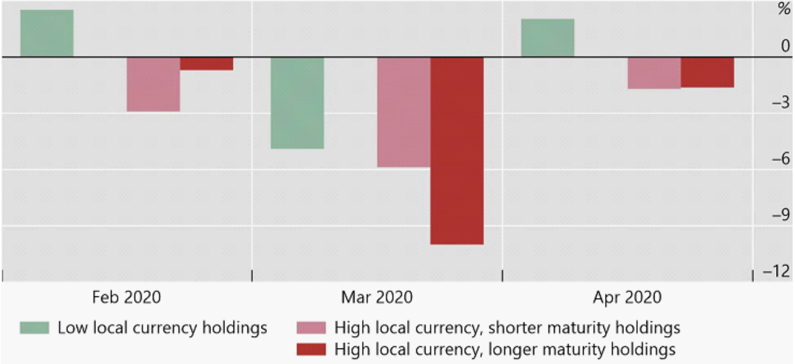
Original Sin Redux: Role of Duration Risk

Carol Bertaut Valentina Bruno Hyun Song Shin

EEA, August 2023

The views expressed here are those of the authors, and not necessarily those of the Bank for International Settlements or the Federal Reserve System.

Purchases (Sales) of EM sovereign bonds by US investors



(as percent of holdings)

- March 2020 event. Larger portfolio outflows from countries with large US holdings of local currency government bonds and longer maturities.

Motivation

- **Eichengreen and Hausmann (1999) "Original Sin"**
  EME dependence on foreign currency (USD) borrowing

Motivation

- **Eichengreen and Hausmann (1999) "Original Sin"**
  EME dependence on foreign currency (USD) borrowing

- **Overcoming the "Original Sin"**
  Share of local currency denominated debt has increased

Motivation

- **Eichengreen and Hausmann (1999) "Original Sin"**
  EME dependence on foreign currency (USD) borrowing
- **Overcoming the "Original Sin"**
  Share of local currency denominated debt has increased
- **"Original Sin Redux"**
  Risk has shifted from borrowers to investors

Original Sin Redux

- During periods of financial stress, portfolio outflows go hand-in-hand with rising yields and risk premia, and with currency depreciation
- Global investors' returns are measured in US dollars. They "lose twice":
  - Local currency returns
  - Effect of currency movements
- Which investors?
  - Mutual Funds

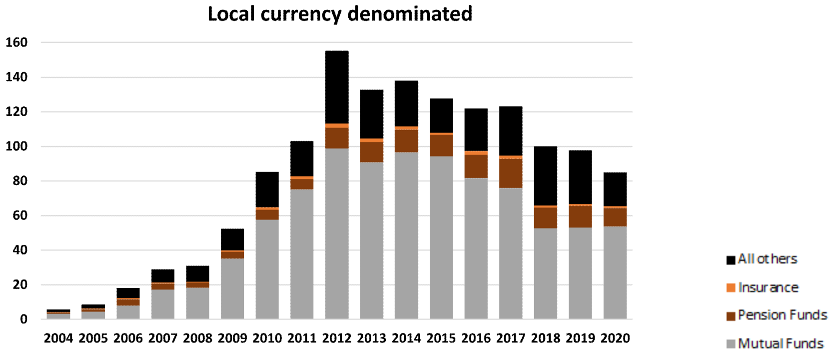
Data

- We explore the relationship between portfolio flows and exchange rates using a unique and comprehensive dataset of portfolio flows of *all* US investors (from Treasury TIC)
- Period: 2004-2021
- Comparative portfolio choice across seven investor sectors
- Direct measurement of the portfolio holdings:
  - Notional holdings, adjusted for valuation changes
  - Liquidity management operations

Three notable findings

- Issuing longer maturity bonds mitigate rollover risk for borrowers, however
  - Longer maturities come with greater duration risk for the lender, which may turn into market disruptions
- Mutual funds's behavior is procyclical, however
  - Mutual funds are more than half but a lot less than full story
  - We cannot generalize from mutual funds' behavior
  - EMEs are less volatile than mutual funds data show
- EMEs have overcome "Original Sin", however
  - Investors are moving away from local currency bonds

