

# Intervening against the Fed

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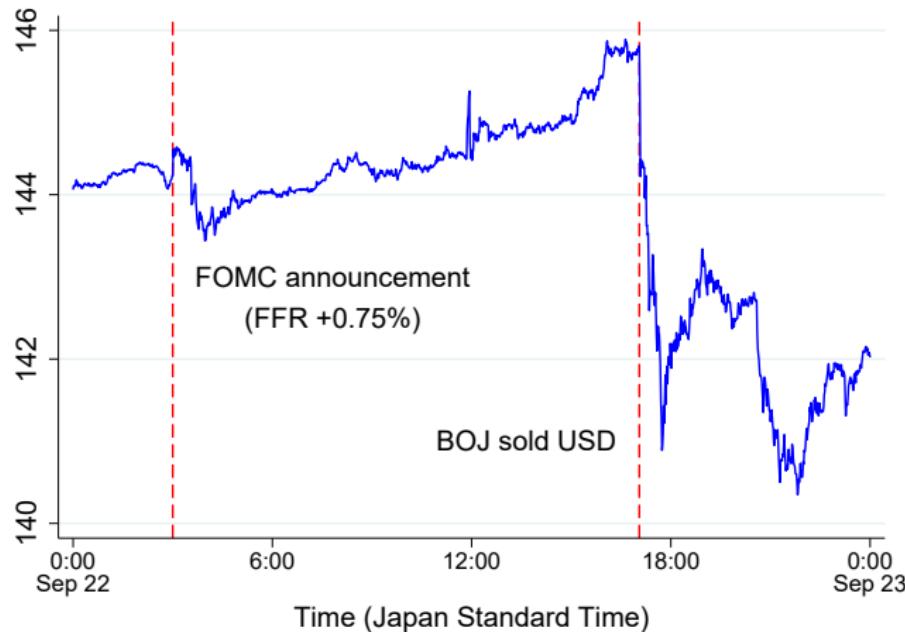


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\*Disclaimer: The views expressed in the paper are solely those of the authors and do not necessarily represent the views of the Federal Reserve Board or the Federal Reserve System.

# Japanese Intervention against Fed: September 22, 2022

Figure 1: Spot Exchange Rate: 1USD = JPY



Note: Higher value implies dollar appreciation / yen depreciation.

# Summary

## Question:

- How does US monetary policy spill over to other countries?
- Can FXI mitigate the effect of US monetary shocks?
- What's the channel through which FXIs work?

## Method:

- Event study using US monetary surprise
- Daily FXI, exchange rate, firm-level stock price and currency denomination of balance sheet in a panel of multiple countries
- Identify FXI via deviation from estimated FXI rule

Result: When the Fed hikes unexpectedly,

- **No FXI**  $\Rightarrow$  Local currency depreciates + stock price of firms with dollar debt decreases
- **FXI**  $\Rightarrow$  Exchange rate and stock price are fully stable, only firms with dollar debt benefit from FXI  
 $\Rightarrow$  US monetary policy spills over through balance sheet channel, but FXI can prevent it

# Literature

- Spillover of US Monetary Policy
  - Rey (2015), Miranda-Agricino and Rey (2020), Kalemli-Özcan (2019), Gürkaynak et al. (2021), Dedola et al. (2017, 2021), Degasperi et al. (2023).....
- ⇒ High-Frequency **response** cross-section of firms' stock returns
  - In spirit of cycle Gürkaynak et al. (2022) and Anderson and Cesa-Bianchi (2023) for US
- Foreign Exchange Intervention
  - Theory: Gabaix and Maggiori (2015), Cavallino (2019), Amador et al. (2020), Fanelli and Straub (2021), Itsikhoki and Mukhin (2022), Hassan et al. (2022)
  - Empirics: Fatum and Hutchison (2010), Kuesteiner et al. (2018), Adler et al. (2019), Fratzscher et al. (2019)
- ⇒ Firm-level effect of daily FXI interventions

# Data Source

- Period: 2000-2019, 13 countries, 4,060 firms
  - Argentina, Australia, Brazil, Chile, Colombia, Costa Rica, Georgia, Hong Kong, Japan, Mexico, Peru, Switzerland, and Turkey
  - Criteria: daily FXI data is available + intervened against US dollar
- Daily FX intervention: central bank website, FRED, individual contacts
- US monetary shock: Nakamura and Steinsson (2018)
- Exchange rate and stock returns: Datastream
- Balance sheet (currency denomination of debt): Capital IQ
- Fundamentals: Worldscope, OECD Input-Output Table

► Summary statistics

► FXI Frequency

► Sample firms

► Firm Selection Criteria

► Capital IQ Data

# Estimation of FXI Policy Rule

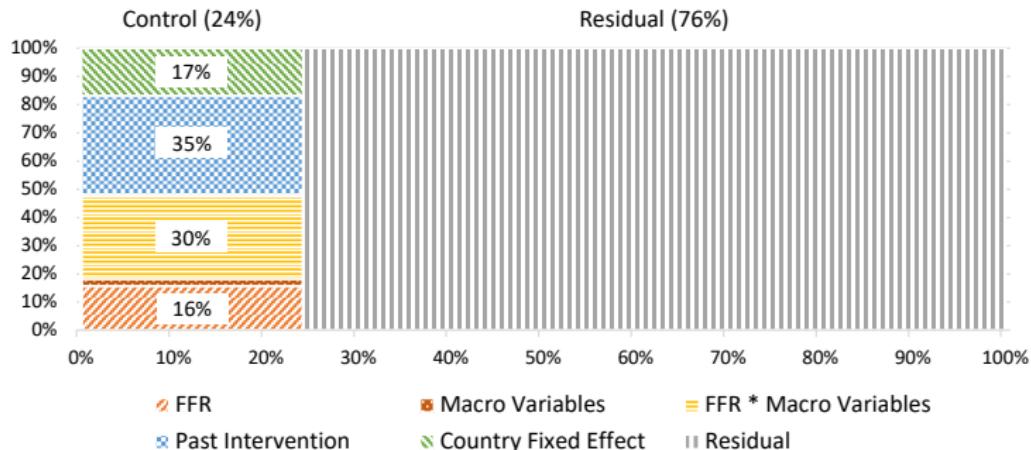
- Identify direct effect of interventions by exploiting deviations from FXI policy rule

