \Gamma^{bust} \cdot Z_s + \epsilon_s^{bust}$$

- Turning points are defined using NBER/credit cycle turning points, but we also present results from the full state-year panel:

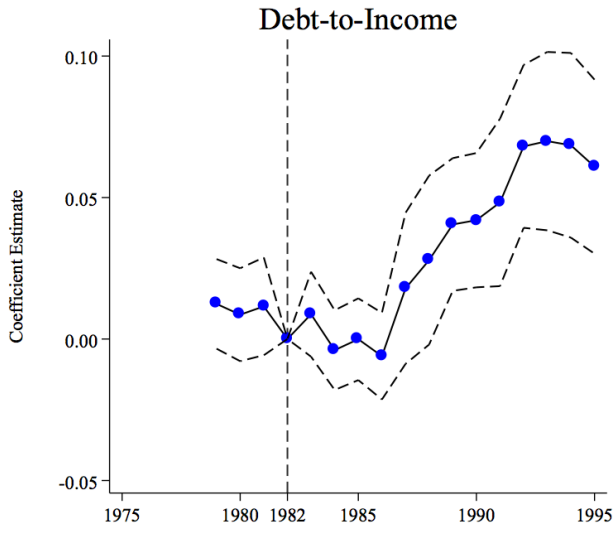
$$Y_{st} = \alpha_s + \gamma_t + \sum_{y \neq 1982} \mathbb{1}_{t=y} \cdot DEREG_s \cdot \beta_y + \epsilon_{st}$$

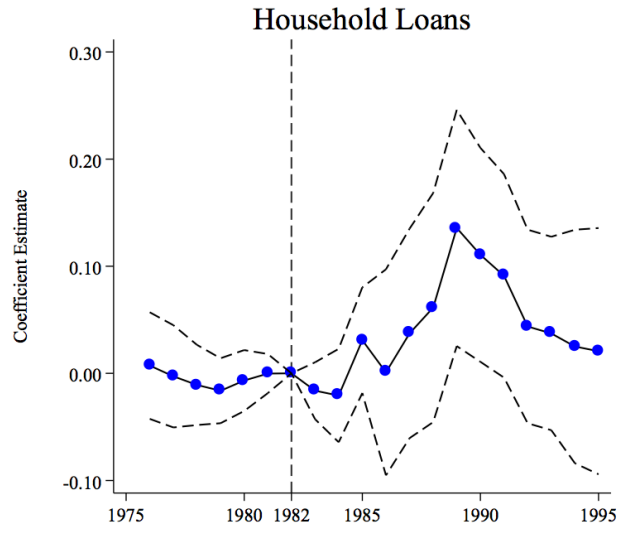
Is this a valid natural experiment? Exclusion restriction

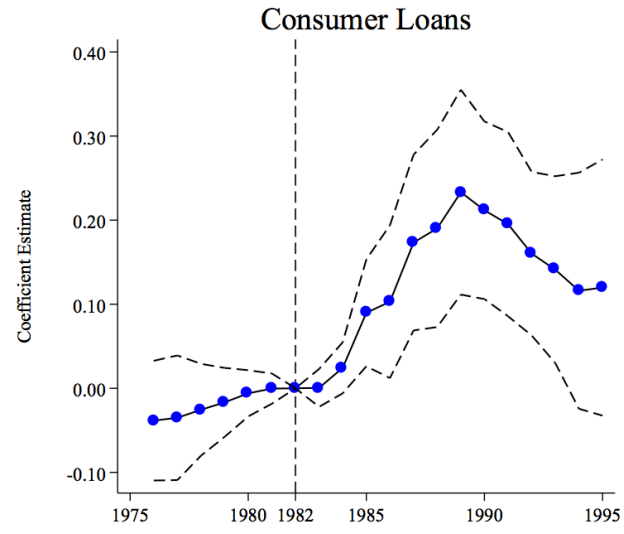
- Did deregulation occur earlier in states with better income prospects? Some other correlated shock?
- Kroszner and Strahan (1999) show evidence that state deregulation timing driven by interest group politics and political ideology
- Kroszner and Strahan (2014): "There is no correlation between rates of bank failures or the state-level business cycle conditions and the *timing* of branching reform." "States did *not* deregulate their economies in *anticipation* of future good growth prospects."
- We show pre-trends, placebo tests, and control for other shocks
- Harder for spurious deregulation timing to explain the results we find, such as boom-bust pattern, or the tradable/non-tradable dynamics

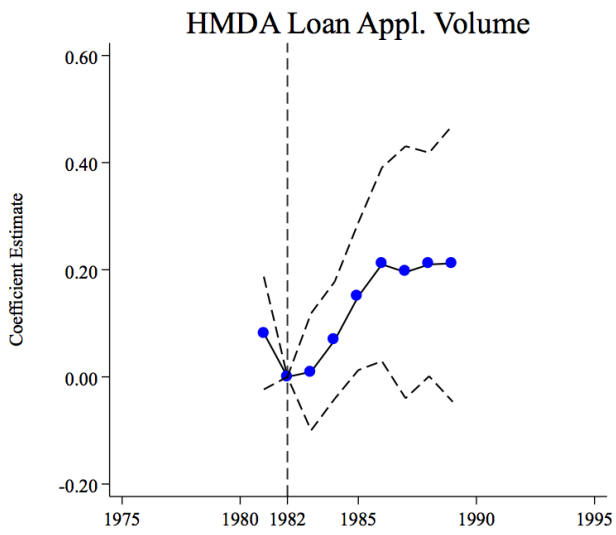
Credit Expansion and Demand

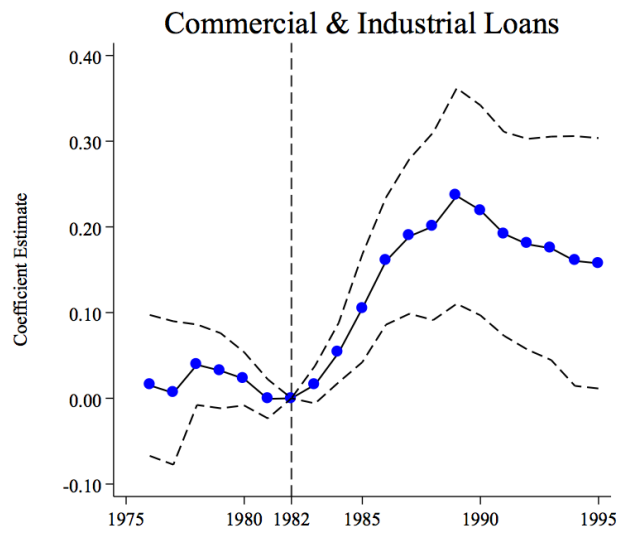
Stronger loan growth in early deregulation states











