Why do central banks make public announcements of open market operations?

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Summary

- Central banks adjust supply of liquidity using open market operations (OMOs) to affect short-term interest rates
  - The 'liquidity effect' of OMOs in the US estimated to be between 1 basis point (bps) and 3 bps per $ 1 billion of liquidity injected (Hamilton, 1997; Carpenter and Demiralp, 2008)
- Why do prominent central banks also choose to make public announcements of OMOs?
  - This paper uses Canadian OMO data to argue that such announcements improve transparency in the funding liquidity market

Mechanism

- Unexpected OMO announcements signal higher-than-expected system-wide demand for liquidity today...
  - OMO announcements are credible public signals of aggregate funding conditions:
    1. Overnight loans are largely traded in over-the-counter (OTC) markets
    2. OTC markets are characterised by limited pre- and post-trade transparency
- ...leading market participants to expect higher funding needs tomorrow...
  - Funding liquidity conditions exhibit persistence (Bulusu and Guérin, 2019)
- ....resulting in higher overnight lending rates after a surprise OMO announcement
  - The table below reports median 24-hour change in overnight lending rates (in bps) when expectations of OMOs differ significantly from outcomes (values highlighted in **bold** are significant at the 95% level or higher)

OMO?	E(Pr OMO)	GoC repo rate	CMB repo rate	PRV repo rate
Yes	≤ 0.33	**59.39**	**105.51**	45.25
No	> 0.67	**-48.04**	**-85.34**	-36.60

Context

- OMO announcements are part of the central bank communication toolkit (along with speeches, reports, forecasts, forward guidance, etc.)
  - How do CBs use different forms of communication to achieve their objectives?
- Central banks intervene in other OTC markets (e.g., currency, sovereign bond lending)
  - What drives decision to make announcements of different CB operations?

Empirical strategy

1. Form market expectations of OMO (key to measuring information in OMO announcement)
   - Bank of Canada (BoC) provides transparency around OMO auctions:
     - Conducted when prevailing overnight rates are judged 'too far' from target
     - Proportional allocation at target rate (in sample period) up to a maximum of C$ 1.5 billion per operation
     - Summary statistics communicated to dealers at conclusion of auction, and to the public (on external website) shortly thereafter
   - Use (publicly-observed) determinants of demand and supply of funding liquidity to estimate market expectations of OMO on day
2. Deviations from expectations provide new information about system-wide liquidity demand
3. Relate information revealed to changes in loan rates and volumes after announcement
   - Time-stamped data allow separating overnight loans transacted before and after OMO announcement and thus accurately calculate loan rate changes

Empirical model

- X is a vector of variables (observed by market) relevant to BoC OMO decision
  - Indicators of demand and supply of funding liquidity: previous OMO volume, balances of market participants at central bank, volume and cost of overnight loans up to scheduled time of OMO
- OMO occurs (E=1) if $\psi + \theta^{'} X \geq 0$; $E = 0$ otherwise
- Market infers unexpected information $OMO\_Comms = \mathbb{E}(\psi|E)$
- Assumptions:
  - Step 1: $\psi_i \sim \mathcal{N}(0, \sigma^2)$
  - Step 2: $\mathbb{E}(y_i|\psi_i) = \pi\psi_i$, where y_i is dependent variable

Estimation following the two-step conditional event study method proposed by Prabhala (1997)

- Step 1: obtain $\hat{\theta}$ by estimating the model

$$E = 1 \text{ if } \psi + \theta^{'} X \geq 0$$
$$E = 0 \text{ if } \psi + \theta^{'} X < 0$$

- Step 2: use $\hat{\theta}$ to run the regression

$$\Delta y \; = \; \pi\lambda(\theta^{'} X) + Controls + \epsilon$$

What drives expectations of OMOs?

Results from the first-stage probit estimation (coefficients highlighted in **bold** are significant at the 95% level or higher):

Persistence of OMOs	$OMOInd_{t-1}$	**0.83**
	$OMOVol_{t-1}$	3.23 $\times 10^{-10}$
System-wide liquidity at end of previous day	$OverdraftLVTS_{t-1}$	-1.70$\times 10^{-9}$
	$CumBalLVTS_{t-1}$	**-3.63** $\times 10^{-10}$
Prevailing liquidity conditions prior to OMO	$GoCRepoVol_t^{0.5hPreOMO}$	4.62 $\times 10^{-10}$
	$GoCRepoSpr_t^{0.5hPreOMO}$	**22.77**
	$UnsecVol_t^{0.5hPreOMO}$	5.33 $\times 10^{-11}$
	$UnsecSpr_t^{0.5hPreOMO}$	0.71
	$RGAllot_t$	**8.49** $\times 10^{-11}$
	$RGSpr_t$	**19.46**

OMO announcement effect

Unexpected announcement of OMOs raises cost of overnight loans. Consistent with higher demand for liquidity raising repo rates, GoC repo volume increases with $OMOVol$.

- Results of the second-stage regression when the dependent variable is the 24-hour change in overnight lending rate and volume (coefficients highlighted in **bold** (*italics*) are significant at the 95% (90%) level or higher):

	GoC repo rate	CMB repo rate	GoC repo vol	CMB repo vol
OMO_Comms	**3.47** $\times 10^{-3}$	**6.16** $\times 10^{-3}$	1.77 $\times 10^{8}$	1.90 $\times 10^{8}$
$OMOVol$	*-4.54* $\times 10^{-12}$	-4.15 $\times 10^{-12}$	**1.57**	0.18

Does announcement of OMO volume also improve transparency?

Modified empirical model

- Adapt the Prabhala (1997) framework to surprises in OMO loan size
  1. Run first-stage Tobit regressions to obtain expectations of OMO volume (truncated due to limits on size of operation)
  2. Surprise in OMO loan amount ($OMOVol\_Comm$) measured as the difference between realized and expected OMO volume
  3. Run second stage regression of 24-hour changes in overnight loan rates and volumes on $OMOVol\_Comm$

Step 1: Predictors of OMO volume

Results from the first-stage Tobit estimation (coefficients highlighted in **bold** (*italics*) are significant at the 95% (90%) level or higher):

Persistence of OMOs	$OMOInd_{t-1}$	**0.59**
	$OMOVol_{t-1}$	*0.37*
System-wide liquidity at end of previous day	$OverdraftLVTS_{t-1}$	-1.18
	$CumBalLVTS_{t-1}$	**-0.33**
Prevailing liquidity conditions prior to OMO	$GoCRepoVol_t^{0.5hPreOMO}$	0.33
	$GoCRepoSpr_t^{0.5hPreOMO}$	**17.99**
	$UnsecVol_t^{0.5hPreOMO}$	0.17
	$UnsecSpr_t^{0.5hPreOMO}$	0.61
	$RGAllot_t$	**0.07**
	$RGSpr_t$	**15.11**

Step 2: Effect of surprises in OMO volume

Unexpectedly high OMO volume raises cost of overnight funding. This is accompanied by GoC repo volumes that increase with OMO volume. (All dependent variables are 24-hour changes; coefficients highlighted in **bold** (*italics*) are significant at the 95% (90%) level or higher).

	GoC repo rate	CMB repo rate	GoC repo vol	CMB repo vol
$OMOVol\_Comms$	**1.83** $\times 10^{-12}$	**2.78** $\times 10^{-12}$	-0.06	0.04
$OMOVol$	0.64 $\times 10^{-12}$	4.80 $\times 10^{-12}$	**1.76**	*0.43*

References

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