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

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# Tradeoff to Channeling Credit Toward Housing?

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- Policymakers intervene in these markets, subsidize mortgages

- Do subsidies increase credit supply? Or inadvertently reallocate credit?

# 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...

- Purchase, guarantee, and securitize mortgages

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In practice, Fannie and Freddie subsidize mortgage borrowing:

- Implicit government guarantee on agency debt, MBS
- Passmore, Sherlund, and Burgess ('05), Passmore ('05), CBO ('12), He and Song ('22)...

# Bank Lending and Loan Originations Constraints

Credit supply from banks may be constrained:

- Funding: contracting frictions, competition for loanable funds
- Regulation: reserve requirements, capital requirements
- Underwriting resources: loan officers

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Partial equilibrium models of credit policies:

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- Crowd out highly sensitive to parameterization of credit supply elasticity

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Quantifiable? Need exogenous variation in supply of subsidized mortgage credit

Fieldhouse and Mertens ('17):

- "A Narrative Analysis of Mortgage Asset Purchases by Federal Agencies"
- We identify regulatory shocks affecting agency mortgage purchases
- Exogenous shocks to supply of subsidized mortgage credit

# Empirical Strategy: Directly Testing for Crowd-out Effects

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This paper:

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This paper:

- Do mortgage subsidies *unintentionally* crowd out commercial lending, activity?
- Yes, evidence of agency purchase shocks reducing business lending, real activity

# Fieldhouse and Mertens ('17) Regulatory Shocks

- 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

**GSE Policy Events Relative to Lagged Mortgage Holdings**

Percent of GSE Mortgage Holdings (left axis)

Detrended Growth in Log GSE Mortgage Holdings (right axis)

— Not Cyclically Motivated GSE Policy Events
— Detrended Growth in GSE Mortgage Holdings

Note: Gray bars depict NBER recession dates.
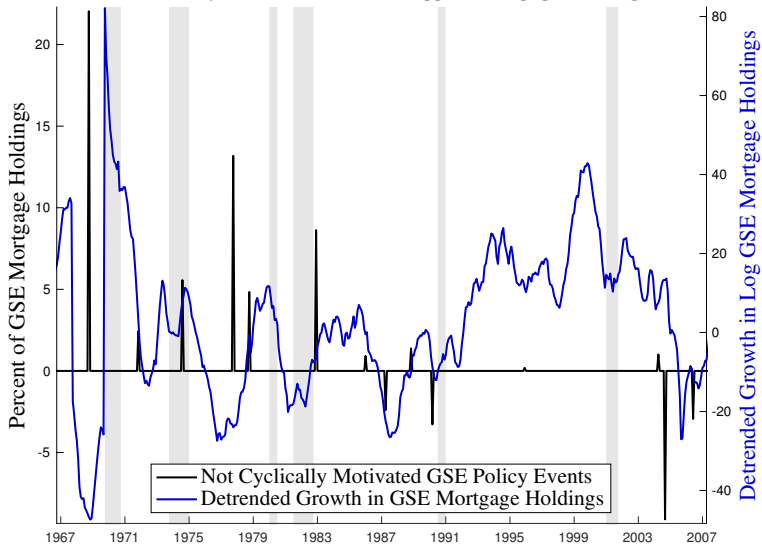
▸ Relative to Originations    ▸ Table of Policy Events

# First-Stage Regressions: Policy Endogeneity, Measurement

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

$$\frac{\sum_{j=0}^{h} p_{t+j}}{X_t} = \tilde{\alpha}_h + \tilde{\beta}_h \frac{m_t}{X_t} + \tilde{\phi}_h(L)\mathbf{Z}_{t-1} + \tilde{u}_{t+h} \quad \text{for } h = 0, 1, 2, \dots \quad (1)$$

$m_t$: narrative 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 Crowd-Out Effects

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

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

$\beta_h$: cumulative credit multiplier for horizon $h$

$p_t$: GSE purchases (instrumented with 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, $y_t/X_t$