Stronger loan growth in early deregulation states

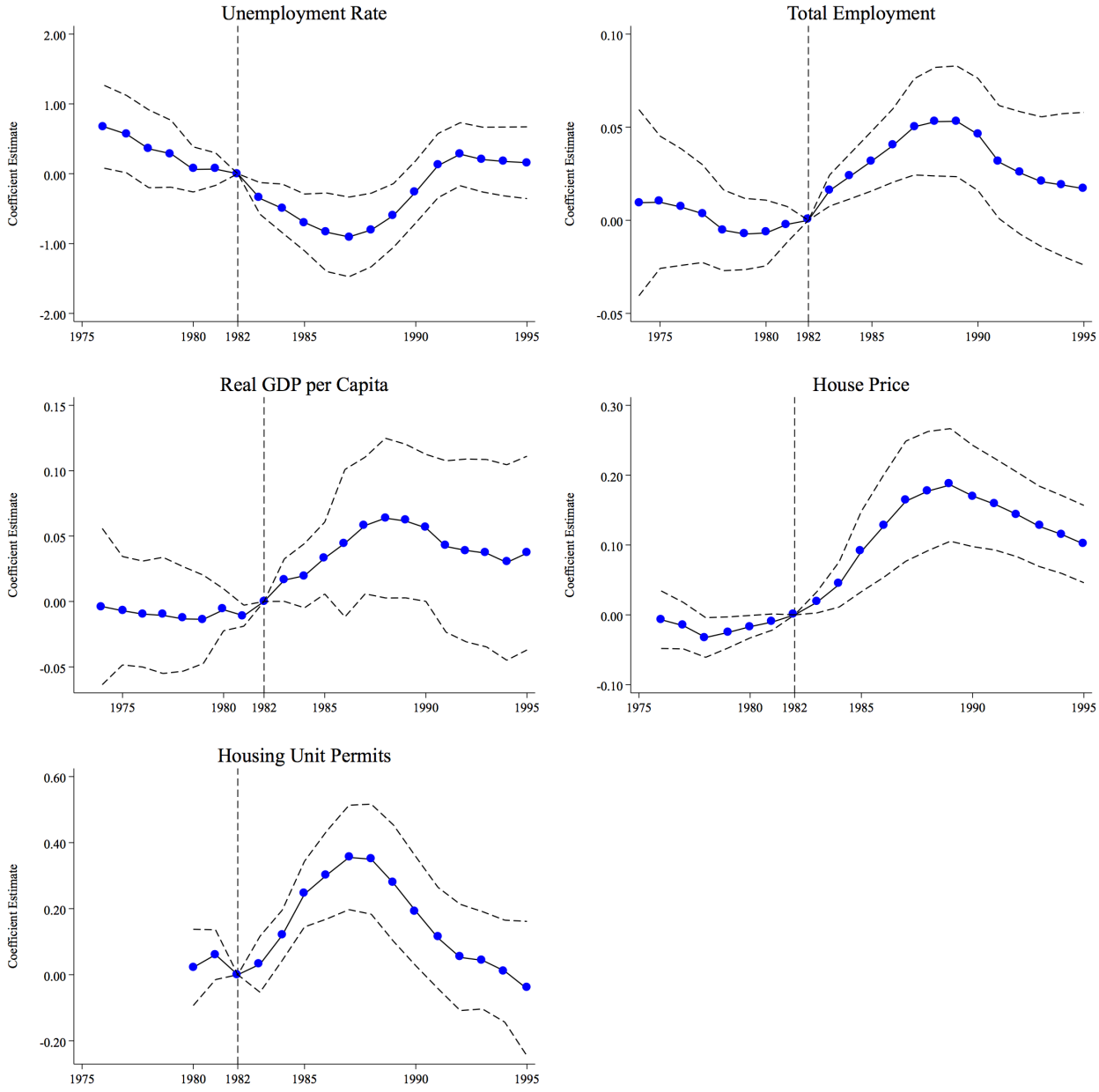
	(1) Δ_{82-89} Debt to income	(2) Δ_{84-89} Loan appl. volume	(3) Δ_{84-89} Loan appl. number	(4) Δ_{82-89} Total loans	(5) Δ_{82-89} C&I loans	(6) Δ_{82-89} HH loans	(7) Δ_{82-89} Con. loans	(8) Δ_{82-89} HH leverage index
Panel A: Base Line								
Dereg. measure	0.0405**	0.416*	0.193*	0.190**	0.236**	0.136*	0.233**	0.742**
	(0.0115)	(0.159)	(0.0876)	(0.0579)	(0.0619)	(0.0543)	(0.0600)	(0.147)
R^2	0.210	0.182	0.128	0.217	0.250	0.147	0.269	0.398
Panel B: Lagged Dependent Variable Controls								
Dereg. measure	0.0296**	0.187**			0.167*	0.137*	0.219**	
	(0.0101)	(0.0485)			(0.0624)	(0.0558)	(0.0576)	
R^2	0.477	0.439			0.425	0.314	0.375	
Observations	49	49	49	49	49	49	49	49

Stronger household debt growth in early deregulation states

	Δ_{82-89} HH leverage index						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dereg. measure	0.700**	0.680**	0.524**	0.777**	0.699**	0.349*	0.525**
	(0.151)	(0.166)	(0.154)	(0.137)	(0.174)	(0.170)	(0.188)
Oil Exposure '85	-0.137*					-0.428**	
	(0.0521)					(0.148)	
Oil Empl. '82	-8.573*					-29.04**	
	(3.725)					(5.999)	
Forbearance		0.201				-0.0635	
		(0.150)				(0.157)	
Northeast region			1.332*			1.412*	
			(0.516)			(0.554)	
South region			0.284			0.677	
			(0.233)			(0.414)	
West region			0.0985			0.224	
			(0.336)			(0.499)	
Debt to income$_{1982}$				-0.905		-2.319	
				(1.508)		(2.050)	
Δ_{82-89} Real GDP per Capita				-0.560		3.617**	
				(0.582)		(1.185)	
Unemployment$_{1982}$				-0.0920		-0.0110	
				(0.0633)		(0.0606)	
Δ_{82-89} C&I loans							0.918*
							(0.400)
R^2	0.503	0.416	0.524	0.439	0.483	0.766	0.500
Demographic controls					✓	✓	
Observations	49	48	49	49	49	48	49

Business Cycle Amplification

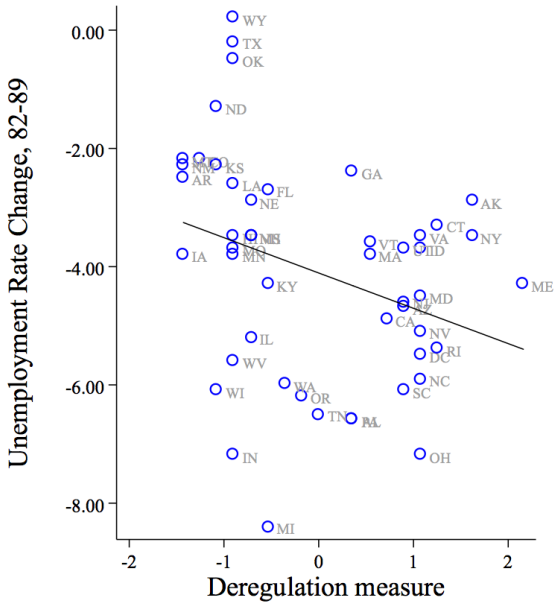
Amplified business cycle in early deregulation states

