Supplementary Appendix of Liquidity and Exchange Rates: An Empirical Investigation

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Supplementary Appendix:

A4 Robustness
includes:
i)   baseline result (Table 2A) with average of foreign country variables
ii)   baseline result (Table 2A) in quarterly frequency and quarterly change of variables
iii)   regressions tables in the main text with all coefficients reported
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vii) regression tables of country by country regressions
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Appendix A4: Robustness

i)   baseline result (Table 2A) with simple average of foreign country variables

Estimation result of $\Delta \bar{s}_{j,t} = \alpha_j + \beta_1 \bar{q}_{j,t-1} + \beta_2 (\Delta \bar{\eta}_{j,t}) + \beta_3 (\Delta \bar{i}_{j,t}^R) + \beta_4 (\bar{\eta}_{j,t-1}) + \beta_5 (\bar{i}_{j,t-1}^R) + u_{j,t}$

	$\bar{q}_{j,t-1}$	$\Delta \bar{\eta}_{j,t}$	$\Delta \bar{i}_{j,t}^R$	$\bar{\eta}_{j,t-1}$	$\bar{i}_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0614***	-6.0687***	-6.1722***	-0.1867	-0.4425**	-0.0365**	228	0.2469
	(0.0236)	(1.3435)	(0.8179)	(1.0228)	(0.2129)	(0.0157)		
CAD	-0.0543**	-3.9156**	-5.6876***	1.3545	-0.3353	-0.0419**	228	0.2191
	(0.0249)	(1.6968)	(0.9024)	(1.1010)	(0.2197)	(0.0193)		
EUR	-0.0336*	-4.9391***	-4.9768***	-2.2041*	-0.4549*	-0.0454**	228	0.1651
	(0.0173)	(1.5917)	(0.8307)	(1.1837)	(0.2532)	(0.0214)		
JPY	-0.0710***	-2.7778	-7.5821***	6.1937***	-0.0513	0.3204***	228	0.2401
	(0.0186)	(1.8555)	(1.3114)	(1.4237)	(0.1703)	(0.0777)		
NZD	-0.0542***	-7.4661***	-6.8127***	-0.3037	-0.0143	-0.0297***	228	0.2530
	(0.0206)	(1.0041)	(0.9543)	(0.6242)	(0.2301)	(0.0110)		
NOK	-0.0197	-3.4964***	-4.7118***	0.8816	-0.2086	0.0245	228	0.1728
	(0.0133)	(0.9300)	(0.7642)	(0.6754)	(0.1388)	(0.0157)		
SEK	-0.0744***	-3.8231***	-3.6216***	-0.9291*	0.0694	0.0959***	228	0.1489
	(0.0257)	(1.0630)	(0.8572)	(0.5328)	(0.1746)	(0.0329)		
CHF	-0.0138	-0.4446	0.0071	0.7538	-0.3945	-0.0163	228	0.0204
	(0.0089)	(1.1473)	(1.0584)	(0.8195)	(0.3437)	(0.0113)		
GBP	-0.0461***	-1.6355	-5.1666***	1.7416	-0.8758***	-0.0688***	228	0.1423
	(0.0160)	(1.3084)	(1.0045)	(1.0702)	(0.3078)	(0.0238)		
USD	-0.0130	-8.4175***	-3.9179***	-2.6690***	0.0359	-0.0072	228	0.2299
	(0.0089)	(1.2562)	(0.9780)	(0.7743)	(0.1498)	(0.0091)		

The table reports the OLS estimates of the coefficient of the regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are simple OLS standard errors. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-side test.

ii) baseline result (Table 2A) in quarterly frequency and quarterly change of variables

Robustness of table 2A – full table of table 2A

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0921***	-3.6750**	-5.4546***	1.9039	-0.9960***	0.0409***	675	0.2379
	(0.0210)	(1.4998)	(0.8259)	(1.3393)	(0.3109)	(0.0119)		
CAD	-0.0839***	-4.8972***	-5.1905***	2.8934***	-0.9549***	0.0255***	675	0.2541
	(0.0173)	(1.2404)	(0.7038)	(1.1110)	(0.2770)	(0.0072)		
EUR	-0.0669***	-5.2973***	-5.0077***	1.0649	-0.7177***	-0.0106	675	0.2147
	(0.0176)	(1.0584)	(0.6500)	(0.9884)	(0.2736)	(0.0065)		
JPY	-0.1212***	-0.9803	-5.4163***	6.7560***	-0.4215	0.5973***	675	0.2675
	(0.0298)	(1.9772)	(1.0659)	(1.7511)	(0.3545)	(0.1397)		
NZD	-0.0823***	-5.1755***	-4.8781***	1.8512	-0.6467*	0.0437***	675	0.2165
	(0.0237)	(1.4958)	(0.9104)	(1.2685)	(0.3502)	(0.0169)		
NOK	-0.0614***	-3.7301***	-4.5606***	3.4978***	-0.6833***	0.1331***	675	0.2530
	(0.0187)	(1.1997)	(0.6912)	(1.1292)	(0.2614)	(0.0385)		
SEK	-0.0690***	-4.9423***	-4.1352***	-0.1468	-0.4995*	0.1417***	675	0.1749
	(0.0181)	(1.1676)	(0.7171)	(1.0509)	(0.2855)	(0.0381)		
CHF	-0.0489***	-3.5282**	-3.1226***	3.4211***	-0.7530***	0.0129	675	0.1479
	(0.0173)	(1.3768)	(0.7827)	(1.2062)	(0.2785)	(0.0090)		
GBP	-0.0669***	-1.7355	-5.9619***	3.2529***	-1.0102***	-0.0207**	675	0.2305
	(0.0183)	(1.2479)	(0.7239)	(1.1803)	(0.2798)	(0.0091)		
USD	-0.0364*	-7.5254***	-4.0988***	-3.5052***	-0.3311	-0.0689*	675	0.2170
	(0.0198)	(1.4844)	(0.8492)	(1.3283)	(0.3093)	(0.0416)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999Q1-2017Q4.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

iii) regressions tables in the main text with all coefficients reported

Robustness of table 2A – full table of table 2A

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0284***	-5.2710***	-5.7441***	0.2859	-0.2746***	0.0117***	2052	0.1891
	(0.0071)	(0.7181)	(0.5356)	(0.4313)	(0.1047)	(0.0040)		
CAD	-0.0267***	-4.6086***	-5.4603***	0.5648	-0.2635***	0.0070***	2052	0.1723
	(0.0062)	(0.6238)	(0.4910)	(0.3827)	(0.0968)	(0.0025)		
EUR	-0.0203***	-4.6406***	-5.0187***	-0.0199	-0.1843**	-0.0043**	2052	0.1434
	(0.0059)	(0.5179)	(0.4103)	(0.3109)	(0.0891)	(0.0021)		
JPY	-0.0400***	-4.3863***	-6.3171***	2.1844***	-0.1223	0.1973***	2052	0.1692
	(0.0102)	(0.9532)	(0.7367)	(0.5770)	(0.1220)	(0.0476)		
NZD	-0.0276***	-6.2906***	-6.0200***	0.1755	-0.1178	0.0127**	2052	0.1955
	(0.0082)	(0.7275)	(0.6082)	(0.4340)	(0.1216)	(0.0059)		
NOK	-0.0190***	-4.0106***	-4.8711***	0.6109	-0.1815*	0.0395***	2052	0.1537
	(0.0068)	(0.6138)	(0.4877)	(0.3915)	(0.0940)	(0.0139)		
SEK	-0.0226***	-4.5193***	-4.5991***	-0.3225	-0.1193	0.0460***	2052	0.1315
	(0.0062)	(0.5796)	(0.4631)	(0.3558)	(0.0968)	(0.0131)		
CHF	-0.0129**	-2.3197***	-2.7587***	0.6843	-0.2153**	0.0016	2052	0.0509
	(0.0065)	(0.7129)	(0.5557)	(0.4265)	(0.1006)	(0.0032)		
GBP	-0.0227***	-3.3495***	-5.2385***	0.8066**	-0.3468***	-0.0076**	2052	0.1283
	(0.0067)	(0.6655)	(0.5212)	(0.4103)	(0.0986)	(0.0033)		
USD	-0.0113*	-6.4388***	-4.7717***	-1.1849***	-0.0761	-0.0212	2052	0.1689
	(0.0068)	(0.7198)	(0.5691)	(0.4373)	(0.1045)	(0.0143)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2B – full table of table 2B

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 (\Delta i_{j,t}^R) + \beta_3 (i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0316***	-4.0715***	-0.2823***	0.0128***	2052	0.1134
	(0.0074)	(0.5134)	(0.1087)	(0.0042)		
CAD	-0.0276***	-4.5353***	-0.2493**	0.0058**	2052	0.1166
	(0.0064)	(0.4682)	(0.0985)	(0.0023)		
EUR	-0.0226***	-3.8297***	-0.1958**	-0.0046**	2052	0.0895
	(0.0060)	(0.3850)	(0.0909)	(0.0021)		
JPY	-0.0340***	-5.3243***	-0.1493	0.1581***	2052	0.1000
	(0.0105)	(0.7255)	(0.1294)	(0.0486)		
NZD	-0.0308***	-2.6695***	-0.0946	0.0135**	2052	0.0563
	(0.0093)	(0.5950)	(0.1333)	(0.0065)		
NOK	-0.0177**	-3.4970***	-0.1255	0.0353**	2052	0.0820
	(0.0070)	(0.4693)	(0.0951)	(0.0141)		
SEK	-0.0267***	-3.2092***	-0.1359	0.0548***	2052	0.0711
	(0.0063)	(0.4350)	(0.0983)	(0.0132)		
CHF	-0.0097	-2.0012***	-0.2245**	-0.0026	2052	0.0239
	(0.0061)	(0.5164)	(0.1026)	(0.0023)		
GBP	-0.0225***	-3.7205***	-0.3344***	-0.0081**	2052	0.0856
	(0.0068)	(0.4902)	(0.0994)	(0.0033)		
USD	-0.0141*	-3.6842***	-0.1376	-0.0288*	2052	0.0684
	(0.0075)	(0.5813)	(0.1122)	(0.0157)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 1999M1-2007M12

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0442**	-3.7828***	-3.3832***	-0.2771	-0.1394	0.0169**	972	0.0860
	(0.0172)	(1.2048)	(0.7835)	(0.7478)	(0.1697)	(0.0070)		
CAD	-0.0343**	-2.7138**	-3.2586***	-0.1023	-0.3389**	0.0083	972	0.0899
	(0.0157)	(1.0860)	(0.7449)	(0.6405)	(0.1582)	(0.0053)		
EUR	-0.0220	-2.8935***	-2.1521***	-0.3512	-0.2072	-0.0046	972	0.0463
	(0.0137)	(0.8520)	(0.5495)	(0.5668)	(0.1302)	(0.0030)		
JPY	-0.0477**	-1.1698	-1.6902*	0.7050	0.1013	0.2400**	972	0.0413
	(0.0198)	(1.3160)	(0.8907)	(0.8468)	(0.1821)	(0.0980)		
NZD	-0.0515***	-4.4680***	-3.5879***	-0.9822	-0.1811	0.0320***	972	0.0987
	(0.0173)	(1.1189)	(0.8693)	(0.6770)	(0.1675)	(0.0103)		
NOK	-0.0260*	-3.5820***	-2.7345***	-0.0776	-0.0880	0.0502*	972	0.0890
	(0.0154)	(0.9969)	(0.6348)	(0.6635)	(0.1318)	(0.0303)		
SEK	-0.0418***	-2.9760***	-2.3355***	-1.9765***	-0.0035	0.0849***	972	0.0743
	(0.0140)	(0.9147)	(0.6098)	(0.5870)	(0.1375)	(0.0301)		
CHF	-0.0265*	-1.1317	-1.1283*	-0.2191	-0.2178	0.0047	972	0.0262
	(0.0148)	(1.0144)	(0.6531)	(0.6819)	(0.1401)	(0.0071)		
GBP	-0.0356***	-4.1039***	-3.0239***	0.0960	-0.2111*	-0.0169**	972	0.0988
	(0.0130)	(0.8843)	(0.5724)	(0.5987)	(0.1252)	(0.0075)		
USD	-0.0017	-3.9766***	-2.0088***	-1.3819*	-0.1937	0.0013	972	0.0791
	(0.0121)	(1.1134)	(0.7022)	(0.7433)	(0.1497)	(0.0258)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2007M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 2008M1-2017M12

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 (\Delta \eta_{j,t}) + \beta_3 (\Delta i^R_{j,t}) + \beta_4 (\eta_{j,t-1}) + \beta_5 (i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0479***	-6.0254***	-7.4325***	0.1386	-0.4157**	0.0154**	1080	0.2958
	(0.0135)	(0.8766)	(0.7380)	(0.6054)	(0.2106)	(0.0071)		
CAD	-0.0421***	-5.7275***	-7.6665***	0.0651	0.1196	0.0049*	1080	0.2921
	(0.0108)	(0.7300)	(0.6477)	(0.4992)	(0.1707)	(0.0030)		
EUR	-0.0379***	-5.2961***	-7.3637***	-0.2554	-0.1148	-0.0116***	1080	0.2587
	(0.0103)	(0.6488)	(0.6024)	(0.4536)	(0.1839)	(0.0038)		
JPY	-0.0594***	-5.7308***	-11.1782***	2.0933**	-0.1388	0.2808***	1080	0.3300
	(0.0176)	(1.2351)	(1.1239)	(0.8886)	(0.2941)	(0.0798)		
NZD	-0.0538***	-6.9225***	-8.0179***	0.3942	0.1117	0.0093	1080	0.3205
	(0.0139)	(0.9474)	(0.8704)	(0.6478)	(0.2404)	(0.0092)		
NOK	-0.0331***	-4.8783***	-8.0136***	0.8544	-0.1418	0.0652***	1080	0.2584
	(0.0111)	(0.7696)	(0.7390)	(0.5510)	(0.1948)	(0.0220)		
SEK	-0.0493***	-5.6023***	-6.5534***	-0.0884	-0.0153	0.0962***	1080	0.2276
	(0.0112)	(0.7307)	(0.6968)	(0.4909)	(0.1970)	(0.0222)		
CHF	-0.0252**	-2.8630***	-4.0887***	0.3166	0.1736	-0.0015	1080	0.0918
	(0.0128)	(1.0104)	(0.9266)	(0.7260)	(0.2240)	(0.0057)		
GBP	-0.0461***	-3.4219***	-7.8212***	0.7905	-0.2768	-0.0182***	1080	0.2086
	(0.0144)	(0.9195)	(0.8551)	(0.6344)	(0.2411)	(0.0064)		
USD	-0.0470***	-7.1136***	-9.5402***	-0.8047	0.0188	-0.0901***	1080	0.3262
	(0.0127)	(0.8594)	(0.8147)	(0.5847)	(0.2209)	(0.0253)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2D – full table of table 2D

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0543**	-7.2292	-22.9042	-11.0936	-2.9609	0.0104	360	0.0535
	(0.0259)	(10.5997)	(14.9001)	(12.0581)	(3.0581)	(0.0100)		
CAD	-0.0299***	-12.7346***	-29.1263***	-9.5571**	0.2082	0.0033	1228	0.0564
	(0.0099)	(4.6383)	(7.2838)	(4.8155)	(1.8784)	(0.0031)		
EUR	-0.0826***	-18.6085**	-20.0382**	-18.8645***	2.2468	-0.0213***	609	0.0870
	(0.0167)	(7.4739)	(9.0270)	(7.3184)	(2.7402)	(0.0050)		
JPY	-0.1023***	-23.3412**	-11.6606	-1.2668	-6.9507**	0.4741***	462	0.1397
	(0.0237)	(10.1332)	(11.6918)	(12.1462)	(3.4989)	(0.1084)		
NZD	-0.0331***	-18.7123***	-28.5861***	-11.9830**	0.9539	0.0072	1228	0.0632
	(0.0103)	(4.8520)	(6.9774)	(5.2982)	(1.5912)	(0.0070)		
SEK	-0.0332***	-14.9686***	-17.2230***	-11.1691***	-0.0599	0.0645***	1228	0.0460
	(0.0085)	(3.8834)	(5.6090)	(4.1247)	(1.2472)	(0.0177)		
CHF	-0.0572***	-10.8859	9.7523	-15.8180*	12.1774***	-0.0080*	731	0.0631
	(0.0138)	(8.9118)	(8.5222)	(9.0595)	(3.4159)	(0.0045)		
GBP	-0.0221*	-8.1728*	-19.2894***	-8.4952*	-1.0091	-0.0118**	1228	0.0305
	(0.0115)	(4.9056)	(7.0342)	(4.9864)	(1.6876)	(0.0055)		
USD	-0.0254***	-17.1716***	-15.1574**	-16.5361***	1.1967	-0.0464**	1228	0.0617
	(0.0088)	(3.9433)	(6.1518)	(3.9614)	(1.4326)	(0.0182)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, full sample, no default risk

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0274***	-6.1475***	-2.9797**	-5.8688***	0.3472	-0.1402	-0.2849**	0.0118***	2028	0.1995
	(0.0072)	(0.7910)	(1.2262)	(0.5366)	(0.4285)	(0.7619)	(0.1109)	(0.0041)		
CAD	-0.0286***	-4.6021***	-5.2004***	-6.1767***	0.6082	-0.0500	-0.2890***	0.0061**	1836	0.2065
	(0.0068)	(0.7235)	(1.1252)	(0.5272)	(0.4023)	(0.7135)	(0.1105)	(0.0025)		
EUR	-0.0190***	-4.6613***	-4.9050***	-5.0429***	-0.0460	-0.3667	-0.1720*	-0.0047**	2028	0.1471
	(0.0059)	(0.5684)	(0.8672)	(0.4086)	(0.3126)	(0.5340)	(0.0911)	(0.0022)		
JPY	-0.0399***	-4.1648***	-4.9939***	-6.4133***	2.1716***	2.0497**	-0.1430	0.1959***	2028	0.1731
	(0.0101)	(1.0016)	(1.5866)	(0.7452)	(0.5782)	(0.9608)	(0.1340)	(0.0476)		
NZD	-0.0288***	-6.6165***	-5.7714***	-6.2660***	0.2044	-0.5417	-0.1606	0.0144**	2028	0.2014
	(0.0078)	(0.7968)	(1.2968)	(0.6124)	(0.4329)	(0.7811)	(0.1266)	(0.0057)		
NOK	-0.0190***	-3.8436***	-5.0816***	-4.9048***	0.5818	0.7234	-0.1754*	0.0397***	2028	0.1574
	(0.0068)	(0.6526)	(1.0437)	(0.4876)	(0.3978)	(0.6896)	(0.0987)	(0.0142)		
SEK	-0.0215***	-4.4583***	-5.0234***	-4.5856***	-0.2974	-0.6584	-0.1246	0.0430***	2028	0.1328
	(0.0063)	(0.6435)	(0.9849)	(0.4676)	(0.3630)	(0.6360)	(0.1030)	(0.0135)		
CHF	-0.0126*	-3.0442***	-1.1689	-3.0433***	0.6559	0.6751	-0.1920*	0.0017	2028	0.0545
	(0.0065)	(0.7725)	(1.1966)	(0.5521)	(0.4222)	(0.7477)	(0.1075)	(0.0034)		
GBP	-0.0218***	-4.1890***	-1.4009	-5.5283***	0.7676*	0.6448	-0.3340***	-0.0074**	2028	0.1373
	(0.0068)	(0.7457)	(1.1224)	(0.5252)	(0.4169)	(0.6977)	(0.1065)	(0.0033)		
USD	-0.0119*	-6.3166***	-6.7369***	-4.7912***	-1.2687***	-0.8782	-0.0583	-0.0231	2028	0.1708
	(0.0070)	(0.8213)	(1.1889)	(0.5794)	(0.4454)	(0.7188)	(0.1109)	(0.0148)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, post 2008, with default risk

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta l^R_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$l^R_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0509***	-7.0027***	-3.1133**	14.3663***	-7.1490***	-0.3463	-0.4152	0.0981	-0.3792*	0.0155**	955	0.2878
	(0.0156)	(1.1219)	(1.5396)	(2.3547)	(0.8016)	(0.6623)	(1.1959)	(1.4170)	(0.2130)	(0.0074)		
CAD	-0.0313***	-8.8567***	-6.8906***	8.3213***	-8.9747***	-0.6043	-3.5155***	-0.6392	0.3944	-0.0009	399	0.3046
	(0.0118)	(1.5154)	(1.7969)	(2.5681)	(1.1122)	(0.8526)	(1.0528)	(1.5427)	(0.2489)	(0.0035)		
EUR	-0.0475***	-6.0993***	-3.9164***	8.2139***	-7.8031***	-0.0617	-0.6728	2.1319**	-0.0555	-0.0159***	966	0.2593
	(0.0108)	(0.7990)	(0.9455)	(1.6760)	(0.6197)	(0.4729)	(0.7124)	(1.0462)	(0.1759)	(0.0042)		
JPY	-0.0638***	-6.7890***	-4.4253**	10.1977***	-11.2335***	2.1124***	2.9840**	-0.2255	-0.0562	0.3035***	966	0.3391
	(0.0177)	(1.3763)	(1.8491)	(3.1745)	(1.1307)	(0.8119)	(1.4166)	(1.9881)	(0.2783)	(0.0799)		
NZD	-0.0548***	-7.7871***	-5.8429***	12.2542***	-7.9726***	0.7042	0.4257	0.0068	0.2191	0.0068	943	0.3138
	(0.0137)	(1.1415)	(1.4849)	(2.5075)	(0.9040)	(0.6976)	(1.2209)	(1.4197)	(0.2471)	(0.0091)		
NOK	-0.0419***	-5.1123***	-5.7420***	4.0843**	-7.8885***	0.6108	0.6935	1.4966	-0.1149	0.0821***	966	0.2600
	(0.0112)	(0.8095)	(1.2013)	(1.9590)	(0.7317)	(0.5327)	(0.8996)	(1.2677)	(0.1930)	(0.0224)		
SEK	-0.0490***	-5.5565***	-4.1789***	7.4308***	-6.1245***	0.0541	-1.0151	0.0312	-0.0316	0.0931***	966	0.2049
	(0.0113)	(0.8854)	(1.1469)	(1.9029)	(0.7209)	(0.5102)	(0.8522)	(1.1411)	(0.1903)	(0.0228)		
CHF	-0.0237*	-3.2384**	-1.1997	5.6024**	-0.9718	-0.4007	0.1134	1.7805	0.1994	-0.0042	888	0.0310
	(0.0124)	(1.4895)	(1.8080)	(2.6065)	(1.0721)	(0.7699)	(1.1614)	(1.4636)	(0.2318)	(0.0055)		
GBP	-0.0493***	-6.1288***	-0.4453	5.6119**	-8.9524***	0.4706	2.0941**	0.9179	-0.0648	-0.0190***	966	0.2294
	(0.0137)	(1.1158)	(1.4105)	(2.3529)	(0.8780)	(0.6577)	(1.0347)	(1.4854)	(0.2365)	(0.0063)		
USD	-0.0560***	-8.9086***	-3.2019**	12.5574***	-10.1507***	-0.9368	0.4045	1.0582	0.1366	-0.1104***	813	0.3756
	(0.0138)	(1.1126)	(1.2482)	(2.1570)	(0.8834)	(0.6296)	(0.9356)	(1.3704)	(0.2270)	(0.0275)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\lambda_{j,t}$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \lambda_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \lambda_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0543***	-4.3320***	-6.2922***	0.0266	-0.3915*	0.0162**	955	0.2080
	(0.0159)	(1.0848)	(0.8438)	(0.5792)	(0.2295)	(0.0077)		
CAD	-0.0359***	-3.6265***	-7.9490***	0.9625	0.4427*	0.0038	399	0.2396
	(0.0125)	(1.3326)	(1.1357)	(0.7107)	(0.2646)	(0.0035)		
EUR	-0.0422***	-3.1217***	-7.5554***	0.6824*	-0.0301	-0.0131***	966	0.2146
	(0.0106)	(0.7396)	(0.6290)	(0.4144)	(0.1847)	(0.0037)		
JPY	-0.0688***	-4.8998***	-10.7149***	1.7353***	-0.3464	0.3143***	966	0.2779
	(0.0182)	(1.3625)	(1.1784)	(0.6549)	(0.2943)	(0.0823)		
NZD	-0.0543***	-4.9252***	-6.8331***	0.9805	0.2785	0.0059	943	0.2225
	(0.0160)	(1.1290)	(0.9642)	(0.6664)	(0.2692)	(0.0100)		
NOK	-0.0355***	-4.1387***	-7.1490***	0.8489*	-0.0853	0.0668***	966	0.2111
	(0.0112)	(0.7748)	(0.7501)	(0.4503)	(0.2030)	(0.0220)		
SEK	-0.0514***	-4.0382***	-5.8983***	0.1242	0.0492	0.1002***	966	0.1613
	(0.0112)	(0.8195)	(0.7262)	(0.4638)	(0.1975)	(0.0223)		
CHF	-0.0212*	-1.7916	-0.7941	-0.0116	0.1872	-0.0033	888	0.0180
	(0.0118)	(1.3227)	(1.0637)	(0.6511)	(0.2334)	(0.0037)		
GBP	-0.0454***	-5.0370***	-8.1277***	0.1534	-0.1255	-0.0196***	966	0.2098
	(0.0134)	(1.0264)	(0.8637)	(0.5511)	(0.2391)	(0.0062)		
USD	-0.0595***	-5.1253***	-9.8593***	-0.7254	0.1777	-0.1159***	813	0.2804
	(0.0163)	(1.1080)	(0.9587)	(0.6271)	(0.2570)	(0.0322)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\tau_{j,t}$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\tau_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \tau_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0312***	-1.4191	-4.1932***	-0.2277	-0.2925**	0.0130***	2028	0.1160
	(0.0075)	(1.2782)	(0.5169)	(0.7500)	(0.1146)	(0.0043)		
CAD	-0.0286***	-4.3619***	-5.3167***	-0.6401	-0.2864***	0.0049**	1836	0.1703
	(0.0068)	(1.1244)	(0.4978)	(0.6464)	(0.1095)	(0.0024)		
EUR	-0.0207***	-3.1629***	-3.6498***	-0.3955	-0.1949**	-0.0051**	2028	0.1036
	(0.0059)	(0.8745)	(0.3745)	(0.4824)	(0.0911)	(0.0022)		
JPY	-0.0339***	-5.8142***	-5.5937***	0.6695	-0.1067	0.1598***	2028	0.1283
	(0.0103)	(1.6352)	(0.7067)	(0.9127)	(0.1352)	(0.0482)		
NZD	-0.0307***	-4.0584***	-2.8848***	-0.3508	-0.1083	0.0139**	2028	0.0762
	(0.0088)	(1.4135)	(0.5836)	(0.7794)	(0.1357)	(0.0063)		
NOK	-0.0176**	-3.0231***	-3.6394***	0.1943	-0.1224	0.0355**	2028	0.0958
	(0.0070)	(1.0557)	(0.4664)	(0.6613)	(0.0976)	(0.0144)		
SEK	-0.0244***	-4.3694***	-3.2657***	-0.5796	-0.1616	0.0491***	2028	0.0859
	(0.0064)	(0.9940)	(0.4275)	(0.6035)	(0.1013)	(0.0136)		
CHF	-0.0112*	-1.4794	-2.0211***	0.4119	-0.1921*	-0.0015	2028	0.0279
	(0.0063)	(1.2040)	(0.5085)	(0.7012)	(0.1057)	(0.0028)		
GBP	-0.0219***	-0.6742	-3.7763***	-0.2472	-0.3444***	-0.0081**	2028	0.0877
	(0.0070)	(1.1406)	(0.4907)	(0.6729)	(0.1063)	(0.0033)		
USD	-0.0126*	-6.1304***	-3.7428***	-0.6531	-0.1663	-0.0246	2028	0.1006
	(0.0075)	(1.2345)	(0.5663)	(0.6949)	(0.1139)	(0.0160)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $l_{j,t}^R$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta l_{j,t}^R + \beta_3 \Delta i_{j,t}^R + \beta_4 l_{j,t-1}^R + \beta_5 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta l_{j,t}^R$	$\Delta i_{j,t}^R$	$l_{j,t-1}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0566***	9.9450***	-5.6511***	0.5019	-0.4507**	0.0186**	955	0.2100
	(0.0161)	(2.2182)	(0.7588)	(1.3146)	(0.2186)	(0.0074)		
CAD	-0.0308**	0.7547	-6.9329***	1.2790	0.5283**	0.0017	399	0.2018
	(0.0127)	(2.2708)	(1.0802)	(1.3620)	(0.2442)	(0.0036)		
EUR	-0.0510***	2.0777	-6.0427***	2.3713**	-0.0532	-0.0140***	966	0.1866
	(0.0110)	(1.5476)	(0.5769)	(0.9485)	(0.1851)	(0.0037)		
JPY	-0.0607***	4.5740	-9.7475***	1.7616	-0.0490	0.2752***	966	0.2393
	(0.0193)	(3.1035)	(1.1419)	(1.8748)	(0.3082)	(0.0868)		
NZD	-0.0667***	4.5388*	-5.7954***	1.9098	0.3233	0.0071	943	0.1607
	(0.0159)	(2.5778)	(0.9641)	(1.4399)	(0.2727)	(0.0101)		
NOK	-0.0446***	-1.2069	-5.1485***	2.8596**	-0.0820	0.0868***	966	0.1373
	(0.0121)	(1.9480)	(0.7167)	(1.1771)	(0.2171)	(0.0241)		
SEK	-0.0559***	3.0840*	-4.1609***	1.2861	0.0484	0.1100***	966	0.1216
	(0.0119)	(1.8008)	(0.6657)	(1.0883)	(0.1960)	(0.0235)		
CHF	-0.0230*	2.4456	-0.1148	1.4120	0.1551	-0.0033	888	0.0166
	(0.0123)	(2.2902)	(0.9815)	(1.3110)	(0.2270)	(0.0032)		
GBP	-0.0491***	0.7847	-5.8242***	1.3991	-0.1526	-0.0206***	966	0.1601
	(0.0145)	(2.2277)	(0.8310)	(1.2958)	(0.2467)	(0.0066)		
USD	-0.0570***	5.1429**	-8.6497***	-0.2386	0.1627	-0.1103***	813	0.2553
	(0.0167)	(2.1134)	(0.9081)	(1.3630)	(0.2547)	(0.0330)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^R$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^R$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta + l^R)_{j,t}$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta + l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta + l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta + l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta + l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0520***	-4.2517***	-6.5840***	-0.1630	-0.3693	0.0156**	955	0.2171
	(0.0159)	(0.9598)	(0.8561)	(0.6479)	(0.2268)	(0.0076)		
CAD	-0.0273**	-5.2887***	-8.2070***	-0.5082	0.6036**	0.0016	399	0.2497
	(0.0120)	(1.2257)	(1.1374)	(0.7763)	(0.2526)	(0.0037)		
EUR	-0.0403***	-3.7550***	-7.3184***	0.3729	-0.0271	-0.0111***	966	0.2288
	(0.0106)	(0.6173)	(0.6016)	(0.4193)	(0.1788)	(0.0038)		
JPY	-0.0676***	-4.5229***	-11.0401***	2.3472***	-0.1759	0.3184***	966	0.3137
	(0.0179)	(1.1374)	(1.1185)	(0.7884)	(0.2913)	(0.0811)		
NZD	-0.0520***	-5.1871***	-7.4018***	1.0370	0.3329	0.0026	943	0.2651
	(0.0151)	(0.9127)	(0.9236)	(0.6564)	(0.2539)	(0.0095)		
NOK	-0.0380***	-4.7337***	-7.7252***	0.9777**	-0.0995	0.0743***	966	0.2531
	(0.0108)	(0.6652)	(0.7121)	(0.4369)	(0.1914)	(0.0214)		
SEK	-0.0489***	-4.1673***	-6.0427***	-0.0709	0.0455	0.0954***	966	0.1779
	(0.0112)	(0.6806)	(0.7060)	(0.4590)	(0.1925)	(0.0223)		
CHF	-0.0216*	-1.5402	-0.5613	0.0418	0.1710	-0.0030	888	0.0211
	(0.0119)	(1.0703)	(1.0174)	(0.6249)	(0.2307)	(0.0047)		
GBP	-0.0450***	-3.3605***	-7.7774***	0.9221	-0.1745	-0.0186***	966	0.2025
	(0.0139)	(0.8669)	(0.8604)	(0.5699)	(0.2380)	(0.0063)		
USD	-0.0596***	-4.5722***	-9.3961***	-0.8059	0.1448	-0.1144***	813	0.2957
	(0.0157)	(0.8519)	(0.9154)	(0.5794)	(0.2493)	(0.0311)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta - \tau)_{j,t}$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta - \tau)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta - \tau)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta-\tau)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta-\tau)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0280***	-5.8403***	-5.6436***	0.3729	-0.2797**	0.0118***	2028	0.1925
	(0.0071)	(0.7792)	(0.5336)	(0.4037)	(0.1104)	(0.0041)		
CAD	-0.0292***	-3.6792***	-6.2239***	0.6596*	-0.2702**	0.0063**	1836	0.1780
	(0.0068)	(0.7446)	(0.5409)	(0.3722)	(0.1123)	(0.0025)		
EUR	-0.0208***	-3.5247***	-5.0296***	0.1062	-0.1604*	-0.0041*	2028	0.1199
	(0.0059)	(0.5774)	(0.4158)	(0.2963)	(0.0941)	(0.0021)		
JPY	-0.0379***	-4.1970***	-6.1899***	1.7952***	-0.2840**	0.1792***	2028	0.1433
	(0.0102)	(1.0210)	(0.7619)	(0.5391)	(0.1352)	(0.0473)		
NZD	-0.0286***	-6.0615***	-5.8825***	0.2684	-0.1196	0.0130**	2028	0.1689
	(0.0086)	(0.8071)	(0.6286)	(0.4018)	(0.1295)	(0.0061)		
NOK	-0.0177***	-2.8878***	-4.3967***	0.4004	-0.1699*	0.0358**	2028	0.1213
	(0.0069)	(0.6514)	(0.4989)	(0.3779)	(0.1021)	(0.0139)		
SEK	-0.0235***	-4.2018***	-4.4555***	-0.2478	-0.0883	0.0484***	2028	0.1128
	(0.0063)	(0.6442)	(0.4750)	(0.3446)	(0.1043)	(0.0130)		
CHF	-0.0101*	-3.1277***	-3.0788***	0.5760	-0.2172**	-0.0003	2028	0.0509
	(0.0061)	(0.7759)	(0.5552)	(0.3918)	(0.1080)	(0.0025)		
GBP	-0.0204***	-4.0860***	-5.3545***	0.5586	-0.3377***	-0.0075**	2028	0.1336
	(0.0067)	(0.7353)	(0.5244)	(0.3895)	(0.1054)	(0.0033)		
USD	-0.0139*	-6.0432***	-4.7403***	-1.1631***	-0.0296	-0.0289*	2028	0.1341
	(0.0071)	(0.8433)	(0.5988)	(0.4303)	(0.1141)	(0.0148)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\tau - l^R)_{j,t}$

