

Crowd-out Effects of U.S. Housing Credit Policy

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Job Market Candidate Presentations

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Housing Credit Policies: Uncle Sam as Mortgage Lender

Expansive use of housing credit policies since the 1930s:

- [Fannie Mae](#), [Freddie Mac](#), Ginnie Mae, Federal Home Loan Bank System, Federal Housing Administration, Veterans Affairs...
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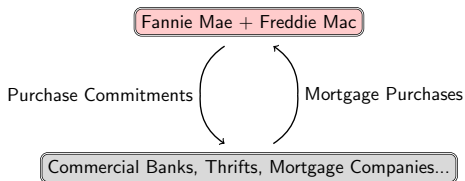
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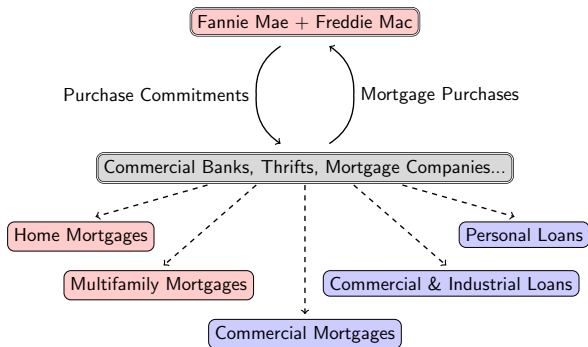
Credit policies can, in principle, boost mortgage lending:

- [Subsidy channel](#)

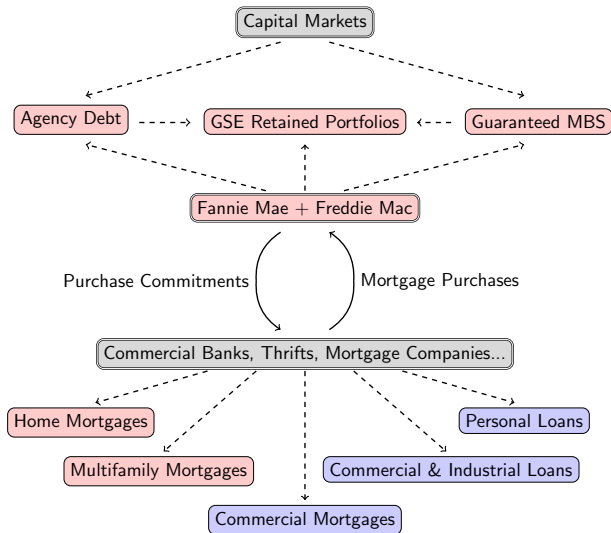
Do Housing Credit Subsidies Crowd Out Other Lending?



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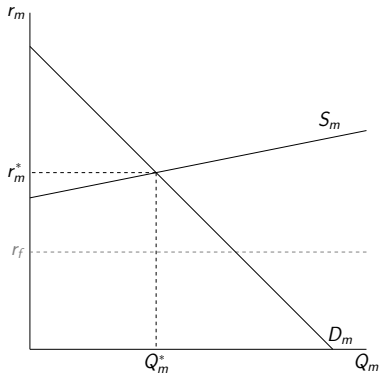


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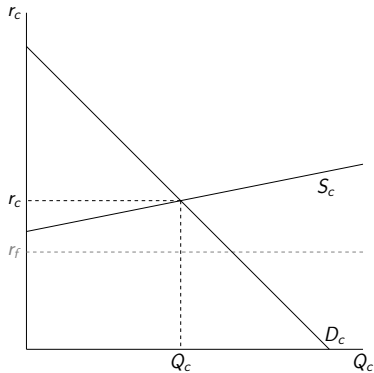


Mortgage Subsidy with Imperfectly Elastic Credit Supply

Mortgage Market (m)

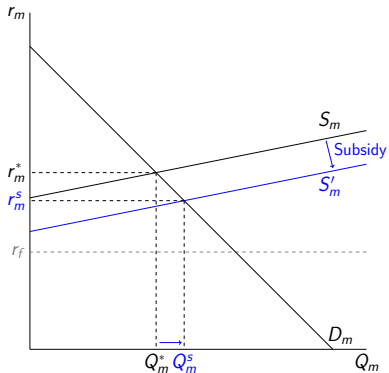


Commercial Loan Market (c)

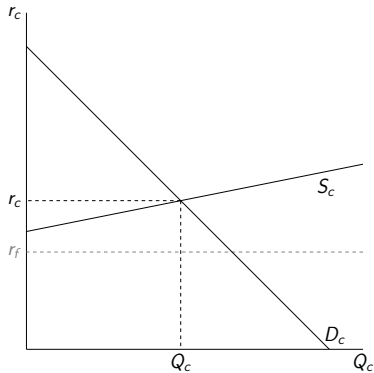


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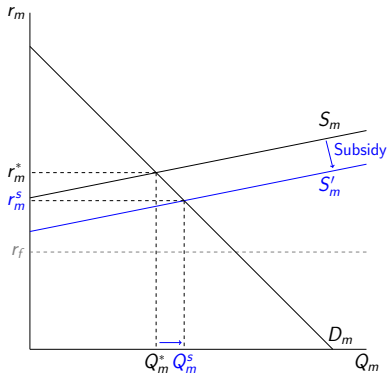


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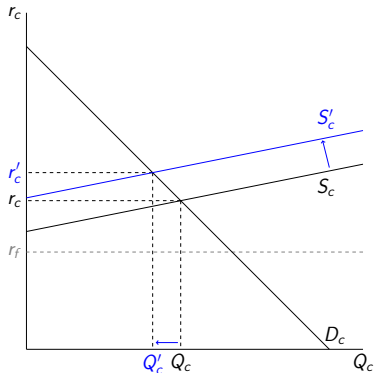


Mortgage Subsidy with Imperfectly Elastic Credit Supply

Mortgage Market (m)



Commercial Loan Market (c)



Degree of Credit Crowd Out?

1. Partial equilibrium models of credit policies:

- Crowd out highly sensitive to parameterization of credit supply elasticity
- Cannot easily speak to real-financial linkages of credit subsidies

Gale ('91), Lucas ('16)

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2. Quantifiable?

