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ABSTRACT

Capital flow and commodity cycles have long been connected with economic crises. Sparse historical data, however, has made it difficult to connect their timing. We date turning points in global capital flows and commodity prices across two centuries and provide estimates from alternative data sources. We then document a strong overlap between the ebb and flow of financial capital, the commodity price super-cycle, and sovereign defaults since 1815. The results have implications for today, as many emerging markets are facing a double bust in capital inflows and commodity prices, making them vulnerable to crises.

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Capital flow cycles and commodity price swings, as well as fluctuations in international interest rates, have long been connected with economic crises, especially but not exclusively, in emerging markets.[1] Narratives of capital flow surges that end badly have been around since the 19th century, if not earlier (e.g. Suter 1990). However, the sparse historical data on cross-border transactions in financial assets has made it difficult to systematically connect the timing of economic crises to the availability of international capital, especially in the pre-WW II era. This paper takes a step toward filling that gap. We provide a first pass at dating turning points in global capital flow and real commodity prices cycles across approximately two centuries. Because of the significant variation across time and countries in the phenomenon we study and in the availability and quality of the data, our methodology is (by necessity) eclectic.[2]

There is a substantial time-series literature about commodity prices across decades and sometimes centuries; but we are not aware of a comparable unified treatment of the recurring booms and busts in cross-border capital flows at the global level. Our contribution is to study the global cycle of capital flows over the very long run. We also touch on the connection between the commodity price super-cycle and the ebb and flow of financial capital, although the issue is studied in more detail in a companion paper (Reinhart et al. 2016). The impact of global economic cycles is highly relevant today, since much of the emerging world faces a sobering reversal of a *double bonanza* in capital inflows and primary commodity prices. By our measurement, the trough in both commodity and capital flow cycles dates to 1999 and the peak came in 2011, followed by a severe bust. This boom episode was the second longest boom in real commodity prices since the late 18th century and one of the four longest inflow episodes since

[1] See Carmen Reinhart and Vincent Reinhart (2009), Jonathan Ostry (2012), Graciela Kaminsky and Pablo Vega-Garcia (2014), and the literature cited therein.
[2] For a more comprehensive description of our approach, data and coding, see the companion paper Carmen Reinhart, Vincent Reinhart, and Christoph Trebesch (2016). The Data Appendix lists all sources used.

1815. Not surprisingly given the historical context, this double bust has been associated with a 2 percentage point markdown in the IMF's most recent forecast for 2015 growth in emerging markets, from 6% to 4%.

We are also interested in the nexus between the end of capital flow bonanzas and economic crises, specifically sovereign default. Before the widespread use of fiat money (which popularized currency crashes and the occasional inflationary spiral after World War I) and well before many countries had established domestic financial institutions (giving rise to the advent of banking crises), there were sovereign default crises. As has been documented elsewhere, these events usually entail significant and persistent economic dislocation.

Section II describes the data and empirical strategy used to date the capital-flow cycle. Particular attention is devoted to measurement issues including a discussion on net versus gross capital flows. The following section studies the connection between capital flow cycles and the recurring waves of sovereign default documented in Reinhart and Rogoff (2009) since 1800. The last of these default waves came in the wake of rising international interest rates, collapsing commodity prices, and a sharp capital flow reversal, as inflows peaked in 1981 (commodity prices had peaked earlier). We conclude by re-capping our main findings and their implications for the current cycle.

Section II. Data and Methodology

Capital flow accounting, and net and gross flows

The simple rules of double-entry accounting ensure that, excluding statistical discrepancies, the capital account surplus, or net capital inflow (denoted by KA), is related to the current account surplus (denoted by CA) and to changes in the official reserves account (denoted

by RA, where $\Delta RA < 0$ implies the accumulation of reserves by the monetary authority) through the identity:

$$CA + KA + \Delta RA \equiv 0.$$

A country that runs a current account deficit must finance this deficit either by a private capital inflow or by a reduction in its official reserves. In both cases, the country runs down its net foreign wealth. As data on capital/financial account balances is limited or nonexistent, we re-construct the capital account (KA) by piecing together time series on the current account (CA) and official reserves. Prior to World War II, official reserves were dominated by gold.

This exercise approximates *net* capital flows. Such measures may be available from creditor countries (who record consistent net capital outflows), the debtor countries importing capital, or (ideally) both. As in other studies of 19th century financial markets, much of the capital flow activity and data used in this study comes from the United Kingdom, which dominated finance until World War I. We also exploit that in recent years scholars have been able to build longer time series on individual countries' external transactions - usually the current account. However for the earlier part of the 1800's current account data is still rare among the advanced economies and even rarer for emerging markets.