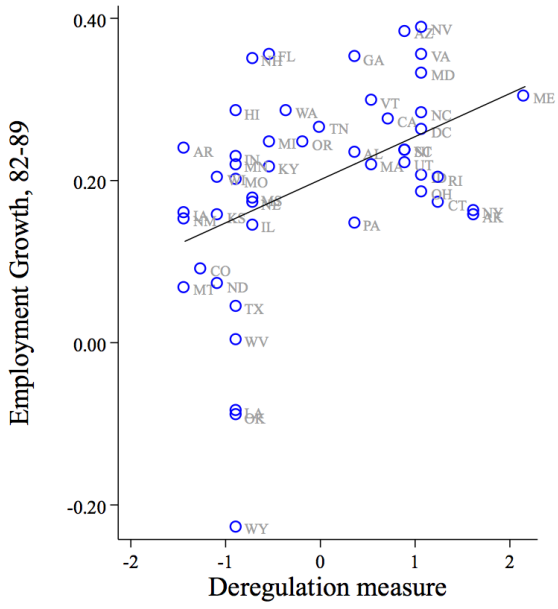


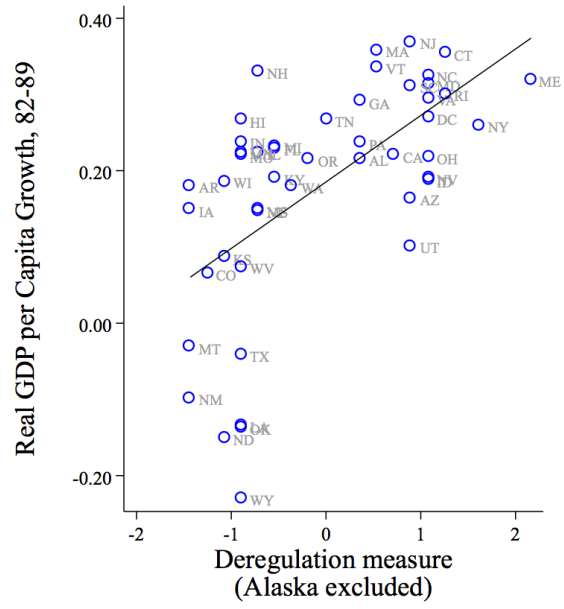
Expansion and contraction regressions

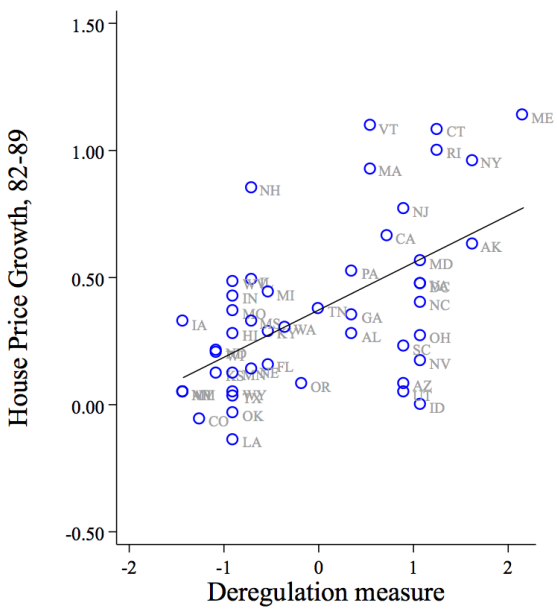
	Boom: Change from 82 to 89				Bust: Change from 89 to 92			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls	None	Lagged Dep. Var.	Oilshock	Demographics & Forbearance	None	Lagged Dep. Var.	Oilshock	Demographics & Forbearance
Panel A: Unemployment								
Dereg. measure	-0.597*	-0.833**	-0.214	-0.425*	0.877**	0.820**	0.781**	0.765**
	(0.225)	(0.162)	(0.216)	(0.205)	(0.137)	(0.138)	(0.157)	(0.106)
R^2	0.104	0.678	0.419	0.422	0.405	0.440	0.473	0.582
Panel B: Total Employment								
Dereg. measure	0.0531**	0.0630**	0.0170	0.0480**	-0.0278**	-0.0301**	-0.0292**	-0.0217^{+}
	(0.0147)	(0.0158)	(0.0110)	(0.0168)	(0.00970)	(0.00858)	(0.00902)	(0.0111)
R^2	0.193	0.332	0.723	0.214	0.181	0.240	0.358	0.452
Panel C: Real GDP per capita								
Dereg. measure	0.0615*	0.0375**	0.0425**	0.0417	-0.0225**	-0.0197**	-0.0199**	-0.0211*
	(0.0290)	(0.0112)	(0.0101)	(0.0313)	(0.00765)	(0.00666)	(0.00502)	(0.00848)
R^2	0.134	0.871	0.861	0.380	0.218	0.472	0.524	0.383
Panel D: House prices								
Dereg. measure	0.186**	0.186**	0.149**	0.191**	-0.0424**	-0.0323*	-0.0455**	-0.0438*
	(0.0397)	(0.0370)	(0.0469)	(0.0492)	(0.0133)	(0.0125)	(0.0161)	(0.0173)
R^2	0.325	0.506	0.384	0.468	0.150	0.433	0.153	0.313
Panel E: Housing unit permits								
Dereg. measure	0.277**	0.283**	0.0280	0.216*	-0.225**	-0.226**	-0.154*	-0.142*
	(0.0861)	(0.102)	(0.0612)	(0.0878)	(0.0577)	(0.0629)	(0.0589)	(0.0620)
R^2	0.148	0.330	0.671	0.305	0.246	0.308	0.360	0.351
Observations	49	49	49	48	49	49	49	48

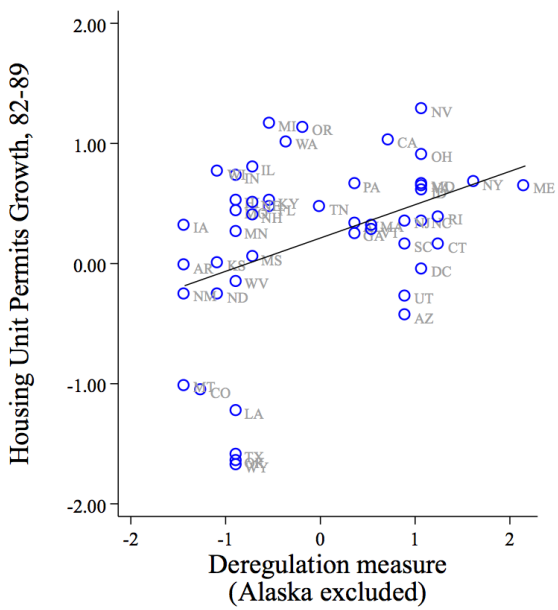
Stronger boom in early deregulation states



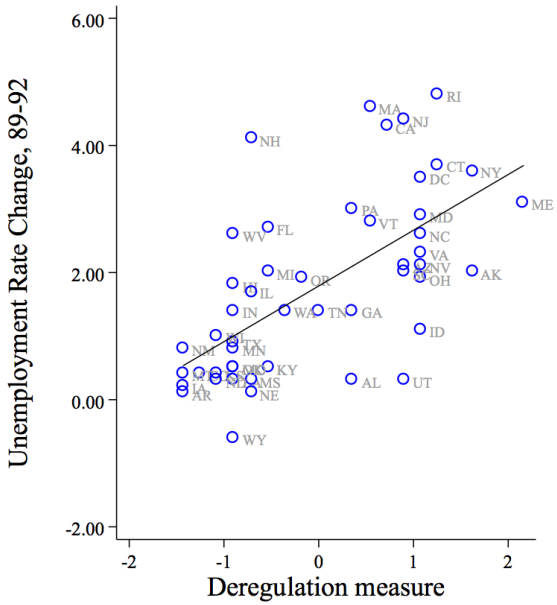


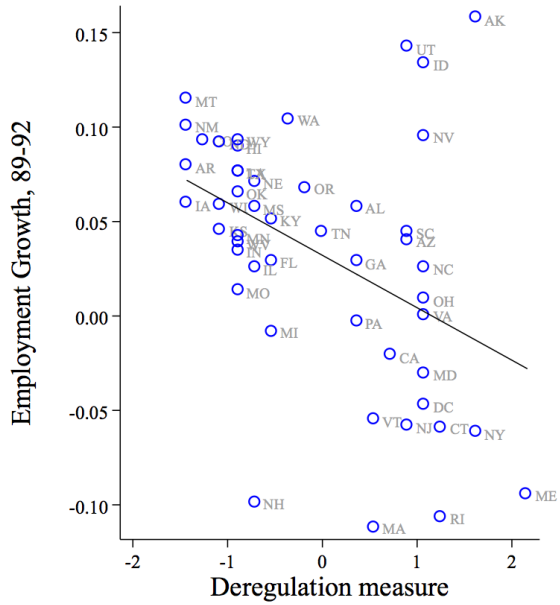


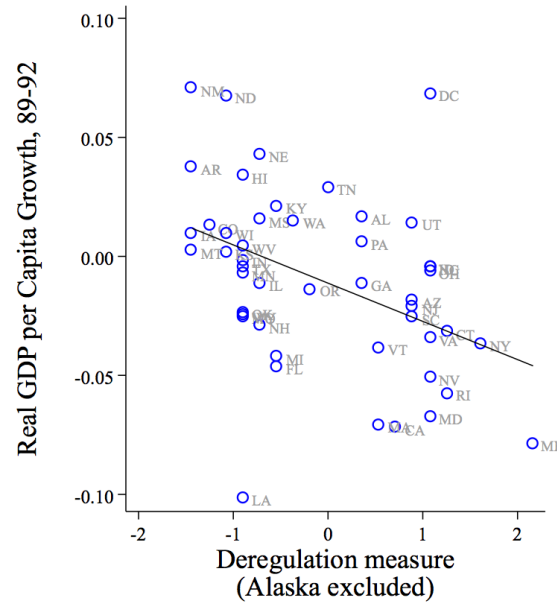


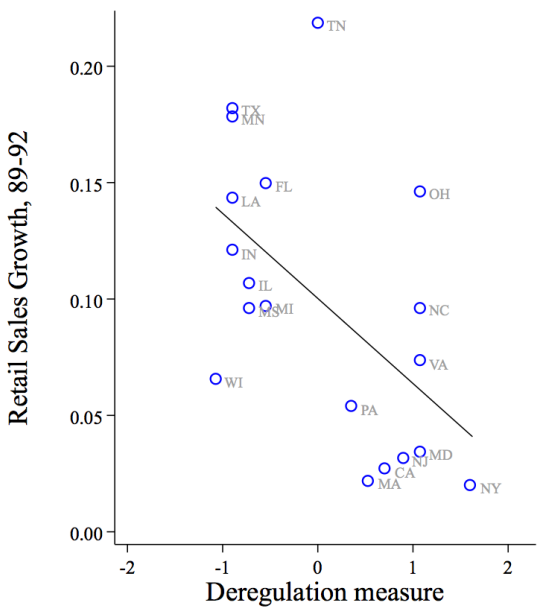


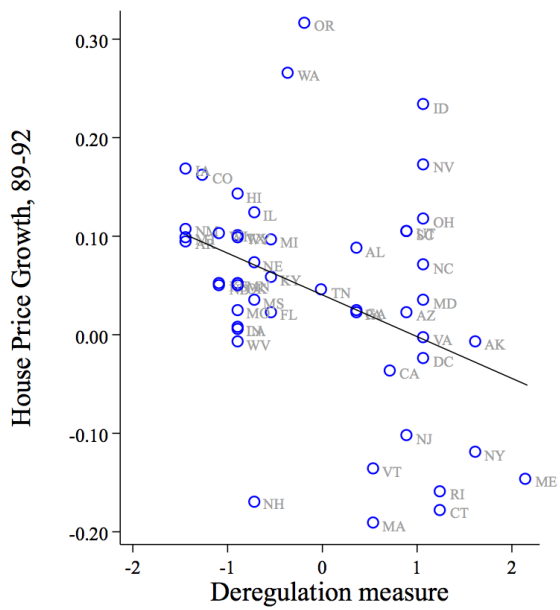
Worse recession in early deregulation states

