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EUROSYSTEM

Bond portfolio rebalancing during the COVID-19 Outbreak

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The paper

- The paper is part of our 2nd ChaMP project on NBFIs and monetary policy.

- The aim of the project is to investigate how investment funds rebalance their bond portfolios during dash-for-cash events, such as during the outbreak of Covid-19:
  - Focus on cross-country rebalancing and monetary policy of the Fed and the ECB

- We examine factors driving bond funds changes in the composition of their portfolios during the outbreak of COVID-19

In a nutshell

- We use a granular security-level dataset of bond funds' portfolio holdings to characterize the changes in the funds' portfolios under stressed conditions, such as those in the first months after the outbreak of COVID-19;

- Our findings reveal that the dash-for-cash was broader than documented in the literature so far:

  - Funds sell, in March 2020, not only AAA-rated (e.g. USTs) but also other IG-rated bonds;

  - In relative terms, funds sell their IG bond holdings in equal proportions: an indication they might be cautious not to alter the balance of risks in their portfolio.

  - We also find that investment funds holding relatively more AAA bonds did not sell as aggressively across lower credit ratings compared to other funds.
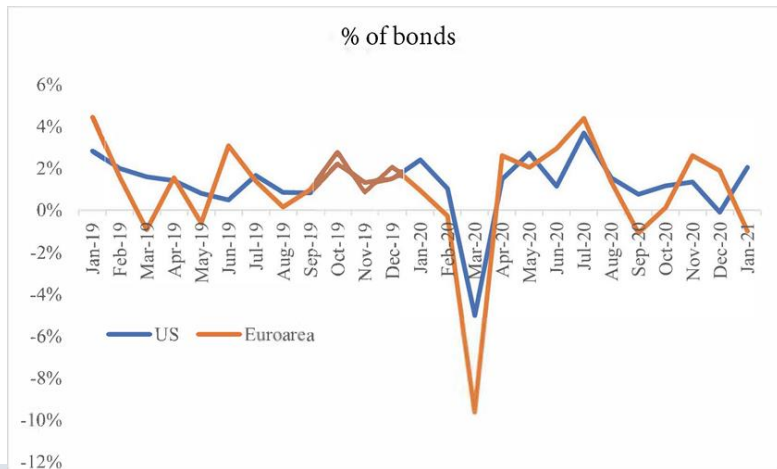
Introduction

Changes in bond funds positions
(as % of total assets)

Falato, et al.
(2021)
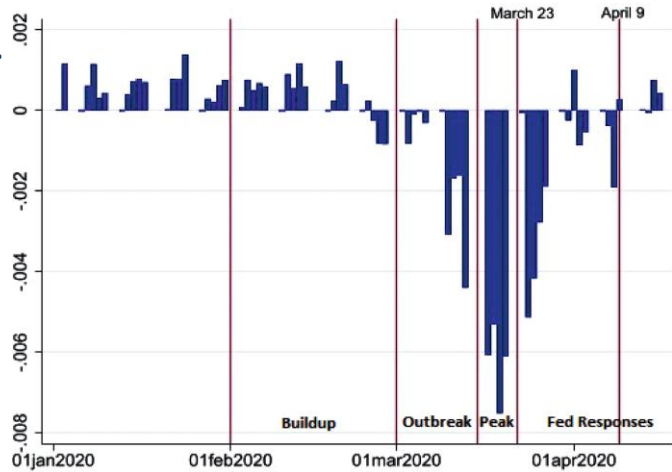
This paper

- At the outbreak of COVID, investment funds faced large cash outflows, as shareholders liquidated their shares amid a broad market turbulence.

- Bond mutual funds also faced large outflows.

- This episode underlined the 'financial fragility' of investment funds:

  - Falato, Goldstein and Hortaçsu (JME 2021) show that US bond funds outflows, reached 5.5% of their asset under management in March 2020.

  - (and that the outflows were reversed by the Fed bond purchase program)

Paper's research focus

■ In the present study we report actual changes in <u>holdings of US and EA bond funds at the security level</u>, during the COVID outbreak.

■ We seek to address the following questions:

- *How widespread was the dash-for-cash during COVID ?*

- *Is there a connection of funds flight-to-liquidity to their concern for retaining a balance of risks in their portfolios?*

- *Is there a rule that could alleviate at least part of the cyclicality in funds' portfolio allocation?*

Literature

- At the outbreak of COVID turbulence (late February to mid-March 2020) investment funds faced a spike in the redemptions of shares by their investors: thus they needed to address liquidity needs quite urgently.