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\tau - l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\tau - l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\tau - l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\tau - l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0554***	-4.6466***	-5.8645***	-0.9218	-0.5139**	0.0205**	955	0.2018
	(0.0161)	(1.3055)	(0.7957)	(0.8636)	(0.2356)	(0.0081)		
CAD	-0.0357***	-1.8207	-6.8766***	-1.6425**	0.3688	0.0005	399	0.2204
	(0.0127)	(1.4376)	(1.0686)	(0.7696)	(0.2464)	(0.0036)		
EUR	-0.0476***	-2.3862***	-5.6532***	-1.3870***	-0.1266	-0.0179***	966	0.1949
	(0.0107)	(0.8126)	(0.5736)	(0.5330)	(0.1827)	(0.0042)		
JPY	-0.0552***	-6.1640***	-9.9686***	0.2269	0.0108	0.2516***	966	0.2720
	(0.0185)	(1.6355)	(1.1145)	(1.0797)	(0.3084)	(0.0831)		
NZD	-0.0568***	-5.2129***	-6.2394***	-0.6536	0.2681	0.0075	943	0.1935
	(0.0160)	(1.3696)	(0.9465)	(0.9252)	(0.2689)	(0.0100)		
NOK	-0.0347***	-3.3848***	-5.1050***	-1.3151*	-0.0892	0.0643***	966	0.1393
	(0.0118)	(1.0826)	(0.7299)	(0.7213)	(0.2193)	(0.0230)		
SEK	-0.0547***	-3.7094***	-4.1018***	-1.1317*	-0.0230	0.1047***	966	0.1379
	(0.0115)	(0.9927)	(0.6640)	(0.6387)	(0.1950)	(0.0227)		
CHF	-0.0206*	-2.0616	0.1087	-0.3677	0.1478	-0.0041	888	0.0191
	(0.0117)	(1.4542)	(0.9897)	(0.8475)	(0.2270)	(0.0042)		
GBP	-0.0497***	-0.4514	-5.8717***	-0.0245	-0.1813	-0.0202***	966	0.1580
	(0.0141)	(1.2028)	(0.8406)	(0.7513)	(0.2525)	(0.0066)		
USD	-0.0587***	-4.6762***	-8.4757***	-0.4799	0.0907	-0.1125***	813	0.2729
	(0.0161)	(1.1607)	(0.9006)	(0.8272)	(0.2501)	(0.0316)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4A – full table of table 4A

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 (\Delta \eta_{j,t}^{IV}) + \beta_3 (\Delta i_{j,t}^R) + \beta_4 (\eta_{j,t-1}^{IV}) + \beta_5 (i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}^{IV}$	$\eta_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N
AUD	-0.0200**	-16.8727***	-1.6947	-8.8118***	-0.1488	0.0084*	1974
	(0.0084)	(3.8681)	(2.2082)	(1.1869)	(0.1553)	(0.0047)	
CAD	-0.0281***	-7.0227*	1.3719	-6.1355***	-0.3047***	0.0094**	1974
	(0.0070)	(3.7557)	(1.3157)	(0.8876)	(0.1019)	(0.0043)	
EUR	-0.0261***	2.7898	-0.1881	-3.8749***	-0.2275**	-0.0062	1890
	(0.0073)	(4.3529)	(1.7837)	(0.9843)	(0.1054)	(0.0048)	
JPY	-0.0429***	-10.3487***	2.3299	-7.6512***	-0.1728	0.2109***	1974
	(0.0113)	(2.5929)	(1.8206)	(0.8700)	(0.1254)	(0.0568)	
NZD	-0.0258***	-6.9143**	1.4006*	-6.9147***	-0.1957	0.0129**	1974
	(0.0085)	(3.0244)	(0.8006)	(1.5137)	(0.1245)	(0.0060)	
NOK	-0.0283***	-3.2652**	2.2045**	-5.3720***	-0.3247***	0.0619***	1890
	(0.0082)	(1.4336)	(1.0055)	(0.6522)	(0.1232)	(0.0179)	
SEK	-0.0186***	-9.7381***	-0.8060	-6.2327***	-0.0989	0.0372**	1974
	(0.0069)	(2.5794)	(0.7554)	(0.9620)	(0.1087)	(0.0148)	
CHF	-0.0244***	0.0340	2.5519***	-2.4110***	-0.1944*	0.0138***	1974
	(0.0074)	(2.2601)	(0.7985)	(0.8263)	(0.1040)	(0.0051)	
GBP	-0.0324***	-1.7451	4.8469**	-6.0530***	-0.5094***	-0.0081**	1890
	(0.0088)	(3.2336)	(2.1057)	(1.2756)	(0.1349)	(0.0037)	
USD	-0.0133*	-9.0688***	-3.6763***	-4.8457***	0.0159	-0.0218	1974
	(0.0072)	(2.3354)	(0.9385)	(0.7826)	(0.1157)	(0.0149)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4B – full table of table 4B

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda^{IV}_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \Delta\tau_{j,t} + \beta_5 \lambda^{IV}_{j,t-1} + \beta_6 i^R_{j,t-1} + \beta_7 \tau_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda^{IV}_{j,t}$	$\lambda^{IV}_{j,t-1}$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta i^R_{j,t}$	$i^R_{j,t-1}$	constant	N
AUD	-0.0134	-24.4061***	-3.5970	-7.7898***	-2.6295	-9.8132***	0.0761	0.0025	1950
	(0.0091)	(4.8670)	(3.1901)	(2.0386)	(1.9391)	(1.2647)	(0.2540)	(0.0064)	
CAD	-0.0333***	1.6306	0.7453	-3.9370**	-0.1260	-5.1841***	-0.3881***	0.0077**	1797
	(0.0079)	(6.0219)	(1.2576)	(1.6216)	(1.2492)	(1.2146)	(0.1333)	(0.0039)	
EUR	-0.0188***	-12.9225***	-0.9598	-8.0655***	-1.2741	-7.3831***	-0.1832*	-0.0072**	1879
	(0.0069)	(4.9583)	(1.2665)	(2.0086)	(1.2391)	(1.3063)	(0.1069)	(0.0037)	
JPY	-0.0463***	-13.1779***	2.9550	-4.5435***	2.6605**	-8.2092***	-0.1987	0.2293***	1950
	(0.0110)	(3.9153)	(1.9388)	(1.7131)	(1.3132)	(1.0604)	(0.1578)	(0.0535)	
NZD	-0.0282***	-4.7995	1.4924*	-5.0176***	0.6119	-6.0322***	-0.2615**	0.0156***	1950
	(0.0082)	(3.3147)	(0.7968)	(1.4749)	(0.9759)	(1.5542)	(0.1326)	(0.0058)	
NOK	-0.0275***	-3.3757**	2.2650**	-4.6378***	1.8415*	-5.4678***	-0.3488***	0.0599***	1879
	(0.0079)	(1.4260)	(1.0043)	(1.2924)	(0.9985)	(0.6378)	(0.1326)	(0.0171)	
SEK	-0.0193***	-8.7994***	-0.6618	-5.6273***	-0.8297	-5.9130***	-0.0892	0.0386***	1950
	(0.0068)	(2.8957)	(0.6855)	(1.1107)	(0.7126)	(1.0111)	(0.1179)	(0.0146)	
CHF	-0.0193***	-3.4301	2.3697***	-0.7266	1.3579*	-3.4869***	-0.2148*	0.0103**	1950
	(0.0070)	(3.6665)	(0.8507)	(1.2398)	(0.8160)	(1.2207)	(0.1192)	(0.0046)	
GBP	-0.0269***	-13.1736***	4.0547**	-2.3178	4.0458**	-9.8183***	-0.4175***	-0.0067	1879
	(0.0088)	(4.5239)	(1.7980)	(1.5615)	(1.6201)	(1.6896)	(0.1561)	(0.0041)	
USD	-0.0139*	-13.1999***	-3.9962***	-7.5803***	-1.6725*	-5.7265***	0.1257	-0.0267*	1950
	(0.0074)	(3.1698)	(1.1005)	(1.2523)	(0.8638)	(0.9184)	(0.1395)	(0.0156)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda^{IV}_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4C – full table of table 4C

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t}^{IV} + \beta_3 \Delta \tau_{j,t} + \beta_4 \Delta l_{j,t}^{R} + \beta_5 \Delta i_{j,t}^{R} + \beta_6 \lambda_{j,t-1}^{IV} + \beta_7 \tau_{j,t-1} + \beta_8 l_{j,t-1}^{R} + \beta_9 i_{j,t-1}^{R} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	$\Delta \tau_{j,t}$	$\tau_{j,t-1}$	$\Delta l_{j,t}^{R}$	$l_{j,t-1}^{R}$	constant	N
AUD	-0.0483***	-13.3167***	-0.1472	-8.4066***	-0.3560	-3.5281**	0.2892	18.4317***	-0.8386	0.0140	919
	(0.0170)	(4.1661)	(2.0215)	(1.1406)	(0.2930)	(1.6758)	(1.5494)	(3.8982)	(2.3370)	(0.0092)	
CAD	-0.0233	-20.8018**	-2.2832	-11.6756***	0.6186	-11.4544***	-4.2982**	19.0624**	0.3970	-0.0017	363
	(0.0165)	(9.1085)	(2.7112)	(2.4103)	(0.3930)	(3.6512)	(1.9533)	(8.3007)	(3.1077)	(0.0063)	
EUR	-0.0513***	-10.7230**	-0.2177	-9.3994***	-0.1383	-4.9764***	-0.4118	13.2351***	2.4765	-0.0156***	930
	(0.0120)	(4.3001)	(1.3624)	(1.5282)	(0.1858)	(1.3958)	(1.2419)	(4.8164)	(1.6481)	(0.0056)	
JPY	-0.0685***	-10.0351**	3.6662*	-11.8043***	-0.2343	-3.2374	3.8910**	12.6846***	-1.6405	0.3311***	930
	(0.0181)	(4.1793)	(2.1142)	(1.3937)	(0.3346)	(1.9837)	(1.6532)	(4.5846)	(2.6103)	(0.0823)	
NZD	-0.0431***	-8.0727***	2.9416**	-8.2882***	0.0678	-5.4233***	1.6182	12.1774***	-1.6455	0.0073	907
	(0.0146)	(3.0272)	(1.3509)	(1.0831)	(0.2763)	(1.5145)	(1.3680)	(3.8898)	(1.6868)	(0.0097)	
NOK	-0.0453***	-4.4598***	-0.4053	-7.2484***	-0.2026	-5.8251***	-0.2135	3.8428*	3.0961*	0.0891***	930
	(0.0115)	(1.3558)	(0.9499)	(0.9580)	(0.2070)	(1.2759)	(1.1051)	(2.2797)	(1.6761)	(0.0231)	
SEK	-0.0455***	-10.5546***	-0.3499	-7.7481***	-0.0055	-3.9043***	-0.7723	11.9122***	-0.2696	0.0875***	930
	(0.0121)	(3.4225)	(0.8034)	(1.3410)	(0.2234)	(1.2313)	(0.9430)	(3.6167)	(1.3424)	(0.0245)	
CHF	-0.0260*	13.1020**	-0.2174	4.4559**	-0.0384	-4.6970**	-0.0715	-10.0703*	1.7802	-0.0050	852
	(0.0134)	(5.2932)	(1.2855)	(2.0139)	(0.2921)	(2.1781)	(1.2754)	(5.5465)	(1.9666)	(0.0074)	
GBP	-0.0441***	-12.7855***	1.3055	-12.2036***	-0.0482	-0.8694	3.3036**	10.4063**	-0.4326	-0.0157**	930
	(0.0157)	(4.2513)	(1.8033)	(2.0675)	(0.2551)	(1.5181)	(1.5565)	(4.0725)	(2.2862)	(0.0075)	
USD	-0.0585***	-18.3097***	-1.4589	-12.4256***	-0.0507	-1.9703	1.8238	20.3893***	2.1069	-0.1201***	777
	(0.0155)	(3.4373)	(1.2340)	(1.2397)	(0.2440)	(1.3883)	(1.1175)	(3.4375)	(1.6525)	(0.0310)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 5 – full table of table 5

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \tau_{j,t} + \beta_3 \Delta \gamma_t + \beta_4 \Delta \gamma_{j,t}^* + \beta_5 \Delta i_{j,t}^R + \beta_6 \gamma_{t-1} + \beta_7 \gamma_{j,t-1}^* + \beta_8 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta \gamma_{j,t}^*$	$\Delta \gamma_t$	$\Delta \tau_{j,t}$	$\Delta i_{j,t}^R$	$\gamma_{j,t-1}^*$	γ_{t-1}	$\tau_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2 within
AUD	-0.0272***	5.4814***	-6.7622***	-2.7406**	-5.8418***	-0.2247	0.4527	-0.1678	-0.2806**	0.0108**	2028	0.2016
	(0.0071)	(0.6856)	(1.2114)	(1.2096)	(0.5369)	(0.3710)	(0.6009)	(0.7650)	(0.1108)	(0.0046)		
CAD	-0.0285***	4.4218***	-5.9115***	-5.2253***	-6.1901***	-0.6357	0.0032	-0.1439	-0.2838**	0.0075**	1836	0.2078
	(0.0068)	(0.6851)	(1.9789)	(1.1260)	(0.5258)	(0.4004)	(1.2475)	(0.7275)	(0.1104)	(0.0035)		
EUR	-0.0191***	4.5771***	-4.9551***	-5.0824***	-5.0469***	0.0468	-0.0906	-0.3875	-0.1728*	-0.0046*	2028	0.1472
	(0.0059)	(0.5595)	(1.0948)	(0.9051)	(0.4093)	(0.3149)	(0.5339)	(0.5724)	(0.0927)	(0.0025)		
JPY	-0.0398***	4.2658***	-2.0942	-4.8186***	-6.3971***	-2.1632***	1.9088	2.0555**	-0.1397	0.1959***	2028	0.1737
	(0.0101)	(0.9865)	(5.1736)	(1.5829)	(0.7460)	(0.5728)	(2.4805)	(0.9609)	(0.1342)	(0.0473)		
NZD	-0.0317***	6.1084***	-6.7754***	-5.5521***	-6.2849***	0.9282*	0.2146	-0.7658	-0.1587	0.0109*	2028	0.2082
	(0.0076)	(0.8609)	(0.8970)	(1.2860)	(0.6118)	(0.5158)	(0.4289)	(0.7728)	(0.1261)	(0.0062)		
NOK	-0.0171**	5.5907***	-3.3078***	-5.0194***	-5.0964***	-0.2142	0.6633	0.6195	-0.1656*	0.0338**	2028	0.1640
	(0.0067)	(0.7336)	(0.7600)	(1.0395)	(0.4911)	(0.4142)	(0.4849)	(0.6848)	(0.0988)	(0.0141)		
SEK	-0.0214***	4.7890***	-4.0441***	-5.0347***	-4.6315***	0.5089	-0.0434	-0.7194	-0.1318	0.0407***	2028	0.1342
	(0.0063)	(0.6331)	(1.2212)	(0.9868)	(0.4665)	(0.3814)	(0.4909)	(0.6404)	(0.1028)	(0.0135)		
CHF	-0.0157**	3.0852***	-2.7329	-1.2225	-3.0622***	-0.5456	1.5494	0.5750	-0.1902*	0.0012	2028	0.0562
	(0.0071)	(0.7469)	(1.8882)	(1.1921)	(0.5525)	(0.4340)	(1.1054)	(0.7591)	(0.1073)	(0.0035)		
GBP	-0.0211***	4.7472***	-3.6829***	-1.1670	-5.4951***	-0.6923*	0.8916	0.6820	-0.3330***	-0.0079**	2028	0.1385
	(0.0070)	(0.7047)	(1.0823)	(1.1121)	(0.5266)	(0.4049)	(0.5855)	(0.6975)	(0.1069)	(0.0037)		
USD	-0.0129*	6.2173***	-5.8436***	-6.4704***	-5.0417***	0.0764	-1.9569***	0.0655	-0.0249	-0.0187	2028	0.1875
	(0.0069)	(0.8044)	(1.3712)	(1.2023)	(0.5772)	(0.4537)	(0.5732)	(0.7334)	(0.1111)	(0.0146)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $\gamma_{j,t}^*$ is a measure of foreign treasury liquidity, $\gamma_{j,t}$ is a measure of the home treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

iv)   regressions tables in the main text with extreme outliner of CHF at 2015M1 excluded

