Online appendix for "The Perfect Storm: Forex Interventions, Global Banks' Limited Risk-Bearing Capacity, Deviations from Covered Interest Parity, and the Impact on the USD/ILS Options Market"

A.1.2 Intervention regime II

B Two popular investment strategies in foreign exchange option markets

B.1 FX option deltas

options (a call and a put) plus the IV of the delta-neutral straddle:

$$BF25 = 0.5 [IV(d(25c)) + IV(d(25p))] \quad ATMV,$$
(C.6)

where the numbers in parenthesis refer to the call and put option's z-value. The 25-D

the more profitable BF spreads should be,²¹ as interventions are expected to stabilize the targeted FX rate.²²

²¹That is, their quoted prices should increase. 22

C Daily cross-correlation between the main variables and the op0 [(C)-18e2rata

Table D.1 showC the daily cross-correlations between the main variables of our empirical exercise in the paper and the price quotes of the option trading strategies (Tables D.4-D.2). We see that the main variables are rather weakly correlated in the cross-section, aC in Table D.1:

Table D.1: Cross-correlation between the main variables

	DUSD/ILS	DEUR/USD	DNEER	DForward ₃ m	Foreign flowC - total	Local flowC - real sector	Local flowC - financial sector	Local flowC - inst. investorsD5-year Israeli CDS	DLIBOR	DTELBOR
Spot and forward exchange rates:										
DUSD/ILS	1									
DEUR/USD	-0.50	1								
DNEER	0.79	0.05	1							
DForward _{3m}	0.89	-0.42	0.74	1						
FlowC:										

Table D.3 presents the cross-correlation between the price quotes of the 10-D and the 25-D butterfly spreads ("BF10" and "BF25") for six different maturities, ranging from one week ("1w") to twelve months ("12m"). We also include the correlation between these price quotes and the log return of the USD/ILS spot rate ("D USD/ILS").

Table D.3: Cross-correlation between the USD/ILS butterfly spreads and the USD/ILS spot rate

BF101w BF101m BF103m BF106m BF109m BF1012m BF251w BF251m BF253m BF256m BF259m BF2512m DUSD/ILS

Finally, Table

D Foreign exchange transaction volumes and relative bidask spreads for the three option strategies



Figure E.1: Daily foreign exchange transaction volume

Notes:

We also display the box plots of the relative bid-ask spread (BAS) for the three option strategies that we use in the paper for 28 currency pairs across six maturities, ranging from one week ("1 W") to twelve months ("12 M"). The currency pairs are retrieved from Bloomberg and are the following: Australian dollar (AUD)/USD, euro (EUR)/Czech koruna (CZK), EUR/pound sterling (GBP), EUR/Japanese yen (JPY),

Figure E.3: Relative bid-ask spread for the risk reversals across six maturities



Notes: The figure displays the box plot of the quoted bid-ask spreads of the risk reversals (RR) divided by the corresponding mid-quote for 28 currency pairs across six maturities, ranging from one week ("1 W") to twelve months ("12 M"). The average relative BAS for the USD/ILS RR contracts are represented by the dots. The data span the period from January 01, 2013 to December 31, 2020. Source: Bloomberg.





Notes: The figure displays the box plot of the quoted bid-ask spreads of the butterfly spreads (BF)

E The higher moments of the risk-neutral density

This appendix shows how risk reversals (RR) and butterfly (BF) spreads are related to the implied skewness and excess kurtosis of the RND. The RR and the BF spread (also

comparable different assets (that is, exchange rates in our paper):²⁷

$$ATMV_{t,T} = S.$$

The other expressions in Equation (G.1) represent the skewness $(s_{t,T})$, the excess kurtosis $(k_{t,T})$ and the z-value (*d*

equals 0.25 under the GK framework.³²

2. After re-arranging and inverting this equation, we get $d(25c) = F^{-1} 0.25 \exp r^{f} t$.³³

We can similarly learn that the mean is greater than the median for all the RRs that we consider. This suggests that the RND is on average right-skewed, that is, the RND on average exhibits a positive skewness. From that table we also learn that the RRs are most often positive throughout our sample period. This finding is in line with the aforementioned inequalities, whereby a positive skewness is associated with non-negative price quotes for the RRs (Equation (G.6)).

If we scale BF

F The costs of foreign exchange interventions

Amador et al. (2020) propose a metric D_t that allows central banks to quantify the resource costs associated with FX interventions carried out at time *t*. The metric is approximated by the covered interest parity (CIP) deviations observed for three-month-ahead assets; that is, the ILS and USD sovereign zero-coupon yields for a maturity of three months ($i_t^{ILS,3m}$ and $i_t^{USD,3m}$

Figure G.1: Costs of foreign exchange interventions

Notes: The figure displays the costs of foreign exchange interventions. This variable is a function of covered interest parity deviations, the market value of the stock of foreign reserves held by the BOI at the end of each month and the ILS denominated monthly Israeli GDP data. The variables used to compute the CIP deviations are retrieved from Bloomberg. The data on foreign reserves is obtained

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