  - This is associated to heavy sales of US Treasuries (Vissing-Jorgensen JME 2021) and to spikes in European corporate bonds (Nicoletti et al. ECB wp 2024).

  - It also led to the emergence of the 'financial fragility' hypothesis of funds (see, Dunne et al., 2024), especially those whose shares are held by other funds (Allaire et al. ECB wp 2023).

- In general, bond funds tend to rely more on cash and liquid assets, such as government bonds, to meet unexpected investor redemptions (Jiang et al. JFQA 2021).

- At the same time, bond funds have reasons (their mandates, see Baghai et al. MgmSc 2024) to be cautious not to disturb the balance of risks in their portfolios.
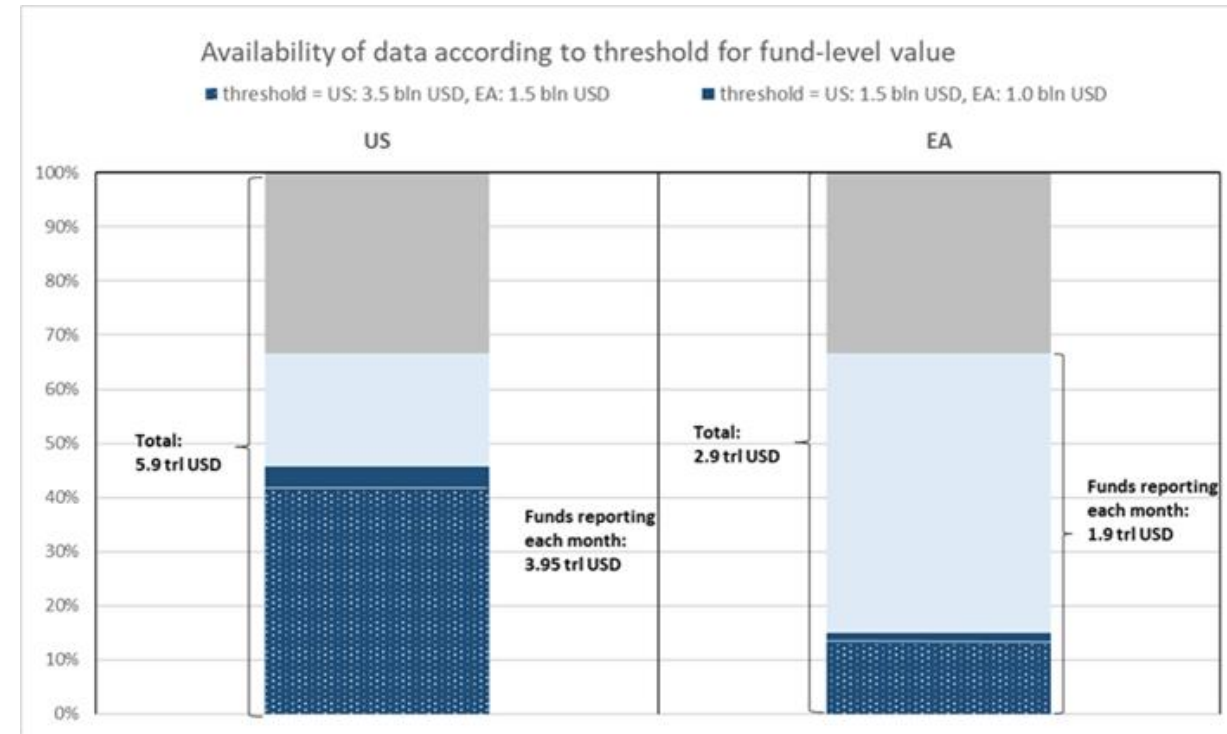
Data set

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Total no. obs.: >12 mln., fund-security data at monthly freq.

Portfolio composition:

- Source: Lipper IM.

- 432 bond funds (US and EA), reporting regularly their portfolios each month.

- Bond holdings, market & book values, domicile of fund, etc.

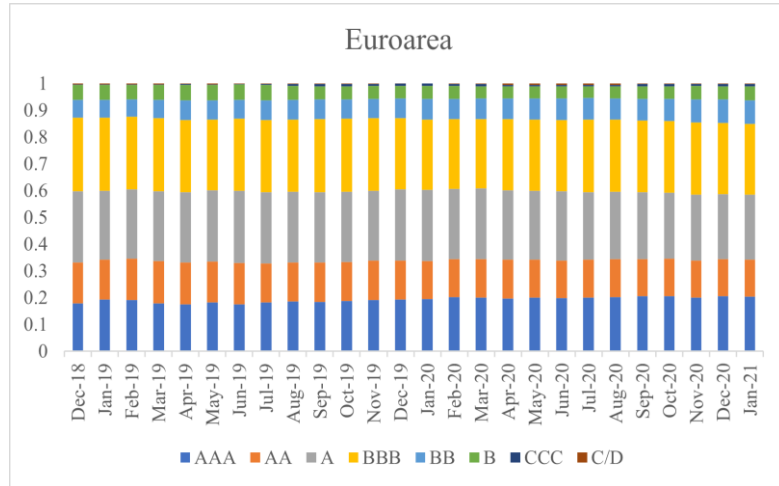- Period: Dec-2018 to Jan-2021.

