Haircut Shocks: policy lever?

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EIEF, March 11, 2025

Central Bank Refinancing Operations

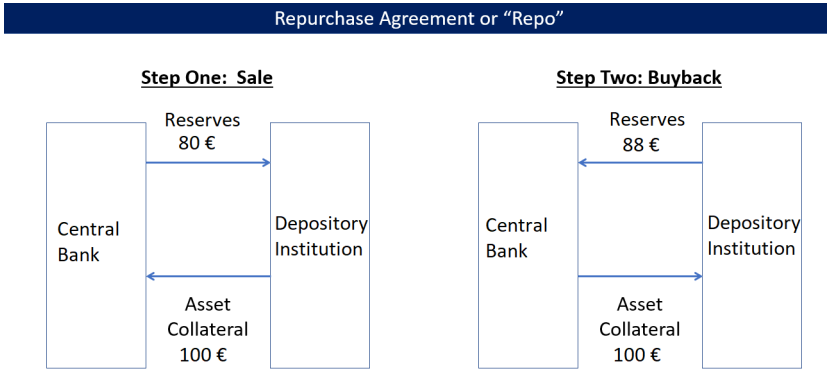

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Figure: Repurchase Agreement. (Ex. ECB’s MRO, FED’s Temporary OMOs)

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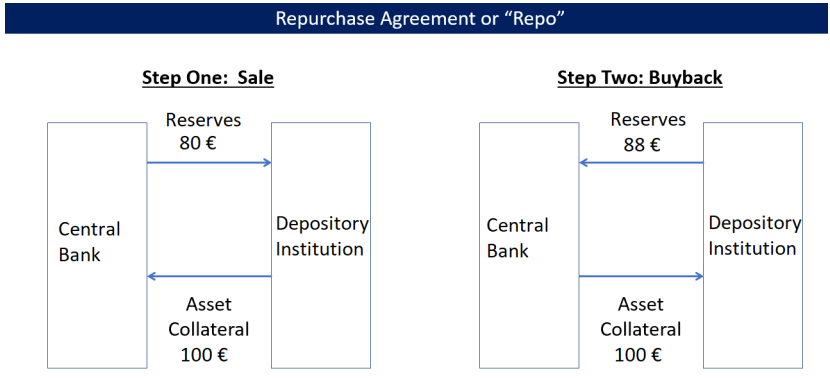

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Figure: Repurchase Agreement. (Ex. ECB's MRO, FED's Temporary OMOs)

- REPO rate 10% = Monetary Policy Rate
- Haircut 20% = Another policy lever?

Motivation

In the wider context:

- **Refinancing Operations** are the most widely used tool for **liquidity provision**, classic function of a central bank to:
  - alleviating liquidity squeezes in the banking sector
- Central Banks operate according to the **separation principle**
  - monetary policy stance: primary goal of inflation & employment stabilization.
  - central bank liquidity: address financial stability.
- Effects on **each other goals** via e.g. general equilibrium effects
  - Both policies operate via the banking sector

$\Rightarrow$ **How do shocks to the provision of central bank liquidity transmit to the macroeconomy?**

This Paper

How does a shock to the provision of central bank liquidity transmit to the macro economy?

- Construct a **novel statistic** capturing the gap between ECB and Private Market Haircut.

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  3. **Bank Bond Spreads** $\Downarrow$, **Systemic Risk Indicators** $\Downarrow$.
  4. **Effects** on Yield Curve and Money Market Dispersion Index $\neq$ **Monetary Policy Shock**.

Contribution to the literature

Large VAR literature on identification of monetary policy shocks
e.g. Bernanke (1992); Christiano et al. (1996); Coibion (2012); Gertler and Karadi (2015); Antolin-Diaz and Rubio-Ramirez (2018),...
$\Longrightarrow$ Focus on Central Bank Liquidity, Haircut Shocks.

LOLR policies and their effects: Drechsler et al. (2017), Rochet and Vives (2004), Freixas et al. (2010), Stein (2012), Pelizzon et al. (2020), Carpinelli and Crossignani (2021), Jasova et al. (2021), Altavilla et al. (2022); Jasova et al. (2024),...
$\Longrightarrow$ New evidence on the macroeconomic effects of LOLR.

Impact of unconventional monetary policy using VAR models
e.g. Debortoli et al. (2020); Gambetti and Musso (2020); Andrade and Ferroni (2021); Altavilla, Rostagno, Schmaker (2023),...
$\Longrightarrow$ Haircut subsidy as new policy lever.

