

# Currency Management by International Fixed Income Mutual Funds

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ABFER

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# Introduction

- ▶ Exchange rate movements contribute significantly to the risk of investments in international fixed income portfolios.
- ▶ Performance of two Barclays Global Aggregate Total Return Indices between 1990 and 2019:
  - ▶ Unhedged Index:
    - Average monthly return of 0.47%
    - Monthly standard deviation of 1.54%
  - ▶ USD-Hedged Index:
    - Average monthly return of 0.49%
    - Monthly standard deviation of 0.86%

Currency management is crucial for international portfolio management!

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# Research Questions

We compile **the first data set** of currency forward contracts used by US-based international fixed income funds and examine their currency risk management.

- ▶ How prevalent is the use of currency derivatives among international fixed income funds?
- ▶ Which factors drive the use of currency derivatives of international fixed income funds?
- ▶ What are the performance consequences of currency management by fixed income funds?

# Overview of Results

- ▶ Extensive use of currency forwards by global fixed income funds
  - 90% of sample funds use currency forwards. Forward is the dominant type of currency derivatives.
  - The average hedge ratio equals 18.7% of foreign currency exposure.
- ▶ Drivers of currency forward use:
  - **Risk management:** asset currency exposure, currency risk concentration, political and economic uncertainty.
  - **Return enhancement:** currency characteristics that predict future FX movements.
  - **Strategic motives:** past fund performance; fund clientele.
- ▶ Funds that hedge their currency exposure exhibit lower risk levels, but do not underperform.

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# Roadmap

- ▶ **Data and Summary Statistics**
- ▶ Determinants of Funds' Currency Forward Use
- ▶ Fund Performance



# Data Sources

- ▶ We collect data on actively-managed international fixed income funds from 2010 to 2018.
- ▶ Portfolio holdings from CRSP mutual fund holdings database.
- ▶ CUSIP-level issuer domicile and currency denomination from S&P Global.
- ▶ Contract-level information on currency forwards are manually collected from N-Q and NCSR/S filings.

# Forwards of J.P. Morgan Emerging Markets Debt Fund

## JPMorgan Emerging Markets Debt Fund

### SCHEDULE OF PORTFOLIO INVESTMENTS

AS OF MAY 31, 2018 (Unaudited) (continued)

(Amounts in U.S. Dollars, unless otherwise noted)

Forward foreign currency exchange contracts outstanding as of May 31, 2018 (amounts in thousands):

Currency Purchased		Currency Sold	Counterparty	Settlement Date	Unrealized Appreciation (Depreciation) (\$)	
AUD	1,401	USD	1,058	Goldman Sachs International	6/19/2018	2
CNH	44,623	USD	6,946	Goldman Sachs International**	6/19/2018	10
COP	21,171,857	USD	7,204	Goldman Sachs International**	6/19/2018	116
EUR	6,518	PLN	28,121	Barclays Bank plc	6/19/2018	15
INR	76,340	USD	1,118	Goldman Sachs International**	6/19/2018	12
USD	8,947	AUD	11,472	Australia & New Zealand Banking Group Ltd.	6/19/2018	271
USD	8,709	CAD	11,232	Credit Suisse International	6/19/2018	42
USD	7,914	CNH	50,441	Goldman Sachs International**	6/19/2018	52
USD	790	CNH	5,032	HSBC Bank, NA**	6/19/2018	6
USD	930	CNH	5,847	Royal Bank of Canada**	6/19/2018	19
USD	8,435	COP	23,317,854	Credit Suisse International**	6/19/2018	373
USD	8,913	COP	25,678,768	Goldman Sachs International**	6/19/2018	34
USD	9,084	CZK	185,532	HSBC Bank, NA	6/19/2018	677
USD	906	CZK	19,261	Societe Generale	6/19/2018	33
USD	24,823	EUR	20,540	Credit Suisse International	6/19/2018	783
USD	7,290	EUR	6,218	Goldman Sachs International	6/19/2018	13
USD	8,785	EUR	7,074	Royal Bank of Canada	6/19/2018	506
USD	8,902	HUF	2,223,902	Goldman Sachs International	6/19/2018	765
USD	8,943	INR	589,890	Merrill Lynch International**	6/19/2018	212
USD	7,929	INR	527,939	Standard Chartered Bank**	6/19/2018	115
USD	7,389	KRW	7,977,765	Goldman Sachs International**	6/19/2018	2
USD	9,171	KRW	9,764,729	Goldman Sachs International**	6/19/2018	130
USD	17,171	MXN	323,800	Credit Suisse International	6/19/2018	980
USD	8,521	PHP	446,245	Citibank, NA**	6/19/2018	46
USD	8,827	PHP	463,439	Merrill Lynch International**	6/19/2018	25
USD	8,817	PLN	29,995	HSBC Bank, NA	6/19/2018	696
USD	9,178	RON	34,748	HSBC Bank, NA	6/19/2018	466
USD	17,283	RUB	1,006,182	Credit Suisse International**	6/19/2018	1,183
USD	851	THB	26,761	HSBC Bank, NA	6/19/2018	14