Security data (funds' holdings):

- source: LSEG Datastream & Refinitiv.

- CB eligibility, maturities & tenors, currencies, credit ratings, parent company etc.

- 684,000 securities

Availability of data according to threshold for fund-level value

■ threshold = US: 3.5 bln USD, EA: 1.5 bln USD   ■ threshold = US: 1.5 bln USD, EA: 1.0 bln USD

US

EA

Total: 5.9 trl USD

Funds reporting each month: 3.95 trl USD

Total: 2.9 trl USD

Funds reporting each month: 1.9 trl USD

Composition of portfolios

Ratings **Sectors** **Location**
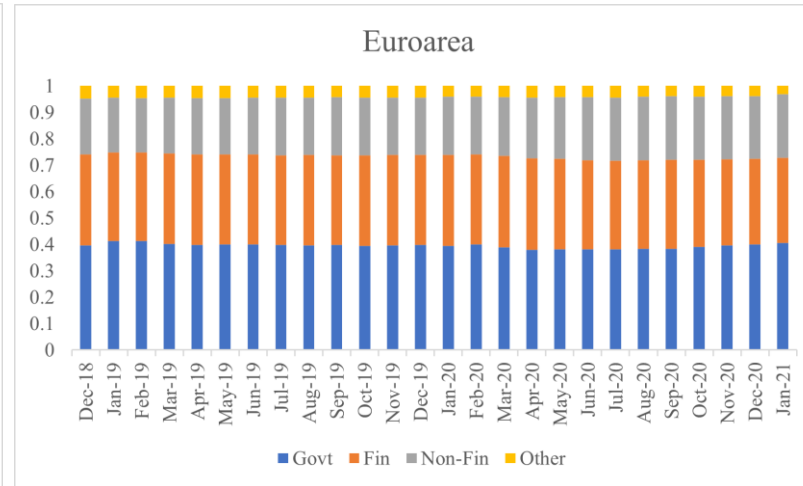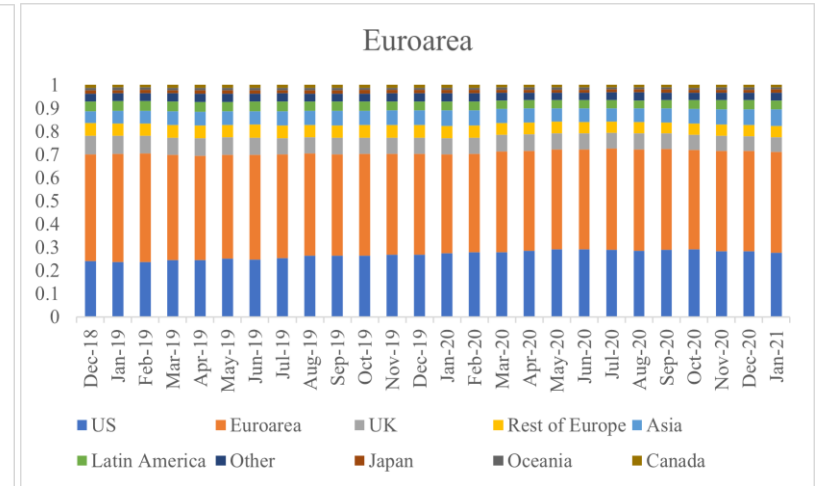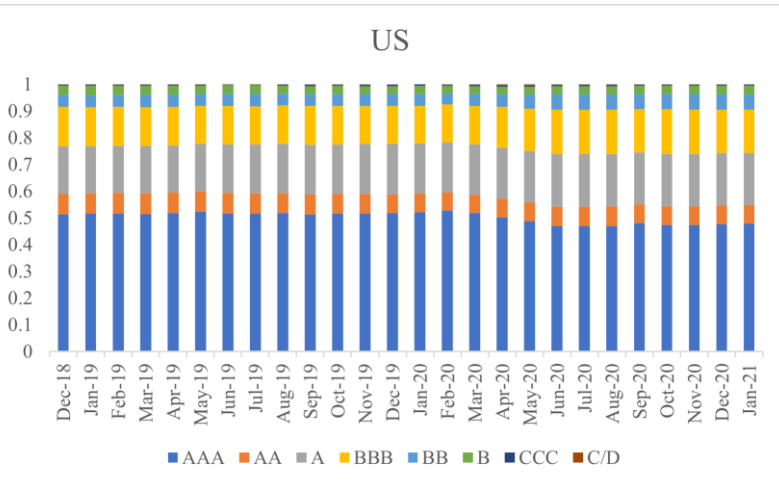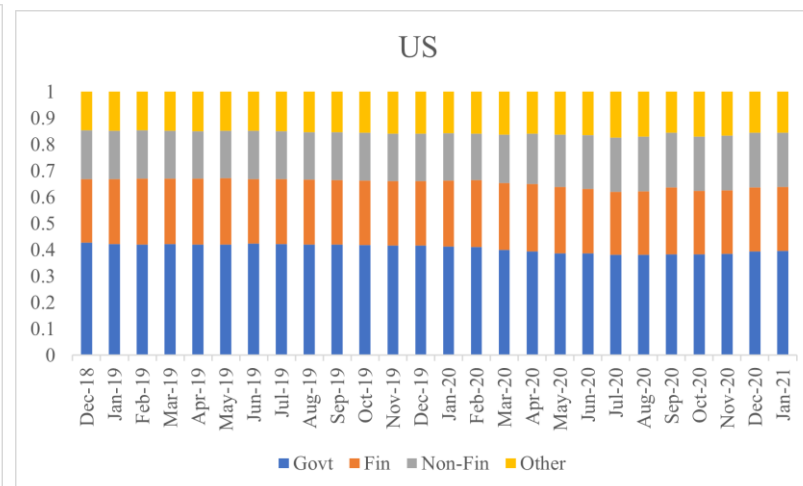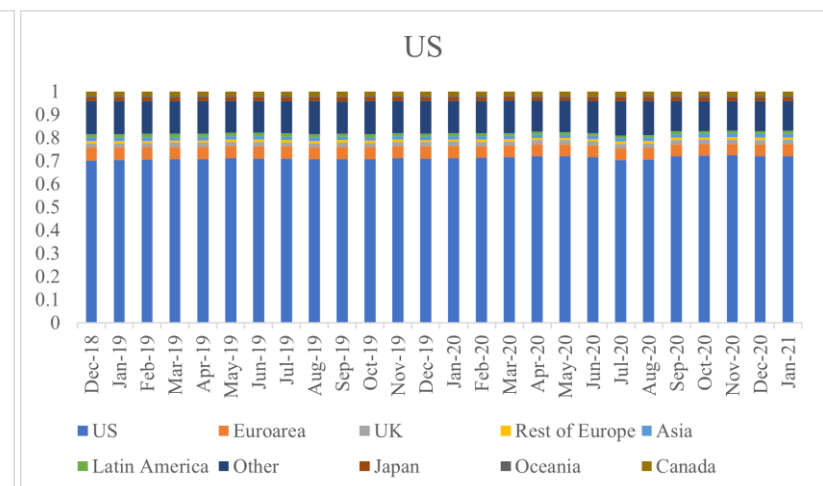
Portfolio dynamics

