Shorting the Dollar When Global Stock Markets Roar: The Equity Hedging Channel of Exchange Rate Determination*

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1 Introduction

We highlight a channel through which global equity market shocks influence exchange rate variation: the collective hedging of foreign exchange (FX) risk by institutional investors (IIs) such as pension and insurance funds. This equity hedging channel of exchange rate determination is driven by the need for investors with foreign equity positions to hedge against increased FX ex-

out other potential mechanisms that could explain the relationship we observe between shocks to the MSCI and the exchange rate.

I. Causality Between Forward Flows and the Exchange Rate. In order to ensure that our analysis is valid and to address potential concerns that hedging activities by IIs may not directly cause

cross-currency basis for all benchmark forward contract horizons.

III. Debt Hedging. The observed hedging that we see is not in response to a positive shock in

similar to the baselines ones, bolstering confidence in the view that the equity hedging channel we find in the data is indeed driven by value shocks to MSCI and not merely coincide with changes in the risk appetite of investors that drive both the MSCI and the exchange rate.

tion. We center our analysis around a straightforward litmus test for the importance of this chan-

The second part of the paper, to which we turn our attention next, tests the model's prediction

FX market following a rise in MSCI is taking place in the forward market, bolstering confidence in the interpretation of our results as being mainly driven by the equity hedging channel (see

Exchange Rate Determinants. The determinants of exchange rate behavior have long alluded researchers (Meese and Rogoff (1983)), with the data offering only a weak connection between ex-

the equity hedging channel we emphasize, European investors would still experience increased FX exposure to the dollar and might want to hedge against this exposure, thereby leading to fluctuations in the FX market.

Hedging and Exchange Rates. There are two additional papers that are relevant to ours in studying the role of hedging in exchange rate determination, which we turn to discuss next. The first is Melvin and Prins (2015

omy so that a counteracting hedging mechanism from the world economy does not prevail and eliminate the local one. And, third, at the core of their debt hedging channel is a CIP-deviation-based mechanism stemming from global arbitrageurs' concave return from investment in non-swap related activity, an element which is omitted from our framework due to the negligible cross-currency basis response to MSCI innovations we find in the data (also see related discussion on Page 12).

move in response to foreign equity innovations. And we also confirmed this finding for several other economies whose institutional background seems conducive to a meaningful equity hedging channel (see Section 7.2). Hence, the data rejects a meaningful role for FX swaps in the equity

sectors. It is noteworthy that the more central buyer of dollar forwards throughout the bulk of the sample is the real sector. These buying and selling activities are intermediated by FX dealers (local banks) who provide liquidity to the market and are central in the determination in exchange rates (see, e.g., Gabaix and Maggiori (2015) and Itskhoki and Mukhin (2021)); only at the end of the

5.1.3 Macro-Financial Data

We use several daily frequency macro-financial variables in our analysis, both foreign and local, all of which cover the IIs' FX flows' sample (4/26/2011-8/18/2021). All of these variables are taken from Bloomberg and their values are end-of-day quotes.

MSCI ACWI IMI Index. The MSCI All Countries World Index Investable Market Index (MSCI ACWI IMI; henceforth MSCI) is our measure of foreign stock prices, the focal impulse underlying

where t indexes time at daily frequency; D$MSCI_t$

sumption of a normal-inverse Wishart conjugate prior structure leads to a normal-inverse Wishart posterior distribution for the block-recursive equation parameters.

That the accumulated forward flow responses dwarf the accumulated spot flow responses at all horizons stresses the dominant role of the equity hedging channel in driving the significant and immediate exchange rate appreciation from the first sub-figure of Figure 8a. In Section 6.7 we discuss how the pre-COVID sample based results (shown in Appendix D.3 of the online appendix to this paper) strengthen this claim by showing that there is no longer significant selling of spot dollars while the selling of dollar forwards continues to be significant, this in tandem with the MSCI innovation accounting for as much as 36% of the variation in the spot rate (even moderately higher than the baseline 31% share). Taken together, the baseline and pre-COVID sample results point to a clear dominance of the forward flows response over the spot flows one, which in turn provides important reassurance that this paper's results are not driven by the FX-*spot*-market-

sector significantly raises its buying (selling) of forward (spot) dollars and the real sector significantly raises its buying of dollar forwards while insignificantly changing its spot flows. (The selling of spot dollars on the part of the local banks and IIs, without any corresponding significant buying of such dollars on the part of the other participants for which we have such data, indicates that the BOI is acting as a major buyer of these sold spot dollars.)