ECB Liquidity Provision

Institutional Details: Haircut Gap

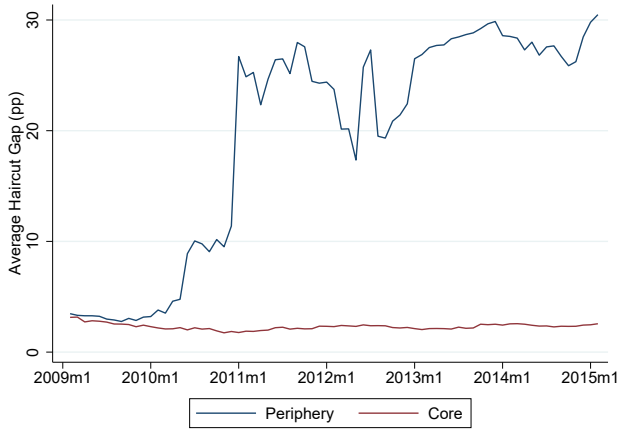
- We use the **haircut gap** as a measure of CB subsidy to borrowers in terms of collateral we define it as:.

$$\text{HaircutGap}_{s,t} = \text{private market haircut}_{s,t} - \text{ECB haircut}_{s,t}$$

  security s in month t.

- micro-level data on ECB and private repo markets: 300+ EA banks; 20,000+ bonds

Average haircut gap for securities issued in core and periphery



Prior to GFC: haircuts applied by the ECB similar to private market haircuts on repo loans.
Afterwards: ECB haircuts significantly below that of the private repo markets.

Shock Identification 1: Granular IV

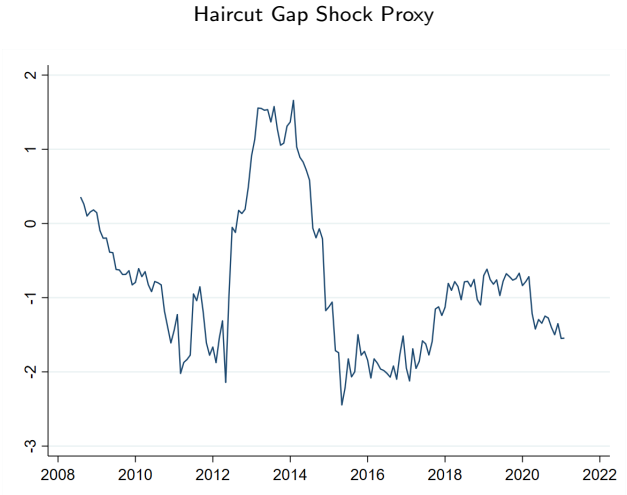
Based on the Granular IV literature, we extract security/bank-level idiosyncratic components through:

$$\text{HaircutGap}_{security,bank,t} = \alpha_{country/bank,t} + \varepsilon_{security,bank,t}$$

The procedure is designed to absorb all the aggregate, country and bank specific variation over time.

$$\text{Liquidity Shock}_t = \sum_{security,bank} \varepsilon_{security,bank,t} \frac{\text{Amount Pledged}_{security,bank,t-1}}{\text{Total Amount Pledged}_{t-1}}$$

Shock Identification 1: Granular IV



Granularity Source: (i) Each security has a highly skewed distribution towards certain holders. (ii) Highly-skewed distribution on the liquidity demand side.

Shock Identification 2: Narrative Restrictions

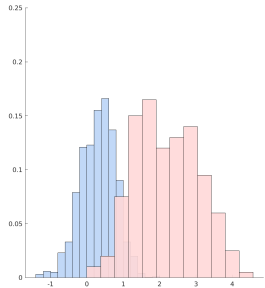
1 **Assumption:** use proxy as an "Informative Variable":
- **Mostly** exogenous to other shocks.
- **Mainly varying** due to our central bank liquidity shock.

2 **Refine** by adding **Narrative restrictions** (see Antolín-Díaz and Rubio-Ramírez (2018)):

- **January 2011** - First downgrade of Greek Government Bonds by rating agency to High Yield Bond level.
  - We impose the shock positively impact our informative variable on that date and explains most of its variation.
- **December 2011** - Date of announcement of the 3 year vLTRO
  - We impose that the shock positively impacts our informative variable.
- **Robustness: June 2014** - Date of announcement of the first TLTRO.
  - We impose that the shock positively impacts our informative variable.

