

# Bond Funds During the Sovereign Debt Crisis: the Argentinian Experience

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# Motivation

- Since 2008 assets of bond funds tripled. According to IMF 40 per cent of issued high-yield bonds are held by mutual funds
  - Becker & Ivashina (2015), Campbell & Sigalov (2021)
- Open-end mutual bond funds are involved in liquidity transformation: accumulate illiquid bonds financed by shares redeemable daily
  - Chen et al. (2010), Goldstein et al. (2017), Jiang et al. (2020)

## Our research questions

How a negative shock leading to a default of high-yield bonds in the funds' portfolio affects reallocations of bond holdings and investor flows for bond funds that pursued "reaching for yield" strategy?

- Important implications for financial stability and sovereign debt restructuring

# Paper in the literature

- We contribute to the bond funds literature (e.g., Chen, Goldstein, and Jiang (2010), Goldstein, Jiang and Ng (2017), Choi and Kronlund (2017), Shek, Shim and Shin (2018), Choi, Hoseinzade, Shin and Tehranian (2020) Jiang, Li and Wang (2020))
- We contribute to the literature on sovereign debt defaults and restructuring (e.g., Sturzenegger and Zettelmeyer (2008), Cruces and Trebesch (2013), Fang, Schumacher and Trebesch (2020))
- To the best of our knowledge we are the first ones to compile data at the bond funds level and study how international bond funds adjust their bond holdings during a sovereign default

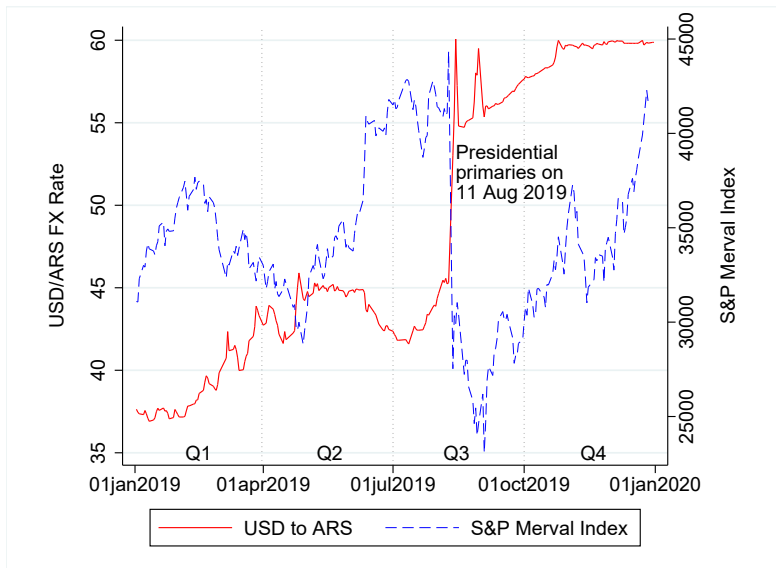
## Causal evidence from a quasi-natural experiment

Use exogenous shock to **default probability of sovereign bonds** caused by unexpected presidential elections outcome to trace effect on **bond holdings and flows conditional on fund's liquidity, maturity and past experience**.

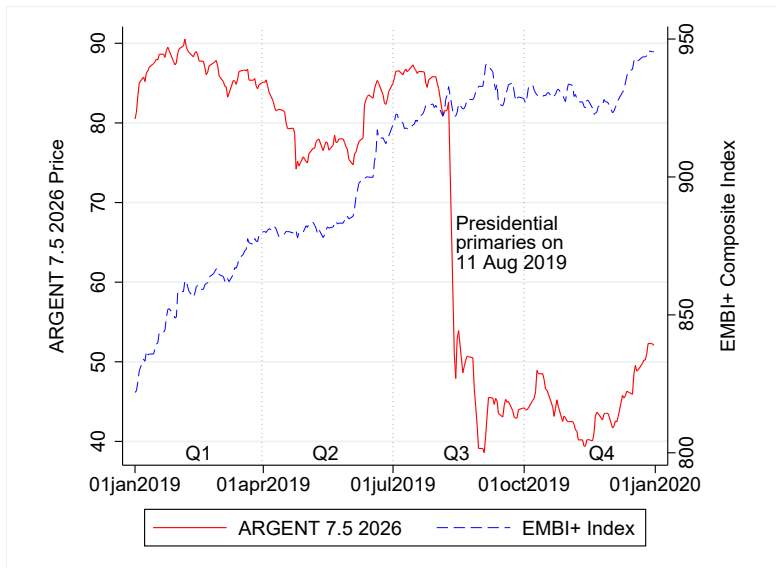
# The Argentinian primary elections shock