Robustness of table 2A – full table of table 2A, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0292***	-5.3880***	-5.8176***	0.2180	-0.2725***	0.0119***	2051	0.1955
	(0.0071)	(0.7154)	(0.5350)	(0.4276)	(0.1045)	(0.0040)		
CAD	-0.0275***	-4.7062***	-5.4869***	0.4856	-0.2617***	0.0069***	2051	0.1779
	(0.0061)	(0.6171)	(0.4871)	(0.3762)	(0.0960)	(0.0025)		
EUR	-0.0212***	-4.8187***	-5.1872***	-0.0804	-0.1829**	-0.0046**	2051	0.1547
	(0.0058)	(0.5144)	(0.4066)	(0.3056)	(0.0887)	(0.0021)		
JPY	-0.0408***	-4.4306***	-6.4025***	2.1611***	-0.1296	0.2008***	2051	0.1721
	(0.0102)	(0.9546)	(0.7401)	(0.5765)	(0.1225)	(0.0477)		
NZD	-0.0282***	-6.3713***	-6.1451***	0.1570	-0.1225	0.0131**	2051	0.2033
	(0.0082)	(0.7227)	(0.6056)	(0.4305)	(0.1208)	(0.0059)		
NOK	-0.0198***	-4.0788***	-4.9352***	0.5975	-0.1802*	0.0411***	2051	0.1590
	(0.0068)	(0.6140)	(0.4888)	(0.3908)	(0.0939)	(0.0139)		
SEK	-0.0236***	-4.5616***	-4.7207***	-0.3232	-0.1185	0.0479***	2051	0.1386
	(0.0062)	(0.5772)	(0.4619)	(0.3527)	(0.0964)	(0.0130)		
CHF	-0.0143**	-2.9085***	-3.6290***	0.5095	-0.2187**	0.0013	2043	0.0806
	(0.0060)	(0.6577)	(0.5162)	(0.3919)	(0.0948)	(0.0030)		
GBP	-0.0231***	-3.4784***	-5.3741***	0.7444*	-0.3459***	-0.0078**	2051	0.1346
	(0.0067)	(0.6649)	(0.5219)	(0.4080)	(0.0986)	(0.0033)		
USD	-0.0116*	-6.5121***	-4.8512***	-1.2066***	-0.0747	-0.0217	2051	0.1734
	(0.0069)	(0.7224)	(0.5720)	(0.4380)	(0.1048)	(0.0144)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2B – full table of table 2B, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta i_{j,t}^R) + \beta_3(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0326***	-4.1144***	-0.2835***	0.0130***	2051	0.1171
	(0.0073)	(0.5130)	(0.1086)	(0.0042)		
CAD	-0.0286***	-4.5534***	-0.2500**	0.0060***	2051	0.1203
	(0.0063)	(0.4644)	(0.0978)	(0.0023)		
EUR	-0.0236***	-3.9506***	-0.1952**	-0.0047**	2051	0.0966
	(0.0059)	(0.3816)	(0.0906)	(0.0021)		
JPY	-0.0348***	-5.4004***	-0.1559	0.1618***	2051	0.1025
	(0.0105)	(0.7281)	(0.1298)	(0.0487)		
NZD	-0.0313***	-2.7495***	-0.0997	0.0138**	2051	0.0597
	(0.0094)	(0.5935)	(0.1328)	(0.0066)		
NOK	-0.0185***	-3.5397***	-0.1251	0.0370***	2051	0.0850
	(0.0070)	(0.4703)	(0.0951)	(0.0141)		
SEK	-0.0276***	-3.3136***	-0.1351	0.0567***	2051	0.0764
	(0.0063)	(0.4335)	(0.0980)	(0.0131)		
CHF	-0.0119**	-2.6838***	-0.2266**	-0.0019	2043	0.0428
	(0.0057)	(0.4814)	(0.0972)	(0.0022)		
GBP	-0.0229***	-3.8122***	-0.3354***	-0.0083**	2051	0.0901
	(0.0068)	(0.4907)	(0.0994)	(0.0033)		
USD	-0.0143*	-3.7412***	-0.1374	-0.0293*	2051	0.0705
	(0.0076)	(0.5839)	(0.1126)	(0.0157)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 2008M1-2017M12, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0485***	-6.2052***	-7.5654***	0.0529	-0.4063*	0.0152**	1079	0.3094
	(0.0133)	(0.8686)	(0.7367)	(0.5997)	(0.2100)	(0.0071)		
CAD	-0.0426***	-5.8707***	-7.7187***	-0.0304	0.1215	0.0048	1079	0.3057
	(0.0103)	(0.7112)	(0.6393)	(0.4858)	(0.1695)	(0.0029)		
EUR	-0.0387***	-5.5505***	-7.7025***	-0.3161	-0.1215	-0.0121***	1079	0.2854
	(0.0098)	(0.6383)	(0.5873)	(0.4413)	(0.1818)	(0.0036)		
JPY	-0.0612***	-5.8055***	-11.4309***	2.0497**	-0.1628	0.2886***	1079	0.3384
	(0.0177)	(1.2356)	(1.1326)	(0.8865)	(0.2957)	(0.0801)		
NZD	-0.0539***	-7.0047***	-8.3443***	0.3830	0.0770	0.0101	1079	0.3376
	(0.0139)	(0.9307)	(0.8652)	(0.6360)	(0.2375)	(0.0091)		
NOK	-0.0341***	-4.9972***	-8.1996***	0.8581	-0.1442	0.0671***	1079	0.2719
	(0.0111)	(0.7699)	(0.7428)	(0.5492)	(0.1942)	(0.0220)		
SEK	-0.0505***	-5.6572***	-6.8427***	-0.0305	-0.0254	0.0985***	1079	0.2445
	(0.0109)	(0.7249)	(0.6930)	(0.4848)	(0.1963)	(0.0218)		
CHF	-0.0271**	-3.6505***	-6.2321***	0.0309	0.1284	-0.0033	1071	0.1718
	(0.0110)	(0.8720)	(0.8105)	(0.6213)	(0.2014)	(0.0050)		
GBP	-0.0459***	-3.6709***	-8.1564***	0.6928	-0.2781	-0.0183***	1079	0.2229
	(0.0143)	(0.9157)	(0.8565)	(0.6265)	(0.2404)	(0.0064)		
USD	-0.0471***	-7.2161***	-9.7982***	-0.7930	0.0168	-0.0902***	1079	0.3381
	(0.0126)	(0.8648)	(0.8216)	(0.5839)	(0.2226)	(0.0251)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2D – full table of table 2D, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0543**	-7.2292	-22.9042	-11.0936	-2.9609	0.0104	360	0.0535
	(0.0259)	(10.5997)	(14.9001)	(12.0581)	(3.0581)	(0.0100)		
CAD	-0.0301***	-13.5169***	-32.2577***	-9.3470*	0.0662	0.0035	1227	0.0654
	(0.0098)	(4.5978)	(7.3181)	(4.7782)	(1.8729)	(0.0031)		
EUR	-0.0810***	-21.2172***	-31.9704***	-16.3791**	1.5667	-0.0210***	608	0.1129
	(0.0151)	(7.2536)	(8.7744)	(6.6045)	(2.6306)	(0.0047)		
JPY	-0.1040***	-24.4186**	-25.1094**	-1.5197	-7.2904**	0.4815***	461	0.1468
	(0.0239)	(10.2002)	(11.9099)	(12.2109)	(3.5545)	(0.1094)		
NZD	-0.0331***	-18.5507***	-31.9789***	-12.1508**	0.7339	0.0077	1227	0.0688
	(0.0103)	(4.7909)	(7.0020)	(5.2317)	(1.5859)	(0.0070)		
SEK	-0.0334***	-15.4295***	-20.2601***	-10.8591***	-0.1253	0.0651***	1227	0.0515
	(0.0084)	(3.8630)	(5.6202)	(4.0993)	(1.2450)	(0.0175)		
CHF	-0.0547***	-9.9728	-17.2902**	-13.6131*	8.4830***	-0.0084**	724	0.0818
	(0.0116)	(7.8673)	(7.6782)	(7.9137)	(3.0055)	(0.0040)		
GBP	-0.0222*	-8.5766*	-22.3137***	-8.5154*	-1.1037	-0.0118**	1227	0.0351
	(0.0115)	(4.8987)	(7.1081)	(4.9745)	(1.6846)	(0.0055)		
USD	-0.0253***	-17.6015***	-16.6230***	-16.4997***	1.1772	-0.0464**	1227	0.0637
	(0.0088)	(3.9543)	(6.2174)	(3.9658)	(1.4349)	(0.0182)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, full sample, no default risk, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0282***	-6.2536***	-3.1378**	-5.9436***	0.2952	-0.2568	-0.2859***	0.0121***	2027	0.2061
	(0.0072)	(0.7880)	(1.2199)	(0.5357)	(0.4251)	(0.7571)	(0.1106)	(0.0041)		
CAD	-0.0292***	-4.6936***	-5.3454***	-6.2016***	0.5250	-0.1580	-0.2890***	0.0061**	1835	0.2135
	(0.0067)	(0.7183)	(1.1114)	(0.5232)	(0.3956)	(0.7041)	(0.1096)	(0.0025)		
EUR	-0.0199***	-4.8871***	-5.0036***	-5.2334***	-0.1073	-0.4550	-0.1705*	-0.0051**	2027	0.1589
	(0.0058)	(0.5625)	(0.8598)	(0.4049)	(0.3066)	(0.5330)	(0.0907)	(0.0022)		
JPY	-0.0407***	-4.2165***	-5.0290***	-6.5016***	2.1511***	2.0178**	-0.1516	0.1994***	2027	0.1761
	(0.0102)	(1.0032)	(1.5890)	(0.7488)	(0.5775)	(0.9618)	(0.1345)	(0.0478)		
NZD	-0.0296***	-6.6971***	-5.9202***	-6.4014***	0.1906	-0.6582	-0.1745	0.0151***	2027	0.2098
	(0.0078)	(0.7912)	(1.2847)	(0.6095)	(0.4292)	(0.7716)	(0.1258)	(0.0057)		
NOK	-0.0198***	-3.9084***	-5.1820***	-4.9689***	0.5705	0.6795	-0.1754*	0.0412***	2027	0.1629
	(0.0068)	(0.6531)	(1.0430)	(0.4885)	(0.3971)	(0.6885)	(0.0987)	(0.0141)		
SEK	-0.0224***	-4.4885***	-5.1247***	-4.7033***	-0.2920	-0.7150	-0.1268	0.0447***	2027	0.1402
	(0.0063)	(0.6409)	(0.9782)	(0.4662)	(0.3599)	(0.6317)	(0.1026)	(0.0134)		
CHF	-0.0131**	-3.7132***	-1.7331	-3.9686***	0.5469	0.1939	-0.2120**	0.0009	2019	0.0868
	(0.0060)	(0.7116)	(1.0979)	(0.5105)	(0.3855)	(0.6935)	(0.1005)	(0.0032)		
GBP	-0.0221***	-4.3195***	-1.5450	-5.6633***	0.7081*	0.5368	-0.3349***	-0.0076**	2027	0.1438
	(0.0068)	(0.7451)	(1.1210)	(0.5258)	(0.4147)	(0.6941)	(0.1065)	(0.0033)		
USD	-0.0121*	-6.3814***	-6.8336***	-4.8691***	-1.2849***	-0.9221	-0.0582	-0.0235	2027	0.1753
	(0.0070)	(0.8238)	(1.1928)	(0.5822)	(0.4460)	(0.7207)	(0.1113)	(0.0149)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, post 2008, with default risk, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2\Delta\lambda_{j,t} + \beta_3\Delta\tau_{j,t} + \beta_4\Delta l^R_{j,t} + \beta_5\Delta i^R_{j,t} + \beta_6\lambda_{j,t-1} + \beta_7\tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta l^R_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$l^R_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0513***	-7.2053***	-3.3530**	14.5092***	-7.3038***	-0.4305	-0.5560	0.1797	-0.3734*	0.0155**	954	0.3029
	(0.0152)	(1.1091)	(1.5116)	(2.3297)	(0.7981)	(0.6495)	(1.1709)	(1.4068)	(0.2101)	(0.0073)		
CAD	-0.0313***	-8.8567***	-6.8906***	8.3213***	-8.9747***	-0.6043	-3.5155***	-0.6392	0.3944	-0.0009	399	0.3046
	(0.0118)	(1.5154)	(1.7969)	(2.5681)	(1.1122)	(0.8526)	(1.0528)	(1.5427)	(0.2489)	(0.0035)		
EUR	-0.0477***	-6.5882***	-4.0138***	8.6759***	-8.3319***	-0.1026	-0.7853	2.1128**	-0.0665	-0.0165***	965	0.2919
	(0.0104)	(0.7780)	(0.9240)	(1.6170)	(0.6126)	(0.4515)	(0.6943)	(1.0123)	(0.1726)	(0.0040)		
JPY	-0.0654***	-6.9260***	-4.4754**	10.4870***	-11.5341***	2.0343**	2.9395**	-0.2503	-0.0736	0.3104***	965	0.3486
	(0.0178)	(1.3761)	(1.8480)	(3.1817)	(1.1389)	(0.8053)	(1.4171)	(1.9958)	(0.2788)	(0.0804)		
NZD	-0.0544***	-7.8269***	-6.0864***	12.3531***	-8.3548***	0.6825	0.2931	-0.0311	0.1621	0.0081	942	0.3321
	(0.0137)	(1.1326)	(1.4691)	(2.4818)	(0.9011)	(0.6844)	(1.1942)	(1.4007)	(0.2444)	(0.0090)		
NOK	-0.0426***	-5.2487***	-5.8965***	4.2135**	-8.1066***	0.6287	0.6719	1.4380	-0.1173	0.0832***	965	0.2752
	(0.0111)	(0.8105)	(1.1987)	(1.9603)	(0.7364)	(0.5300)	(0.8958)	(1.2685)	(0.1921)	(0.0223)		
SEK	-0.0497***	-5.6003***	-4.3565***	7.3048***	-6.4572***	0.1517	-1.0694	-0.1471	-0.0534	0.0941***	965	0.2228
	(0.0111)	(0.8805)	(1.1318)	(1.8924)	(0.7211)	(0.5018)	(0.8421)	(1.1388)	(0.1894)	(0.0226)		
CHF	-0.0249**	-5.8228***	-1.0930	7.9530***	-4.9992***	-0.5818	-0.5845	2.0607	0.1926	-0.0076	881	0.0880
	(0.0111)	(1.3117)	(1.5992)	(2.3441)	(0.9353)	(0.6809)	(1.0374)	(1.3520)	(0.2040)	(0.0051)		
GBP	-0.0486***	-6.4730***	-0.6533	5.8833**	-9.3742***	0.3684	1.9781*	0.9996	-0.0670	-0.0189***	965	0.2468
	(0.0136)	(1.1133)	(1.4022)	(2.3437)	(0.8828)	(0.6481)	(1.0200)	(1.4796)	(0.2350)	(0.0063)		
USD	-0.0560***	-8.9086***	-3.2019**	12.5574***	-10.1507***	-0.9368	0.4045	1.0582	0.1366	-0.1104***	813	0.3756
	(0.0138)	(1.1126)	(1.2482)	(2.1570)	(0.8834)	(0.6296)	(0.9356)	(1.3704)	(0.2270)	(0.0275)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\lambda_{j,t}$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \lambda_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0548***	-4.4892***	-6.4274***	-0.0210	-0.3793*	0.0159**	954	0.2194
	(0.0157)	(1.0744)	(0.8423)	(0.5668)	(0.2274)	(0.0076)		
CAD	-0.0359***	-3.6265***	-7.9490***	0.9625	0.4427*	0.0038	399	0.2396
	(0.0125)	(1.3326)	(1.1357)	(0.7107)	(0.2646)	(0.0035)		
EUR	-0.0426***	-3.4544***	-8.0497***	0.6814*	-0.0377	-0.0134***	965	0.2424
	(0.0103)	(0.7207)	(0.6233)	(0.3932)	(0.1825)	(0.0036)		
JPY	-0.0704***	-4.9658***	-10.9949***	1.6701**	-0.3591	0.3213***	965	0.2858
	(0.0184)	(1.3638)	(1.1874)	(0.6485)	(0.2952)	(0.0829)		
NZD	-0.0542***	-4.9241***	-7.1773***	0.9769	0.2323	0.0069	942	0.2358
	(0.0160)	(1.1240)	(0.9658)	(0.6579)	(0.2672)	(0.0100)		
NOK	-0.0364***	-4.2428***	-7.3424***	0.8598*	-0.0874	0.0683***	965	0.2237
	(0.0112)	(0.7759)	(0.7554)	(0.4492)	(0.2025)	(0.0221)		
SEK	-0.0525***	-4.0889***	-6.2107***	0.2019	0.0339	0.1021***	965	0.1773
	(0.0111)	(0.8147)	(0.7272)	(0.4550)	(0.1968)	(0.0220)		
CHF	-0.0235**	-3.5106***	-4.5120***	-0.1109	0.1738	-0.0046	881	0.0633
	(0.0106)	(1.1842)	(0.9489)	(0.5623)	(0.2077)	(0.0035)		
GBP	-0.0448***	-5.2950***	-8.5265***	0.1084	-0.1244	-0.0194***	965	0.2259
	(0.0133)	(1.0231)	(0.8687)	(0.5483)	(0.2379)	(0.0061)		
USD	-0.0595***	-5.1253***	-9.8593***	-0.7254	0.1777	-0.1159***	813	0.2804
	(0.0163)	(1.1080)	(0.9587)	(0.6271)	(0.2570)	(0.0322)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\tau_{j,t}$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \tau_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \tau_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \tau_{j,t}$	$\Delta i^R_{j,t}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0320***	-1.5353	-4.2424***	-0.3062	-0.2969***	0.0133***	2027	0.1201
	(0.0075)	(1.2740)	(0.5164)	(0.7480)	(0.1144)	(0.0043)		
CAD	-0.0296***	-4.4586***	-5.3357***	-0.6788	-0.2922***	0.0051**	1835	0.1763
	(0.0067)	(1.1111)	(0.4934)	(0.6416)	(0.1086)	(0.0023)		
EUR	-0.0216***	-3.1621***	-3.7711***	-0.4263	-0.1949**	-0.0053**	2027	0.1111
	(0.0059)	(0.8675)	(0.3712)	(0.4797)	(0.0907)	(0.0022)		
JPY	-0.0347***	-5.8441***	-5.6721***	0.6453	-0.1159	0.1634***	2027	0.1310
	(0.0103)	(1.6373)	(0.7093)	(0.9138)	(0.1357)	(0.0483)		
NZD	-0.0314***	-4.1731***	-2.9760***	-0.4427	-0.1216	0.0146**	2027	0.0807
	(0.0088)	(1.4047)	(0.5814)	(0.7741)	(0.1351)	(0.0063)		
NOK	-0.0184***	-3.0822***	-3.6837***	0.1610	-0.1232	0.0370**	2027	0.0993
	(0.0070)	(1.0560)	(0.4673)	(0.6614)	(0.0977)	(0.0144)		
SEK	-0.0253***	-4.4653***	-3.3708***	-0.6392	-0.1635	0.0508***	2027	0.0921
	(0.0063)	(0.9870)	(0.4258)	(0.6007)	(0.1009)	(0.0135)		
CHF	-0.0119**	-2.0420*	-2.7135***	-0.0208	-0.2162**	-0.0018	2019	0.0492
	(0.0059)	(1.1117)	(0.4725)	(0.6566)	(0.0996)	(0.0027)		
GBP	-0.0223***	-0.7693	-3.8679***	-0.3056	-0.3479***	-0.0083**	2027	0.0924
	(0.0070)	(1.1399)	(0.4911)	(0.6717)	(0.1063)	(0.0033)		
USD	-0.0129*	-6.2108***	-3.8031***	-0.6893	-0.1674	-0.0249	2027	0.1036
	(0.0076)	(1.2382)	(0.5687)	(0.6968)	(0.1143)	(0.0160)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $l_{j,t}^R$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta l_{j,t}^R + \beta_3 \Delta i_{j,t}^R + \beta_4 l_{j,t-1}^R + \beta_5 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta l_{j,t}^R$	$\Delta i_{j,t}^R$	$l_{j,t-1}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0572***	9.9471***	-5.7573***	0.5040	-0.4473**	0.0185**	954	0.2194
	(0.0159)	(2.1987)	(0.7584)	(1.3025)	(0.2176)	(0.0074)		
CAD	-0.0308**	0.7547	-6.9329***	1.2790	0.5283**	0.0017	399	0.2018
	(0.0127)	(2.2708)	(1.0802)	(1.3620)	(0.2442)	(0.0036)		
EUR	-0.0512***	2.0137	-6.3724***	2.3257**	-0.0624	-0.0142***	965	0.2069
	(0.0108)	(1.5065)	(0.5710)	(0.9197)	(0.1832)	(0.0037)		
JPY	-0.0623***	4.7482	-10.0143***	1.6921	-0.0719	0.2825***	965	0.2477
	(0.0194)	(3.1077)	(1.1494)	(1.8797)	(0.3087)	(0.0872)		
NZD	-0.0664***	4.5846*	-6.1433***	1.8722	0.2763	0.0081	942	0.1730
	(0.0158)	(2.5575)	(0.9643)	(1.4215)	(0.2708)	(0.0100)		
NOK	-0.0452***	-1.2134	-5.2769***	2.8374**	-0.0823	0.0880***	965	0.1447
	(0.0121)	(1.9512)	(0.7214)	(1.1799)	(0.2170)	(0.0241)		
SEK	-0.0565***	2.9482	-4.4351***	1.2175	0.0452	0.1109***	965	0.1340
	(0.0118)	(1.7924)	(0.6650)	(1.0864)	(0.1952)	(0.0234)		
CHF	-0.0247**	2.2263	-3.1002***	1.3974	0.1175	-0.0042	881	0.0456
	(0.0110)	(2.0983)	(0.8766)	(1.1801)	(0.2053)	(0.0032)		
GBP	-0.0484***	0.7863	-6.0860***	1.4121	-0.1539	-0.0204***	965	0.1712
	(0.0144)	(2.2231)	(0.8362)	(1.2948)	(0.2463)	(0.0066)		
USD	-0.0570***	5.1429**	-8.6497***	-0.2386	0.1627	-0.1103***	813	0.2553
	(0.0167)	(2.1134)	(0.9081)	(1.3630)	(0.2547)	(0.0330)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^R$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^R$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta + l^R)_{j,t}$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta + l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta + l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta + l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta + l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0522***	-4.4479***	-6.7364***	-0.2415	-0.3564	0.0153**	954	0.2299
	(0.0157)	(0.9424)	(0.8535)	(0.6316)	(0.2251)	(0.0075)		
CAD	-0.0273**	-5.2887***	-8.2070***	-0.5082	0.6036**	0.0016	399	0.2497
	(0.0120)	(1.2257)	(1.1374)	(0.7763)	(0.2526)	(0.0037)		
EUR	-0.0406***	-4.0124***	-7.7359***	0.3185	-0.0381	-0.0115***	965	0.2564
	(0.0103)	(0.6037)	(0.5951)	(0.3991)	(0.1764)	(0.0037)		
JPY	-0.0692***	-4.5828***	-11.3109***	2.2805***	-0.1964	0.3253***	965	0.3217
	(0.0181)	(1.1377)	(1.1269)	(0.7851)	(0.2926)	(0.0818)		
NZD	-0.0519***	-5.2704***	-7.7770***	0.9965	0.2855	0.0037	942	0.2814
	(0.0151)	(0.9046)	(0.9226)	(0.6417)	(0.2518)	(0.0094)		
NOK	-0.0389***	-4.8577***	-7.9348***	0.9800**	-0.1026	0.0759***	965	0.2678
	(0.0107)	(0.6646)	(0.7161)	(0.4346)	(0.1908)	(0.0214)		
SEK	-0.0499***	-4.2427***	-6.3769***	-0.0080	0.0342	0.0973***	965	0.1952
	(0.0111)	(0.6756)	(0.7062)	(0.4504)	(0.1919)	(0.0221)		
CHF	-0.0233**	-2.4752**	-3.8496***	-0.1723	0.1487	-0.0052	881	0.0632
	(0.0106)	(0.9612)	(0.9103)	(0.5461)	(0.2060)	(0.0044)		
GBP	-0.0444***	-3.6011***	-8.1602***	0.8494	-0.1785	-0.0185***	965	0.2179
	(0.0138)	(0.8638)	(0.8653)	(0.5628)	(0.2370)	(0.0063)		
USD	-0.0596***	-4.5722***	-9.3961***	-0.8059	0.1448	-0.1144***	813	0.2957
	(0.0157)	(0.8519)	(0.9154)	(0.5794)	(0.2493)	(0.0311)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta - \tau)_{j,t}$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta - \tau)_{j,t} + \beta_3 \Delta i_{j,t}^R + \beta_4 (\eta - \tau)_{j,t-1} + \beta_5 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta - \tau)_{j,t}$	$\Delta i_{j,t}^R$	$(\eta - \tau)_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0290***	-5.9108***	-5.7064***	0.3593	-0.2795**	0.0121***	2027	0.1985
	(0.0070)	(0.7769)	(0.5328)	(0.4024)	(0.1102)	(0.0041)		
CAD	-0.0300***	-3.7373***	-6.2502***	0.6129*	-0.2651**	0.0064***	1835	0.1833
	(0.0067)	(0.7409)	(0.5376)	(0.3694)	(0.1113)	(0.0025)		
EUR	-0.0217***	-3.7149***	-5.2196***	0.0865	-0.1582*	-0.0043**	2027	0.1305
	(0.0058)	(0.5711)	(0.4126)	(0.2903)	(0.0937)	(0.0021)		
JPY	-0.0387***	-4.2481***	-6.2795***	1.7813***	-0.2904**	0.1831***	2027	0.1462
	(0.0102)	(1.0223)	(0.7654)	(0.5386)	(0.1357)	(0.0474)		
NZD	-0.0291***	-6.1113***	-6.0012***	0.2823	-0.1273	0.0134**	2027	0.1755
	(0.0086)	(0.8027)	(0.6266)	(0.3997)	(0.1288)	(0.0061)		
NOK	-0.0186***	-2.9316***	-4.4539***	0.3986	-0.1694*	0.0375***	2027	0.1256
	(0.0069)	(0.6522)	(0.5001)	(0.3778)	(0.1021)	(0.0139)		
SEK	-0.0245***	-4.2249***	-4.5719***	-0.2349	-0.0887	0.0504***	2027	0.1192
	(0.0062)	(0.6417)	(0.4739)	(0.3424)	(0.1039)	(0.0129)		
CHF	-0.0123**	-3.7831***	-4.0124***	0.5170	-0.2152**	0.0003	2019	0.0826
	(0.0057)	(0.7129)	(0.5127)	(0.3574)	(0.1009)	(0.0024)		
GBP	-0.0209***	-4.1934***	-5.4897***	0.5308	-0.3363***	-0.0077**	2027	0.1401
	(0.0067)	(0.7345)	(0.5249)	(0.3884)	(0.1054)	(0.0033)		
USD	-0.0142**	-6.0996***	-4.8139***	-1.1734***	-0.0284	-0.0294**	2027	0.1376
	(0.0071)	(0.8458)	(0.6020)	(0.4310)	(0.1144)	(0.0148)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^R$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^R$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\tau - l^R)_{j,t}$, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\tau - l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\tau - l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\tau - l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\tau - l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0561***	-4.7837***	-5.9795***	-1.0041	-0.5195**	0.0207***	954	0.2127
	(0.0159)	(1.2895)	(0.7940)	(0.8484)	(0.2337)	(0.0080)		
CAD	-0.0357***	-1.8207	-6.8766***	-1.6425**	0.3688	0.0005	399	0.2204
	(0.0127)	(1.4376)	(1.0686)	(0.7696)	(0.2464)	(0.0036)		
EUR	-0.0484***	-2.3497***	-5.9865***	-1.4418***	-0.1389	-0.0184***	965	0.2161
	(0.0104)	(0.7944)	(0.5670)	(0.5189)	(0.1804)	(0.0041)		
JPY	-0.0570***	-6.2547***	-10.2499***	0.2292	-0.0145	0.2597***	965	0.2813
	(0.0186)	(1.6331)	(1.1204)	(1.0798)	(0.3086)	(0.0834)		
NZD	-0.0570***	-5.3858***	-6.6085***	-0.7078	0.2140	0.0088	942	0.2089
	(0.0159)	(1.3571)	(0.9433)	(0.9077)	(0.2660)	(0.0099)		
NOK	-0.0355***	-3.4656***	-5.2402***	-1.3365*	-0.0909	0.0657***	965	0.1477
	(0.0118)	(1.0828)	(0.7346)	(0.7222)	(0.2190)	(0.0231)		
SEK	-0.0554***	-3.7487***	-4.3686***	-1.1369*	-0.0270	0.1060***	965	0.1515
	(0.0114)	(0.9855)	(0.6629)	(0.6368)	(0.1942)	(0.0226)		
CHF	-0.0225**	-2.2309*	-2.8585***	-0.7918	0.1033	-0.0063	881	0.0502
	(0.0105)	(1.3036)	(0.8806)	(0.7633)	(0.2048)	(0.0039)		
GBP	-0.0489***	-0.5402	-6.1315***	-0.0555	-0.1844	-0.0199***	965	0.1691
	(0.0140)	(1.2007)	(0.8462)	(0.7509)	(0.2522)	(0.0066)		
USD	-0.0587***	-4.6762***	-8.4757***	-0.4799	0.0907	-0.1125***	813	0.2729
	(0.0161)	(1.1607)	(0.9006)	(0.8272)	(0.2501)	(0.0316)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4A – full table of table 4A, extreme outliner of CHF at 2015M1 excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 (\Delta \eta_{j,t}^{IV}) + \beta_3 (\Delta i_{j,t}^{R}) + \beta_4 (\eta_{j,t-1}^{IV}) + \beta_5 (i_{j,t-1}^{R}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}^{IV}$	$\eta_{j,t-1}^{IV}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	constant	N
AUD	-0.0213**	-16.6397***	-1.8207	-8.7888***	-0.1461	0.0088*	1973
	(0.0083)	(3.8005)	(2.1907)	(1.1713)	(0.1538)	(0.0046)	
CAD	-0.0291***	-6.6701*	1.2508	-6.0732***	-0.3020***	0.0093**	1973
	(0.0069)	(3.6976)	(1.3041)	(0.8753)	(0.1009)	(0.0042)	
EUR	-0.0266***	1.9328	-0.2659	-4.1781***	-0.2244**	-0.0065	1889
	(0.0072)	(4.2834)	(1.7480)	(0.9753)	(0.1040)	(0.0047)	
JPY	-0.0440***	-10.4866***	2.3621	-7.7705***	-0.1809	0.2161***	1973
	(0.0114)	(2.6056)	(1.8263)	(0.8750)	(0.1260)	(0.0569)	
NZD	-0.0264***	-7.0796**	1.4038*	-7.0967***	-0.2021	0.0133**	1973
	(0.0085)	(3.0070)	(0.7946)	(1.5094)	(0.1236)	(0.0060)	
NOK	-0.0296***	-3.0147**	2.2410**	-5.3626***	-0.3268***	0.0645***	1889
	(0.0082)	(1.4232)	(1.0070)	(0.6525)	(0.1234)	(0.0179)	
SEK	-0.0199***	-9.7440***	-0.7337	-6.3671***	-0.1016	0.0400***	1973
	(0.0069)	(2.5739)	(0.7538)	(0.9622)	(0.1085)	(0.0147)	
CHF	-0.0264***	0.9245	2.4451***	-2.8447***	-0.2001**	0.0139***	1965
	(0.0069)	(1.9856)	(0.7360)	(0.7730)	(0.0992)	(0.0048)	
GBP	-0.0323***	-2.2280	4.6088**	-6.2936***	-0.5022***	-0.0083**	1889
	(0.0087)	(3.2510)	(2.1082)	(1.2847)	(0.1347)	(0.0037)	
USD	-0.0141*	-8.7655***	-3.8188***	-4.8319***	0.0226	-0.0230	1973
	(0.0072)	(2.3313)	(0.9406)	(0.7864)	(0.1163)	(0.0149)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4B – full table of table 4B, extreme outliner of CHF at 2015M1 excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t}^{IV} + \beta_3 \Delta i_{j,t}^{R} + \beta_4 \Delta\tau_{j,t} + \beta_5 \lambda_{j,t-1}^{IV} + \beta_6 i_{j,t-1}^{R} + \beta_7 \tau_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	constant	N
AUD	-0.0151*	-23.9766***	-3.3812	-7.8255***	-2.6183	-9.8026***	0.0511	0.0035	1949
	(0.0089)	(4.7652)	(3.1342)	(2.0123)	(1.9138)	(1.2463)	(0.2493)	(0.0063)	
CAD	-0.0338***	0.9517	0.6945	-4.1934***	-0.1926	-5.3129***	-0.3862***	0.0077**	1796
	(0.0078)	(5.9492)	(1.2439)	(1.6001)	(1.2326)	(1.2014)	(0.1319)	(0.0039)	
EUR	-0.0194***	-13.5650***	-1.2282	-8.3685***	-1.5551	-7.6865***	-0.1779*	-0.0081**	1878
	(0.0068)	(4.8916)	(1.2482)	(1.9891)	(1.2189)	(1.3000)	(0.1067)	(0.0036)	
JPY	-0.0474***	-13.3600***	2.9690	-4.5663***	2.6484**	-8.3354***	-0.2100	0.2343***	1949
	(0.0110)	(3.9344)	(1.9467)	(1.7180)	(1.3179)	(1.0677)	(0.1586)	(0.0537)	
NZD	-0.0289***	-5.4532*	1.4813*	-5.3152***	0.4620	-6.4386***	-0.2800**	0.0164***	1949
	(0.0081)	(3.2776)	(0.7862)	(1.4548)	(0.9612)	(1.5388)	(0.1311)	(0.0058)	
NOK	-0.0286***	-3.1243**	2.2960**	-4.5774***	1.8166*	-5.4612***	-0.3530***	0.0621***	1878
	(0.0079)	(1.4159)	(1.0053)	(1.2900)	(0.9987)	(0.6377)	(0.1326)	(0.0171)	
SEK	-0.0205***	-8.6904***	-0.6238	-5.7096***	-0.8723	-5.9991***	-0.0942	0.0409***	1949
	(0.0068)	(2.8795)	(0.6822)	(1.1040)	(0.7073)	(1.0073)	(0.1174)	(0.0145)	
CHF	-0.0206***	-0.4933	2.4314***	-1.5272	0.8889	-3.3235***	-0.2582**	0.0100**	1941
	(0.0065)	(3.0790)	(0.7679)	(1.1325)	(0.7589)	(1.0840)	(0.1101)	(0.0043)	
GBP	-0.0269***	-13.4231***	3.8047**	-2.5523	3.7698**	-9.9858***	-0.4114***	-0.0070*	1878
	(0.0088)	(4.5225)	(1.7967)	(1.5621)	(1.6147)	(1.6943)	(0.1561)	(0.0041)	
USD	-0.0147**	-12.8757***	-4.1557***	-7.6863***	-1.7825**	-5.7155***	0.1347	-0.0280*	1949
	(0.0074)	(3.1644)	(1.0989)	(1.2541)	(0.8630)	(0.9202)	(0.1396)	(0.0156)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4C – full table of table 4C, extreme outliner of CHF at 2015M1 excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t}^{IV} + \beta_3 \Delta \tau_{j,t} + \beta_4 \Delta l_{j,t}^{R} + \beta_5 \Delta i_{j,t}^{R} + \beta_6 \lambda_{j,t-1}^{IV} + \beta_7 \tau_{j,t-1} + \beta_8 l_{j,t-1}^{R} + \beta_9 i_{j,t-1}^{R} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	$\Delta \tau_{j,t}$	$\tau_{j,t-1}$	$\Delta l_{j,t}^{R}$	$l_{j,t-1}^{R}$	constant	N
AUD	-0.0491***	-13.2005***	-0.0571	-8.5240***	-0.3709	-3.7304**	0.1946	18.3263***	-0.8772	0.0145	918
	(0.0166)	(4.1190)	(1.9993)	(1.1351)	(0.2883)	(1.6452)	(1.5264)	(3.8532)	(2.3024)	(0.0090)	
CAD	-0.0233	-20.8018**	-2.2832	-11.6756***	0.6186	-11.4544***	-4.2982**	19.0624**	0.3970	-0.0017	363
	(0.0165)	(9.1085)	(2.7112)	(2.4103)	(0.3930)	(3.6512)	(1.9533)	(8.3007)	(3.1077)	(0.0063)	
EUR	-0.0519***	-12.1068***	-0.4418	-10.2444***	-0.1484	-5.3102***	-0.6099	14.6460***	2.6467*	-0.0165***	929
	(0.0116)	(4.2177)	(1.3488)	(1.5263)	(0.1829)	(1.3683)	(1.2310)	(4.7270)	(1.6080)	(0.0054)	
JPY	-0.0703***	-10.1503**	3.6041*	-12.1094***	-0.2566	-3.2900*	3.8470**	12.9606***	-1.6755	0.3388***	929
	(0.0182)	(4.1868)	(2.1264)	(1.4050)	(0.3358)	(1.9855)	(1.6591)	(4.5961)	(2.6231)	(0.0829)	
NZD	-0.0426***	-8.7216***	2.9000**	-8.8090***	0.0002	-5.7307***	1.4808	12.8964***	-1.7524	0.0091	906
	(0.0145)	(2.9953)	(1.3313)	(1.0764)	(0.2737)	(1.4972)	(1.3431)	(3.8511)	(1.6674)	(0.0097)	
NOK	-0.0461***	-4.1830***	-0.3408	-7.2845***	-0.2030	-5.8644***	-0.2434	3.5436	3.0121*	0.0905***	929
	(0.0115)	(1.3484)	(0.9536)	(0.9631)	(0.2068)	(1.2760)	(1.1048)	(2.2766)	(1.6790)	(0.0231)	
SEK	-0.0467***	-10.6680***	-0.1192	-8.1589***	-0.0522	-4.0859***	-0.7955	11.8531***	-0.5584	0.0894***	929
	(0.0119)	(3.4290)	(0.7984)	(1.3484)	(0.2220)	(1.2182)	(0.9369)	(3.6180)	(1.3448)	(0.0241)	
CHF	-0.0275**	0.8861	-0.6937	-2.5166	0.0547	-2.5738	-0.6146	1.6010	2.3954	-0.0083	845
	(0.0115)	(5.1059)	(1.1122)	(1.9945)	(0.2345)	(1.8861)	(1.0824)	(5.2525)	(1.6868)	(0.0063)	
GBP	-0.0444***	-13.4318***	0.8957	-12.7244***	-0.0492	-1.1922	2.9663*	10.9652***	-0.0544	-0.0162**	929
	(0.0156)	(4.2660)	(1.8052)	(2.0902)	(0.2537)	(1.5129)	(1.5458)	(4.0811)	(2.2841)	(0.0074)	
USD	-0.0585***	-18.3097***	-1.4589	-12.4256***	-0.0507	-1.9703	1.8238	20.3893***	2.1069	-0.1201***	777
	(0.0155)	(3.4373)	(1.2340)	(1.2397)	(0.2440)	(1.3883)	(1.1175)	(3.4375)	(1.6525)	(0.0310)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 5 – full table of table 5, extreme outliner of CHF at 2015M1 excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\tau_{j,t} + \beta_3 \Delta\gamma_t + \beta_4 \Delta\gamma^*_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \gamma_{t-1} + \beta_7 \gamma^*_{j,t-1} + \beta_8 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\gamma^*_{j,t}$	$\Delta\gamma_t$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\gamma^*_{j,t-1}$	γ_{t-1}	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2 within
AUD	-0.0280***	5.5961***	-6.8581***	-2.9017**	-5.9156***	-0.1666	0.4068	-0.2829	-0.2816**	0.0110**	2027	0.2082
	(0.0071)	(0.6832)	(1.2076)	(1.2032)	(0.5360)	(0.3671)	(0.5979)	(0.7601)	(0.1105)	(0.0046)		
CAD	-0.0291***	4.5341***	-5.9784***	-5.3881***	-6.2179***	-0.5539	-0.2016	-0.2669	-0.2838***	0.0077**	1835	0.2149
	(0.0067)	(0.6815)	(1.9588)	(1.1120)	(0.5219)	(0.3941)	(1.2300)	(0.7169)	(0.1095)	(0.0035)		
EUR	-0.0199***	4.7862***	-5.2400***	-5.2134***	-5.2391***	0.1091	-0.1477	-0.4698	-0.1712*	-0.0050**	2027	0.1591
	(0.0058)	(0.5569)	(1.0692)	(0.8926)	(0.4055)	(0.3093)	(0.5161)	(0.5679)	(0.0923)	(0.0025)		
JPY	-0.0407***	4.3243***	-1.9827	-4.8411***	-6.4875***	-2.1454***	1.9348	2.0260**	-0.1486	0.1997***	2027	0.1767
	(0.0101)	(0.9876)	(5.1896)	(1.5851)	(0.7495)	(0.5721)	(2.4880)	(0.9619)	(0.1347)	(0.0474)		
NZD	-0.0326***	6.2598***	-6.8412***	-5.7259***	-6.4160***	0.9929*	0.1996	-0.8909	-0.1721	0.0114*	2027	0.2171
	(0.0076)	(0.8569)	(0.8899)	(1.2724)	(0.6085)	(0.5100)	(0.4249)	(0.7619)	(0.1252)	(0.0062)		
NOK	-0.0178***	5.6901***	-3.3614***	-5.1197***	-5.1663***	-0.1887	0.6584	0.5733	-0.1657*	0.0351**	2027	0.1698
	(0.0067)	(0.7323)	(0.7606)	(1.0386)	(0.4921)	(0.4132)	(0.4846)	(0.6837)	(0.0988)	(0.0141)		
SEK	-0.0223***	4.9061***	-3.9380***	-5.1512***	-4.7600***	0.5291	-0.0031	-0.7903	-0.1351	0.0421***	2027	0.1421
	(0.0063)	(0.6320)	(1.2143)	(0.9801)	(0.4649)	(0.3791)	(0.4870)	(0.6361)	(0.1024)	(0.0134)		
CHF	-0.0152**	3.5183***	-4.1800**	-1.8215*	-3.9956***	-0.4722	1.1342	0.1253	-0.2127**	0.0006	2019	0.0882
	(0.0066)	(0.6924)	(1.7224)	(1.0940)	(0.5113)	(0.3965)	(1.0083)	(0.7031)	(0.1002)	(0.0033)		
GBP	-0.0215***	4.8877***	-3.8070***	-1.3110	-5.6315***	-0.6401	0.8236	0.5672	-0.3345***	-0.0081**	2027	0.1451
	(0.0069)	(0.7036)	(1.0815)	(1.1103)	(0.5273)	(0.4029)	(0.5838)	(0.6936)	(0.1069)	(0.0037)		
USD	-0.0131*	6.3062***	-5.8798***	-6.5810***	-5.1169***	0.1079	-1.9605***	0.0112	-0.0255	-0.0192	2027	0.1917
	(0.0070)	(0.8049)	(1.3767)	(1.2061)	(0.5802)	(0.4530)	(0.5751)	(0.7353)	(0.1115)	(0.0147)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $\gamma^*_{j,t}$ is a measure of foreign treasury liquidity, $\gamma_{j,t}$ is a measure of the home treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