Shock Identification 2: Narrative Restrictions

Shock Distribution on Narrative Dates



(a) January 2011

Shock Identification 2: Narrative Restrictions

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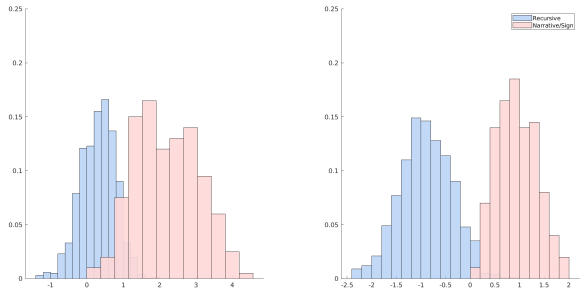


(a) January 2011 (b) Dacember 2011

Blu bars: Shock identified through recursive ordering. Red Bars: Shock identified through Narrative Restrictions

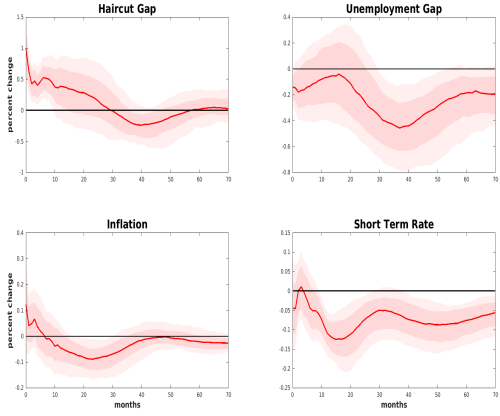
▸ Shocks Time-Series

Outline of Results

- Baseline
- Credit Spreads
- Bank Bond Spreads, SRISK, Market Inefficiency
- Compare Haircut vs MP Shock
  - Zoom in on Yield Curve
- Further Results

Results: Baseline

Haircut Gap Effects: Baseline Zoom-in



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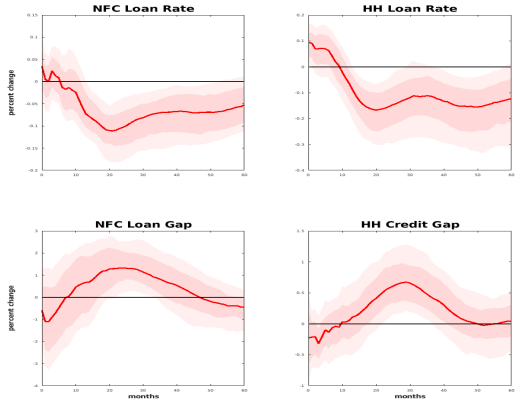
Monthly BVAR. Sample 2009M1-2020M2. **Expansionary** effects on Unemployment. Marginal on Inflation. **No effects** on EONIA.

▸ Recursive/Narrative

Results: Bank Credit

Transmission: NFC and Household Credit



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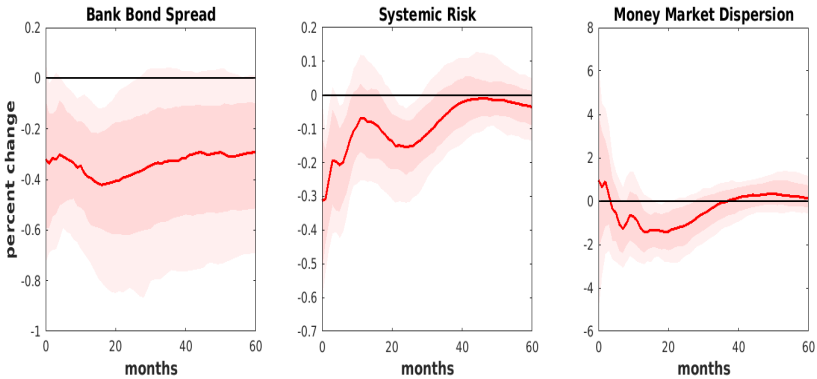
Expansionary Effects on Credit Amounts and Loan Rates.

▶ Hybrid VAR

Bank Funding and Financial Stability

Haircut Gap Effects: Bank Bond Spreads and Systemic Risk



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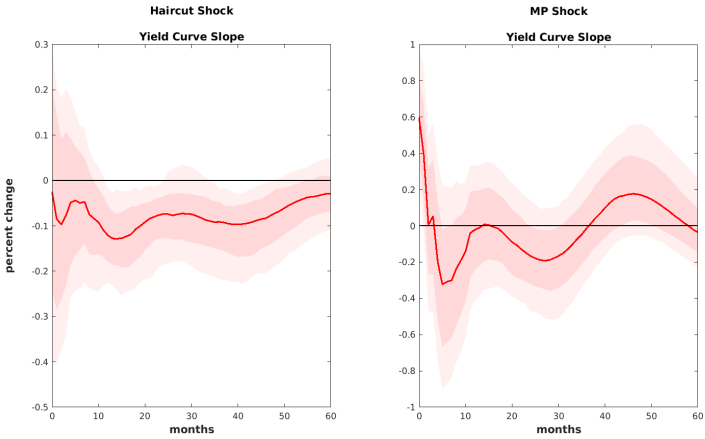
Expansionary effect on Bank Bond Spread and SRISK (Brownlees and Engle (2017)). No impact on Money Market Dispersion (Duffie and Krishnamurthy (2016)).