In March 2020 US funds positions decreased by about 5.5% and EA funds by about 10%.

Changes in bond funds positions (as % of total assets)
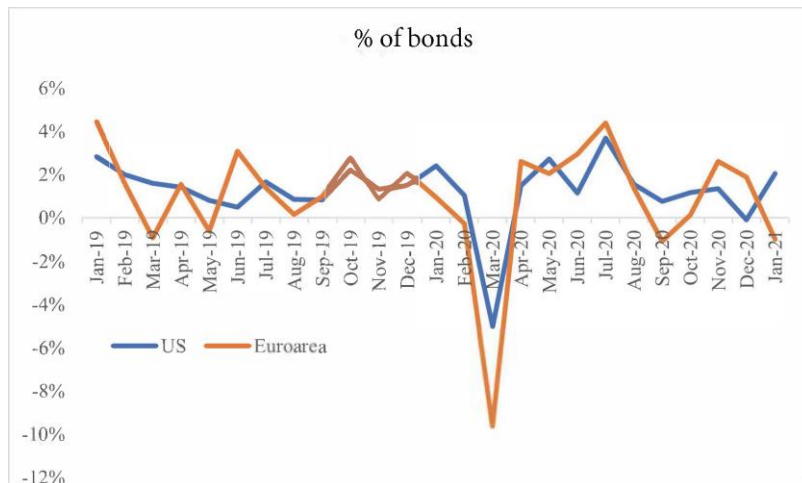
Portfolio dynamics

In March 2020 US funds positions decreased by about 5.5% and EA funds by about 10%.

