

Appendix

A Data Sources and Sample Makeup

A.1 Modern Dataset

Crisis Data Our data on banking crises identifying the start year of an event is taken from the systemic banking crises database ([Laeven and Valencia, 2020](#)).

Commodity Price Data Variables related to aggregate commodity price growth and its volatility are constructed from IMF Primary Commodity Prices (monthly data) using (fixed) weights from [Gruss and Kebhaj \(2019\)](#). Details of the weighting, data filtering and transformation are described in the main text of the paper.

Controls A substantial number of our control variables come from the World Bank World Development Indicators (WDI): Real GDP growth, Inflation (GDP deflator), M2/reserves, short-term debt (in % of total external debt), size (broad money as share of GDP), overseas development assistance (foreign aid) as a share of GNI, depreciation (growth rate of the annual LCU-US\$ exchange rate), total debt service (share of exports of goods, services and primary income), and trade openness (Merchandise trade as share of GDP).

For domestic credit to the private sector we adopt the change of the domestic credit-to-GDP ratio, where credit/GDP is taken from WDI, integrated with FinStats and Global Financial Development Database (GFDD) series (both also from the World Bank).³⁴

Public debt to GDP is taken from the IMF World Economic Outlook database. In a robustness check we use the growth of debt liabilities, taken from the *External Wealth of Nations* data updated from [Lane and Milesi-Ferretti \(2007\)](#).

Net foreign assets as a share of GDP are computed from assets and liabilities brought together in the same updated *External Wealth of Nations* database (Lane and Milesi-Ferretti, 2007). In robustness checks we use net capital inflows as a share of GDP from the IMF Financial Flows Analytics (FFA) Database. More specifically this refers to the ‘Total Net Nonofficial Inflows, in percent of GDP in U.S. Dollars.’

From the IMF International Financial Statistics we use lines 22d, 24, and 25: for liquidity we divide claims (22d) by demand deposits (24) and other deposits (25).

³⁴This variable is selected in [Jordà et al. \(2011, 2013, 2015, 2016\)](#) and [Gourinchas and Obstfeld \(2012\)](#) among others. We show in Table C-2 that results are qualitatively unchanged for the commodity price variables if we select real credit growth instead.

Conflict is taken from the UCDP/PRIO Armed Conflict Dataset (version 4-2016) which covers 1946-2015. We code countries as being in conflict if they have an intensity score of 2. The deposit insurance dummy (deposit guarantee scheme) is based on a July 2015 update of the 'Deposit Insurance Database' by [Demirguc-Kunt et al. \(2008\)](#). Fiscal crisis events are taken from the [Medas et al. \(2018\)](#) database, currency crises from the [Laeven and Valencia \(2020\)](#) dataset (we construct crisis start year dummies in both cases).

The 10-year Treasury constant maturity rate is taken from FRED. We select the year-end value on the final trading day of each year from this daily dataset.

For the closer analysis of credit and capital inflows we create dummies for 'bonanzas' and 'surges' following the definitions in [Caballero \(2016\)](#) and [Ghosh et al. \(2014\)](#), respectively. Note that these indicators are constructed from the 'raw' data and not the winsorized, MA-transformed version. Bonanzas are measured as periods of deviation from the (HP-filtered) long-run trend of credit volumes or net foreign assets (or net capital flows), where the threshold is taken as 1 or 2 standard deviation(s).³⁵ Surges are defined as periods when an observation of credit volume or capital flows is both in the top 30th percentile of an individual country and in the top 30th percentile of the entire sample of 60 countries.

For heterogeneity analysis we adopt data on exchange rate regime from [Ilzetzki et al. \(2019\)](#) and separate out countries with a hard peg or a fixed exchange rate; from the bilateral trade flow data by [Fouquin and Hugot \(2016, TRADHIST\)](#) we take the primary share of exports and aggregate this up at the exporter level for 1963-2014 — observations above the median of 28% are designated the 'high' share of primary exports. Alternatively, we split the same into two groups of countries on the basis of 'high' primary export share (results not reported).

Sample Our sample is made up of 60 PRGT (Poverty Reduction and Growth Trust)-eligible low-income economies with 2,120 observations the over 1963-2015 period. A total of 73 countries are eligible, but we were forced to drop 13 of these due to insufficient data on control variables – the countries dropped are primarily fragile states (including Afghanistan, Somalia and South Sudan) or small island states (including Micronesia, Kiribati and the Marshall Islands), with Viet Nam the only notable larger economy omitted. None of the 13 countries dropped experienced a banking crisis in the 1963-2015 time period. In our sample of 60 countries 29 economies experienced 38 banking crises. In Table [A-1](#) below we report the sample make-up, indicating the *eight* crises we miss due to insufficient data on controls.

³⁵In the credit bonanza results adopting a 2 sd threshold identifies only a single event and is therefore not analysed.

Levels versus growth rates or ratios A common practice in most of the empirical literature on EWS is to include macroeconomic variables in levels—primarily per capita GDP—to the crisis prediction model (see, among others, [Aizenman and Noy, 2013](#); [Beck et al., 2006](#)). This practice is of concern when these macroeconomic variables display stochastic trends: the theoretical time series literature suggests that this data property leads to stark outcomes whereby the sample proportion of binary choices follows an arc sine law, meaning it is either close to zero or close to unity most of the time, implying either large numbers of repeated crises in individual countries alongside the virtual absence of crisis in all others ([Park and Phillips, 2000](#)). Since no country in our sample experienced more than two banking crises over the post-WWII period, it would be difficult to argue that our data represent an empirical example of the stochastic process just described. Therefore, in our empirical application we focus on growth rates or ratios, which are less likely to be characterized by a stochastic trend.

A.2 Historical Dataset

Banking Crises We adopt the crisis database constructed by Reinhart and Rogoff (2009) as our main source for banking crises start years and duration ('ongoing crisis years'). Since Cuba and Serbia are not covered we use information from Shelton (1994) for the former (1866 and 1920) and Stojanovic (2010) for pre-WWI (1908, 1912) and Nikolic (2016), corroborated by Grossman (2010) for 1931, for the latter. Following an extensive literature search, there are no indications of banking crises in French Indo-China in the sample period.

Commodity Price Data Variables related to aggregate commodity price growth and its volatility are constructed from international commodity price series in Federico and Tena-Junguito (FT, 2016, annual data) using (fixed) trade weights from Blattman, Hwang and Williamson (BHW, 2007). The FT data stretches back to the early 19th century, although for the purpose of constructing aggregate commodity price series the gaps for individual commodities imply that broad coverage is only available from the mid-1840s. BHW's raw commodity price data coverage extends beyond the 1865 start date for the constructed indices, but we have overall much-improved coverage by using FT price series instead. BHW report results for 35 countries, of which they classify 29 as 'periphery' (France, Germany, Britain, Italy, Austria-Hungary and the US are the 'core'). We add a further 12 peripheral countries to our sample: the export-share data for Sweden are missing in the BHW spreadsheet, and we construct these from Jorberg (1965). For Finland we use Hjerpe (1989). Hanson (1980) provides export-share data for Algeria, Bolivia, Costa Rica, Ecuador and French Indochina. From Mitchell (2007) we get commodity export shares for Honduras, Paraguay and Venezuela, from Eddie

(1977) for Hungary and from Lampe (1975) for Romania.

For most of these countries we have several (up to annual) export shares and in our empirical results we adopt the mean export weights for the entire 19th and 20th century time horizon, following the suggestion in [Ciccone \(2018\)](#). For those countries with sufficient data we can restrict the weights to the 19th century: using country and time fixed effects the regression coefficient for the aggregate commodity price index based on the mean weights regressed on that for the 19th century mean weights is .908 (st.e. .006). Details of the construction of the commodity price growth and volatility variables are provided in the main text of the paper.

If we exclude the Scandinavian economies, the ‘European Periphery’ or the ‘rich European Offshoots’ (AUS, CAN, NZL) from the analysis we obtain qualitatively identical results (not reported) to those in the full sample banking crisis analysis. Similarly if we omit the sample years and countries which were not independent states (see footnote [29](#)).

Controls In our benchmark results in Table [7](#) of the main text we use indicator variables for sovereign default start years (41) and ongoing sovereign default years (346); these are based on Reinhart and Rogoff’s (2009) crisis dataset. Additional information on Cuba and Serbia are taken from Shelton (1994) for the former, and Stojanovic (2010) and Nikolic (2016) for the latter.

Capital flow cycles studied in Reinhart, Reinhart and Trebesch (2016) offer an opportunity to control for global capital flow peaks (indicator variable). These indicators are global, not country-specific.

Details on the time periods when countries adopted the Gold Standard are available from Reinhart and Rogoff (2011), supplemented by other sources for Cuba and Serbia as above and Officer (2010) for French Indochina. All of these data are available for the 1848-1938 time period.