# GSE Purchases Boost Home Mortgage Lending
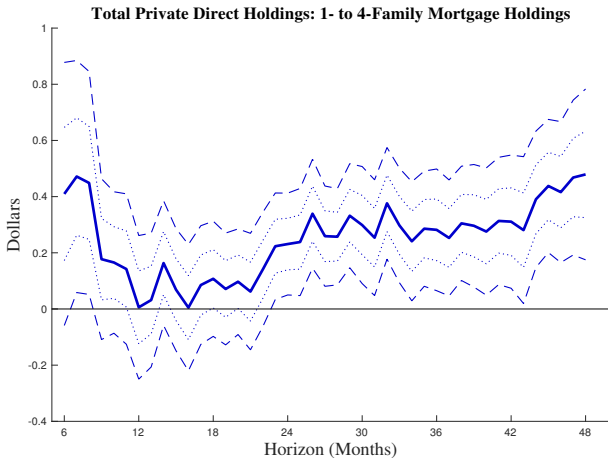


**Total Private Direct Holdings: 1- to 4-Family Mortgage Holdings**

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

▸ GSE Mortgage Holdings

# GSE Purchases Crowd Out Commercial Mortgage Lending
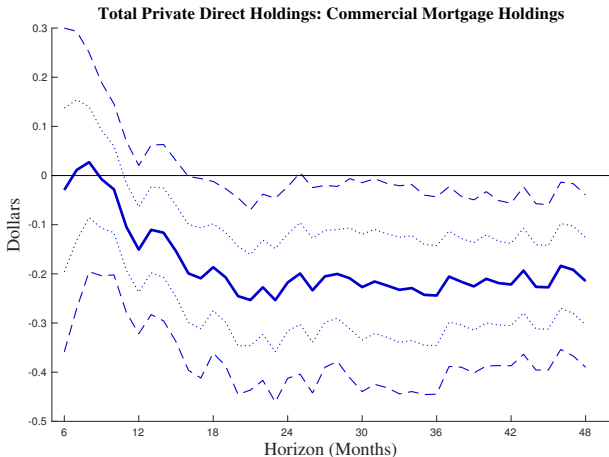


**Total Private Direct Holdings: Commercial Mortgage Holdings**

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

▸ Multifamily Mortgage Holdings

# GSE Purchases Crowd Out Business Loans



**Commercial and Industrial Loans**

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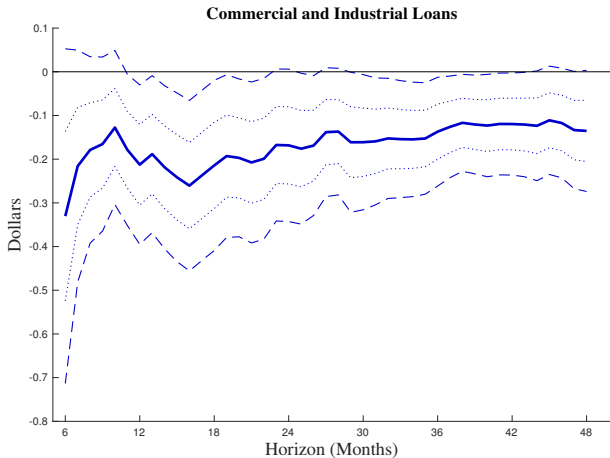
▸ Business Loan Spreads

# GSE Purchases Boost Single-Family Home Construction



**Private Construction: Single Family Homes**

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

# GSE Purchases Crowd Out Other Construction
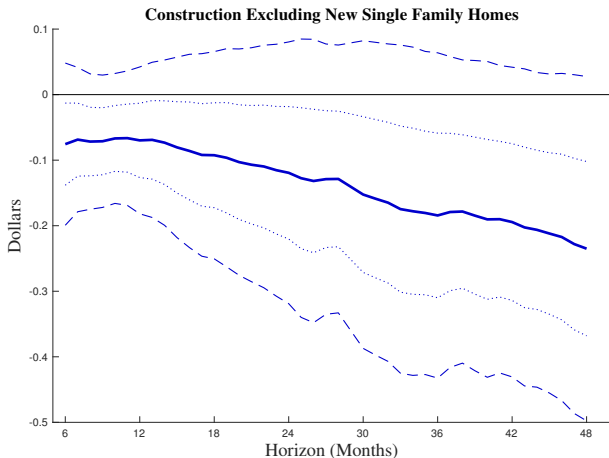


**Construction Excluding New Single Family Homes**

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

▶ Construction Material Prices

# Construction Employment Unaffected by GSE Purchases



**Construction Employment**

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

▸ Construction Wages    ▸ Total Employment    ▸ Financial Services Employment

# Conclusion: Intended vs. Unintended Consequences

1. GSE mortgage purchases reallocate credit:

   - Boost private home mortgage lending: $0.25–$0.50

   - Crowd out multifamily, commercial lending: $0.30–$0.50

2. GSE mortgage purchases reallocate real activity:

   - Boost home construction spending: $0.05–$0.18

   - Crowd out other construction spending: $0.10–$0.20

→ Zero net effect on construction spending, employment

# Policy Relevance: Winding Down Mortgage Subsidies?



Note: Gray bars depict NBER recession dates.

Legend:
- Federal Agency Total
- Fannie + Freddie
- Fannie + Freddie + Fed

Y-axis: Share of Residential Mortgage Debt Outstanding
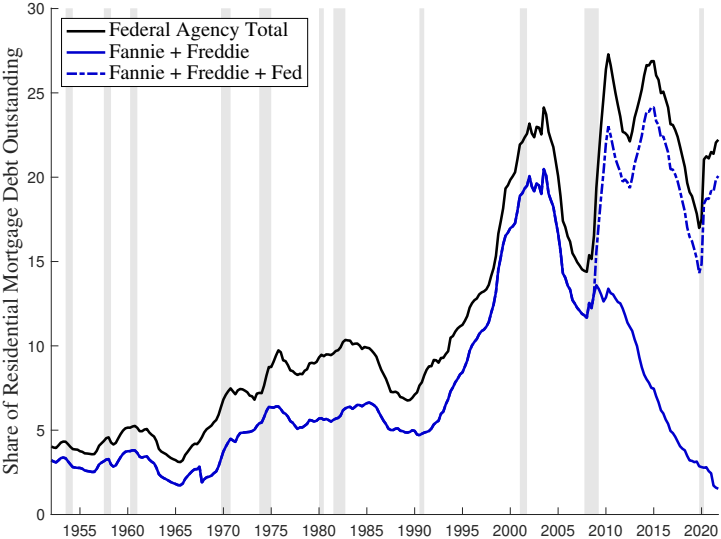
▸ Fannie + Freddie Mortgage Holdings    ▸ Federal Reserve MBS Holdings

