

Online Appendix for “Banking across Borders”

- Sample statistics for additional variables are given in Table E.1.
- Table E.2 gives information on the observations in each year of the panel.
- In Column (1) of Table E.3, Equation 28 is estimated using information from Schindler (2009) on outflow and inflow restrictions of country i and country j as an alternative to information from the Chinn & Ito Index. The Schindler Index decreases in capital account openness. The coefficients related to financial freedom and capital account restrictions of the recipient country are all highly significant. This suggests that there is a differential impact of capital account and banking sector liberalization on foreign asset holdings as the model assumes and Figure (4) indicates. Strikingly, the coefficient related to inflow restrictions of the recipient country is positive. This could be due to the fact that the regression already controls for outflow restrictions and financial freedom. It could also be due to a reversed causality problem. Governments have established inflow restrictions in response to large capital inflows in the past.

Column (2) shows results where the property rights index is replaced by other proxies of institutional quality. The variables law & order, bureaucratic quality and investment climate are taken from the Country Risk Guide (see <http://www.prsgroup.com/icrg.aspx>). When these additional variables are included, the efficiency coefficient decreases while the endowment coefficient increases. This is similar to the effects when recipient country fixed effects are included in the regression, which indicates that institutional quality is one source of unobserved country heterogeneity.

- In Table E.4, results are reported when 5-year lags of differences in capital-labor ratios and of differences in overhead costs to total assets are used (Columns (1) to (3)). Columns (4) to (6) show the estimates for the cross-section of the year 2003. Columns (2) and (5) include source country and Columns (3) and (6) recipient country fixed effects.
- Tables E.5 shows regression results where absolute differences in capital-labor ratios between countries are used as a proxy for differences in endowments instead of log differences. The absolute differences were multiplied by the factor 1/1000.
- In Table E.6, total foreign assets are used as the dependent variable. These assets comprise the total consolidated claims of a banking sector *vis-a-vis* all sectors in a given recipient country. Columns (1) to (3) show the results of regressions performed on the cross-section.

Columns (4) and (5) display the results from the pooled estimation based on the panel dataset.

- As discussed in the main body of the text, current differences in overhead costs to total assets between country i and j are endogenous to foreign bank assets. As an alternative to working with lagged values, contemporaneous values of differences in overhead costs to total assets between countries i and j are instrumented. Information from the WDI on total services exports in ICT industries (in current USD) serves as the instrument. More specifically, the instrument for $\Delta \log(c_{ij})$ is the log of total ICT exports of country j minus the log of total ICT exports of country i . Banking is an information intensive industry. While ICT services may be exported within banks to foreign countries where affiliates are established, a country's aggregate value of ICT exports should be exogenous to foreign bank asset holdings. Countries that export ICT services have a comparative advantage in this sector, which should also affect domestic banking sector efficiency.

The F-statistics of the first stage regression takes a value of around 87. The hypothesis that the instrument is weak can therefore be rejected. The Hausman-Wu test, which tests the exogeneity of contemporaneous values of $\Delta \log(c_{ij})$ under the null, can be rejected at all standard significance levels. The IV regression is performed on the cross-section (Column (1) of Table E.7). The estimate of the efficiency coefficient becomes significantly larger compared to previous results.

Table E.7: Robustness VI: instrumental variable regression

	(1)
$\Delta \log(c_{ijt})$	1.835*** (0.391)
$\Delta \log(K/L_{ijt})$	0.374*** (0.140)
R^2	0.521
N	1123

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses.
Controls not reported.

- Observations that take the value zero are dropped from the liability sample. As these constitute about 22% of all observations, this approach may bias the estimates. In order

to check for this, a Heckman selection model is estimated. There are no natural exclusion restrictions at hand in the context of this paper so the performed regression relies on the assumption that the errors are normally distributed. The efficiency coefficient remains essentially unchanged taking a value of 0.543 with a standard error of 0.168 compared to an estimate of 0.526 with a standard error of 1.156 from the baseline regression without selection.