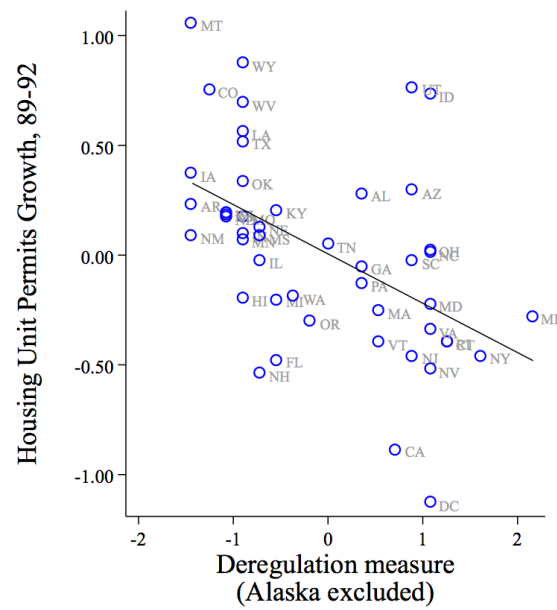






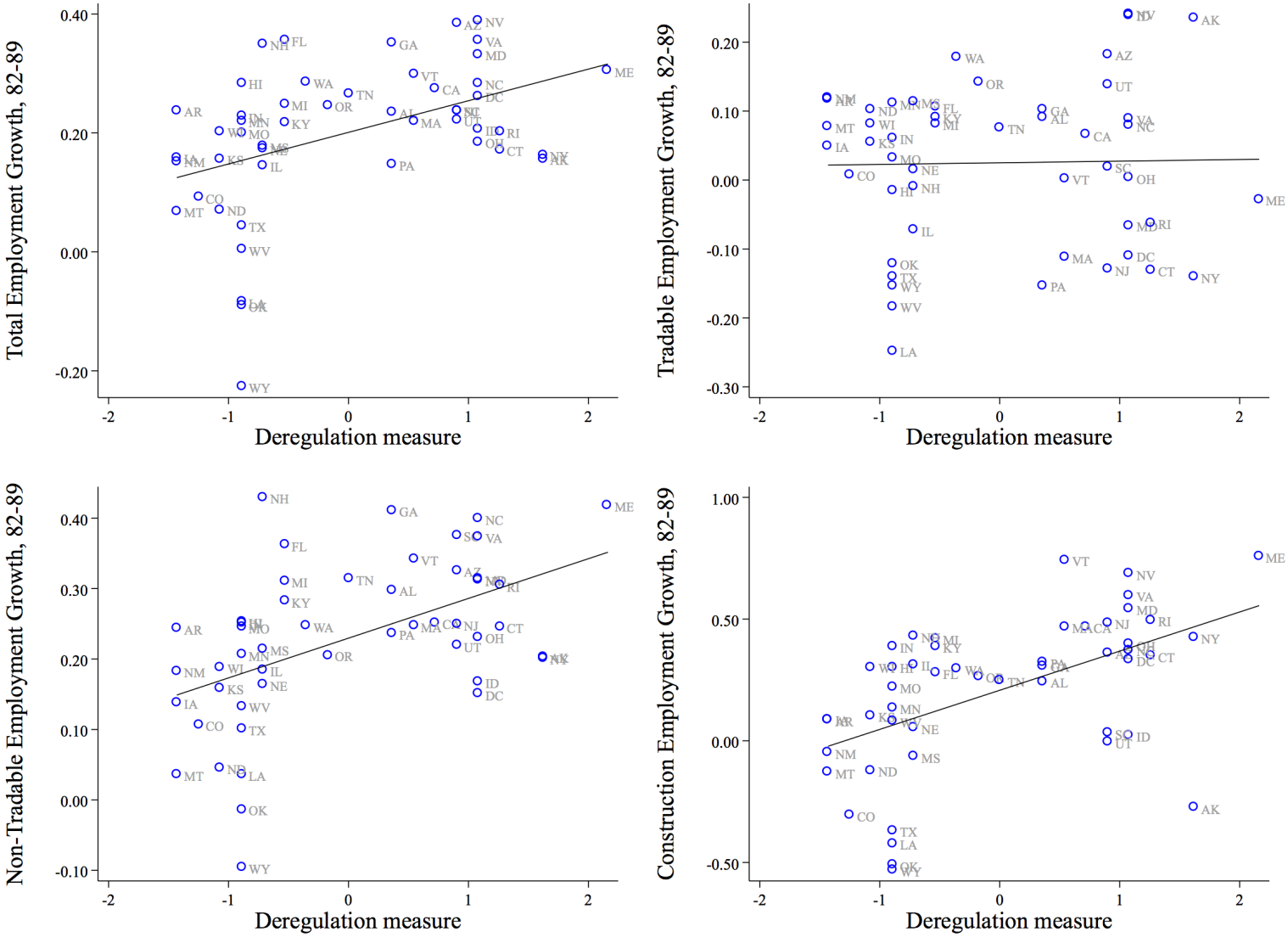






Local Demand vs. Production Capacity

Job gains concentrated in non-tradable sector



Job gains concentrated in non-tradable sector

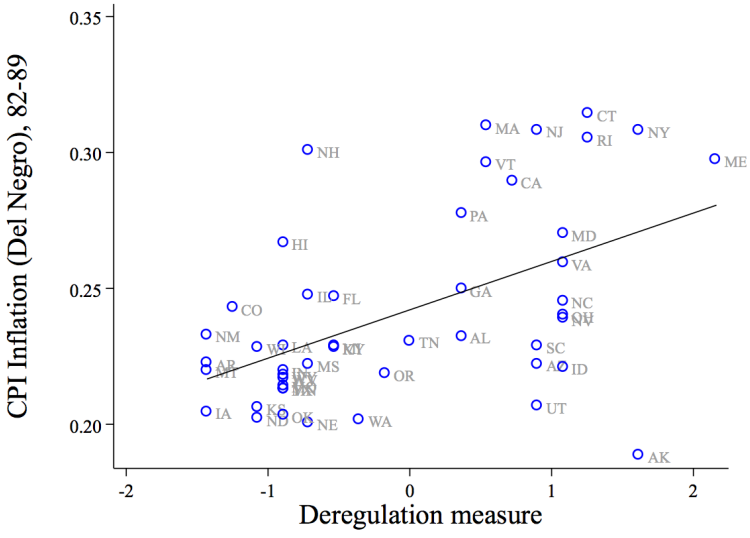
	Δ_{82-89} Total employment	Δ_{82-89} Empl. tradables	Δ_{82-89} Empl. non-tradables	Δ_{82-89} Empl. construction	Δ_{82-89} Industry-level employment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dereg. measure	0.0531**	0.00237	0.0564**	0.161**	0.0378*	-0.0206	-0.0181	-
	(0.0147)	(0.0174)	(0.0134)	(0.0404)	(0.0155)	(0.0215)	(0.0212)	-
Dereg. measure								
x other						0.0715**	0.0676**	0.0687**
						(0.0231)	(0.0229)	(0.0226)
x non-tradables						0.0890**	0.0866**	0.0874**
						(0.0238)	(0.0235)	(0.0232)
x construction						0.184**	0.182**	0.183**
						(0.0395)	(0.0400)	(0.0396)
Unit of Obs.	State	State	State	State	State x 2 digit Ind.	State x 2 digit Ind.	State x 2 digit Ind.	State x 2 digit Ind.
2 Digit Ind. FE							✓	✓
State FE								✓
R^2	0.193	0.000	0.256	0.276	0.004	0.023	0.446	0.478
Observations	49	49	49	49	3,762	3,762	3,762	3,762

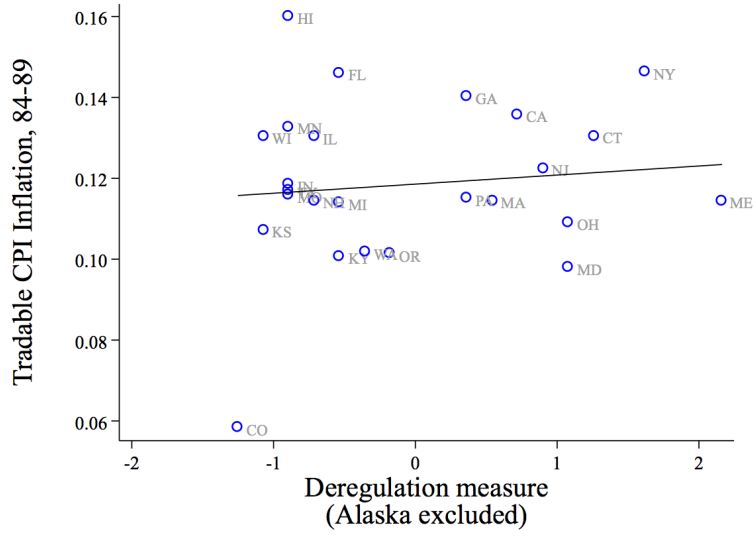
Employment growth by establishment size

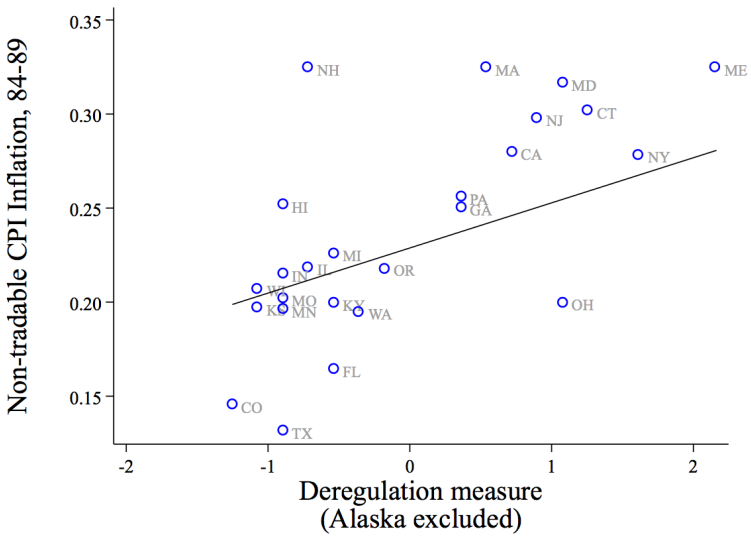
- No differential employment growth even for small tradable firms, which rely on local bank credit (Chen, Hanson, and Stein 2017)