$$\widetilde{FXI}_{c,t} = \alpha + \sum_c \beta_c (FFR_t \times \gamma_c) + \delta Z_{c,t} + \gamma_c + \epsilon_{c,t}. \quad (1)$$

- $\widetilde{FXI}_{c,t}$ : Counter-intervention indicator
  - 1 if FFR  $\uparrow$  on date  $t$ , CB sells but does not buy USD b/w  $t$  and  $t+5$
  - 1 if FFR  $\downarrow$  on date  $t$ , CB buys but does not sell USD b/w  $t$  and  $t+5$
- $FFR_t$ : US monetary shock on date  $t$  ( $FFR_t \uparrow =$  US tightening)
- $Z_{c,t}$ : Controls
  - Past trend and volatility of exchange rate, past intervention, macro variables (policy rate, GDP, CPI inflation, unemployment rate, trade balance over GDP ratio), macro variables  $\times$  FFR shock
- $\gamma_c$ : Country FE

# Estimation of FXI Policy Rule

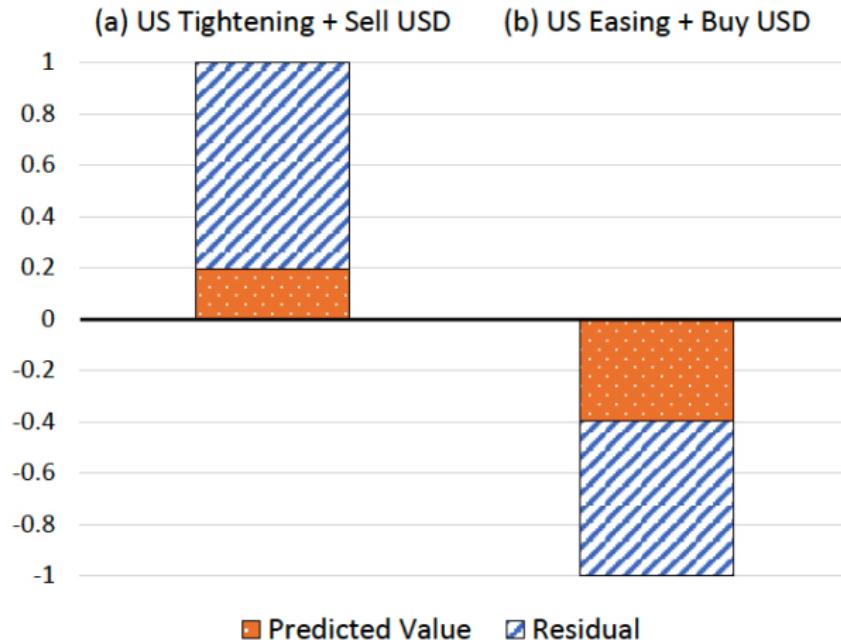
Figure 2: Variance Decomposition for Counter-Intervention



- 76% of variation in counter-intervention cannot be explained.
- FXI is **unexpected** if residual from estimating policy rule (1) is larger than the median in absolute value

# Estimation of FXI Policy Rule

Figure 3: Example for Estimating Policy Rule



- FXI is **unexpected** if the residual is large enough.

# US Monetary Policy Spillover

- Testing for the balance sheet channel
  - Depreciation driven reduction in net worth for firms with Dollar debt
  - Exploit heterogeneity across **firms** with and without Dollar debt **within country**
- Estimate for countries with and without FXI separately:

$$y_{i(c),t+h} - y_{i(c),t-1} = \gamma_h \text{FFR}_t \times \text{USD}_{i(c),y-1(t)} + \mathbf{X} \delta_x^h + \alpha_{i(c)} + \alpha_{c,t}^h + \epsilon_{i(c),t}^h \quad (2)$$

- $y_{i(c),t+h}$ : stock price,  $\forall h \in [-5, 5]$
- $\text{FFR}_t$ : US monetary shock on date  $t$  ( $\text{FFR}_t \uparrow = \text{US tightening}$ )
- $\text{USD}_{i(c),y-1(t)}$ : Dollar debt indicator
- $\mathbf{X}$ : controls
  - **Firm-level**: total asset, export intensity, liquidity over asset ratio, firm age,
  - **Industry-level**: import content of production + interaction with FFR shock
- $\alpha_{i(c)}$ : firm FE,  $\alpha_{c,t}^h$ : **country-time FE**

(a) Without Intervention

Dependent variable:	$\Delta \text{Stock Price}_{i(c),t}$			
	Dollar Debt	No Dollar Debt	Both	
	(1)	(2)	(3)	(4)
FFR Shock <sub>t</sub>	-0.660*** (0.117)	-0.094** (0.045)	-0.097** (0.045)	
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			-0.314*** (0.087)	-0.259*** (0.071)
$R^2$	0.093	0.032	0.031	0.083
N	1,926	103,155	105,114	105,114
Firm FE	✓	✓	✓	✓
Country × Date FE				✓