# Thank you!

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APPENDIX SLIDES

# Do Housing Credit Subsidies Displace Other Lending?
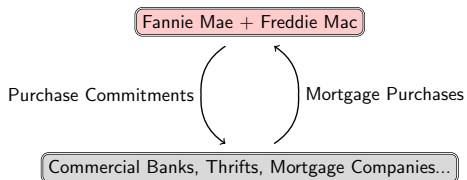
# Do Housing Credit Subsidies Displace Other Lending?
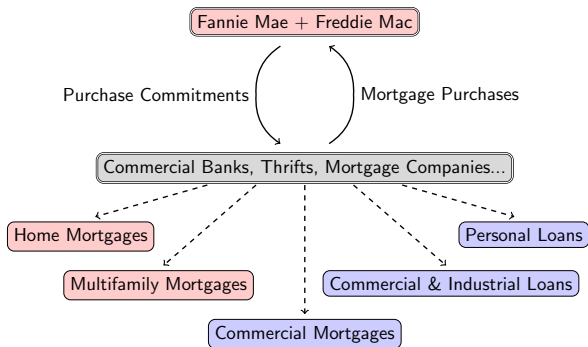
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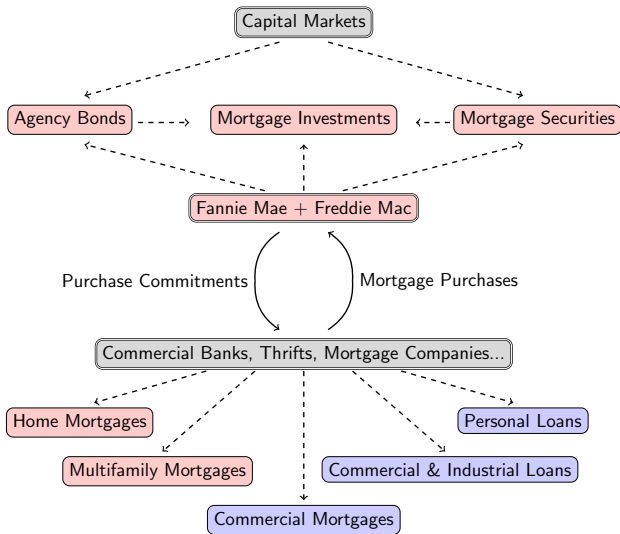
# Mortgage Holdings of Fannie Mae and Freddie Mac