To better understand the role of the banking sector and real sector as the holders of the long FX position that oppo1that ongesponding sign w'gn thndi337(Ft)-2gu(al)-305590.676 .0 r / F.676 .0 RG [g1005590

As in Gabaix and Koijen (2020), we define the Bartik instrument shock as the cross-sectional mean (equally-weighted-average) of our 14 IIs' idiosyncratic shocks. Gabaix and Koijen (2020) define and compare the Bartik instrument in relation to their GIV instrument and emphasize that the two instruments should be viewed as complementary identification approaches. Specifically, while the GIV approach seems to be the natural and preferable method for identification when

(2). (The estimation and inference procedure for Equations (3) and (4) is shown in Appendix C of the online appendix to this paper.)

The coefficient of interest is F_h, whose estimate provides the impulse response of our outcome

foreign equity positions' capital gains. I.e., one may worry that what we are picking up in the data in this paper is mainly a portfolio rebalancing mechanism where forward dollar selling substitutes

losses arising from future fluctuations in the value of the dollar. This approach offers an additional

maturity (1 on the x-axis) all exhibit statistical significance and negative values, aligning with our initial expectations. Remarkably, these estimates cumulatively amount to approximately -0.78, suggesting that nearly 80% of forward contracts' settlement is funded by IIs' tapping into the FX swap market. This empirical evidence substantiates our hypothesis that II's do not engage in actual foreign stock sales but rather maintain exposure to the assets when using FX forwards. Furthermore, it is important to highlight that the estimates for the days preceding and following the maturity date are in close proximity to zero, indicating their non-significance. This outcome

global risk shocks are being picked up by our MSCI innovations, thereby confounding our inter-

capital variable. This variable is a reasonable proxy for LOA as higher values in it imply more available equity for global financial institutions to implement arbitrage activities. Hence, the sum of the estimated coefficient on the MSCI innovation and that on the interaction between this innovation and the He et al.

shares of the aggregate IIs' foreign equity position.[22] We then estimate our model using the latter aggregate return series instead of the MSCI return series. (We also report in the context of this robustness check that the correlation between these two return series is 98.3%, indicating that our baseline MSCI return series is an excellent measure of the actual aggregate return of IIs' foreign equity portfolio.)

can be viewed as the net outcome of the *rise* in hedging from global equity price increases and the *decline* in hedging from global debt price decreases induced by the driving global equity shock. In other words, the equity hedging channel we find in the data is not overstated due to a debt hedging mechanism. If anything, it is understated on account of it.

7 External Validity

This section discusses the issue of our analysis's external validity, i.e., whether we can infer a broader conclusion regarding the equity hedging channel we uncover in Israel for other economies as well. We first lay out three necessary conditions for a meaningful equity hedging channel along with some survey evidence supporting the likely relevance of these conditions for a broad sample of economies. Then, we provide estimates of exchanges rate and cross-currency basis responses to an MSCI innovation for six economies which appear to belong to the latter sample.

7.1 Conditions for a Meaningful Equity Hedging Channel

An important question arising from this paper's analysis is whether its obtained results can be

to go down when computing it in terms of U.S. pension funds' total investment (i.e., direct and indirect (through investment funds) investment). But even if this number were much higher, so long that the economy at hand is small, U.S. pension funds' position (or any other large economy's

E.g., according to the OECD 2019 Survey of Investment Regulation of Pension Funds, such minimal ratios are required for pension funds in Chile (50%), Colombia (50%-85%), Denmark (80%),

the equity hedging channel. (Also see related discussion from Page 12.) Towards this end, we re-estimate Equations (1) and (2) using as outcome variables for the latter equation the spot rates and cross-currency basis for these six economies relative to the dollar.

Results for Spot Rates. Figure 16a presents these variables' impulse responses and Figure 16b presents the share of their FEV that is attributable to the MSCI innovation. For all six economies, a

8 Conclusion

Ben Zeev, N.: 2023, The TFP channel of credit supply shocks, *The Review of Economics and Statistics* **105**(2), 425–441.