## Measures of Currency Forward Use

- ▶ Notional amount of forward contracts in currency  $c$  expressed in USD:

$$Forward_{i,t}^c = \frac{\sum_{j=c} ForwardSales_{i,t}^j - \sum_{j=c} ForwardBuys_{i,t}^j}{TNA_{i,t}}$$

$$Forward_{i,t}^{net} = \sum_{c \neq USD} Forward_{i,t}^c$$

- ▶ Hedge ratio:

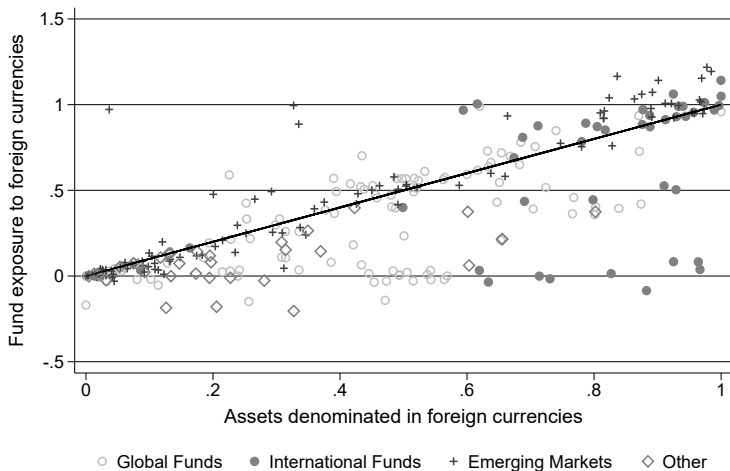
$$Hedge\_ratio_{i,t} = \frac{Forward_{i,t}^{net} / (1 + r_T)^T}{\sum_{c \neq USD} \omega_{i,t}^c},$$

where  $\omega_{i,t}^c$  is the portfolio weight of assets denominated in  $c$ .

- ▶ Total exposure to foreign currencies after hedging:

$$Exposure_{i,t} = \sum_{c \neq USD} (\omega_{i,t}^c - Forward_{i,t}^c / (1 + r_T)^T)$$

# Asset Denomination $\neq$ Currency Exposure



# Roadmap

- ▶ Data and Summary Statistics
- ▶ **Determinants of Funds' Currency Forward Use**
- ▶ Fund Performance

# Potential Determinants of Currency Forward Use

- ▶ Risk management:
  - Exposure to foreign currency risks through asset denominations
  - Concentration of currency holdings
  - Political and economic risks of foreign countries
- ▶ Return enhancement:
  - Past currency returns (currency momentum)
  - Interest rate differential (currency carry)
- ▶ Managerial strategic motive:
  - Recent fund performance
  - Institutional vs retail clientele

# Cross-Sectional Variation of Currency Forwards

Model	Logit	OLS	
Dependent variable	$1_{\text{Forwards}}$ (1)	$\text{Forward}^{\text{net}}$ (2)	$\text{Hedge\_ratio}$ (3)
<b>Assets denominated in G10 currencies</b>	0.0261*** (0.010)	0.269*** (0.071)	0.256 (0.168)
<b>Assets denominated in other foreign currencies</b>	0.0241** (0.010)	0.0441 (0.059)	-0.0255 (0.144)
<b>Portfolio currency concentration</b>	0.0346 (0.500)	7.165** (3.477)	38.23* (23.031)
Ln(Fund family TNA)	0.189*** (0.065)	0.570 (0.751)	2.955* (1.757)
Expense ratio	-0.413 (0.550)	-10.73** (4.837)	-30.06*** (10.942)
<b>Fraction of assets in institutional shares</b>	0.316 (0.354)	-6.956** (3.327)	-18.11* (9.666)
Observations	6463	6463	6192
Adjusted $R^2$	0.175	0.124	0.076
Time FE	Y	Y	Y
Add'l controls: Ln(Fund TNA), Portfolio weight of corporate bonds, Fund age, Fund turnover			

# Currency forwards and market conditions

Funds' use of currency derivatives varies with market conditions:

- ▶ Currency hedging becomes more valuable when economic and political uncertainty is high.
  - Proxied by World Uncertainty Index (WUI) developed by Ahir, Bloom, and Furceri (2018).
  - Volatility of exchange rates.
- ▶ Currency forwards can be used to enhance performance if fund managers have a view on future currency returns.
  - Currency momentum: Hedge less when currency return has been high (Menkhoff et al. 2012).
  - Currency carry: Hedge less when foreign interest rate differential is high (Fama 1984).