- Need exogenous variation in subsidized supply of mortgage credit

Empirical Strategy: Testing Crowd Out from Subsidies

Fieldhouse and Mertens ('17) narrative analysis:

- Identify regulatory shocks affecting agency mortgage purchases
- Exogenous shocks to supply of subsidized mortgage credit

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- Do agency purchases advance *intended* policy objectives?
- Yes, consistent with subsidy channel, real-financial linkages

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Fieldhouse, Mertens, and Ravn ('18):

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This paper:

- Do mortgage subsidies *unintentionally* crowd out commercial lending, activity?

Results: Intended vs. Unintended Consequences

Mortgage purchases of Fannie and Freddie:

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1. Crowd in private-sector home mortgage lending

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Mortgage purchases of Fannie and Freddie:

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2. Crowd out commercial mortgages, business lending
3. Boost home construction and crowd out other construction

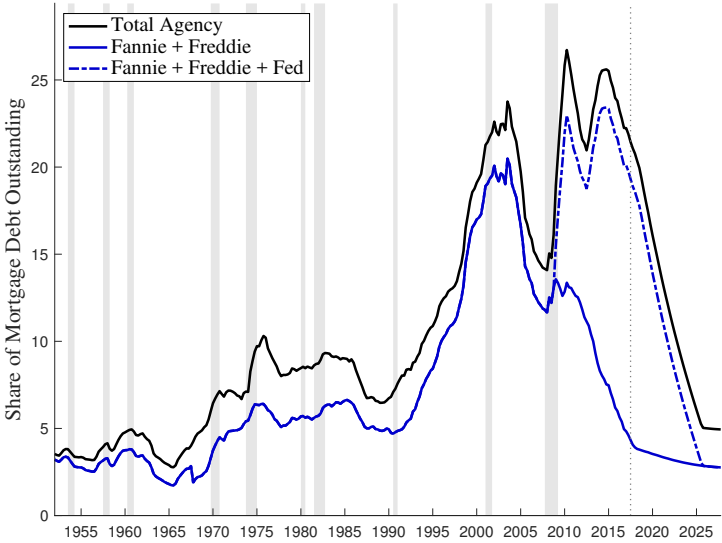
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Mortgage purchases of Fannie and Freddie:

1. Crowd in private-sector home mortgage lending
2. Crowd out commercial mortgages, business lending
3. Boost home construction and crowd out other construction

→ Housing credit policy appears zero sum for lending, real activity

Policy Relevance: Winding Down Mortgage Subsidies?



Note: Gray bars depict NBER recession dates.

Roadmap of Presentation

- I. Introduction
- II. Narrative analysis used for identification
- III. Main regression framework
- IV. Evidence of credit crowd-in, crowd-out
- V. Evidence of zero-sum nature for real activity
- VI. Conclusion and policy implications

II. NARRATIVE IDENTIFICATION STRATEGY

Narrative Approach to Time Series Identification

Monetary policy shocks:

- Friedman and Schwartz ('63), Romer and Romer ('89, '04), Cloyne and Hürtgen ('16)

Military spending shocks:

- Ramey and Shapiro ('98), Ramey ('11), Ramey and Zubairy ('17)

Tax policy shocks:

- Romer and Romer ('10), Cloyne ('13)

Oil supply shocks:

- Hamilton ('83), Kilian ('08)

Identification by Narrative Analysis of GSE Shocks

1. Identify policy changes expected to affect agency holdings
2. Quantify a projected dollar effect on agency holdings
3. Pinpoint timing of each policy's news first becoming anticipated
4. Classify each policy as either cyclically or not cyclically motivated
5. Restrict sample: January 1967–December 2006

Fieldhouse and Mertens ('17)

▶ Mortgage Holdings

▶ Primary Sources

Policies Affecting GSE Mortgage Holdings

- **Leverage regulations**

 - e.g. raising Fannie's debt-to-capital ratio from 25 to 30 in Dec. 1982

- **Capital requirements/surcharges**

 - e.g. accounting scandal capital surcharges on Fannie in Sep. 2004

- **Portfolio limits**

 - e.g. capping Freddie's portfolio growth to 2% annually in June 2006

- **Conforming loan limit increases**

 - e.g. increasing conforming loan limits by 67% in Aug. 1974

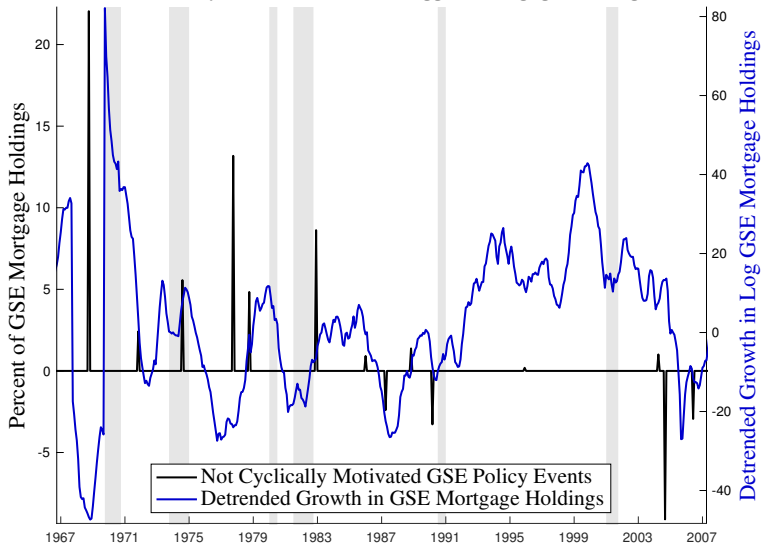
- **New market approvals**

 - e.g. authorizing Freddie to buy from mortgage banks in Oct. 1978

▶ Quantification Detail

▶ Example Policy Event

GSE Policy Events Relative to Lagged Mortgage Holdings



Note: Gray bars depict NBER recession dates.