v) regressions tables in the main text with CHF excluded

Robustness of table 2A – full table of table 2A, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0339***	-5.7707***	-5.9978***	0.0364	-0.2777***	0.0133***	1824	0.2087
	(0.0087)	(0.7140)	(0.5286)	(0.4316)	(0.1024)	(0.0042)		
CAD	-0.0334***	-4.9720***	-5.5980***	0.2538	-0.2460***	0.0076***	1824	0.1895
	(0.0072)	(0.6130)	(0.4751)	(0.3835)	(0.0922)	(0.0026)		
EUR	-0.0234***	-5.2314***	-5.4526***	-0.2984	-0.1668*	-0.0055**	1824	0.1663
	(0.0071)	(0.5501)	(0.4330)	(0.3393)	(0.0909)	(0.0023)		
JPY	-0.0471***	-4.4000***	-6.7706***	2.1643***	-0.1937	0.2293***	1824	0.1893
	(0.0117)	(0.9758)	(0.7389)	(0.5998)	(0.1269)	(0.0542)		
NZD	-0.0270***	-6.8214***	-6.3993***	0.0840	-0.1050	0.0122*	1824	0.2184
	(0.0097)	(0.7382)	(0.6065)	(0.4481)	(0.1184)	(0.0063)		
NOK	-0.0236***	-4.5295***	-5.1565***	0.5006	-0.1757*	0.0480***	1824	0.1730
	(0.0079)	(0.6353)	(0.4965)	(0.4113)	(0.0939)	(0.0160)		
SEK	-0.0276***	-4.8590***	-4.9335***	-0.4927	-0.1038	0.0559***	1824	0.1508
	(0.0075)	(0.5996)	(0.4748)	(0.3795)	(0.0970)	(0.0157)		
GBP	-0.0261***	-3.9282***	-5.4146***	0.5725	-0.3411***	-0.0093**	1824	0.1402
	(0.0078)	(0.6841)	(0.5271)	(0.4345)	(0.0984)	(0.0037)		
USD	-0.0158**	-6.6931***	-4.9629***	-1.3677***	-0.0583	-0.0302*	1824	0.1809
	(0.0077)	(0.7426)	(0.5750)	(0.4654)	(0.1039)	(0.0160)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2B – full table of table 2B, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta i_{j,t}^R) + \beta_3(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0394***	-4.1914***	-0.3012***	0.0151***	1824	0.1262
	(0.0092)	(0.5036)	(0.1065)	(0.0045)		
CAD	-0.0364***	-4.5876***	-0.2409**	0.0076***	1824	0.1297
	(0.0074)	(0.4500)	(0.0936)	(0.0024)		
EUR	-0.0265***	-4.1544***	-0.1822**	-0.0052**	1824	0.1030
	(0.0073)	(0.4070)	(0.0926)	(0.0022)		
JPY	-0.0406***	-5.7467***	-0.2204	0.1882***	1824	0.1177
	(0.0122)	(0.7265)	(0.1345)	(0.0561)		
NZD	-0.0316***	-2.8511***	-0.0892	0.0137*	1824	0.0631
	(0.0111)	(0.5977)	(0.1311)	(0.0071)		
NOK	-0.0247***	-3.6090***	-0.1299	0.0489***	1824	0.0915
	(0.0084)	(0.4751)	(0.0947)	(0.0168)		
SEK	-0.0323***	-3.4127***	-0.1306	0.0664***	1824	0.0820
	(0.0079)	(0.4435)	(0.0986)	(0.0164)		
GBP	-0.0275***	-3.7175***	-0.3363***	-0.0104***	1824	0.0887
	(0.0080)	(0.4934)	(0.0997)	(0.0038)		
USD	-0.0169**	-3.8682***	-0.1297	-0.0346**	1824	0.0768
	(0.0085)	(0.5832)	(0.1109)	(0.0175)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 1999M1-2007M12, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 (\Delta \eta_{j,t}) + \beta_3 (\Delta i_{j,t}^R) + \beta_4 (\eta_{j,t-1}) + \beta_5 (i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0433***	-4.0743***	-3.5553***	-0.2706	-0.1409	0.0166**	864	0.0943
	(0.0167)	(1.1485)	(0.7484)	(0.7041)	(0.1599)	(0.0067)		
CAD	-0.0318**	-3.1122***	-3.4772***	-0.1338	-0.3094**	0.0073	864	0.0983
	(0.0148)	(1.0582)	(0.7152)	(0.6571)	(0.1509)	(0.0051)		
EUR	-0.0216	-3.1517***	-2.2988***	-0.3934	-0.1997	-0.0047	864	0.0491
	(0.0139)	(0.9009)	(0.5882)	(0.5896)	(0.1335)	(0.0031)		
JPY	-0.0493**	-1.2176	-1.9986**	0.6790	0.0858	0.2475**	864	0.0475
	(0.0199)	(1.3346)	(0.8917)	(0.8786)	(0.1795)	(0.0980)		
NZD	-0.0482***	-4.7768***	-3.8331***	-1.0448	-0.1660	0.0301***	864	0.1073
	(0.0169)	(1.1017)	(0.8496)	(0.6734)	(0.1623)	(0.0100)		
NOK	-0.0231	-3.8077***	-2.9528***	-0.0982	-0.0923	0.0443	864	0.0957
	(0.0155)	(1.0349)	(0.6648)	(0.6981)	(0.1370)	(0.0306)		
SEK	-0.0407***	-3.3855***	-2.6788***	-2.0091***	0.0058	0.0824***	864	0.0833
	(0.0145)	(0.9508)	(0.6368)	(0.6090)	(0.1425)	(0.0312)		
GBP	-0.0382***	-4.3386***	-3.0487***	-0.0971	-0.1709	-0.0189**	864	0.1009
	(0.0133)	(0.9140)	(0.5919)	(0.6238)	(0.1275)	(0.0076)		
USD	-0.0030	-4.0533***	-1.9258***	-1.4997**	-0.1651	-0.0013	864	0.0800
	(0.0121)	(1.1060)	(0.6965)	(0.7453)	(0.1482)	(0.0260)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 2008M1-2017M12, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0551***	-6.5375***	-7.7810***	0.1772	-0.4210*	0.0152**	960	0.3235
	(0.0161)	(0.8951)	(0.7416)	(0.6108)	(0.2158)	(0.0071)		
CAD	-0.0537***	-5.9988***	-7.7935***	0.0505	0.0134	0.0048	960	0.3131
	(0.0118)	(0.7276)	(0.6331)	(0.5010)	(0.1712)	(0.0029)		
EUR	-0.0436***	-5.9758***	-8.1407***	-0.4740	-0.1342	-0.0121***	960	0.3085
	(0.0123)	(0.6861)	(0.6129)	(0.4693)	(0.1898)	(0.0036)		
JPY	-0.0726***	-5.6558***	-11.8075***	2.2534**	-0.3162	0.2886***	960	0.3631
	(0.0200)	(1.2600)	(1.1183)	(0.9095)	(0.3021)	(0.0801)		
NZD	-0.0526***	-7.7335***	-8.5373***	0.3425	0.0747	0.0101	960	0.3549
	(0.0153)	(0.9770)	(0.8670)	(0.6626)	(0.2342)	(0.0091)		
NOK	-0.0428***	-5.5701***	-8.5901***	0.9560*	-0.2428	0.0671***	960	0.2962
	(0.0125)	(0.7802)	(0.7295)	(0.5491)	(0.1966)	(0.0220)		
SEK	-0.0542***	-5.8241***	-7.1465***	0.0956	-0.0489	0.0985***	960	0.2557
	(0.0133)	(0.7554)	(0.7063)	(0.5067)	(0.2007)	(0.0218)		
GBP	-0.0545***	-4.1554***	-8.1722***	0.6418	-0.3541	-0.0183***	960	0.2308
	(0.0165)	(0.9519)	(0.8591)	(0.6440)	(0.2391)	(0.0064)		
USD	-0.0507***	-7.5754***	-10.2740***	-0.7230	-0.0625	-0.0902***	960	0.3574
	(0.0146)	(0.8951)	(0.8249)	(0.6000)	(0.2299)	(0.0251)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2D – full table of table 2D, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0517**	-6.8823	-20.7537	-7.8786	-3.5718	0.0119	320	0.0460
	(0.0202)	(10.9945)	(13.9123)	(12.3911)	(2.7578)	(0.0089)		
CAD	-0.0322***	-13.9490***	-32.7070***	-9.3565*	-0.3054	0.0041	1120	0.0655
	(0.0090)	(4.2981)	(6.9136)	(4.9935)	(1.6557)	(0.0029)		
EUR	-0.0905***	-25.4278***	-44.1946***	-17.0089**	0.6397	-0.0239***	523	0.1384
	(0.0143)	(6.4942)	(9.2660)	(6.8064)	(2.3221)	(0.0042)		
JPY	-0.1070***	-22.8305**	-24.7507	-1.0194	-8.0759**	0.4955***	397	0.1336
	(0.0236)	(10.2244)	(19.5927)	(11.5514)	(3.6969)	(0.1077)		
NZD	-0.0323**	-20.2957***	-33.2623***	-12.7645*	0.7103	0.0073	1120	0.0724
	(0.0143)	(6.6694)	(9.7585)	(6.6508)	(2.1103)	(0.0093)		
SEK	-0.0332***	-16.5632***	-20.3370**	-10.7233**	-0.1962	0.0648***	1120	0.0526
	(0.0110)	(5.5384)	(8.2876)	(5.2088)	(1.6714)	(0.0228)		
GBP	-0.0228**	-8.4952**	-22.6602***	-8.3824*	-1.2993	-0.0119**	1120	0.0352
	(0.0100)	(4.0540)	(7.0246)	(4.4440)	(1.6564)	(0.0050)		
USD	-0.0235*	-16.9230***	-16.3964*	-16.4460***	1.1472	-0.0428	1120	0.0616
	(0.0136)	(6.0231)	(9.9272)	(6.1601)	(2.1943)	(0.0284)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, full sample, no default risk, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t} + \beta_3 \Delta \tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \lambda_{j,t}$	$\Delta \tau_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0346***	-6.4515***	-3.9071***	-6.0862***	0.1370	-0.7074	-0.3135***	0.0145***	1800	0.2191
	(0.0086)	(0.7720)	(1.2067)	(0.5250)	(0.4322)	(0.7555)	(0.1088)	(0.0043)		
CAD	-0.0344***	-4.9467***	-5.6085***	-6.2997***	0.3365	-0.3453	-0.2897***	0.0067***	1632	0.2244
	(0.0076)	(0.7116)	(1.0905)	(0.5056)	(0.4043)	(0.6865)	(0.1070)	(0.0026)		
EUR	-0.0220***	-5.2205***	-5.5812***	-5.4720***	-0.3186	-0.6202	-0.1542*	-0.0059**	1800	0.1711
	(0.0071)	(0.5985)	(0.9141)	(0.4283)	(0.3446)	(0.5440)	(0.0934)	(0.0024)		
JPY	-0.0473***	-4.1142***	-5.1573***	-6.8808***	2.1386***	2.0529**	-0.2182	0.2297***	1800	0.1945
	(0.0116)	(1.0137)	(1.6054)	(0.7443)	(0.6014)	(0.9654)	(0.1400)	(0.0540)		
NZD	-0.0316***	-7.0363***	-6.9714***	-6.6004***	0.0617	-1.1214	-0.1784	0.0162***	1800	0.2263
	(0.0092)	(0.7909)	(1.3167)	(0.6051)	(0.4403)	(0.8066)	(0.1249)	(0.0063)		
NOK	-0.0234***	-4.3438***	-5.8921***	-5.1996***	0.4728	0.5472	-0.1727*	0.0477***	1800	0.1781
	(0.0079)	(0.6680)	(1.0751)	(0.4951)	(0.4150)	(0.7104)	(0.0986)	(0.0161)		
SEK	-0.0265***	-4.7234***	-5.6800***	-4.9144***	-0.4683	-0.8071	-0.1090	0.0530***	1800	0.1528
	(0.0076)	(0.6535)	(1.0287)	(0.4775)	(0.3843)	(0.6625)	(0.1039)	(0.0159)		
GBP	-0.0252***	-4.7037***	-2.2087*	-5.6704***	0.5393	0.2393	-0.3404***	-0.0094**	1800	0.1491
	(0.0079)	(0.7517)	(1.1500)	(0.5290)	(0.4369)	(0.7212)	(0.1080)	(0.0038)		
USD	-0.0159**	-6.3490***	-7.6474***	-4.9476***	-1.3808***	-1.3348*	-0.0570	-0.0305*	1800	0.1837
	(0.0078)	(0.8291)	(1.2164)	(0.5827)	(0.4705)	(0.7342)	(0.1108)	(0.0163)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, post 2008, with default risk, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta l^R_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$l^R_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0617***	-7.3246***	-3.8874**	14.7095***	-7.5579***	-0.2044	-0.3545	0.2423	-0.4382*	0.0181**	847	0.3262
	(0.0178)	(1.1654)	(1.6683)	(2.4208)	(0.8274)	(0.7369)	(1.2455)	(1.4865)	(0.2287)	(0.0080)		
CAD	-0.0455***	-8.4448***	-6.9717***	7.1595***	-8.8556***	-0.5355	-3.3505***	-1.0804	0.3126	0.0017	354	0.3039
	(0.0160)	(1.5224)	(2.1366)	(2.5463)	(1.0602)	(0.9366)	(1.1584)	(1.5500)	(0.2427)	(0.0038)		
EUR	-0.0511***	-6.8363***	-4.5878***	9.0551***	-8.5559***	-0.0906	-1.0481	1.9918*	-0.1184	-0.0185***	858	0.3157
	(0.0127)	(0.7946)	(0.9673)	(1.6522)	(0.6143)	(0.4771)	(0.7207)	(1.0554)	(0.1834)	(0.0047)		
JPY	-0.0796***	-6.3816***	-4.6534**	10.6119***	-11.6876***	2.3505***	3.3847**	0.1648	-0.2154	0.3761***	858	0.3766
	(0.0198)	(1.3792)	(1.8841)	(3.1280)	(1.1240)	(0.8395)	(1.4156)	(1.9424)	(0.2884)	(0.0895)		
NZD	-0.0520***	-8.1048***	-6.8952***	12.9479***	-8.6530***	0.7225	0.5779	-0.0485	0.1744	0.0067	835	0.3556
	(0.0157)	(1.1336)	(1.5240)	(2.4700)	(0.8896)	(0.7156)	(1.2405)	(1.3882)	(0.2432)	(0.0095)		
NOK	-0.0515***	-5.4895***	-6.4144***	4.6641**	-8.4870***	0.8235	0.6662	1.2043	-0.2236	0.1008***	858	0.3044
	(0.0129)	(0.8189)	(1.2288)	(1.9507)	(0.7275)	(0.5414)	(0.9147)	(1.2657)	(0.2024)	(0.0257)		
SEK	-0.0551***	-5.5748***	-4.8080***	7.4730***	-6.7519***	0.4073	-0.9178	-0.1588	-0.1047	0.1045***	858	0.2444
	(0.0132)	(0.8773)	(1.1882)	(1.9070)	(0.7165)	(0.5129)	(0.8747)	(1.1399)	(0.1964)	(0.0266)		
GBP	-0.0551***	-6.4945***	-1.0137	5.8926**	-9.4345***	0.4629	1.9710*	0.8890	-0.1608	-0.0216***	858	0.2605
	(0.0159)	(1.1199)	(1.4748)	(2.3784)	(0.8822)	(0.6763)	(1.0792)	(1.4716)	(0.2456)	(0.0072)		
USD	-0.0642***	-8.7478***	-3.5078***	11.9301***	-10.3989***	-1.0270	0.2283	0.6063	0.0416	-0.1264***	726	0.3903
	(0.0157)	(1.1105)	(1.2754)	(2.1573)	(0.8679)	(0.6560)	(0.9512)	(1.3786)	(0.2374)	(0.0310)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\lambda_{j,t}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \lambda_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \lambda_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0672***	-4.4248***	-6.5808***	0.2408	-0.4653*	0.0196**	847	0.2382
	(0.0193)	(1.1619)	(0.8799)	(0.6757)	(0.2495)	(0.0085)		
CAD	-0.0511***	-3.7008***	-7.9366***	0.8493	0.3676	0.0061	354	0.2519
	(0.0163)	(1.2409)	(1.0451)	(0.6358)	(0.2538)	(0.0038)		
EUR	-0.0455***	-3.5153***	-8.3289***	0.7925*	-0.0712	-0.0144***	858	0.2600
	(0.0126)	(0.7374)	(0.6268)	(0.4199)	(0.1932)	(0.0042)		
JPY	-0.0835***	-4.5211***	-11.0772***	2.0122***	-0.5438*	0.3806***	858	0.3066
	(0.0209)	(1.3730)	(1.1801)	(0.6918)	(0.3071)	(0.0940)		
NZD	-0.0521***	-4.9385***	-7.2324***	0.9889	0.2351	0.0062	835	0.2419
	(0.0173)	(1.1435)	(0.9663)	(0.6927)	(0.2691)	(0.0104)		
NOK	-0.0469***	-4.3751***	-7.6026***	0.9921**	-0.2045	0.0893***	858	0.2465
	(0.0130)	(0.7815)	(0.7458)	(0.4602)	(0.2141)	(0.0257)		
SEK	-0.0590***	-3.9851***	-6.3983***	0.4719	-0.0228	0.1144***	858	0.1925
	(0.0134)	(0.8146)	(0.7220)	(0.4667)	(0.2042)	(0.0264)		
GBP	-0.0531***	-5.3176***	-8.5520***	0.1501	-0.2299	-0.0228***	858	0.2389
	(0.0157)	(1.0253)	(0.8639)	(0.5670)	(0.2484)	(0.0070)		
USD	-0.0675***	-5.2872***	-10.1467***	-0.9025	0.0807	-0.1320***	726	0.3021
	(0.0181)	(1.0916)	(0.9333)	(0.6373)	(0.2665)	(0.0358)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\tau_{j,t}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \tau_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \tau_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \tau_{j,t}$	$\Delta i^R_{j,t}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0405***	-1.7697	-4.3301***	-0.7707	-0.3418***	0.0166***	1800	0.1309
	(0.0091)	(1.2550)	(0.5044)	(0.7354)	(0.1125)	(0.0046)		
CAD	-0.0370***	-4.3257***	-5.4073***	-0.7635	-0.3095***	0.0065***	1632	0.1841
	(0.0077)	(1.0847)	(0.4755)	(0.6156)	(0.1051)	(0.0025)		
EUR	-0.0241***	-3.5327***	-3.9699***	-0.3876	-0.1817*	-0.0056**	1800	0.1205
	(0.0072)	(0.9232)	(0.3950)	(0.4956)	(0.0928)	(0.0023)		
JPY	-0.0407***	-6.0205***	-6.0569***	0.6457	-0.1827	0.1903***	1800	0.1488
	(0.0119)	(1.6544)	(0.7067)	(0.9043)	(0.1416)	(0.0549)		
NZD	-0.0342***	-4.7384***	-3.1233***	-0.8494	-0.1438	0.0163**	1800	0.0882
	(0.0105)	(1.4436)	(0.5833)	(0.7968)	(0.1354)	(0.0070)		
NOK	-0.0240***	-3.3622***	-3.7628***	0.0667	-0.1315	0.0477***	1800	0.1075
	(0.0083)	(1.0822)	(0.4721)	(0.6669)	(0.0975)	(0.0168)		
SEK	-0.0300***	-4.8452***	-3.5053***	-0.5631	-0.1562	0.0605***	1800	0.1003
	(0.0078)	(1.0346)	(0.4356)	(0.6148)	(0.1022)	(0.0164)		
GBP	-0.0272***	-1.2267	-3.7831***	-0.4812	-0.3616***	-0.0107***	1800	0.0921
	(0.0081)	(1.1635)	(0.4942)	(0.6761)	(0.1083)	(0.0039)		
USD	-0.0158*	-6.5410***	-3.9408***	-0.9311	-0.1696	-0.0305*	1800	0.1115
	(0.0083)	(1.2465)	(0.5685)	(0.6747)	(0.1131)	(0.0174)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $l_{j,t}^{R}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta l_{j,t}^{R} + \beta_3 \Delta i_{j,t}^{R} + \beta_4 l_{j,t-1}^{R} + \beta_5 i_{j,t-1}^{R} + u_{j,t}$

	$q_{j,t-1}$	$\Delta l_{j,t}^{R}$	$\Delta i_{j,t}^{R}$	$l_{j,t-1}^{R}$	$i_{j,t-1}^{R}$	constant	N	R2_within
AUD	-0.0709***	10.2422***	-5.8959***	0.7815	-0.5038**	0.0217***	847	0.2379
	(0.0190)	(2.3201)	(0.7922)	(1.4180)	(0.2329)	(0.0081)		
CAD	-0.0483***	0.1008	-6.8726***	0.7753	0.4390*	0.0046	354	0.2127
	(0.0169)	(2.1774)	(0.9851)	(1.2343)	(0.2329)	(0.0040)		
EUR	-0.0551***	2.1824	-6.6515***	2.3728**	-0.0966	-0.0153***	858	0.2218
	(0.0134)	(1.5534)	(0.5770)	(0.9814)	(0.1934)	(0.0043)		
JPY	-0.0721***	5.4482*	-10.1721***	2.0152	-0.1757	0.3261***	858	0.2702
	(0.0220)	(3.0734)	(1.1441)	(1.8770)	(0.3204)	(0.0991)		
NZD	-0.0668***	4.9577*	-6.1932***	2.0583	0.2756	0.0081	835	0.1789
	(0.0179)	(2.6064)	(0.9647)	(1.4513)	(0.2740)	(0.0105)		
NOK	-0.0569***	-1.0191	-5.4385***	2.7889**	-0.1983	0.1110***	858	0.1554
	(0.0146)	(1.9705)	(0.7216)	(1.2065)	(0.2295)	(0.0290)		
SEK	-0.0616***	3.2781*	-4.6074***	1.3203	0.0276	0.1208***	858	0.1470
	(0.0142)	(1.8187)	(0.6598)	(1.1054)	(0.1994)	(0.0280)		
GBP	-0.0578***	1.0074	-6.1628***	1.3975	-0.2703	-0.0241***	858	0.1834
	(0.0169)	(2.2452)	(0.8340)	(1.2906)	(0.2572)	(0.0076)		
USD	-0.0623***	4.5951**	-8.9423***	-0.7163	0.0935	-0.1206***	726	0.2711
	(0.0187)	(2.1035)	(0.8860)	(1.3652)	(0.2679)	(0.0369)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^{R}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^{R}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta + l^R)_{j,t}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta + l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta + l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta + l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta + l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0630***	-4.7002***	-7.0058***	0.0107	-0.4190*	0.0179**	847	0.2519
	(0.0192)	(0.9771)	(0.8899)	(0.6951)	(0.2385)	(0.0083)		
CAD	-0.0417***	-5.4191***	-8.2019***	-0.4889	0.5181**	0.0038	354	0.2589
	(0.0157)	(1.2842)	(1.0569)	(0.7942)	(0.2442)	(0.0040)		
EUR	-0.0414***	-4.3067***	-8.0713***	0.2874	-0.0551	-0.0120***	858	0.2770
	(0.0126)	(0.6303)	(0.6024)	(0.4333)	(0.1858)	(0.0043)		
JPY	-0.0837***	-4.3901***	-11.5411***	2.7494***	-0.3579	0.3926***	858	0.3493
	(0.0202)	(1.1684)	(1.1203)	(0.8290)	(0.3012)	(0.0915)		
NZD	-0.0494***	-5.6105***	-8.0163***	1.1609*	0.2846	0.0027	835	0.2995
	(0.0163)	(0.9354)	(0.9160)	(0.6846)	(0.2499)	(0.0098)		
NOK	-0.0483***	-5.0881***	-8.2944***	1.1234**	-0.1994	0.0948***	858	0.2954
	(0.0124)	(0.6828)	(0.7082)	(0.4519)	(0.2010)	(0.0247)		
SEK	-0.0544***	-4.3539***	-6.7184***	0.2382	-0.0056	0.1064***	858	0.2141
	(0.0135)	(0.6926)	(0.7071)	(0.4719)	(0.1984)	(0.0267)		
GBP	-0.0514***	-3.8162***	-8.3340***	0.8929	-0.2739	-0.0213***	858	0.2336
	(0.0160)	(0.8934)	(0.8693)	(0.6071)	(0.2450)	(0.0072)		
USD	-0.0689***	-4.7561***	-9.7078***	-0.9760	0.0265	-0.1325***	726	0.3179
	(0.0175)	(0.8636)	(0.8951)	(0.6069)	(0.2589)	(0.0346)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta-\tau)_{j,t}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta-\tau)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta-\tau)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta-\tau)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta-\tau)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0348***	-5.8705***	-5.7773***	0.3781	-0.3013***	0.0140***	1800	0.2081
	(0.0088)	(0.7577)	(0.5208)	(0.4054)	(0.1082)	(0.0044)		
CAD	-0.0353***	-3.7929***	-6.2774***	0.4883	-0.2594**	0.0072***	1632	0.1934
	(0.0078)	(0.7288)	(0.5167)	(0.3696)	(0.1091)	(0.0026)		
EUR	-0.0245***	-3.8766***	-5.4469***	-0.0556	-0.1406	-0.0048**	1800	0.1373
	(0.0073)	(0.6064)	(0.4362)	(0.3270)	(0.0967)	(0.0022)		
JPY	-0.0457***	-4.1483***	-6.6419***	1.7671***	-0.3665***	0.2148***	1800	0.1627
	(0.0118)	(1.0339)	(0.7602)	(0.5540)	(0.1409)	(0.0547)		
NZD	-0.0285***	-6.2101***	-6.0964***	0.2783	-0.1113	0.0128*	1800	0.1829
	(0.0101)	(0.8036)	(0.6243)	(0.4007)	(0.1278)	(0.0066)		
NOK	-0.0236***	-3.1411***	-4.5956***	0.3131	-0.1633	0.0471***	1800	0.1344
	(0.0082)	(0.6638)	(0.5065)	(0.3872)	(0.1025)	(0.0165)		
SEK	-0.0286***	-4.3899***	-4.7373***	-0.3903	-0.0683	0.0590***	1800	0.1278
	(0.0078)	(0.6509)	(0.4843)	(0.3567)	(0.1054)	(0.0161)		
GBP	-0.0251***	-4.4752***	-5.4642***	0.4355	-0.3362***	-0.0096**	1800	0.1435
	(0.0079)	(0.7348)	(0.5253)	(0.3950)	(0.1070)	(0.0037)		
USD	-0.0176**	-5.8134***	-4.8570***	-1.1732***	-0.0193	-0.0364**	1800	0.1395
	(0.0081)	(0.8484)	(0.6031)	(0.4405)	(0.1147)	(0.0168)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\tau - l^R)_{j,t}$, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\tau - l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\tau - l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\tau - l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\tau - l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0692***	-5.1221***	-6.1511***	-1.1610	-0.5801**	0.0241***	847	0.2325
	(0.0198)	(1.4415)	(0.8318)	(0.8906)	(0.2558)	(0.0090)		
CAD	-0.0546***	-0.9734	-6.8016***	-1.4092**	0.2937	0.0038	354	0.2260
	(0.0173)	(1.4441)	(0.9776)	(0.7024)	(0.2374)	(0.0040)		
EUR	-0.0551***	-2.6557***	-6.2226***	-1.6343***	-0.2007	-0.0210***	858	0.2349
	(0.0129)	(0.8257)	(0.5716)	(0.5352)	(0.1913)	(0.0048)		
JPY	-0.0649***	-6.5977***	-10.5294***	0.3689	-0.0817	0.2959***	858	0.3075
	(0.0210)	(1.6615)	(1.1122)	(1.0688)	(0.3203)	(0.0942)		
NZD	-0.0555***	-5.8720***	-6.7651***	-0.7393	0.2174	0.0082	835	0.2212
	(0.0178)	(1.4145)	(0.9388)	(0.9304)	(0.2702)	(0.0105)		
NOK	-0.0482***	-3.7168***	-5.4454***	-1.4094*	-0.2222	0.0908***	858	0.1622
	(0.0143)	(1.1084)	(0.7334)	(0.7277)	(0.2322)	(0.0278)		
SEK	-0.0602***	-4.0482***	-4.5861***	-1.1476*	-0.0488	0.1152***	858	0.1671
	(0.0138)	(1.0247)	(0.6569)	(0.6490)	(0.1981)	(0.0272)		
GBP	-0.0578***	-0.7623	-6.2034***	-0.1776	-0.3052	-0.0237***	858	0.1816
	(0.0166)	(1.2445)	(0.8440)	(0.7551)	(0.2644)	(0.0076)		
USD	-0.0638***	-4.4516***	-8.8626***	-0.2944	0.0152	-0.1229***	726	0.2877
	(0.0183)	(1.1720)	(0.8814)	(0.8251)	(0.2657)	(0.0359)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4A – full table of table 4A, with CHF excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}^{IV}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}^{IV}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}^{IV}$	$\eta_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N
AUD	-0.0234**	-19.7890***	-2.0110	-9.7040***	-0.1353	0.0092*	1750
	(0.0104)	(4.2312)	(1.8535)	(1.3138)	(0.1432)	(0.0049)	
CAD	-0.0314***	-7.4921*	0.7038	-6.2958***	-0.2697***	0.0085**	1750
	(0.0078)	(4.0759)	(1.1422)	(0.9698)	(0.0978)	(0.0036)	
EUR	-0.0303***	3.2834	0.4713	-4.2197***	-0.2179**	-0.0052	1680
	(0.0083)	(3.7086)	(1.3348)	(0.8745)	(0.1064)	(0.0045)	
JPY	-0.0501***	-9.6833***	2.0341	-8.0492***	-0.2586**	0.2422***	1750
	(0.0126)	(2.3631)	(1.4340)	(0.8590)	(0.1290)	(0.0607)	
NZD	-0.0226**	-8.0211***	1.4548*	-7.6306***	-0.1988*	0.0116*	1750
	(0.0103)	(3.0933)	(0.8001)	(1.5074)	(0.1204)	(0.0065)	
NOK	-0.0294***	-3.3427**	2.0451**	-5.4833***	-0.3175***	0.0637***	1680
	(0.0086)	(1.5126)	(1.0031)	(0.6791)	(0.1230)	(0.0180)	
SEK	-0.0248***	-8.8040***	-0.9565	-6.2225***	-0.0830	0.0497***	1750
	(0.0081)	(2.4183)	(0.7859)	(0.9512)	(0.1102)	(0.0169)	
GBP	-0.0284***	-1.3114	4.1451***	-5.8059***	-0.4893***	-0.0068	1680
	(0.0084)	(2.7995)	(1.4916)	(1.1333)	(0.1234)	(0.0042)	
USD	-0.0209**	-10.2839***	-3.9569***	-5.1624***	0.0501	-0.0369**	1750
	(0.0084)	(2.4698)	(0.9974)	(0.8248)	(0.1178)	(0.0170)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4B – full table of table 4B, with CHF excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t}^{IV} + \beta_3 \Delta i_{j,t}^{R} + \beta_4 \Delta\tau_{j,t} + \beta_5 \lambda_{j,t-1}^{IV} + \beta_6 i_{j,t-1}^{R} + \beta_7 \tau_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	constant	N
AUD	-0.0204**	-23.4716***	-1.8880	-9.5583***	-2.2035	-9.9260***	-0.0918	0.0076	1726
	(0.0104)	(4.5457)	(1.9119)	(2.1046)	(1.5507)	(1.2338)	(0.1742)	(0.0054)	
CAD	-0.0385***	0.7288	0.4184	-4.1691**	-0.4620	-5.3958***	-0.3756***	0.0080**	1597
	(0.0086)	(5.3516)	(1.1006)	(1.7015)	(1.1961)	(1.0907)	(0.1270)	(0.0035)	
EUR	-0.0237***	-9.8564**	-0.5605	-7.2718***	-0.9908	-6.9343***	-0.1835*	-0.0074*	1669
	(0.0078)	(4.8165)	(1.1275)	(2.0394)	(1.0869)	(1.2341)	(0.1056)	(0.0038)	
JPY	-0.0541***	-12.7927***	2.3109	-4.8880***	2.3150**	-8.6914***	-0.2780*	0.2620***	1726
	(0.0125)	(3.6347)	(1.5202)	(1.6940)	(1.1713)	(1.0397)	(0.1619)	(0.0593)	
NZD	-0.0285***	-6.2421**	1.3529*	-6.3562***	0.2122	-6.8738***	-0.2737**	0.0163**	1726
	(0.0096)	(3.1232)	(0.7810)	(1.5316)	(1.0409)	(1.4209)	(0.1275)	(0.0064)	
NOK	-0.0283***	-3.4553**	2.0810**	-5.3489***	1.5693	-5.5972***	-0.3445***	0.0609***	1669
	(0.0084)	(1.4855)	(1.0034)	(1.3598)	(1.0500)	(0.6602)	(0.1311)	(0.0175)	
SEK	-0.0249***	-8.2105***	-0.9266	-6.2780***	-1.1229	-5.9989***	-0.0728	0.0496***	1726
	(0.0081)	(2.7937)	(0.7181)	(1.1878)	(0.7753)	(1.0164)	(0.1199)	(0.0170)	
GBP	-0.0240***	-12.2174***	3.4977**	-3.0293*	3.3716**	-9.3363***	-0.4236***	-0.0058	1669
	(0.0089)	(4.3117)	(1.4275)	(1.5822)	(1.4284)	(1.5740)	(0.1455)	(0.0045)	
USD	-0.0191**	-13.5162***	-3.9580***	-9.0503***	-2.3809**	-5.8941***	0.1149	-0.0361**	1726
	(0.0086)	(3.1543)	(1.0969)	(1.3277)	(0.9578)	(0.9274)	(0.1383)	(0.0177)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4C – full table of table 4C, with CHF excluded

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t}^{IV} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l_{j,t}^R + \beta_5 \Delta i_{j,t}^R + \beta_6 \lambda_{j,t-1}^{IV} + \beta_7 \tau_{j,t-1} + \beta_8 l_{j,t-1}^R + \beta_9 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta l_{j,t}^R$	$l_{j,t-1}^R$	constant	N
AUD	-0.0575***	-13.5460***	0.8415	-8.9661***	-0.4798	-4.4030**	1.0129	18.4445***	-1.3843	0.0173*	815
	(0.0189)	(4.3213)	(1.9067)	(1.2168)	(0.2979)	(1.8496)	(1.6833)	(3.9965)	(2.0734)	(0.0095)	
CAD	-0.0316	-17.4880**	-2.8270	-10.8177***	0.5633	-12.1971**	-4.8103**	15.0001**	0.6758	-0.0015	322
	(0.0213)	(8.7696)	(2.5333)	(2.3736)	(0.3662)	(4.8952)	(2.1489)	(7.6296)	(2.8554)	(0.0063)	
EUR	-0.0550***	-12.5662***	-0.1205	-10.5106***	-0.2111	-5.9643***	-0.6395	15.2616***	2.1922	-0.0178***	826
	(0.0143)	(4.4601)	(1.2916)	(1.5328)	(0.1955)	(1.4950)	(1.1688)	(4.9666)	(1.4979)	(0.0060)	
JPY	-0.0851***	-8.2932**	3.5311*	-12.0226***	-0.3866	-3.8433*	3.9996**	12.0217***	-0.7983	0.4055***	826
	(0.0207)	(4.0148)	(1.9155)	(1.3644)	(0.3537)	(1.9772)	(1.5836)	(4.3986)	(2.4127)	(0.0945)	
NZD	-0.0369**	-9.5570***	3.2021**	-9.3065***	-0.0002	-6.4912***	2.2641	13.9164***	-2.0274	0.0066	803
	(0.0171)	(2.9271)	(1.4058)	(1.0723)	(0.2707)	(1.5760)	(1.4793)	(3.8309)	(1.6641)	(0.0101)	
NOK	-0.0559***	-4.2739***	-0.0611	-7.6054***	-0.3169	-6.2243***	-0.1882	3.7894*	2.5963	0.1098***	826
	(0.0133)	(1.3093)	(0.9290)	(0.9329)	(0.2164)	(1.3039)	(1.0966)	(2.2424)	(1.6141)	(0.0266)	
SEK	-0.0520***	-10.3213***	0.3599	-8.4163***	-0.1491	-4.6508***	-0.6170	11.6749***	-0.6950	0.0996***	826
	(0.0141)	(3.3614)	(0.8037)	(1.3076)	(0.2332)	(1.2645)	(0.9671)	(3.5138)	(1.3265)	(0.0284)	
GBP	-0.0512***	-13.3978***	0.5630	-12.5969***	-0.1236	-1.8070	2.6670*	10.8270***	0.2738	-0.0191**	826
	(0.0181)	(4.2895)	(1.7185)	(2.0616)	(0.2650)	(1.5930)	(1.5905)	(4.0520)	(2.1635)	(0.0085)	
USD	-0.0702***	-17.3863***	-1.8767*	-12.3614***	-0.1459	-2.7006**	1.3942	19.1286***	1.7848	-0.1430***	694
	(0.0173)	(3.3544)	(1.1393)	(1.1964)	(0.2543)	(1.3638)	(1.1377)	(3.3919)	(1.6175)	(0.0346)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 5 – full table of table 5, with CHF excluded