(b) With Intervention

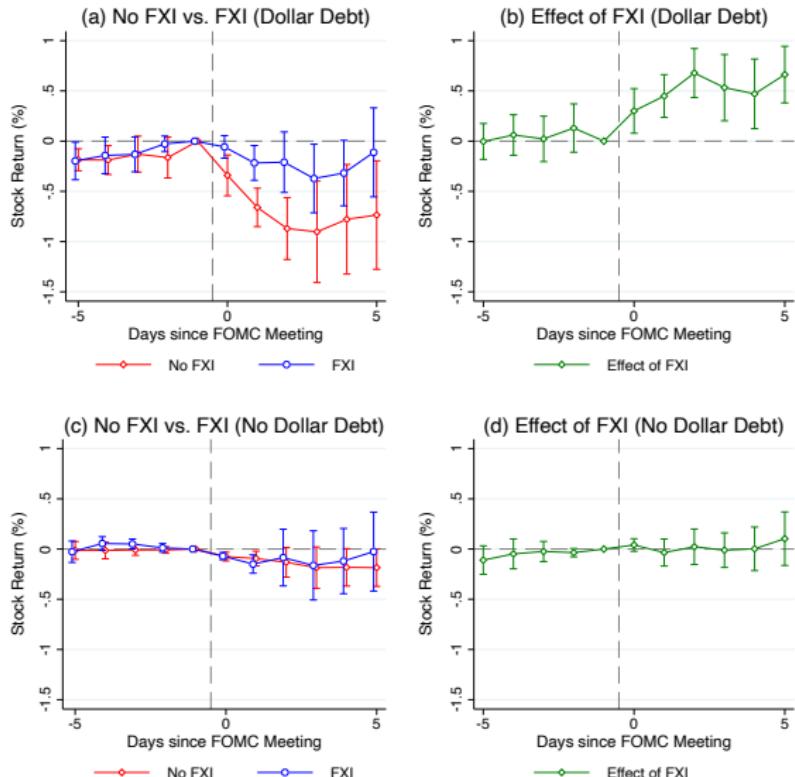
Dependent variable:	$\Delta \text{Stock Price}_{i(c),t}$			
	Dollar Debt	No Dollar Debt	Both	
	(1)	(2)	(3)	(4)
FFR Shock <sub>t</sub>	-0.217** (0.105)	-0.149*** (0.056)	-0.158** (0.061)	
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			-0.001 (0.042)	-0.033 (0.035)
$R^2$	0.114	0.209	0.194	0.270
N	1,258	9,915	11,178	11,178
Firm FE	✓	✓	✓	✓
Country × Date FE				✓

- **No FXI**  $\Rightarrow$  US monetary spillover via balance sheet channel
  - 10bp tightening shock associated with  $\approx 6\%$  decline if no FXI
- **FXI**  $\Rightarrow$  spillover is mitigated

Table 5: Stock Price: Effect of Intervention

Dependent variable:	$\Delta \text{Stock Price}_{i(c),t}$			
	Dollar Debt	No Dollar Debt	Both	
	(1)	(2)	(3)	(4)
FFR Shock <sub>t</sub>	-0.647*** (0.116)	-0.093** (0.045)	-0.096** (0.045)	
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	0.449*** (0.130)	-0.035 (0.082)	-0.042 (0.079)	
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			-0.310*** (0.083)	-0.259*** (0.070)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			0.324*** (0.093)	0.232*** (0.067)
$R^2$	0.091	0.033	0.033	0.086
N	3,206	113,534	116,754	116,754
Firm FE	✓	✓	✓	✓
Country × Date FE				✓

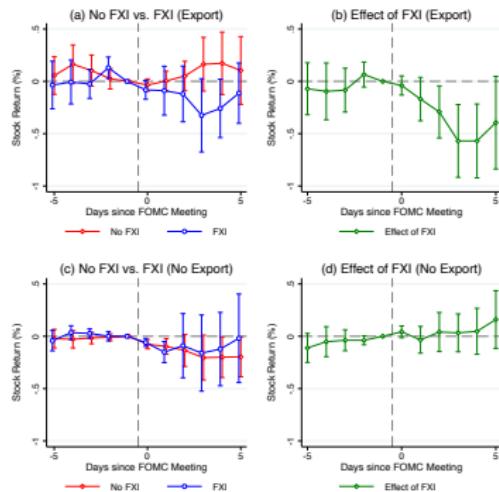
- FXI mitigates the stock price decline of firms with dollar debt.



- FXI has persistent effect on stock price for firms with dollar debt.

# Expenditure Switching Channel

- Depreciation effect of US tightening may boost exports, but also negative demand effects (Gourinchas, 2018)
- FXI mutes the depreciation effect without mitigating demand channel



- FXI harms exporters but the effect is small

► Balance Sheet Channel

# Identification: Debt Maturity

Table 7: Stock Price: Maturity of Dollar Debt

Dependent variable:	$\Delta \text{Stock Price}_{i(c),t}$			
	Benchmark (1)	Matures 2Q (2)	Matures 3Q (3)	Matures 1Y (4)
FFR Shock <sub>t</sub>	-0.103* (0.052)	-0.111** (0.053)	-0.109** (0.053)	-0.109** (0.053)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	-0.035 (0.094)	-0.026 (0.092)	-0.028 (0.092)	-0.028 (0.093)
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>	-0.310*** (0.103)	-0.552** (0.228)	-0.660*** (0.176)	-0.585*** (0.132)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>	0.326** (0.127)	0.540* (0.318)	0.564** (0.279)	0.560*** (0.174)
$R^2$	0.033	0.033	0.033	0.033
N	116,757	116,757	116,757	116,757
Firm FE	✓	✓	✓	✓

