



BANK OF ENGLAND

Appendix to Staff Working Paper No. 762

Global banks and synthetic funding: the benefits of foreign relatives

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Dennis Reinhardt

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Global banks and synthetic funding: the benefits of foreign relatives

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Online Appendix

Global banks and synthetic funding: the benefits of foreign relatives

A.1 Further figures and tables

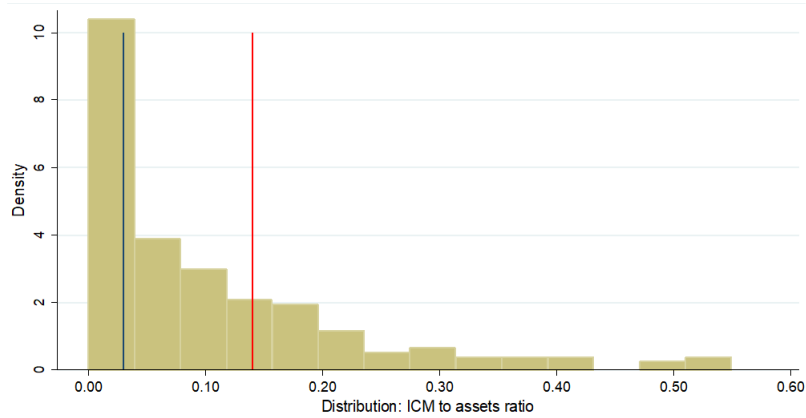


Figure A.1 Distribution of internal capital markets' funding

Notes: This figure reports an histogram with the distribution of the ICM ratio. ICM funding represent foreign internal liabilities raised outside the UK in related entities (see definition in Table A.1) The figure corresponds to the distribution of the average ICM ratio over the sample period, restricted for purposes of analysis from 2008Q1 to 2016Q1. The blue vertical line represent the median of the distribution, while the red vertical line represents the cutoff at the 75th percentile used in the article to assign banks to a group of high ICM ratio banks.

Table A.1 PRELIMINARY TEST — REGRESSING RSF ON BANK VARIABLES

	Dependent variable: RSF					
	I	II	III	IV	V	VI
$Log\ assets_{t-1}$	0.029** (0.013)					0.031** (0.012)
$Dep.\ ratio_{t-1}$		-0.018 (0.065)				0.029 (0.086)
$Liq.\ ratio_{t-1}$			0.072 (0.088)			0.134 (0.096)
$Cap.\ ratio_{t-1}$				0.394 (0.394)		0.541 (0.387)
$Branch$					-0.037 (0.058)	0.051 (0.043)
Constant	-0.422** (0.212)	0.096*** (0.018)	0.063*** (0.023)	0.061*** (0.017)	0.113** (0.055)	-0.584** (0.256)
Obs	62739	62739	62739	62739	62739	62739
R^2	0.096	0.000	0.009	0.044	0.053	0.171

NOTE: This table reports the results from estimating RSF as a function of bank characteristics used in the analysis as control variables. Robust standard errors are clustered at the bank and quarter level and are reported between parentheses. In column VI we include all bank characteristics as independent variables. The variables include the log of total assets ($Log\ assets_{t-1}$), the deposit ratio ($Dep.\ ratio_{t-1}$), the liquidity ratio ($Liq.\ ratio_{t-1}$), the capital ratio ($Cap.\ ratio_{t-1}$), and a dummy equal to 1 if a bank is a foreign branch ($Branch$). Variables are winsorized at the 1st and 99th percentiles. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.2 FX FUNDING RATIOS BY BANK TYPE

	I	II	III	IV	V
	<i>Number</i>	<i>RSF</i>	<i>Total FX</i>	<i>Non – ICM</i>	<i>ICM</i>
Total banks	106	0.06	0.38	0.27	0.11
Foreign	93	0.06	0.40	0.29	0.11
Local	11	0.12	0.19	0.15	0.03
Branch	76	0.06	0.42	0.29	0.13
Uk-reg.	30	0.08	0.29	0.24	0.04
High ICM	27	0.05	0.45	0.21	0.24
Low ICM	79	0.07	0.36	0.29	0.06

NOTE: This table displays the average ratio of different measures of banks' FX funding by bank type. On the horizontal axis, the table reports the numbers of banks by bank-type (*Number*); the average *RSF*, the average ratio of total FX funding to total assets (*Total FX*), the average ratio of total FX funding from abroad excluding ICM to assets (*Non – ICM*), and the average ratio of ICM funding to total assets (i.e. ICM ratio). On the vertical axis the matrix distinguishes between foreign banks, UK-owned banks, foreign branches, UK-regulated banks, high ICM, and low ICM banks. High vs. low ICM banks are defined according to a split at the 75th percentile of the ICM ratio's distribution. Variables' definitions are reported in Table A.1 in the article.