Table E.1: Summary statistics for additional variables

Variable	N	Mean	Std. Dev.	Min	Max
$\Delta \log(\text{MPC}_{ij})$	655	-.112371	.4065846	-1.467844	.9897796
$\Delta \log(\text{net interest margin}_{ij})$	1228	.3442117	.7531107	-2.2991	2.299
concentration _j	1249	.5801691	.1840369	.2070417	.8956705
concentration _i	1249	.6460901	.2030711	.2070417	1
$\Delta \log(\text{lending interest rate}_i)$	950	.4966312	.7905744	-2.184185	3.277521
outflow restrictions _j	1249	.1785428	.2646676	0	1
inflow restrictions _i	1082	.2410659	.3247187	0	1
bureaucratic quality _j	1249	3.563651	.6330822	2	4
bureaucratic quality _i	1235	2.674528	1.040828	0	4
law and order _j	1249	5.106886	.8186923	2.5	6
law and order _i	1235	4.100641	1.311749	1	6
investment climate _j	1249	5.813517	.3641471	4.5	6
investment climate _i	1235	4.719771	1.535886	0	6
$\log(\text{FDI flow}_{ij})$	702	2.15959	4.399629	-9.220647	9.889891
common border _{ij}	1247	.0441059	.2054127	0	1
$\log(\text{GDP per capita}_j)$	1249	10.13103	1.004623	6.635907	10.82145
$\log(\text{GDP per capita}_i)$	1249	8.847493	1.570856	5.491785	11.08712

Table E.2: Observations by year

Year	Asset sample	Liability sample
	N	N
1999	199	-
2000	391	-
2001	432	-
2002	764	-
2003	1,103	-
2004	1,153	-
2005	1,249	493
2006	1,356	-
2007	1,423	-
Total	8,163	493

Table E.3: Robustness II: alternative measures of capital account openness and institutional quality

	(1)	(2)
$\Delta \log(c_{ij})$	0.536 (0.088)***	0.295 (0.085)***
$\Delta \log(K/L_{ij})$	0.511 (0.145)***	0.495 (0.125)***
financial freedom _i	0.020 (0.004)***	0.010 (0.003)***
openness _j		0.405 (0.145)***
openness _i		0.023 (0.053)
property rights _j	0.032 (0.007)***	
property rights _i	0.000 (0.005)	
banking crisis _i	1.105 (0.352)***	0.958 (0.324)***
outflow restriction _j	-0.155 (0.304)	
outflow restriction _i	-0.773 (0.286)***	
inflow restriction _j	0.411 (0.622)	
inflow restriction _i	1.736 (0.357)***	
bureaucratic quality _j		1.552 (0.159)***
bureaucratic quality _i		0.318 (0.100)***
law & order _j		-0.632 (0.129)***
law & order _i		-0.144 (0.065)**
investment climate _j		0.431 (0.134)***
investment climate _i		-0.018 (0.047)
R^2	0.63	0.65
N	1082	1235

* $p < 0.1$, ** $p < 0.05$; *** $p < 0.01$.
Robust standard errors in parentheses.
Dependent variable: $\log(\text{assets}_{ij})$.
Constant and gravity variables not reported.

Table E.4: Robustness III: alternative number of lags and alternative cross-section