	(1) 1 to 9	(2) 10 to 49	(3) 50 to 99	(4) 100+
Panel A: Tradable Employment Growth, 1982-89				
Dereg. measure	0.0118 (0.0539)	0.0284 (0.0353)	-0.0181 (0.0302)	-0.00385 (0.0268)
R^2	0.001	0.017	0.007	0.001
Observations	48	49	49	49
Panel B: Non-tradable Employment Growth, 1982-89				
Dereg. measure	0.0434** (0.00830)	0.0637** (0.0131)	0.0522+ (0.0281)	0.0253 (0.0302)
R^2	0.324	0.314	0.087	0.015
Observations	49	49	49	49
Panel C: Construction Employment Growth, 1982-89				
Dereg. measure	0.0992** (0.0318)	0.189** (0.0463)	0.182** (0.0625)	0.125+ (0.0667)
R^2	0.189	0.293	0.183	0.064
Observations	49	49	49	49

Real exchange rate appreciation



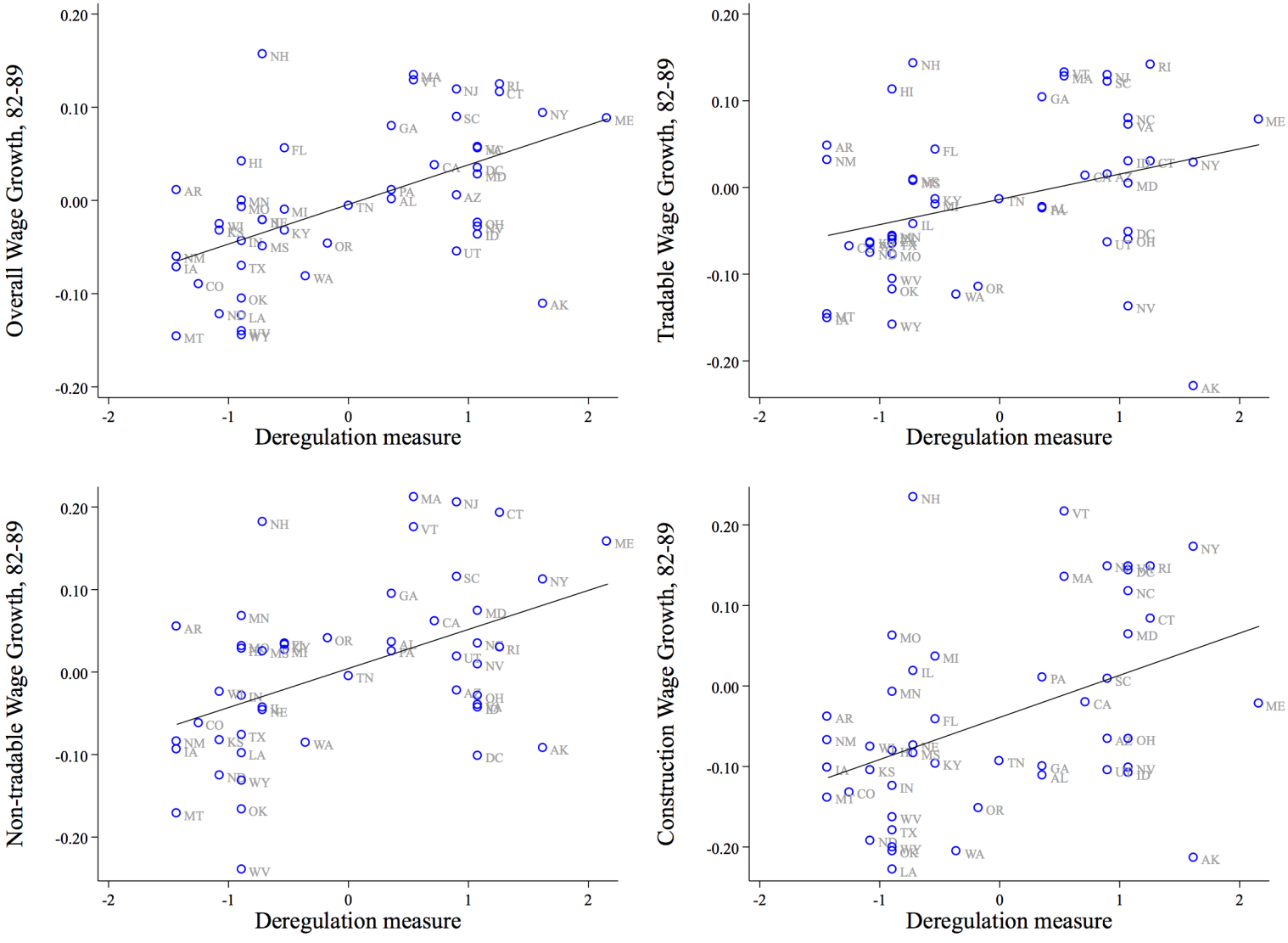




RER appreciation in early deregulation states

			Special Aggregates		
	(1) Δ_{82-89} All items (Del Negro)	(2) Δ_{84-89} All items	(3) Δ_{84-89} Non-tradables	(4) Δ_{84-89} Tradables	(5) Δ_{84-89} Non-tradables or Tradables
Dereg. measure	1.780**	2.334**	4.017**	0.303	0.303
	(0.482)	(0.513)	(0.777)	(0.459)	(0.463)
Dereg. measure × NT					3.714**
					(0.821)
Dummy Non-tradables					11.94**
					(0.878)
R^2	0.261	0.434	0.476	0.021	0.807
Unit of obs.	State	State	State	State	State × NT-T
Observations	48	25	25	25	50

Nominal wages rise in early deregulation states



Wage growth in early deregulation states in all sectors

	Aggregate Wage Growth		By Gender		By Industry		
	(1) Average Wages	(2) Residualized Wages	(3) Male Resid. Wages	(4) Female Resid. Wages	(5) Tradable Resid. Wages	(6) Non-Tradable Resid. Wages	(7) Construction Resid. Wages
Dereg. measure	4.007**	4.249**	4.364**	3.638**	2.911*	4.735**	5.232**
	(0.888)	(0.994)	(1.013)	(0.878)	(1.366)	(1.304)	(1.618)
R^2	0.288	0.291	0.299	0.255	0.106	0.221	0.188
Observations	49	49	49	49	49	49	49

Placebo tests on previous expansions

- These results are unique to the 1980s expansion. Only one positive and significant coefficient out of 18 tests on previous expansions

	(1) Δ Total loans	(2) Δ C&I loans	(3) Δ HH loans	(4) Δ Con. loans	(5) Δ CPI (Del Negro)	(6) Δ Empl. tradables	(7) Δ Empl. non-tradables	(8) Δ Empl. construction
Panel A: Boom Period 1975-1979								
Dereg. measure	-0.00109	0.000888	-0.00172	0.00138	-0.00817**	-0.00832	-0.0128	-0.0743*
	(0.000724)	(0.00143)	(0.00109)	(0.00130)	(0.00271)	(0.0139)	(0.0118)	(0.0314)
R^2	0.034	0.010	0.040	0.027	0.179	0.008	0.026	0.125
Observations	49	49	49	49	48	49	49	49
Panel B: Boom Period 1970-1973								
Dereg. measure					0.00334*	-0.0271+	-0.0102	-0.0150
					(0.00148)	(0.0144)	(0.00983)	(0.0203)
R^2					0.126	0.083	0.026	0.011
Observations					48	49	49	49
Panel C: Boom Period 1962-1969								
Dereg. measure						0.00327	0.0445	0.0279
						(0.0318)	(0.0309)	(0.0436)
R^2						0.000	0.067	0.010
Observations						48	48	48
Panel D: Boom Period 1962-1967								
Dereg. measure						0.0190	0.0393	0.0212
						(0.0344)	(0.0329)	(0.0543)
R^2						0.010	0.055	0.004
Observations						47	47	47

Results supportive of demand channel

- Early deregulation states see a simultaneous increase in household debt, an increase in non-tradable employment but steady tradable employment, and an increase in the relative price of non-tradable goods
- Perhaps a different model with investment could explain our results, a "firm demand" channel?
- But overall, evidence is inconsistent with the view that deregulation affects the real economy through an improvement in labor productivity at firms