In the robustness checks in Table [8](#) of the main text we make use of the ‘pre-WWII’ data in Catao and Mano (CM, 2017), which covers 1870-1938. We adopt GDP growth, the foreign reserves ratio, the total public debt ratio and the government balance (all but the first are in terms of GDP). We add change in M2/GDP from CM to proxy credit booms. All variables in CM are lagged by one period, so we reverse this so as to apply our standard MA-transformation (as described in the maintext). The sample size drops substantially to between 43 and 60% of the full 40-country, 2,749 observation one.

Commercial Banking Many countries have data series stretching back to the early 19th century, but it would be misleading to include these observations in our analysis if no commercial banking existed at that point in time. We collate information on the first mention of commercial banking in each country from the following sources: AUS (1835), CAN (1820), DNK (1846), FIN (1862), JPN (1873), NOR (1848), SWE (1830) – Grossman (2010) Appendix Table 2.2; ARG (1822), BRA

(1851), MEX (1864) – Marichal (2008); all others (in alphabetical order): BOL (1872) – Banco National de Bolivia is among the oldest in the country, highlighting 1872 on their web pages, no other contenders were identified; COL (1864) – Safford (1965); CUB (1842) – Shelton (1994); CHN (-) – Ma (2012) mentions 1897 for the founding of Imperial Bank of China, the first ‘modern’ bank, however Reinhart and Rogoff (2009) record four banking crises prior to this date, although only one is described in the book appendix, p.357, and we therefore do not restrict the country sample’s 1852 start; CHL (1855) – Banco de Chile (n.d.); CRI (1877) – Banco de Costa Rica (n.d.); DZA (1851) – des Essars (1896); EGY (1898) – Yousef (2002); ESP (1856) – BBVA (n.d.); GRC (1841) – Bank of Greece (n.d.); HND (1903) – Bank of British Honduras appears to be the oldest, limited information available; HUN (1841) – Barcsay (1991); IDN (1827) – Skully (1982); IND (1809) – The Tribune (2005); LKA/Ceylon (1841) – Endagama (1988); MMR/Burma (1900) – Myanmar Times (2014); NZL (1861) – Singleton and Verhoef (2010); PER (1862) – Zegarra (2013); PHL (1851) – BPI (n.d.); PRT (1821) – Fraser et al (2013); PRY (1880) – we found no information on commercial banking history, and hence simply added 10 years prior to the 1890 crisis recorded by Reinhart and Rogoff (2009); ROM (1880) – Lampe (1977); RUS (1860) – Petrov (1990); SRB (1844) – Stojanovic (2010); THA (1855) – Ueda (1994); URY (1865) – Steinberg (2018); TUR (1844) – Pamuk (2004); VEN (1890) – Banco de Venezuela is mentioned in banksdaily.com’s directory; VNM (1875) – Robequain (1944).

Year of Independence We take this from Reinhart and Rogoff’s (2009) database and apply a reduced sample (post-independence) for the historical main results (see Footnote 29 in main text).

Sample Our sample is for 40 economies with 2,749 observations over the 1848-1938 period. 27 of these countries experienced 91 banking crises. In Table A-4 below we indicate the sample make-up, highlighting the *six* crises we miss due to the conventional practice of excluding the years and immediate aftermath of the Great War from analysis. We further highlight that there were a total of 54 ‘ongoing crisis years’ which are excluded as well.

A.3 Additional Sources (primarily for the Historical Data)

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- [4]. Bank of Greece (n.d.) *Historical Review*. <https://www.bankofgreece.gr/en/the-bank/history/historical-review>
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Table A-1: Regression Sample Makeup (Modern Dataset)

	ISO	Name	Obs	Start	End	Banking Crises						
						All	Year 1	Year 2	Sample	Year 1	Year 2	Drop
1	BDI	Burundi	46	1966	2015	1	1994		1	1994		
2	BEN	Benin	48	1964	2015	1	1988		1	1988		
3	BFA	Burkina Faso	48	1964	2015	1	1990		1	1990		
4	BGD	Bangladesh	40	1976	2015	1	1987		1	1987		
5	BOL	Bolivia	53	1963	2015	2	1986	1994	2	1986	1994	
6	BTN	Bhutan	31	1985	2015							
7	CAF	Central African Rep.	51	1964	2015	2	1976	1995	2	1976	1995	
8	CIV	Cote d'Ivoire	47	1964	2014	1	1988		1	1988		
9	CMR	Cameroon	47	1963	2015	2	1987	1995	2	1987	1995	
10	COG	Congo, Republic	51	1963	2015	1	1992		1	1992		
11	COM	Comoros	13	2002	2014							
12	CPV	Cape Verde	34	1982	2015							
13	DJI	Djibouti	20	1996	2015	1	1991		0			1
14	DMA	Dominica	37	1979	2015							
15	ERI	Eritrea	15	1997	2011	1	1993		0			1
16	ETH	Ethiopia	26	1983	2008							
17	GHA	Ghana	50	1963	2013	1	1982		1	1982		
18	GIN	Guinea	14	1993	2015	2	1985	1993	1		1993	1
19	GMB	The Gambia	47	1968	2014							
20	GNB	Guinea-Bissau	22	1991	2015	2	1995	2014	2	1995	2014	
21	GRD	Grenada	37	1979	2015							
22	GUY	Guyana	53	1963	2015	1	1993		1	1993		
23	HND	Honduras	53	1963	2015							
24	HTI	Haiti	17	1999	2015	1	1994		0			1
25	KEN	Kenya	46	1968	2015	2	1985	1992	2	1985	1992	
26	KGZ	Kyrgyz Republic	16	2000	2015	1	1995		0			1
27	KHM	Cambodia	21	1995	2015							
28	LAO	Lao PDR	20	1991	2010							
29	LCA	St. Lucia	34	1982	2015							
30	LSO	Lesotho	15	2001	2015							
31	MDA	Moldova	19	1997	2015	1	2014		1	2014		
32	MDG	Madagascar	52	1964	2015	1	1988		1	1988		
33	MDV	Maldives	13	2003	2015							
34	MLI	Mali	43	1969	2015	1	1987		1	1987		
35	MMR	Myanmar	12	2001	2012							
36	MNG	Mongolia	20	1993	2015	1	2008		1	2008		
37	MOZ	Mozambique	24	1992	2015	1	1987		0			1
38	MRT	Mauritania	34	1964	2012	1	1984		1	1984		
39	MWI	Malawi	48	1967	2014							
40	NER	Niger	50	1964	2015	1	1983		1	1983		
41	NGA	Nigeria	47	1963	2015	2	1991	2009	2	1991	2009	
42	NIC	Nicaragua	45	1963	2015	2	1990	2000	2	1990	2000	
43	NPL	Nepal	52	1964	2015	1	1988		1	1988		
44	PNG	Papua New Guinea	40	1975	2014							
45	RWA	Rwanda	50	1966	2015							
46	SDN	Sudan	53	1963	2015							
47	SEN	Senegal	49	1964	2015	1	1988		1	1988		
48	SLB	Solomon Islands	24	1992	2015							
49	SLE	Sierra Leone	49	1963	2015	1	1990		1	1990		
50	STP	São Tomé & Principle	13	2003	2015							
51	TCD	Chad	49	1963	2015	2	1983	1992	2	1983	1992	
52	TGO	Togo	51	1964	2015	1	1993		1	1993		
53	TJK	Tajikistan	16	2000	2015							
54	TON	Tonga	25	1991	2015							
55	TZA	Tanzania	26	1990	2015	1	1987		0			1
56	UGA	Uganda	25	1984	2015	1	1994		1	1994		
57	VCT	St. Vincent & Grenadines	39	1977	2015							
58	VUT	Vanuatu	34	1982	2015							
59	YEM	Yemen, Republic of	22	1992	2013	1	1996		1	1996		
60	ZMB	Zambia	44	1967	2015	1	1995		1			1
Total			2,120			45			38			7

Notes: 'All' indicates the number of crises from [Laeven and Valencia \(2020\)](#), 'sample' which ones make it into our regression sample. 'Drop' indicates the number of crises we miss out on due to lack of data on controls. The sample amounts to 2,120 observations in 60 countries over 1963-2015, 32 countries experience 38 banking crises. Over this time period 36 countries experienced a total of 45 crises, with the difference omitted due to data availability for covariates. The sample calculations are made on the basis of MA(3) variable transformation used in the main results for this 'modern' sample.