- After pro-market candidate Macri was elected president in 2015 and settled all previous debt litigations, Argentina returned to the global capital markets after being cut-off for 15 years and raised \$70 billion
- In August 2019 Argentina's pro-market president unexpectedly lost a primary vote by a landslide
  - Zhou and Makse (2019) report that top five Argentinian pollsters made wrong predictions: "Macri wins by one point: 38 to 37%."
- With Macri's loss by 16 points the Argentinian stock market plunged by 30 per cent, making it the second-biggest one day stock market slump since 1950 internationally
- Prices of sovereign Argentinian bonds declined by 30 per cent overnight and in 9 month Argentina defaulted on its sovereign bonds

# Argentinian stock market and currency collapse



# Argentinian bond price collapse



- We identified all Argentinian sovereign bonds issued in 2016-2018 under the New York Law in US dollar and Euro (M-bonds)
- Obtained holdings of M-bonds by 1000 international open-end bond mutual funds from 2018 Q4 through 2020 Q1 from Bloomberg
- We also went back into history of our sample funds and checked if they held Argentinian sovereign bonds back in 2001 and so-called 'Kirchner bonds' (K-bonds)
- Obtained geolocation of fund's managing team
- Obtained fund level controls: Fun size, Fund age, Manager fee, Rear Load, Quarterly return
- Group funds belonging to a fund family

# Variables construction

- Dependent variables:

- 1 Symmetric growth of each fund's Argentinean bond holdings, which is bounded by  $[-2,2]$  corresponding to exit and entry:

$$\text{Holding Growth}_{\tau-1,\tau} = \frac{(H_{\tau} - H_{\tau-1})}{0.5 \cdot (H_{\tau} + H_{\tau-1})},$$

- 2 Fund flow generated by ultimate investors

$$\text{Flow}_{\tau-1,\tau} = \frac{TNA_{\tau} - TNA_{\tau-1}(1 + R_{\tau})}{TNA_{\tau-1}},$$

- Independent variables:

- 1 Fund's exposure to Argentinian bonds:

$$\text{Exposure Sov}_{\tau-1} = \frac{H_{\tau-1}^{\$}}{TSH_{\tau-1}^{\$}},$$

- 2 Fund's Experience with previous Argentinian Bonds

$$\text{Experienced fund} = 1 \{H_{old} > 0 | H_{new} > 0\},$$



# Variables construction (cont.)

- Independent variables:

- ① Fund's Experience with previous Argentinian Bonds:

$$\text{Newcomer fund} = 1 \{H_{old} = 0 | H_{new} > 0\},$$

- ② Fund location variables:

- We summarize distance by the continent dummies of the managing team's location. For example, the indicator variable *Europe manager* takes value one if fund's management team is located in one of the European countries, zero otherwise

- Moderator variables:

- ① Fund's liquidity position: *Cash as share of net assets*
- ② Fund's maturity of Argentinian Bonds: *Weighted-average maturity of Argentinian Bonds* in the fund's portfolio

# Summary statistics

- Fund level variables are measured in the pre-election quarter  $\tau - 1 = 2019Q2$ .  
Unit of observation: fund.

	N	Mean	St. Dev	Min	p50	Max
Holdings growth $_{\tau-1,\tau}$	980	-0.170	0.973	-2	0	2
Flow $_{\tau-1,\tau}$	980	0.002	0.135	-0.454	-0.014	0.794
Exposure Sov $_{\tau-1}$	980	0.157	0.248	0	0.057	1
Exposure Tot $_{\tau-1}$	980	0.013	0.037	-0.025	0.004	0.677
Cash Share $_{\tau-1}$	980	0.028	0.070	-0.699	0.005	1
Maturity Arg $_{\tau-1}$ (N. Years)	980	9.329	9.649	0	7.25	98.25
Newcomer fund (0/1)	980	0.412	0.492	0	0	1
Europe manager (0/1)	980	0.513	0.500	0	1	1
South America (0/1)	980	0.042	0.200	0	0	1
Asia manager (0/1)	980	0.012	0.110	0	0	1

# Effect of Fund's Exposure to Defaulting Bonds on Holdings and Flows: Treatment-Control Balance

	Low exposure fund < Median Obs.=490	High exposure fund > Median Obs.=490	
	Mean (1)	Mean (2)	Diff. t-test (3)
Cash share $_{\tau-1}$	0.024	0.032	-1.747*
Maturity Arg. $_{\tau-1}$	9.358	9.299	0.095
Fund manag. fee (Ln)	-4.814	-4.817	0.063
Rear load (0/1)	0.196	0.165	1.245
Fund age $_{\tau-1}$ (Ln)	4.736	4.808	-1.485
Fund size $_{\tau-1}$ (Ln)	5.896	5.881	0.131
Fund return $_{\tau-1}$	2.607	2.325	2.828***