- Debt maturity structure is orthogonal to exchange rate
- Debt matures 2 quarters / 3 quarters / 1 year around FOMC events
- Larger effect on stock price due to increased debt rollover cost

# Exchange Rate

- Balance sheet channel implies that US monetary policy contraction depreciates domestic exchange rate

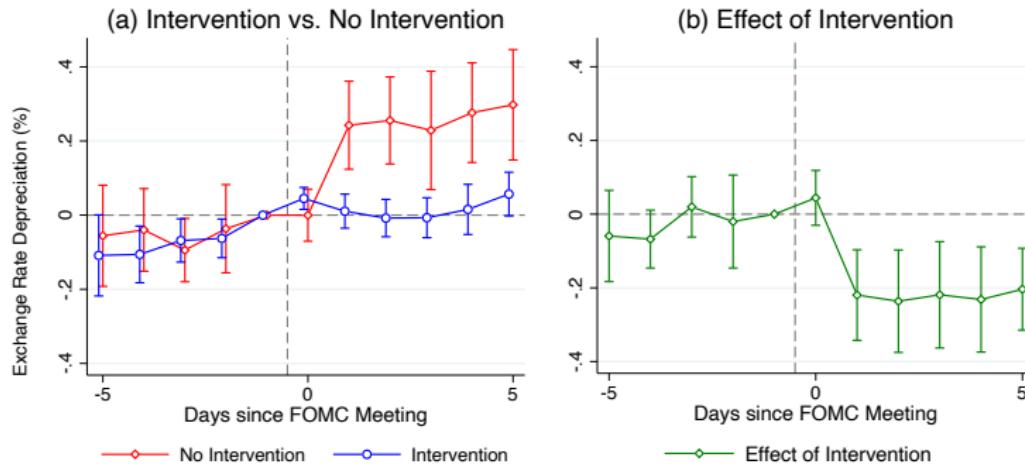
Table 6: Exchange Rate: Baseline Regression

Dependent Variable:	$\Delta \text{Exchange Rate}_{c,t}$		
	No Intervention (1)	Intervention (2)	Both (3)
FFR Shock <sub>t</sub>	0.225*** (0.069)	0.004 (0.021)	0.201** (0.072)
Intervention <sub>c,t</sub>			0.266 (0.155)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>			-0.202** (0.072)
$R^2$	0.108	0.083	0.084
N	418	417	836
Country FE	✓	✓	✓

When the Fed funds rate increases,

- **No FXI**  $\Rightarrow$  local depreciation / USD appreciation
- **FXI**  $\Rightarrow$  little effect

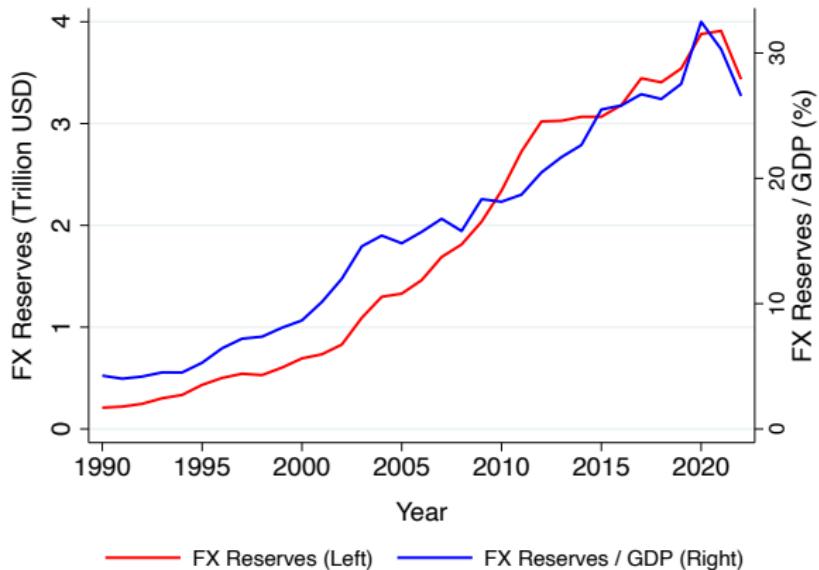
10bp tightening shock associated with  $\approx 2\%$  depreciation if no FXI



- FXI has persistent effect on exchange rate over time.

# Accumulation of FX Reserves

Figure 4: FX Reserves in Sample Countries



- FX reserves grew by more than 16 times from 1990 to 2022.

# Foreign Exchange Reserves

Table 7: FX Reserves

Dependent variable:	$\Delta \text{Exchange Rate}_{c,t}$		$\Delta \text{Stock Price}_{i(c),t}$			
	FX reserve:		Large	Small	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)
FFR Shock <sub>t</sub>	0.252*** (0.065)	0.122 (0.071)	-0.075 (0.067)	-0.126 (0.094)		
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	-0.298*** (0.089)	-0.161* (0.080)	-0.108 (0.079)	0.162 (0.143)		
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			-0.387** (0.151)	-0.261*** (0.086)	-0.352*** (0.108)	-0.230*** (0.079)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>			0.418** (0.172)	0.137 (0.112)	0.317*** (0.118)	0.201* (0.102)
R <sup>2</sup>	0.121	0.149	0.053	0.051	0.109	0.098
N	422	413	90,860	25,880	90,860	25,880
Country FE	✓	✓				
Firm FE			✓	✓	✓	✓
Country × Date FE					✓	✓

- FXI is more effective in countries with larger FX reserves
- FX reserves have a self-insurance role

▶ Graph of FX Reserve Accumulation

# Currency Risk Hedging

Table 9: Stock Price: Numbers of Hedged and Unhedged Firms

	(1) Total firms	(2)	(3)
		Hedged firms Corr(exchange, stock) > 0	Unhedged firms Corr(exchange, stock) < 0
(a) Dollar Debt	261	64	195
(b) No Dollar Debt	3709	2409	1378
(c) Export	501	462	38
(d) No Export	3559	2011	1535

- Define hedged firms if  $\text{Corr}(\text{stock}, \text{exchange}) > 0$   
(stock price  $\uparrow$  when \$ appreciates)
  - 75% of firms with dollar debt are unhedged.
  - 63% of exporters are hedged.
- 4/261 firms with dollar debt are exporters (most of them are not naturally hedged).