▸ Recursive: SRISK ▸ Recursive: MM Disp Index

Haircut Gap VS Monetary Policy Shocks

Haircut Gap and Monetary Policy Shocks: effects on Yield Curve



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Expansionary Haircut Shock yield curve flattens. Expansionary MP Shock: yield curve steepens

▸ Recursive ▸ More Results

More Results

Financial Stability Indicators:

a CDS Spreads (Senior & Junior Tranches)

b KMV Expected Default Probabilities (Corporate & Banks)

- Respond positively and significantly to Haircut Shocks.
- Junior CDS tranches and Corporate KMV PDs respond significantly more

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Money Market Dispersion Index:

- Contractionary Haircut Shock **does not affect it**.
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Robustness - Bank Level Results:

- Run Bank Level Regressions of log(Credit) on Haircut Shocks.
- Time, Bank and Country/Time FE.
  - Log(NFC Credit) responds positively to Haircut shocks.
  - Log(HH Credit) responds positively and by more to Haircut shocks.

Recursive: Excess Liquidity

Conclusion

- Haircut Shocks are **an effective policy lever** for Central Banks:
  - Unemployment, Inflation.
  - NFC and HH Credit.
  - Bank Financial Soundness and Systemic Stability

- **Different from conventional policy rate shocks:**
  - Affects medium term of YC rather than short term.
  - Contractionary Haircut Shocks **do not** Money Market Dispersion.

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- **Next Steps:**
  - Leverage micro-level data to explore heterogeneity in effects and asymmetries.
  - Construct shift-share instrument combining exposure with aggregate shock.
  - Conduct inference on banks credit provision and stability.

THANKS!

APPENDIX

References I

Antolín-Díaz, J. and Rubio-Ramírez, J. F. (2018). Narrative sign restrictions for svars. *American Economic Review*, 108(10):2802–29.

Brownlees, C. and Engle, R. F. (2017). SRISK: A conditional capital shortfall measure of systemic risk. *Review of Financial Studies*, 30(1):48–79.

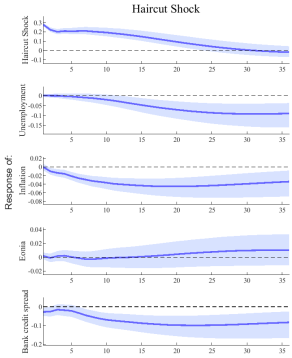
Duffie, D. and Krishnamurthy, A. (2016). Passthrough efficiency in the fed's new monetary policy setting. In *Designing Resilient Monetary Policy Frameworks for the Future. Federal Reserve Bank of Kansas City, Jackson Hole Symposium*, pages 1815–1847.

Gabaix, X. (2011). The granular origins of aggregate fluctuations. *Econometrica*, 79(3):733–772.

Gilchrist, S. and Mojon, B. (2018). Credit risk in the euro area. *The Economic Journal*, 128(608):118–158.

Haircut Gap Shock

Haircut Gap Effects: Baseline and Credit Spreads



(a) Baseline

Haircut Gap Shock

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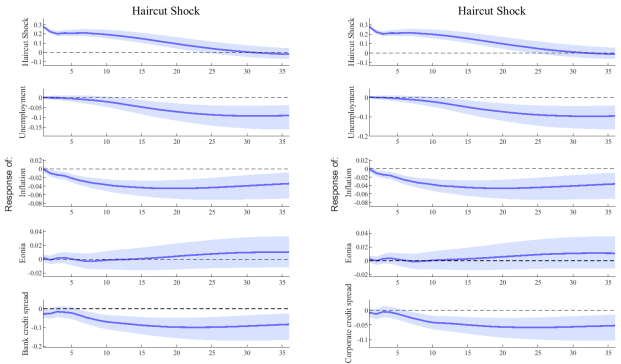

(a) Baseline

(b) NFC Credit Spread

Haircut Gap Shock

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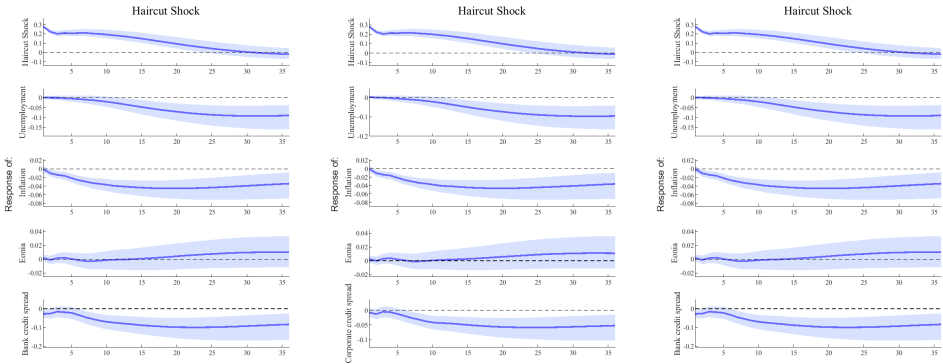

(a) Baseline (b) NFC Credit Spread (c) Bank Credit Spread

Positive Effects on Unemployment and Credit Spreads.