# Empirical specification I: Effect of fund's exposure and liquidity on holdings growth and flows

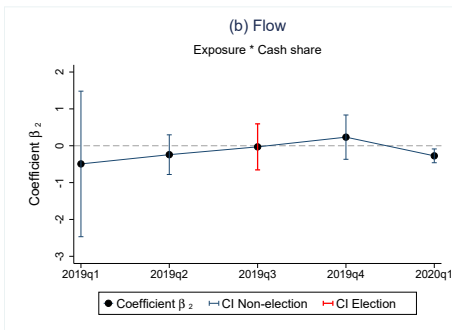
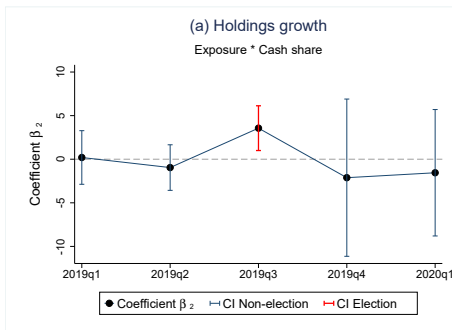
$$Y_{\tau-1,\tau} = \alpha + \delta_i + \beta_1 \text{Exposure}_{\tau-1} + \beta_2 \text{Exposure}_{\tau-1} \times \text{Cash Share}_{\tau-1} + \beta_3 \text{Cash Share}_{\tau-1} + \gamma \text{Controls}_{\tau-1} + \varepsilon_{\tau}$$

- $Y_{\tau-1,\tau}$  is either  *Holding Growth* $_{\tau-1,\tau}$  or *Flow* $_{\tau-1,\tau}$
- $\beta_1$  captures the impact of *Exposure* $_{\tau-1}$  on zero cash funds,  $\beta_2$  captures the differential response of fund managers and investors to exposure conditional on fund's liquidity
- $\delta_i$ ; the coefficients  $\beta$  capture the differential effect of the fund's exposure on dependent variables *within* a fund family  $i$

## Hypothesis 1

High Liquidity funds avoid costly fire-sales of distressed bonds reduce their holdings less compared to Low Liquidity funds. Investor in funds also respond to fund's exposure and increase their redemptions

# Regression Results I: Coefficient Plots



- We plot the interaction term coefficients from quarter-by-quarter regressions that estimate the effect of fund's liquidity on exposure and outcomes nexus.
- The left-hand side coefficient plot confirms the parallel-trends assumption

# Regression Results I: Election Shock

Dependent variable:	Panel A: Holdings growth $_{\tau-1,\tau}$		Panel B: Flow $_{\tau-1,\tau}$	
	OLS	Fund family FE	OLS	Fund family FE
	(1)	(2)	(3)	(4)
Exposure Sov $_{\tau-1}$	-0.803*** (0.050)	-0.666*** (0.068)	-0.043** (0.011)	-0.056** (0.013)
Exp. Sov $_{\tau-1} \times$ Cash $_{\tau-1}$	3.147*** (0.645)	3.563** (0.806)	-0.032 (0.150)	-0.030 (0.196)
Cash share $_{\tau-1}$	-1.116* (0.402)	-0.921** (0.238)	-0.043 (0.033)	-0.049 (0.089)
Controls $_{\tau-1}$	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Fund strategy FE	YES	YES	YES	YES
Fund objective FE	YES	YES	YES	YES
Fund family FE	NO	YES	NO	YES
Num. fund families (i)		127		127
R <sup>2</sup>	0.089	0.490	0.095	0.315
Observations	980	885	980	885

# Empirical specification II: Effect of fund's exposure and maturity on holdings growth and flows

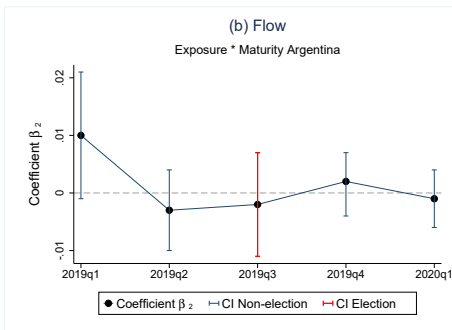
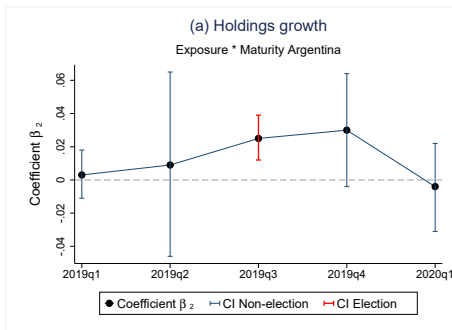
$$Y_{\tau-1,\tau} = \alpha + \delta_i + \beta_1 \text{Exposure Sov}_{\tau-1} + \beta_2 \text{Exposure Sov}_{\tau-1} \times \text{Maturity Arg}_{\tau-1} + \beta_3 \text{Maturity Arg}_{\tau-1} + \gamma \text{Controls}_{\tau-1} + \varepsilon_{\tau}$$