Table A-2: Descriptive Statistics (Modern Dataset)

Variable	Full sample 1963-2015					
	Obs	Mean	Median	SD	Min	Max
Banking Crisis dummy ‡	2,120	0.018	0		0	1
Commodity Price Growth	2,120	-0.073	-0.066	1.215	-7.014	7.992
Commodity Price Volatility	2,120	0.594	0.420	0.496	0.078	2.582
Conflict dummy	2,120	0.032	0		0	1
Deposit insurance dummy	2,120	0.104	0		0	1
Currency crisis (start year) dummy	2,120	0.027	0		0	0.333
Fiscal crisis (start year) dummy	2,120	0.079	0		0	0.667
US Treasury rate	2,120	6.093	5.587	2.584	2.200	12.367
Liquidity	2,120	0.968	0.795	0.595	0.147	3.250
Size	2,120	30.804	23.071	21.554	6.441	109.564
Real GDP growth (in %)	2,120	3.905	3.882	3.348	-8.337	18.042
Growth in Credit/GDP	2,120	3.364	3.105	11.562	-37.311	59.942
Reserves/GDP (in %)	2,120	11.332	8.993	9.563	0.201	52.349
Short-term debt as a share of total external debt (in %)	2,120	18.870	14.328	14.733	1.583	70.871
Inflation (in %)	2,120	11.460	7.260	16.580	-5.280	165.534
Change in Net Foreign Assets/GDP	2,120	-0.059	0.002	0.534	-5.729	0.494
Overseas Development Assistance/GNI (in %)	2,120	9.733	7.680	8.092	0	45.330
Trade Openness: Exports + Imports/GDP (in %)	2,120	52.089	47.265	26.644	11.326	142.712
Real Credit growth (in %)	1,780	-12.307	-7.834	17.585	-164.222	7.414
Public Debt/GDP (in %)	1,941	57.402	45.101	46.349	.346	270.183
Government Revenue/GDP (in %)	1,615	19.129	17.711	8.601	4.689	50.385
Debt service (in % of total exports of goods and services)	1,661	13.678	10.438	11.066	0.351	61.025
Exchange Rate Depreciation	2,120	0.059	0.018	0.130	-0.118	0.962
Credit/GDP Bonanza (1sd) dummy	2,109	0.003	0		0	0.667
Credit/GDP Surge (at time t) dummy	2,120	0.160	0		0	1
Credit/GDP Surge (3 consec. periods) dummy	2,120	0.154	0		0	1
Net Foreign Assets/GDP Bonanza (1sd) dummy	2,120	0.072	0		0	0.667
Net Foreign Assets/GDP Bonanza (2sd) dummy	2,120	0.016	0		0	0.333
Net Foreign Assets/GDP Surge (at time t) dummy	2,120	0.250	0.333		0	1
Net Capital Inflow/GDP Surge (3 consec. periods) dummy	2,120	0.150	0		0	1
Net Capital Inflow/GDP Bonanza (1sd) dummy	2,120	0.036	0		0	0.667
Net Capital Inflow/GDP Bonanza (2sd) dummy	2,120	0.004	0		0	0.333
Net Capital Inflow/GDP Surge (at time t) dummy	2,120	0.175	0		0	1
Net Capital Inflow/GDP Surge (3 consec. periods) dummy	2,120	0.141	0		0	1
Change in Real Credit (in %)	1,738	-12.374	-7.827	17.752	-164.222	7.414
Change in M2/GDP (in %)	2,120	0.612	0.558	1.988	-12.288	11.347
Real M2 Growth (in %)	2,119	4.268	5.822	11.089	-88.331	36.151
Net (non-official) capital inflows/GDP	1,608	3.079	1.979	5.105	-15.104	28.420
Total (non-official) capital inflows/GDP	1,608	4.436	2.828	5.678	-9.568	32.537
Total capital inflows/GDP	1,608	6.999	5.453	6.838	-13.714	37.019

Notes: We present descriptive statistics for $N = 60$ countries, covering 38 crises in the time period 1963-2015. The full sample has $n = 2,120$ observations. ‡ All variables are transformed into MA(3) processes with the exception of the banking crisis start year dependent variable and the revenue variable (only used in the regressions in Table 10 which do not feature MA-transformations). The MA(3) transformation explains why some of the dummy variables have maximum values of 0.33 (equal to 1 in one of three consecutive years) or 0.67 (equal to 1 in two of three consecutive years).

Table A-3: Commodity Groups and Commodities (Modern Dataset)

Primary Commodities Covered	
Agricultural raw materials	Food and Beverages (continued)
Cotton	Barley
Hard Logs	Beef
Hard sawnwood	Chicken
Hides	Cocoa
Natural rubber	Coffee
Soft logs	Corn
Soft sawnwood	Fish
Wool	Fish meal
Energy	Groundnuts
Coal	Lamb
Crude Oil	Olive oil
Natural gas	Oranges
Metals	Palm oil
Aluminium	Pork
Coppe	Rapeseed oil
Gold	Rice
Iron ore	Shrimp
Lead	Soybean meal
Nickel	Soybean oil
Tin	Soybeans
Uranium	Sugar
Zinc	Sunflower seed oil
Food and Beverages	Tea
Bananas	Wheat

Notes: We present the primary commodities covered in the construction of the aggregate commodity price indeces [Gruss and Kebhaj \(2019\)](#).

Table A-4: Regression Sample Makeup (Historical Dataset)

	ISO	Name	Obs	Start	End	Ongoing	Banking Crises						
							All	Sample	Banking	Crisis	Start	Years	
1	ARG	Argentina	84	1848	1938	1	4	3	1890	<u>1914</u>	1931	1934	
2	AUS	Australia	84	1848	1938	1	2	2	1893	1931			
3	BOL	Bolivia	62	1871	1938	0							
4	BRA	Brazil	79	1852	1938	2	7	6	1890	1897	1900	<u>1914</u>	1923
5	CAN	Canada	81	1852	1938	0	6	6	1866	1873	1906	1908	1912
6	CHL	Chile	77	1855	1938	1	5	4	1890	1899	1907	<u>1915</u>	1926
7	CHN	China	72	1852	1938	9	9	9	1863	1866	1873	1883	1897
8	COL	Colombia	69	1864	1938	0							
9	CRI	Costa Rica	56	1877	1938	0							
10	CUB	Cuba	85	1848	1938	0	2	2	1866	1920			
11	DNK	Denmark	85	1848	1938	0	7	7	1857	1877	1885	1902	1907
12	DZA	Algeria	81	1852	1938	0							
13	ECU	Ecuador	27	1906	1938	0							
14	EGY	Egypt	35	1898	1938	0	1	1	1907				
15	ESP	Spain	72	1856	1938	5	2	2	1920	1931			
16	FIN	Finland	71	1862	1938	0	2	2	1921	1931			
17	GRC	Greece	81	1852	1938	0	1	1	1931				
18	HND	Honduras	30	1903	1938	0							
19	HUN	Hungary	85	1848	1938	0	1	1	1931				
20	IDN	Indonesia	81	1852	1938	0							
21	IND	India	79	1848	1938	9	5	5	1863	1908	1913	1921	1929
22	JPN	Japan	59	1873	1938	1	6	4	1901	1907	<u>1914</u>	<u>1917</u>	1923
23	LKA	Ceylon	81	1852	1938	0							
24	MEX	Mexico	65	1864	1938	4	5	5	1883	1907	1913	1920	1929
25	MMR	Burma	33	1900	1938	0							
26	NOR	Norway	77	1852	1938	4	4	3	1898	<u>1914</u>	1921	1931	
27	NZL	New Zealand	67	1861	1938	5	1	1	1890				
28	PER	Peru	67	1862	1938	4	1	1	1872				
29	PHL	Philippines	81	1852	1938	0							
30	PRT	Portugal	80	1852	1938	2	4	4	1890	1920	1923	1931	
31	PRY	Paraguay	53	1880	1938	0	1	1	1890				
32	ROM	Romania	53	1880	1938	0	1	1	1931				
33	RUS	Russia	72	1860	1938	1	3	3	1862	1875	1896		
34	SRB	Serbia	81	1852	1938	0	4	4	1875	1908	1912	1931	
35	SWE	Sweden	76	1852	1938	5	4	4	1876	1907	1922	1931	
36	THA	Thailand	78	1855	1938	0							
37	TUR	Turkey	81	1852	1938	0	1	1	1931				
38	URY	Uruguay	68	1865	1938	0	2	2	1893	1898			
39	VEN	Venezuela	43	1890	1938	0							
40	VNM	Indochina	58	1875	1938	0							
Total			2,749			54	91	85					

Notes: We report the sample observation count, the start and end years of the country samples, as well as the number of observations dropped since they constitute 'Ongoing' banking crisis years (these are not included in the total observation count). For banking crises, 'All' indicates the number of crises from [Reinhart and Rogoff \(2009\)](#), while 'Sample' counts only those which make it into our regression sample: six crises are not included in the analysis since they fall in the 1914-19 (slightly extended) Great War period, which by convention is not included in the analysis — these crisis years are underlined. The sample amounts to 2,749 observations in 40 countries over 1848-1938, 27 countries experienced 85 banking crises. There were an additional 54 'ongoing' crisis years. The sample calculations are made on the basis of MA(3) variable transformation used in the main results for this 'historical' sample.