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\tau_{j,t} + \beta_3\Delta\gamma_t + \beta_4\Delta\gamma^*_{j,t} + \beta_5\Delta i^R_{j,t} + \beta_6\gamma_{t-1} + \beta_7\gamma^*_{j,t-1} + \beta_8 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\gamma^*_{j,t}$	$\Delta\gamma_t$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\gamma^*_{j,t-1}$	γ_{t-1}	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2 within
AUD	-0.0350***	5.8589***	-7.0284***	-3.6892***	-6.0529***	0.0257	0.2929	-0.7461	-0.3123***	0.0133***	1800	0.2214
	(0.0086)	(0.6965)	(1.1868)	(1.1887)	(0.5251)	(0.3915)	(0.5988)	(0.7569)	(0.1086)	(0.0048)		
CAD	-0.0350***	4.7716***	-6.8209***	-5.7245***	-6.3034***	-0.3241	-0.7176	-0.5701	-0.2840***	0.0090**	1632	0.2272
	(0.0075)	(0.6896)	(1.8915)	(1.0908)	(0.5034)	(0.4036)	(1.2114)	(0.6971)	(0.1068)	(0.0035)		
EUR	-0.0223***	5.0912***	-5.8180***	-5.9629***	-5.4758***	0.3331	-0.5077	-0.7386	-0.1571*	-0.0056**	1800	0.1716
	(0.0071)	(0.5832)	(1.2075)	(0.9695)	(0.4297)	(0.3431)	(0.6132)	(0.5940)	(0.0946)	(0.0026)		
JPY	-0.0476***	4.1854***	-2.1277	-4.9911***	-6.8761***	-2.1503***	2.2418	2.0686**	-0.2179	0.2309***	1800	0.1949
	(0.0116)	(1.0017)	(5.2443)	(1.6051)	(0.7454)	(0.5973)	(2.5278)	(0.9658)	(0.1402)	(0.0537)		
NZD	-0.0390***	6.9813***	-7.1412***	-7.0202***	-6.5786***	1.5545***	0.0019	-1.7482**	-0.1799	0.0131**	1800	0.2370
	(0.0090)	(0.8955)	(0.8813)	(1.3052)	(0.6015)	(0.5505)	(0.4272)	(0.7919)	(0.1237)	(0.0064)		
NOK	-0.0213***	6.1246***	-3.7375***	-5.7582***	-5.4035***	-0.0845	0.5692	0.4329	-0.1623*	0.0415***	1800	0.1857
	(0.0078)	(0.7600)	(0.7780)	(1.0707)	(0.4969)	(0.4322)	(0.5044)	(0.7036)	(0.0986)	(0.0159)		
SEK	-0.0267***	5.2214***	-3.9404***	-5.7279***	-4.9794***	0.6904*	-0.1504	-0.8924	-0.1195	0.0511***	1800	0.1553
	(0.0076)	(0.6509)	(1.2496)	(1.0323)	(0.4760)	(0.4018)	(0.5142)	(0.6672)	(0.1039)	(0.0158)		
GBP	-0.0246***	5.0267***	-4.3648***	-2.0374*	-5.6439***	-0.4826	0.6602	0.2947	-0.3380***	-0.0098**	1800	0.1496
	(0.0080)	(0.7264)	(1.0991)	(1.1396)	(0.5305)	(0.4312)	(0.6117)	(0.7194)	(0.1085)	(0.0041)		
USD	-0.0143*	6.2431***	-5.8393***	-7.3036***	-5.2097***	0.2077	-1.9940***	-0.1971	-0.0193	-0.0216	1800	0.1985
	(0.0077)	(0.8328)	(1.3850)	(1.2344)	(0.5817)	(0.4860)	(0.5866)	(0.7459)	(0.1114)	(0.0162)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $\gamma^*_{j,t}$ is a measure of foreign treasury liquidity, $\gamma_{j,t}$ is a measure of the home treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

vi)   regressions in the main text with real exchange rates only or nominal exchange rates only on both sides of the regression estimations

Robustness of table 2A – full table of table 2A with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0280***	-5.2808***	-5.7719***	0.2796	-0.2817***	0.0124***	2043	0.1850
	(0.0073)	(0.7342)	(0.5483)	(0.4404)	(0.1074)	(0.0041)		
CAD	-0.0244***	-4.6322***	-5.4419***	0.4694	-0.2444**	0.0060**	2050	0.1633
	(0.0063)	(0.6411)	(0.5059)	(0.3920)	(0.0995)	(0.0025)		
EUR	-0.0187***	-4.7080***	-5.0380***	-0.0553	-0.1667*	-0.0047**	2050	0.1412
	(0.0059)	(0.5218)	(0.4116)	(0.3131)	(0.0889)	(0.0021)		
JPY	-0.0369***	-4.3784***	-6.3494***	2.1603***	-0.0740	0.1816***	2050	0.1668
	(0.0102)	(0.9564)	(0.7390)	(0.5790)	(0.1224)	(0.0477)		
NZD	-0.0254***	-6.4265***	-6.0499***	0.1261	-0.0877	0.0113*	2043	0.1944
	(0.0083)	(0.7362)	(0.6158)	(0.4390)	(0.1234)	(0.0059)		
NOK	-0.0169**	-4.2863***	-5.0364***	0.6300	-0.1657*	0.0351**	2050	0.1582
	(0.0069)	(0.6275)	(0.4992)	(0.4000)	(0.0961)	(0.0142)		
SEK	-0.0205***	-4.5858***	-4.6016***	-0.3178	-0.0947	0.0408***	2050	0.1281
	(0.0063)	(0.5866)	(0.4690)	(0.3595)	(0.0980)	(0.0132)		
CHF	-0.0113*	-2.2507***	-2.7679***	0.6901	-0.1981*	0.0001	2050	0.0480
	(0.0065)	(0.7200)	(0.5613)	(0.4305)	(0.1018)	(0.0032)		
GBP	-0.0200***	-3.3262***	-5.3780***	0.7598*	-0.3324***	-0.0066**	2050	0.1275
	(0.0068)	(0.6743)	(0.5278)	(0.4151)	(0.0996)	(0.0033)		
USD	-0.0106	-6.7341***	-4.9568***	-1.3935***	-0.0467	-0.0187	2050	0.1773
	(0.0069)	(0.7250)	(0.5736)	(0.4399)	(0.1051)	(0.0144)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2A – full table of table 2A with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$s_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0237***	-5.3633***	-5.7211***	0.0786	-0.2335**	0.0102**	2052	0.1858
	(0.0089)	(0.7197)	(0.5390)	(0.4200)	(0.1018)	(0.0043)		
CAD	-0.0288***	-4.6938***	-5.4336***	0.3836	-0.2166**	0.0065***	2052	0.1721
	(0.0072)	(0.6237)	(0.4915)	(0.3814)	(0.0915)	(0.0025)		
EUR	-0.0232***	-4.6716***	-4.9958***	-0.1015	-0.1615*	-0.0054**	2052	0.1441
	(0.0067)	(0.5160)	(0.4100)	(0.3063)	(0.0841)	(0.0023)		
JPY	-0.0305***	-4.5475***	-6.1840***	1.8056***	0.0757	0.1523***	2052	0.1608
	(0.0108)	(0.9595)	(0.7449)	(0.5726)	(0.1078)	(0.0501)		
NZD	-0.0201**	-6.3074***	-5.9606***	0.1187	-0.0467	0.0083	2052	0.1909
	(0.0095)	(0.7317)	(0.6122)	(0.4359)	(0.1154)	(0.0061)		
NOK	-0.0220***	-4.0410***	-4.8326***	0.5207	-0.1588*	0.0448***	2052	0.1539
	(0.0077)	(0.6121)	(0.4879)	(0.3851)	(0.0902)	(0.0155)		
SEK	-0.0274***	-4.5156***	-4.5788***	-0.3614	-0.1164	0.0552***	2052	0.1333
	(0.0072)	(0.5772)	(0.4627)	(0.3518)	(0.0923)	(0.0149)		
CHF	-0.0198**	-2.3232***	-2.7311***	0.6513	-0.2142**	0.0022	2052	0.0537
	(0.0077)	(0.7090)	(0.5544)	(0.4133)	(0.0954)	(0.0032)		
GBP	-0.0242***	-3.4007***	-5.2168***	0.7013*	-0.3016***	-0.0088**	2052	0.1271
	(0.0075)	(0.6652)	(0.5219)	(0.4052)	(0.0917)	(0.0037)		
USD	-0.0149*	-6.4486***	-4.7487***	-1.2456***	-0.0737	-0.0283*	2052	0.1701
	(0.0081)	(0.7181)	(0.5691)	(0.4352)	(0.1011)	(0.0167)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2B – full table of table 2B with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta i_{j,t}^R) + \beta_3(i_{j,t-1}^R) + u_{j,t}$

	$q_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0312***	-4.0999***	-0.2896***	0.0134***	2043	0.1111
	(0.0075)	(0.5238)	(0.1113)	(0.0043)		
CAD	-0.0255***	-4.5241***	-0.2327**	0.0051**	2050	0.1102
	(0.0065)	(0.4809)	(0.1012)	(0.0023)		
EUR	-0.0210***	-3.8378***	-0.1785**	-0.0049**	2050	0.0870
	(0.0060)	(0.3867)	(0.0908)	(0.0021)		
JPY	-0.0309***	-5.3606***	-0.1008	0.1429***	2050	0.0988
	(0.0105)	(0.7272)	(0.1297)	(0.0487)		
NZD	-0.0284***	-2.6422***	-0.0654	0.0119*	2043	0.0529
	(0.0095)	(0.6027)	(0.1355)	(0.0067)		
NOK	-0.0156**	-3.5742***	-0.1077	0.0309**	2050	0.0801
	(0.0072)	(0.4840)	(0.0981)	(0.0145)		
SEK	-0.0246***	-3.1896***	-0.1109	0.0497***	2050	0.0670
	(0.0064)	(0.4408)	(0.0999)	(0.0133)		
CHF	-0.0081	-2.0299***	-0.2073**	-0.0041*	2050	0.0226
	(0.0062)	(0.5213)	(0.1038)	(0.0023)		
GBP	-0.0198***	-3.8803***	-0.3213***	-0.0071**	2050	0.0872
	(0.0068)	(0.4952)	(0.1004)	(0.0034)		
USD	-0.0134*	-3.8489***	-0.1179	-0.0265*	2050	0.0706
	(0.0076)	(0.5911)	(0.1141)	(0.0159)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2B – full table of table 2B with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta i_{j,t}^R) + \beta_3(i_{j,t-1}^R) + u_{j,t}$

	$s_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0286***	-4.0396***	-0.2565**	0.0120***	2052	0.1111
	(0.0095)	(0.5155)	(0.1062)	(0.0046)		
CAD	-0.0312***	-4.5105***	-0.2077**	0.0060**	2052	0.1173
	(0.0074)	(0.4683)	(0.0936)	(0.0023)		
EUR	-0.0259***	-3.8068***	-0.1708**	-0.0056**	2052	0.0905
	(0.0070)	(0.3847)	(0.0862)	(0.0023)		
JPY	-0.0298***	-5.2081***	0.0252	0.1393***	2052	0.0969
	(0.0113)	(0.7291)	(0.1139)	(0.0522)		
NZD	-0.0245**	-2.6140***	-0.0272	0.0097	2052	0.0525
	(0.0108)	(0.5979)	(0.1273)	(0.0068)		
NOK	-0.0223***	-3.4701***	-0.1141	0.0441***	2052	0.0834
	(0.0081)	(0.4690)	(0.0922)	(0.0161)		
SEK	-0.0320***	-3.1980***	-0.1334	0.0651***	2052	0.0733
	(0.0075)	(0.4342)	(0.0944)	(0.0154)		
CHF	-0.0169**	-1.9801***	-0.2356**	-0.0019	2052	0.0270
	(0.0076)	(0.5153)	(0.0991)	(0.0023)		
GBP	-0.0249***	-3.7020***	-0.2996***	-0.0096**	2052	0.0852
	(0.0077)	(0.4905)	(0.0933)	(0.0038)		
USD	-0.0172*	-3.6744***	-0.1330	-0.0350*	2052	0.0691
	(0.0090)	(0.5814)	(0.1090)	(0.0184)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test

Robustness of table 2C – full table of table 2C 1999M1-2007M12 with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0446**	-3.6947***	-3.2181***	-0.2731	-0.1467	0.0173**	972	0.0990
	(0.0176)	(1.2306)	(0.8008)	(0.7622)	(0.1732)	(0.0071)		
CAD	-0.0309*	-2.7151**	-3.0882***	-0.1167	-0.3193*	0.0066	972	0.0915
	(0.0161)	(1.1173)	(0.7691)	(0.6574)	(0.1631)	(0.0053)		
EUR	-0.0236*	-2.9133***	-2.0719***	-0.4467	-0.1770	-0.0058*	972	0.0447
	(0.0135)	(0.8537)	(0.5482)	(0.5675)	(0.1302)	(0.0030)		
JPY	-0.0450**	-1.2690	-1.7333*	0.7925	0.1156	0.2250**	972	0.0411
	(0.0199)	(1.3233)	(0.8956)	(0.8524)	(0.1835)	(0.0982)		
NZD	-0.0498***	-4.4889***	-3.5506***	-0.9927	-0.1421	0.0299***	972	0.0980
	(0.0174)	(1.1293)	(0.8775)	(0.6827)	(0.1694)	(0.0103)		
NOK	-0.0262*	-3.7653***	-2.8374***	0.1317	-0.0953	0.0504	972	0.0906
	(0.0157)	(1.0260)	(0.6549)	(0.6835)	(0.1357)	(0.0309)		
SEK	-0.0388***	-3.2415***	-2.3670***	-1.8654***	0.0115	0.0776**	972	0.0744
	(0.0140)	(0.9280)	(0.6193)	(0.5927)	(0.1395)	(0.0302)		
CHF	-0.0262*	-1.0109	-0.9998	-0.2636	-0.2114	0.0030	972	0.0281
	(0.0149)	(1.0324)	(0.6645)	(0.6929)	(0.1421)	(0.0071)		
GBP	-0.0353***	-4.0676***	-3.0539***	0.0276	-0.1883	-0.0181**	972	0.0998
	(0.0132)	(0.9125)	(0.5918)	(0.6173)	(0.1289)	(0.0076)		
USD	-0.0006	-4.1116***	-2.0521***	-1.4413*	-0.1698	0.0048	972	0.0808
	(0.0121)	(1.1183)	(0.7050)	(0.7448)	(0.1502)	(0.0259)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2007M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 1999M1-2007M12 with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$s_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0398**	-3.6570***	-3.4492***	0.0056	-0.2361	0.0186**	972	0.0845
	(0.0166)	(1.2070)	(0.7825)	(0.7460)	(0.1605)	(0.0074)		
CAD	-0.0284*	-2.7650**	-3.3029***	-0.1085	-0.3363**	0.0054	972	0.0867
	(0.0153)	(1.0901)	(0.7478)	(0.6428)	(0.1583)	(0.0048)		
EUR	-0.0235*	-2.8941***	-2.1413***	-0.3580	-0.2126	-0.0060*	972	0.0473
	(0.0131)	(0.8497)	(0.5483)	(0.5562)	(0.1297)	(0.0033)		
JPY	-0.0158	-0.7731	-1.6623*	1.3044	0.0027	0.0794	972	0.0235
	(0.0167)	(1.3451)	(0.9048)	(0.8650)	(0.1843)	(0.0801)		
NZD	-0.0459***	-4.5199***	-3.5901***	-1.0688	-0.2135	0.0311***	972	0.0954
	(0.0163)	(1.1210)	(0.8711)	(0.6808)	(0.1623)	(0.0101)		
NOK	-0.0222	-3.5589***	-2.7512***	0.0004	-0.1040	0.0425	972	0.0876
	(0.0147)	(0.9971)	(0.6344)	(0.6567)	(0.1312)	(0.0288)		
SEK	-0.0381***	-2.9543***	-2.3417***	-1.9087***	-0.0461	0.0744***	972	0.0724
	(0.0135)	(0.9139)	(0.6087)	(0.5759)	(0.1379)	(0.0283)		
CHF	-0.0321**	-1.1660	-1.1067*	-0.2910	-0.2211	0.0036	972	0.0285
	(0.0137)	(1.0100)	(0.6504)	(0.6643)	(0.1398)	(0.0056)		
GBP	-0.0300**	-4.0928***	-3.0436***	0.1676	-0.2343*	-0.0140*	972	0.0963
	(0.0129)	(0.8862)	(0.5737)	(0.5945)	(0.1247)	(0.0075)		
USD	-0.0033	-3.9845***	-1.9965***	-1.4203*	-0.1879	-0.0019	972	0.0793
	(0.0132)	(1.1128)	(0.7043)	(0.7341)	(0.1482)	(0.0274)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2007M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 2008M1-2017M12 with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0470***	-6.0352***	-7.6226***	0.1786	-0.4299**	0.0165**	1071	0.3002
	(0.0138)	(0.8927)	(0.7531)	(0.6182)	(0.2169)	(0.0073)		
CAD	-0.0402***	-5.7126***	-7.8492***	-0.0596	0.1273	0.0044	1078	0.2913
	(0.0110)	(0.7458)	(0.6660)	(0.5077)	(0.1766)	(0.0030)		
EUR	-0.0346***	-5.3779***	-7.4541***	-0.2743	-0.0978	-0.0111***	1078	0.2595
	(0.0104)	(0.6571)	(0.6077)	(0.4598)	(0.1845)	(0.0038)		
JPY	-0.0542***	-5.6465***	-11.2605***	2.0872**	-0.0793	0.2563***	1078	0.3308
	(0.0177)	(1.2394)	(1.1294)	(0.8921)	(0.2962)	(0.0803)		
NZD	-0.0512***	-7.1671***	-8.0791***	0.2807	0.1149	0.0090	1071	0.3220
	(0.0142)	(0.9642)	(0.8866)	(0.6598)	(0.2472)	(0.0094)		
NOK	-0.0293***	-5.2234***	-8.2771***	0.7820	-0.1070	0.0579***	1078	0.2618
	(0.0112)	(0.7781)	(0.7493)	(0.5585)	(0.1982)	(0.0223)		
SEK	-0.0471***	-5.5394***	-6.5734***	-0.0853	0.0028	0.0914***	1078	0.2377
	(0.0113)	(0.7432)	(0.7081)	(0.4987)	(0.2008)	(0.0225)		
CHF	-0.0239*	-2.8031***	-4.2448***	0.3146	0.2226	-0.0027	1078	0.1761
	(0.0128)	(1.0134)	(0.9299)	(0.7273)	(0.2267)	(0.0057)		
GBP	-0.0442***	-3.4178***	-8.0737***	0.7458	-0.2589	-0.0170***	1078	0.2089
	(0.0144)	(0.9215)	(0.8559)	(0.6355)	(0.2419)	(0.0064)		
USD	-0.0459***	-7.4838***	-9.8596***	-1.1229*	0.0316	-0.0869***	1078	0.3256
	(0.0128)	(0.8681)	(0.8195)	(0.5909)	(0.2214)	(0.0254)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2C – full table of table 2C 2008M1-2017M12 with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$s_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0492***	-5.9909***	-7.4202***	0.2291	-0.3337	0.0131*	1080	0.2959
	(0.0156)	(0.8779)	(0.7400)	(0.6052)	(0.2095)	(0.0072)		
CAD	-0.0521***	-5.7511***	-7.6897***	0.0112	0.1015	0.0062**	1080	0.2953
	(0.0119)	(0.7265)	(0.6457)	(0.4996)	(0.1702)	(0.0031)		
EUR	-0.0413***	-5.3178***	-7.3974***	-0.2630	-0.1253	-0.0121***	1080	0.2591
	(0.0117)	(0.6482)	(0.6033)	(0.4547)	(0.1857)	(0.0040)		
JPY	-0.0586***	-5.8506***	-11.2549***	1.8963**	0.0145	0.2787***	1080	0.3286
	(0.0188)	(1.2388)	(1.1283)	(0.8933)	(0.2861)	(0.0860)		
NZD	-0.0556***	-6.9970***	-8.0703***	0.3636	0.1691	0.0089	1080	0.3218
	(0.0154)	(0.9483)	(0.8712)	(0.6509)	(0.2351)	(0.0094)		
NOK	-0.0434***	-4.9075***	-8.0550***	0.8204	-0.1823	0.0853***	1080	0.2617
	(0.0127)	(0.7663)	(0.7375)	(0.5484)	(0.1963)	(0.0251)		
SEK	-0.0600***	-5.6607***	-6.6391***	-0.1650	-0.1090	0.1188***	1080	0.2313
	(0.0129)	(0.7264)	(0.6946)	(0.4896)	(0.1972)	(0.0259)		
CHF	-0.0407**	-2.8807***	-4.1192***	0.2668	0.1272	-0.0010	1080	0.0985
	(0.0160)	(1.0049)	(0.9224)	(0.7229)	(0.2266)	(0.0056)		
GBP	-0.0556***	-3.5000***	-7.9158***	0.7427	-0.3191	-0.0226***	1080	0.2104
	(0.0161)	(0.9183)	(0.8555)	(0.6337)	(0.2368)	(0.0072)		
USD	-0.0517***	-7.1658***	-9.6362***	-0.8298	-0.0262	-0.1006***	1080	0.3266
	(0.0142)	(0.8602)	(0.8173)	(0.5846)	(0.2257)	(0.0285)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2D – full table of table 2D with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0532**	-8.2425	-24.1151	-9.8448	-3.0785	0.0121	360	0.0513
	(0.0261)	(10.7255)	(15.0846)	(12.2280)	(3.1098)	(0.0119)		
CAD	-0.0277***	-13.9201***	-29.4273***	-10.8506**	0.4895	0.0035	1227	0.0545
	(0.0101)	(4.7626)	(7.4452)	(4.9374)	(1.9228)	(0.0032)		
EUR	-0.0817***	-20.9888***	-27.0912***	-21.2376***	2.4764	-0.0216***	608	0.0984
	(0.0169)	(7.5837)	(9.1983)	(7.4064)	(2.7841)	(0.0053)		
JPY	-0.0986***	-21.4511**	-13.6255	1.1911	-7.9017**	0.5160***	461	0.1295
	(0.0242)	(10.3551)	(11.9705)	(12.4120)	(3.5755)	(0.1192)		
NZD	-0.0314***	-19.5937***	-30.2513***	-12.2364**	1.1698	0.0058	1221	0.0659
	(0.0104)	(4.8945)	(7.0247)	(5.3484)	(1.6065)	(0.0072)		
SEK	-0.0305***	-16.6822***	-16.8925***	-12.1601***	0.2214	0.0767***	1227	0.0456
	(0.0085)	(3.9413)	(5.6739)	(4.1854)	(1.2648)	(0.0185)		
CHF	-0.0573***	-10.4051	8.3720	-13.9700	12.1927***	-0.0060	730	0.0594
	(0.0139)	(9.1014)	(8.6491)	(9.2527)	(3.4866)	(0.0042)		
GBP	-0.0194*	-8.9733*	-20.4977***	-9.3455*	-0.9275	-0.0133**	1227	0.0299
	(0.0116)	(5.0094)	(7.1602)	(5.1057)	(1.7048)	(0.0065)		
USD	-0.0247***	-18.5417***	-16.2520***	-17.6993***	1.5415	-0.0502**	1227	0.0664
	(0.0088)	(4.0163)	(6.2360)	(4.0169)	(1.4493)	(0.0196)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 2D – full table of table 2D with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta\eta_{j,t}) + \beta_3(\Delta i^R_{j,t}) + \beta_4(\eta_{j,t-1}) + \beta_5(i^R_{j,t-1}) + u_{j,t}$