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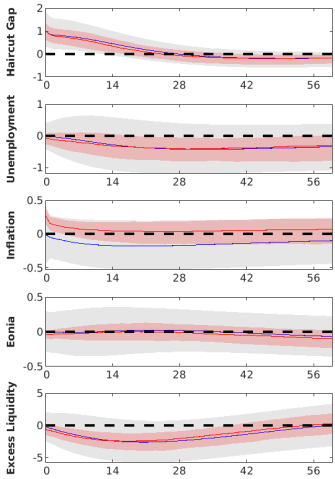
Haircut Gap VS MP Shock - Excess Liquidity

Baseline Specification + Excess Liquidity



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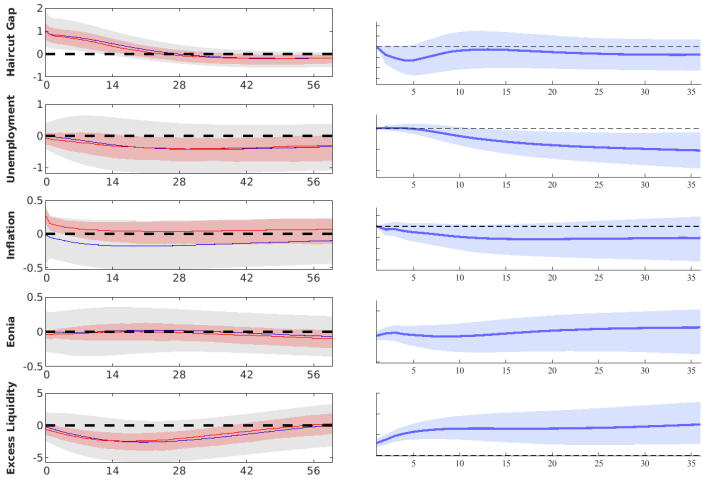

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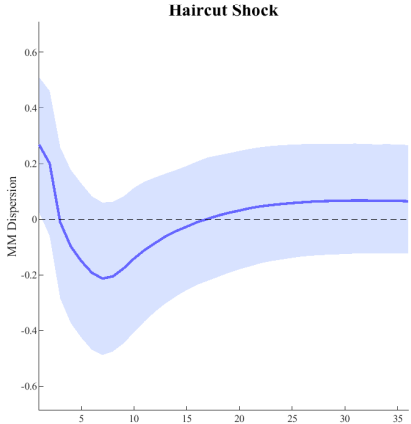
(b) MP Shock

Money Market Dispersion Index

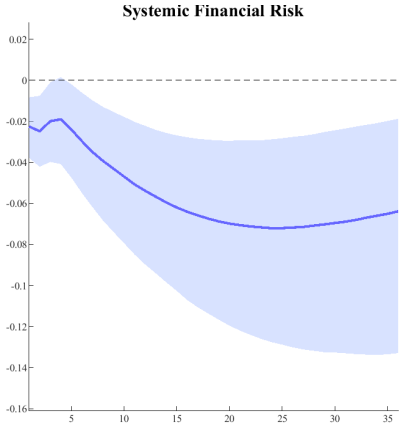
Money Market Dispersion Index (Duffie and Krishnamurthy (2016))



Index of rate dispersion in U.S. short-term money markets,the weighted mean absolute deviation of the cross-sectional distribution of overnight-equivalent rates, after adjusting for premia associated with credit risk and term structure.

Financial Stability Indicators: Systemic Risk

Baseline + Systemic Financial Risk (Brownlees and Engle (2017))



SRISK measures the conditional capital shortfall in case of a systemic event: $CS_{it} = k(A_{it}) - W_{it} = k(D_{it} + W_{it}) - W_{it}$, with k prudential capital, A assets, W equity, D debt, $SRISK_t = \sum_i \mathbb{E}_t(CS_{it+h} \mid Rm_{t+1:t+h} < C)$, Brownlees and Engle (2017).