# Currency Risk Hedging

Table 10: Stock Price: Exclude Hedged Firms

	(1)	(2)	(3)
FFR Shock <sub>t</sub>	-0.111* (0.064)	-0.104** (0.051)	-0.111* (0.064)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	-0.054 (0.115)	-0.025 (0.093)	-0.040 (0.116)
FFR Shock <sub>t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>	-0.293*** (0.101)	-0.318*** (0.107)	-0.297*** (0.104)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub> × Dollar Debt <sub>i(c),y-1(t)</sub>	0.288*** (0.103)	0.333** (0.146)	0.281** (0.127)
<i>R</i> <sup>2</sup>	0.032	0.033	0.032
N	49,665	101,768	48,912
Excluding Hedged Firms	✓		✓
Excluding Exporters		✓	✓

- The result is robust after excluding hedged firms, exporters, or both.

# Robustness Checks

- ① Intensive and extensive margins of dollar debt
- ② Alternative definition for unexpected counter-intervention
- ③ Size of intervention
- ④ Control for daily policy rate to study sterilized intervention
- ⑤ Include zero FFR shock dates
- ⑥ Exclude global financial crisis and ZLB
- ⑦ Control for monetary policy expectation (government bond yield)
- ⑧ Standard risk factor (market beta)
- ⑨ Control for international sales and asset
- ⑩ Currency denomination of stock price
- ⑪ Lower-frequency effect of FXI

► Intensive margin

► Stock price

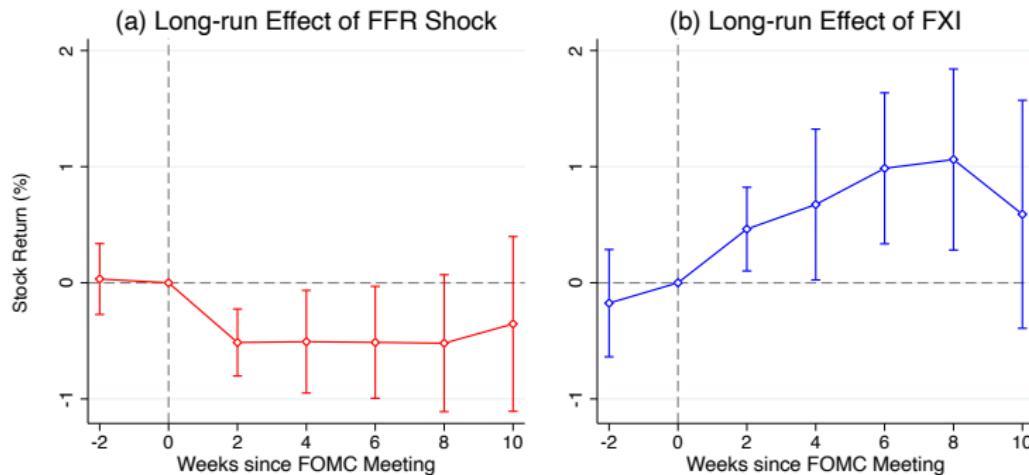
► Exchange rate

► Weight by firm numbers

► Exclude one country (stock)

► Exclude one country (exchange)

# Lower-Frequency Effect of FXI



- Effect of FFR shock and FXI are persistent over 6 to 8 weeks (1.5 to 2 months).

# Conclusion

- Identification of spillover of US monetary policy by using high-frequency US monetary shock and **firm-level data**
- Estimate **deviation from FXI policy rule** to understand how interventions can help countries insulate against spillover
- Contractionary US monetary policy depresses stock prices of firms with dollar debt
  - Balance sheet channel of exchange rates through depreciation
- Counter-interventions ⇒ Mutes balance sheet channel
- FXI can be a tool insulate countries from global financial cycle.
- Buildup of reserves over last decades reduces US spillover effects
- Important to understand general equilibrium implications and optimality of policy (IMF's integrated policy framework)

# Appendix

# Summary Statistics

Table 1: Summary Statistics: FFR shock, exchange rate, and stock price

	Mean	Med	S.D.	p5	p95	Obs
(1) FFR shock (basis point)	0.015	-0.48	1.81	-3.1	3.75	90
(2) Exchange rate (% change, $\log(e_{c,t+1}) - \log(e_{c,t-1})$ )	0.04	0	0.72	-1.37	1.29	875
(3) Stock price (% change, $\log(p_{i,t+1}) - \log(p_{i,t-1})$ )	0.02	0	3.48	-5.61	5.71	124,559

Note:  $t$  is the FOMC announcement date.  $e_{c,t+1}$  is the exchange rate in country  $c$  at date  $t + 1$ . Higher  $e_{c,t+1}$  implies the appreciation of US dollar or depreciation of local currency.  $p_{i,t+1}$  is the stock price of firm  $i$  at date  $t + 1$ . The stock price is in terms of local currency. Observations are the number of FOMC announcement dates (row 1), country times FOMC announcement dates (row 2), and firm times FOMC announcement dates (row 3).