Fortunately, other data can provide an approximation to gross (and in some circumstances net) international capital flows. Gross flows can be approximated by compiling data on bond issuance. Kaminsky and Vega-Garcia (2014) have pioneered this approach, as they document Latin America's volatile external finance since independence. In effect, in the 1820s, and even much later, *gross* capital inflows were very similar to *net* capital inflows for newly-minted nation-states that were borrowing in international capital markets for the first time. Also,

the work of Stone (1999) traces capital exports from the United Kingdom to 25 countries in five continents over 1865-1914. See Reinhart et al. (2016) for more details on the dataset.

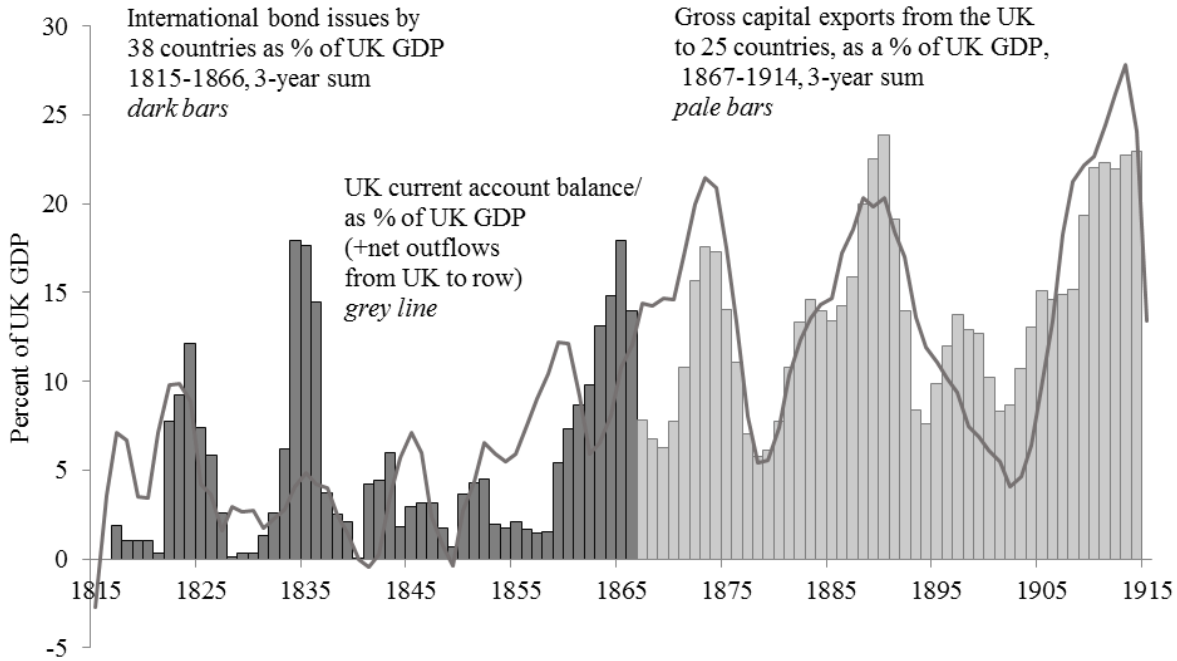
Figure 1 presents a panorama of the capital flow cycles of the 19th century. For 1815-1868, our data on bond issues covers 38 countries but is limited to sovereigns and sub-sovereigns. Private bond issuance played an increasingly prominent role in the latter part of the century. The figure overlays the bond issuance data and gross capital exports from the UK to the rest of the world with the UK current account (as a percent of GDP), which records net flows from the dominant financier. Three features stand out.

First, the different measures of international capital flows provide a fairly consistent narrative of the capital flow cycle.[3] Second, the peaks and valleys are, for the most part, sharp and distinct. Third, the well-known ascent of global finance at the height of the Gold Standard Era is evident in the upward trend in these series. Global capital flows since World War I are aggregated from the constructed capital/financial account for individual countries, as described. The building blocks (i.e., current account balances, official gold, and foreign exchange reserves) are culled from a broad range of sources. The data availability and, thus, the country coverage varies by period, as noted in Figure 2. The interwar sample is comprised of 34 countries, while the post-World War II core group includes 68 countries. For many of these countries our time series extend back to the 1860s and earlier. Not included in Figure 2, is an even more inclusive sample of 132 capital importers for which we construct capital account data since 1980.[4]

[3] The correlation between gross capital exports from the UK and the current account (which abstracting from reserve changes and errors and omission, should approximate *net* capital exports from the UK) is 0.77 over 1867-1914. The correlation between bond issuance and the current account is notably lower (0.40) but statistically significant at the 1% level. In part, this may reflect that not all funds were raised in London, as Paris, Amsterdam, and other centers were associated with some of the bonds issued during 1815-1868.