# Time-Series Variation of Currency Forwards

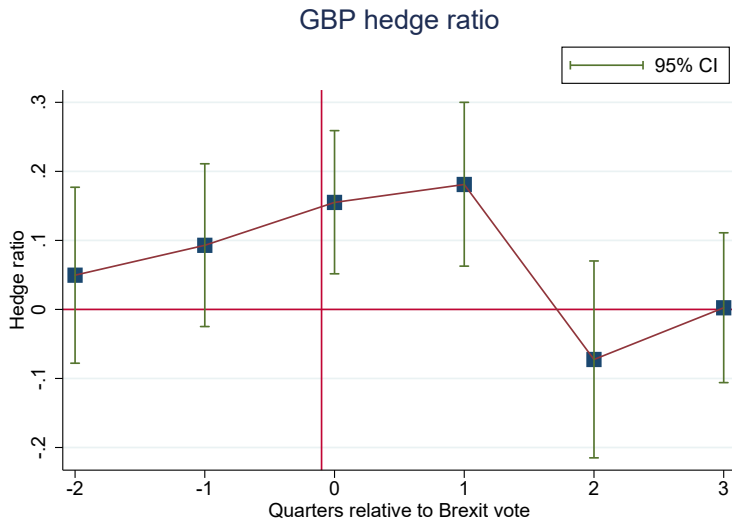
Dependent variable	<i>Hedge_ratio</i> (1)	<i>Forward</i> <sup>net</sup> (2)	$\omega$ <sup>foreign</sup> (3)	<i>Exp</i> <sup>foreign</sup> (4)
Average foreign currency excess return	-0.746** (0.355)	-0.277** (0.111)	0.0278 (0.058)	0.266** (0.115)
Average G10-US interest rate differential	-5.934** (2.609)	-1.355 (0.897)	0.0396 (0.588)	1.258 (1.039)
World Uncertainty Index	0.475** (0.200)	0.119* (0.063)	-0.0510 (0.040)	-0.155** (0.072)
Fund characteristics	Y	Y	Y	Y
Fund FE	Y	Y	Y	Y
Observations	6185	6457	6457	6457
Adjusted $R^2$	0.646	0.755	0.934	0.875

# Within-Fund, Between-Currency Variation of Hedging

Dependent variable	<i>Hedge_ratio<sub>c</sub></i> (1)	<i>Forward<sub>c</sub></i> (2)
Currency return relative to USD last quarter	-0.169*** (0.057)	-0.00675* (0.004)
Interest rate differential relative to US	-0.644** (0.268)	-0.117*** (0.031)
Currency daily return volatility last quarter	0.616*** (0.147)	0.0488*** (0.013)
Country-specific World Uncertainty Index	11.95*** (1.745)	0.362** (0.152)
Currency forward market bid-ask spread	-0.101** (0.041)	-0.0115** (0.005)
Portfolio weight of assets denominated in this currency	0.594*** (0.092)	0.285*** (0.026)
Observations	50009	50009
Adjusted $R^2$	0.260	0.257
Fund-by-Quarter FE	Y	Y

# Hedge Ratio around the Brexit Referendum

The Brexit referendum on Jun 23, 2016.



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# Performance Measures

- ▶ Currency return and currency-adjusted return

$$Ret_{i,t}^{Currency} = \sum_{c \neq USD} Exposure_{i,t-1}^c * r_{i,t}^c$$

$$Ret_{i,t}^{CurAdj} = Ret_{i,t}^{Fund} - Ret_{i,t}^{Currency}$$

- ▶ Alphas adjusted for currency changes:

$$\begin{aligned} Return_{i,t} - rf_t &= \alpha_i + \beta_i^{GlobHg} (GlobalMarket_t^{Hedged} - rf_t) \\ &+ \beta_i^{Emerg} (EmergMkt_t - rf_t) + \beta_i^{Term} Term_t + \beta_i^{Credit} Credit_t \\ &+ \beta_i^{RX} RX_t + \beta_i^{Carry} HML_t^{FX} + \epsilon_{i,t} \end{aligned}$$

# Fund Full-Sample Performance

Quintile portfolios sorted by funds' time-series average foreign currency exposure

	1 (Low)	2	3	4	5 (High)	Low - High
Average foreign currency exposure	-0.01	0.05	0.29	0.57	0.97	-0.98***
Average monthly excess return (%)	0.263	0.296	0.168	0.106	0.037	0.225***
Average standard deviation (%)	1.18	1.70	1.68	1.76	2.58	-1.40***
Average annualized Sharpe Ratio	0.79	0.62	0.36	0.26	0.09	0.70***
Currency return (%)	-0.039	-0.056	-0.135	-0.191	-0.252	0.213***
Currency-adjusted return (%)	0.341	0.386	0.338	0.330	0.313	0.028
$\alpha_2$ (%)	0.035	0.040	0.018	-0.047	-0.108	0.144***

# Conclusions

- ▶ Prevalent use of currency forwards by US-based international bond funds.
- ▶ Currency forward use varies with risk management, return enhancement, and strategic motives.
- ▶ Funds that hedge their currency exposure exhibit lower total risk levels and do not generate inferior returns.