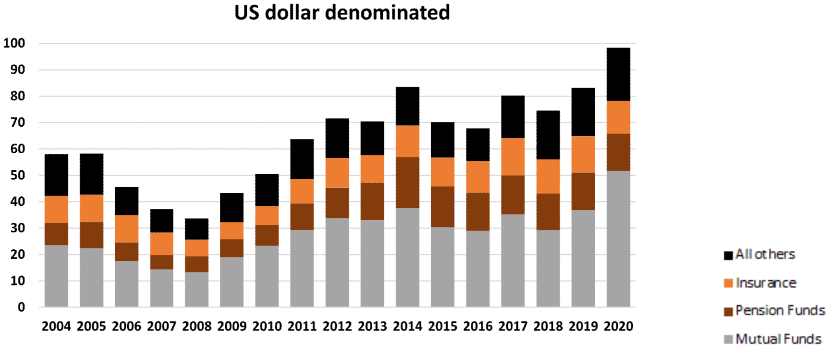
Local currency holdings by investor type



(USD billion)

- Mutual Funds stand out as the largest holder of EME bonds

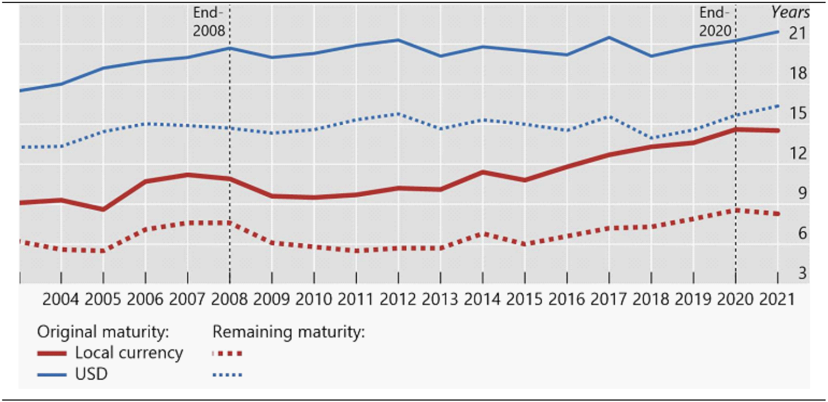
US dollar currency holdings by investor type



(USD billion)

- Mutual Funds + "sticky" Pension funds & Insurance sector

Original and Remaining Maturity



The US dollar as a barometer of global financial conditions

- We use the broad US dollar index as an indicator capturing global financial conditions.

The US dollar as a barometer of global financial conditions

- We use the broad US dollar index as an indicator capturing global financial conditions.
- A stronger dollar is associated with tighter dollar credit conditions

The US dollar as a barometer of global financial conditions

- We use the broad US dollar index as an indicator capturing global financial conditions.
- A stronger dollar is associated with tighter dollar credit conditions
- Under a portfolio approach, a broad based appreciation or depreciation of the dollar affects the global portfolio return of a dollar-based investor –*Risk taking channel of exchange rate* (Bruno and Shin, *Review of Economic Studies*, 2015).

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep. Var.	Local	Local	Local	Local	USD
Sector	All	Mutual	Non-Mutual	All	All
ΔUSD Broad	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
Pension*ΔUSD				1.2682	2.3653***
				[0.8935]	[0.5619]
Insur*ΔUSD				1.0853	1.2574*
				[0.9904]	[0.5965]
All Others*ΔUSD				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

- Country- Investor Type fixed effects

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep.Var.	*Local*	Local	Local	Local	USD
Sector	*All*	Mutual	Non-Mutual	All	All
Δ*USDBroad*	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
Pension*ΔUSD				1.2682	2.3653***
				[0.8935]	[0.5619]
Insur*ΔUSD				1.0853	1.2574*
				[0.9904]	[0.5965]
All Others*ΔUSD				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep.Var.	Local	*Local*	Local	Local	USD
Sector	All	*Mutual*	Non-Mutual	All	All
Δ*USDBroad*	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
Pension*ΔUSD				1.2682	2.3653***
				[0.8935]	[0.5619]
Insur*ΔUSD				1.0853	1.2574*
				[0.9904]	[0.5965]
All Others*ΔUSD				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep.Var.	Local	Local	*Local*	Local	USD
Sector	All	Mutual	*NonMutual*	All	All
Δ*USDBroad*	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
Pension*ΔUSD				1.2682	2.3653***
				[0.8935]	[0.5619]
Insur*ΔUSD				1.0853	1.2574*
				[0.9904]	[0.5965]
All Others*ΔUSD				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep.Var.	Local	Local	Local	*Local*	USD
Sector	All	Mutual	Non-Mutual	*All*	All
Δ*USDBroad*	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
Pension*ΔUSD				1.2682	2.3653***
				[0.8935]	[0.5619]
Insur*ΔUSD				1.0853	1.2574*
				[0.9904]	[0.5965]
*AllOthers**Δ*USD*				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