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Table 2: Interventions around 90 FOMC event dates in sample

Country	Frequency			FXI Volume (Millions USD)		Periods
	Buy USD (1)	Sell USD (2)	Counter (3)	Mean (4)	Median (5)	
Argentina	59	45	15	86	52	2003-2019
Australia	0	2	2	19	19	2000-2019
Brazil	11	1	8	165	114	2009-2019
Chile	6	0	4	0.091	0.096	2008-2019
Colombia	34	2	18	19	17	2000-2019
Costa Rica	34	32	3	12	8.1	2006-2019
Georgia	9	12	15	3.9	3.1	2009-2019
Hong Kong	83	58	13	70	12	2000-2019
Japan	4	0	1	0.11	0.15	2000-2019
Mexico	0	24	7	27	22	2000-2011
Peru	72	51	26	23	4.3	2000-2019
Switzerland	0	0	0	0	0	2000-2001
Turkey	1	1	0	5.9	5.9	2002-2019
Total	312	229	111	45	14	2000-2019

Counteracting intervention = FFR increases at date  $t$  and central banks sell USD at least once and never buy USD between dates  $t$  and  $t + 5$ .

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Table 2: Sample Firms

Country	Total	Dollar Debt	Country	Total	Dollar Debt
Argentina	34	25	Colombia	22	9
Australia	1190	126	Hong Kong	480	42
Brazil	68	21	Japan	2216	4
Chile	3	1	Mexico	48	33
			Total	4060	261

- 261 firms (6%) have dollar debt (14% except Japan).
- Share of dollar debt / total debt = 66%, conditioning on firms with positive dollar debt.
- 501 firms (12%) are exporters (mostly in Japan).
  - Among the firms with dollar debt, four firms are exporters.  
= Firms with dollar debt are not naturally hedged.

# Firm Selection Criteria

Drop firm-year observations with following criteria:\*

- Currency composition of debt is reported.
- Total asset belongs to either top or bottom 1%.
- Direct subsidiary of another firm (to avoid double-count).
- The sum of cash and cash equivalents + tangible assets is greater than total asset.
- The difference between **the total principal due** and **the sum of principal dues of individual debt investment** is greater than 100,000 USD.

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\*The criteria are based on Kim (2019) and Kim et al. (2020).

# Capital IQ Balance Sheet Data

Agrometal S.A.I. (BASE:AGRO) Financials > Capital Structure Details

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<< Return to Capital Structure Summary

Key Stats Income Statement Balance Sheet Cash Flow Multiples Cap. Structure Ratios Supplemental Industry Specific Pension/QRS Segments

Period Type: Annual Source: A 2015 End Mar-10-2016  
Currency: US Dollar Conversion: Historical  
Units: S&P Capital IQ (Default) Decimals: Capital IQ (Default) Go << Fewer Options

Principal Due in Millions of USD  
\*In cases where an interim filing contains less detailed information on components of debt capital structure, we have carried forward information from the previous annual.

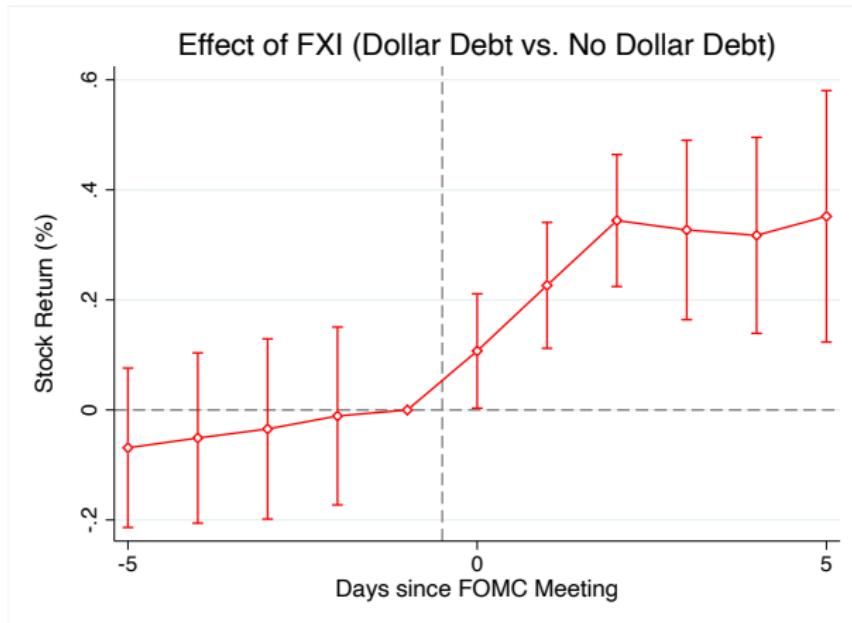
Description	Type	Principal Due (USD)	Coupon/Base Rate	Floating Rate	Maturity	Seniority	Secured	Convertible	Renaming/Comments
Working Capital from Banco Nacion Argentina	Term Loan	2.2	2.450%	NA	Aug-17-2016	Senior	No	No	USD
Working Capital from Banco Nacion Argentina	Revolving Credit	0.6	25.050%	NA	Sep-18-2015	Senior	No	No	ARS
Working Capital from Banco Nacion Argentina	Revolving Credit	0.0	25.050%	NA	Oct-30-2015	Senior	No	No	ARS
Working Capital from Banco Nacion Argentina	Revolving Credit	0.1	25.050%	NA	Dec-04-2015	Senior	No	No	ARS
Working Capital from Banco Nacion Argentina	Revolving Credit	0.1	25.050%	NA	Dec-09-2015	Senior	No	No	ARS
Working Capital from Banco Nacion Argentina	Revolving Credit	0.1	23.000%	NA	Mar-01-2016	Senior	No	No	ARS
Working Capital from Bank of The Province of Cordoba S. A.	Revolving Credit	0.2	25.648%	NA	Aug-11-2016	Senior	No	No	ARS
Working Capital from Bank of The Province of Cordoba S. A.	Revolving Credit	0.1	27.050%	NA	Dec-07-2016	Senior	No	No	ARS
Working Capital from Bank of The Province of Cordoba S. A.	Revolving Credit	0.0	37.550%	NA	Jan-09-2016	Senior	No	No	ARS
Working Capital from Bank of The Province of Cordoba S. A.	Revolving Credit	0.0	37.550%	NA	Mar-26-2016	Senior	No	No	ARS
Working Capital from Bank of The Province of Cordoba S. A.	Revolving Credit	0.1	13.750%	NA	Oct-18-2016	Senior	No	No	ARS