	$s_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0420*	-6.1255	-22.9702	-9.2576	-3.7846	-0.0050	360	0.0465
	(0.0249)	(10.6280)	(15.0457)	(11.9021)	(3.5309)	(0.0035)		
CAD	-0.0330***	-13.0088***	-29.0955***	-10.1306**	0.0577	-0.0136***	1228	0.0565
	(0.0111)	(4.6399)	(7.2932)	(4.7910)	(1.8971)	(0.0030)		
EUR	-0.0882***	-18.9649**	-21.2256**	-19.0896***	0.9455	-0.0860***	609	0.0845
	(0.0186)	(7.4816)	(9.0414)	(7.3569)	(2.8330)	(0.0159)		
JPY	-0.1100***	-22.9549**	-13.5040	-0.9211	-8.7010**	0.4847***	462	0.1394
	(0.0258)	(10.0978)	(11.7250)	(12.1154)	(3.6683)	(0.0669)		
NZD	-0.0290***	-18.9129***	-28.1859***	-12.3604**	1.0430	-0.0077***	1228	0.0605
	(0.0105)	(4.8701)	(6.9947)	(5.3371)	(1.5986)	(0.0023)		
SEK	-0.0395***	-15.2212***	-17.2152***	-11.8799***	-0.2303	0.0690***	1228	0.0493
	(0.0090)	(3.8734)	(5.5854)	(4.1150)	(1.2488)	(0.0131)		
CHF	-0.0831***	-10.3270	8.1529	-15.5219*	10.2469***	-0.0547***	731	0.0747
	(0.0161)	(8.8365)	(8.4713)	(8.9880)	(3.4494)	(0.0089)		
GBP	-0.0248*	-8.4546*	-19.3578***	-9.0781*	-1.2418	-0.0292***	1228	0.0308
	(0.0134)	(4.9111)	(7.0492)	(4.9918)	(1.6042)	(0.0080)		
USD	-0.0275***	-17.3643***	-15.3126**	-16.8933***	1.0161	-0.0119***	1228	0.0618
	(0.0095)	(3.9407)	(6.1502)	(3.9631)	(1.4429)	(0.0042)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}$ is a measure of the treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, full sample, no default risk, with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0269***	-6.1125***	-3.1154**	-5.9027***	0.3805	-0.2541	-0.2998***	0.0127***	2019	0.1956
	(0.0074)	(0.8081)	(1.2520)	(0.5487)	(0.4370)	(0.7782)	(0.1135)	(0.0042)		
CAD	-0.0262***	-4.7578***	-5.0606***	-6.1798***	0.5135	-0.2924	-0.2885**	0.0053**	1834	0.1966
	(0.0069)	(0.7419)	(1.1586)	(0.5425)	(0.4118)	(0.7321)	(0.1132)	(0.0026)		
EUR	-0.0171***	-4.7713***	-4.9377***	-5.0710***	-0.0752	-0.5204	-0.1569*	-0.0053**	2026	0.1453
	(0.0059)	(0.5726)	(0.8733)	(0.4109)	(0.3147)	(0.5385)	(0.0908)	(0.0022)		
JPY	-0.0367***	-4.1337***	-5.0325***	-6.4433***	2.1405***	2.0365**	-0.0931	0.1800***	2026	0.1708
	(0.0102)	(1.0046)	(1.5941)	(0.7475)	(0.5800)	(0.9654)	(0.1343)	(0.0478)		
NZD	-0.0267***	-6.7612***	-5.9030***	-6.2988***	0.1569	-0.6276	-0.1350	0.0132**	2019	0.2004
	(0.0080)	(0.8064)	(1.3145)	(0.6201)	(0.4379)	(0.7935)	(0.1285)	(0.0058)		
NOK	-0.0168**	-4.0928***	-5.5236***	-5.0670***	0.6073	0.6625	-0.1637	0.0350**	2026	0.1624
	(0.0070)	(0.6672)	(1.0670)	(0.4988)	(0.4064)	(0.7048)	(0.1009)	(0.0145)		
SEK	-0.0195***	-4.4841***	-5.1720***	-4.5787***	-0.2946	-0.6172	-0.0998	0.0381***	2026	0.1292
	(0.0064)	(0.6520)	(0.9988)	(0.4740)	(0.3669)	(0.6449)	(0.1043)	(0.0136)		
CHF	-0.0111*	-2.8827***	-1.2675	-3.0160***	0.6630	0.6845	-0.1749	0.0002	2026	0.0508
	(0.0066)	(0.7813)	(1.2110)	(0.5584)	(0.4264)	(0.7576)	(0.1088)	(0.0035)		
GBP	-0.0190***	-4.1011***	-1.5710	-5.6397***	0.7323*	0.4878	-0.3269***	-0.0066**	2026	0.1357
	(0.0069)	(0.7560)	(1.1410)	(0.5325)	(0.4223)	(0.7082)	(0.1077)	(0.0033)		
USD	-0.0108	-6.5855***	-7.1197***	-4.9650***	-1.4400***	-1.2587*	-0.0382	-0.0194	2026	0.1789
	(0.0070)	(0.8278)	(1.2047)	(0.5845)	(0.4483)	(0.7295)	(0.1115)	(0.0149)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, full sample, no default risk, with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta \lambda_{j,t} + \beta_3 \Delta \tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0293***	-6.1153***	-3.3934***	-5.8207***	0.3300	-1.0130	-0.3173***	0.0139***	2028	0.2002
	(0.0085)	(0.7901)	(1.2181)	(0.5373)	(0.4255)	(0.7283)	(0.1091)	(0.0044)		
CAD	-0.0340***	-4.6422***	-5.4011***	-6.1473***	0.4646	-0.4723	-0.2886***	0.0065**	1836	0.2083
	(0.0079)	(0.7234)	(1.1216)	(0.5273)	(0.4006)	(0.7003)	(0.1096)	(0.0026)		
EUR	-0.0227***	-4.6702***	-5.0325***	-4.9995***	-0.1083	-0.6544	-0.1630*	-0.0063***	2028	0.1486
	(0.0067)	(0.5670)	(0.8619)	(0.4083)	(0.3087)	(0.5186)	(0.0884)	(0.0024)		
JPY	-0.0308***	-4.2212***	-5.3680***	-6.2586***	1.8793***	1.3745	0.0210	0.1518***	2028	0.1652
	(0.0108)	(1.0079)	(1.5977)	(0.7535)	(0.5767)	(0.9537)	(0.1258)	(0.0497)		
NZD	-0.0279***	-6.6545***	-6.0965***	-6.2321***	0.1273	-1.1984	-0.1498	0.0145**	2028	0.2001
	(0.0090)	(0.7975)	(1.2964)	(0.6142)	(0.4312)	(0.7672)	(0.1242)	(0.0062)		
NOK	-0.0216***	-3.8634***	-5.2116***	-4.8596***	0.5095	0.4263	-0.1622*	0.0438***	2028	0.1575
	(0.0077)	(0.6519)	(1.0383)	(0.4880)	(0.3948)	(0.6645)	(0.0973)	(0.0154)		
SEK	-0.0275***	-4.4120***	-5.2121***	-4.5315***	-0.2852	-1.1030*	-0.1513	0.0539***	2028	0.1354
	(0.0072)	(0.6414)	(0.9796)	(0.4666)	(0.3611)	(0.6147)	(0.1021)	(0.0150)		
CHF	-0.0189**	-3.0251***	-1.2444	-3.0125***	0.6560	0.5159	-0.1998*	0.0021	2028	0.0570
	(0.0075)	(0.7705)	(1.1869)	(0.5511)	(0.4155)	(0.7024)	(0.1062)	(0.0033)		
GBP	-0.0234***	-4.2066***	-1.5885	-5.4765***	0.6976*	0.2243	-0.3141***	-0.0090**	2028	0.1367
	(0.0075)	(0.7460)	(1.1200)	(0.5259)	(0.4142)	(0.6801)	(0.1044)	(0.0038)		
USD	-0.0151*	-6.2921***	-6.8514***	-4.7590***	-1.2806***	-1.1215	-0.0658	-0.0288*	2028	0.1718
	(0.0082)	(0.8215)	(1.1837)	(0.5799)	(0.4466)	(0.7037)	(0.1109)	(0.0168)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, post 2008, with default risk, with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \lambda_{j,t} + \beta_3 \Delta \tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta l^R_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$l^R_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0500***	-6.9905***	-3.2537**	13.9603***	-7.3647***	-0.2514	-0.3967	0.0704	-0.4035*	0.0170**	946	0.2877
	(0.0161)	(1.1544)	(1.5895)	(2.4229)	(0.8265)	(0.6792)	(1.2372)	(1.4657)	(0.2212)	(0.0077)		
CAD	-0.0375***	-8.5976***	-6.4680***	7.5185***	-9.5496***	-0.4895	-3.8675***	-0.7664	0.3320	-0.0003	397	0.3046
	(0.0127)	(1.6347)	(2.0021)	(2.8412)	(1.2465)	(0.9194)	(1.1732)	(1.6863)	(0.2739)	(0.0036)		
EUR	-0.0441***	-6.3260***	-3.8591***	7.9316***	-7.9929***	-0.0368	-0.8180	2.0960**	-0.0394	-0.0157***	964	0.2592
	(0.0108)	(0.8082)	(0.9578)	(1.6943)	(0.6267)	(0.4774)	(0.7231)	(1.0633)	(0.1767)	(0.0042)		
JPY	-0.0591***	-6.8276***	-4.2662**	10.0638***	-11.3810***	2.0644**	3.1155**	0.1625	0.0191	0.2816***	964	0.3372
	(0.0178)	(1.3788)	(1.8635)	(3.1921)	(1.1352)	(0.8133)	(1.4265)	(2.0052)	(0.2798)	(0.0804)		
NZD	-0.0534***	-8.0860***	-5.9783***	12.5350***	-8.0470***	0.5891	0.3525	0.2115	0.2131	0.0072	934	0.3123
	(0.0140)	(1.1602)	(1.5135)	(2.5481)	(0.9202)	(0.7084)	(1.2478)	(1.4474)	(0.2537)	(0.0094)		
NOK	-0.0388***	-5.5007***	-5.9573***	4.2082**	-8.1254***	0.5270	0.6183	1.6778	-0.0826	0.0761***	964	0.2670
	(0.0112)	(0.8186)	(1.2155)	(1.9775)	(0.7404)	(0.5385)	(0.9116)	(1.2826)	(0.1960)	(0.0225)		
SEK	-0.0460***	-5.4898***	-4.2737***	7.3440***	-6.1670***	0.0279	-0.9114	-0.0626	-0.0083	0.0868***	964	0.1980
	(0.0115)	(0.9057)	(1.1731)	(1.9522)	(0.7384)	(0.5190)	(0.8715)	(1.1734)	(0.1950)	(0.0233)		
CHF	-0.0236*	-3.0688**	-1.4029	5.2727**	-1.1023	-0.3194	0.3271	1.8528	0.2218	-0.0047	886	0.0312
	(0.0126)	(1.5060)	(1.8328)	(2.6419)	(1.0836)	(0.7739)	(1.1767)	(1.4893)	(0.2359)	(0.0056)		
GBP	-0.0468***	-6.0848***	-0.5898	5.6774**	-9.1657***	0.4693	2.0281*	1.0813	-0.0513	-0.0176***	964	0.2330
	(0.0137)	(1.1178)	(1.4178)	(2.3574)	(0.8805)	(0.6587)	(1.0387)	(1.4895)	(0.2373)	(0.0064)		
USD	-0.0553***	-9.3364***	-3.5274***	13.0448***	-10.5412***	-1.2093*	0.0704	1.2208	0.1490	-0.1080***	811	0.3843
	(0.0140)	(1.1279)	(1.3005)	(2.1895)	(0.8953)	(0.6417)	(0.9708)	(1.3843)	(0.2284)	(0.0278)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3A – full table of table 3A, post 2008, with default risk, with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l^R_{j,t} + \beta_5 \Delta i^R_{j,t} + \beta_6 \lambda_{j,t-1} + \beta_7 \tau_{j,t-1} + \beta_8 l^R_{j,t-1} + \beta_9 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta\tau_{j,t}$	$\Delta l^R_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$\tau_{j,t-1}$	$l^R_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0561***	-6.9234***	-3.0928**	14.5433***	-7.0818***	-0.2219	-0.5739	0.4607	-0.3511	0.0153**	955	0.2905
	(0.0171)	(1.1179)	(1.5349)	(2.3556)	(0.7989)	(0.6625)	(1.1915)	(1.4263)	(0.2175)	(0.0076)		
CAD	-0.0452***	-8.7478***	-6.8539***	8.2598***	-8.9245***	-0.5903	-3.6899***	-0.5421	0.3553	0.0011	399	0.3095
	(0.0155)	(1.5103)	(1.7874)	(2.5604)	(1.1076)	(0.8476)	(1.0582)	(1.5414)	(0.2520)	(0.0037)		
EUR	-0.0561***	-6.1346***	-3.9516***	8.4379***	-7.8268***	-0.0649	-0.8720	2.4586**	-0.0988	-0.0182***	966	0.2626
	(0.0123)	(0.7976)	(0.9435)	(1.6765)	(0.6184)	(0.4718)	(0.7110)	(1.0576)	(0.1801)	(0.0045)		
JPY	-0.0650***	-6.8812***	-4.5365**	10.4251***	-11.2611***	2.0921**	2.5341*	0.2363	0.0396	0.3097***	966	0.3381
	(0.0192)	(1.3812)	(1.8549)	(3.1878)	(1.1344)	(0.8183)	(1.4283)	(2.0116)	(0.2789)	(0.0869)		
NZD	-0.0578***	-7.8690***	-5.9201***	12.5630***	-8.0042***	0.6155	0.2007	0.3171	0.2458	0.0075	943	0.3147
	(0.0159)	(1.1425)	(1.4861)	(2.5156)	(0.9045)	(0.6991)	(1.2257)	(1.4519)	(0.2459)	(0.0096)		
NOK	-0.0556***	-5.1392***	-5.8378***	4.2726**	-7.9138***	0.5503	0.3971	1.8382	-0.1758	0.1082***	966	0.2651
	(0.0130)	(0.8053)	(1.1951)	(1.9521)	(0.7288)	(0.5305)	(0.8934)	(1.2767)	(0.1976)	(0.0258)		
SEK	-0.0625***	-5.6128***	-4.1807***	7.6208***	-6.1712***	-0.0062	-1.2239	0.2801	-0.1383	0.1206***	966	0.2102
	(0.0134)	(0.8799)	(1.1420)	(1.8930)	(0.7177)	(0.5105)	(0.8454)	(1.1431)	(0.1939)	(0.0270)		
CHF	-0.0429***	-3.1797**	-1.2316	5.7305**	-0.9602	-0.5137	0.0141	2.3253	0.1572	-0.0042	888	0.0423
	(0.0156)	(1.4839)	(1.7978)	(2.5929)	(1.0661)	(0.7682)	(1.1504)	(1.4810)	(0.2330)	(0.0055)		
GBP	-0.0566***	-6.1559***	-0.6474	5.7833**	-8.9778***	0.4620	1.6963*	1.2768	-0.1226	-0.0232***	966	0.2306
	(0.0158)	(1.1167)	(1.4103)	(2.3582)	(0.8789)	(0.6578)	(1.0290)	(1.5065)	(0.2380)	(0.0074)		
USD	-0.0620***	-8.9441***	-3.3469***	12.5068***	-10.2297***	-0.9105	0.0934	0.8905	0.0817	-0.1227***	813	0.3760
	(0.0158)	(1.1130)	(1.2514)	(2.1606)	(0.8861)	(0.6266)	(0.9398)	(1.3678)	(0.2366)	(0.0314)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\lambda_{j,t}$ with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \lambda_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0534***	-4.3739***	-6.5096***	0.0997	-0.4144*	0.0177**	946	0.2127
	(0.0164)	(1.1082)	(0.8622)	(0.5894)	(0.2368)	(0.0080)		
CAD	-0.0417***	-3.7888***	-8.5852***	1.1051	0.4062	0.0047	397	0.2494
	(0.0134)	(1.4655)	(1.2578)	(0.7903)	(0.2887)	(0.0036)		
EUR	-0.0388***	-3.4389***	-7.7765***	0.7446*	-0.0085	-0.0125***	964	0.2181
	(0.0107)	(0.7464)	(0.6335)	(0.4171)	(0.1848)	(0.0037)		
JPY	-0.0636***	-4.9737***	-10.8616***	1.7369***	-0.2885	0.2901***	964	0.2780
	(0.0183)	(1.3654)	(1.1818)	(0.6563)	(0.2953)	(0.0828)		
NZD	-0.0515***	-5.1729***	-6.9011***	0.9073	0.2786	0.0059	934	0.2198
	(0.0163)	(1.1498)	(0.9819)	(0.6777)	(0.2765)	(0.0103)		
NOK	-0.0320***	-4.4965***	-7.3775***	0.8098*	-0.0473	0.0599***	964	0.2168
	(0.0113)	(0.7858)	(0.7615)	(0.4551)	(0.2065)	(0.0223)		
SEK	-0.0486***	-3.9759***	-5.9093***	0.0752	0.0733	0.0941***	964	0.1551
	(0.0114)	(0.8385)	(0.7441)	(0.4719)	(0.2026)	(0.0227)		
CHF	-0.0206*	-1.7830	-0.9819	0.0818	0.2107	-0.0043	886	0.0178
	(0.0120)	(1.3401)	(1.0761)	(0.6575)	(0.2374)	(0.0037)		
GBP	-0.0428***	-4.9667***	-8.3456***	0.2093	-0.1122	-0.0180***	964	0.2134
	(0.0135)	(1.0282)	(0.8663)	(0.5513)	(0.2399)	(0.0062)		
USD	-0.0573***	-5.4277***	-10.3205***	-0.9251	0.2120	-0.1111***	811	0.2864
	(0.0166)	(1.1358)	(0.9772)	(0.6452)	(0.2609)	(0.0327)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\tau_{j,t}$ with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta \tau_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \tau_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta \tau_{j,t}$	$\Delta i^R_{j,t}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0306***	-1.5580	-4.2340***	-0.3559	-0.3044***	0.0138***	2019	0.1146
	(0.0077)	(1.3011)	(0.5264)	(0.7647)	(0.1169)	(0.0044)		
CAD	-0.0266***	-4.1632***	-5.3026***	-0.8095	-0.2918***	0.0043*	1834	0.1604
	(0.0070)	(1.1573)	(0.5126)	(0.6645)	(0.1125)	(0.0024)		
EUR	-0.0188***	-3.1431***	-3.6503***	-0.5212	-0.1804**	-0.0056**	2026	0.1007
	(0.0059)	(0.8809)	(0.3771)	(0.4858)	(0.0909)	(0.0022)		
JPY	-0.0309***	-5.8410***	-5.6309***	0.6750	-0.0575	0.1444***	2026	0.1273
	(0.0103)	(1.6410)	(0.7081)	(0.9162)	(0.1354)	(0.0482)		
NZD	-0.0284***	-4.1545***	-2.8570***	-0.3922	-0.0823	0.0125*	2019	0.0730
	(0.0089)	(1.4344)	(0.5912)	(0.7932)	(0.1380)	(0.0064)		
NOK	-0.0153**	-3.3299***	-3.7231***	0.1104	-0.1082	0.0306**	2026	0.0956
	(0.0072)	(1.0869)	(0.4805)	(0.6810)	(0.1006)	(0.0148)		
SEK	-0.0224***	-4.5149***	-3.2503***	-0.5409	-0.1366	0.0442***	2026	0.0827
	(0.0065)	(1.0079)	(0.4331)	(0.6124)	(0.1027)	(0.0137)		
CHF	-0.0096	-1.5690	-2.0432***	0.4203	-0.1742	-0.0029	2026	0.0268
	(0.0063)	(1.2161)	(0.5133)	(0.7098)	(0.1069)	(0.0028)		
GBP	-0.0192***	-0.8562	-3.9284***	-0.3696	-0.3375***	-0.0072**	2026	0.0897
	(0.0070)	(1.1545)	(0.4956)	(0.6809)	(0.1073)	(0.0034)		
USD	-0.0114	-6.4723***	-3.8889***	-0.9843	-0.1586	-0.0206	2026	0.1045
	(0.0076)	(1.2571)	(0.5748)	(0.7087)	(0.1154)	(0.0162)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $l_{j,t}^R$ with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta l_{j,t}^R + \beta_3 \Delta i_{j,t}^R + \beta_4 l_{j,t-1}^R + \beta_5 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta l_{j,t}^R$	$\Delta i_{j,t}^R$	$l_{j,t-1}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0557***	9.5842***	-5.8544***	0.5459	-0.4645**	0.0199***	946	0.2106
	(0.0167)	(2.2739)	(0.7789)	(1.3563)	(0.2265)	(0.0077)		
CAD	-0.0359***	0.1895	-7.5258***	1.4216	0.5160*	0.0024	397	0.2107
	(0.0135)	(2.5282)	(1.1956)	(1.5294)	(0.2702)	(0.0037)		
EUR	-0.0475***	1.5135	-6.1494***	2.3604**	-0.0327	-0.0132***	964	0.1828
	(0.0111)	(1.5723)	(0.5837)	(0.9697)	(0.1860)	(0.0038)		
JPY	-0.0562***	4.4139	-9.8760***	2.1216	0.0010	0.2537***	964	0.2392
	(0.0194)	(3.1174)	(1.1446)	(1.8890)	(0.3094)	(0.0873)		
NZD	-0.0648***	4.4994*	-5.7978***	2.0931	0.3272	0.0070	934	0.1550
	(0.0163)	(2.6259)	(0.9824)	(1.4705)	(0.2809)	(0.0104)		
NOK	-0.0415***	-1.5135	-5.2312***	2.9458**	-0.0437	0.0810***	964	0.1354
	(0.0123)	(1.9833)	(0.7324)	(1.1982)	(0.2222)	(0.0245)		
SEK	-0.0529***	3.0654*	-4.2163***	1.1342	0.0647	0.1033***	964	0.1180
	(0.0121)	(1.8408)	(0.6777)	(1.1156)	(0.2005)	(0.0240)		
CHF	-0.0228*	2.3077	-0.3057	1.6418	0.1830	-0.0047	886	0.0165
	(0.0125)	(2.3223)	(0.9909)	(1.3364)	(0.2311)	(0.0033)		
GBP	-0.0467***	0.8943	-6.0613***	1.5762	-0.1343	-0.0191***	964	0.1657
	(0.0145)	(2.2250)	(0.8301)	(1.2965)	(0.2472)	(0.0067)		
USD	-0.0539***	5.3278**	-9.0747***	-0.3014	0.1945	-0.1033***	811	0.2592
	(0.0170)	(2.1713)	(0.9298)	(1.3941)	(0.2596)	(0.0337)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^R$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^R$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta + l^R)_{j,t}$ with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta + l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta + l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta + l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta + l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0510***	-4.3330***	-6.8168***	-0.0988	-0.3855*	0.0168**	946	0.2224
	(0.0164)	(0.9813)	(0.8744)	(0.6628)	(0.2341)	(0.0078)		
CAD	-0.0320**	-5.3497***	-8.8092***	-0.5048	0.5908**	0.0022	397	0.2540
	(0.0128)	(1.3506)	(1.2660)	(0.8605)	(0.2785)	(0.0038)		
EUR	-0.0367***	-3.9413***	-7.4480***	0.3598	-0.0061	-0.0104***	964	0.2291
	(0.0107)	(0.6257)	(0.6064)	(0.4234)	(0.1794)	(0.0039)		
JPY	-0.0625***	-4.4920***	-11.1699***	2.4222***	-0.1201	0.2949***	964	0.3137
	(0.0180)	(1.1395)	(1.1205)	(0.7912)	(0.2922)	(0.0815)		
NZD	-0.0490***	-5.4003***	-7.4684***	0.9618	0.3324	0.0026	934	0.2631
	(0.0154)	(0.9280)	(0.9399)	(0.6675)	(0.2608)	(0.0097)		
NOK	-0.0344***	-5.0701***	-7.9508***	0.9347**	-0.0651	0.0673***	964	0.2599
	(0.0108)	(0.6722)	(0.7199)	(0.4411)	(0.1945)	(0.0216)		
SEK	-0.0462***	-4.1494***	-6.0740***	-0.0862	0.0640	0.0896***	964	0.1725
	(0.0115)	(0.6960)	(0.7218)	(0.4672)	(0.1972)	(0.0228)		
CHF	-0.0213*	-1.5999	-0.7741	0.1657	0.1943	-0.0036	886	0.0221
	(0.0120)	(1.0840)	(1.0277)	(0.6311)	(0.2346)	(0.0048)		
GBP	-0.0426***	-3.3640***	-8.0299***	0.9588*	-0.1576	-0.0171***	964	0.2075
	(0.0139)	(0.8676)	(0.8606)	(0.5704)	(0.2385)	(0.0064)		
USD	-0.0582***	-4.8651***	-9.7742***	-1.0721*	0.1731	-0.1106***	811	0.3030
	(0.0159)	(0.8745)	(0.9304)	(0.5963)	(0.2522)	(0.0315)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta-\tau)_{j,t}$ with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\eta-\tau)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta-\tau)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\eta-\tau)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta-\tau)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0277***	-5.7751***	-5.6699***	0.4402	-0.2934***	0.0127***	2019	0.1883
	(0.0072)	(0.7965)	(0.5457)	(0.4127)	(0.1131)	(0.0042)		
CAD	-0.0271***	-3.8495***	-6.2294***	0.6398*	-0.2601**	0.0057**	1834	0.1714
	(0.0069)	(0.7614)	(0.5544)	(0.3810)	(0.1146)	(0.0025)		
EUR	-0.0191***	-3.6097***	-5.0646***	0.1470	-0.1441	-0.0044**	2026	0.1187
	(0.0059)	(0.5813)	(0.4181)	(0.2974)	(0.0939)	(0.0021)		
JPY	-0.0347***	-4.1654***	-6.2198***	1.7668***	-0.2332*	0.1635***	2026	0.1410
	(0.0103)	(1.0244)	(0.7643)	(0.5412)	(0.1356)	(0.0474)		
NZD	-0.0264***	-6.1882***	-5.9097***	0.2401	-0.0913	0.0117*	2019	0.1672
	(0.0087)	(0.8175)	(0.6368)	(0.4070)	(0.1315)	(0.0062)		
NOK	-0.0157**	-3.0530***	-4.5264***	0.4380	-0.1567	0.0316**	2026	0.1226
	(0.0070)	(0.6696)	(0.5129)	(0.3882)	(0.1048)	(0.0143)		
SEK	-0.0215***	-4.2228***	-4.4396***	-0.2548	-0.0638	0.0434***	2026	0.1084
	(0.0063)	(0.6532)	(0.4820)	(0.3490)	(0.1058)	(0.0132)		
CHF	-0.0085	-2.9705***	-3.0542***	0.5812	-0.2002*	-0.0018	2026	0.0469
	(0.0062)	(0.7853)	(0.5617)	(0.3960)	(0.1093)	(0.0025)		
GBP	-0.0180***	-3.9696***	-5.4704***	0.5693	-0.3275***	-0.0066**	2026	0.1321
	(0.0067)	(0.7452)	(0.5315)	(0.3946)	(0.1066)	(0.0033)		
USD	-0.0134*	-6.2974***	-4.9367***	-1.2904***	0.0006	-0.0269*	2026	0.1398
	(0.0072)	(0.8529)	(0.6062)	(0.4349)	(0.1152)	(0.0149)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\tau - l^R)_{j,t}$ with real exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta(\tau - l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\tau - l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta(\tau - l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\tau - l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0544***	-4.6485***	-6.0675***	-0.9573	-0.5285**	0.0218***	946	0.2053
	(0.0165)	(1.3342)	(0.8128)	(0.8864)	(0.2430)	(0.0084)		
CAD	-0.0415***	-1.4134	-7.4779***	-1.8776**	0.3391	0.0010	397	0.2301
	(0.0135)	(1.5977)	(1.1781)	(0.8608)	(0.2726)	(0.0037)		
EUR	-0.0448***	-2.1385***	-5.7709***	-1.5086***	-0.1106	-0.0178***	964	0.1911
	(0.0108)	(0.8262)	(0.5806)	(0.5440)	(0.1836)	(0.0043)		
JPY	-0.0501***	-6.0067***	-10.0991***	0.2014	0.0658	0.2277***	964	0.2693
	(0.0187)	(1.6490)	(1.1207)	(1.0903)	(0.3108)	(0.0838)		
NZD	-0.0542***	-5.3081***	-6.2437***	-0.7509	0.2669	0.0075	934	0.1879
	(0.0163)	(1.3981)	(0.9651)	(0.9459)	(0.2771)	(0.0103)		
NOK	-0.0314***	-3.3808***	-5.1824***	-1.3813*	-0.0505	0.0578**	964	0.1360
	(0.0120)	(1.1076)	(0.7473)	(0.7373)	(0.2246)	(0.0234)		
SEK	-0.0517***	-3.7575***	-4.1713***	-1.0157	-0.0031	0.0984***	964	0.1343
	(0.0117)	(1.0152)	(0.6759)	(0.6546)	(0.1994)	(0.0232)		
CHF	-0.0198*	-2.1756	-0.0573	-0.3278	0.1774	-0.0052	886	0.0192
	(0.0119)	(1.4756)	(0.9995)	(0.8623)	(0.2311)	(0.0043)		
GBP	-0.0470***	-0.5878	-6.0992***	-0.1266	-0.1690	-0.0187***	964	0.1632
	(0.0141)	(1.2057)	(0.8406)	(0.7522)	(0.2530)	(0.0066)		
USD	-0.0566***	-4.9275***	-8.8790***	-0.6179	0.1045	-0.1072***	811	0.2777
	(0.0164)	(1.2004)	(0.9218)	(0.8523)	(0.2543)	(0.0322)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\lambda_{j,t}$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta\lambda_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \lambda_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\lambda_{j,t}$	$\Delta i^R_{j,t}$	$\lambda_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0590***	-4.2368***	-6.2444***	0.2449	-0.3457	0.0154*	955	0.2109
	(0.0177)	(1.0806)	(0.8405)	(0.5866)	(0.2336)	(0.0079)		
CAD	-0.0490***	-3.5511***	-7.9123***	1.0562	0.4060	0.0059	399	0.2440
	(0.0161)	(1.3298)	(1.1303)	(0.7125)	(0.2670)	(0.0039)		
EUR	-0.0477***	-3.1006***	-7.5862***	0.7900*	-0.0539	-0.0142***	966	0.2164
	(0.0121)	(0.7402)	(0.6290)	(0.4149)	(0.1889)	(0.0039)		
JPY	-0.0729***	-4.9654***	-10.8168***	1.9380***	-0.2287	0.3363***	966	0.2810
	(0.0196)	(1.3595)	(1.1771)	(0.6566)	(0.2899)	(0.0893)		
NZD	-0.0546***	-4.9534***	-6.8799***	0.9760	0.3157	0.0056	943	0.2227
	(0.0173)	(1.1303)	(0.9666)	(0.6669)	(0.2668)	(0.0103)		
NOK	-0.0483***	-4.1381***	-7.2070***	0.8925**	-0.1439	0.0918***	966	0.2164
	(0.0130)	(0.7709)	(0.7477)	(0.4500)	(0.2064)	(0.0256)		
SEK	-0.0630***	-4.0957***	-6.0086***	0.1026	-0.0504	0.1244***	966	0.1657
	(0.0135)	(0.8153)	(0.7240)	(0.4651)	(0.2013)	(0.0270)		
CHF	-0.0384***	-1.7289	-0.7926	0.0104	0.1453	-0.0026	888	0.0282
	(0.0148)	(1.3206)	(1.0593)	(0.6496)	(0.2354)	(0.0035)		
GBP	-0.0536***	-4.9932***	-8.2041***	0.3304	-0.1841	-0.0236***	966	0.2121
	(0.0154)	(1.0261)	(0.8641)	(0.5606)	(0.2395)	(0.0071)		
USD	-0.0645***	-5.1997***	-10.0205***	-0.7124	0.1317	-0.1272***	813	0.2799
	(0.0184)	(1.1099)	(0.9636)	(0.6255)	(0.2667)	(0.0366)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $\tau_{j,t}$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta \tau_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 \tau_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0345***	-1.9094	-4.1470***	-1.2390*	-0.3375***	0.0158***	2028	0.1180
	(0.0090)	(1.2705)	(0.5166)	(0.7223)	(0.1131)	(0.0046)		
CAD	-0.0359***	-4.5162***	-5.2931***	-0.9604	-0.2998***	0.0059**	1836	0.1732
	(0.0080)	(1.1220)	(0.4975)	(0.6466)	(0.1090)	(0.0024)		
EUR	-0.0249***	-3.2810***	-3.6089***	-0.6452	-0.1861**	-0.0067***	2028	0.1055
	(0.0069)	(0.8708)	(0.3739)	(0.4749)	(0.0886)	(0.0024)		
JPY	-0.0289***	-6.0544***	-5.4636***	0.2067	0.0248	0.1358***	2028	0.1247
	(0.0110)	(1.6384)	(0.7110)	(0.9079)	(0.1274)	(0.0508)		
NZD	-0.0300***	-4.3844***	-2.8557***	-0.9886	-0.1053	0.0143**	2028	0.0751
	(0.0102)	(1.4156)	(0.5851)	(0.7793)	(0.1336)	(0.0068)		
NOK	-0.0216***	-3.1209***	-3.6053***	-0.0206	-0.1184	0.0426***	2028	0.0970
	(0.0080)	(1.0513)	(0.4663)	(0.6435)	(0.0968)	(0.0159)		
SEK	-0.0314***	-4.5926***	-3.2172***	-1.0937*	-0.1917*	0.0619***	2028	0.0896
	(0.0074)	(0.9890)	(0.4259)	(0.5867)	(0.1004)	(0.0152)		
CHF	-0.0176**	-1.5296	-1.9983***	0.3017	-0.2028*	-0.0010	2028	0.0307
	(0.0073)	(1.1968)	(0.5073)	(0.6710)	(0.1049)	(0.0027)		
GBP	-0.0247***	-0.8436	-3.7322***	-0.6089	-0.3355***	-0.0101***	2028	0.0881
	(0.0078)	(1.1388)	(0.4908)	(0.6617)	(0.1049)	(0.0039)		
USD	-0.0164*	-6.2485***	-3.7134***	-0.9035	-0.1768	-0.0316*	2028	0.1021
	(0.0088)	(1.2288)	(0.5663)	(0.6748)	(0.1137)	(0.0180)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $l_{j,t}^R$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta l_{j,t}^R + \beta_3 \Delta i_{j,t}^R + \beta_4 l_{j,t-1}^R + \beta_5 i_{j,t-1}^R + u_{j,t}$

	$s_{j,t-1}$	$\Delta l_{j,t}^R$	$\Delta i_{j,t}^R$	$l_{j,t-1}^R$	$i_{j,t-1}^R$	constant	N	R2_within
AUD	-0.0614***	10.1942***	-5.5983***	0.9575	-0.3848*	0.0172**	955	0.2125
	(0.0178)	(2.2184)	(0.7563)	(1.3342)	(0.2207)	(0.0075)		
CAD	-0.0430***	0.7942	-6.9043***	1.4441	0.5067**	0.0036	399	0.2058
	(0.0162)	(2.2663)	(1.0756)	(1.3637)	(0.2448)	(0.0040)		
EUR	-0.0574***	2.2288	-6.0698***	2.6641***	-0.0724	-0.0150***	966	0.1880
	(0.0129)	(1.5516)	(0.5769)	(0.9624)	(0.1899)	(0.0040)		
JPY	-0.0628***	4.7410	-9.8144***	2.2184	0.0849	0.2869***	966	0.2399
	(0.0207)	(3.1073)	(1.1420)	(1.8900)	(0.2967)	(0.0942)		
NZD	-0.0689***	4.7585*	-5.8371***	2.1691	0.3667	0.0071	943	0.1614
	(0.0183)	(2.5898)	(0.9655)	(1.4758)	(0.2705)	(0.0105)		
NOK	-0.0591***	-1.0564	-5.2035***	3.0798***	-0.1318	0.1150***	966	0.1428
	(0.0142)	(1.9423)	(0.7147)	(1.1881)	(0.2220)	(0.0283)		
SEK	-0.0686***	3.2242*	-4.2413***	1.5259	-0.0595	0.1363***	966	0.1259
	(0.0142)	(1.7932)	(0.6633)	(1.0912)	(0.2006)	(0.0284)		
CHF	-0.0425***	2.6141	-0.1369	1.8040	0.1082	-0.0028	888	0.0284
	(0.0155)	(2.2824)	(0.9769)	(1.3189)	(0.2288)	(0.0030)		
GBP	-0.0588***	1.0319	-5.8955***	1.8902	-0.2035	-0.0252***	966	0.1623
	(0.0168)	(2.2302)	(0.8311)	(1.3320)	(0.2462)	(0.0077)		
USD	-0.0601***	5.1038**	-8.7622***	-0.3906	0.1390	-0.1176***	813	0.2539
	(0.0189)	(2.1210)	(0.9109)	(1.3654)	(0.2646)	(0.0377)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l_{j,t}^R$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}_{j,t}^R$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta+l^R)_{j,t}$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta(\eta+l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta+l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta(\eta+l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta+l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0551***	-4.1786***	-6.5414***	-0.0379	-0.2985	0.0139*	955	0.2188
	(0.0176)	(0.9546)	(0.8533)	(0.6497)	(0.2300)	(0.0077)		
CAD	-0.0372**	-5.2590***	-8.1842***	-0.4818	0.5854**	0.0032	399	0.2525
	(0.0153)	(1.2234)	(1.1341)	(0.7696)	(0.2540)	(0.0040)		
EUR	-0.0436***	-3.7517***	-7.3482***	0.4040	-0.0345	-0.0115***	966	0.2292
	(0.0121)	(0.6175)	(0.6022)	(0.4191)	(0.1828)	(0.0041)		
JPY	-0.0675***	-4.6016***	-11.1431***	2.2662***	-0.0091	0.3209***	966	0.3131
	(0.0191)	(1.1404)	(1.1224)	(0.7924)	(0.2804)	(0.0873)		
NZD	-0.0516***	-5.2227***	-7.4423***	0.9851	0.3715	0.0021	943	0.2646
	(0.0165)	(0.9141)	(0.9256)	(0.6567)	(0.2517)	(0.0098)		
NOK	-0.0495***	-4.7408***	-7.7634***	0.9719**	-0.1401	0.0965***	966	0.2571
	(0.0124)	(0.6618)	(0.7101)	(0.4345)	(0.1942)	(0.0246)		
SEK	-0.0596***	-4.2090***	-6.1225***	-0.1391	-0.0442	0.1178***	966	0.1819
	(0.0133)	(0.6766)	(0.7035)	(0.4571)	(0.1956)	(0.0267)		
CHF	-0.0388***	-1.5085	-0.5730	0.0520	0.1303	-0.0023	888	0.0312
	(0.0147)	(1.0673)	(1.0133)	(0.6200)	(0.2325)	(0.0047)		
GBP	-0.0536***	-3.3666***	-7.8781***	0.9942*	-0.2251	-0.0225***	966	0.2044
	(0.0157)	(0.8659)	(0.8614)	(0.5777)	(0.2359)	(0.0072)		
USD	-0.0658***	-4.6510***	-9.5203***	-0.8913	0.0951	-0.1279***	813	0.2957
	(0.0177)	(0.8523)	(0.9201)	(0.5739)	(0.2574)	(0.0353)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\eta - \tau)_{j,t}$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta(\eta - \tau)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4 (\eta - \tau)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta(\eta - \tau)_{j,t}$	$\Delta i^R_{j,t}$	$(\eta - \tau)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0257***	-5.6745***	-5.5987***	0.6116	-0.2746**	0.0116***	2028	0.1909
	(0.0089)	(0.7806)	(0.5354)	(0.4041)	(0.1068)	(0.0044)		
CAD	-0.0344***	-3.6676***	-6.2024***	0.6432*	-0.2459**	0.0069***	1836	0.1793
	(0.0081)	(0.7464)	(0.5413)	(0.3780)	(0.1083)	(0.0026)		
EUR	-0.0238***	-3.4722***	-4.9982***	0.1845	-0.1411	-0.0049**	2028	0.1207
	(0.0069)	(0.5779)	(0.4158)	(0.2977)	(0.0904)	(0.0022)		
JPY	-0.0320***	-4.2433***	-6.0675***	1.6479***	-0.0801	0.1527***	2028	0.1383
	(0.0110)	(1.0243)	(0.7676)	(0.5408)	(0.1202)	(0.0510)		
NZD	-0.0223**	-6.0083***	-5.8285***	0.3361	-0.0618	0.0094	2028	0.1650
	(0.0099)	(0.8126)	(0.6323)	(0.4059)	(0.1244)	(0.0064)		
NOK	-0.0220***	-2.8769***	-4.3672***	0.3995	-0.1573	0.0438***	2028	0.1223
	(0.0080)	(0.6512)	(0.4988)	(0.3790)	(0.0995)	(0.0160)		
SEK	-0.0278***	-4.1445***	-4.4416***	-0.1737	-0.0930	0.0567***	2028	0.1139
	(0.0075)	(0.6445)	(0.4752)	(0.3468)	(0.1014)	(0.0153)		
CHF	-0.0170**	-3.0973***	-3.0510***	0.5991	-0.2264**	0.0005	2028	0.0538
	(0.0076)	(0.7749)	(0.5543)	(0.3922)	(0.1044)	(0.0026)		
GBP	-0.0233***	-4.0538***	-5.3340***	0.6145	-0.3150***	-0.0091**	2028	0.1337
	(0.0076)	(0.7357)	(0.5245)	(0.3912)	(0.1005)	(0.0037)		
USD	-0.0163*	-6.0164***	-4.7338***	-1.1285***	-0.0252	-0.0334*	2028	0.1342
	(0.0085)	(0.8445)	(0.5995)	(0.4304)	(0.1122)	(0.0174)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 3B – full table of table 3B for $(\tau - l^R)_{j,t}$ with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta(\tau - l^R)_{j,t} + \beta_3 \Delta i^R_{j,t} + \beta_4(\tau - l^R)_{j,t-1} + \beta_5 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta(\tau - l^R)_{j,t}$	$\Delta i^R_{j,t}$	$(\tau - l^R)_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_within
AUD	-0.0599***	-4.7368***	-5.7959***	-1.2388	-0.4624*	0.0197**	955	0.2044
	(0.0181)	(1.3034)	(0.7928)	(0.8795)	(0.2404)	(0.0083)		
CAD	-0.0515***	-1.8440	-6.8437***	-1.8067**	0.3296	0.0027	399	0.2268
	(0.0165)	(1.4316)	(1.0629)	(0.7791)	(0.2480)	(0.0039)		
EUR	-0.0550***	-2.4649***	-5.6618***	-1.6118***	-0.1652	-0.0201***	966	0.1974
	(0.0125)	(0.8134)	(0.5728)	(0.5410)	(0.1884)	(0.0046)		
JPY	-0.0551***	-6.2777***	-9.9786***	-0.1479	0.0977	0.2521***	966	0.2704
	(0.0202)	(1.6417)	(1.1176)	(1.1036)	(0.3042)	(0.0909)		
NZD	-0.0584***	-5.3074***	-6.2658***	-0.8499	0.2932	0.0079	943	0.1937
	(0.0180)	(1.3752)	(0.9475)	(0.9518)	(0.2697)	(0.0105)		
NOK	-0.0482***	-3.4671***	-5.1417***	-1.5500**	-0.1634	0.0904***	966	0.1448
	(0.0138)	(1.0796)	(0.7270)	(0.7325)	(0.2256)	(0.0269)		
SEK	-0.0679***	-3.7679***	-4.1573***	-1.3394**	-0.1408	0.1316***	966	0.1427
	(0.0138)	(0.9892)	(0.6611)	(0.6441)	(0.1999)	(0.0274)		
CHF	-0.0384***	-2.1231	0.1012	-0.5429	0.1039	-0.0041	888	0.0298
	(0.0148)	(1.4497)	(0.9858)	(0.8548)	(0.2290)	(0.0040)		
GBP	-0.0568***	-0.6345	-5.8886***	-0.4046	-0.2362	-0.0242***	966	0.1589
	(0.0163)	(1.2057)	(0.8416)	(0.7701)	(0.2549)	(0.0077)		
USD	-0.0631***	-4.7205***	-8.5966***	-0.5507	0.0471	-0.1224***	813	0.2715
	(0.0185)	(1.1673)	(0.9027)	(0.8431)	(0.2630)	(0.0367)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $l^R_{j,t}$ is a measure of home minus foreign default risk, $\lambda_{j,t}$ is a measure of the treasury liquidity after adjusting for derivative market friction and default risk, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12. Regressions involving default risk $\hat{l}^R_{j,t}$ are only estimated through 2008M1-2017M12 period.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4A – full table of table 4A with real exchange rates on both sides of regressions