Investor Type Analysis

	(1)	(2)	(3)	(4)	(7)
Dep. Var.	Local	Local	Local	Local	*USD*
Sector	All	Mutual	Non-Mutual	All	*All*
Δ*USDBroad*	-1.4550	-2.5729***	-1.0742	-2.5729***	-1.8720**
	[0.8477]	[0.8743]	[0.9069]	[0.0000]	[0.0000]
*Pension**Δ*USD*				1.2682	2.3653***
				[0.8935]	[0.5619]
*Insur**Δ*USD*				1.0853	1.2574*
				[0.9904]	[0.5965]
All Others*ΔUSD				2.1300**	0.4286
				[0.9661]	[0.4492]
Constant	0.2169**	0.2569**	0.2032**	0.2169**	0.0538
	[0.0884]	[0.1068]	[0.0861]	[0.0884]	[0.0420]
Obs.	1,010	257	753	1,010	948

Maturity and amplification effects

	(1)	(2)
Dependent Variable	Maturity > 5 years	Maturity < 5 years
Sector	Mutual Funds	Mutual Funds
ΔUSD Broad	-2.8101***	-1.0766
	[0.9531]	[1.0211]
Constant	0.2832***	0.2202*
	[0.0905]	[0.1236]
Observations	256	249
Country FE	✓	✓

- Remaining maturity by currency/country/year/investor type, long vs. short

Maturity and amplification effects

	(1)	(2)
Dependent Variable	Maturity $>$ 5 years	Maturity $<$ 5 years
Sector	Mutual Funds	Mutual Funds
ΔUSD Broad	-2.8101***	-1.0766
	[0.9531]	[1.0211]
Constant	0.2832***	0.2202*
	[0.0905]	[0.1236]
Observations	256	249
Country FE	✓	✓

- Remaining maturity by currency/country/year/investor type, long vs. short
- Behavior of the same investor type within the same country depending on bond maturity.

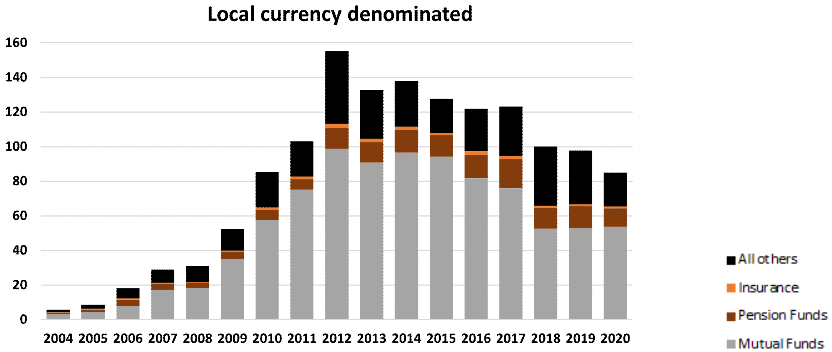
Conclusions (1)

- Unique dataset allows us to explore novel findings
  - liquidity management operations across the entire US investors base
- Local currency bonds display greater sensitivity in reaction to shifting financial conditions as captured by US dollar exchange rate fluctuations
- Mutual funds are procyclical, decrease their local currency holdings when the dollar appreciates.
- Insurance and pension funds are a "stickier" investor base and play a buffering role in the case of USD denominated bonds.
  - Paradoxically, EM dollar currency bonds benefit more than EM local currency bonds
- Role and risks by nonbank financial sector for global financial stability

Conclusions (2)

- Longer maturities mitigate rollover risk for borrowers, but this is achieved at the expense of greater sensitivity of bond prices to yield changes due to the greater duration risk for the lender.
- To the extent that market disruptions are made worse by duration risk, lengthening maturities may have the perverse effect of exacerbating rollover problems even in the case of local currency issuances.