- $Y_{\tau-1,\tau}$  is either *Holding Growth* $_{\tau-1,\tau}$  or *Flow* $_{\tau-1,\tau}$
- $\beta_1$  captures the impact of *Exposure Sov* $_{\tau-1}$  on zero maturity (in years) funds,  $\beta_2$  captures the differential response of fund managers and investors to exposure conditional on fund's maturity
- $\delta_i$ ; the coefficients  $\beta$  capture the differential effect of the fund's exposure on dependent variables *within* a fund family  $i$

## Hypothesis 2

Long Maturity Bonds historically experienced less losses during the sovereign defaults (Asonuma, Niepelt and Ranciere (2017) and Fang, Schumacher and Trebesch (2020)). We expect longer maturity funds to be less sensitive to fund's exposure.

# Regression Results II: Coefficient Plots



- We plot the interaction term coefficients from quarter-by-quarter regressions that estimate the effect of fund's average maturity on exposure and outcomes nexus.
- The left-hand side coefficient plot confirms the parallel-trends assumption



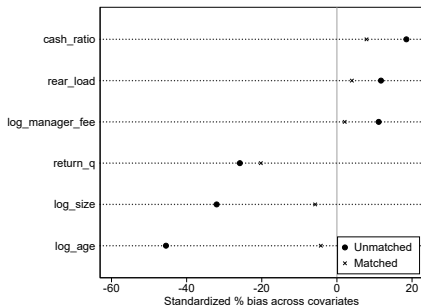
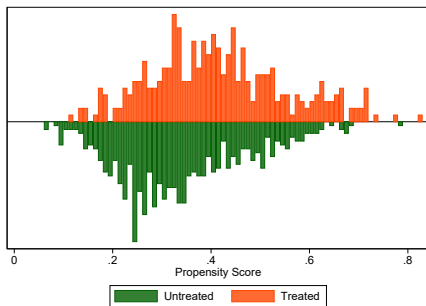
# Regression Results II: Election Shock

Dependent variable:	Panel A: Holdings growth $_{\tau-1,\tau}$		Panel B: Flow $_{\tau-1,\tau}$	
	OLS	Fund family FE	OLS	Fund family FE
	(1)	(2)	(3)	(4)
Exposure Sov $_{\tau-1}$	-1.041*** (0.065)	-0.770*** (0.078)	-0.044 (0.026)	-0.040 (0.032)
Exp. Sov $_{\tau-1} \times$ Mat. $_{\tau-1}$	0.037** (0.007)	0.025*** (0.004)	-0.000 (0.003)	-0.002 (0.003)
Maturity Arg. $_{\tau-1}$	-0.012*** (0.001)	-0.018* (0.006)	0.000 (0.001)	0.001 (0.001)
Controls $_{\tau-1}$	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Fund strategy FE	YES	YES	YES	YES
Fund objective FE	YES	YES	YES	YES
Fund family FE	NO	YES	NO	YES
Num. fund families (i)		127		127
R <sup>2</sup>	0.095	0.499	0.094	0.317
Observations	980	885	980	885

# Effect of Fund's Experience and Location on Holdings and Flows: Treatment-Control Balance

	Panel A: Full sample			Panel B: PSM sample		
	Experien. fund Obs.=576	Newcomer fund Obs.=404	Diff. t-test	Experien. fund Obs.=308	Newcomer fund Obs.=295	Diff. t-test
	Mean (1)	Mean (2)	(3)	Mean (4)	Mean (5)	(6)
Fund man fee	-4.871	-4.736	-2.914***	-4.809	-4.795	-0.252
Rear load (0/1)	0.174	0.191	-0.680	0.208	0.224	-0.475
Fund age $_{T-1}$	4.898	4.593	6.249***	4.649	4.618	0.523
Fund size $_{T-1}$	6.271	5.344	7.842***	5.841	5.739	0.725
Fund return $_{T-1}$	2.644	2.212	4.292***	2.510	2.211	2.523**
Cash share $_{T-1}$	0.023	0.036	-2.810***	0.033	0.038	-0.952