# Mortgage Holdings of the Federal Reserve System
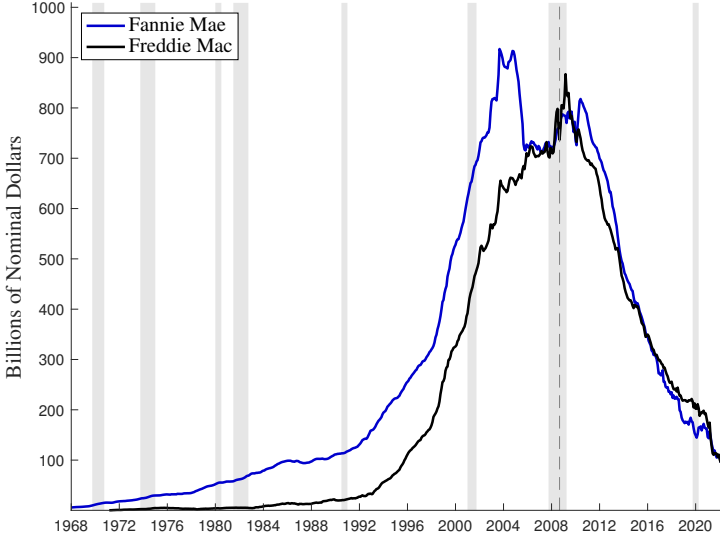


**Agency MBS Holdings of the Federal Reserve System**
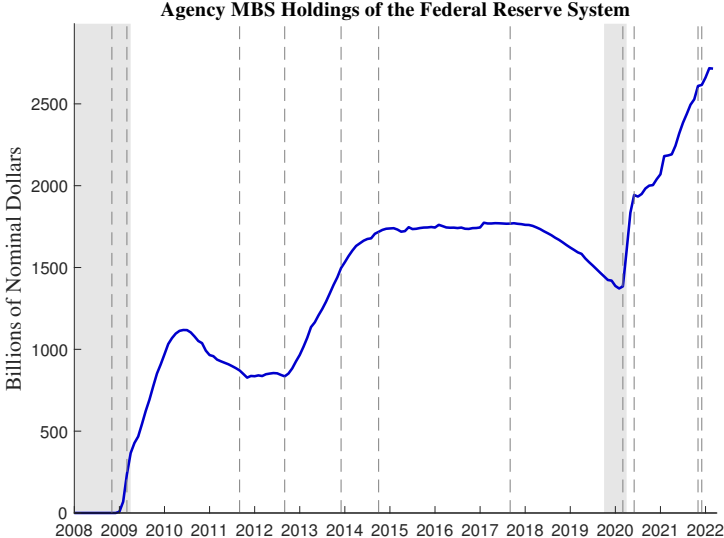
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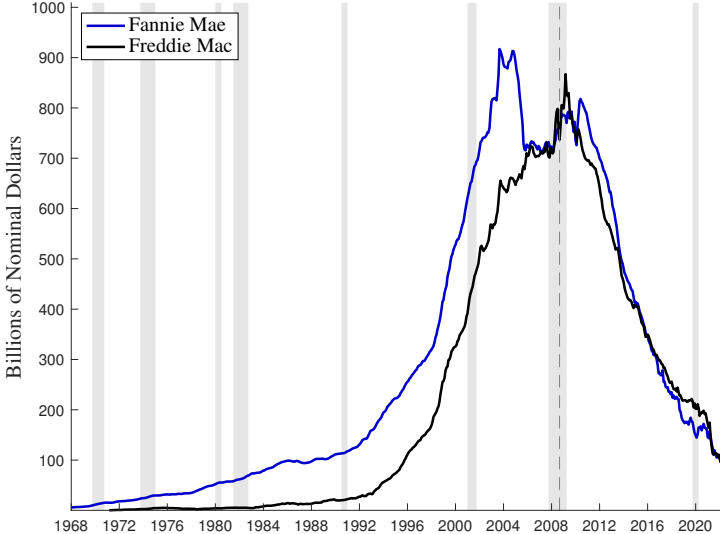
# Data Sources for Narrative Analysis

- 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*)

**GSE Policy Events Relative to Lagged Mortgage Originations**

Legend:
— Not Cyclically Motivated GSE Policy Events
— Detrended Growth in GSE Mortgage Holdings

Left axis: Percent of Residential Mortgage Originations
Right axis: Detrended Growth in Log GSE Mortgage Holdings

▸ Back
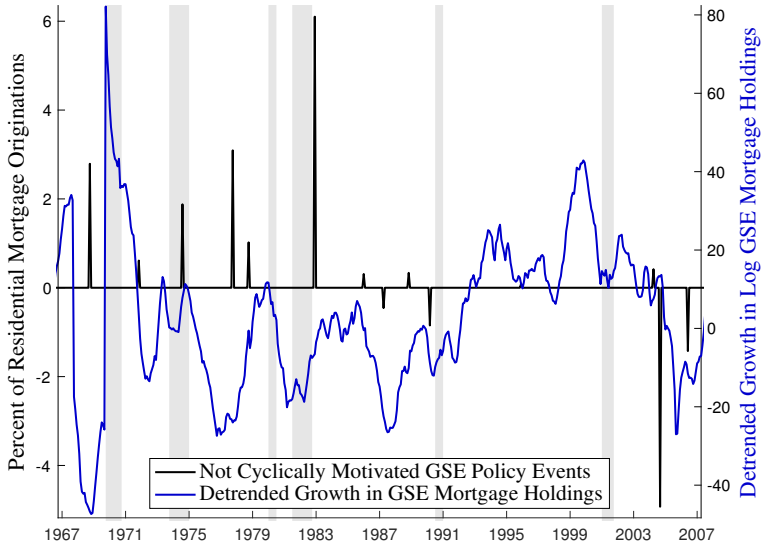
**Table 1:** Non-Cyclically Motivated GSE Narrative Instruments

| 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).

# Identifying Assumptions for Instrument Validity

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

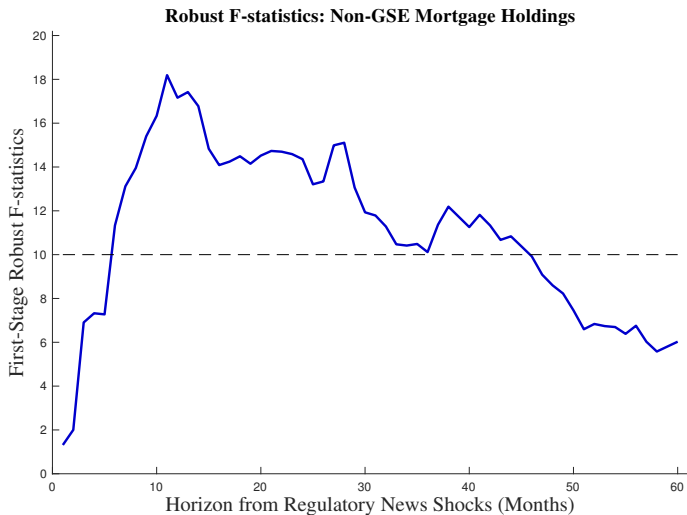$$Y_{i,t+h} = \beta_{h,i1} Y_{1,t} + \phi_h' W_t + u_{i,t+h}^{\perp}$$

where

$$u_t^{\perp} = u_t - \text{Proj}(u_t | W_t)$$
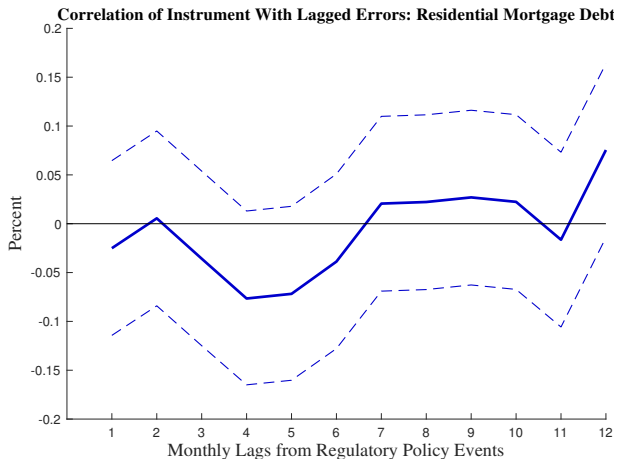
provided the following conditions hold:

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

**Robust F-statistics: Non-GSE Mortgage Holdings**

**Correlation of Instrument With Lagged Errors: Residential Mortgage Debt**

Notes: Finer lines are 95% confidence bands.