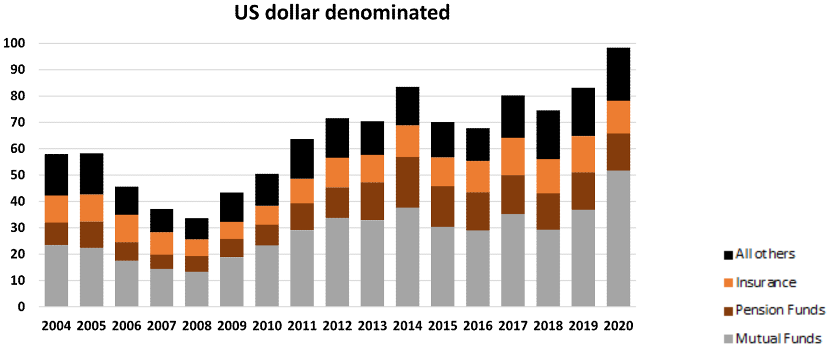
Conclusions (3)



(USD billion)

- US mutual fund investors have progressively decreased their holdings in local currency bonds....

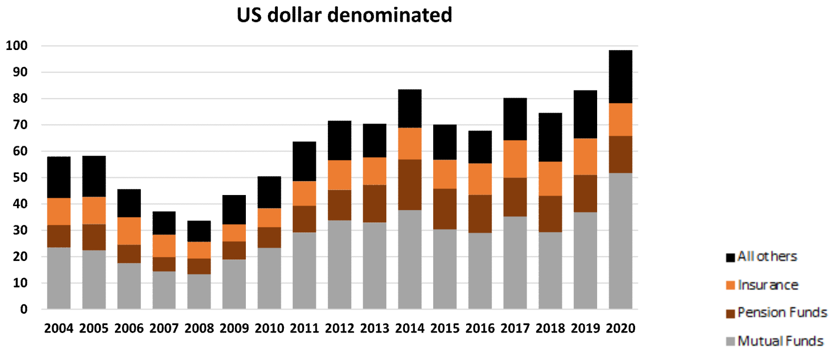
Conclusions (3)



(USD billion)

- ....while slowly but steadily increased their holdings denominated in US dollars.

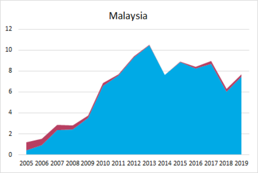
Conclusions (3)

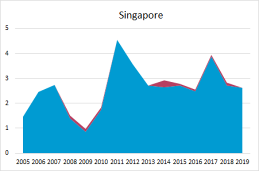


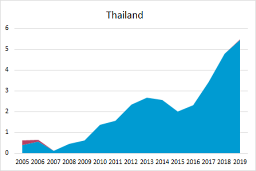
(USD billion)

- ....while slowly but steadily increased their holdings denominated in US dollars.
- EMEs have been able to overcome "Original Sin", yet global investors are moving away from local currency debt.

Dynamics of portfolio flows

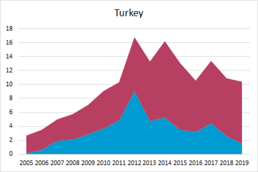


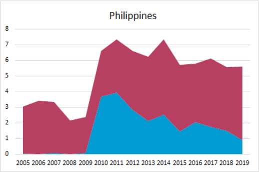


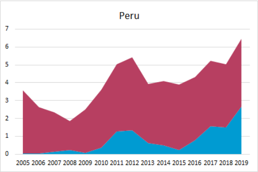


Portfolio holdings of sovereign local currency bonds by US investors (blue)
Portfolio holdings of sovereign bonds in USD by US investors (red)
(USD billion)

Dynamics of portfolio flows





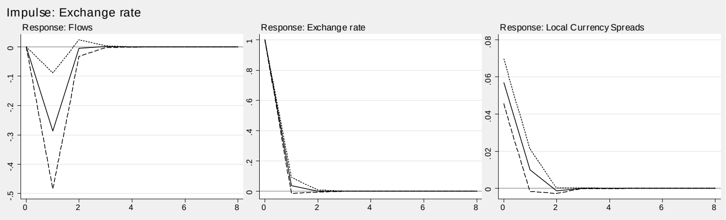


Portfolio holdings of sovereign local currency bonds by US investors (blue)
Portfolio holdings of sovereign bonds in USD by US investors (red) (USD billion)