…This is the result of a sharp increase in liquidation of bond funds' positions (~14% of total assets)…

Changes in bond funds positions (as % of total assets)
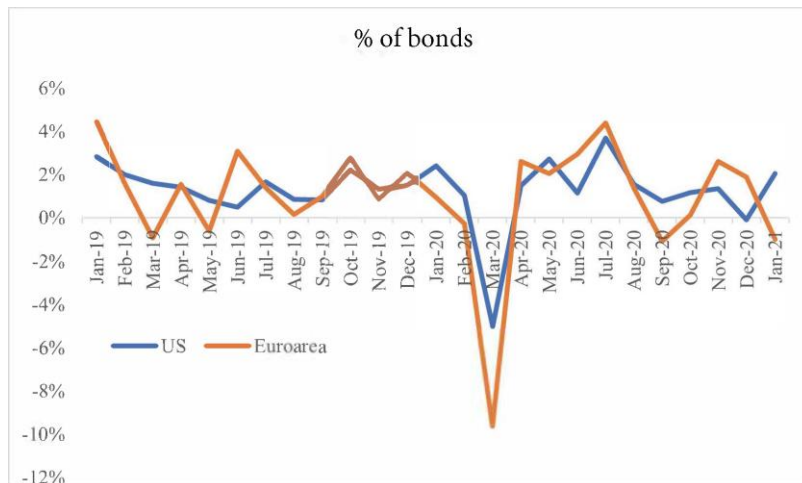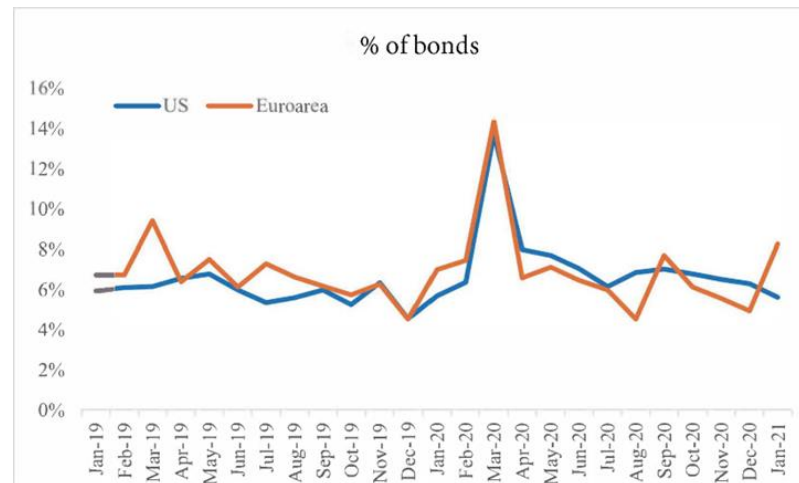
Bond sales (as % of total BV)

Portfolio dynamics

In March 2020 US funds positions decreased by about 5.5% and EA funds by about 10%.

…This is the result of a sharp increase in liquidation of bond funds' positions (~14% of total assets)…

…At the same period EA bond funds also pause their new purchases (down 40% mom), which is not the case for US funds.