Table A-5: Descriptive Statistics (Historical Dataset)

Variable	Full sample 1848-1938					
	Obs	Mean	Median	SD	Min	Max
Banking Crisis dummy ‡	2,749	0.031	0		0	1
Commodity Price Growth	2,749	-1.288	-0.709	10.898	-56.273	56.436
Commodity Price Volatility	2,749	18.832	12.558	18.431	4.197	124.309
Sovereign Default dummy	2,749	0.015	0		0	0.333
Ongoing Sovereign Default dummy	2,749	0.126	0		0	1
Capital Flow Cycle Peak dummy	2,749	0.083	0		0	1
Gold Standard dummy	2,749	0.312	0		0	1
GDP growth	1,328	2.770	2.645	3.769	-19.384	21.875
Forex reserves/GDP	1,209	0.052	0.041	0.046	0.001	0.347
Change in M2/GDP	1,147	0.002	0.002	0.021	-0.141	0.116
Total Public Debt/GDP	1,335	0.605	0.423	0.544	0.004	3.132
Government Balance/GDP	1,326	-0.015	-0.008	0.036	-0.680	0.074

Notes: We present descriptive statistics for $N = 40$ countries, covering 85 crises in the time period 1848-1938. The full sample has $n = 2,749$ observations. ‡ All variables are transformed into MA(3) processes with the exception of the banking crisis start year dependent variable. This MA(3) transformation explains why some of the dummy variables have maximum values of 0.333 (equal to 1 in one of three consecutive years). The sample size is reduced for the alternative specifications in Table 8 in the main text, for which variables for 1871-1938 are taken from [Catão and Mano \(2017\)](#).

Table A-6: Commodities (Historical Dataset)

Primary Commodities Covered	
Beans and Bean Products	Minerals
Butter	Nitrate
Cocoa	Non-Ferrous Metals
Coffee	Oil and Oil Products
Copper	Olive Oil
Copra	Opium
Cork & Products	Paper
Cotton	Petroleum
Dried Plums	Raw Cotton
Fish	Raw Silk
Flax	Rice
Fruit & Nuts	Rubber
Grain	Silver
Hemp	Sugar
Hides and Skins	Tea
Iron & Steel	Tin
Iron Ore	Tobacco
Jute	Wheat
Lead	Wine
Linseed	Wood
Livestock	Wood & Products
Lumber	Wood Pulp
Maize	Wool
Meat	Wool & Mohair
Milk	Zinc

Notes: We present the primary commodities covered in the combination of the price indices of [Federico and Tena-Junguito \(2019\)](#) and the trade weights of [Blattman et al. \(2007\)](#).

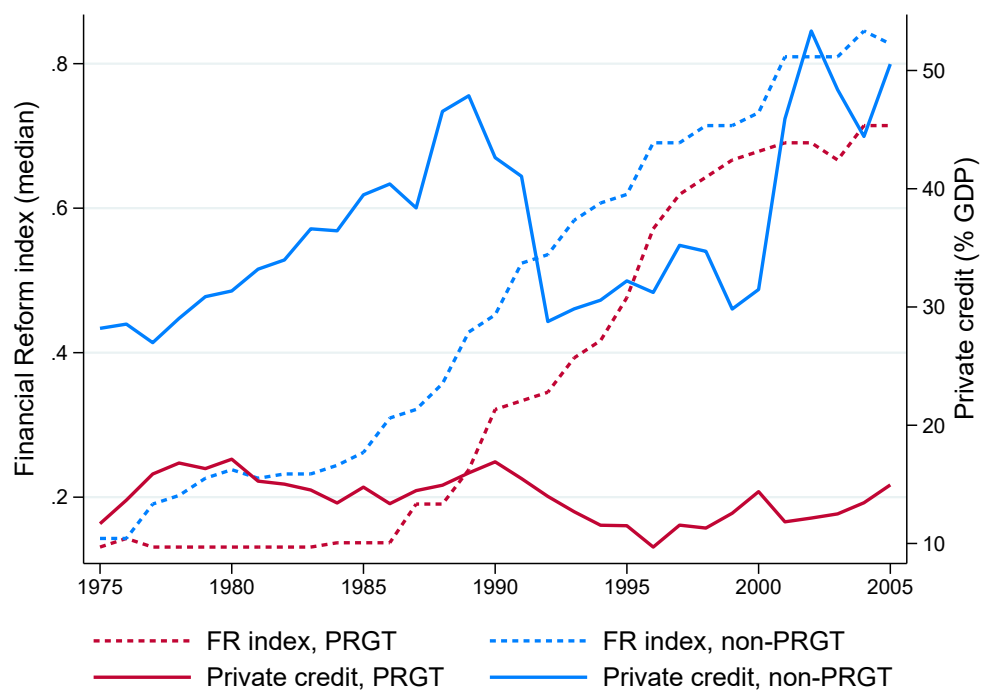
B Additional Figures

Figure B-1: Bank Profitability and Asset Quality in LICs



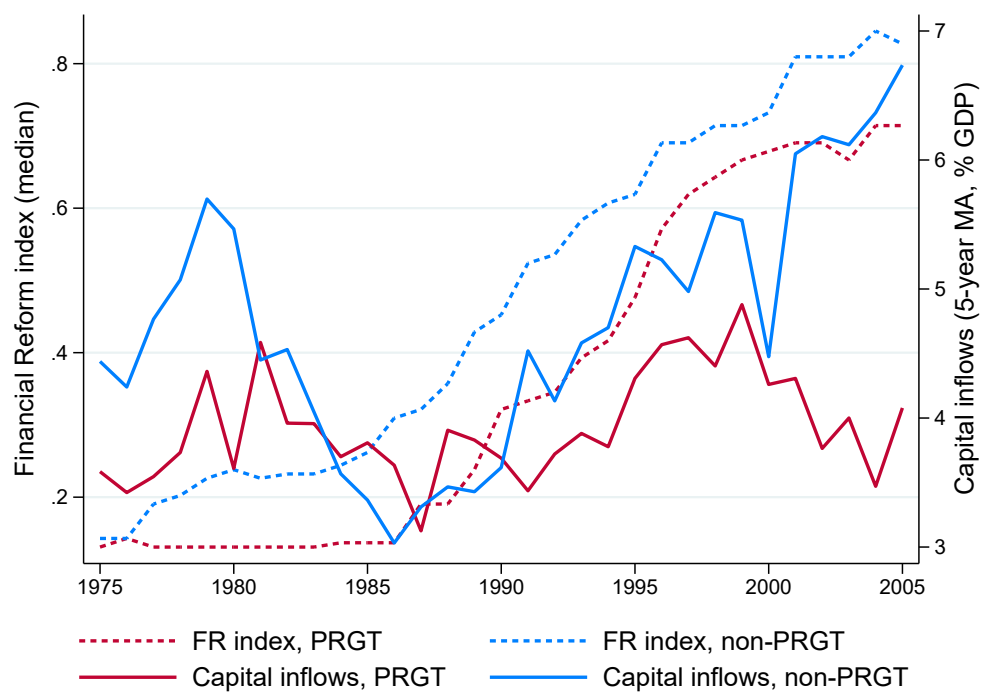
Notes: $N = 22$ PRGT-eligible countries with continuous annual observations for return on assets and non performing loans over gross loans between 2010 and 2018. Data are taken from the IMF Financial Soundness Indicators (FSI), available at <https://data.imf.org>.