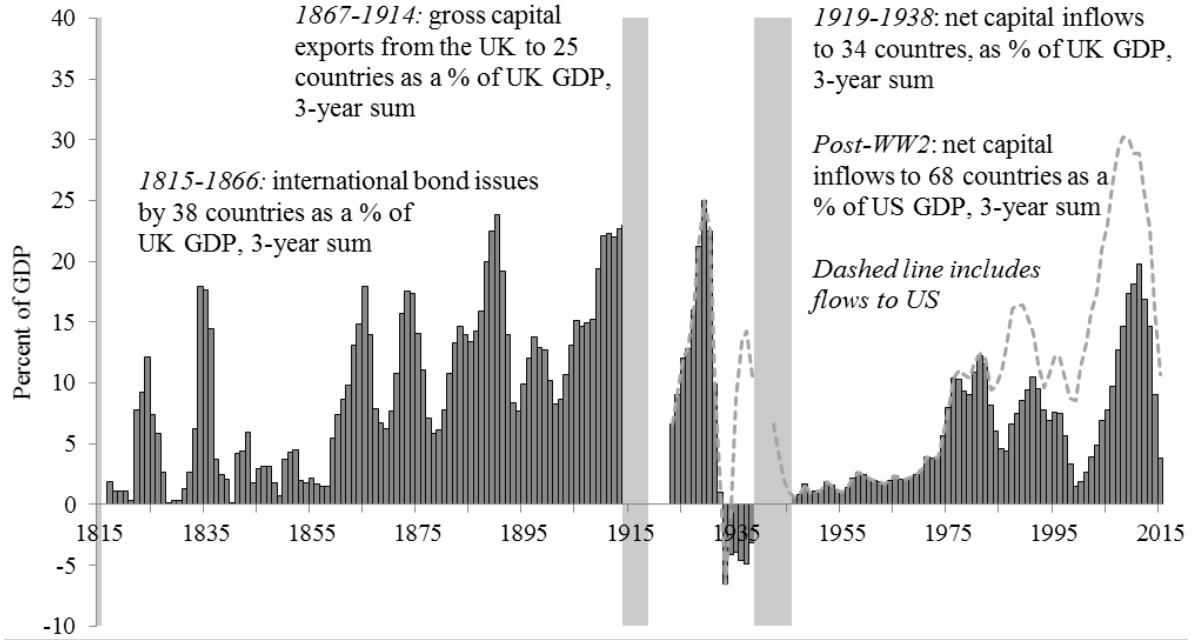
[4] The larger sample does not appreciable change the pattern shown in Figure 2.

Figure 1. Measuring International Capital Flows in the 19th Century



Sources: Reinhart et al. (2016). See also Data Appendix.

Figure 2. Quantifying 200 Years of Capital Flow Cycles: Alternative Measures



Notes: Shaded years are Napoleonic and World Wars I and II.
Sources: Reinhart et al. (2016). See also Data Appendix.

Defining the cycles and episodes: 1820-2015

Don Harding and Adrian Pagan (2002) provide a persuasive case for a simple and mechanical scheme to date turning points in business cycles which we apply to the capital flow and commodity price data. These two authors have also addressed the synchronization of two cycles, which is of interest to describe the interplay of the individual capital flow and commodity bonanza-bust cycles and helps to define the concept of a "Double Bonanza-Bust".

This literature also counsels over-interpreting specific dates. For instance, the dating of some bond issues is less than precise (some issues are listed as 1821-1822 and discrepancies across sources are not uncommon). Information on disbursements of the funds (the actual capital flow) varies and is not uniformly reported. Balance of payments accounts (past and present) are subject to errors and omissions, which tend to worsen in times of turmoil when capital flight escalates. Valuation changes affect the gold stock and reserves data.

With these caveats in mind, Table 1 presents the dates, duration and magnitudes of the global boom and bust cycles in capital flows since 1815. Appendix Table A1 and the longer working paper show a comparable exercise for real commodity prices. Most capital flow cycles lasted 3-6 years, abstracting from the thirty-year stretch following World War II, during which restrictions on cross-border financial transaction kept the volume of international capital flows minimal. The capital flow bonanza that peaked in 2011 was exceptionally protracted (and came to an abrupt reversal phase after the taper tantrum of the spring of 2013 when the Federal Reserve announced its intention to taper its extended post-crisis stimulus).