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Excess Liquidity

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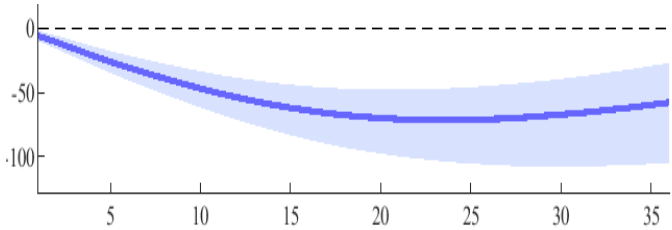

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Haircut Gap VS MP Shock - Money Market Dispersion Index

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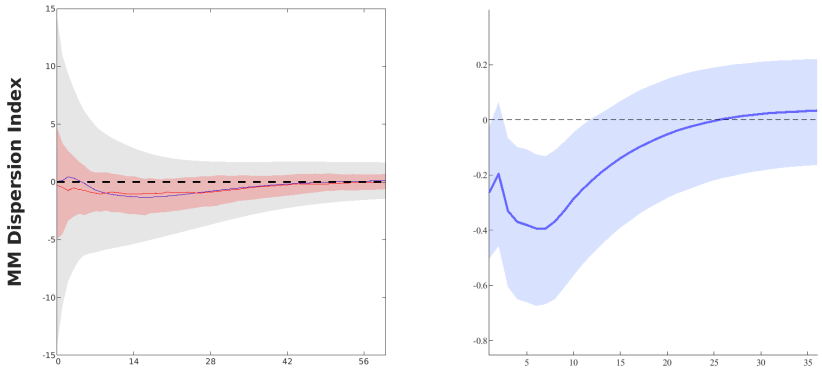

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(b) MP Shock

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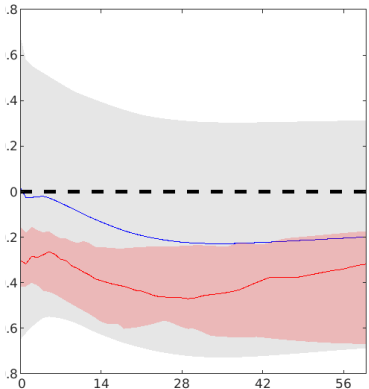
back

Haircut Gap VS MP Shock - Yield Curve

Baseline Specification + 10Y-3M Yield Curve Spread



(a) Haircut Shock

Haircut Gap VS MP Shock - Yield Curve

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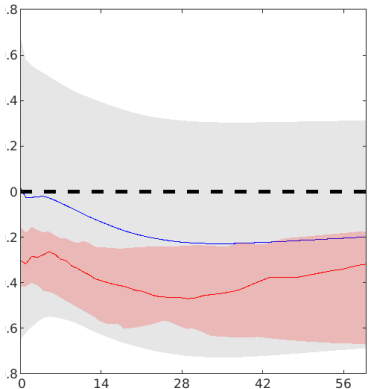

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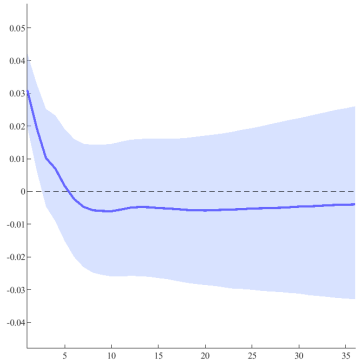

(b) MP Shock

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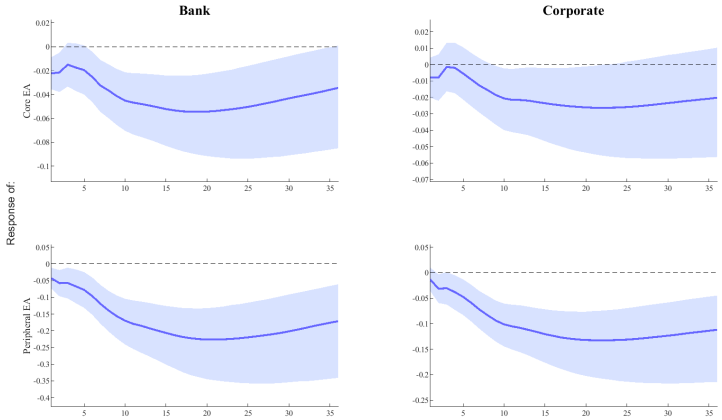
Credit Spreads Core VS Peripheral EA

Baseline + Credit Spreads (Gilchrist and Mojon (2018))



▸ NSR VAR ▸ back

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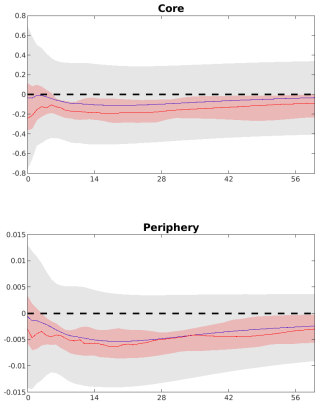
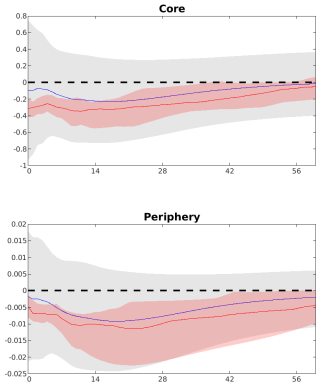