Figure B-2: Financial Liberalization and Private Credit



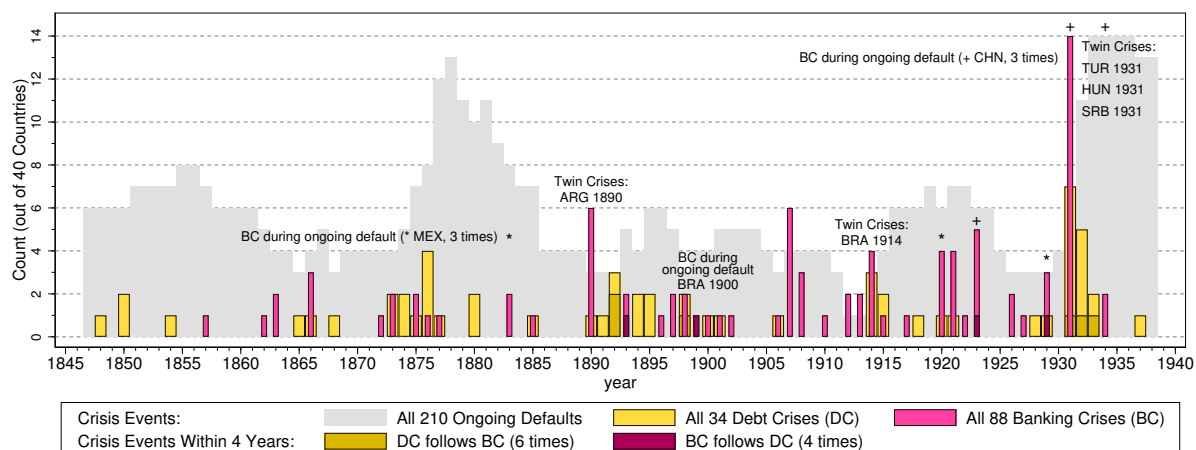
Notes: $N = 17$ PRGT-eligible economies and $N = 70$ non PRGT-eligible economies. FR is the normalized index of financial reforms, where larger values indicate stronger financial liberalization, measured across seven components (see [Abiad et al., 2008](#), for further details on the methodology of the index).

Figure B-3: Financial Liberalization and Private Capital Inflows



Notes: $N = 17$ PRGT-eligible economies and $N = 70$ non PRGT-eligible economies. FR is the normalized index of financial reforms, where larger values indicate stronger financial liberalization, measured across seven components (see [Abiad et al., 2008](#), for further details on the methodology of the index).

Figure B-4: Banking and Sovereign Debt Crises in Peripheral Economies (1848-1938)



Notes: $N = 40$ economies. In the empirical analysis we exclude 1914-19, which accounts for 10 Sovereign Defaults (DC) and 10 Banking Crises (BC). 7 BC take place when a country's sovereign default is ongoing: 3 times in MEX and CHN (marked with * and +), respectively, once in BRA. Five Twin Crises (debt default and banking crisis in the same year), three of which in 1931, are highlighted as well.

C Additional Regression Results

Table C-1: Main Results (Full) – Economic Magnitudes (1sd increase in covariate)

	RE-Mundlak Logit				Logit	FE Logit
DV: Crisis Start Year	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional Crisis Probability	1.79%	1.79%	1.79%	1.79%	1.79%	2.92%
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA(3) transformed)</i>						
Commodity Price Growth	0.145 (0.64)	0.120 (0.51)	0.152 (0.71)	0.081 (0.43)	0.108 (0.51)	0.357 (0.18)
Commodity Price Volatility	2.105 (2.81)***	1.943 (2.44)**	2.162 (2.33)**	2.473 (2.39)**	0.860 (3.06)***	18.792 (1.66)*
Conflict	0.105 (0.39)	-0.004 (0.02)	-0.246 (0.77)	-0.295 (1.11)	-0.351 (1.61)	-1.767 (0.13)
Deposit insurance	0.485 (1.34)	0.415 (1.04)	0.342 (0.96)	0.614 (1.64)	0.703 (3.27)***	3.640 (0.90)
Currency Crisis	0.213 (0.75)	0.185 (0.64)	0.053 (0.19)	0.099 (0.35)	0.124 (0.50)	0.707 (0.41)
Debt Crisis	-1.350 (2.34)**	-1.422 (2.43)**	-1.421 (2.56)**	-1.394 (2.40)**	-1.219 (2.25)**	-9.119 (0.34)
Risk-free rate	1.315 (5.19)***	1.417 (5.53)***	1.293 (3.92)***	1.453 (3.81)***	1.075 (3.72)***	10.363 (1.74)*
Liquidity		-0.274 (0.67)	-1.119 (2.49)**	-1.076 (2.07)**	-0.219 (0.73)	-9.350 (1.18)
Size		1.069 (1.94)*	-1.360 (1.60)	-0.573 (0.72)	-0.782 (1.49)	-2.234 (0.35)
Change in credit/GDP			-0.114 (0.40)	0.030 (0.10)	-0.134 (0.46)	0.761 (0.33)
Reserves/GDP			0.139 (0.23)	0.357 (0.57)	0.070 (0.17)	2.435 (0.59)
Short-term Public Debt			2.587 (3.53)***	2.239 (2.82)***	0.734 (1.41)	10.344 (1.15)
GDP growth			-0.238 (0.68)	-0.244 (0.77)	-0.401 (1.54)	-2.050 (0.70)
Inflation			0.696 (3.88)***	0.557 (3.37)***	0.478 (3.80)***	3.875 (1.21)
Change in Net Foreign Assets/GDP				0.678 (0.82)	0.438 (0.99)	4.172 (0.09)
Foreign Aid/GNI				1.058 (2.64)***	0.615 (2.91)***	6.301 (1.66)*
Trade Openness				-1.753 (2.30)**	-1.071 (2.36)**	-12.858 (1.11)
Observations	2,120	2,120	2,120	2,120	2,120	1,267
Countries	60	60	60	60	60	30
Crises	38	38	38	38	38	38
LogL	-170.28	-166.06	-152.58	-144.91	-161.33	-102.81
AUROC	0.779	0.803	0.867	0.883	0.816	0.759
se(AUROC)	0.035	0.031	0.022	0.023	0.036	0.036
Wald χ^2 (FE)	13.16	23.30	65.75	97.44		
Wald p -value	0.041	0.003	0.000	0.000		

Notes: All estimates shown are the economic magnitudes for a one standard deviation increase in the explanatory variable, expressed in percent. Absolute t -ratios in parentheses, based on standard errors computed via the Delta method from RE-Mundlak logit estimates (where in turn standard errors based on clustering at the country level). *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The dependent variable is a dummy for the crisis start year, years for ongoing banking crises are dropped as per convention in the literature. The winsorization is for the top and bottom 1% of observations for each variable. Our sample covers 1963-2015.

Table C-2: Alternative Debt Measures – Economic Magnitudes

	RE-Mundlak Logit			
	(1)	(2)	(3)	(4)
DV: Crisis Start Year				
Unconditional Crisis Probability	2.03%	2.15%	2.00%	1.79%
<i>Selected Covariates (in percent, winsorized tails 1%, MA(3) transformed)</i>				
Commodity Price Growth	0.036 (0.17)	0.246 (0.78)	0.014 (0.07)	0.085 (0.45)
Commodity Price Volatility	3.008 (2.94)***	3.438 (2.66)***	3.064 (3.07)***	2.471 (2.39)**
Public Debt/GDP	0.186			
Instead of ST Public Debt	(0.41)			
Debt Service/Exports		1.332		
Instead of ST Public Debt		(1.41)		
Growth in Debt Liabilities			-0.280	
Instead of ST Public Debt			(0.69)	
Depreciation				-0.052 (0.12)
Additional Covariate Groups ‡				
Banking System	×	×	×	×
Macro & Monetary Fundamentals	×	×	×	×
Aid and Capital Flows	×	×	×	×
Trade openness	×	×	×	×
Deposit Insurance & Crisis Dummies	×	×	×	×
10-yr US Treasury Rate eoy	×	×	×	×
Observations	1,979	1,631	1,901	2,117
Countries	60	60	60	60
Crises	38	35	38	38
LogL	-147.50	-131.16	-146.59	-144.85
AUROC	0.865	0.866	0.864	0.883
se(AUROC)	0.028	0.028	0.027	0.023
Wald χ^2 (FE)	53.83	55.72	47.66	102.57
Wald <i>p</i> -value	0.000	0.000	0.000	0.000
ROC Comp w/ baseline <i>p</i> -value ‡	0.127	0.879	0.116	0.668
Commodity Price Results, benchmark model				
Commodity Price Growth	0.091 (0.43)	0.216 (0.70)	0.080 (0.36)	0.081 (0.43)
Commodity Price Volatility	2.605 (2.26)**	2.994 (2.45)**	2.671 (2.24)**	2.481 (2.39)**

Notes: Estimates reported are economic magnitudes as in Table 1 in the maintext. Each column presents results from a specification which deviates from the benchmark in column [4] of Table 1 by one covariate, as indicated. Most of these alternative proxies are only available from the 1970s onwards. Due to the reduction in sample size of 10-23%, we report the economic magnitudes for the commodity price variables in the reduced-sample benchmark specification (including the ST debt variable instead) in the final rows of the Table. ‡ This compares the ROC between the benchmark model and the alternative presented – the null is that the two models have identical fit. Absolute *t*-ratios in parentheses based on standard errors computed via the delta method. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. ‡ Additional covariate groups: ‘Deposit Insurance & Crisis Dummies’ – deposit insurance, fiscal crisis and currency crisis dummies, conflict dummy; ‘Banking System’ – liquidity, size; ‘Trade, Aid & Capital Flows’ – change in net foreign assets, trade openness, foreign aid/GNI; ‘Macro & Monetary Fundamentals’ – real GDP growth, inflation, Reserves/GDP, short-term/total debt ratio.