Changes in bond funds positions (as % of total assets)
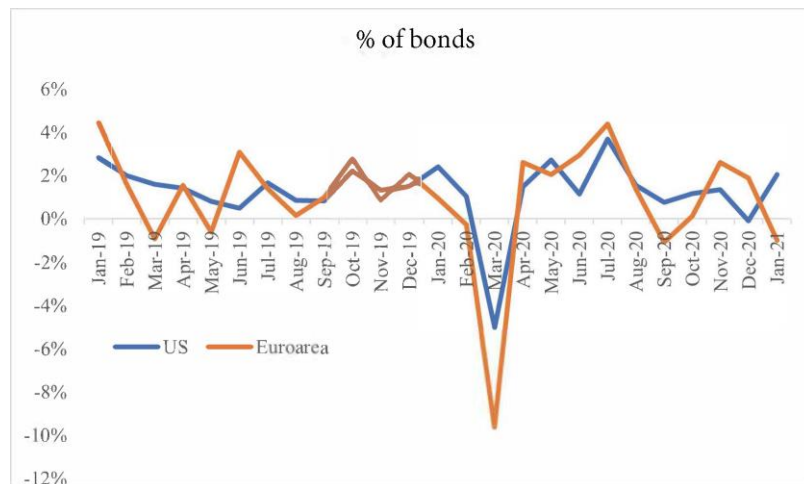
Bond sales
(as % of total BV)
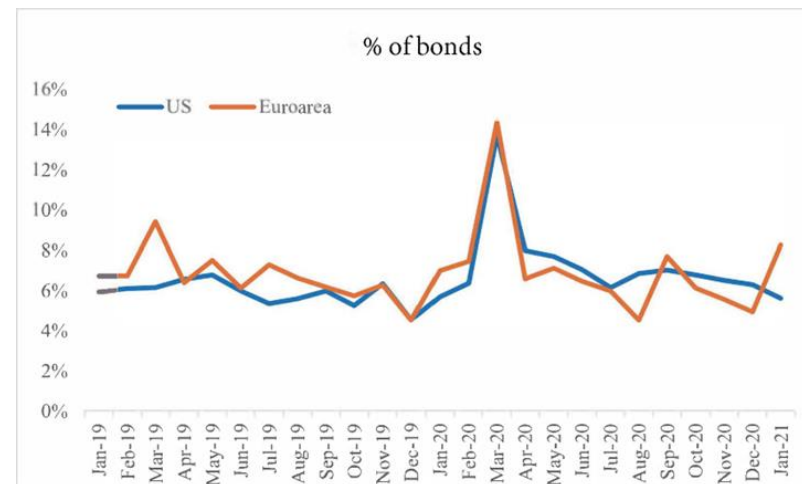
Bond purchases (as % of total BV)
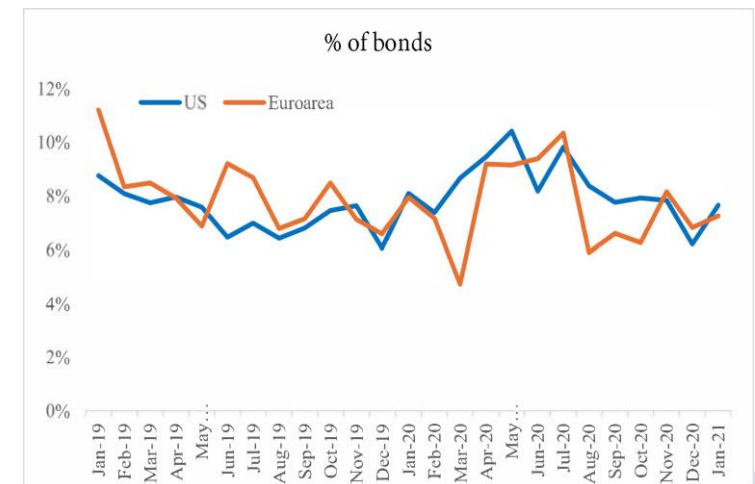
Empirical findings

1ˢᵗ setup:

$$\Delta Holdings_{i,j,t} = \mathbf{b}\boldsymbol{T}_t + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

Dependent variable: Changes in book-value holdings

- Either in mln dollar terms ($\$\Delta BV_{i,j,t}$)

- Or as month-on-month percentage changes (%$\Delta BV_{i,j,t}$)

Bond-fund FE included in all setups

Controls: bond returns (at *t* and/or *t-1*)

Empirical findings

1st setup:

$$\Delta Holdings_{i,j,t} = \mathbf{b}\boldsymbol{T}_t + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

	US funds							
	$\$\Delta BV_{i,j,t}$				$\%\Delta BV_{i,j,t}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jan-20	-	-	-	-	0.033**	-	-	-
Feb-20	-	-0.030*	-	-0.033**	-	-	-	-
Mar-20	-0.421***	-0.251***	-0.443***	-0.245***	-	-0.015***	-0.026***	-0.013***
Apr-20	-	-	-	-	-	-	-	-
May-20	-	-	-0.080*	-	-	-	-	-
Jun-20	-	-	-	-	-	-	-	-
Return$_{i,j,t}$	No	Yes	No	Yes	No	Yes	No	Yes
Return$_{i,j,t-1}$	No	No	Yes	Yes	No	No	Yes	Yes
Bon-fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	8,831,067	8,260,236	7,900,156	7,695,478	8,831,067	8,260,236	7,900,156	7,695,478
R²	3.8%	9.1%	15.3%	7.7%	10.5%	15.3%	16.1%	14.9%

Empirical findings

1st setup:

$$\Delta Holdings_{i,j,t} = b\boldsymbol{T}_t + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