III. LOCAL PROJECTION-IV REGRESSION FRAMEWORK

First-Stage Regressions: Addressing Measurement Error

Policy effect on GSE purchases, p_t , over horizon h iteratively estimated by:

$$\frac{\sum_{j=0}^h p_{t+j}}{X_t} = \tilde{\alpha}_h + \tilde{\beta}_h \frac{m_t}{X_t} + \tilde{\phi}_h(L) \mathbf{Z}_{t-1} + \tilde{u}_{t+h} \quad (1)$$

m_t : instrumental variable of GSE regulatory shocks

X_t : trend real personal income

Controls Z_t : 12 lags of p_t/X_t , growth of a nominal house price index, core PCE price index, mortgage debt, housing starts, and log real originations, 3-month T-bill rate, 10-year Treasury rate, conventional mortgage spread, BAA-AAA spread, unemployment rate, real personal income growth, y_t/X_t

Second-Stage Regressions: Testing for Crowd-Out

Policy effect on lending, y_t , over horizon h iteratively estimated by:

$$\frac{y_{t+h} - y_{t-1}}{X_t} = \alpha_h + \beta_h \frac{\sum_{j=0}^h p_{t+j}}{X_t} + \phi_h(L)\mathbf{Z}_{t-1} + u_{t+h} \quad (2)$$

p_t : GSE purchases (instrumented with regulatory shocks)

β_h : credit multiplier for horizon h , estimated by two-stage least squares

X_t : trend real personal income

Controls Z_t : 12 lags of p_t/X_t , growth of a nominal house price index, core PCE price index, mortgage debt, housing starts, and log real originations, 3-month T-bill rate, 10-year Treasury rate, conventional mortgage spread, BAA-AAA spread, unemployment rate, real personal income growth, y_t/X_t

Identifying Assumptions for Instrument Validity

If m_t is an instrument for unobserved shocks to $Y_{1,t}$, it can identify

$$Y_{i,t+h} = \beta_{h,i1} Y_{1,t} + \phi_h' W_t + u_{i,t+h}^\perp$$

where

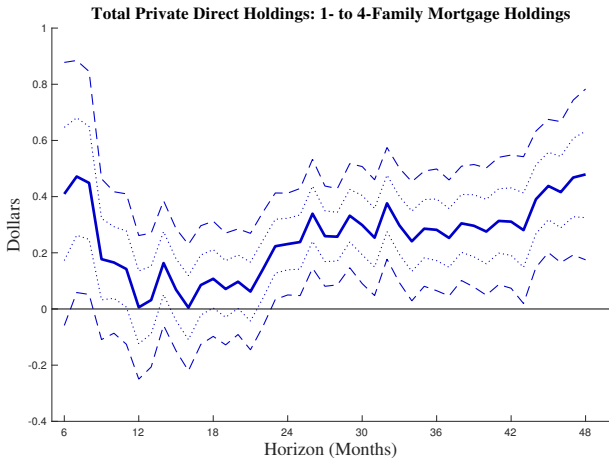
$$u_t^\perp = u_t - \text{Proj}(u_t | W_t)$$

provided the following conditions hold:

- A1. $\mathbb{E} [u_{1,t}^\perp m_t^{\perp'}] \neq 0$ (relevance)
- A2. $\mathbb{E} [u_{2:n,t}^\perp m_t^{\perp'}] = 0$ (exclusion)
- A3. $\mathbb{E} [u_{t+j}^\perp m_t^{\perp'}] = 0$ for $j \neq 0$ (lead/lag exogeneity)

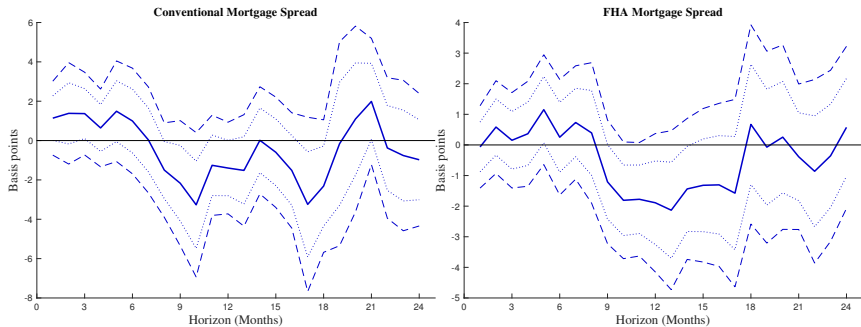
IV. PRIVATE SECTOR LENDING: CROWD-IN, CROWD-OUT

GSE Purchases Crowd In Home Mortgage Lending



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

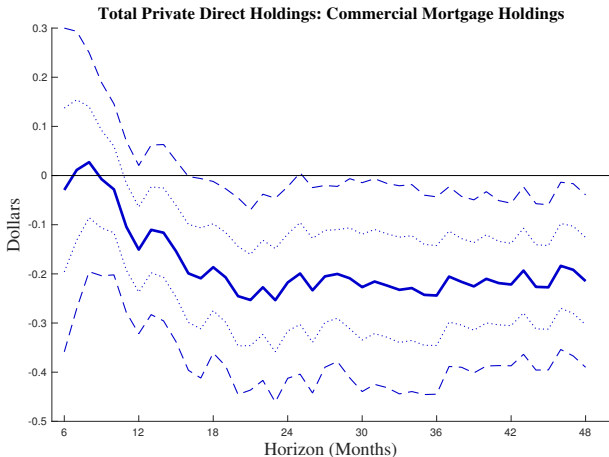
GSE Purchases Reduce Mortgage Spreads



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

► Regression Modification

GSE Purchases Crowd Out Commercial Mortgage Lending



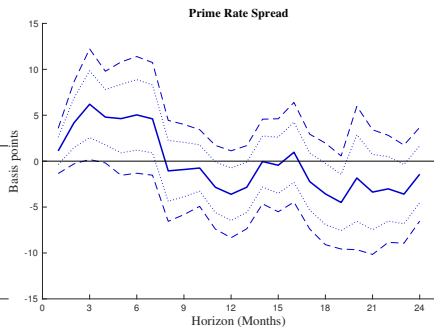
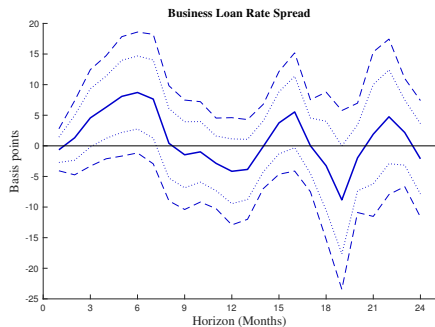
Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