Table C-3: Rare Events Logit – Raw Logit Coefficients

	RE-Mundlak Logit	Logit	RLogit	Logit MN	RLogit MN
DV: Crisis Start Year dummy	(1)	(2)	(3)	(4)	(5)
<i>Selected Covariates (in percent, winsorized tails 1% respectively)</i>					
Commodity Price Growth	0.039 (0.43)	0.053 (0.51)	0.058 (0.56)	0.041 (0.42)	0.055 (0.56)
Commodity Price Volatility	2.963 (2.37)**	1.044 (3.01)***	1.060 (3.08)***	3.016 (2.42)**	2.534 (2.07)**
Real GDP growth	-0.043 (0.77)	-0.072 (1.52)	-0.070 (1.49)	-0.046 (0.80)	-0.041 (0.72)
Change in Credit/GDP	0.002 (0.10)	-0.007 (0.46)	-0.007 (0.47)	0.001 (0.08)	0.001 (0.08)
Reserves/GDP	0.022 (0.57)	0.004 (0.17)	0.005 (0.20)	0.022 (0.55)	0.027 (0.69)
Short-term Public Debt	0.090 (2.91)***	0.030 (1.40)	0.026 (1.21)	0.093 (3.04)***	0.087 (2.90)***
Inflation	0.020 (3.24)***	0.017 (3.70)***	0.017 (3.66)***	0.021 (3.30)***	0.019 (2.97)***
Change in Net Foreign Assets/GDP	0.754 (0.81)	0.494 (0.99)	-0.013 (0.03)	0.728 (0.83)	0.035 (0.04)
Foreign Aid/GNI	0.078 (2.55)**	0.046 (3.05)***	0.046 (3.09)***	0.079 (2.37)**	0.069 (2.10)**
Trade Openness	-0.039 (2.27)**	-0.024 (2.36)**	-0.023 (2.22)**	-0.040 (2.32)**	-0.038 (2.24)**
Additional Covariate Groups					
10-yr US Treasury Rate eoy	×	×	×	×	×
Deposit Insurance & Crisis Dummies	×	×	×	×	×
Banking System	×	×	×	×	×
Observations	2,120	2,120	2,120	2,120	2,120
Countries	60	60	60	60	60
Crises	38	38	38	38	38
LogL	-144.91	-161.33		-144.92	
AUROC	0.883	0.816	0.810	0.885	0.881
se(AUROC)	0.023	0.036	0.036	0.023	0.023
Wald χ^2 (FE)	97.44	n/a	n/a	97.63	83.69
Wald <i>p</i> -value	0.000			0.000	0.000

Notes: All estimates shown are the raw logit estimates from the model as indicated: RE-M Logit — Random-Effects Mundlak Logit; Logit — Pooled Logit; RLogit — Rare Events Logit; Logit MN — Pooled Logit augmented with within averages of all covariates; RLogit MN — dto for Rare Events Logit. Absolute *t*-ratios in parentheses, standard errors are clustered at the country level. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table C-4: Alternative MA-transformation – Economic Magnitudes

DV: Crisis Start Year	RE-Mundlak Logit				
	(1)	(2)	(3)	(4)	(5)
Unconditional Crisis Probability	1.85%	1.79%	1.79%	1.79%	1.79%
MA-transformation	Lagged	MA(2)	MA(3)	MA(4)	MA(5)
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA-transformed)</i>					
Commodity Price Growth	-0.344 (1.26)	0.192 (0.98)	0.081 (0.43)	0.050 (0.19)	-0.009 (0.03)
Commodity Price Volatility	0.850 (1.81)*	2.147 (2.85)***	2.473 (2.39)**	2.922 (2.73)***	3.152 (2.74)***
Real GDP Growth	-0.073 (0.26)	-0.171 (0.52)	-0.244 (0.77)	-0.040 (0.13)	-0.129 (0.47)
Growth in Credit/GDP	0.519 (2.01)**	0.281 (1.10)	0.030 (0.10)	-0.066 (0.19)	-0.050 (0.14)
Reserves/GDP	0.612 (1.39)	0.743 (1.25)	0.357 (0.57)	0.326 (0.50)	0.248 (0.40)
Short-term Public Debt	1.725 (2.40)**	1.941 (2.51)**	2.239 (2.82)***	2.721 (3.18)***	2.560 (3.25)***
Inflation	0.492 (3.71)***	0.661 (4.22)***	0.557 (3.37)***	0.671 (3.41)***	0.659 (2.57)**
Change in Net Foreign Assets/GDP	3.480 (2.27)**	0.258 (0.44)	0.678 (0.82)	0.118 (0.81)	0.865 (3.12)***
Foreign Aid/GNI	0.960 (3.18)***	1.207 (3.30)***	1.058 (2.64)***	0.980 (2.19)**	0.897 (1.76)*
Trade Openness	-1.549 (2.17)**	-2.190 (3.19)***	-1.753 (2.30)**	-1.899 (2.33)**	-2.022 (2.47)**
Additional Covariate Groups					
Deposit Insurance & Crisis Dummies	×	×	×	×	×
10-yr US Treasury Rate eoy	×	×	×	×	×
Banking System	×	×	×	×	×
Observations	2,050	2,118	2,120	2,121	2,121
Countries	60	60	60	60	60
Crises	38	38	38	38	38
LogL	-148.64	-146.94	-144.91	-142.88	-146.19
AUROC	0.867	0.883	0.883	0.884	0.872
se(AUROC)	0.024	0.022	0.023	0.030	0.029
Wald χ^2 (FE)	174.02	112.53	97.44	150.34	152.57
Wald <i>p</i> -value	0.000	0.000	0.000	0.000	0.000

Notes: We present marginal effects (1sd increase in covariate) for the main empirical model (model (4) from Table 1) adopting different lag/MA-transformations for the data: in column (2) we transform all explanatory variables into MA(2) processes including variables at $t - 1$ and $t - 2$, for MA(3) we further add $t - 3$, for MA(4) $t - 4$, and for MA(5) $t - 5$. The model in (1) simply lags all regressors by a single time period, which is a widespread practice in the literature. Absolute *t*-ratios in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table C-5: Alternative Measures for Credit – Economic Magnitudes

Panel A	(1)	(2)	(3)	(4)	(5)	(6)
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA-transformed)</i>						
Commodity Price Growth						0.047 (0.25)
Commodity Price Volatility						2.487 (2.75)***
Change in M2/GDP	-0.077 (0.26)	-0.072 (0.22)	-0.013 (0.03)	-0.004 (0.01)	0.325 (0.93)	0.386 (1.10)
<i>Additional Covariate Groups†</i>						
10-yr US Treasury Rate eoy	×	×	×	×	×	×
Deposit Insurance & Crisis Dummies	×	×	×	×	×	×
Liquidity		×	×	×	×	×
ST Debt & Change in Credit/GDP‡			×	×	×	×
Reserves/GDP				×	×	×
All Macro & Monetary Fundamentals					×	×
Aid, Trade and Capital Flows					×	×
LogL	-173.95	-171.66	-166.65	-166.55	-147.08	-144.01
AUROC	0.766	0.767	0.805	0.804	0.878	0.886
se(AUROC)	0.034	0.035	0.030	0.031	0.024	0.023
Wald χ^2 (FE)	3.41	7.36	27.33	26.89	125.47	98.51
Wald <i>p</i> -value	0.636	0.289	0.001	0.001	0.000	0.000
Panel B	(7)	(8)	(9)	(10)	(11)	(12)
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA-transformed)</i>						
Commodity Price Growth						0.033 (0.18)
Commodity Price Volatility						2.306 (2.54)**
Real M2 Growth	-0.415 (2.65)***	-0.381 (2.40)**	-0.556 (2.90)***	-0.547 (2.78)***	0.289 (0.70)	0.328 (0.84)
LogL	-168.69	-166.40	-158.76	-158.70	-146.72	-144.03
AUROC	0.792	0.799	0.845	0.845	0.881	0.886
se(AUROC)	0.030	0.031	0.026	0.026	0.023	0.022
Wald χ^2 (FE)	8.10	23.48	52.35	51.20	102.19	76.14
Wald <i>p</i> -value	0.151	0.001	0.000	0.000	0.000	0.000
Panel C	(13)	(14)	(15)	(16)	(17)	(18)
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA-transformed)</i>						
Commodity Price Growth						0.169 (0.66)
Commodity Price Volatility						2.540 (2.07)**
Real Credit Growth	-0.579 (2.91)***	-0.675 (3.49)***	-0.898 (4.95)***	-0.886 (4.86)***	-1.536 (1.77)*	-1.498 (1.82)*
LogL	-158.55	-153.97	-151.14	-150.94	-142.52	-140.64
AUROC	0.788	0.810	0.825	0.824	0.859	0.863
se(AUROC)	0.033	0.031	0.030	0.031	0.028	0.027
Wald χ^2 (FE)	3.66	18.36	35.60	35.41	44.09	41.34
Wald <i>p</i> -value	0.599	0.010	0.000	0.000	0.000	0.000

Notes: These are alternative results for Change in M2/GDP, Real M2 Growth, and Real Credit Growth in Panels A, B, and C, respectively. All models in Panels A and B (C) have 2,119 (1,738) observations in 60 countries which experienced 38 (37) crises. The Unconditional Crisis Probabilities for these two samples are 1.79% and 2.12%, respectively. Estimates reported are economic magnitudes as in Table 1. Absolute *t*-ratios in parentheses based on standard errors computed via the delta method. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. † These controls are included as indicated in the models in all three panels. ‡ In Panel C the 'change in credit/GDP' variable is obviously excluded, while size (M2/GDP) is added to the model.