IV Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2(\Delta \eta_{j,t}^{IV}) + \beta_3(\Delta i_{j,t}^{R}) + \beta_4(\eta_{j,t-1}^{IV}) + \beta_5(i_{j,t-1}^{R}) + u_{j,t}$

	$q_{j,t-1}$	$\Delta \eta_{j,t}^{IV}$	$\eta_{j,t-1}^{IV}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	constant	N
AUD	-0.0188**	-16.9494***	-2.1130	-8.7934***	-0.1285	0.0083*	1974
	(0.0085)	(3.9392)	(2.2485)	(1.2089)	(0.1578)	(0.0047)	
CAD	-0.0263***	-5.9707	1.3475	-5.8983***	-0.2849***	0.0087**	1974
	(0.0071)	(3.8570)	(1.3527)	(0.9113)	(0.1045)	(0.0043)	
EUR	-0.0252***	3.9389	-0.0278	-3.6544***	-0.2191**	-0.0062	1890
	(0.0074)	(4.4194)	(1.8096)	(1)	(0.1064)	(0.0049)	
JPY	-0.0394***	-9.8198***	2.2023	-7.5643***	-0.1272	0.1928***	1974
	(0.0113)	(2.5906)	(1.8195)	(0.8694)	(0.1253)	(0.0567)	
NZD	-0.0228***	-7.4363**	1.4009*	-7.1435***	-0.1589	0.0107*	1974
	(0.0086)	(3.0545)	(0.8084)	(1.5292)	(0.1258)	(0.0060)	
NOK	-0.0269***	-3.3250**	2.3594**	-5.5000***	-0.3232**	0.0595***	1890
	(0.0084)	(1.4726)	(1.0331)	(0.6697)	(0.1265)	(0.0184)	
SEK	-0.0164**	-10.2930***	-0.7042	-6.4207***	-0.0810	0.0321**	1974
	(0.0070)	(2.6379)	(0.7724)	(0.9825)	(0.1106)	(0.0150)	
CHF	-0.0231***	0.6916	2.6045***	-2.2478***	-0.1766*	0.0126**	1974
	(0.0074)	(2.2780)	(0.8053)	(0.8337)	(0.1054)	(0.0051)	
GBP	-0.0293***	-1.8175	4.5890**	-6.2075***	-0.4882***	-0.0070*	1890
	(0.0088)	(3.2408)	(2.1108)	(1.2788)	(0.1352)	(0.0037)	
USD	-0.0124*	-10.0589***	-4.2861***	-5.0548***	0.0717	-0.0181	1974
	(0.0072)	(2.3512)	(0.9456)	(0.7891)	(0.1166)	(0.0149)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4A – full table of table 4A with nominal exchange rates on both sides of regressions

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2(\Delta\eta_{j,t}^{IV}) + \beta_3(\Delta i_{j,t}^R) + \beta_4(\eta_{j,t-1}^{IV}) + \beta_5(i_{j,t-1}^R) + u_{j,t}$

	$s_{j,t-1}$	$\Delta\eta_{j,t}^{IV}$	$\eta_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N
AUD	-0.0197*	-17.6450***	-2.7378	-8.8706***	-0.0927	0.0081*	1974
	(0.0103)	(3.8627)	(2.3466)	(1.2036)	(0.1449)	(0.0048)	
CAD	-0.0276***	-6.7310*	1.2273	-6.0501***	-0.2496***	0.0084**	1974
	(0.0078)	(3.7894)	(1.3153)	(0.8932)	(0.0941)	(0.0039)	
EUR	-0.0300***	3.3946	0.4917	-3.7973***	-0.2048**	-0.0056	1890
	(0.0078)	(4.4416)	(2.0098)	(0.9959)	(0.0972)	(0.0058)	
JPY	-0.0331***	-11.0226***	0.6570	-7.5189***	-0.0033	0.1577***	1974
	(0.0111)	(2.6292)	(1.7322)	(0.8835)	(0.1179)	(0.0527)	
NZD	-0.0153	-7.0085**	1.4809*	-6.9377***	-0.1220	0.0069	1974
	(0.0101)	(3.0352)	(0.8198)	(1.5219)	(0.1171)	(0.0064)	
NOK	-0.0307***	-3.2727**	2.1447**	-5.3318***	-0.2958***	0.0660***	1890
	(0.0086)	(1.4317)	(0.9613)	(0.6503)	(0.1141)	(0.0180)	
SEK	-0.0228***	-9.7286***	-0.6001	-6.2683***	-0.1069	0.0458***	1974
	(0.0077)	(2.5804)	(0.7620)	(0.9641)	(0.1031)	(0.0161)	
CHF	-0.0306***	-0.0270	2.2601***	-2.3517***	-0.1609*	0.0130***	1974
	(0.0083)	(2.2419)	(0.7262)	(0.8229)	(0.0971)	(0.0047)	
GBP	-0.0328***	-0.9711	6.0046***	-5.9836***	-0.4370***	-0.0082*	1890
	(0.0087)	(3.3489)	(2.1903)	(1.2956)	(0.1153)	(0.0043)	
USD	-0.0191**	-9.1545***	-3.7740***	-4.8166***	0.0148	-0.0331*	1974
	(0.0086)	(2.3326)	(1.0027)	(0.7873)	(0.1134)	(0.0175)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\eta_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4B – full table of table 4B with real exchange rates on both sides of regressions

IV Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2 \Delta\lambda_{j,t}^{IV} + \beta_3 \Delta i_{j,t}^R + \beta_4 \Delta\tau_{j,t} + \beta_5 \lambda_{j,t-1}^{IV} + \beta_6 i_{j,t-1}^R + \beta_7 \tau_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	constant	N
AUD	-0.0119	-24.6697***	-4.1232	-8.0341***	-3.0484	-9.8431***	0.1100	0.0021	1950
	(0.0093)	(4.9702)	(3.2542)	(2.0796)	(1.9777)	(1.2920)	(0.2588)	(0.0065)	
CAD	-0.0309***	2.3048	0.6215	-3.6721**	-0.4405	-5.0195***	-0.3887***	0.0068*	1797
	(0.0081)	(6.2203)	(1.2962)	(1.6701)	(1.2817)	(1.2548)	(0.1377)	(0.0040)	
EUR	-0.0168**	-13.1441***	-1.0358	-8.1550***	-1.4654	-7.4239***	-0.1726	-0.0079**	1879
	(0.0069)	(4.9583)	(1.2630)	(2.0125)	(1.2382)	(1.3075)	(0.1060)	(0.0037)	
JPY	-0.0426***	-12.1202***	2.8877	-4.6374***	2.5610*	-8.0469***	-0.1551	0.2104***	1950
	(0.0110)	(3.9033)	(1.9346)	(1.7097)	(1.3099)	(1.0575)	(0.1573)	(0.0533)	
NZD	-0.0253***	-5.4835*	1.4853*	-5.3057***	0.5301	-6.3191***	-0.2318*	0.0137**	1950
	(0.0082)	(3.3314)	(0.8003)	(1.4833)	(0.9825)	(1.5625)	(0.1336)	(0.0058)	
NOK	-0.0257***	-3.5471**	2.4267**	-5.0639***	1.8324*	-5.6316***	-0.3553***	0.0565***	1879
	(0.0081)	(1.4637)	(1.0310)	(1.3250)	(1.0234)	(0.6542)	(0.1359)	(0.0175)	
SEK	-0.0172**	-9.2160***	-0.6237	-5.8000***	-0.7483	-6.0396***	-0.0667	0.0336**	1950
	(0.0069)	(2.9531)	(0.6991)	(1.1303)	(0.7248)	(1.0303)	(0.1199)	(0.0148)	
CHF	-0.0179**	-2.2156	2.4307***	-0.8884	1.3830*	-3.1328**	-0.2029*	0.0090*	1950
	(0.0071)	(3.6863)	(0.8555)	(1.2495)	(0.8240)	(1.2275)	(0.1202)	(0.0047)	
GBP	-0.0240***	-12.5547***	3.9070**	-2.4798	3.7504**	-9.7440***	-0.4108***	-0.0058	1879
	(0.0088)	(4.5072)	(1.7893)	(1.5581)	(1.6111)	(1.6839)	(0.1553)	(0.0041)	
USD	-0.0127*	-14.5776***	-4.5484***	-8.1210***	-2.1308**	-6.0207***	0.1832	-0.0227	1950
	(0.0075)	(3.2136)	(1.1178)	(1.2765)	(0.8800)	(0.9322)	(0.1414)	(0.0158)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test

Robustness of table 4B – full table of table 4B with nominal exchange rates on both sides of regressions

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta \lambda_{j,t}^{IV} + \beta_3 \Delta i_{j,t}^{R} + \beta_4 \Delta \tau_{j,t} + \beta_5 \lambda_{j,t-1}^{IV} + \beta_6 i_{j,t-1}^{R} + \beta_7 \tau_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta i_{j,t}^{R}$	$i_{j,t-1}^{R}$	constant	N
AUD	-0.0135	-24.6326***	-3.5395	-8.0307***	-2.9879	-9.8565***	0.0639	0.0032	1950
	(0.0105)	(4.9372)	(3.3014)	(2.0342)	(1.9771)	(1.2835)	(0.2526)	(0.0066)	
CAD	-0.0391***	2.7476	0.4849	-3.9604**	-0.7178	-4.9393***	-0.3852***	0.0078**	1797
	(0.0091)	(6.1382)	(1.2380)	(1.6297)	(1.2153)	(1.2363)	(0.1307)	(0.0037)	
EUR	-0.0240***	-13.2605***	-1.0566	-8.3051***	-1.5709	-7.4234***	-0.1828*	-0.0092**	1879
	(0.0075)	(4.9543)	(1.3468)	(2.0042)	(1.2975)	(1.3085)	(0.1027)	(0.0041)	
JPY	-0.0354***	-13.5375***	1.3435	-5.3485***	1.2643	-8.0324***	0.0100	0.1723***	1950
	(0.0112)	(3.9665)	(1.8866)	(1.7208)	(1.2715)	(1.0705)	(0.1462)	(0.0523)	
NZD	-0.0244***	-5.1467	1.4430*	-5.3664***	0.0736	-6.1438***	-0.2353*	0.0140**	1950
	(0.0095)	(3.2770)	(0.8008)	(1.4530)	(0.9697)	(1.5383)	(0.1285)	(0.0063)	
NOK	-0.0299***	-3.3749**	2.2177**	-4.8272***	1.4324	-5.4131***	-0.3384***	0.0635***	1879
	(0.0084)	(1.4259)	(0.9723)	(1.2856)	(0.9188)	(0.6361)	(0.1283)	(0.0172)	
SEK	-0.0244***	-8.6838***	-0.5003	-5.7771***	-1.1379*	-5.8709***	-0.1211	0.0480***	1950
	(0.0079)	(2.8942)	(0.6923)	(1.1014)	(0.6905)	(1.0123)	(0.1176)	(0.0162)	
CHF	-0.0252***	-3.2948	2.2833***	-0.9160	0.9877	-3.3957***	-0.2131*	0.0100**	1950
	(0.0080)	(3.6583)	(0.8287)	(1.2256)	(0.7537)	(1.2187)	(0.1170)	(0.0044)	
GBP	-0.0271***	-13.1141***	4.4749**	-2.3910	3.9832**	-9.8244***	-0.3819***	-0.0076	1879
	(0.0091)	(4.5474)	(1.8423)	(1.5739)	(1.6064)	(1.6907)	(0.1480)	(0.0047)	
USD	-0.0166*	-13.2471***	-3.9538***	-7.7129***	-1.9305**	-5.7155***	0.1168	-0.0314*	1950
	(0.0088)	(3.1756)	(1.1580)	(1.2512)	(0.8926)	(0.9286)	(0.1422)	(0.0178)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^{R}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4C – full table of table 4C with real exchange rates on both sides of regressions

IV Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2\Delta\lambda_{j,t}^{IV} + \beta_3\Delta\tau_{j,t} + \beta_4\Delta l_{j,t}^R + \beta_5\Delta i_{j,t}^R + \beta_6\lambda_{j,t-1}^{IV} + \beta_7\tau_{j,t-1} + \beta_8 l_{j,t-1}^R + \beta_9 i_{j,t-1}^R + u_{j,t}$

	$q_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta l_{j,t}^R$	$l_{j,t-1}^R$	constant	N
AUD	-0.0468***	-12.6984***	-0.0774	-8.4784***	-0.3514	-3.6134**	0.2533	17.5882***	-0.8276	0.0143	919
	(0.0173)	(4.2449)	(2.0610)	(1.1609)	(0.2976)	(1.7118)	(1.5832)	(3.9735)	(2.3889)	(0.0093)	
CAD	-0.0304*	-19.6128*	-2.0326	-11.9151***	0.5462	-10.7661***	-4.5744**	17.4561*	0.2257	-0.0010	363
	(0.0177)	(10.2209)	(2.9105)	(2.7118)	(0.4180)	(4.0252)	(2.1178)	(9.2865)	(3.3491)	(0.0067)	
EUR	-0.0470***	-11.7576***	-0.0487	-9.9020***	-0.1167	-5.0773***	-0.3770	13.7949***	2.2913	-0.0147***	930
	(0.0121)	(4.3731)	(1.3878)	(1.5569)	(0.1866)	(1.4215)	(1.2634)	(4.8971)	(1.6776)	(0.0057)	
JPY	-0.0635***	-9.2416**	3.5935*	-11.8006***	-0.1687	-3.2785	3.9180**	11.9352***	-1.1379	0.3073***	930
	(0.0181)	(4.1736)	(2.1201)	(1.3927)	(0.3346)	(1.9946)	(1.6619)	(4.5872)	(2.6286)	(0.0826)	
NZD	-0.0408***	-8.5899***	2.8811**	-8.3645***	0.0984	-5.5862***	1.5735	12.6553***	-1.4675	0.0061	907
	(0.0148)	(3.0672)	(1.3681)	(1.0974)	(0.2799)	(1.5374)	(1.3908)	(3.9433)	(1.7122)	(0.0098)	
NOK	-0.0424***	-4.9438***	-0.5201	-7.5413***	-0.1837	-6.0795***	-0.2884	4.0680*	3.2919*	0.0836***	930
	(0.0116)	(1.3759)	(0.9654)	(0.9710)	(0.2088)	(1.2956)	(1.1248)	(2.3067)	(1.7026)	(0.0233)	
SEK	-0.0425***	-10.3108***	-0.3786	-7.7378***	0.0100	-4.0136***	-0.6754	11.6648***	-0.3609	0.0814***	930
	(0.0123)	(3.4979)	(0.8156)	(1.3675)	(0.2270)	(1.2531)	(0.9587)	(3.6930)	(1.3702)	(0.0248)	
CHF	-0.0257*	13.7126**	-0.1098	4.4750**	-0.0322	-4.9585**	0.1530	-10.8390*	1.7968	-0.0054	852
	(0.0135)	(5.3526)	(1.2977)	(2.0365)	(0.2968)	(2.2019)	(1.2884)	(5.6121)	(1.9965)	(0.0075)	
GBP	-0.0411***	-12.5672***	1.4199	-12.3670***	-0.0417	-0.9781	3.3151**	10.3152**	-0.3886	-0.0139*	930
	(0.0157)	(4.2420)	(1.7972)	(2.0640)	(0.2554)	(1.5238)	(1.5541)	(4.0682)	(2.2855)	(0.0075)	
USD	-0.0571***	-19.8062***	-2.0055	-12.8908***	0.0114	-2.2209	1.6242	21.7824***	2.5564	-0.1169***	777
	(0.0160)	(3.5534)	(1.2812)	(1.2760)	(0.2495)	(1.4498)	(1.1614)	(3.5511)	(1.7118)	(0.0320)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 4C – full table of table 4C with nominal exchange rates on both sides of regressions

IV Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2 \Delta\lambda_{j,t}^{IV} + \beta_3 \Delta\tau_{j,t} + \beta_4 \Delta l_{j,t}^R + \beta_5 \Delta i_{j,t}^R + \beta_6 \lambda_{j,t-1}^{IV} + \beta_7 \tau_{j,t-1} + \beta_8 l_{j,t-1}^R + \beta_9 i_{j,t-1}^R + u_{j,t}$

	$s_{j,t-1}$	$\Delta\lambda_{j,t}^{IV}$	$\lambda_{j,t-1}^{IV}$	$\Delta i_{j,t}^R$	$i_{j,t-1}^R$	$\Delta\tau_{j,t}$	$\tau_{j,t-1}$	$\Delta l_{j,t}^R$	$l_{j,t-1}^R$	constant	N
AUD	-0.0538***	-12.6844***	0.9082	-8.3348***	-0.4198	-3.3232**	0.5467	18.0129***	-1.3161	0.0157*	919
	(0.0182)	(4.1600)	(1.9757)	(1.1411)	(0.2928)	(1.6754)	(1.5415)	(3.9067)	(2.3200)	(0.0092)	
CAD	-0.0344*	-20.9739**	-2.0834	-11.7061***	0.5739	-11.4445***	-4.2914**	19.2211**	0.2320	0.0001	363
	(0.0203)	(9.0602)	(2.6896)	(2.3981)	(0.4024)	(3.6682)	(1.9059)	(8.2626)	(3.0563)	(0.0065)	
EUR	-0.0588***	-11.0246**	0.3400	-9.6135***	-0.1723	-4.9192***	-0.1461	13.7601***	2.2903	-0.0164***	930
	(0.0134)	(4.3460)	(1.3138)	(1.5439)	(0.1890)	(1.4029)	(1.2333)	(4.8764)	(1.6370)	(0.0058)	
JPY	-0.0699***	-10.1198**	3.8777*	-11.8162***	-0.1521	-3.2763*	3.5187**	12.9353***	-1.3067	0.3387***	930
	(0.0198)	(4.1945)	(2.1256)	(1.4016)	(0.3449)	(1.9897)	(1.6469)	(4.6090)	(2.6259)	(0.0905)	
NZD	-0.0428**	-8.4859***	2.9228**	-8.3856***	0.0918	-5.5156***	1.4837	12.7015***	-1.5764	0.0071	907
	(0.0168)	(3.0205)	(1.3745)	(1.0832)	(0.2747)	(1.5171)	(1.3880)	(3.8978)	(1.7383)	(0.0101)	
NOK	-0.0590***	-4.4980***	-0.3959	-7.2974***	-0.2600	-5.9084***	-0.4694	4.0141*	3.3335**	0.1153***	930
	(0.0133)	(1.3465)	(0.9469)	(0.9521)	(0.2113)	(1.2683)	(1.0983)	(2.2721)	(1.6861)	(0.0265)	
SEK	-0.0595***	-10.8048***	-0.4352	-7.8516***	-0.1081	-3.8804***	-0.9498	12.2850***	-0.0060	0.1159***	930
	(0.0141)	(3.3925)	(0.8026)	(1.3342)	(0.2238)	(1.2302)	(0.9418)	(3.5970)	(1.3506)	(0.0284)	
CHF	-0.0491***	13.5475**	-0.2830	4.5878**	-0.0930	-4.7855**	-0.1490	-10.2838*	2.3589	-0.0049	852
	(0.0169)	(5.3098)	(1.2901)	(2.0186)	(0.2939)	(2.1784)	(1.2658)	(5.5546)	(1.9969)	(0.0074)	
GBP	-0.0493***	-12.6585***	1.7311	-12.2721***	-0.1038	-0.9247	3.3012**	10.3548**	-0.5556	-0.0186**	930
	(0.0178)	(4.2616)	(1.7779)	(2.0713)	(0.2551)	(1.5237)	(1.5695)	(4.0891)	(2.3083)	(0.0086)	
USD	-0.0631***	-18.6096***	-1.1405	-12.6401***	-0.1127	-2.0216	1.6244	20.5667***	1.7123	-0.1295***	777
	(0.0169)	(3.4468)	(1.2067)	(1.2408)	(0.2529)	(1.3974)	(1.1302)	(3.4551)	(1.6271)	(0.0338)	

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\lambda_{j,t}^{IV}$ is a measure of the treasury liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 2008M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 5 – full table of table 5 with real exchange rates on both sides of regressions

Estimation result of $\Delta q_{j,t} = \alpha_j + \beta_1 q_{j,t-1} + \beta_2\Delta\tau_{j,t} + \beta_3\Delta\gamma_t + \beta_4\Delta\gamma^*_{j,t} + \beta_5\Delta i^R_{j,t} + \beta_6\gamma_{t-1} + \beta_7\gamma^*_{j,t-1} + \beta_8 i^R_{j,t-1} + u_{j,t}$

	$q_{j,t-1}$	$\Delta\gamma^*_{j,t}$	$\Delta\gamma_t$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\gamma^*_{j,t-1}$	γ_{t-1}	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2 within
AUD	-0.0267***	5.4282***	-6.7391***	-2.8717**	-5.8718***	-0.2414	0.5035	-0.2808	-0.2951***	0.0115**	2019	0.2134
	(0.0073)	(0.6989)	(1.2378)	(1.2348)	(0.5490)	(0.3771)	(0.6155)	(0.7812)	(0.1134)	(0.0047)		
CAD	-0.0261***	4.5638***	-6.3743***	-5.1167***	-6.2022***	-0.5507	-0.4400	-0.4321	-0.2823**	0.0074**	1834	0.1974
	(0.0069)	(0.7008)	(2.0361)	(1.1584)	(0.5404)	(0.4096)	(1.2821)	(0.7461)	(0.1130)	(0.0036)		
EUR	-0.0172***	4.6420***	-5.2236***	-5.2164***	-5.0760***	0.0752	-0.1639	-0.5683	-0.1587*	-0.0051**	2026	0.1453
	(0.0059)	(0.5655)	(1.0935)	(0.9110)	(0.4114)	(0.3168)	(0.5350)	(0.5786)	(0.0924)	(0.0025)		
JPY	-0.0365***	4.2326***	-2.2114	-4.8667***	-6.4200***	-2.1214***	1.6876	2.0357**	-0.0885	0.1794***	2026	0.1720
	(0.0101)	(0.9895)	(5.1846)	(1.5906)	(0.7483)	(0.5748)	(2.4872)	(0.9655)	(0.1345)	(0.0474)		
NZD	-0.0297***	6.1267***	-6.9512***	-5.6387***	-6.3253***	1.0141*	0.1682	-0.8634	-0.1330	0.0095	2019	0.2154
	(0.0077)	(0.8714)	(0.9067)	(1.3022)	(0.6189)	(0.5209)	(0.4333)	(0.7846)	(0.1280)	(0.0063)		
NOK	-0.0148**	5.7564***	-3.5732***	-5.4628***	-5.2565***	-0.2195	0.7117	0.5658	-0.1556	0.0289**	2026	0.1716
	(0.0069)	(0.7496)	(0.7776)	(1.0629)	(0.5025)	(0.4231)	(0.4956)	(0.7000)	(0.1010)	(0.0144)		
SEK	-0.0193***	5.0373***	-3.6774***	-5.2317***	-4.6433***	0.5315	0.0047	-0.7085	-0.1087	0.0352***	2026	0.1359
	(0.0064)	(0.6410)	(1.2354)	(0.9998)	(0.4724)	(0.3853)	(0.4961)	(0.6489)	(0.1041)	(0.0137)		
CHF	-0.0141**	2.9468***	-2.5001	-1.3164	-3.0334***	-0.5529	1.5591	0.5841	-0.1730	-0.0002	2026	0.0536
	(0.0072)	(0.7557)	(1.9085)	(1.2066)	(0.5588)	(0.4383)	(1.1170)	(0.7692)	(0.1085)	(0.0035)		
GBP	-0.0183***	4.9239***	-3.3655***	-1.2412	-5.5986***	-0.6562	0.8722	0.5135	-0.3281***	-0.0071*	2026	0.1398
	(0.0070)	(0.7148)	(1.0952)	(1.1286)	(0.5333)	(0.4099)	(0.5923)	(0.7070)	(0.1080)	(0.0037)		
USD	-0.0118*	6.4787***	-6.1135***	-6.8490***	-5.2149***	0.2363	-2.1369***	-0.3064	-0.0037	-0.0150	2026	0.1962
	(0.0070)	(0.8114)	(1.3825)	(1.2181)	(0.5828)	(0.4571)	(0.5777)	(0.7439)	(0.1118)	(0.0147)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $\gamma^*_{j,t}$ is a measure of foreign treasury liquidity, $\gamma_{j,t}$ is a measure of the home treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

Robustness of table 5 – full table of table 5 with nominal exchange rates on both sides of regressions

Estimation result of $\Delta s_{j,t} = \alpha_j + \beta_1 s_{j,t-1} + \beta_2\Delta\tau_{j,t} + \beta_3\Delta\gamma_t + \beta_4\Delta\gamma^*_{j,t} + \beta_5\Delta i^R_{j,t} + \beta_6\gamma_{t-1} + \beta_7\gamma^*_{j,t-1} + \beta_8 i^R_{j,t-1} + u_{j,t}$

	$s_{j,t-1}$	$\Delta\gamma^*_{j,t}$	$\Delta\gamma_t$	$\Delta\tau_{j,t}$	$\Delta i^R_{j,t}$	$\gamma^*_{j,t-1}$	γ_{t-1}	$\tau_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2 within
AUD	-0.0299***	5.4375***	-6.7016***	-3.1545***	-5.7743***	-0.1259	0.5188	-1.0400	-0.3189***	0.0125***	2028	0.2030
	(0.0084)	(0.6838)	(1.2095)	(1.2018)	(0.5372)	(0.3661)	(0.6014)	(0.7299)	(0.1091)	(0.0048)		
CAD	-0.0351***	4.4677***	-6.0910***	-5.4676***	-6.1643***	-0.5081	-0.4865	-0.6167	-0.2873***	0.0088**	1836	0.2103
	(0.0079)	(0.6848)	(1.9728)	(1.1210)	(0.5256)	(0.3981)	(1.2421)	(0.7133)	(0.1094)	(0.0036)		
EUR	-0.0233***	4.5724***	-5.0079***	-5.2792***	-4.9931***	0.0997	-0.3333	-0.8159	-0.1699*	-0.0060**	2028	0.1489
	(0.0067)	(0.5578)	(1.0918)	(0.8994)	(0.4087)	(0.3111)	(0.5275)	(0.5534)	(0.0909)	(0.0026)		
JPY	-0.0312***	4.3278***	-1.8465	-5.1748***	-6.2563***	-1.8910***	2.0154	1.3894	0.0227	0.1539***	2028	0.1658
	(0.0110)	(0.9917)	(5.2345)	(1.5931)	(0.7537)	(0.5734)	(2.5487)	(0.9522)	(0.1263)	(0.0500)		
NZD	-0.0323***	6.1592***	-6.8200***	-5.9324***	-6.2455***	1.1145**	0.1224	-1.5591**	-0.1537	0.0115*	2028	0.2079
	(0.0088)	(0.8596)	(0.8971)	(1.2849)	(0.6129)	(0.5014)	(0.4244)	(0.7484)	(0.1233)	(0.0065)		
NOK	-0.0194**	5.6143***	-3.3276***	-5.1365***	-5.0536***	-0.1630	0.5877	0.3513	-0.1532	0.0377**	2028	0.1641
	(0.0076)	(0.7350)	(0.7594)	(1.0344)	(0.4915)	(0.4139)	(0.4826)	(0.6593)	(0.0974)	(0.0154)		
SEK	-0.0269***	4.7323***	-3.9786***	-5.2370***	-4.5729***	0.4500	-0.0859	-1.1534*	-0.1555	0.0512***	2028	0.1364
	(0.0072)	(0.6304)	(1.2187)	(0.9822)	(0.4657)	(0.3788)	(0.4877)	(0.6201)	(0.1021)	(0.0149)		
CHF	-0.0230***	3.0804***	-2.6574	-1.3391	-3.0266***	-0.5239	1.6395	0.3283	-0.1956*	0.0015	2028	0.0591
	(0.0080)	(0.7448)	(1.8807)	(1.1845)	(0.5513)	(0.4299)	(1.0763)	(0.7316)	(0.1059)	(0.0034)		
GBP	-0.0228***	4.7660***	-3.7016***	-1.3531	-5.4467***	-0.6326	0.8127	0.2650	-0.3138***	-0.0094**	2028	0.1379
	(0.0077)	(0.7056)	(1.0830)	(1.1105)	(0.5271)	(0.4016)	(0.5879)	(0.6854)	(0.1048)	(0.0041)		
USD	-0.0148*	6.2155***	-5.8200***	-6.6182***	-5.0111***	0.1152	-1.9332***	-0.2274	-0.0298	-0.0221	2028	0.1875
	(0.0081)	(0.8046)	(1.3724)	(1.1985)	(0.5778)	(0.4512)	(0.5733)	(0.7132)	(0.1114)	(0.0166)		

The table reports the OLS estimates of the coefficient of the panel fixed effect regression listed above. The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a regression estimation using the first column currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. $\tau_{j,t}$ is a measure of currency derivative friction, $\gamma^*_{j,t}$ is a measure of foreign treasury liquidity, $\gamma_{j,t}$ is a measure of the home treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The sample period is 1999M1-2017M12.