Ellul, A., Jotikasthira, C. and Lundblad, C. T.: 2011, Regulatory pressure and fire sales in the corporate bond market, *Journal of Financial Economics* **101**(3), 596–620.

Evans, M. D. D. and Lyons, R. K.: 2002, Order flow and exchange rate dynamics,

He, Z. and Krishnamurthy, A.: 2013, Intermediary asset pricing, *American Economic Review* **103**(2), 732–70.

Menkhoff, L., Sarno, L., Schmeling, M. and Schrimpf, A.: 2016, Information flows in foreign exchange markets: Dissecting customer currency trades, *The Journal of Finance* **71**(2), 601–634.

Mercer: 2020, European asset allocation insights 2020,

Table 1: **Summary Statistics of IIs' Forward Contracts' Maturity Distribution.**

Volume-Weighted Mean	Median	25th Percentile	75th Percentile	Min	Max
52	25	3	64	0	1767

Notes: This table shows the volume-weighted mean, median, and upper and lower per-

Figure 2: **Time Series of IIs' Foreign Assets, Foreign Equities, FX Hedge Ratio, and USD/ILS Spot Rate.**

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Figure 3: **Time Series of Accumulated FX Forward and Spot Flows.**

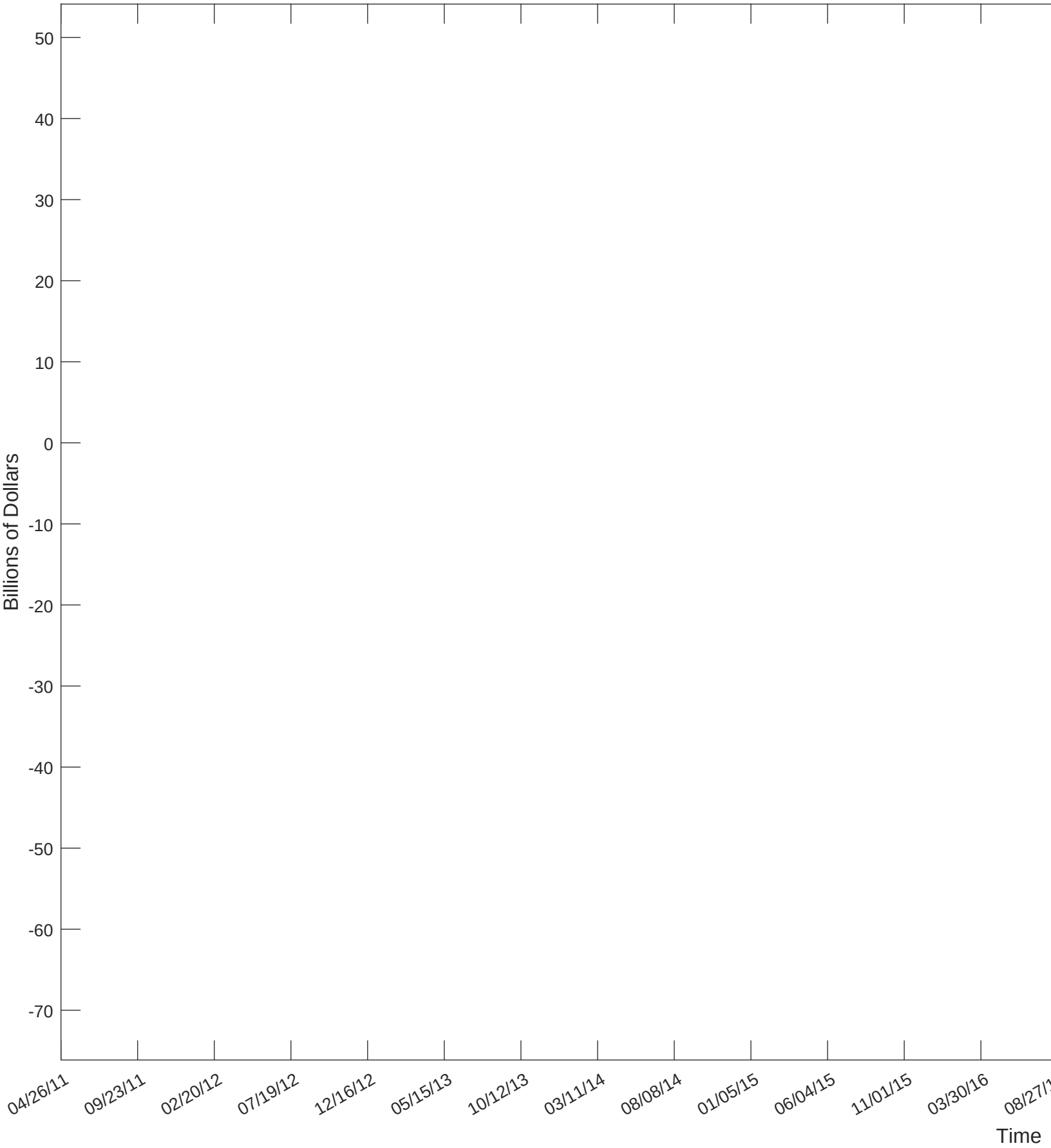
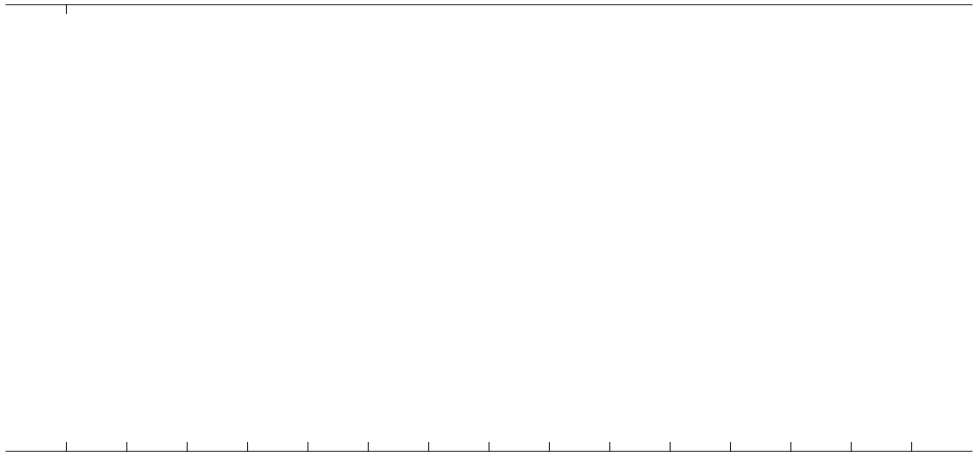