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# Response of GSE Debt to Regulatory Shocks



**Housing GSE Debt Outstanding**

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

▸ Back

# Response of GSE MBS to to Regulatory Shocks



**GSE MBS Outstanding**

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▸ Back

# Response of GSE Mortgage Holdings to Regulatory Shocks
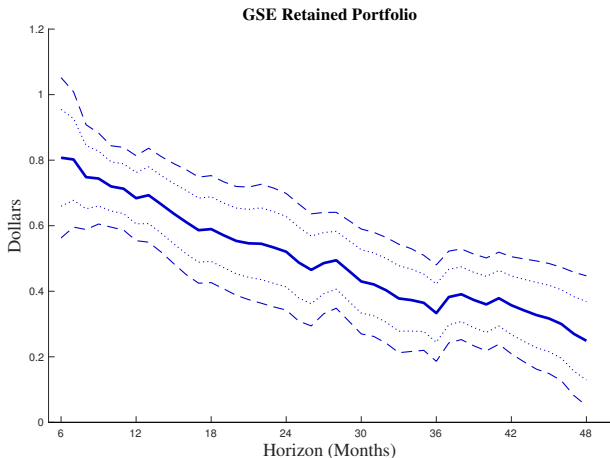


**GSE Retained Portfolio**

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

# GSE Purchases Crowd Out Multifamily Mortgage Lending



**Total Private Direct Holdings: Multifamily Mortgage Holdings**
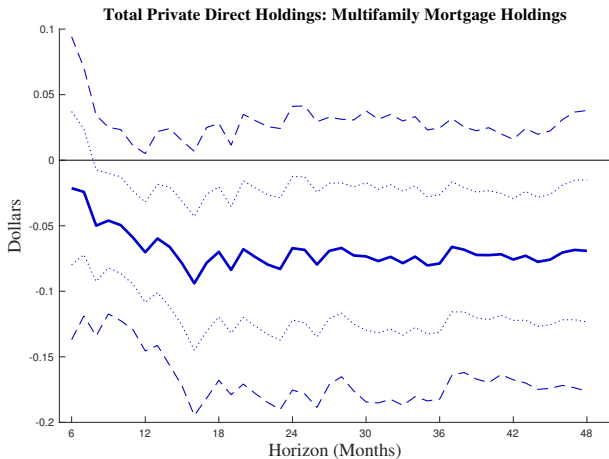
Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

▸ Back

# GSE Purchases Increase Business Loan Spreads
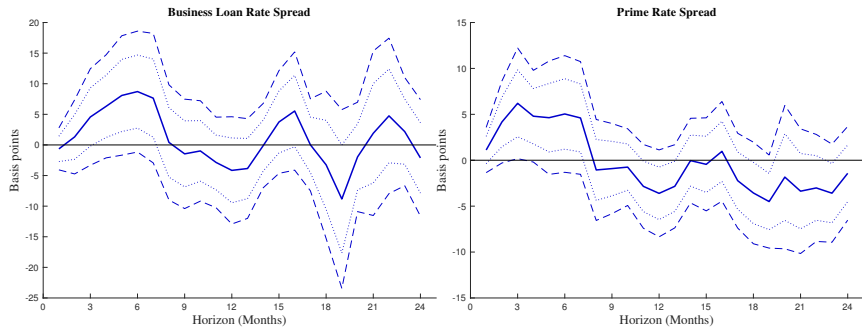


Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

▶ Back

# Response to GSE Purchases: Residential Originations
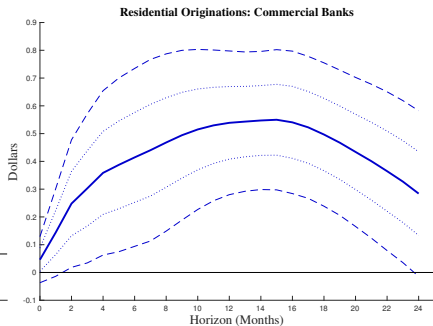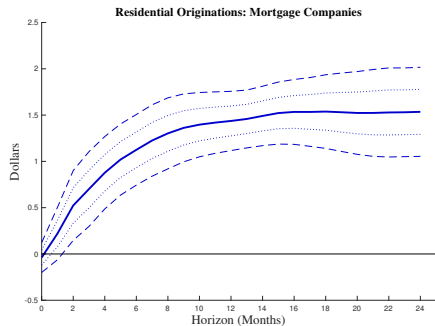


**Residential Originations: Mortgage Companies**

**Residential Originations: Commercial Banks**

Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands. Sample: Jan 1971-Dec 1995.