Table C-6: Alternative Measures for Capital Flows – Economic Magnitudes

Panel A	(1)	(2)	(3)	(4)	(5)
<i>Selected Covariates (in percent, winsorized tails 1%, MA-transformed)</i>					
Commodity Price Growth					0.307 (1.01)
Commodity Price Volatility					3.135 (2.29)**
Net Non-official Capital Inflows/GDP	0.290 (0.53)	0.127 (0.21)	0.476 (0.83)	0.638 (1.30)	0.659 (1.50)
<i>Additional Covariate Groups†</i>					
Deposit Insurance & Crisis Dummies	×	×	×	×	×
10-yr US Treasury Rate eoy	×	×	×	×	×
Banking System		×	×	×	×
Inflation & Monetary Fund.			×	×	×
Real GDP growth				×	×
Aid and Trade Flows				×	×
LogL	-149.28	-146.44	-139.09	-129.41	-125.31
AUROC	0.769	0.785	0.828	0.870	0.880
se(AUROC)	0.036	0.033	0.031	0.026	0.025
Wald χ^2 (FE)	6.22	12.69	28.66	90.45	77.82
Wald <i>p</i> -value	0.286	0.080	0.003	0.000	0.000
Panel B	(6)	(7)	(8)	(9)	(10)
<i>Selected Covariates (in percent, winsorized tails 1%, MA-transformed)</i>					
Commodity Price Growth					0.257 (0.87)
Commodity Price Volatility					3.021 (2.25)**
Total Non-official Capital Inflows/GDP	-0.043 (0.06)	-0.246 (0.32)	0.002 (0.00)	0.236 (0.33)	0.228 (0.35)
LogL	-149.75	-146.58	-139.53	-129.84	-125.86
AUROC	0.764	0.784	0.823	0.869	0.878
se(AUROC)	0.035	0.033	0.030	0.025	0.024
Wald χ^2 (FE)	2.68	10.81	30.15	81.40	73.29
Wald <i>p</i> -value	0.749	0.147	0.001	0.000	0.000
Panel C	(11)	(12)	(13)	(14)	(15)
<i>Selected Covariates (in percent, winsorized tails 1%, MA-transformed)</i>					
Commodity Price Growth					0.220 (0.74)
Commodity Price Volatility					2.924 (2.30)**
Total Capital Inflows/GDP	0.323 (0.64)	0.287 (0.47)	0.050 (0.10)	-0.217 (0.35)	-0.382 (0.58)
LogL	-150.20	-146.38	-139.19	-129.90	-125.76
AUROC	0.770	0.784	0.826	0.870	0.878
se(AUROC)	0.034	0.032	0.031	0.025	0.024
Wald χ^2 (FE)	3.75	11.33	31.81	82.74	72.32
Wald <i>p</i> -value	0.586	0.125	0.001	0.000	0.000

Notes: These are alternative results for Net Non-Official Capital Inflows/GDP, Total Non-Official Capital Inflows/GDP, and Total Capital Inflows/GDP in Panels A, B, and C, respectively. All models have 1,608 observations in 60 countries which experienced 34 banking crises. The Unconditional Crisis Probabilities for this sample is 2.11%. Estimates reported are economic magnitudes as in Table 1. Absolute *t*-ratios in parentheses based on standard errors computed via the delta method. *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. † Controls as indicated are included in models in [all](#) three panels.

Table C-7: Total Capital Flow Bonanzas and Surges – Raw Logit Coefficients

DV: Crisis Start Year dummy	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Total Capital Inflows				Total Non-Official Capital Inflows				
Definition [†]		Bonanza 1sd	Surge time t	Surge consec		Bonanza 1sd	Bonanza 2sd	Surge time t	Surge consec
Bonanza or Surge Count		88	315	244		59	8	372	292
Selected Covariates (in percent, winsorized tails 1% respectively, MA-transformed)									
Commodity Price Growth	0.095 (0.75)	0.090 (0.71)	0.095 (0.70)	0.106 (0.76)	0.111 (0.88)	0.063 (0.48)	0.094 (0.73)	0.113 (0.89)	0.105 (0.83)
Commodity Price Volatility	3.264 (2.27)**	3.359 (2.28)**	3.281 (2.31)**	3.358 (2.41)**	3.373 (2.22)**	3.645 (2.49)**	3.353 (2.26)**	3.430 (2.31)**	3.458 (2.37)**
Total capital inflows/GDP _‡	-0.028 (0.58)				0.020 (0.35)				
Capital Flow Bonanza _‡		-2.152 (1.06)				-5.899 (2.39)**	-0.673 (0.21)		
Capital Flow Surge _‡			-1.239 (1.18)	-1.179 (1.29)				0.375 (0.49)	0.301 (0.37)
Additional Covariate Groups [‡]									
Banking System	×	×	×	×	×	×	×	×	×
Macro & Monetary Fund.	×	×	×	×	×	×	×	×	×
Aid & Trade	×	×	×	×	×	×	×	×	×
Deposit Insurance & Crises	×	×	×	×	×	×	×	×	×
10-yr US Treasury Rate eoy	×	×	×	×	×	×	×	×	×
Observations	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608	1,608
Countries	60	60	60	60	60	60	60	60	60
Crises	34	34	34	34	34	34	34	34	34
LogL	-125.76	-125.16	-124.69	-124.72	-125.86	-122.89	-126.01	-125.76	-125.56
AUROC	0.878	0.880	0.883	0.886	0.878	0.886	0.877	0.880	0.880
se(AUROC)	0.024	0.023	0.023	0.022	0.024	0.023	0.025	0.024	0.024
Wald χ^2 (FE)	72.32	69.80	73.95	81.99	73.29	104.43	70.18	76.37	76.92
Wald p -value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: All estimates presented are raw logit coefficients from the RE-Mundlak logit estimator. Absolute t -ratios in parentheses are based on standard errors clustered at the country-level. We compare results for the benchmark model (or rather its raw logit equivalent) from column (4) in Table 1, albeit for a reduced sample due to data availability, with a number of specifications for total capital inflows or an equivalent bonanza or surge dummy – for construction of these dummies see main text and below. Like all explanatory variables these dummies are MA(3) transformed. [†] Definitions: 1sd – periods in which total capital inflow/GDP is one standard deviation above the country-specific (HP-filtered) trend; 2 sd – dto but two standard deviations above trend, but this only identified a small number of episodes and the RE-Mundlak estimator does not converge; time t – surge is detected at time t ; consec – surge is detected at times $t - 1$, t , and $t + 1$. [‡] See column header for the type of capital flow (total or total non-official). [‡] Additional covariate groups: ‘Deposit Insurance & Crisis Dummies’ – deposit insurance, fiscal crisis and currency crisis dummies, conflict dummy; ‘Banking System’ – liquidity, size; ‘Aid & Trade’ – trade openness, ODA/GNI; ‘Macro & Monetary Fund.’ – real GDP growth, inflation, Reserves/GDP, short-term/total debt ratio, credit/GDP growth.