Standard errors in parentheses are standard errors adjusted for cross-sectional correlation. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

vii) regression tables of country by country regressions

$$\Delta s_t = \alpha + \beta_1 q_{t-1} + \beta_2 \Delta \eta_t + \beta_3 \Delta i_t^R + \beta_4 \eta_{t-1} + \beta_5 i_{t-1}^R + u_t$$

The first country is foreign country and the second country is home country

Full sample regressions

	$q_{j,t-1}$	$\Delta \eta_{j,t}$	$\Delta i_{j,t}^R$	$\eta_{j,t-1}$	$i_{j,t-1}^R$	constant	N	R2_adjusted
AUDCAD	-0.0674***	-5.1977***	-4.9839***	0.4442	-0.2702*	0.0060*	228	0.2304
	(0.0238)	(1.2719)	(0.6967)	(0.9489)	(0.1546)	(0.0035)		
AUDDEM	-0.0368*	-6.4516***	-5.1513***	-1.2369	-0.3213	0.0261**	228	0.1682
	(0.0200)	(1.3697)	(0.8765)	(1.0437)	(0.2176)	(0.0112)		
AUDJPY	-0.1160***	-5.2592***	-9.2078***	3.0900***	-0.3998*	-0.5208***	228	0.3342
	(0.0245)	(1.5062)	(1.0226)	(1.0712)	(0.2296)	(0.1046)		
AUDNZD	-0.0249	-6.7055***	-6.1856***	-0.0832	-0.1128	-0.0041	228	0.3011
	(0.0171)	(0.8065)	(0.6610)	(0.4691)	(0.1944)	(0.0033)		
AUDNOK	-0.0252	-3.6025***	-5.1689***	-0.0226	-0.1652	-0.0413	228	0.1637
	(0.0193)	(1.1561)	(0.7851)	(0.7725)	(0.1461)	(0.0325)		
AUDSEK	-0.0818***	-3.6198***	-3.8200***	0.6062	-0.2086	-0.1458***	228	0.1219
	(0.0286)	(1.2070)	(0.8353)	(0.8106)	(0.1886)	(0.0517)		
AUDCHF	-0.0182	-2.5989**	-3.7065***	1.0778	-0.3547	0.0074	228	0.0726
	(0.0116)	(1.1996)	(0.9659)	(0.7426)	(0.2637)	(0.0098)		
AUDGBP	-0.0442***	-5.5490***	-6.3352***	-0.6464	-0.7150***	0.0419***	228	0.1711
	(0.0168)	(1.4200)	(0.9958)	(1.3513)	(0.2557)	(0.0155)		
AUDUSD	-0.0252*	-9.9847***	-5.8320***	-2.7425**	-0.0893	0.0085	228	0.2408
	(0.0135)	(1.6060)	(0.9048)	(1.3378)	(0.2039)	(0.0064)		
CADDEM	-0.0554**	-4.7185**	-5.4935***	-1.4692	-0.2847	0.0227**	228	0.1816
	(0.0243)	(2.0046)	(0.9231)	(1.6883)	(0.2189)	(0.0096)		
CADJPY	-0.0884***	-1.8407	-7.4392***	4.6344***	-0.1505	-0.4081***	228	0.2255
	(0.0238)	(1.7781)	(1.1304)	(1.5441)	(0.1903)	(0.1078)		
CADNZD	-0.0333*	-6.6695***	-6.5682***	0.5065	-0.2106	-0.0089	228	0.2620
	(0.0175)	(0.9707)	(0.8387)	(0.6097)	(0.1956)	(0.0056)		
CADNOK	-0.0432**	-2.1132	-4.9494***	1.5138*	-0.4172**	-0.0775**	228	0.1703
	(0.0194)	(1.3576)	(0.7859)	(0.8993)	(0.1633)	(0.0337)		

CADSEK	-0.0610**	-5.3958***	-4.5688***	-0.0125	-0.2260	-0.1127**	228	0.1655
	(0.0281)	(1.3538)	(0.9582)	(0.9541)	(0.1955)	(0.0520)		
CADCHF	-0.0180	-2.9179*	-4.2925***	1.1647	-0.4738*	0.0051	228	0.0803
	(0.0142)	(1.5198)	(1.1389)	(1.1590)	(0.2860)	(0.0064)		
CADGBP	-0.0397**	-2.2840*	-4.9910***	0.7890	-0.5634	0.0255**	228	0.1180
	(0.0171)	(1.3243)	(0.8928)	(1.2594)	(0.3653)	(0.0113)		
CADUSD	-0.0188**	-7.2535***	-5.7732***	-2.0422***	0.3217	-0.0028	228	0.1652
	(0.0095)	(1.5955)	(1.0768)	(0.7669)	(0.2592)	(0.0032)		
DEMJPY	-0.0679***	-1.4288	-5.3472***	8.3397***	0.2322	-0.3514***	228	0.1715
	(0.0181)	(2.3679)	(1.2447)	(2.0207)	(0.1826)	(0.0888)		
DEMNZD	-0.0553***	-6.5903***	-5.9472***	-0.0517	-0.0476	-0.0322**	228	0.2048
	(0.0202)	(1.0196)	(0.9165)	(0.5902)	(0.2632)	(0.0156)		
DEMNOK	-0.0121	-3.2592***	-5.3253***	0.2405	-0.1437	-0.0271	228	0.2005
	(0.0142)	(0.8626)	(0.7220)	(0.6360)	(0.1751)	(0.0302)		
DEMSEK	-0.0413**	-4.8647***	-3.2700***	-1.0986*	-0.2233	-0.0939**	228	0.1664
	(0.0197)	(0.9449)	(0.6662)	(0.5785)	(0.2234)	(0.0439)		
DEMGBP	-0.0167	-2.9368**	-6.6960***	0.8921	-0.4995**	0.0019	228	0.2008
	(0.0119)	(1.3973)	(0.8990)	(1.0902)	(0.2445)	(0.0036)		
DEMUSD	-0.0118	-6.9337***	-5.6550***	-3.0634***	-0.0151	-0.0109***	228	0.1955
	(0.0102)	(1.4722)	(0.9898)	(0.9267)	(0.1598)	(0.0037)		
JPYNZD	-0.0728***	-8.0616***	-8.0591***	-0.0026	-0.1162	0.3111***	228	0.2104
	(0.0231)	(1.3456)	(1.2117)	(0.9449)	(0.1938)	(0.0930)		
JPYNOK	-0.0549***	-4.1603***	-6.1797***	2.8019***	-0.2494*	0.1543***	228	0.1785
	(0.0171)	(1.2717)	(1.1279)	(0.9330)	(0.1461)	(0.0468)		
JPYSEK	-0.0798***	-3.7436*	-7.6177***	2.8282**	-0.0307	0.2214***	228	0.1768
	(0.0209)	(2.0226)	(1.2391)	(1.1132)	(0.1637)	(0.0566)		
JPYUSD	-0.0283**	-1.2824	-4.1577***	1.5302**	-0.2779*	0.1359**	228	0.0986
	(0.0124)	(1.1764)	(0.9553)	(0.7623)	(0.1477)	(0.0580)		
NZDSEK	-0.0917***	-5.0676***	-5.3837***	-0.2202	-0.0685	-0.1503***	228	0.2019
	(0.0260)	(0.8964)	(0.8259)	(0.5114)	(0.2047)	(0.0414)		
NZDUSD	-0.0146	-8.6432***	-6.3106***	-0.7943	-0.1607	0.0095	228	0.2207
	(0.0129)	(1.1345)	(1.0909)	(0.7669)	(0.2005)	(0.0082)		

NOKNZD	-0.0243	-5.7511***	-6.2049***	0.4553	-0.1695	0.0369	228	0.2056
	(0.0159)	(1.0825)	(0.8605)	(0.8251)	(0.1980)	(0.0239)		
NOKSEK	-0.0053	-3.4732***	-4.2796***	-0.2574	-0.2272	0.0017	228	0.1393
	(0.0139)	(0.7597)	(0.7201)	(0.5326)	(0.1953)	(0.0029)		
NOKUSD	-0.0130	-8.5785***	-4.1838***	-0.7852	-0.0085	0.0233	228	0.2086
	(0.0103)	(1.2337)	(0.8558)	(0.7067)	(0.1315)	(0.0200)		
SEKUSD	-0.0313***	-7.6365***	-4.5536***	-3.4799***	0.1946	0.0590**	228	0.2333
	(0.0122)	(1.1943)	(0.9418)	(0.7708)	(0.1486)	(0.0246)		
CHFDEM	-0.0292***	1.7140	0.2499	2.1966**	-0.2625	0.0111**	228	0.0276
	(0.0106)	(1.1573)	(0.8086)	(0.9039)	(0.3270)	(0.0050)		
CHFJPY	-0.0369**	-7.2543***	-0.2721	-0.1446	0.3794	-0.1730**	228	0.0593
	(0.0182)	(2.1122)	(1.3765)	(1.9150)	(0.2803)	(0.0846)		
CHFNZD	-0.0314*	-2.8115***	-3.0886***	0.7583	-0.1848	-0.0099	228	0.0458
	(0.0172)	(1.0188)	(1.0260)	(0.6085)	(0.2728)	(0.0130)		
CHFNOK	-0.0098	-1.1624	-2.6851***	0.8401	-0.1825	-0.0202	228	0.0302
	(0.0097)	(0.9128)	(0.8734)	(0.6177)	(0.2065)	(0.0195)		
CHFSEK	-0.0127	-2.0541*	-1.4801	0.0020	-0.2275	-0.0283	228	0.0027
	(0.0117)	(1.2289)	(0.9061)	(0.5572)	(0.2540)	(0.0231)		
CHFGBP	-0.0257**	1.6141	-3.1949***	1.6639*	-0.5666**	0.0117	228	0.0859
	(0.0100)	(1.3582)	(1.0628)	(0.9342)	(0.2581)	(0.0077)		
CHFUSD	-0.0029	-5.2363***	-2.8313***	-1.0467	-0.2540	-0.0095**	228	0.0938
	(0.0076)	(1.1068)	(1.0503)	(0.6928)	(0.1849)	(0.0048)		
GBPJPY	-0.0551***	-1.7169	-6.1662***	4.7555***	-0.4196*	-0.2940***	228	0.1631
	(0.0192)	(1.8059)	(1.1681)	(1.3580)	(0.2437)	(0.0955)		
GBPNZD	-0.0188	-7.7192***	-7.3608***	0.3127	-0.5196*	-0.0239*	228	0.1977
	(0.0123)	(1.1931)	(1.0396)	(0.7078)	(0.2877)	(0.0145)		
GBPNOK	-0.0310**	-3.0595***	-4.1840***	1.3742*	-0.3652**	-0.0770**	228	0.1267
	(0.0132)	(0.9710)	(0.8283)	(0.7310)	(0.1662)	(0.0323)		
GBPSEK	-0.0180	-2.5245**	-4.8259***	0.5421	-0.3664*	-0.0431	228	0.0876
	(0.0127)	(1.1666)	(1.0023)	(0.8697)	(0.2091)	(0.0315)		
GBPUSD	-0.0299**	-3.1475***	-3.5440***	-2.5393***	0.0395	-0.0159**	228	0.1121
	(0.0137)	(1.0500)	(0.8787)	(0.8441)	(0.1854)	(0.0065)		

Post 2008 regressions

	$q_{j,t-1}$	$\Delta\eta_{j,t}$	$\Delta i^R_{j,t}$	$\eta_{j,t-1}$	$i^R_{j,t-1}$	constant	N	R2_adjusted
AUDCAD	-0.0855**	-6.4235***	-6.2099***	0.2782	-0.1615	0.0030	120	0.3193
	(0.0404)	(1.9104)	(0.9486)	(1.4404)	(0.2800)	(0.0051)		
AUDDEM	-0.0589**	-6.3257***	-5.6310***	-1.1293	-1.1834***	0.0582***	120	0.2632
	(0.0260)	(1.7232)	(1.0688)	(1.1520)	(0.4251)	(0.0197)		
AUDJPY	-0.1236***	-7.3666***	-11.8359***	2.1110	-0.5612	-0.5446***	120	0.4868
	(0.0361)	(2.0447)	(1.3431)	(1.8356)	(0.3507)	(0.1557)		
AUDNZD	-0.0431	-7.3726***	-6.7146***	-0.0737	-0.4074	-0.0053	120	0.3825
	(0.0281)	(1.0914)	(0.8830)	(0.8790)	(0.3042)	(0.0044)		
AUDNOK	-0.0479	-3.2616**	-5.9159***	-0.0203	-0.3932	-0.0797	120	0.1995
	(0.0307)	(1.4731)	(1.0822)	(1.0849)	(0.4133)	(0.0536)		
AUDSEK	-0.0949**	-3.8477**	-4.5070***	1.4597	-0.7684**	-0.1581**	120	0.1769
	(0.0374)	(1.5100)	(1.0704)	(0.9548)	(0.3756)	(0.0661)		
AUDCHF	-0.0340	-3.1074**	-4.7070***	0.9027	-0.7972	0.0258	120	0.1131
	(0.0233)	(1.5233)	(1.3802)	(1.3104)	(0.5483)	(0.0225)		
AUDGBP	-0.0550**	-4.2889**	-7.8210***	-0.1258	-0.7163*	0.0458**	120	0.2421
	(0.0270)	(1.9330)	(1.3603)	(1.8885)	(0.3894)	(0.0215)		
AUDUSD	-0.0582*	-11.8603***	-9.0333***	-2.4785	-0.2666	0.0150	120	0.4067
	(0.0306)	(2.4188)	(1.3422)	(1.7510)	(0.3408)	(0.0126)		
CADDEM	-0.0617*	-7.5273***	-7.3512***	-4.9137***	0.2804	0.0269*	120	0.3675
	(0.0345)	(2.1995)	(1.0826)	(1.9003)	(0.2832)	(0.0139)		
CADJPY	-0.0965***	-2.5057	-14.3361***	4.1998**	-0.4204	-0.4397***	120	0.3835
	(0.0359)	(2.0276)	(2.0929)	(1.8563)	(0.7761)	(0.1588)		
CADNZD	-0.0645**	-7.7645***	-6.9932***	0.1637	0.4252	0.0010	120	0.4127
	(0.0263)	(1.4393)	(1.1445)	(1.0129)	(0.3567)	(0.0065)		
CADNOK	-0.1158***	-3.1091**	-6.9945***	0.8923	-0.7379*	-0.2086***	120	0.2609
	(0.0442)	(1.5634)	(1.1005)	(1.1486)	(0.4233)	(0.0803)		
CADSEK	-0.0758*	-7.4166***	-6.3493***	0.1045	0.2299	-0.1400*	120	0.2877
	(0.0407)	(1.5027)	(1.2323)	(1.0254)	(0.2826)	(0.0752)		
CADCHF	-0.0778***	-4.4524**	-5.8910***	-0.0593	2.6786**	-0.0061	120	0.1932

	(0.0293)	(1.7865)	(1.8629)	(1.4386)	(1.1063)	(0.0087)		
CADGBP	-0.0899**	-2.4709	-5.8980***	0.0522	-0.6337	0.0503**	120	0.1485
	(0.0393)	(1.6590)	(1.3717)	(1.7186)	(0.6110)	(0.0227)		
CADUSD	-0.0382	-9.0991***	-13.6492***	-1.2651	-0.0326	0.0023	120	0.3985
	(0.0371)	(1.8750)	(1.8205)	(0.9476)	(0.9531)	(0.0091)		
DEMJPY	-0.0698**	-6.3237**	-11.1725***	4.0414	-0.1078	-0.3486**	120	0.3186
	(0.0288)	(2.8254)	(1.8895)	(2.5226)	(0.3923)	(0.1395)		
DEMNZD	-0.0433*	-6.4686***	-7.3175***	0.1479	0.0414	-0.0203	120	0.2813
	(0.0226)	(1.4511)	(1.3045)	(0.9342)	(0.5434)	(0.0222)		
DEMNOK	-0.0148	-3.9931***	-8.4577***	0.5119	-0.1793	-0.0349	120	0.3062
	(0.0218)	(1.1211)	(1.2485)	(0.9143)	(0.9532)	(0.0553)		
DEMSEK	-0.0368	-6.7133***	-5.9829***	-0.8495	-0.2773	-0.0843	120	0.3352
	(0.0302)	(1.1542)	(0.9398)	(0.7199)	(0.5015)	(0.0679)		
DEMGBP	-0.0773*	-5.1340**	-9.6338***	-1.7363	-0.3035	0.0072	120	0.3169
	(0.0433)	(2.0691)	(1.4275)	(2.0862)	(0.5338)	(0.0060)		
DEMUSD	-0.0743	-5.6210***	-10.2522***	-1.1514	-0.2247	-0.0244	120	0.3821
	(0.0461)	(1.8650)	(1.5379)	(1.5833)	(0.4732)	(0.0151)		
JPYNZD	-0.1011***	-9.3097***	-14.2991***	-0.0275	-0.1974	0.4302***	120	0.3973
	(0.0316)	(1.7516)	(2.1181)	(1.4227)	(0.4194)	(0.1282)		
JPYNOK	-0.1143***	-5.2508***	-12.7072***	3.8050***	-0.8701*	0.3071***	120	0.3916
	(0.0341)	(1.3733)	(1.7281)	(1.2054)	(0.5042)	(0.0860)		
JPYSEK	-0.1131***	-3.7223	-11.1959***	3.3314**	-0.3100	0.3079***	120	0.2742
	(0.0354)	(2.6713)	(1.9155)	(1.6972)	(0.3929)	(0.0953)		
JPYUSD	-0.0231	-3.0391**	-11.0678***	0.5434	0.4707	0.1098	120	0.2026
	(0.0209)	(1.4804)	(2.2242)	(1.2352)	(0.6002)	(0.0939)		
NZDSEK	-0.0953***	-5.7602***	-6.3097***	0.4668	-0.3328	-0.1542***	120	0.2944
	(0.0338)	(1.1911)	(1.1803)	(0.7337)	(0.3740)	(0.0553)		
NZDUSD	-0.1669***	-11.3702***	-10.7088***	-3.4592**	0.3404	0.0381**	120	0.4358
	(0.0391)	(1.6871)	(1.7379)	(1.4547)	(0.3041)	(0.0150)		
NOKNZD	-0.0323	-6.6913***	-8.5086***	0.8029	-0.5474	0.0492*	120	0.3234
	(0.0199)	(1.4720)	(1.3262)	(1.3022)	(0.6471)	(0.0285)		
NOKSEK	-0.0248	-3.7390***	-6.3523***	0.8128	-0.0332	-0.0001	120	0.1455

	(0.0203)	(1.0424)	(1.3454)	(0.7462)	(0.4024)	(0.0050)		
NOKUSD	-0.0251	-10.9204***	-12.3308***	0.7353	0.0318	0.0465	120	0.4697
	(0.0332)	(1.3766)	(1.4648)	(1.0388)	(0.5756)	(0.0676)		
SEKUSD	-0.1147***	-9.3184***	-9.7011***	-2.5207**	-0.2633	0.2221***	120	0.4491
	(0.0423)	(1.3431)	(1.5183)	(0.9810)	(0.3408)	(0.0831)		
CHFDEM	-0.0330**	1.5830	0.7669	2.4355*	0.0117	0.0129*	120	0.0121
	(0.0164)	(1.7645)	(1.3927)	(1.4287)	(0.5895)	(0.0075)		
CHFJPY	-0.0384	-8.6597***	-2.5390	-0.4711	0.7347	-0.1805	120	0.0916
	(0.0251)	(2.9666)	(2.5015)	(3.1030)	(0.6081)	(0.1183)		
CHFNZD	-0.0694**	-2.5187*	-3.1960*	0.7673	0.6308	-0.0028	120	0.1126
	(0.0330)	(1.3175)	(1.7418)	(0.9610)	(0.5549)	(0.0244)		
CHFNOK	-0.0111	-1.7563	-4.7434***	0.3976	0.2802	-0.0189	120	0.0521
	(0.0179)	(1.2235)	(1.7035)	(0.9765)	(0.9060)	(0.0469)		
CHFSEK	-0.0255	-4.1005**	-2.2072	-1.0538	0.4236	-0.0588	120	0.0521
	(0.0238)	(1.7582)	(1.4665)	(0.8594)	(0.6446)	(0.0507)		
CHFGBP	-0.0312*	2.9053	-4.3979**	1.5692	-0.1327	0.0154	120	0.1105
	(0.0170)	(2.0488)	(1.9337)	(1.4981)	(0.5813)	(0.0118)		
CHFUSD	-0.0692**	-5.6639***	-2.3016	-1.7140	0.5264	-0.0168*	120	0.1488
	(0.0287)	(1.4035)	(2.1029)	(1.1428)	(0.4186)	(0.0087)		
GBPJPY	-0.0694**	-3.4898	-10.6606***	4.7323**	-0.7556	-0.3632**	120	0.2721
	(0.0289)	(2.5125)	(1.8751)	(2.2340)	(0.5665)	(0.1435)		
GBPNZD	-0.0573**	-8.4851***	-10.0156***	1.2284	0.7641	-0.0181	120	0.3266
	(0.0234)	(1.8882)	(1.5111)	(1.3280)	(0.6526)	(0.0202)		
GBPNOK	-0.1160***	-4.1037***	-6.3600***	-0.5632	-2.1592**	-0.2873***	120	0.1552
	(0.0414)	(1.4124)	(1.6223)	(1.3983)	(0.9107)	(0.1020)		
GBPSEK	-0.0686**	-2.9876*	-5.9169***	-0.1121	-0.1582	-0.1628**	120	0.1168
	(0.0347)	(1.6026)	(1.6839)	(1.2211)	(0.4100)	(0.0829)		
GBPUSD	-0.1976***	-3.8274***	-5.3212***	-5.6947***	-1.9616**	-0.0826***	120	0.2118
	(0.0646)	(1.4690)	(1.8988)	(2.0484)	(0.9306)	(0.0265)		

Standard errors in parentheses are simple OLS standard error. *, **, and *** indicate that the alternative model significantly different from zero at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the two-sided test.

viii)   Robustness of table 6: Meese Rogoff 1983 out-of-sample-fit exercise extreme outliner of CHF at 2015M1 excluded and with recursive window

Table 6: Out-of-sample fit comparison of different models with extreme outliner of CHF at 2015M1 excluded
Rolling window prediction error of regression model (20) with liquidity return:

$$\Delta \hat{s}_{j,t} = \hat{\alpha}_j + \hat{\beta}_1 q_{j,t-1} + \hat{\beta}_2 \Delta \eta_{j,t} + \hat{\beta}_3 \Delta i_{j,t}^R + \hat{\beta}_4 \eta_{j,t-1} + \hat{\beta}_5 i_{j,t-1}^R$$

Rolling window prediction error of regression model (21) without liquidity return:

$$\Delta \hat{s}_{j,t} = \hat{\alpha}_j + \hat{\beta}_1 q_{j,t-1} + \hat{\beta}_2 \Delta i_{j,t}^R + \hat{\beta}_3 i_{j,t-1}^R$$

and random walk (RW) model: $\Delta \hat{s}_{j,t}^{RW} = 0$

Home Currency	RMSE of RW	RMSE of model (21)	RMSE of model (20)	DMW statistics of (21) vs RW	DMW statistics of (20) vs RW	DMW statistics of (20) vs (21)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AUD	0.0331	0.0307	0.0291	5.353	5.529	3.174
CAD	0.0301	0.0276	0.0263	6.379	6.573	4.328
EUR	0.0309	0.0305	0.0301	1.384	2.017	1.421
JPY	0.0282	0.0263	0.0252	5.608	7.189	4.782
NZD	0.0331	0.0313	0.0309	4.719	5.198	1.559
NOK	0.0428	0.0402	0.0393	5.424	6.511	3.256
SEK	0.0309	0.0295	0.0279	4.399	4.992	3.224
CHF	0.0361	0.0345	0.0310	4.481	6.523	5.762
GBP	0.0294	0.0282	0.0271	3.360	4.807	3.913
USD	0.0348	0.0335	0.0309	4.713	7.731	6.064

Home Currency	CW statistics of (21) vs RW	p-value of CW test (21) vs RW	CW statistics of (20) vs RW	p-value of CW test (20) vs RW	CW statistics of (20) vs (21)	p-value of CW test (20) vs (21)
	(8)	(9)	(10)	(12)	(13)	(14)
AUD	10.891	0.000***	10.606	0.000***	5.522	0.000***
CAD	11.544	0.000***	11.132	0.000***	6.437	0.000***
EUR	5.461	0.000***	6.406	0.000***	3.754	0.000***
JPY	10.225	0.000***	12.230	0.000***	7.150	0.000***
NZD	8.371	0.000***	9.737	0.000***	4.083	0.000***
NOK	10.195	0.000***	11.490	0.000***	6.631	0.000***
SEK	8.941	0.000***	8.718	0.000***	5.286	0.000***
CHF	9.040	0.000***	12.077	0.000**	9.332	0.000***
GBP	7.636	0.000***	9.536	0.000***	6.717	0.000***
USD	9.348	0.000***	12.763	0.000***	9.644	0.000***

The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krone (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a rolling window predictive regression using the column (1) currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. η_t is the measure of government bond liquidity, $i_{j,t}^R$ is the home minus foreign interest rates. Δ is a difference operator. The rolling window is 108 months. The first estimated coefficient uses sample from 1999M1 to 2007M12. Germany government interest rate is used for EUR case. DMW stands for Diebold and Mariano (1995) and West (1996) and CW stands for Clark and West (2007)

The null hypotheses are that the models MSE are equal. The alternative hypotheses are that the larger models MSE are smaller than the nested models. *, **, and *** indicate that the alternative model significantly outperforms the smaller nested model at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the one-sided test.

Table 6: Out-of-sample fit comparison of different models with CHF excluded
Rolling window prediction error of regression model (20) with liquidity return:

$$\Delta \hat{s}_{j,t} = \hat{\alpha}_j + \hat{\beta}_1 q_{j,t-1} + \hat{\beta}_2 \Delta \eta_{j,t} + \hat{\beta}_3 \Delta i^R_{j,t} + \hat{\beta}_4 \eta_{j,t-1} + \hat{\beta}_5 i^R_{j,t-1}$$

Rolling window prediction error of regression model (21) without liquidity return:

$$\Delta \hat{s}_{j,t} = \hat{\alpha}_j + \hat{\beta}_1 q_{j,t-1} + \hat{\beta}_2 \Delta i^R_{j,t} + \hat{\beta}_3 i^R_{j,t-1}$$

and random walk (RW) model: $\Delta \hat{s}^{RW}_{j,t} = 0$

Home Currency	RMSE of RW	RMSE of model (21)	RMSE of model (20)	DMW statistics of (21) vs RW	DMW statistics of (20) vs RW	DMW statistics of (20) vs (21)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AUD	0.0333	0.0307	0.0289	5.565	5.508	3.097
CAD	0.0300	0.0273	0.0259	6.262	6.235	3.881
EUR	0.0290	0.0269	0.0256	5.799	7.481	5.009
JPY	0.0330	0.0312	0.0306	4.739	5.442	2.000
NZD	0.0434	0.0403	0.0393	5.801	6.740	3.202
NOK	0.0310	0.0295	0.0274	4.502	5.025	3.314
SEK	0.0366	0.0349	0.0310	4.414	6.521	5.823
GBP	0.0297	0.0284	0.0270	3.540	4.846	3.840
USD	0.0350	0.0335	0.0309	5.156	7.398	5.461

Home Currency	CW statistics of (21) vs RW	p-value of CW test (21) vs RW	CW statistics of (20) vs RW	p-value of CW test (20) vs RW	CW statistics of (20) vs (21)	p-value of CW test (20) vs (21)
	(8)	(9)	(10)	(12)	(13)	(14)
AUD	10.709	0.000***	10.221	0.000***	5.231	0.000***
CAD	10.977	0.000***	10.369	0.000***	5.756	0.000***
EUR	10.342	0.000***	12.544	0.000***	7.282	0.000***
JPY	8.133	0.000***	9.757	0.000***	4.511	0.000***
NZD	10.306	0.000***	11.374	0.000***	6.554	0.000***
NOK	8.957	0.000***	8.543	0.000***	5.233	0.000***
SEK	8.718	0.000***	11.738	0.000***	9.175	0.000***
GBP	7.607	0.000***	9.385	0.000***	6.518	0.000***
USD	9.623	0.000***	11.980	0.000***	8.661	0.000***

The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krone (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a rolling window predictive regression using the column (1) currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. η_t is the measure of government bond liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The rolling window is 108 months. The first estimated coefficient uses sample from 1999M1 to 2007M12. Germany government interest rate is used for EUR case. DMW stands for Diebold and Mariano (1995) and West (1996) and CW stands for Clark and West (2007)

The null hypotheses are that the models MSE are equal. The alternative hypotheses are that the larger models MSE are smaller than the nested models. *, **, and *** indicate that the alternative model significantly outperforms the smaller nested model at 10%, 5%, and 1% significance level, respectively, based on standard normal critical values for the one-sided test.

Recursive window prediction error of regression model with liquidity return:

$$\Delta \hat{s}_{j,t} = \hat{\alpha}_j + \hat{\beta}_1 q_{j,t-1} + \hat{\beta}_2 \Delta \eta_{j,t} + \hat{\beta}_3 \Delta i^R_{j,t} + \hat{\beta}_4 \eta_{j,t-1} + \hat{\beta}_5 i^R_{j,t-1}$$ and random walk model: $\Delta \hat{s}^{RW}_{j,t} = 0$

Home Currency	RMSE of the model (20)	RMSE of random walk	RMSE of the model (20) CHF 2015M1 excluded	RMSE of random walk CHF 2015M1 excluded	RMSE of the model (20) CHF excluded	RMSE of random walk CHF excluded
(1)	(2)	(3)	(4)	(5)	(6)	(7)
AUD	0.0268	0.0294	0.0263	0.0291	0.0287	0.0333
CAD	0.0250	0.0275	0.0243	0.0270	0.0262	0.0300
EUR	0.0295	0.0291	0.0262	0.0266	0.0325	0.0328
JPY	0.0241	0.0259	0.0233	0.0255	0.0257	0.0290
NOK	0.0285	0.0300	0.0281	0.0297	0.0309	0.0330
NZD	0.0361	0.0382	0.0359	0.0382	0.0398	0.0434
SEK	0.0264	0.0285	0.0260	0.0283	0.0276	0.0310
CHF	0.0306	0.0335	0.0300	0.0332	0.0313	0.0366
GBP	0.0261	0.0277	0.0256	0.0274	0.0270	0.0297
USD	0.0291	0.0320	0.0289	0.0319	0.0311	0.0350

The 10 currencies used are Australian Dollar (AUD), Canadian Dollar (CAD), Euro (EUR), Japanese Yen (JPY), New Zealand Dollar (NZD), Norwegian Krone (NOK), Swedish Krona (SEK), Swiss Franc (CHF), British Pound (GBP) and United States Dollar (USD). Each row represents a recursive window predictive regression using the column (1) currency as the home currency and the other 9 currencies as foreign currency j. $s_{j,t}$ is the nominal exchange rate between home and foreign country j, defined as home currency price of foreign currency, $q_{j,t}$ is the real exchange rate. η_i is the measure of treasury liquidity, $i^R_{j,t}$ is the home minus foreign interest rates. Δ is a difference operator. The first estimated coefficient uses sample from 1999M1 to 2007M12. The first prediction is 2008M1 and last prediction is 2017M12. Germany government interest rate is used for EUR case.