GSE Purchases Crowd Out Business Loans



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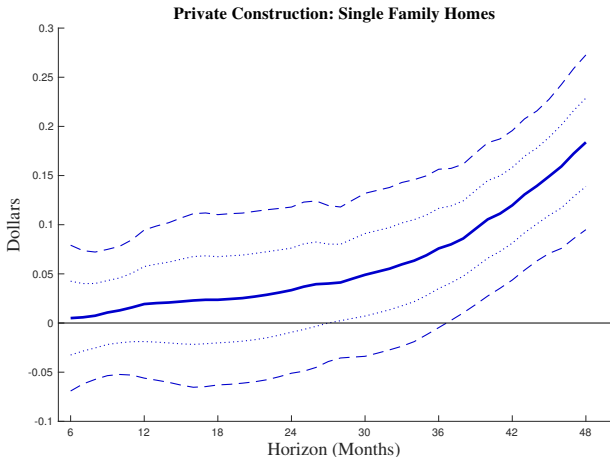
GSE Purchases Increase Business Loan Spreads



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

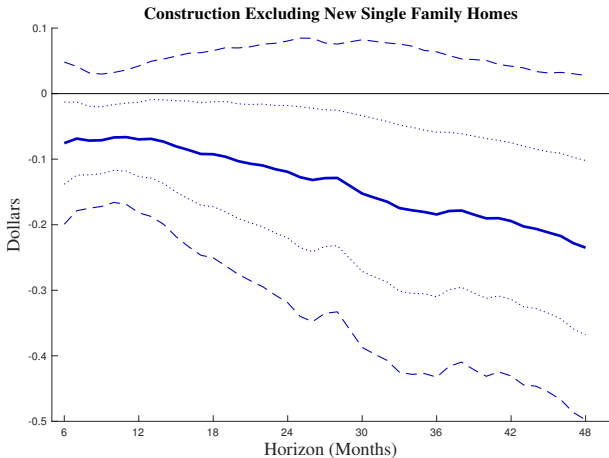
V. REAL ACTIVITY: CONSTRUCTION AND EMPLOYMENT

GSE Purchases Crowd In Single-Family Home Construction



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

GSE Purchases Crowd Out Other Construction



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

Construction Employment Unaffected by GSE Purchases



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

► Construction Wages

► Total Employment

► Financial Services Employment

VI. CONCLUSION AND POLICY IMPLICATIONS

Intended vs. Unintended Consequences Revisited

1. GSE mortgage purchases reallocate credit:

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 2. GSE mortgage purchases reallocate real activity:
 - Crowd in home construction spending: \$0.05–\$0.18
 - Crowd out other construction spending: \$0.10–\$0.20
- Zero net effect on construction spending, employment

Policy Implications: GSE Reform

Ongoing efforts at GSE reform on Capital Hill:

- Bipartisan Housing Finance Reform Act of 2018
- [To what extent should mortgage debt be subsidized?](#)

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GSE purchases advance policy objectives via subsidies:

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- Promoting owner-occupied housing, homeownership

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[Opportunity cost of subsidies:](#)

- Credit crowd-out, distortions
- Fiscal cost
- Horizontal inequities

Thank you!

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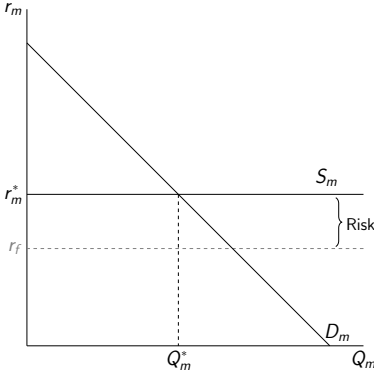
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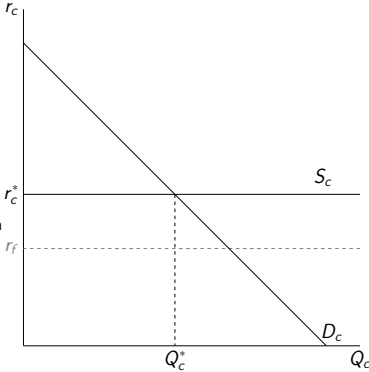
APPENDIX SLIDES

Mortgage Subsidy with Perfectly Elastic Credit Supply

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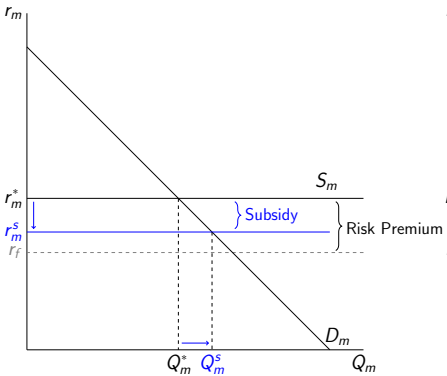


Commercial Loan Market (c)

