1 THE NEXUS BETWEEN BANK M&AS AND FINANCIAL DEVELOPMENT

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Appendix

Table A1. Distribution of bank M&As by country.

Country	M&As	% from total	Domestic M&As	Cross-border M&As
Albania	8	4%	2	6
Bosnia and Herzegovina	10	5%	5	5
Bulgaria	11	5%	6	5
Croatia	15	7%	9	6
Czech Republic	12	6%	9	3
Estonia	3	1%	1	2
Hungary	10	5%	8	2
Latvia	8	4%	5	3
Lithuania	7	3%	6	1
North Macedonia	8	4%	3	5
Poland	25	12%	14	11
Romania	20	9%	10	10
Serbia	18	8%	7	11
Slovakia	6	3%	2	4
Slovenia	14	7%	9	5
Ukraine	38	18%	14	24
Total	213	100%	110	103

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Table A2. Distribution of bank M&As by year.

Year	M&As	% from total	Domestic M&As	Cross-border M&As
2000	19	9%	5	14
2001	8	4%	4	4
2002	10	5%	5	5
2003	8	4%	3	5
2004	8	4%	5	3
2005	9	4%	4	5
2006	22	10%	7	15
2007	19	9%	8	11
2008	15	7%	8	7
2009	9	4%	6	3
2010	8	4%	7	1
2011	10	5%	3	7
2012	14	7%	8	6
2013	15	7%	10	5
2014	15	7%	11	4
2015	12	6%	7	5
2016	8	4%	5	3
2017	2	1%	2	0
2018	2	1%	2	0
Total	213	100%	110	103

Table A3. Description of variables used in the empirical analysis.

Variables	Description	Level	Source		
Financial Development Index	The financial development index is constructed based on financial markets and institutions indices, and follows the methodology of Sahay et al. (2015). The index takes values from 0 to 1, higher values being associated with increased financial development	per country	Sahay	et	al. (2015)
Financial Institutions Index	The financial institutions index is constructed based on financial institutions depth, access and efficiency, and follows the methodology of Sahay et al. (2015). The index takes values from 0 to 1, higher values being associated with more developed financial institutions	per country	Sahay	et	al. (2015)
Financial Institutions Depth	Financial institutions depth is constucted based on private sector credit (% of GDP), pension funds assets (% of GDP), mutual funds assets (% of GDP) and Insurance premiums, life and non-life (% of GDP), and follows the methodology of Sahay et al. (2015). It takes values from 0 to 1, higher values being associated with increased financial institutions depth	per country	Sahay	et	al. (2015)
Financial Institutions Access	Financial institutions access is constucted based on branches (commercial banks) per 100,000 adults and ATMs per 100,000 adults, and follows the methodology of Sahay et al. (2015). It takes values from 0 to 1, higher values being associated with increased financial institutions acess	per country	Sahay	et	al. (2015)
Financial Institutions Efficiency	Financial institutions efficiency is constucted based on net interest margin, lending-deposits spread, non-interest income to total income, overhead costs to total assets, return on assets and return on equity, and	per country	Sahay	et	al. (2015)

Variables	Description	Level	Source
	follows the methodology of Sahay et al. (2015). It takes values from 0 to 1, higher values being associated with increased financial institutions efficiency		
M&As	The number of mergers and acquisitions a financial institution has been involved in a particular year	per bank	Zephyr
Domestic M&As	The number of domestic mergers and acquisitions a financial institution has been involved in a particular year	per bank	Zephyr
Cross-border M&As	The number of cross-border merger and acquisitions a financial institution has been involved in a particular year	per bank	Zephyr
Cumulative M&As	The cumulative sum of th number of mergers and acquisitions a financial institution has been involved	per bank	Zephyr
Cumulative Domestic M&As	The cumulative sum of th number of domestic mergers and acquisitions a financial institution has been involved	per bank	Zephyr
Cumulative Cross-border M&As	The cumulative sum of th number of cross-border mergers and acquisitions a financial institution has been involved	per bank	Zephyr
Bank Z-score	It captures the probability of default of a country's commercial banking system, calculated as a weighted average of the Z-scores of a country's individual banks (the weights are based on the individual banks' total assets). Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns. It is estimated as (ROA+(equity/assets))/sd(ROA, where sd(ROA) is the standard deviation of Return on Assets. Higher values indicate a lower probability of default	per country	GFDD
Bank Concentration (%)	Assets of three largest commercial banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets	per country	GFDD
Real GDP Growth (%)	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars	per country	WDI
Inflation (%)	Inflation as measured by the annual growth rate of the GDP implicit deflator. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency	per country	WDI
Governance Index	Index constructed as the equally-weighted average of the Worldwide Governance Indicators (WGI): (i) voice and accountability; (ii) political stability and absence of violence; (iii) government effectiveness; (iv) regulatory quality; (v) rule of law; and (vi) control of corruption. A higher index value implies higher degree of governance	per country	Kaufmann and Kraay (2011)

Note: GFDD stands for Global Financial Development Database, WDI stands for World Development Indicators.