Figure 6: **The Relation between FX Forwards and FX Spots.**



Notes: This table presents the point estimates obtained from a panel regression with fixed effects, following the specification of Equation (5) but replacing the FX swap outcome

Figure 7: **Impulse Responses to a One Standard Deviation MSCI Index Innovation: MSCI and Interest Rates**.

Figure 8: **FX Market Prices and Quantities: (a) Impulse Responses; (b) FEVs**.

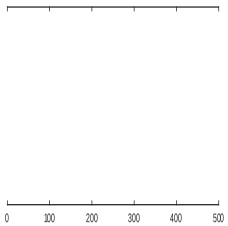


Figure 9: **Impulse Responses to a One Standard Deviation MSCI Index Innovation: Non-II Sectors' Spot and Forward Flows**.

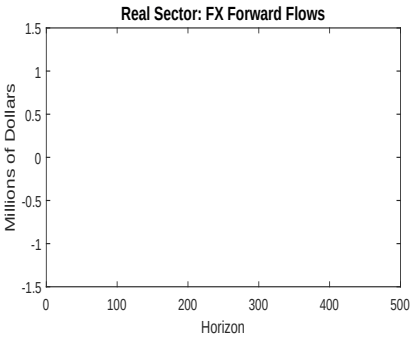


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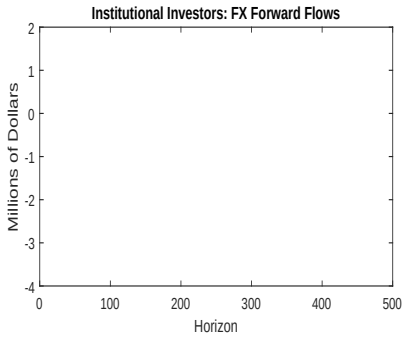
Figure 10: **Impulse Responses to a One Standard Deviation MSCI Index Innovation: Banking and Real Sectors' Forward Flows Versus IIs' Forward Flows**.