Deregulation and employment during the recession

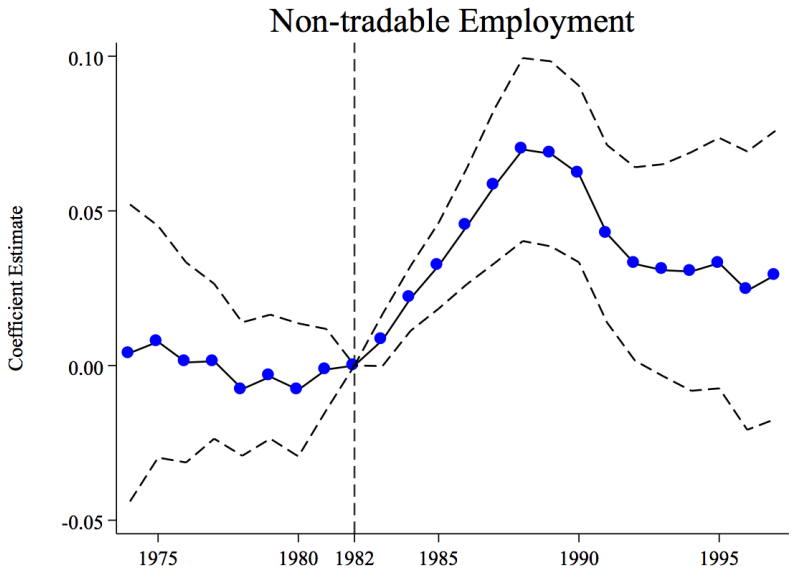
	Δ_{89-92} Total employment	Δ_{89-92} Empl. tradables	Δ_{89-92} Empl. non-tradables	Δ_{89-92} Empl. construction	Δ_{89-92} Industry-level employment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dereg. measure	-0.0278**	-0.0322*	-0.0313*	-0.128**	-0.0435*	-0.0438*	-0.0422*	-
	(0.00970)	(0.0140)	(0.0116)	(0.0329)	(0.0162)	(0.0188)	(0.0184)	-
Dereg. measure								
x other						0.00386	0.00135	0.000297
						(0.0192)	(0.0190)	(0.0187)
x non-tradables						0.00814	0.00654	0.00612
						(0.0140)	(0.0136)	(0.0134)
x construction						-0.0742**	-0.0758**	-0.0762**
						(0.0253)	(0.0250)	(0.0244)
Unit of Obs.	State	State	State	State	State x 2 digit Ind.	State x 2 digit Ind.	State x 2 digit Ind.	State x 2 digit Ind.
2 Digit Ind. FE							✓	✓
State FE								✓
R^2	0.181	0.140	0.166	0.264	0.005	0.009	0.468	0.500
Observations	49	49	49	49	3,816	3,816	3,816	3,816

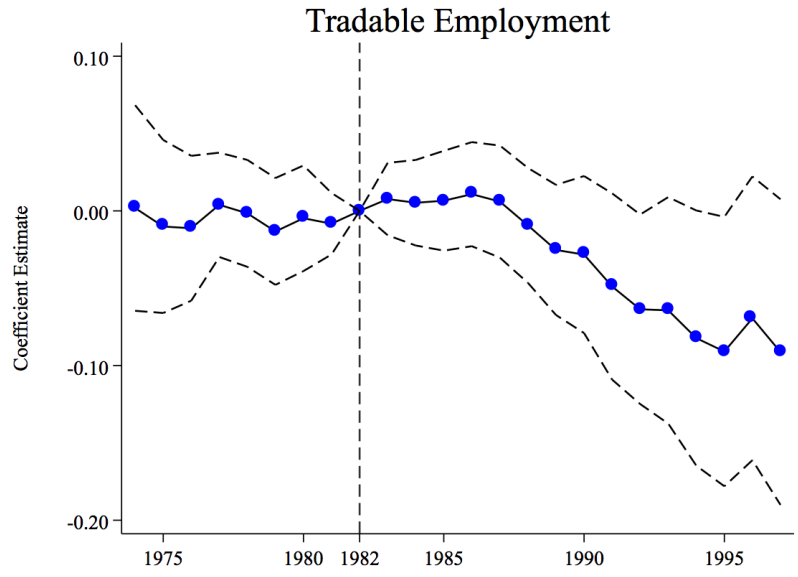
Why a Worse Recession?

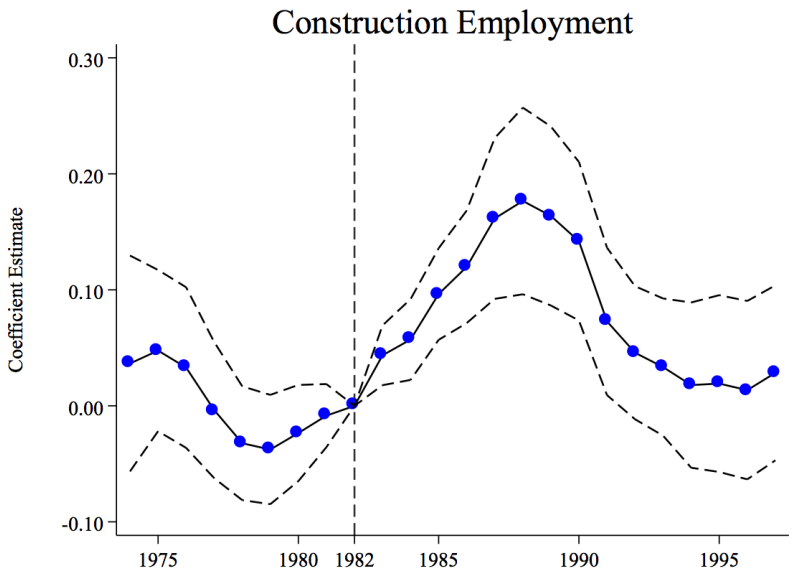
Three channels for the worse recession

- **Downward nominal wage rigidity**, as in Schmitt-Grohé and Uribe (2016); also evidence of a decline in long-run competitiveness in the tradable sector
- **Banking sector losses**: help explain why even tradable employment falls in early deregulation states
- **Household debt overhang**: very strong correlation across states between the rise in household debt during expansion and recession severity during contraction