Table A.3 ROBUSTNESS TESTS — RSF DEFINITION AND BANK SIZE

Empirical change:	Rank > 100				
	None	Alt. RSF_{t-5}		Yes	No
	I	II	III	IV	V
Joint $\Delta CIP \times RSF_{t-5}$	0.605*** (0.176)	0.234*** (0.0698)	0.228*** (0.0538)	0.490** (0.212)	0.715** (0.332)
RSF_{t-5}	0.020 (0.031)	0.006 (0.007)	0.009 (0.011)	0.012 (0.060)	0.045 (0.043)
Controls:					
$Total\ assets_{t-1}$	-0.013 (0.010)	-0.013 (0.010)	-0.013 (0.010)	0.000 (0.044)	-0.013 (0.011)
$Deposit\ ratio_{t-1}$	0.008 (0.017)	0.003 (0.014)	0.006 (0.017)	-0.032 (0.044)	0.016 (0.019)
$Liquidity\ ratio_{t-1}$	-0.037 (0.046)	-0.036 (0.043)	-0.040 (0.045)	0.012 (0.094)	-0.049 (0.041)
$Capital\ ratio_{t-1}$	-0.093 (0.087)	-0.104 (0.087)	-0.097 (0.086)	0.078 (0.217)	-0.097 (0.089)
$\Delta L_{i,k,t}^{\neq k}$	0.084*** (0.022)	0.076*** (0.023)	0.084*** (0.022)	0.276** (0.108)	0.057*** (0.021)
Constant	0.256 (0.183)	0.264 (0.180)	0.259 (0.183)	0.021 (0.863)	0.239 (0.182)
Fixed effects	i,j,k j,k,t	i,j t	i,j,k j,k,t	i,j,k j,k,t	i,j,k j,k,t
Obs.	62,739	62,739	62,739	21,071	39,928
R^2	0.108	0.060	0.108	0.263	0.107

NOTE: This table reports the results from estimating Equation (4) under alternative specifications. All constitutive terms of the interactions are included in the regressions. Coefficients for $\Delta CIP_{k,t}$ and for its interactions with RSF_{t-5} are not reported. Column I replicates the baseline results from Column V in Table 2 without changes to the empirical setting. In Columns II and III we compute RSF_{t-5} as a continuous variable including its negative values. Column II reports a regression with bank-country and time fixed effects, whereas the regression on Column III uses the full specification with bank-country-currency and country-currency-quarter FE. In Columns IV and V we report regressions of sample splits according to the median of banks' size rank computed from average total assets. Banks on Column IV are above that threshold, whereas banks in Column V lie below the threshold. Robust standard errors clustered at the bank and quarter level are reported between parentheses. All regressions include a set of fixed effects at the bank-country-currency and country-currency-time level. Variables are winsorized at the 1st and 99th percentiles. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.4 ROBUSTNESS TESTS — GDP-DENOMINATED CLAIMS

Empirical change:	None	GBP flows	Base FE	Bank-time FE	Bank-country-time FE
	I	II	III	IV	V
Joint $\Delta CIP \times RSF_{t-5}$	0.601*** (0.175)	0.675*** (0.204)	0.599*** (0.169)	0.199** (0.0909)	0.305** (0.119)
RSF_{t-5}	0.021 (0.031)	-0.008 (0.016)	0.021 (0.025)	0.010 (0.021)	0.009 (0.029)
Controls:					
$Total\ assets_{t-1}$	-0.013 (0.010)	-0.019** (0.009)	-0.016* (0.009)		
$Deposit\ ratio_{t-1}$	0.006 (0.018)	-0.009 (0.013)	0.003 (0.016)	0.016 (0.012)	0.029** (0.012)
$Liquidity\ ratio_{t-1}$	-0.037 (0.046)	-0.043 (0.033)	-0.051* (0.030)		
$Capital\ ratio_{t-1}$	-0.094 (0.087)	-0.135* (0.078)	-0.118 (0.073)		
$\Delta L_{i,k,t}^{\neq k}$	0.085*** (0.023)	0.076*** (0.022)	0.095*** (0.023)	-1.957*** (0.074)	-1.873*** (0.082)
Constant	0.260 (0.184)	0.380** (0.161)	0.330* (0.166)	0.024** (0.010)	0.024** (0.009)
Fixed effects	i,j,k j,k,t	i j,t	i,j,k j,k,t	i,j,k j,k,t i,t	i,j,k j,k,t i,j,t
Obs.	62,739	100,060	97,607	101,075	60,521
R^2	0.108	0.054	0.117	0.141	0.497