▸ Flows Regression Specification    ▸ Back

# Response to GSE Purchases: Nonresidential Originations
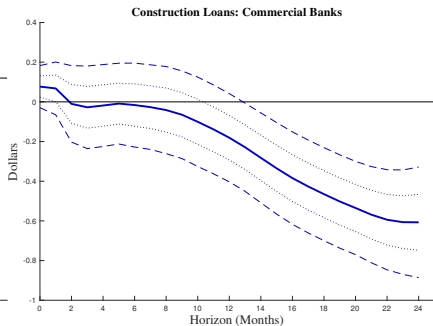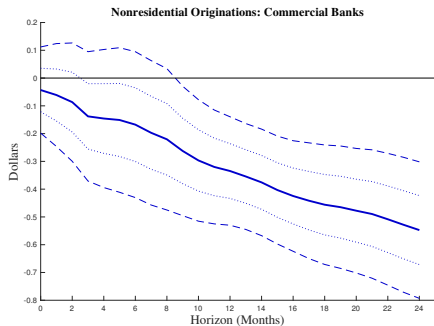


Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands. Sample: Jan 1971-Dec 1995.

▸ Back

# Mortgage Transaction Responses to GSE Purchases

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

$$\sum_{j=0}^{h} f_{t+j} = \alpha_h + \beta_h \frac{\sum_{j=0}^{h} p_{t+j}}{X_t} + \phi_h(L)Z_{t-1} + u_{t+h} \tag{3}$$

$p_t$: actual GSE purchases

$\beta_h$: credit multiplier for horizon $h$, estimated by OLS

$X_t$: trend real personal income

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 to GSE Purchases: Agency Securities
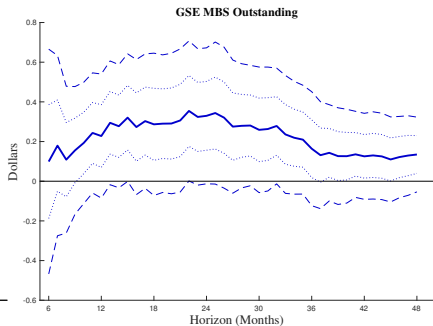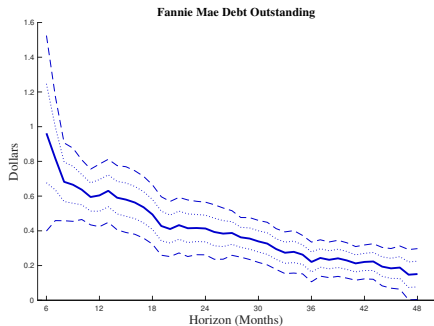


**Fannie Mae Debt Outstanding**

**GSE MBS Outstanding**

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

# Response to GSE Purchases: International Capital



**Total Foriegn Net Purchases of Agency Securities**

**Foriegn Private Net Purchases of Agency Securities**
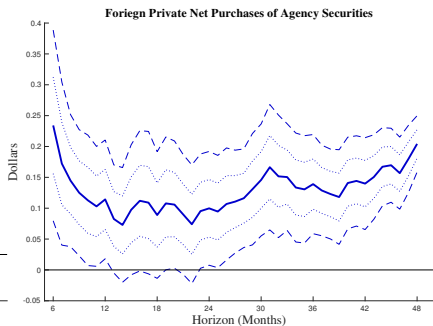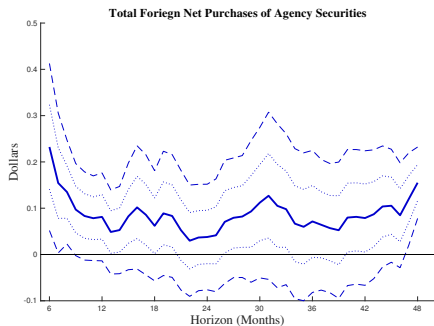
Notes: U.S. cyclical controls dropped. Finer lines are 68% and 95% Newey and West (1987) confidence bands.
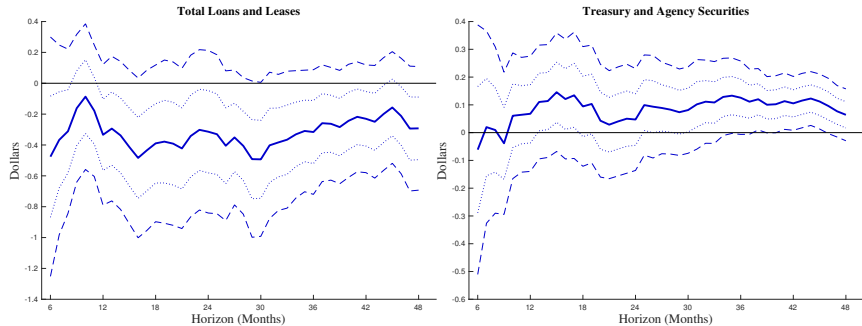Sample: August 1979 – December 2006.