	5-year lags			Cross-section 2003		
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \log(c_{ij,t-5})$	0.154 (0.066)**	0.057 (0.076)	0.614 (0.100)***			
$\Delta \log(K/L_{ij,t-5})$	0.230 (0.120)*	-0.004 (0.118)	1.490 (0.273)***			
$\Delta \log(c_{ij,t-10})$				0.505 (0.082)***	0.311 (0.095)***	0.885 (0.104)***
$\Delta \log(K/L_{ij,t-10})$				0.244 (0.144)*	-0.003 (0.168)	0.826 (0.222)***
financial freedom _i	0.012 (0.003)***	0.014 (0.003)***		0.010 (0.004)***	0.014 (0.003)***	
openness _j	0.496 (0.157)***		0.422 (0.144)***	0.232 (0.178)		0.120 (0.156)
openness _i	-0.011 (0.051)	-0.022 (0.046)		-0.000 (0.055)	-0.040 (0.050)	
property rights _j	0.021 (0.007)***		0.026 (0.007)***	0.016 (0.006)***		0.014 (0.006)**
property rights _i	0.004 (0.004)	0.006 (0.004)		0.012 (0.004)***	0.011 (0.004)***	
banking crisis _i	0.779 (0.341)**	0.843 (0.280)***		1.038 (0.257)***	1.165 (0.234)***	
$\log(\text{distance}_{ij})$	-0.810 (0.063)***	-0.714 (0.059)***	-1.286 (0.081)***	-0.847 (0.064)***	-0.709 (0.060)***	-1.237 (0.076)***
common currency _{ij}	0.536 (0.172)***	0.309 (0.169)*	0.068 (0.218)	0.194 (0.171)	0.354 (0.161)**	-0.343 (0.206)*
common legal system _{ij}	0.085 (0.124)	0.425 (0.117)***	-0.101 (0.119)	0.360 (0.125)***	0.537 (0.124)***	0.155 (0.120)
common language _{ij}	0.341 (0.165)**	0.241 (0.163)	0.398 (0.175)**	0.496 (0.209)**	0.286 (0.188)	0.549 (0.204)***
colony _{ij}	1.287 (0.216)***	1.192 (0.222)***	1.470 (0.219)***	1.034 (0.255)***	1.280 (0.264)***	1.005 (0.251)***
$\log(\text{GDP}_j)$	0.519 (0.196)***		-0.155 (0.265)	1.011 (0.201)***		0.781 (0.216)***
$\log(\text{GDP}_i)$	0.995 (0.103)***	0.924 (0.094)***		0.931 (0.115)***	0.871 (0.115)***	
$\log(\text{population}_j)$	0.197 (0.195)		0.976 (0.264)***	-0.049 (0.214)		0.244 (0.226)
$\log(\text{population}_i)$	-0.289 (0.103)***	-0.164 (0.093)*		-0.162 (0.119)	-0.079 (0.117)	
R^2	0.61	0.70	0.69	0.64	0.73	0.72
N	1336	1336	1336	1103	1103	1103
Source country FE	-	yes	-	-	yes	-
Recipient country FE	-	-	yes	-	-	yes

* $p < 0.1$, ** $p < 0.05$; *** $p < 0.01$.
Robust standard errors in parentheses.
Dependent variable: $\log(\text{assets}_{ij})$. Constant not reported.

Table E.5: Robustness IV: absolute differences of $\Delta K/L$

	(1)	(2)	(3)	(4)	(5)
$\Delta \log(c_{ijt})$	0.439 (0.074)***	0.149 (0.083)*	0.969 (0.099)***	0.404 (0.052)***	0.174 (0.049)***
$\Delta K/L_{ijt}$	0.154 (0.016)***	0.101 (0.023)***	0.206 (0.021)***	0.143 (0.012)***	0.033 (0.035)
financial freedom _{it}	0.006 (0.003)*	0.010 (0.003)***		0.007 (0.003)***	(0.002)
openness _{jt}	0.371 (0.150)**		0.326 (0.136)**	0.235 (0.102)**	0.015 (0.082)
openness _{it}	0.114 (0.053)**		0.080 (0.047)*	0.070 (0.037)*	-0.015 (0.039)
property rights _{jt}	0.038 (0.007)***		0.035 (0.006)***	0.029 (0.005)***	0.021 (0.006)***
property rights _{it}	0.010 (0.004)**	0.009 (0.004)**		0.012 (0.003)***	0.007 (0.004)**
banking crisis _{it}	0.377 (0.335)	0.625 (0.282)**		0.687 (0.123)***	0.410 (0.070)***
banking crisis _{jt}				0.050 (0.118)	0.003 (0.087)
log distance _{ij}	-0.874 (0.061)***	-0.769 (0.059)***	-1.199 (0.081)***	-0.817 (0.049)***	
common currency _{ijt}	0.479 (0.172)***	0.429 (0.158)***	-0.174 (0.202)	0.325 (0.146)**	0.079 (0.137)
common legal system _{ijt}	0.147 (0.120)	0.495 (0.118)***	-0.008 (0.117)	0.316 (0.097)***	0.418 (0.086)***
common language _{ijt}	0.537 (0.178)***	0.263 (0.167)	0.589 (0.179)***	0.554 (0.149)***	0.249 (0.135)*
colony _{ijt}	1.323 (0.228)***	1.180 (0.234)***	1.397 (0.222)***	1.136 (0.190)***	1.206 (0.184)***
log GDP _{jt}	0.125 (0.185)		0.027 (0.181)	0.508 (0.125)***	0.348 (0.267)
log GDP _{it}	1.262 (0.069)***	1.170 (0.071)***		1.231 (0.056)***	0.604 (0.145)***
log(population _{jt})	0.638 (0.181)***		0.803	0.338 (0.125)***	1.138 (2.033)
log(population _{it})	-0.456 (0.073)***	-0.336 (0.072)***		-0.400 (0.060)***	-0.050 (0.770)
R^2	0.65	0.73	0.72	0.66	0.79
N	1249	1249	8163	8163	
Year FE	-	-	-	yes	yes
Source country FE	-	yes	-	no	yes
Recipient country FE	-	-	yes	no	yes