(a) Bank Credit Spreads



(b) Corporate Credit Spreads

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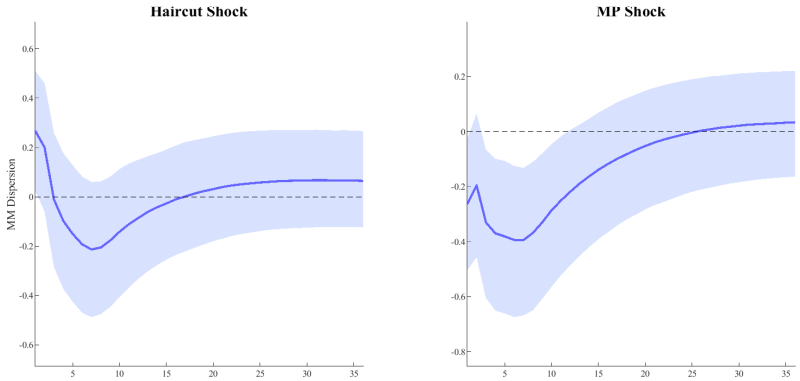
Haircut Gap VS MP Shock - Money Market Dispersion Index

Baseline + Money Market Dispersion index (Duffie and Krishnamurthy (2016))



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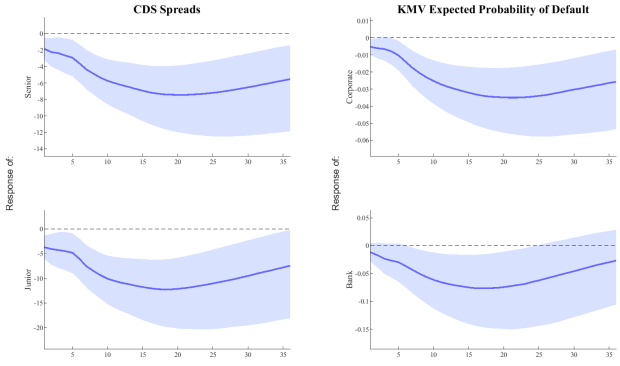
▸ NSR Var ▸ back

Financial Stability Indicators

Baseline + Financial Stability Indicators



Markit CDS Indices covering 25 senior (CDS senior) and junior subordination (CDS subordinate) European banks measured in basis points. Expected Default Frequencies are defined as: $EDF = \mathbb{P}_t(V_t \leq D_t)$.

back

Bank-level Regressions - Methodology

- Merge bank-level haircut gaps with monthly unconsolidated bank balance sheet data.
- Explore effects on lending.

$$log(\text{credit}_{b,t}) = \alpha_b + \alpha_{c,t} + \beta \text{HaircutGap}_{b,t-1} + \gamma X_{b,t} + \epsilon_{b,t}, \tag{1}$$

with:

$$\text{HaircutGap}_{b,t} = \frac{\sum_s \left(\text{HaircutGap}_{s,t} \times Q_{b,s,t=2008m8}\right)}{\text{total assets}_{b,t-1}}, \tag{2}$$

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Bank-level Regressions - Results

Table: LOLR lending Effects: credit to the private sector

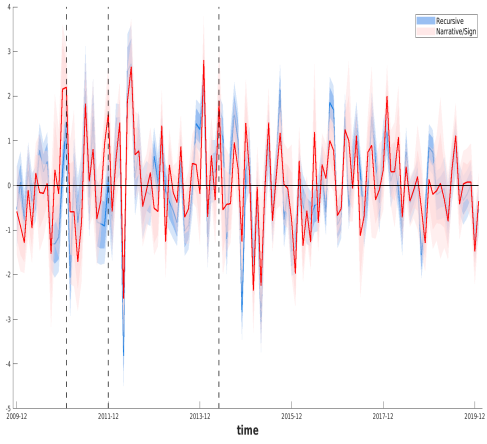
	$log\,(NFC\ credit_{b,t})$		$log\,(HH\ credit_{b,t})$	
	(1)	(2)	(3)	(4)
$HaircutGap_{b,t-1}$	0.0250^{***}	0.0265^{***}	0.0358^{**}	0.0508^{***}
	(0.00605)	(0.00850)	(0.0178)	(0.0175)
Time FE	Yes	No	Yes	No
Bank FE	Yes	Yes	Yes	Yes
Country $\times$ Time FE	No	Yes	No	Yes
N	7,612	7,612	7,154	7,154
R^2	0.997	0.998	0.998	0.999

Notes: This table presents coefficients from the credit regressions, as described in equation (1).The reported coefficients are standardized. Standard errors are clustered at the bank and time level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

▸ Core VS Periphery ▸ back

Shock Identification 2: Narrative Restrictions

Recursive vs NR Shocks.