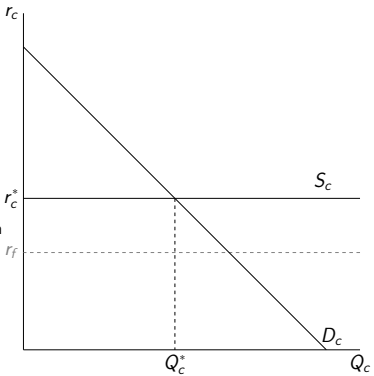


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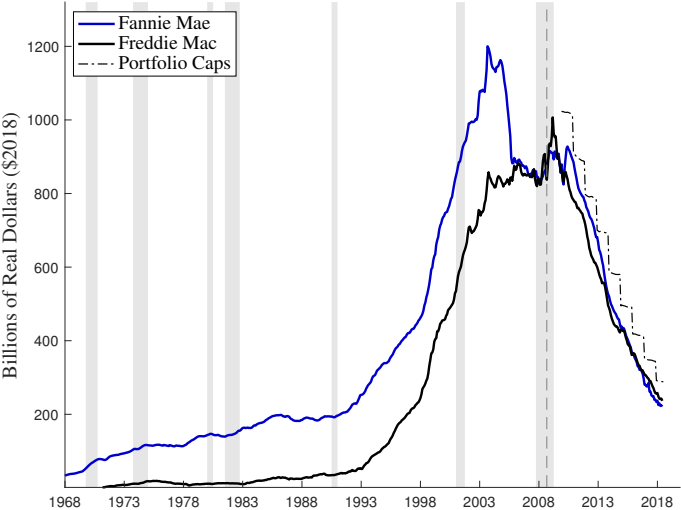
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Mortgage Holdings of Fannie Mae and Freddie Mac



Data Sources for Narrative Analysis

- Public laws, *Federal Register*
- Congressional committee reports, hearings, draft bills
- Presidential speeches, *U.S. Budget, Economic Report of the President*
- Reports of agencies and regulators (HUD, OFHEO, FHFA)
- Other government reports (CBO, CRS, GAO, Treasury)
- Newspapers, industry newsletters (*WSJ, American Banker, CQ Almanac*)

Quantifying Policy Effects on GSE Holdings

- **Leverage regulations**

Use ex ante balance sheet data, capital/leverage requirements

- **Portfolio/growth limits**

Use agency, financial analyst forecasts as counterfactual

- **Capital requirements/surcharges**

Use ex ante balance sheet data, perfect foresight of recapitalization efforts

- **Large conforming loan limit increases**

Use estimates from congressional committee reports, home price indices

- **New market approvals and affordable housing goals**

Press releases, newspapers (HUD, *WSJ*, *American Banker*)

Illustrative Regulatory Policy Event

HUD Increases Debt-to-Capital Ratio to 30-to-1 (47 FR 58044) Announced: December 22, 1982

Policy Change	Agency	Impact	News	Effective	Classification
Increased Debt-to-Capital Ratio	FNMA	+\$6.25 billion	Dec. 1982	Dec. 1982	Non-Cyclical

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- **Bite:** Fannie's debt-to-capital ratio: 23.2 in '81 → 25.9 in '82 → 27.3 in '83

GSE Policy Events Relative to Lagged Mortgage Originations

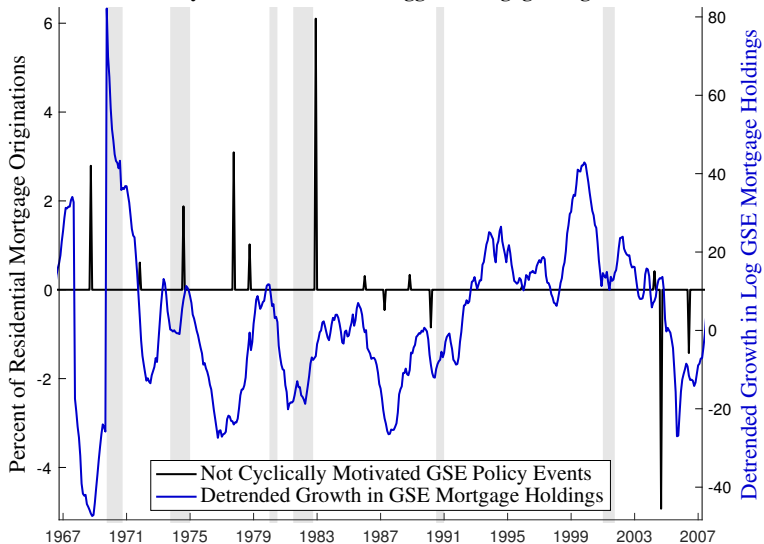
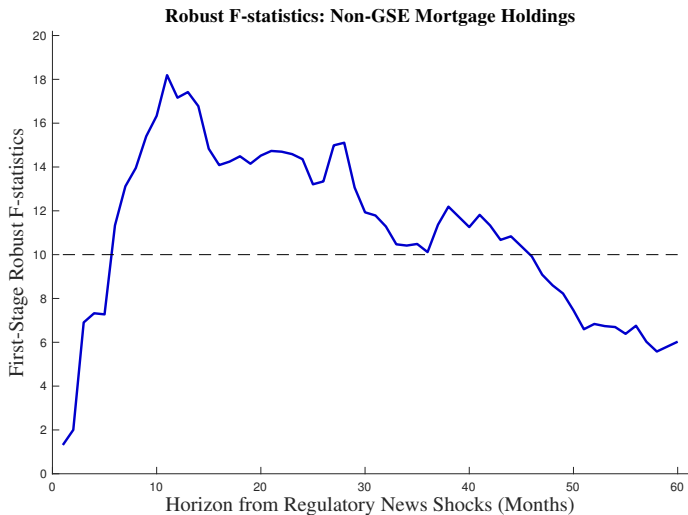