	EA funds							
	$\$\Delta BV_{i,j,t}$				$\%\Delta BV_{i,j,t}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jan-20	-	-	-	-	-	0.009	-	0.011*
Feb-20	-	-0.073***	-0.088***	-0.078***	-	-	-	-0.008*
Mar-20	-0.397***	-0.445***	-0.334***	-0.441***	-0.073***	-0.054***	-0.063***	-0.055***
Apr-20	-	0.078***	-	0.139***	-	0.016***	-	0.028***
May-20	-	-	-0.097***	-	-	0.010***	-	-
Jun-20	-	0.039*	-	-	-	0.009*	-	-
Return$_{i,j,t}$	No	Yes	No	Yes	No	Yes	No	Yes
Return$_{i,j,t-1}$	No	No	Yes	Yes	No	No	Yes	Yes
Bon-fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	2,665,507	8,260,236	7,900,156	7,695,478	8,831,067	8,260,236	7,900,156	7,695,478
R²	3.8%	9.1%	15.3%	7.7%	10.5%	15.3%	16.1%	14.9%

Empirical findings

2nd setup:

$$\Delta Holdings_{i,j,t}$$
$$= b_1 \boldsymbol{Ratings}_{i,t} + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \boldsymbol{Ratings}_{i,t} + Controls_{i,j,t}$$
$$+ \alpha_{j,t} + u_{i,j,t}$$

We examine whether funds followed a rule based on the credit quality of the security, when liquidating their positions in March 2020.

The ratings variable increases with credit risk: AAA=1, AA=2, A=3, BBB=4, BB=5, B=6, CCC=7 C/D=8

Empirical findings

2nd setup:

$$\Delta Holdings_{i,j,t}$$
$$= b_1 \textbf{Ratings}_{i,t} + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \textbf{Ratings}_{i,t} + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

	US funds				EA funds			
	$\$\Delta BV_{i,j,t}$		$\%\Delta BV_{i,j,t}$		$\$\Delta BV_{i,j,t}$		$\%\Delta BV_{i,j,t}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ratings	-0.025*	-0.038***	-0.010***	-0.010***	-	-	-0.008**	-0.007**
Mar-20	-0.331***	-0.693***	-0.015***	0.003*	-0.416***	-0.323***	-0.050***	-0.013***
Ratings x Mar-20		0.141***		-0.007***		-		-0.011***
Return Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bon-fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	5,138,513	5,138,513	5,138,513	5,138,513	2,052,304	2,052,304	2,052,304	2,052,304
R^2	12.1%	12.1%	13.9%	13.9%	10.6%	10.6%	7.9%	8.0%

Note: AAA=1, AA=2, A=3, BBB=4, BB=5, B=6, CCC=7, C/D=8

Empirical findings

3r^d setup:

$$\Delta Holdings_{i,j,t}^{C}$$
$$= b_1 \overline{\Delta Holdings_{i,j,t}^{AAA}} + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \overline{\Delta Holdings_{i,j,t}^{AAA}}$$
$$+ Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

We examine whether the reduction in AAA-rated fund holdings affected (spilled-over) to other rating categories.

Empirical findings

3rd **setup:**

$$\Delta Holdings_{i,j,t}^{c}$$
$$= b_1 \overline{\Delta Holdings_{i,j,t}^{AAA}} + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \overline{\Delta Holdings_{i,j,t}^{AAA}} + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

US funds							
$\$\Delta BV_{i,j,t}$							
	AA	A	BBB	BB	B	CCC	C/D
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$	-	-	0.001*	-	-	-	-
Mar-20	-0.384***	-0.203***	-0.107***	0.206***	0.157***	-	-
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$ **x Mar-20**	0.014***	0.006***	0.003***	-	-	-	-
$\%\Delta BV_{i,j,t}$							
	AA	A	BBB	BB	B	CCC	C/D
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$	0.119***	0.114***	0.110***	0.027***	0.029***	-	-
Mar-20	-0.025***	-0.020***	-0.024***	-	-	-0.011*	-
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$ **x Mar-20**	-	-	0.041***	-0.030***	-0.054***	-0.065***	-
Both tables							
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond-fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Empirical findings

3rd **setup:**

$$\Delta Holdings_{i,j,t}^{C} = b_1 \overline{\Delta Holdings_{i,j,t}^{AAA}} + b_2 \mathbf{1}(March\ 2020) + b_3 \mathbf{1}(March\ 2020) \cdot \overline{\Delta Holdings_{i,j,t}^{AAA}} + Controls_{i,j,t} + \alpha_{j,t} + u_{i,j,t}$$