Figure: Excerpt of detailed financial statement for Agrometal S.A.I.

- Total debt = **5.6** (millions USD)
- Sum of individual debts =  $2.2 + 0.6 + 0.1 + \dots = 5.6$
- Dollar debt = **2.2**
  - The total debt (from main financial statement) matches the sum of individual debts (from detailed statement).

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# Stock Price (Triple Interaction)



- The effect of FXI is larger for firms with dollar debt.

# Robustness Checks: Stock Price (Intensive Margin)

Table 8: Stock Price: Robustness Checks with Different Definitions with Dollar Debt

Dependent Variable	$\Delta \text{Stock Price}_{i(c),t}$			
	Low \$ Debt (1)	High \$ Debt (2)	All \$ Debt (3)	Continuous \$ Debt (4)
FFR Shock <sub>t</sub>	-0.097** (0.045)	-0.098** (0.046)	-0.099** (0.046)	-0.102** (0.046)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	-0.039 (0.079)	-0.040 (0.080)	-0.041 (0.080)	-0.035 (0.080)
FFR Shock <sub>t</sub> × Dollar Debt	-0.303*** (0.086)	-0.311*** (0.083)	-0.345*** (0.070)	-0.043*** (0.011)
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub> × Dollar Debt	0.293*** (0.082)	0.345*** (0.073)	0.468*** (0.145)	0.044*** (0.010)
$R^2$	0.033	0.033	0.033	0.033
N	116,754	116,754	116,754	116,754
Firm FE	✓	✓	✓	✓

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# Robustness Checks: Stock Price

Table A2: Stock Price: Other Robustness Checks

Dependent Variable	AStruct Price <sub>(t),L</sub>											
	Mean FXI	p75 FXI	FXI Volume	Large FXI	Daily Policy Rate	Zero FFR Shock	Excl. GFC	Excl. ZLB	Bond Yield	Market Beta	Int Asset Sales	Stock Denom.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FFR Shock <sub>t</sub>	-0.108** (0.052)	-0.116** (0.053)	-0.113** (0.054)	-0.103* (0.052)	-0.128** (0.051)	-0.115** (0.053)	-0.111** (0.054)	-0.125* (0.065)	-0.103* (0.052)	-0.117* (0.065)	-0.095* (0.049)	-0.185** (0.082)
FFR Shock <sub>t</sub> × Intervention <sub>v,t</sub>	-0.106 (0.096)	0.110 (0.113)	-0.006 (0.108)	-0.008 (0.132)	0.018 (0.126)	-0.029 (0.098)	-0.018 (0.100)	-0.022 (0.097)	-0.035 (0.094)	0.080 (0.096)	0.003 (0.089)	0.056 (0.130)
FFR Shock <sub>t</sub> × Dollar Debt <sub>(v,t),y-1(t)</sub>	-0.253*** (0.088)	-0.212*** (0.079)	-0.196** (0.081)	-0.316*** (0.103)	-0.276*** (0.101)	-0.294*** (0.102)	-0.312*** (0.106)	-0.306*** (0.111)	-0.310*** (0.103)	-0.307*** (0.105)	-0.323*** (0.104)	-0.383*** (0.121)
FFR Shock <sub>t</sub> × Intervention <sub>v,t</sub> × Dollar Debt <sub>(v,t),y-1(t)</sub>	0.307** (0.124)	0.212* (0.115)	0.076 (0.102)	0.335*** (0.124)	0.293** (0.129)	0.304** (0.124)	0.337** (0.129)	0.323** (0.124)	0.326** (0.135)	0.275** (0.127)	0.331** (0.118)	0.382*** (0.143)
R <sup>2</sup>	0.033	0.033	0.033	0.034	0.034	0.022	0.037	0.036	0.033	0.033	0.034	0.038
N	116,757	116,757	115,226	112,560	109,809	188,394	99,258	85,267	116,757	116,507	110,770	116,757
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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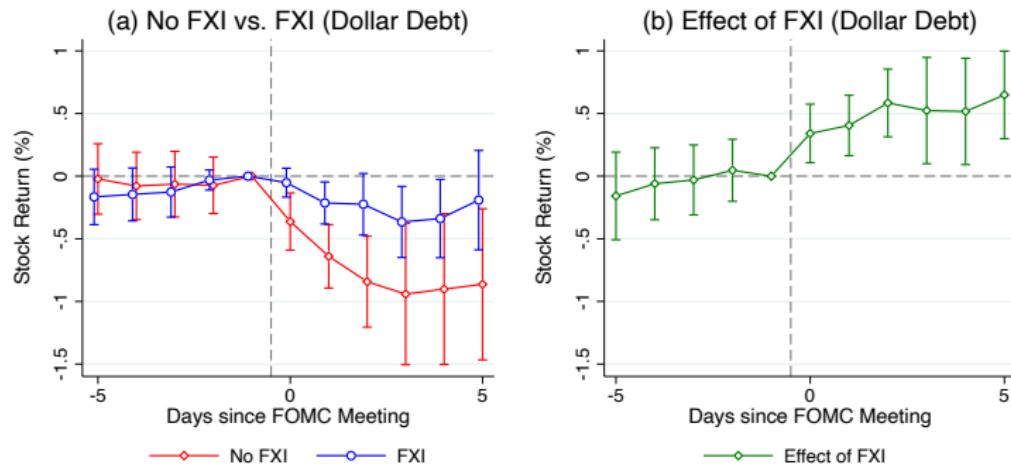
# Robustness Checks: Exchange Rate