Table A4. Correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Financial Development Index	1.0000												
(2) Financial Institutions Index	0.7491*	1.0000											
(3) Financial Institutions Depth	0.7871*	0.7502*	1.0000										
(4) Financial Institutions Access	0.5886*	0.9138*	0.5133*	1.0000									
(5) Financial Institutions Efficiency	0.3839*	0.5161*	0.3436*	0.2227*	1.0000								
(6) M&As	-0.0435	-0.1110*	-0.0609	-0.0650	-0.1836*	1.0000							
(7) Domestic M&As	0.0841	0.0356	0.0511	0.0565	-0.0762	0.7236*	1.0000						
(8) Cross-border M&As	-0.1389*	-0.1918*	-0.1339*	-0.1447*	-0.1945*	0.7794*	0.1315*	1.0000					
(9) Bank Z-score	-0.2975*	-0.2418*	-0.2249*	-0.2011*	-0.1289*	-0.1108*	-0.1362*	-0.0359	1.0000				
(10) Bank Concentration	-0.3018*	-0.2059*	-0.0622	-0.3533*	0.2385*	-0.2663*	-0.2524*	-0.1531*	-0.0674	1.0000			
(11) Real GDP Growth	-0.1859*	-0.2172*	-0.2219*	-0.2609*	0.1283*	-0.0383	-0.1212*	0.0550	0.0911	0.1646*	1.0000		
(12) Inflation	-0.2308*	-0.3402*	-0.2838*	-0.2450*	-0.3225*	0.1977*	0.0722	0.2185*	-0.1200*	-0.0895	0.1636*	1.0000	
(13) Governance Index	0.6077*	0.5384*	0.6673*	0.3140*	0.4554*	-0.1944*	-0.0390	-0.2439*	-0.1926*	0.2586*	-0.0064	-0.3629*	1.0000

Note: This table exhibits the correlation matrix of the variables used in the empirical analysis. A complete description of variables can be found in Table A3 from Appendix.

* denote statistical significance at the maximum level of significance of 10%.

Table A5. The impact of cumulative domestic M&As on financial development before the global financial crisis.

Variables	(1) Financial Development Index	(2) Financial Institutions Index	(3) Financial Institutions Depth	(4) Financial Institutions Access	(5) Financial Institutions Efficiency
Cumulative Domestic M&As	0.0036	0.0053	0.0054	0.0008	0.0109
	(0.0069)	(0.0062)	(0.0066)	(0.0102)	(0.0093)
Bank Z-score (t-1)	0.0026	-0.0050*	0.0008	-0.0057	-0.0115*
	(0.0020)	(0.0024)	(0.0018)	(0.0036)	(0.0056)
Bank Concentration (t-1)	0.0011*	-0.0004	-0.0003	0.0001	-0.0011
	(0.0006)	(0.0007)	(0.0007)	(0.0010)	(0.0015)
Real GDP Growth (t-1)	0.0010	0.0022	0.0016	-0.0011	0.0078*
	(0.0011)	(0.0013)	(0.0014)	(0.0022)	(0.0039)
Inflation (t-1)	0.0005	0.0004	0.0004	0.0001	0.0009
	(0.0004)	(0.0004)	(0.0005)	(0.0006)	(0.0008)
Governance Index (t-1)	-0.0742**	0.0156	-0.1030	0.0812	0.0948
	(0.0310)	(0.0506)	(0.0615)	(0.0696)	(0.1192)
Constant	0.1271**	0.3706***	0.1408**	0.3583***	0.6245***
	(0.0541)	(0.0661)	(0.0519)	(0.1035)	(0.1182)
Observations	112	112	112	112	112
Countries	16	16	16	16	16
R-squared	0.758	0.858	0.627	0.829	0.500
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: This table exhibits the estimation results of Eq. (2). A complete description of variables can be found in Table A3 from the Appendix. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10%, respectively.

Table A6. The impact of cumulative domestic M&As on financial development after the global financial crisis.