EA funds							
$\$\Delta BV_{i,j,t}$							
	AA	A	BBB	BB	B	CCC	C/D
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$	-	-	-	-	-	-	-
Mar-20	-0.358***	-0.247***	-0.279***	-0.788*	-0.678***	-0.640***	-0.601***
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$ **x Mar-20**	0.146***	0.013*	0.020***	-	-	0.037**	-0.494***
$\%\Delta BV_{i,j,t}$							
	AA	A	BBB	BB	B	CCC	C/D
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$	0.299***	0.233***	0.214***	0.052***	0.077***	-	-
Mar-20	-0.025***	-0.029***	-0.049***	-0.111***	-0.102***	-0.093***	-0.056***
$\overline{\Delta Holdings_{i,j,t}^{AAA}}$ **x Mar-20**	0.159***	0.073**	0.055**	-	-	0.105**	-
Both tables							
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bond-fund FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Empirical findings

4ʳᵗʰ **setup:**

$$\$\Delta BV_{i,j,t}^{non-AAA}/\$BV_{i,j,t}$$

$$= b_1 \mathbf{1}(\%BV_{j,Jan'19}^{AAA} < median(\%BV_{j,Jan'19}^{AAA})_j + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020)$$

$$\cdot \mathbf{1}(\%BV_{j,t}^{AAA} < median(\%BV_{j,t}^{AAA})_j + \alpha_{j,t} + e_{j,t}$$

$$Return_{j,t}$$

$$= b_1 \mathbf{1}(\%BV_{j,Jan'19}^{AAA} < median(\%BV_{j,Jan'19}^{AAA})_j + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020)$$

$$\cdot \mathbf{1}(\%BV_{j,t}^{AAA} < median(\%BV_{j,t}^{AAA})_j + \alpha_{j,t} + e_{j,t}$$

We examine whether those funds holding less-than-average AAA rated bonds in January-2019 (a) sold proportionately more non-AAA rated bonds, and (b) suffered bigger losses.

Empirical findings

4rth setup:

$$\$\Delta BV_{j,t}^{non-AAA}/\$BV_{j,t}$$
$$= b_1 \mathbf{1}(\%BV_{j,Jan'19}^{AAA} < median(\%BV_{j,Jan'19}^{AAA})_j + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \mathbf{1}(\%BV_{j,t}^{AAA} < median(\%BV_{j,t}^{AAA})_j + \alpha_{j,t} + e_{j,t}$$

$$Return_{j,t}$$
$$= b_1 \mathbf{1}(\%BV_{j,Jan'19}^{AAA} < median(\%BV_{j,Jan'19}^{AAA})_j + b_2 \mathbf{1}(March\ 2020) \quad + b_3 \mathbf{1}(March\ 2020) \cdot \mathbf{1}(\%BV_{j,t}^{AAA} < median(\%BV_{j,t}^{AAA})_j + \alpha_{j,t} + e_{j,t}$$

	US funds		EA funds	
	$\% \dfrac{\$\Delta BV_{j,t}^{non-AAA}}{\$BV_{j,t}}$	$\sum_{i=1}^{N} \dfrac{MarketValue_{i,t} \cdot MVReturn_{i,t}}{\sum_{i=1}^{N} MarketValue_{i,t}}$	$\% \dfrac{\$\Delta BV_{j,t}^{non-AAA}}{\$BV_{j,t}}$	$\sum_{i=1}^{N} \dfrac{MarketValue_{i,t} \cdot MVReturn_{i,t}}{\sum_{i=1}^{N} MarketValue_{i,t}}$
$\mathbf{1}(\%BV_{j,Jan'19}^{AAA} < median(\%BV_{j,Jan'19}^{AAA})_j$	0.032***	-	0.018***	-
Mar-20	-	-0.076***	-0.024***	-0.090***
$\mathbf{1}(March\ 2020) \cdot \mathbf{1}(\%BV_{j,t}^{AAA} < median(\%BV_{j,t}^{AAA})_j$	-0.048***	-0.089***	-0.075***	0.027***
R^2	4.7%	4.4%	3.1%	4.9%

Robustness checks

- Checked other types of portfolio allocation (per sector, per location).

- Used alternative definitions for ratings variables.

Conclusions

- Under an unforeseen adverse shock, investment funds liquidate their portfolio across-the-board; this happened at the COVID outbreak, probably in order to face outflows from shareholders.

- At the same time, bond funds in the US and the EA are mindful of the balance of risks in their portfolios, so they reduced proportionately more the lower-rated part of their portfolios;

- We find that this reduction, in lower-rated IG categories, is associated to that of AAA-rated holdings; i.e. it came as a result of the liquidity needs that resulted to the liquidation of AAA bonds.

- Bond funds holding a less-than-average proportion of AAA rated bonds, liquidated more non-AAA bonds and (US funds) had a lower return.

Thank you!

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