Deregulation and employment over the full cycle

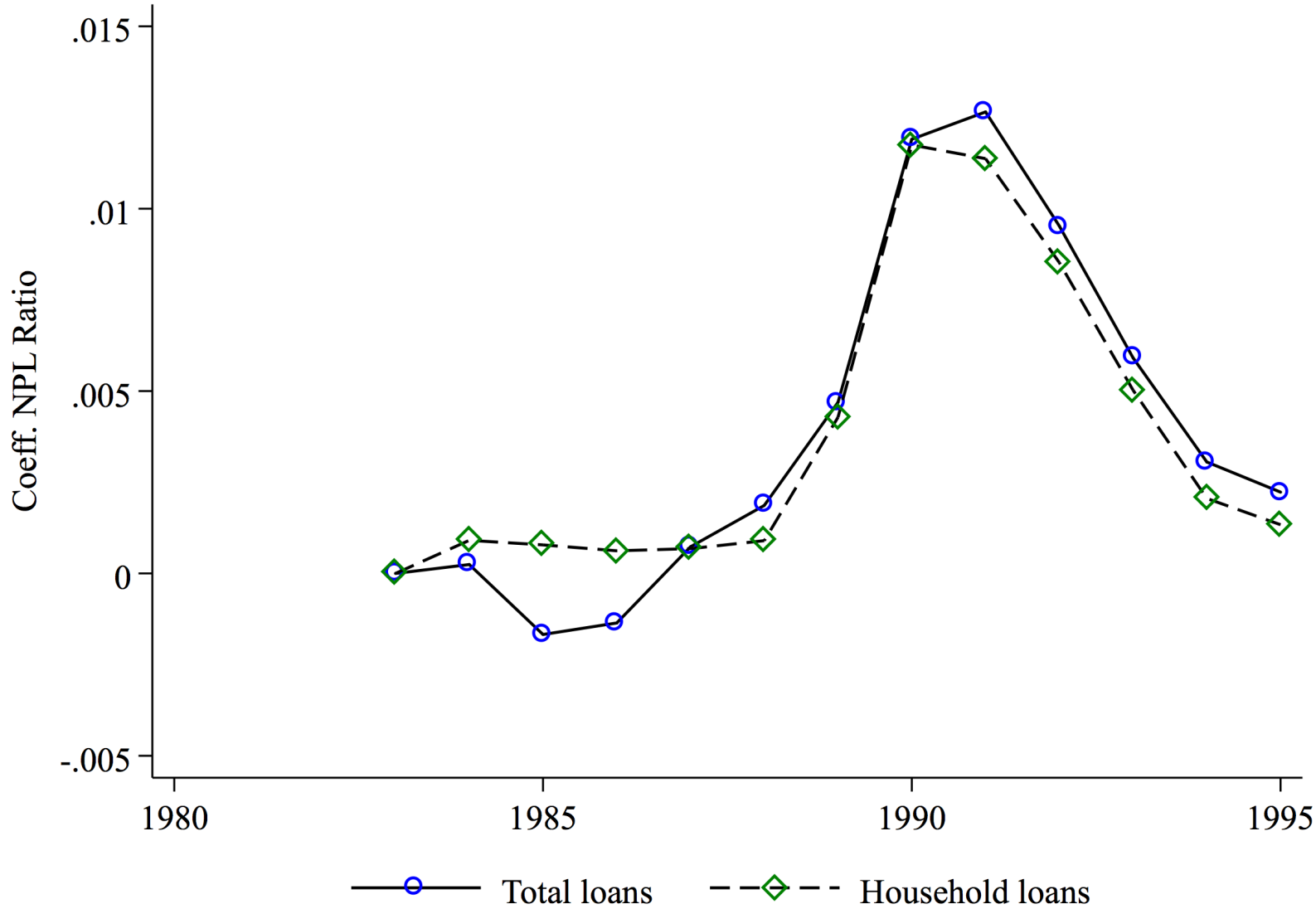






Deregulation and wages over the full cycle

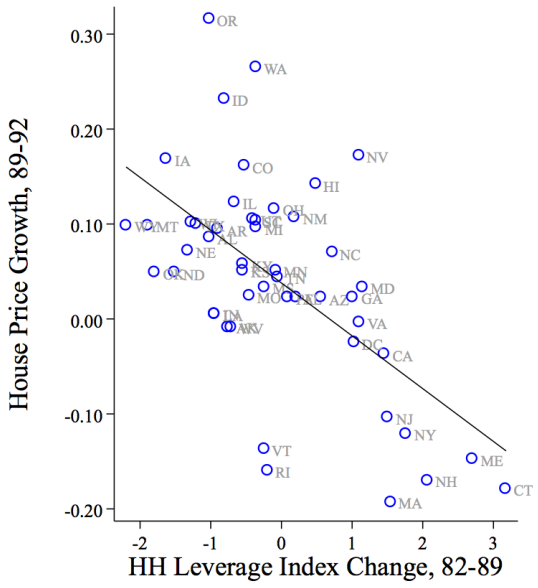
Banking sector losses elevated in early deregulation states

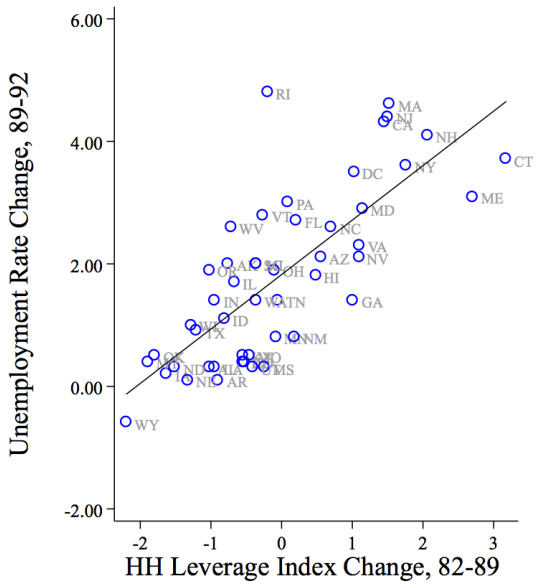


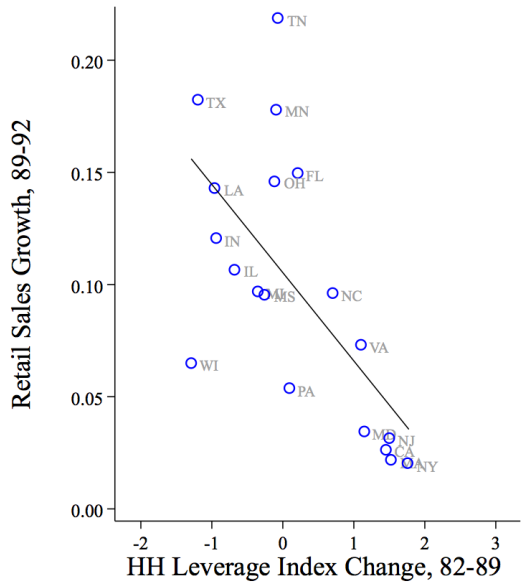
Banking sector losses elevated in early deregulation states

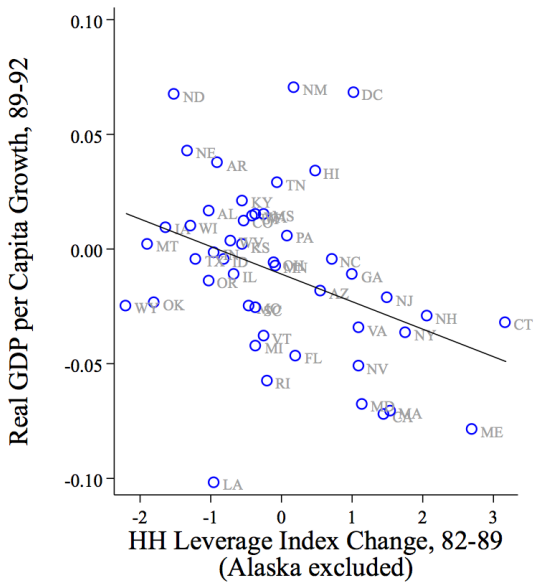
	NPL ratio total loans 1990	NPL ratio HH loans 1990	Δ_{89-92} Total Employment		
	(1)	(2)	(3)	(4)	(5)
Dereg. measure	0.00866**	0.0111**			
	(0.00245)	(0.00248)			
NPL ratio total loans 1990			-2.610**		-3.206**
			(0.332)		(0.882)
NPL ratio HH loans 1990				-1.982*	
				(0.784)	
NPL ratio C&I loans 1990				-0.382	
				(0.595)	
R^2	0.225	0.320	0.532	0.504	0.504
Specification	OLS	OLS	OLS	OLS	IV
Observations	49	49	49	49	49

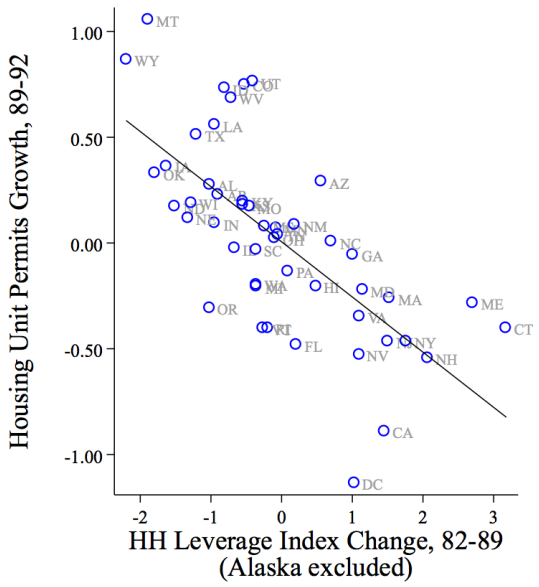
Household leverage and the recession of 1990 to 1991











Household leverage and the recession of 1990 to 1991

	Δ_{89-92} Unemployment	Δ_{89-92} Total employment	Δ_{89-92} Real GDP per capita	Δ_{89-92} House prices	Δ_{89-92} Retail sales	Δ_{89-92} Housing unit permits
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Base Case						
Δ_{82-89} HH leverage index	0.889**	-0.0380**	-0.00970	-0.0556**	-0.0393**	-0.265**
	(0.111)	(0.00592)	(0.00580)	(0.0109)	(0.0111)	(0.0402)
R^2	0.575	0.467	0.056	0.357	0.424	0.482
Panel B: Controls						
Δ_{82-89} HH leverage index	0.861**	-0.0289**	-0.0198*	-0.0582**	-0.0329+	-0.201**
	(0.152)	(0.00693)	(0.00748)	(0.0136)	(0.0183)	(0.0516)
Δ_{82-89} C&I loans	0.0627	-0.0113	-0.0218	-0.0644+	-0.0484	0.0881
	(0.427)	(0.0194)	(0.0209)	(0.0381)	(0.0381)	(0.144)
Δ_{82-89} Housing unit permits	-0.397	0.0121	0.0209	0.0588*	-0.0874+	-0.205+
	(0.318)	(0.0145)	(0.0156)	(0.0284)	(0.0424)	(0.108)
Δ_{82-89} Real GDP per capita	1.673	-0.273**	0.160*	-0.221	0.0192	-0.0918
	(1.600)	(0.0727)	(0.0785)	(0.143)	(0.231)	(0.541)
Δ_{82-89} Unemployment	-0.242*	0.00219	0.00738	-0.00298	-0.0157	0.00165
	(0.0990)	(0.00450)	(0.00486)	(0.00884)	(0.0122)	(0.0335)
Δ_{82-89} Total employment	-1.607	0.247**	-0.0349	0.340*	0.444+	-0.366
	(1.645)	(0.0747)	(0.0807)	(0.147)	(0.211)	(0.556)
R^2	0.655	0.683	0.319	0.564	0.624	0.629
Observations	49	49	49	49	19	49