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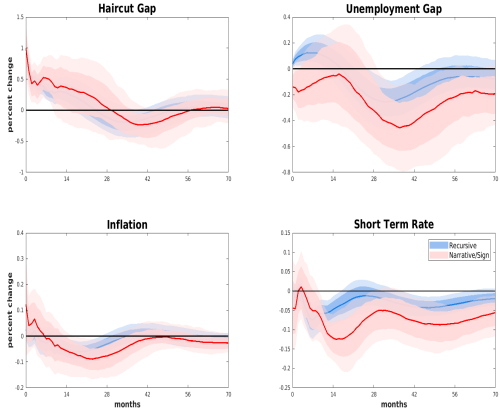
Haircut Gap Shock: Recursive vs Narrative

Haircut Gap Effects: Baseline Zoom-in



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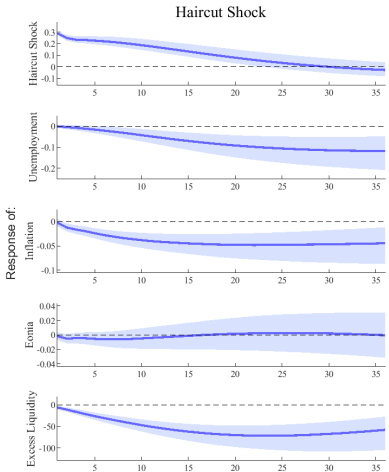
Monthly BVAR. Sample 2009M1-2020M2. **Expansionary** effects on Unemployment. Marginal on Inflation. **No effects** on EONIA.

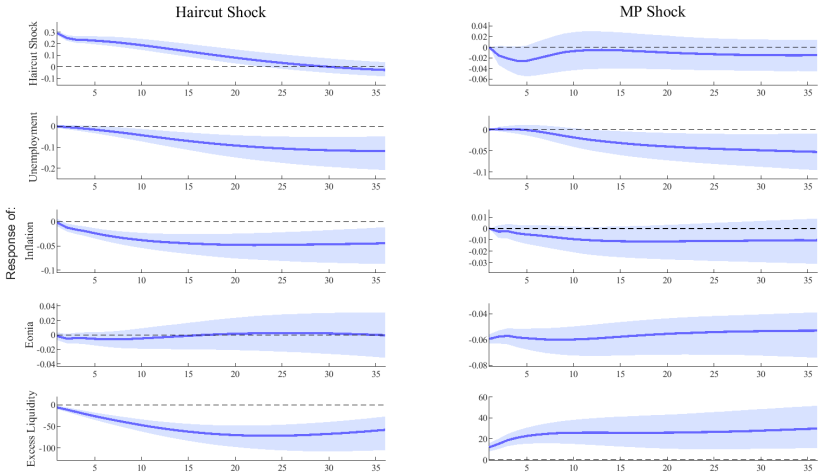
Haircut Gap VS MP Shock - Excess Liquidity. Hybrid VAR.

Baseline Specification + Excess Liquidity



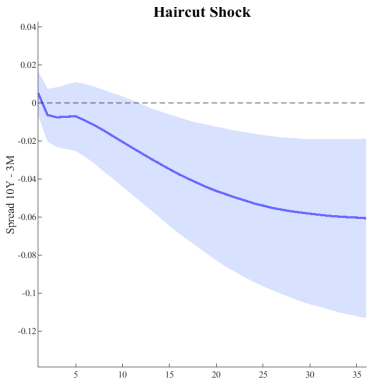
Haircut Gap VS MP Shock - Excess Liquidity. Hybrid VAR.

Baseline Specification + Excess Liquidity



Haircut Gap VS MP Shock - Yield Curve

Baseline Specification + 10Y-3M Yield Curve Spread



Haircut Gap VS MP Shock - Yield Curve

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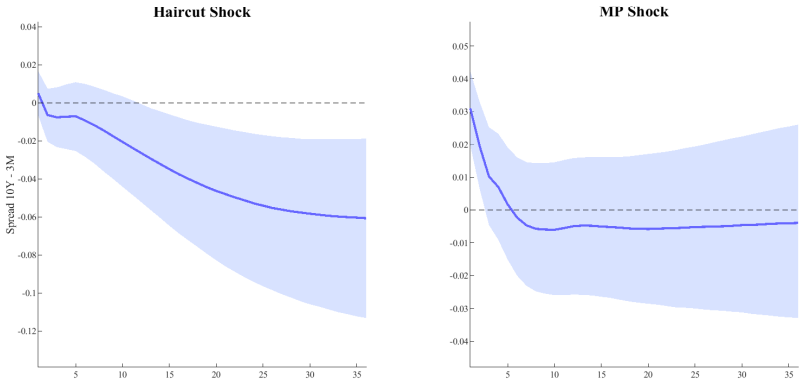

back Full VAR