Table A3: Exchange Rate: Robustness Checks

Dependent Variable:	$\Delta\text{Exchange Rate}_{c,t}$									
	Mean FXI	p75 FXI	FXI Volume	Large FXI	Daily Policy Rate	Zero FFR Shock	Excl. GFC	Excl. ZLB	Bond Yield	(9)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
FFR Shock, <sub>t</sub>	0.146** (0.049)	0.121** (0.041)	0.143** (0.064)	0.206** (0.071)	0.274** (0.119)	0.210** (0.084)	0.243*** (0.067)	0.201** (0.067)	0.329*** (0.088)	
Intervention <sub>c,t</sub>	0.181 (0.168)	-0.047 (0.162)	0.058 (0.183)	0.223 (0.163)	0.303 (0.205)	0.157** (0.061)	0.217 (0.158)	0.247 (0.152)	0.181 (0.240)	
FFR Shock <sub>t</sub> × Intervention <sub>c,t</sub>	-0.117** (0.044)	-0.150* (0.076)	-0.140** (0.051)	-0.211** (0.083)	-0.363** (0.155)	-0.196** (0.081)	-0.231*** (0.068)	-0.208** (0.070)	-0.347*** (0.083)	
<i>R</i> <sup>2</sup>	0.074	0.071	0.092	0.103	0.083	0.064	0.107	0.098	0.087	
N	836	836	829	741	683	1,289	754	790	713	
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	

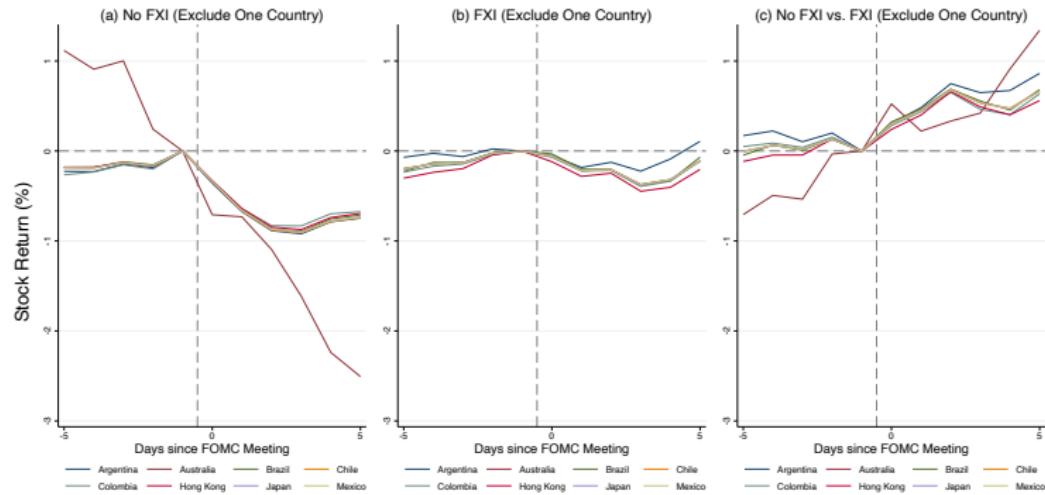
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# Weight by the Number of Firms with Dollar Debt



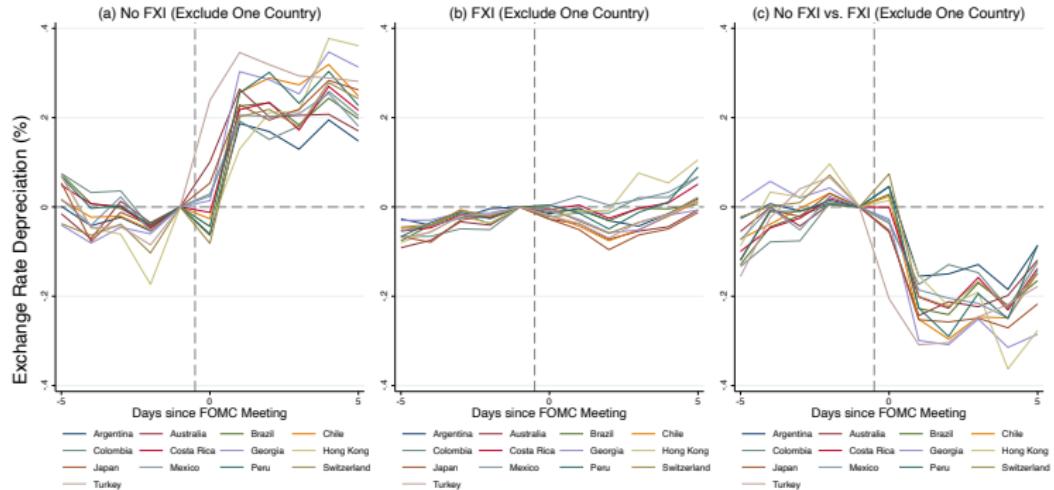
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# Exclude One Country from the Sample



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# Exclude One Country from the Sample



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