Variables	(1) Financial Development Index	(2) Financial Institutions Index	(3) Financial Institutions Depth	(4) Financial Institutions Access	(5) Financial Institutions Efficiency
Cumulative Domestic M&As	-0.0036	-0.0037	-0.0086***	-0.0040	0.0063
	(0.0036)	(0.0032)	(0.0024)	(0.0068)	(0.0045)
Bank Z-score (t-1)	-0.0001	-0.0002	-0.0024	-0.0012	0.0051
	(0.0022)	(0.0028)	(0.0021)	(0.0056)	(0.0061)
Bank Concentration (t-1)	-0.0007	-0.0004	-0.0003	-0.0015	0.0015
	(0.0005)	(0.0007)	(0.0005)	(0.0012)	(0.0010)
Real GDP Growth (t-1)	-0.0018**	-0.0013	-0.0020**	-0.0032	0.0037*
	(0.0007)	(0.0011)	(0.0009)	(0.0025)	(0.0019)
Inflation (t-1)	-0.0001	-0.0000	-0.0002	0.0006	-0.0008
	(0.0006)	(0.0010)	(0.0008)	(0.0021)	(0.0012)
Governance Index (t-1)	0.0833*	-0.0247	0.0598	-0.1799*	0.1045
	(0.0457)	(0.0506)	(0.0374)	(0.0874)	(0.1039)
Constant	0.3728***	0.5570***	0.2866***	0.7821***	0.4110***
	(0.0335)	(0.0566)	(0.0395)	(0.0845)	(0.0697)
Observations	175	175	175	175	175
Countries	16	16	16	16	16
R-squared	0.283	0.0847	0.338	0.284	0.327
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: This table exhibits the estimation results of Eq. (2). A complete description of variables can be found in Table A3 from the Appendix. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10%, respectively.

Table A7. The impact of cumulative cross-border M&As on financial development before the global financial crisis.

Variables	(1) Financial Development Index	(2) Financial Institutions Index	(3) Financial Institutions Depth	(4) Financial Institutions Access	(5) Financial Institutions Efficiency
Cumulative Cross-border M&As	0.0029*	0.0017	-0.0012	0.0047	0.0010
	(0.0015)	(0.0033)	(0.0020)	(0.0049)	(0.0056)
Bank Z-score (t-1)	0.0031	-0.0044*	0.0013	-0.0054	-0.0104*
	(0.0019)	(0.0025)	(0.0019)	(0.0036)	(0.0053)
Bank Concentration (t-1)	0.0012**	-0.0004	-0.0005	0.0003	-0.0013
	(0.0006)	(0.0007)	(0.0007)	(0.0008)	(0.0015)
Real GDP Growth (t-1)	0.0019	0.0029*	0.0016	0.0000	0.0087*
	(0.0012)	(0.0015)	(0.0016)	(0.0021)	(0.0045)
Inflation (t-1)	0.0004	0.0004	0.0004	0.0000	0.0008
	(0.0004)	(0.0004)	(0.0005)	(0.0005)	(0.0008)
Governance Index (t-1)	-0.0985***	-0.0083	-0.1130*	0.0569	0.0582
	(0.0281)	(0.0457)	(0.0543)	(0.0496)	(0.0998)
Constant	0.1169**	0.3703***	0.1571***	0.3333***	0.6380***
	(0.0486)	(0.0635)	(0.0500)	(0.0861)	(0.1242)
Observations	112	112	112	112	112
Countries	16	16	16	16	16
R-squared	0.762	0.856	0.622	0.834	0.491
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

Note: This table exhibits the estimation results of Eq. (2). A complete description of variables can be found in Table A3 from the Appendix. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10%, respectively.

Table A8. The impact of cumulative cross-border M&As on financial development after the global financial crisis.

Variables	(1) Financial Development Index	(2) Financial Institutions Index	(3) Financial Institutions Depth	(4) Financial Institutions Access	(5) Financial Institutions Efficiency
Cumulative Cross-border M&As	0.0050*	0.0078*	-0.0029	0.0133	0.0130
	(0.0028)	(0.0040)	(0.0036)	(0.0083)	(0.0075)
Bank Z-score (t-1)	0.0016	0.0017	0.0007	0.0011	0.0036
	(0.0022)	(0.0028)	(0.0029)	(0.0056)	(0.0061)
Bank Concentration (t-1)	-0.0006	-0.0001	-0.0004	-0.0011	0.0019
	(0.0005)	(0.0007)	(0.0006)	(0.0013)	(0.0011)
Real GDP Growth (t-1)	-0.0017**	-0.0010	-0.0026**	-0.0026	0.0047**
	(0.0006)	(0.0009)	(0.0010)	(0.0022)	(0.0019)
Inflation (t-1)	-0.0001	-0.0001	-0.0002	0.0005	-0.0008
	(0.0005)	(0.0009)	(0.0008)	(0.0018)	(0.0013)
Governance Index (t-1)	0.1062**	0.0033	0.0885**	-0.1409	0.1024
	(0.0426)	(0.0478)	(0.0339)	(0.0899)	(0.0967)
Constant	0.3089***	0.4709***	0.2503***	0.6503***	0.3527***
	(0.0402)	(0.0517)	(0.0500)	(0.0906)	(0.0821)
Observations	175	175	175	175	175
Countries	16	16	16	16	16
R-squared	0.286	0.123	0.207	0.324	0.345
Country FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES

*Note: This table exhibits the estimation results of Eq. (2). A complete description of variables can be found in Table A3 from the Appendix. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1%, 5% and 10%, respectively.*