Table 1: Non-Cyclically Motivated GSE Narrative Instruments

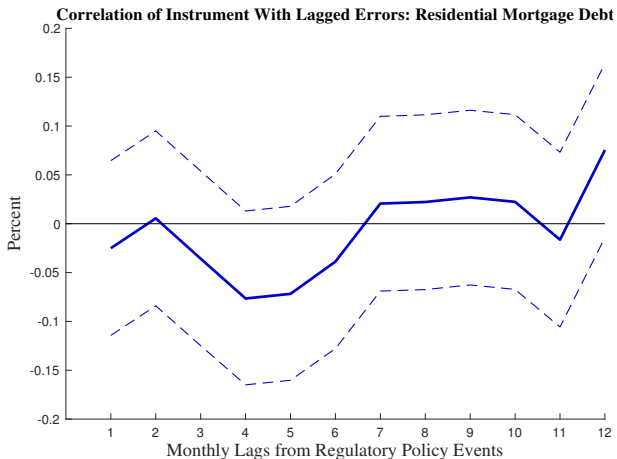
Policy Description	Agency	Impact	News	Effective	Classification
HUDA 1968: Increased Debt-to-Capital Ratio	FNMA	+\$1.39 billion	Oct. 1968	Oct. 1968	Non-Cyclical
Conforming Mortgage Program Approval	FNMA	+\$0.4 billion	Nov. 1971	Feb. 1972	Non-Cyclical
HCDA 1974: Conforming Loan Limit	FNMA	+\$1.14 billion	Aug. 1974	Aug. 1974	Non-Cyclical
HCDA 1974: Conforming Loan Limit	FHLMC	+\$0.46 billion	Aug. 1974	Aug. 1974	Non-Cyclical
HCDA 1977: Conforming Loan Limit	FNMA	+\$4.82 billion	Oct. 1977	Oct. 1977	Non-Cyclical
HCDA 1977: Conforming Loan Limit	FHLMC	+\$0.21 billion	Oct. 1977	Oct. 1977	Non-Cyclical
HCDA 1978: Mortgagee Expansion	FHLMC	+\$2.0 billion	Oct. 1978	May 1979	Non-Cyclical
Increased Debt-to-Capital Ratio	FNMA	+\$6.25 billion	Dec. 1982	Dec. 1982	Non-Cyclical
Second Mortgage Program Approval	FHLMC	+\$1.0 billion	Jan. 1986	Jan. 1986	Non-Cyclical
Decreased Debt-to-Capital Ratio	FNMA	-\$2.7 billion	Apr. 1987	Dec. 1987	Non-Cyclical
Public Listing: Stock Split Capitalization	FHLMC	+\$1.62 billion	Nov. 1988	Nov. 1988	Non-Cyclical
FHEFSSA 1992: Capital Requirements	FNMA	-\$4.25 billion	Mar. 1990	Mar. 1990	Non-Cyclical
Affordable Housing Goals of 1995	FHLMC	+\$0.61 billion	Dec. 1995	Jan. 1996	Non-Cyclical
Affordable Housing Goals of 2004	FNMA	+\$7.6 billion	Apr. 2004	Jan. 2005	Non-Cyclical
Affordable Housing Goals of 2004	FHLMC	+\$7.6 billion	Apr. 2004	Jan. 2005	Non-Cyclical
Accounting Scandal: Capital Surcharge	FNMA	-\$141.4 billion	Sep. 2004	Sep. 2004	Non-Cyclical
Portfolio Growth Limit Imposed	FHLMC	-\$42.8 billion	June 2006	July 2006	Non-Cyclical

Notes on acronyms: Housing and Urban Development Act (HUDA); Housing and Community Development Act (HCDA); and Federal Housing Enterprises Financial Safety and Soundness Act (FHEFSSA).

First-Stage Diagnostics: Robust F-Statistics

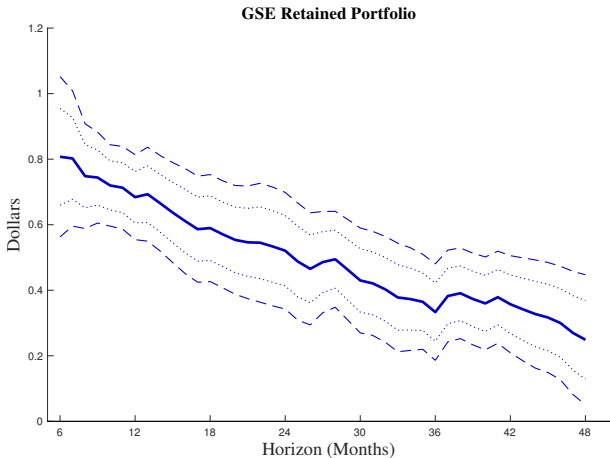


First-Stage Diagnostics: Lag Exogeneity



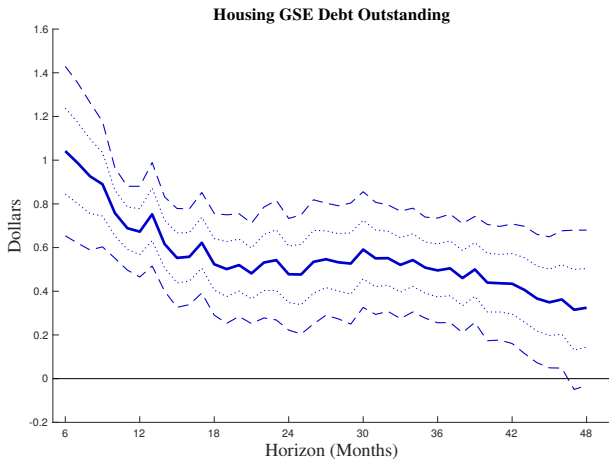
Notes: Finer lines are 95% confidence bands.

Response of GSE Mortgage Holdings to Regulatory Shocks



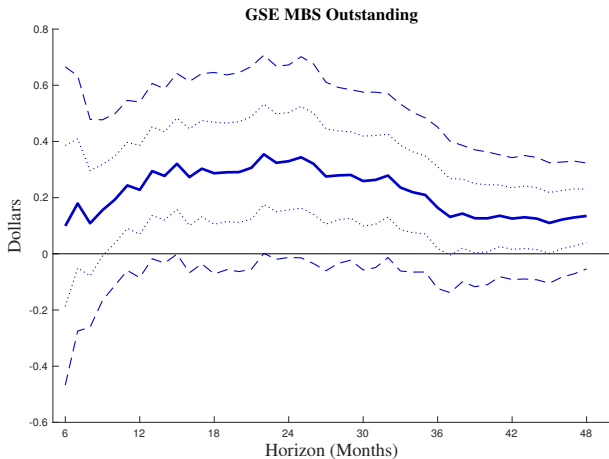
Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

Response of GSE Debt to Regulatory Shocks



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

Response of GSE MBS to Regulatory Shocks



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

Regression Modification for Log First-Differences

Percentage point change in indicator f_t at horizon h iteratively estimated by:

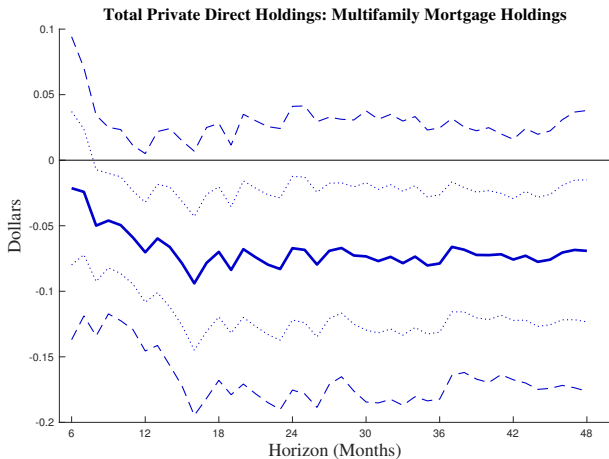
$$\sum_{j=0}^h f_{t+j} = \alpha_h + \beta_h \left(\frac{12}{8} \times \frac{\sum_{k=0}^7 c_{t+k}}{\bar{X}_t} \right) + \phi_h(L)Z_{t-1} + u_{t+h} \quad (3)$$

c_t : GSE purchase commitments (instrumented with regulatory policy shocks)

β_h : response to a one percentage point increase in GSE flow market share

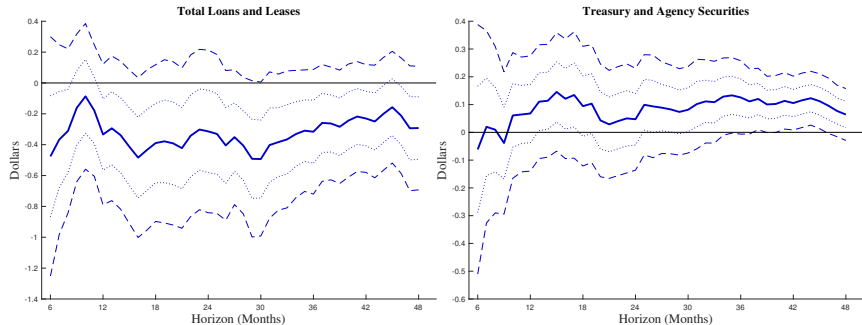
\bar{X}_t : trend real mortgage originations as scale factor

GSE Purchases Crowd Out Multifamily Mortgage Lending



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

GSE Purchases Induce Rebalancing of Commercial Bank Assets



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

Mortgage Transaction Responses to GSE Purchases

Change in mortgage transaction flows, f_t , at horizon h iteratively estimated by:

$$\sum_{j=0}^h f_{t+j} = \alpha_h + \beta_h \frac{\sum_{j=0}^h p_{t+j}}{X_t} + \phi_h(L)Z_{t-1} + u_{t+h} \quad (4)$$

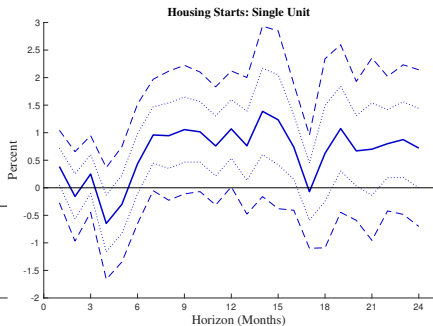
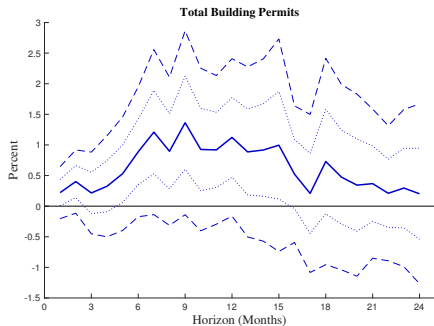
p_t : actual GSE purchases

β_h : cumulative credit multiplier over horizon h , estimated by OLS

X_t : trend log real personal income as scale factor

Controls Z_t : 12 lags of p_t/X_t , y_t/X_t , growth of a nominal house price index, core PCE price index, mortgage debt, housing starts, and log real originations, 3-month T-bill rate, 10-year Treasury rate, conventional mortgage rate, BAA-AAA spread

Response of Building Permits, Housing Starts to Shocks

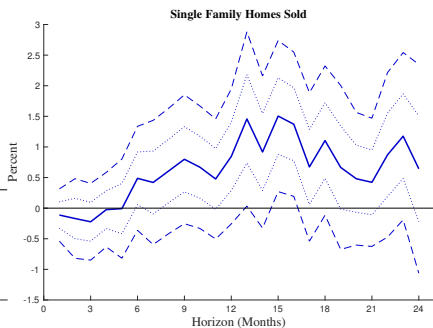


Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

► [Housing Starts vs. New Home Sales](#)

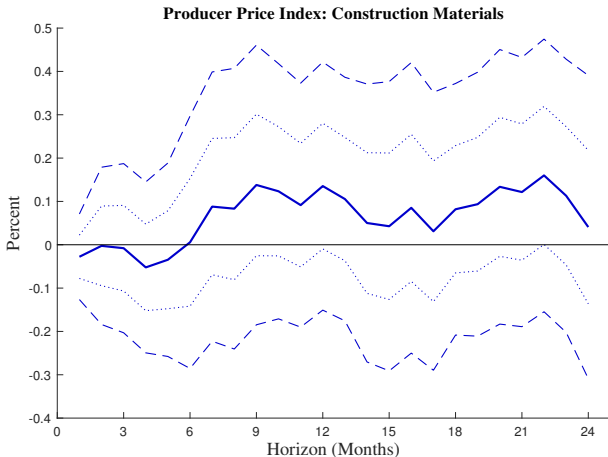
► [Back](#)