▸ Back

# Response to GSE Purchases: Ginnie Mae MBS

**Ginnie Mae MBS Outstanding**
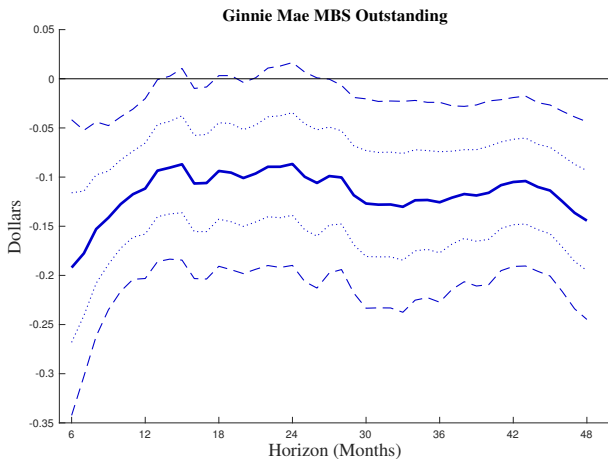


Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands.

Sample: January 1972 - December 2006.

# GSE Purchases Alter Commercial Bank Asset Holdings



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

# GSE Purchases Reduce Mortgage Spreads
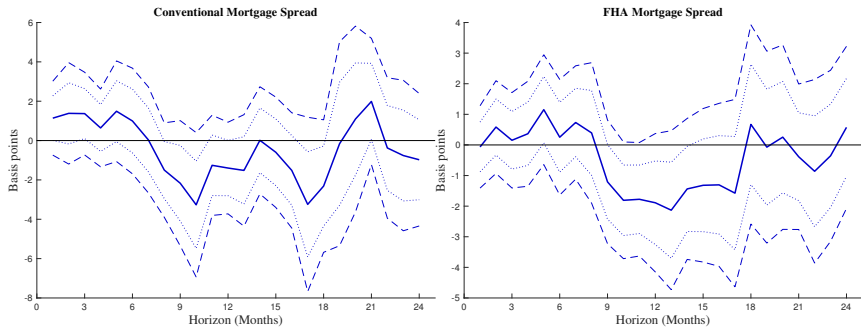


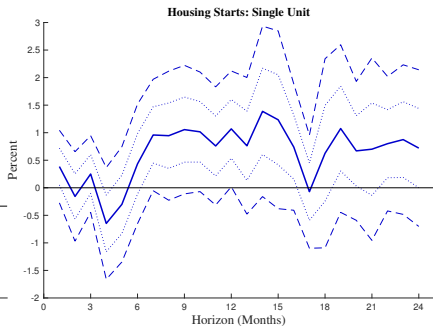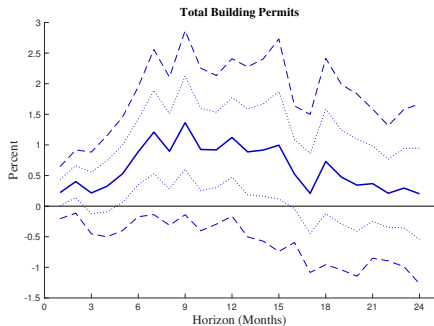Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

# 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
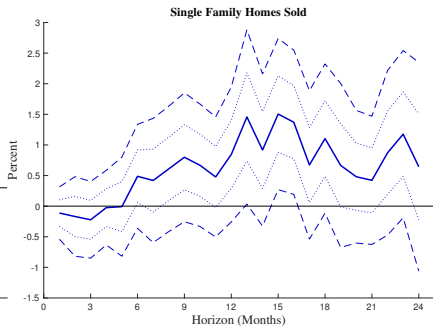
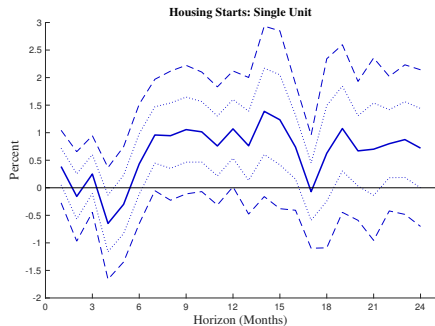# Response of Building Permits, Housing Starts to Shocks



**Total Building Permits**

**Housing Starts: Single Unit**

Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands
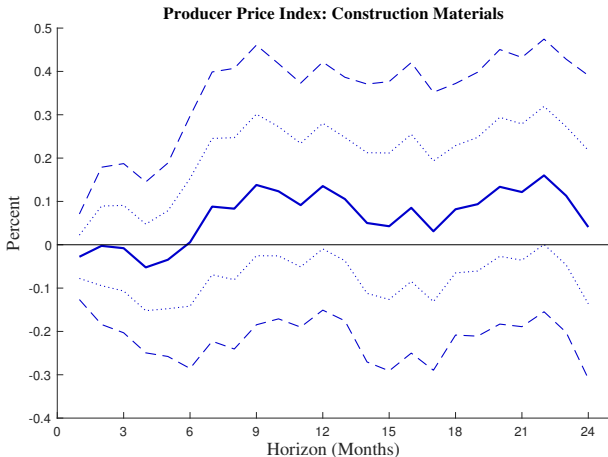
▸ Housing Starts vs. New Home Sales    ▸ Back