NOTE: This table reports the results from estimating Equation (4) by adding to the working sample cross-border claims denominated in GBP. All constitutive terms of the interactions are included in the regressions. Coefficients for $\Delta CIP_{k,t}$ and for its interactions with RSF_{t-5} are not reported. Column I replicates the baseline results from column V in Table 2 without changes to the empirical setting. In column II we estimate Eq. (4) with bank and country-time fixed effects (FE) including the claims denominated in GBP. Column III replicates this exercise with the benchmark FE by bank-country-currency and country-currency-time. Columns IV and V add to this later setting bank-time and bank-country-time FE, respectively. Robust standard errors clustered at the bank and quarter level are reported between parentheses. All regressions include a set of fixed effects at the bank-country-currency and country-currency-time level. Variables are winsorized at the 1st and 99th percentiles. In columns IV and V only the coefficients for the control variables $Dep.ratio_{t-1}$ and $\Delta L_{i,k,t}^{\neq k}$ are reported, which vary over the bank-currency-time dimension. Other control variables are absorbed by bank-time FE. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.5 ROBUSTNESS TESTS — CHANGES TO ECONOMETRIC SETTING

Adjustment:	1-m rates	Max CIP	Loan growth	Trunc. LHS	2.5 winsor.	Clust. bank	Clust. k,t
	I	II	III	IV	V	VI	VII
<i>J. ΔCIP</i>	0.634***	0.660***	2.605**	0.302**	0.496**	0.605***	0.605***
<i>x RSF_{t-5}</i>	(0.163)	(0.164)	(1.294)	(0.125)	(0.151)	(0.178)	(0.233)
<i>RSF_{t-5}</i>	0.020	0.012	-0.016	0.003	0.010	0.020	0.020
	(0.031)	(0.031)	(0.303)	(0.020)	(0.027)	(0.031)	(0.038)
Controls:							
<i>Total assets_{t-1}</i>	-0.013	-0.013	-0.087	-0.007	-0.011	-0.013	-0.013
	(0.010)	(0.010)	(0.081)	(0.006)	(0.009)	(0.010)	(0.011)
<i>Dep. ratio_{t-1}</i>	0.008	0.008	0.282*	0.002	0.005	0.008	0.008
	(0.017)	(0.017)	(0.167)	(0.011)	(0.015)	(0.017)	(0.019)
<i>Liq. ratio_{t-1}</i>	-0.036	-0.037	-0.439	-0.020	-0.030	-0.037	-0.037
	(0.045)	(0.045)	(0.285)	(0.032)	(0.041)	(0.041)	(0.037)
<i>Cap. ratio_{t-1}</i>	-0.093	-0.094	-0.140	-0.093	-0.090	-0.093	-0.093
	(0.088)	(0.088)	(0.734)	(0.069)	(0.083)	(0.086)	(0.092)
<i>$\Delta L_{i,k,t}^{\neq k}$</i>	0.084***	0.084***	0.000	0.051***	0.071***	0.084***	0.084***
	(0.023)	(0.022)	(0.000)	(0.014)	(0.019)	(0.023)	(0.015)
Constant	0.255	0.255	2.464	0.132	0.218	0.256	0.256
	(0.183)	(0.182)	(1.487)	(0.114)	(0.157)	(0.176)	(0.193)
Obs.	62,739	62,739	60,056	62,739	62,739	62,739	62,739
<i>R²</i>	0.108	0.108	0.157	0.110	0.109	0.108	0.108