Response of Housing Starts, New Home Sales to Shocks



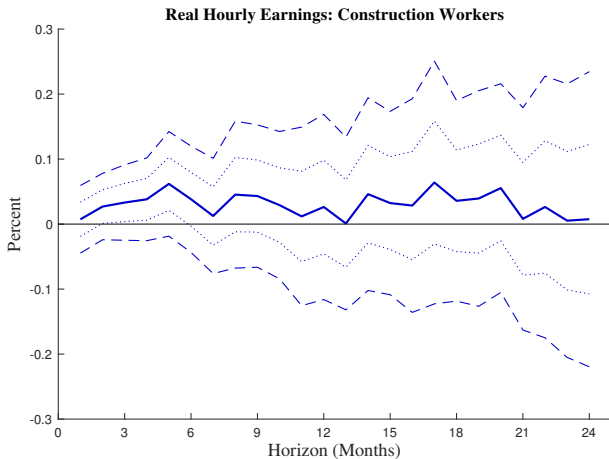
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Construction Material Prices Unaffected by GSE Purchases



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

Construction Wages Unaffected by GSE Purchases



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

Transmission Mechanisms of U.S. Housing Credit Policy

1. Mortgage originations channel:

► Mortgage Origination Responses

- Secondary market demand induces an expansion of originations
- Capacity constraints: Tradeoff with nonresidential originations

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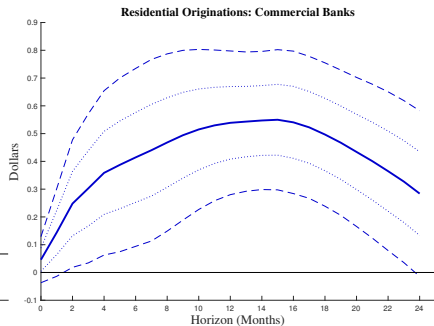
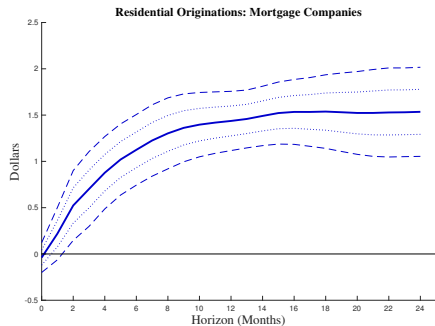
- Subsidy via safe asset premium of agency debt, agency MBS

3. Transmission of GSE purchases through bank lending channels:

- Subsidy: Capable of stimulating home mortgage lending, housing activity
- Inelastic credit supply/credit frictions: Subsidy crowds out non-targeted lending

▶ Back

Response to GSE Purchases: Residential Originations

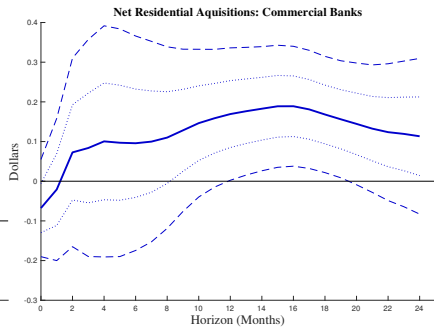
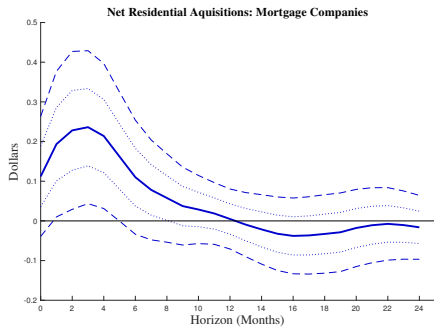


Notes: Finer lines are 90% Newey and West (1987) confidence bands. Sample: January 1971-December 1995.

► Single-Stage Regression Specification

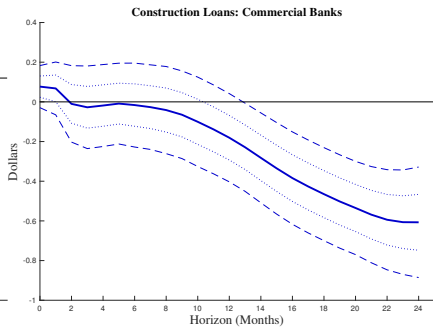
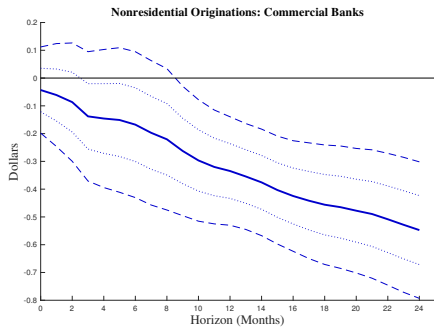
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Response to GSE Purchases: Residential Acquisitions



Notes: Finer lines are 90% Newey and West (1987) confidence bands. Sample: January 1971-December 1995.

Response to GSE Purchases: Nonresidential Originations



Notes: Finer lines are 90% Newey and West (1987) confidence bands. Sample: January 1971-December 1995.

Robustness Checks: Credit and Construction Multipliers

LP-IV estimates are broadly robust to controlling for:

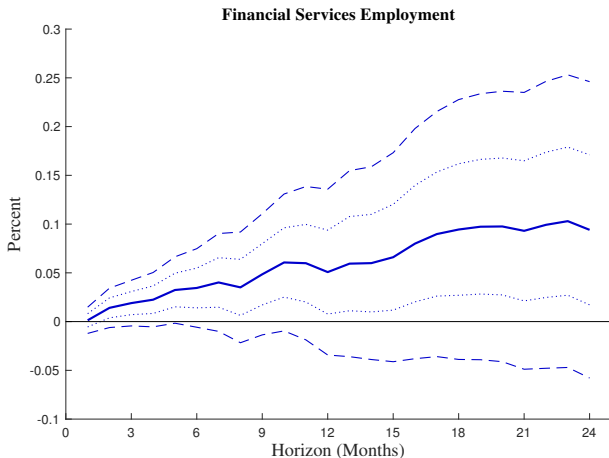
- Bank deregulation diffusion indices
- Home mortgage interest deduction
- Average marginal tax rates
- Conforming loan limit
- Monetary policy shocks
- Dropping each of largest narrative events

Total Employment Response to GSE Purchases



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

Financial Services Employment Response to GSE Purchases



Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

Winding Down the Fed's MBS Holdings