Notes: This figure presents the difference between raw and accumulated (in absolute terms) response of IIs' forward flows and banking and real sectors' raw and accumulated forward flows, respectively, to a one standard deviation MSCI index innovation from the model described by Equations (1) and (2). (For completeness, responses themselves (both raw and accumulated) for all three sectors are also shown in the figure.) Responses are in terms of deviations from pre-shock values (in million of dollar terms). Horizon (on x-axis) is in days.

Figure 11: **Impulse Responses to a One Standard Deviation MSCI Index Innovation: Interest Rate Spreads and Cross-Currency Basis**.

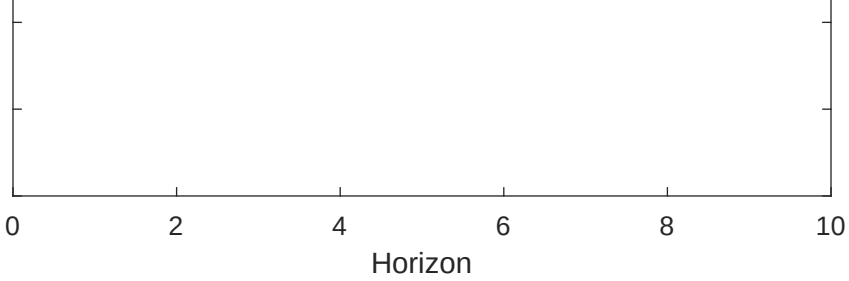
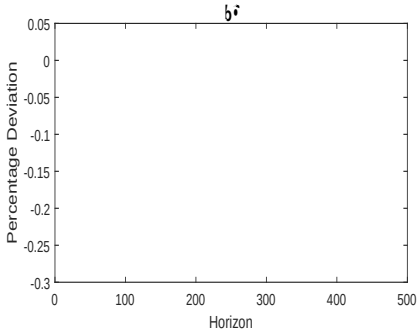


Figure 12: **Impulse Responses to a One Standard Deviation GIV-Based Forward Flow Shock: FX Market Prices and Quantities**.

Figure 13:

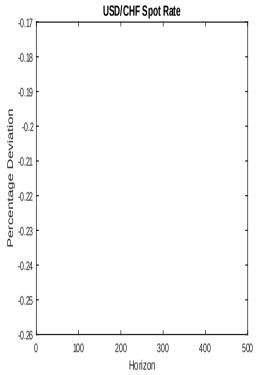
Figure 14: **Impulse Responses to a One Standard Deviation MSCI Index Innovation Orthogonalized with Respect to Risk Appetite Shocks: FX Market Prices and Quantities**.

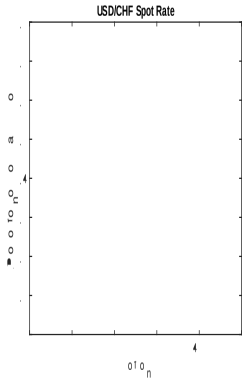


Notes: This figure presents the impulse responses of the spot and forward rates and quantities to a one standard deviation MSCI innovation from an augmented version of the model described by Equations (1) and (2) where current and lagged values of the daily EBP series from Gilchrist et al. (2021) are added to the RHS of Equation (1). Responses are

Figure 15: **LOA-Dependent Impulse Responses to a One Standard Deviation MSCI**

Figure 16: **Spot Exchange Rates for Other Economies: (a) Impulse Responses; (b) FEVs**.

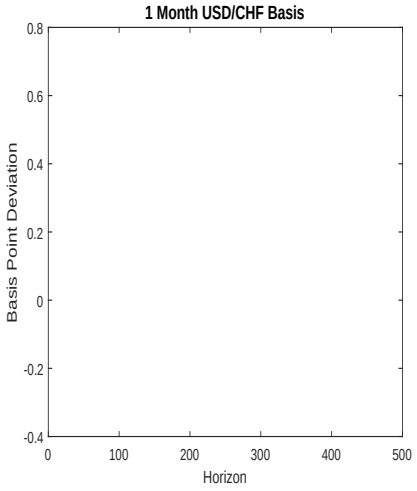




(a) Impulse Responses of Spot Exchange Rates for Other Economies to a One Standard Deviation MSCI Index Innovation.

(b) FEV of Spot Exchange Rates for Other Economies Attributable

Figure 17: **Cross-Currency Basis for Other Economies**.



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