NOTE: This table reports the results from estimating Equation (4) by changing different features of the econometric model and the data structure. All constitutive terms of the interactions are included in the regressions. Coefficients for $\Delta CIP_{k,t}$ and for its interactions with RSF_{t-5} are not reported. Column I replicates the benchmark model using 1-month interest rates to compute ΔCIP instead of 3-month interest rates. In column II we measure ΔCIP as the quarterly change in the maximum CIP deviations during a given quarter. In column III we use only cross-border loans to compute $\Delta L_{i,j,k,t}$ as the dependent variable. In column IV we truncate $\Delta L_{i,j,k,t}$ by replacing values above 1 by 1 and below 0 by 0. In column V we winsorize the variables in the model at the 2.5th and 97.5th percentiles. Finally, columns VI and VII cluster the standard errors at the bank and at the currency and time levels, respectively. Robust standard errors are clustered at the bank and quarter level in columns I to V and are reported between parentheses in all columns. All regressions include a set of fixed effects at the bank-country-currency and country-currency-time level. Variables are winsorized at the 1st and 99th percentiles in all columns besides column V. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.6 ROBUSTNESS TESTS — EXCLUDING RELEVANT OBSERVATIONS

Exclude:	Excl. destination:			Excl. bank home country:		
	US	EZ	US+EZ	US	EZ	US+EZ
	I	II	III	IV	V	VI
<i>J. $\Delta CIP \times RSF_{t-5}$</i>	0.681*** (0.151)	0.603*** (0.191)	0.726*** (0.186)	0.435*** (0.155)	0.748** (0.287)	0.537** (0.242)
<i>RSF_{t-5}</i>	0.028 (0.029)	0.047 (0.048)	0.070 (0.048)	0.008 (0.031)	0.012 (0.041)	-0.003 (0.040)
Controls:						
<i>Total assets_{t-1}</i>	-0.014 (0.011)	-0.012 (0.009)	-0.013 (0.013)	-0.011 (0.011)	-0.035** (0.014)	-0.030** (0.014)
<i>Dep. ratio_{t-1}</i>	0.008 (0.017)	-0.000 (0.018)	-0.003 (0.014)	0.007 (0.017)	0.009 (0.019)	0.008 (0.020)
<i>Liq. ratio_{t-1}</i>	-0.041 (0.043)	-0.055 (0.056)	-0.068 (0.057)	-0.018 (0.043)	-0.039 (0.061)	-0.016 (0.061)
<i>Cap. ratio_{t-1}</i>	-0.095 (0.095)	-0.105 (0.106)	-0.114 (0.128)	-0.051 (0.084)	-0.134* (0.076)	-0.094 (0.069)
<i>$\Delta L_{i,k,t}^{\neq k}$</i>	0.088*** (0.025)	0.067** (0.025)	0.069** (0.030)	0.063*** (0.021)	0.089*** (0.029)	0.056** (0.026)
Constant	0.271 (0.198)	0.252 (0.172)	0.280 (0.236)	0.211 (0.186)	0.664** (0.256)	0.558** (0.244)
Obs.	57,325	36,701	31,287	54,971	45,737	37,992
<i>R²</i>	0.118	0.140	0.165	0.119	0.129	0.146

NOTE: This table reports the results from estimating Equation (4) by excluding relevant countries or banks from the analysis. All constitutive terms of the interactions are included in the regressions. In columns I to III we exclude the US (col. I), the Euro Zone (EZ, col. II), and both the US and the EZ (col. III) from our sample of destination countries in which UK-based banks hold cross-border FX claims. In columns IV to VI we exclude banks whose headquarters are located in the US (col. IV), the EZ (col. V), or either the US or the EZ (col. VI) from our sample. Robust standard errors are clustered at the bank and quarter level and are reported between parentheses. All regressions include a set of fixed effects at the bank-country-currency and country-currency-time level. Variables are winsorized at the 1st and 99th percentiles. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.7 EXTENSION — ΔCIP SIGN AND CURRENCY DIFFERENCES