Table C-8: Alternative Results Historical Sample – Economic Magnitudes

	RE-Mundlak Logit				
DV: Crisis Start Year dummy	(1)	(2)	(3)	(4)	(5)
Sample	1848-1938	1848-1938	1848-1938	1848-1938	1848-1938
MA-transformation	Lagged	MA(2)	MA(3)	MA(4)	MA(5)
<i>Selected Covariates (in percent, winsorized tails 1% respectively)†</i>					
Commodity Price	0.012	0.061	0.492	0.677	0.685
Growth	(0.03)	(0.14)	(1.20)	(1.78)*	(1.74)*
Commodity Price	0.770	0.891	0.904	0.870	0.817
Volatility	(2.37)**	(3.10)***	(3.17)***	(2.83)***	(2.72)***
Sovereign Default	0.449	0.337	0.377	0.394	0.406
	(2.13)**	(1.58)	(1.74)*	(1.79)*	(1.88)*
Ongoing Sovereign Default	-0.200	-0.167	-0.176	-0.204	-0.234
	(0.39)	(0.34)	(0.36)	(0.42)	(0.49)
Capital Flow Cycle Peak	-0.104	0.857	0.716	0.462	0.345
	(0.33)	(3.81)***	(2.61)***	(1.62)	(1.03)
Gold Standard	1.057	1.097	1.116	1.112	1.014
	(2.68)***	(2.85)***	(2.88)***	(2.93)***	(2.81)***
Observations	2,748	2,749	2,749	2,749	2,749
Countries	40	40	40	40	40
Crises	85	85	85	85	85
LogL	-359.18	-354.70	-356.65	-357.39	-359.04
AUROC	0.665	0.699	0.680	0.670	0.658
se(AUROC)	0.030	0.028	0.030	0.032	0.032
Wald χ^2 (FE)	12.45	14.03	12.88	12.98	12.04
Wald p -value	0.053	0.029	0.045	0.043	0.061
ROC Comp. commodities (p)‡	0.008	0.002	0.031	0.031	0.031

Notes: All estimates shown are the economic magnitudes for a one standard deviation increase in the explanatory variable, expressed in percent. Absolute t -ratios in parentheses, based on standard errors computed via the Delta method from RE-Mundlak logit estimates (where in turn standard errors based on clustering at the country level). *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The sample is nominally for 1848-1938, though we drop observations prior to commercial banking being established in a country. Observations during the Great War and its immediate aftermath (1914-19) are excluded from the sample. Results for a reduced sample (from 1870) are qualitatively identical. † Due to the temporal overlap between a sovereign default event (of which there are 41) and ongoing default years (of which there are 346) we use the untransformed crisis dummies here. ‡ This test compares the model presented with an alternative one excluding the two commodity price variables, under the null that the AUROC statistics for the two models are identical (which is always rejected).

Table C-9: Sovereign Defaults – Economic Magnitudes

DV: Crisis Start Year	RE-Mundlak Logit				Logit
	(1)	(2)	(3)	(4)	(5)
<i>Selected Covariates (in percent, winsorized tails, MA(3) transformed)</i>					
Commodity Price Growth	-0.419 (2.33)**	-0.342 (1.49)	-0.256 (1.03)	-0.006 (0.03)	-0.367 (1.52)
Commodity Price Volatility	0.571 (0.98)	0.444 (0.64)	0.182 (0.28)	0.019 (0.03)	-0.102 (0.45)
Real GDP growth			-0.529 (2.94)***	-0.391 (2.37)**	-0.530 (3.49)***
Change in credit/GDP			0.331 (1.49)	0.073 (0.31)	0.302 (1.91)*
Reserves/GDP			-1.123 (3.35)***	-0.654 (1.39)	-0.839 (1.83)*
Short-term/Total Public debt			0.308 (0.59)	0.687 (0.85)	0.517 (1.29)
Inflation			-0.934 (1.88)*	-0.973 (1.84)*	-0.291 (1.37)
Change in Net Foreign Assets				-5.255 (1.01)	-0.062 (1.57)
Foreign Aid/GNI				-0.788 (1.63)	-0.864 (2.44)**
Trade Openness				-0.510 (1.35)	0.235 (0.72)
Currency Crisis	0.266 (1.08)	0.349 (1.33)	0.510 (2.96)***	0.571 (2.85)***	0.417 (2.32)**
Banking Crisis	0.034 (0.12)	0.093 (0.32)	0.140 (0.58)	0.144 (0.56)	-0.031 (0.15)
Additional Covariate Groups					
10-yr US Treasury Rate eoy	×	×	×	×	×
Conflict Dummies	×	×	×	×	×
Banking System		×	×	×	×
Observations	1,984	1,984	1,984	1,984	1,984
Countries	60	60	60	60	60
Crises	26	26	26	26	26
LogL	-93.21	-89.22	-76.58	-70.29	-84.88
AUROC	0.829	0.836	0.894	0.919	0.907
se(AUROC)	0.062	0.059	0.037	0.031	0.027
Wald χ^2 (FE)	11.15	17.18	40.07	93.16	
Wald p -value	0.084	0.028	0.000	0.000	

Notes: We estimate a model of sovereign default start year following the definition in the [Laeven and Valencia \(2020\)](#) dataset; ongoing default years are omitted. The unconditional default probability is 1.3% and there are 26 defaults in this sample (1963-2015). All estimates shown are the economic magnitudes for a one standard deviation increase in the explanatory variable, expressed in percent. Absolute t -ratios in parentheses, based on standard errors computed via the Delta method from RE-Mundlak logit estimates (where in turn standard errors based on clustering at the country level). *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The winsorization is for the top and bottom 1% of observations for each variable. The Fixed Effects Logit estimator did not converge.

Table C-10: Main Results w/ Alternative Default Indicator – Economic Magnitudes

	RE-Mundlak Logit				Logit	FE Logit
DV: Crisis Start Year	(1)	(2)	(3)	(4)	(5)	(6)
Unconditional Crisis Probability	1.79%	1.79%	1.79%	1.79%	1.79%	2.92%
<i>Selected Covariates (in percent, winsorized tails 1% respectively, MA(3) transformed)</i>						
Commodity Price Growth	0.115 (0.59)	0.110 (0.55)	0.176 (1.01)	0.127 (0.73)	0.090 (0.50)	0.727 (0.37)
Commodity Price Volatility	2.068 (2.72)***	1.878 (2.42)**	1.975 (2.32)**	2.233 (2.44)**	0.793 (2.88)***	15.834 (1.66)*
Ongoing Sovereign Default	1.047 (4.24)***	0.987 (3.74)***	0.872 (3.01)***	0.707 (2.23)**	0.585 (3.02)***	7.561 (1.47)
Real GDP growth			-0.034 (0.10)	0.003 (0.01)	-0.243 (0.90)	0.398 (0.15)
Change in credit/GDP			-0.043 (0.15)	0.098 (0.34)	-0.068 (0.22)	1.869 (0.62)
Reserves/GDP			0.414 (0.69)	0.493 (0.78)	0.196 (0.53)	2.835 (0.59)
Short-term/Total Public debt			2.313 (3.04)***	2.208 (2.60)***	0.435 (0.79)	13.024 (1.17)
Inflation			0.567 (3.22)***	0.497 (2.87)***	0.348 (2.77)***	3.692 (1.19)
Change in Net Foreign Assets				0.519 (0.72)	0.432 (0.96)	3.064 (0.10)
Foreign Aid/GNI				0.959 (2.30)**	0.582 (2.70)***	5.327 (1.45)
Trade Openness				-1.647 (2.13)**	-1.004 (2.11)**	-13.110 (1.03)
Additional Covariate Groups						
10-yr US Treasury Rate eoy	×	×	×	×	×	×
Deposit Insurance & Crisis Dummies	×	×	×	×	×	×
Banking System		×	×	×	×	×
Observations	2,120	2,120	2,120	2,120	2,120	1,267
Countries	60	60	60	60	60	30
Crises	38	38	38	38	38	38
LogL	-164.31	-161.95	-152.40	-146.69	-162.03	-103.62
AUROC	0.825	0.838	0.866	0.875	0.805	0.747
se(AUROC)	0.031	0.028	0.024	0.024	0.041	0.043
Wald χ^2 (FE)	26.03	28.37	72.81	114.29		
Wald p-value	0.000	0.001	0.000	0.000		

Notes: We estimate our main model of banking crisis start year but adopt the sovereign default dates following the definition in the [Laeven and Valencia \(2020\)](#) dataset. All estimates shown are the economic magnitudes for a one standard deviation increase in the explanatory variable, expressed in percent. Absolute *t*-ratios in parentheses, based on standard errors computed via the Delta method from RE-Mundlak logit estimates (where in turn standard errors based on clustering at the country level). *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively. The dependent variable is a dummy for the crisis start year, years for ongoing banking crises are dropped as per convention in the literature. The winsorization is for the top and bottom 1% of observations for each variable. Our sample covers 1963-2015. Additional covariate groups: ‘Deposit Insurance & Crisis Dummies’ – fiscal crisis dummy, currency crisis dummy, deposit insurance dummy, conflict dummy; ‘Banking System’ – liquidity, size (M2/GDP).