# PSM Diagnostics



- We use standard one-to-one matching algorithm on values of pre-determined variables at the end of the previous year before elections (2018 Q4)

# Empirical specification III: Effect of fund's experience and location on holdings growth and flows

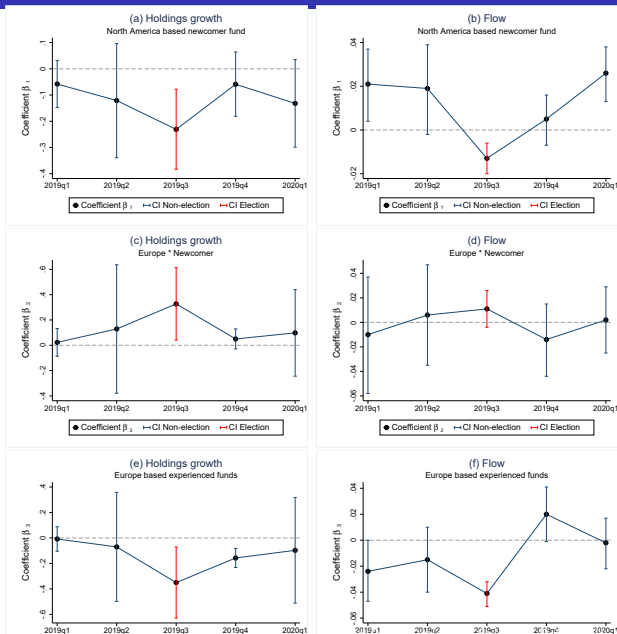
$$Y_{\tau-1,\tau} = \alpha + \delta_i + \beta_1 1\{\text{Newcomer fund}\} + \beta_2 1\{\text{Newcomer fund}\} \times 1\{\text{Europe}\} + \beta_3 1\{\text{Europe}\} + \beta_4 1\{\text{S.America}\} + \beta_5 1\{\text{Asia}\} + \gamma \text{Controls}_{\tau-1} + \varepsilon_{\tau}$$

- Reference group are North America based *experienced* funds
- $\beta_1$  captures the difference in our dependent variables between North America based *newcomer* and the reference group;  $\beta_2$  capture the difference in the dependent variables between Europe based *newcomer* funds and the reference group;  $\beta_3$  captures the difference in the dependent variables between Europe based *experienced* and the reference group

## Hypothesis 3

Bond funds with a previous *experience* in defaulted Argentinian debt have lower information asymmetry regarding the negotiation outcome and hence lower renegotiations costs. Thus, we expect the experienced funds to decrease their Argentinian bond holdings less, compared to the *newcomer* funds who only held newly issued M-bonds.

# Regression Results III: Coefficient Plots



# Regression Results III: Election Shock

Dependent variable:	Panel A: Holdings growth $_{\tau-1,\tau}$		Panel B: Flow $_{\tau-1,\tau}$	
	PSM	Fund family FE	PSM	Fund family FE
	(1)	(2)	(3)	(4)
Newcomer fund	-0.231*** (0.065)	0.095 (0.131)	-0.013*** (0.003)	-0.023*** (0.006)
Newcomer fund $\times$ Europe	0.327** (0.121)	0.022 (0.161)	0.011 (0.006)	0.037* (0.020)
Europe	-0.350** (0.118)	-0.228** (0.092)	-0.041*** (0.004)	-0.017** (0.007)
South America		0.455*** (0.135)		-0.030 (0.017)
Asia		-0.369*** (0.085)		-0.115*** (0.032)
Controls $_{\tau-1}$	YES	YES	YES	YES
Fund strategy FE	YES	YES	YES	YES
Fund objective FE	YES	YES	YES	YES
Fund family FE	NO	YES	NO	YES
R <sup>2</sup>	0.073	0.477	0.125	0.310
Observations	603	885	603	885

# Conclusion

- Using a rare event of unexpected presidential elections outcome in Argentina that lead to a sovereign default and caught bond fund managers and investors off-guard we find:
- Fund's Exposure :
  - 1 Funds which on average held more cash (liquid funds) decreased their bond holdings less compared to illiquid funds with the same level of exposure to Argentinian sovereign debt
  - 2 Funds with longer-term Argentinian bonds were less sensitive to exposure compared to funds with shorter duration of the Argentinian bonds portfolio.
- Fund's Experience:
  - 1 *Experienced* North American funds with the lowest renegotiation costs retained more of their holdings of Argentinian bonds than all other groups and also exhibited the lowest outflows