Definition of Dif_{t-5} :	None	1 if EUR	1 if EUR	1 if $\Delta CIP < 0$	1 if $\Delta CIP < 0$
	I	II	III	IV	V
Joint $\Delta CIP \times RSF_{t-5} \times Dif_{t-5}$		-0.397 (0.344)	-0.348 (0.343)	0.152 (0.304)	0.179 (0.301)
Joint $\Delta CIP \times RSF_{t-5}$	0.605*** (0.176)	0.806*** (0.183)	0.742*** (0.157)	0.510* (0.303)	0.453* (0.261)
$RSF_{t-5} \times Dif_{t-5}$		0.049** (0.023)	0.092* (0.049)	-0.0158 0.0313	-0.0376 0.0331
RSF_{t-5}	0.020 (0.031)	-0.014 (0.020)	-0.028 (0.041)	0.020 (0.031)	0.047 (0.036)
Controls:					
$Total\ assets_{t-1}$	-0.013 (0.010)	0.002 (0.002)	-0.014 (0.011)	0.001 (0.002)	-0.014 (0.011)
$Dep.\ ratio_{t-1}$	0.008 (0.017)	-0.002 (0.012)	0.006 (0.017)	-0.002 (0.013)	0.007 (0.017)
$Liq.\ ratio_{t-1}$	-0.037 (0.046)	-0.012 (0.016)	-0.034 (0.046)	-0.012 (0.016)	-0.037 (0.046)
$Cap.\ ratio_{t-1}$	-0.093 (0.087)	0.037 (0.043)	-0.092 (0.087)	0.036 (0.044)	-0.096 (0.087)
$\Delta L_{i,k,t}^{\neq k}$	0.084*** (0.022)	0.090*** (0.021)	0.084*** (0.023)	0.090*** (0.021)	0.084*** (0.023)
Constant	0.256 (0.183)	-0.018 (0.024)	0.279 (0.192)	-0.015 (0.024)	0.264 (0.186)
Obs	62,739	62,739	62,739	62,739	62,739
R^2	0.108	0.005	0.108	0.005	0.108

NOTE: This table reports the results from estimating Equation (4) by including a triple-interaction term between $\Delta CIP \times RSF_{t-5}$ and a dummy variable Dif_{t-5} equal to 1 if the respective claims are denominated in EUR (cols. II and III), or equal to 1 if ΔCIP is negative (cols. IV and V). All constitutive terms of the interactions are included in the regressions. Robust standard errors are clustered at the bank and quarter level and are reported between parentheses. All regressions include a set of fixed effects at the bank-country-currency and country-currency-time level. Variables are winsorized at the 1st and 99th percentiles. Variables' definitions are reported in Table A.1 in the article. *** indicates significance at the 1% level; ** at the 5%; * at the 10%.

Table A.8 DESCRIPTIVE STATISTICS OF COUNTRY-LEVEL REGRESSIONS

	I	II	III	IV	V
	Mean	Median	SD	Min	Max
Dependent variables:					
$\Delta L_{j,k,t}$ (within sample)	0.01	0.00	0.27	-0.95	0.96
$\Delta L_{j,k,t}$ (BIS data, RoW)	0.01	0.01	0.13	-0.53	0.43
$\Delta L_{j,k,t}$ (BIS data, CA)	0.01	0.01	0.24	-0.85	0.94
Exposure variable:					
RSF_{t-5}	0.11	0.08	0.10	0.00	0.43
Control variables:					
$Total\ assets_{t-1}$	16.94	17.56	2.04	9.43	19.26
$Dep.\ ratio_{t-1}$	0.72	0.74	0.19	0.19	1.19
$Liq.\ ratio_{t-1}$	0.39	0.39	0.12	0.12	0.67
$Cap.\ ratio_{t-1}$	0.09	0.08	0.05	0.00	0.24
$\Delta L_{i,k,t}^{\neq k}$	0.02	0.02	0.09	-0.24	0.24
CIP variables:					
$GBP-CB$	-0.08	-0.08	0.18	-0.76	0.41
ΔCIP	0.00	0.00	0.14	-0.74	0.46
Further variables:					
Branch share dummy	0.26	0.00	0.44	0.00	1.00
UK share dummy	0.25	0.00	0.43	0.00	1.00

NOTE: This table reports descriptive statistics for the variables used in the analysis of Section 5 in the main article. The variables are divided into five categories: dependent variables, exposure variable, control variables, CIP variables, and further (auxiliary) variables. The displayed descriptive statistics include the mean (col. I), median (col. II), standard deviation (col. III), minimum (col. IV), and maximum (col. V). The dependent variable $\Delta L_{j,k,t}$ is reported for the within-sample exercise displayed in Table 6 (computed from the aggregated bank-level data), and for the cross-country substitution exercise using BIS data displayed in Table 7. This later exercise considers the growth rate in total claims from the rest of the world (RoW, all reporting countries excluding the UK) and the growth rate in total claims from the US and the Euro Zone. These jurisdictions represent the home currency areas (CA) of the currencies in which cross-border claims are denominated (i.e. USD and EUR). Variables are defined in Table A.1 in the article.