* $p < 0.1$, ** $p < 0.05$; *** $p < 0.01$
Robust standard errors in parentheses in Columns (1)-(3).
Clustered standard errors (country pairs) in Columns (4) and (5).
Dependent variable: $\log(\text{assets}_{ijt})$. Constant not reported.

Table E.6: Robustness V: total foreign assets as dependent variable

	(1)	(2)	(3)	(4)	(5)
$\Delta \log(c_{ijt})$	0.449*** (0.0643)	0.271*** (0.0714)	0.780*** (0.0934)	0.390*** (0.0473)	0.122*** (0.0434)
$\Delta \log(K/L_{ijt})$	0.155 (0.108)	0.0775 (0.111)	0.475** (0.207)	-0.0210 (0.0863)	-0.103 (0.232)
property rights _{jt}	0.0165*** (0.00539)		0.0147*** (0.00542)	0.0117*** (0.00420)	0.0155*** (0.00511)
property rights _{it}	0.0122*** (0.00386)	0.0134*** (0.00327)		0.0157*** (0.00286)	0.00515* (0.00307)
financial freedom _{it}	0.00794*** (0.00307)	0.00893*** (0.00262)		0.00836*** (0.00229)	0.00230 (0.00162)
banking crisis _{jt}				-0.124 (0.108)	0.0437 (0.0747)
banking crisis _{it}	0.588** (0.297)	0.590** (0.248)		0.624*** (0.116)	0.381*** (0.0665)
openness _{jt}	0.226** (0.109)		0.175* (0.105)	0.178** (0.0840)	-0.0262 (0.0746)
openness _{it}	-0.0279 (0.0473)	-0.0240 (0.0407)		-0.0155 (0.0335)	-0.00515 (0.0344)
$\log(\text{distance}_{ij})$	-0.910*** (0.0581)	-0.805*** (0.0568)	-1.162*** (0.0750)	-0.875*** (0.0472)	-0.944*** (0.0614)
common currency _{ij}	0.874*** (0.140)	0.803*** (0.140)	0.579*** (0.174)	0.575*** (0.122)	0.410*** (0.129)
common legal system _{ij}	0.0621 (0.110)	0.404*** (0.109)	-0.0618 (0.108)	0.267*** (0.0901)	0.401*** (0.0886)
common language _{ij}	0.476*** (0.168)	0.319** (0.158)	0.613*** (0.174)	0.424*** (0.137)	0.260** (0.132)
colony _{ij}	1.577*** (0.228)	1.454*** (0.231)	1.541*** (0.229)	1.463*** (0.201)	1.454*** (0.200)
$\log \text{GDP}_{jt}$	1.074*** (0.139)		0.928*** (0.174)	1.350*** (0.108)	-0.0114 (0.217)
$\log \text{GDP}_{it}$	1.135*** (0.0941)	1.137*** (0.0875)		0.966*** (0.0778)	0.769*** (0.132)
$\log \text{population}_{jt}$	-0.228* (0.137)		-0.0323 (0.172)	-0.430*** (0.109)	-0.0550 (1.810)
$\log \text{population}_{it}$	-0.251*** (0.0929)	-0.201** (0.0850)		-0.0660 (0.0783)	-1.052 (0.741)
R^2	0.737	0.809	0.776	0.736	0.836
N	1309	1309	1309	8488	8488
Year FE	-	-	-	yes	yes
Source country FE	-	yes	-	no	yes
Recipient country FE	-	-	yes	no	yes

* $p < 0.1$, ** $p < 0.05$; *** $p < 0.01$
Robust standard errors in parentheses in Columns (1)-(3).
Clustered standard errors (country pairs) in Columns (4) and (5).
Dependent variable: $\log(\text{assets}_{ijt})$. Constant not reported.