Conclusion

Conclusion

- Examining joint behavior of sectoral employment and prices can identify whether credit supply expansion works through boosting demand or increasing labor productivity at firms
- Applying this test to the U.S. in the 1980s suggests that the credit supply shock induced by banking deregulation on net had a bigger effect by amplifying demand
- Methodology can be used in other settings and in real time. For example, sorting eurozone countries based on decline in sovereign spread up to the introduction of the euro suggests that 2000s European credit boom also worked primarily through demand
    - Credit supply shocks may operate through productivity channel in other settings

Additional Slides

Exposure to banking deregulation during expansion

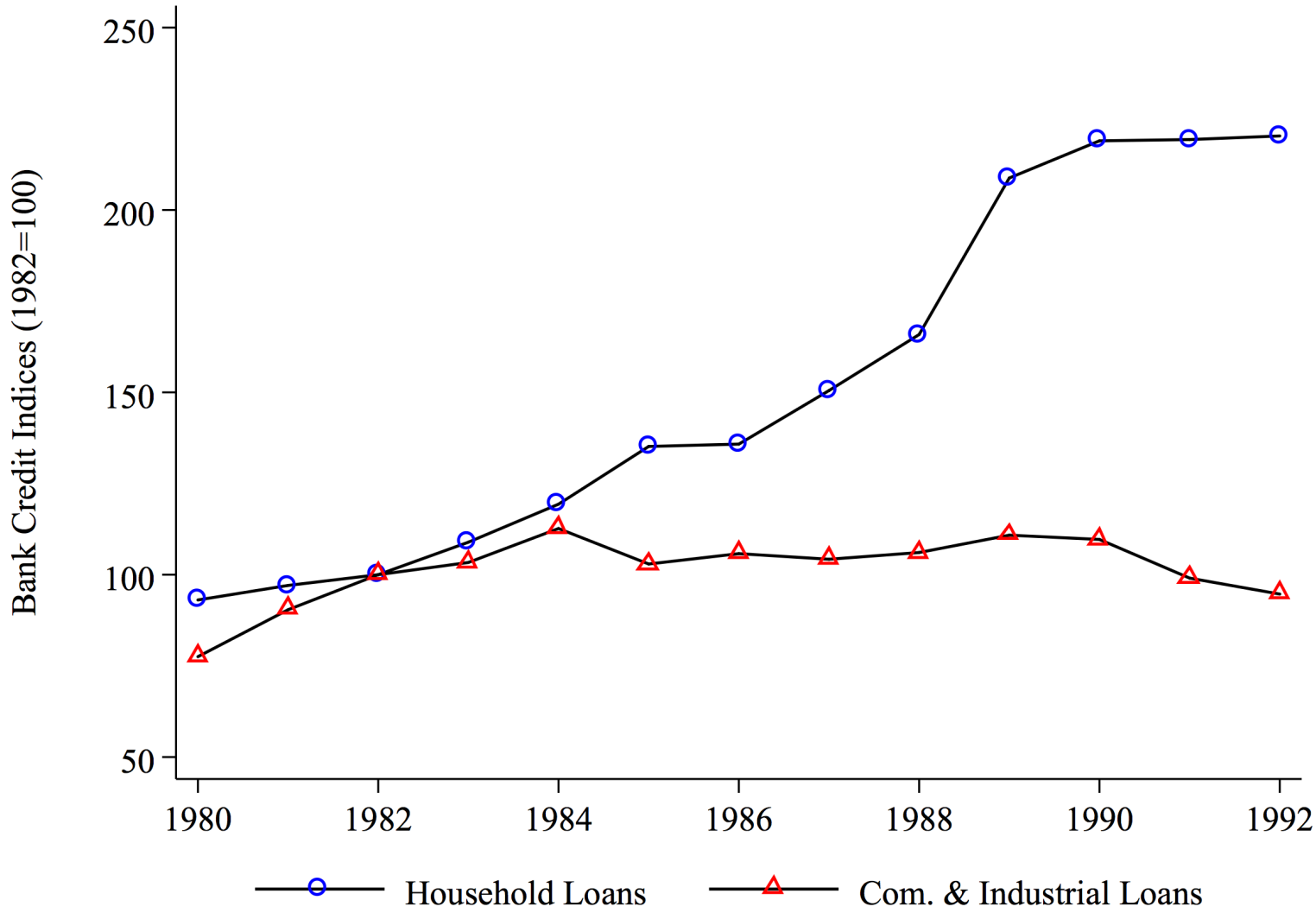
State	Inter-state deregulation	Intra-state deregulation	Dereg. measure
Alaska	1982	1970	1.62
Alabama	1987	1981	0.37
Arkansas	1989	1994	-1.43
Arizona	1986	1970	0.90
California	1987	1970	0.72
Colorado	1988	1991	-1.25
Connecticut	1983	1980	1.26
Washington, DC	1985	1970	1.08
Florida	1985	1988	-0.53
Georgia	1985	1983	0.37
Hawaii	1995	1986	-0.89
Iowa	1991	1994	-1.43
Idaho	1985	1970	1.08
Illinois	1986	1988	-0.71
Indiana	1986	1989	-0.89
Kansas	1992	1987	-1.07
Kentucky	1984	1990	-0.53
Louisiana	1987	1988	-0.89
Massachusetts	1983	1984	0.55
Maryland	1985	1970	1.08
Maine	1978	1975	2.16
Michigan	1986	1987	-0.53
Minnesota	1986	1993	-0.89
Missouri	1986	1990	-0.89
Mississippi	1988	1986	-0.71
Montana	1993	1990	-1.43
North Carolina	1985	1970	1.08
North Dakota	1991	1987	-1.07
Nebraska	1990	1985	-0.71
New Hampshire	1987	1987	-0.71
New Jersey	1986	1977	0.90
New Mexico	1989	1991	-1.43
Nevada	1985	1970	1.08
New York	1982	1976	1.62
Ohio	1985	1979	1.08
Oklahoma	1987	1988	-0.89
Oregon	1986	1985	-0.17
Pennsylvania	1986	1982	0.37
Rhode Island	1984	1970	1.26
South Carolina	1986	1970	0.90
Tennessee	1985	1985	0.01
Texas	1987	1988	-0.89
Utah	1984	1981	0.90
Virginia	1985	1978	1.08
Vermont	1988	1970	0.55
Washington	1987	1985	-0.35
Wisconsin	1987	1990	-1.07
West Virginia	1988	1987	-0.89
Wyoming	1987	1988	-0.89

Back

Defining turning point of cycle

- Our goal is to see how credit supply shocks affect real economic activity
- We must take a stand on turning point in aggregate business cycle or aggregate credit cycle
- We pick 1989 as the turning point based on NBER recession and expansion dates and an evaluation of credit spreads and high yield corporate debt issuance share
- But we show the full time series for all outcome variables for full transparency

Aggregate household debt growth from Call Reports



Beta regressions: 1980s cycle and placebo

	(1) Real GDP growth	(2) Real GDP p.c. growth	(3) Unemployment Change	(4) House price growth	(5) Housing unit permit growth
	Panel A: Boom-Bust Cycle 1982-89 & 1989-92				
GDP growth	0.734**	0.875**	-1.735**	1.171**	-1.552
	(0.103)	(0.0845)	(0.100)	(0.312)	(1.035)
Dereg. measure	-0.00858**	-0.00955**	0.0113**	-0.0201**	-0.0747**
	(0.00284)	(0.00253)	(0.00174)	(0.00585)	(0.0272)
Dereg. measure x GDP growth	0.539**	0.453**	-0.463**	1.304**	2.526*
	(0.102)	(0.0870)	(0.0908)	(0.303)	(1.133)
R^2	0.369	0.481	0.802	0.379	0.154
	Panel B: Boom-Bust Cycle 1975-79 & 1979-82				
GDP growth	1.030**	0.981**	-1.355**	2.327**	
	(0.110)	(0.0938)	(0.0771)	(0.173)	
Dereg. measure	0.00315	0.00328	-0.00312^{+}	0.00485	
	(0.00600)	(0.00478)	(0.00174)	(0.00352)	
Dereg. measure x GDP growth	-0.164	-0.140	0.0117	-0.377*	
	(0.133)	(0.114)	(0.0870)	(0.171)	
R^2	0.378	0.489	0.795	0.630	
	Panel B: Boom-Bust Cycle 1970-73 & 1973-75				
GDP growth	0.969**	0.919**	-0.420**		
	(0.134)	(0.120)	(0.0511)		
Dereg. measure	-0.00110	-0.00154	0.00293		
	(0.00896)	(0.00720)	(0.00248)		
Dereg. measure x GDP growth	-0.188	-0.186	-0.00976		
	(0.179)	(0.158)	(0.0605)		
R^2	0.401	0.462	0.501		
Observations	98	98	98	98	98

Deregulation and consumer prices over the full cycle