# Response of Housing Starts, New Home Sales to Shocks



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

▸ Back

# Construction Material Prices Unaffected by GSE Purchases
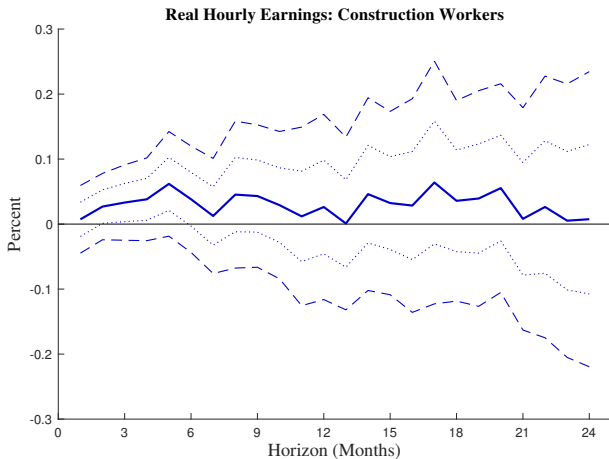


**Producer Price Index: Construction Materials**

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

# Construction Wages Unaffected by GSE Purchases



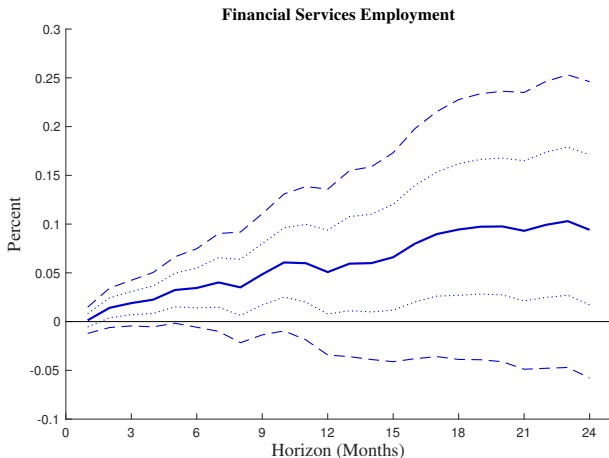Notes: Finer lines are 68% and 95% Newey and West (1987) confidence bands

# Total Employment Response to GSE Purchases



**Total Employment**

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

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# Financial Services Employment Response to GSE Purchases



**Financial Services Employment**

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

# LP-OLS Regression Specification

Dollar change in loan volume $y_t$ at horizon $h$ is estimated iteratively by:

$$\frac{y_{t+h} - y_{t-1}}{X_t} = a_h + b_h \frac{\sum_{j=0}^{h} o_{t+j}}{X_t} + \phi_h(L)W_{t-1} + u_{t+h} \tag{4}$$
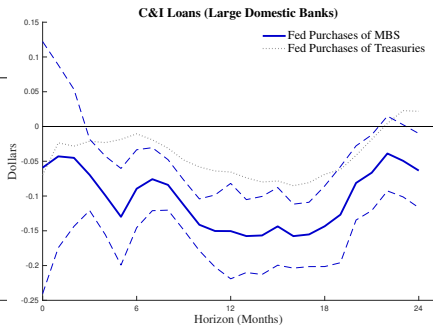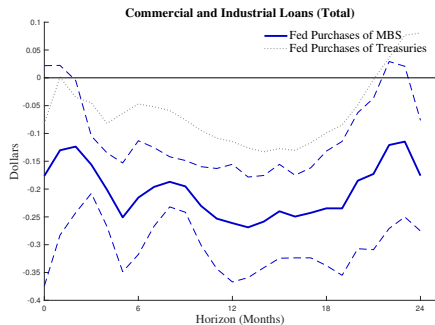
$o_t$: Fed purchases of agency MBS or Treasuries

$b_h$: credit multiplier for horizon $h$, estimated by OLS

$X_t$: trend real personal income

Controls $W_t$: 6 lags of $o_t/X_t$, $y_t/X_t$, GSE retained portfolio holdings, agency MBS held by third parties, growth of CPI, housing starts, and industrial production, federal funds rate, 10-year Treasury rate, conventional mortgage spread, BAA-AAA spread, QE event indicator
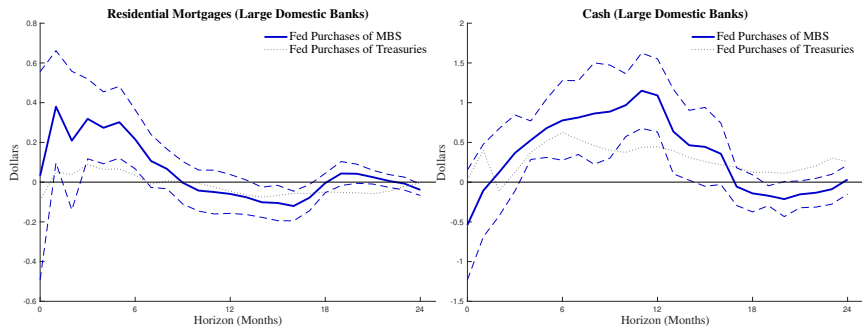
# Local Projections Responses to Fed Purchases



Notes: Finer dashed lines are 95% Newey and West (1987) confidence intervals.

Sample: January 2008 - March 2018

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# Local Projections Responses to Fed Purchases



Notes: Finer dashed lines are 95% Newey and West (1987) confidence intervals.

Sample: January 2008 - March 2018

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