Online appendix: Fintech credit markets around the world: size, drivers and policy issues[1]

Fintech credit volumes by country

Fintech credit volumes

	Level (USD, in millions)		Annualised growth 2013–16 (%)	Memo: Volume per capita in 2016 (USD)
	2013	2016		
Australia	12	549	258	22.5
Brazil	1	61	294	0.3
Canada	8	169	176	4.7
Chile	12	93	98	5.1
China	5,547	240,905	252	174.2
Colombia	...	131	...	2.7
Estonia	...	83	...	63.0
Finland	...	119	...	21.7
France	59	338	79	5.2
Georgia	...	111	...	30.1
Germany	48	233	69	2.8
India	4	90	182	0.1
Ireland	...	81	...	17.3
Israel	...	33	...	3.9
Italy	0	114	...	1.9
Japan	79	380	69	3.0
Korea	1	368	617	7.2
Mexico	1	106	373	0.9
Netherlands	48	165	51	9.7
New Zealand	<1	190	668	40.1
Nigeria	...	36	...	0.2
Poland	...	35	...	0.9
Singapore	0	101	...	18.0
Spain	4	85	177	1.8
Sweden	...	7	...	0.7
United Kingdom	906	6,068	88	92.4
United States	3,757	32,414	105	100.2
World	10,555	283,529	199	50.5

Sources: Cambridge Centre for Alternative Finance and research partners; IMF, *World Economic Outlook*; BIS calculations.

[1] This appendix accompanies S Claessens, J Frost, G Turner and F Zhu, "Fintech credit markets around the world: size, drivers and policy issues", *BIS Quarterly Review*, September 2018.

Additional information on regressions

The analysis of drivers of fintech credit draws on multivariate cross-sectional regressions of fintech credit volumes per capita for a sample of 63 economies for 2016. Appendix Table 2 provides descriptive statistics of the variables.

Besides the regression results shown in Table 1 in the main text, we have conducted regressions with a number of additional control variables, as follows:

$$c_i = \alpha_i + \beta_1 y_i + \beta_2 y_i^2 + \gamma LI_i + \delta RS_i + X_i + \varepsilon_i$$

where c_i is the volume of fintech credit per capita in economy i in 2016; y_i is the log of GDP per capita in economy i, and the variable y_i^2 is its quadratic term; LI_i is the Lerner index of banking sector markups in economy i; RS_i is a regulatory stringency index for the banking sector of economy i, as constructed by Navaretti et al (2017); and X_i is a vector of control variables. The control variables are growth in GDP and total credit; a dummy for whether a country had suffered a financial crisis since 2006; mobile phone penetration (given the mobile-based nature of many platforms); and the density of the bank branch network (which may capture both the reach of the banking sector and its relative cost base).[2]

Results are presented in Appendix Table 3. The additional variables turn out to be insignificant when considered alongside the three main variables. Exceptions are overall credit growth, which is negatively associated with business fintech credit per capita, and mobile phone penetration, which is negatively linked to consumer fintech credit. These insignificant or counterintuitive regression results could arise due to multicollinearity. For example, mobile phone penetration shows a high degree of correlation with GDP per capita. If GDP per capita and its quadratic term are left out,

Summary statistics for main variables					Appendix Table 2
Variable	Obs	Mean	Std dev	Min	Max
Fintech credit per capita (USD)	63	10.11	28.45	0	174.23
GDP per capita (USD)	63	21,616.07	16,527.04	751.86	62,645.55
Lerner index	63	0.26	0.14	−0.27	0.62
Regulatory stringency index	63	0.74	0.08	0.52	0.96
GDP growth (%)	63	3.64	2.17	−0.4	8.33
Credit growth (%)	62	7.42	8.22	−8.65	22.14
Crisis dummy (post-2006)	63	0.27	0.45	0	1
Mobile phones per 100 persons	62	113.38	32.62	37.37	196
Bank branches per 100,000 adults	63	22.98	23.44	1.71	145.99

Sources: Laeven and Valencia (2012); Cambridge Centre for Alternative Finance and research partners; IMF, *Financial Soundness Indicators*; IMF, *International Financial Statistics*; IMF, *World Economic Outlook*; World Bank, *Bank Regulation and Supervision Survey*; World Bank, Global Financial Development Database; Datastream; International Telecommunication Union; national data; BIS calculations.

[2]   Other financial inclusion-related measures, such as the relative number of individuals with bank accounts, or other measures of the reach of the existing financial system led to similar regression results. Note that these measures, like some of the other measures, can capture both potential demand and the actual supply of financial services.

Regression results for fintech credit volumes across countries, 2016

	Total fintech credit (1)	Total fintech credit (2)	Business credit (3)	Consumer credit (4)
GDP per capita (USD thousands)[1]	0.260***	0.209***	0.199**	0.136
GDP per capita squared[1]	–0.003**	–0.002*	–0.002*	–0.001
Lerner index[2]	5.142**	3.559*	3.716	3.910
Normalised regulation index[3]	–13.501**	–10.995**	–11.882**	–10.002*
GDP growth[2]	0.001	–0.080	0.135	–0.064
Crisis dummy (post-2006)	–0.239	–0.790	0.133	–1.075
Credit growth[2]	–0.053	–0.072	–0.072*	–0.068
Bank branches per adult pop[2]	–0.011	–0.007	0.0003	–0.020
Mobile penetration[3]	–0.015	–0.010	–0.008	–0.028*
CN dummy		4.394***		
US dummy		3.868***		
GB dummy		2.820***		
Constant	7.180*	6.078*	5.175	9.167
N	61	61	48	48
R squared	0.619	0.700	0.605	0.292

[1] Average from 2013–15.   [2] Average from 2010–15.   [3] In 2015.

*/**/*** indicates statistical significance at the 5/1/0.1% level.

Sources: Laeven and Valencia (2012); Cambridge Centre for Alternative Finance and research partners; IMF, *International Financial Statistics*; IMF, *World Economic Outlook*; World Bank, *Bank Regulation and Supervision Survey*; World Bank, Global Financial Development Database; Datastream; national data; BIS calculations.

then credit growth and mobile penetration are insignificant, while coefficients for the Lerner index and regulatory stringency remain significant.[3]

In order to explore the drivers of fintech credit relative to the factors explaining credit more generally, regressions have been conducted with fintech credit (lending volumes) divided by total credit (stocks). These regressions (available upon request) show broadly similar results, with a positive coefficient for the Lerner index and a negative coefficient for regulatory stringency. GDP per capita and its quadratic term are no longer significant, reflecting the fact that scaling by a country's level of credit already accounts for the well documented relationship between economic development and credit across countries. The dummy variables for China, the United States and the United Kingdom maintain their statistically significant positive coefficient, while other controls are generally insignificant.

[3]   The results are available upon request.