Dynamics of portfolio flows

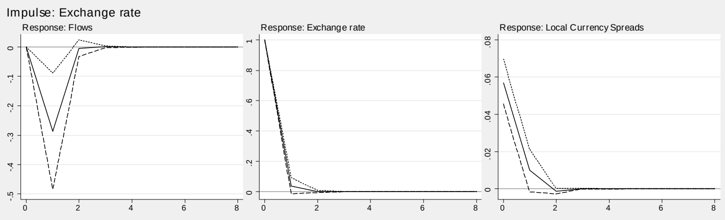
- Structural panel VAR with monthly notional portfolios flows, adjusted for valuation effects
- January 2012 to December 2021
- Sample of countries
  - 1. US investments mostly in local currency (Thailand, Malaysia, Singapore, Brazil, Korea, Mexico, Poland, S. Africa)
    2. US investments mostly in USD currency (Chile, Colombia, Hungary, Indonesia, Peru, Philippines, Russia, Turkey)
- Benchmark 3-variables SVAR
  - Investment Flows $\Rightarrow$ Exchange Rate $\Rightarrow$ Local Currency Spreads
- Cholesky ordering

Impulse Response Functions (Local currency investments)



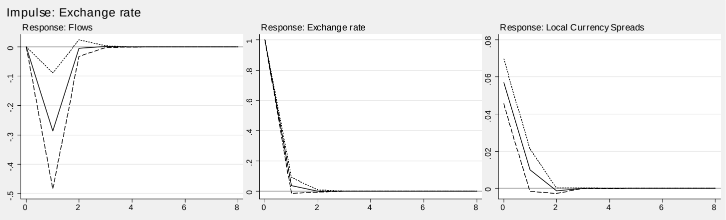
- A one percent appreciation of the bilateral exchange rate leads to a drop in local currency flows by 0.3% after one month (left chart)

Impulse Response Functions (Local currency investments)



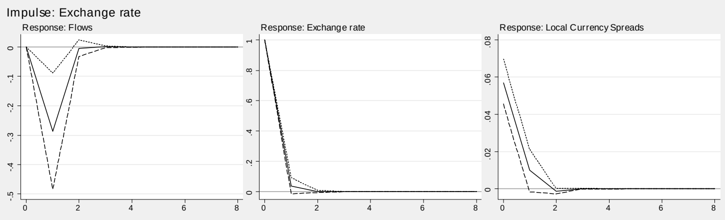
- A one percent appreciation of the bilateral exchange rate leads to a drop in local currency flows by 0.3% after one month (left chart)
- Dollar appreciation is associated with a simultaneous increase in local spreads (right chart)

Impulse Response Functions (Local currency investments)



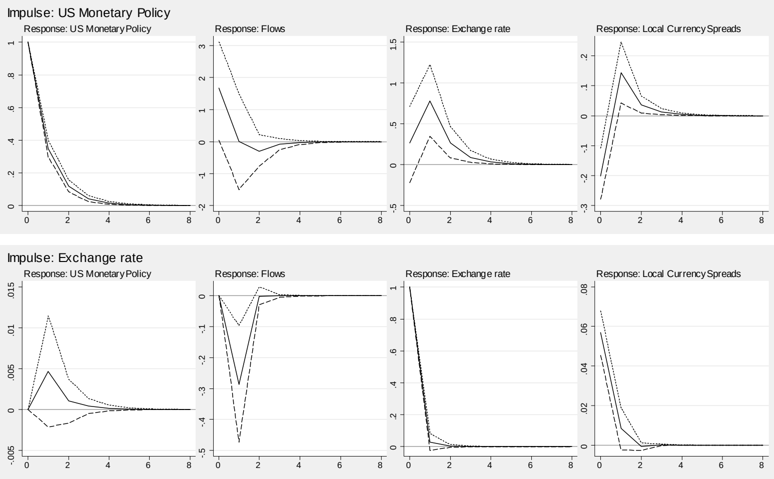
- A one percent appreciation of the bilateral exchange rate leads to a drop in local currency flows by 0.3% after one month (left chart)
- Dollar appreciation is associated with a simultaneous increase in local spreads (right chart)
- Dollar-based investors suffer "twice":

Impulse Response Functions (Local currency investments)



- A one percent appreciation of the bilateral exchange rate leads to a drop in local currency flows by 0.3% after one month (left chart)
- Dollar appreciation is associated with a simultaneous increase in local spreads (right chart)
- Dollar-based investors suffer "twice":
- Wind-chill (currency movements) on top of underlying temperature (local currency spreads)

US Monetary Policy



- A one percent increase in the US interest rate leads to a prolonged dollar appreciation (top panel, 3rd chart)