III. The End of Bonanzas

While the longer companion piece to this paper provides detailed analysis of the

individual cycles and their connection (or not) to crises, Figure 3 provides a synthesis of the overlap between capital flow booms, as in Table 1 (pale shading), and the waves of (new) sovereign defaults. Darker shading in Figure 3 highlights double busts, meaning episodes where a decline in capital inflows overlaps with a contraction in real commodity prices.

Table 1. Capital Flow Surges, Declines and Sudden Stops: 1815-2015

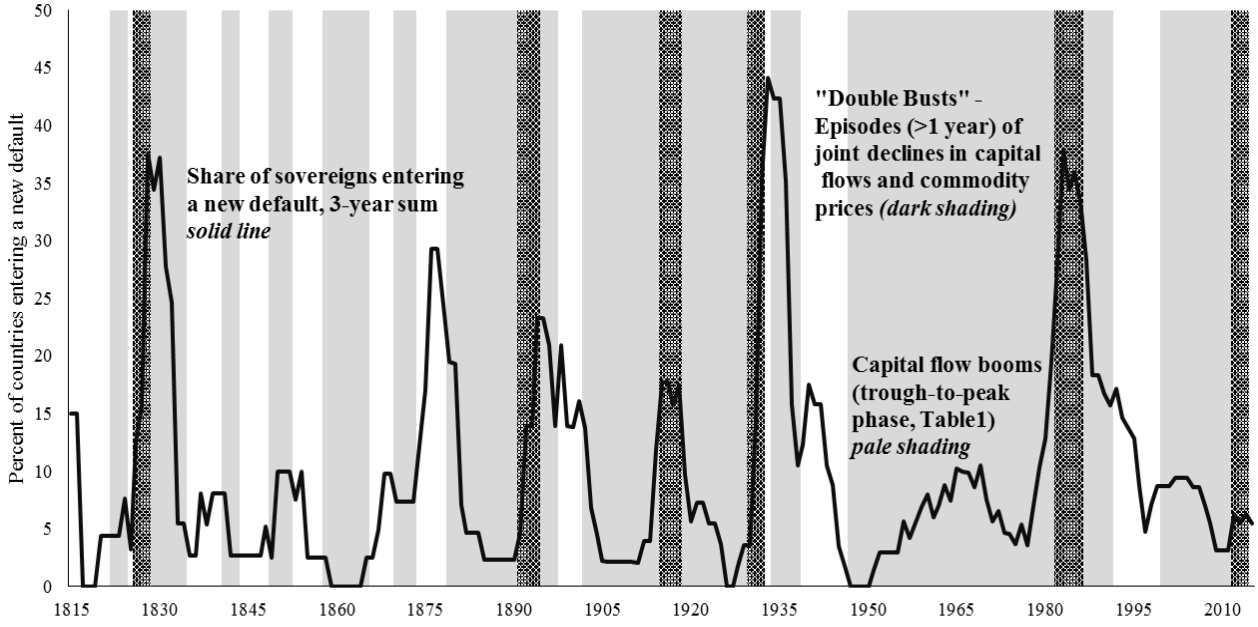
Panel A: **Global Booms:** Rising Capital Inflows					Panel B: **Global Busts:** Decline in Inflows or Outflows			
Episode	Trough	Peak	Duration	Change (% of GDP)	Peak	Trough	Duration	Change (% of GDP)
1	1821	1824	3	11.8	1824	1828	4	-12.0
2	1828	1834	6	17.8	1834	1840	6	-17.9
3	1840	1843	3	5.9	1843	1849	6	-5.3
4	1849	1852	3	3.8	1852	1857	5	-3.1
5	1857	1865	8	16.5	1865	1869	4	n.a.
6	1869	1873	4	11.3	1873	1878	5	-11.8
7	1878	1890	12	18.1	1890	1894	4	-16.2
8	1894	1897	3	6.1	1897	1901	4	-5.5
9	1901	1914	13	14.7	1914	1918?	5	n.a.
1914-1918, World War I: Private capital flows collapse but there is a surge in official flows from US								
10	1918?	1929	12	18.4	1929	1933	4	-31.6
11	1933	1938	5	3.4	1938	n.a.	n.a.	n.a.
1939-1945, World War II: Widespread exchange controls introduced in 1939								
12	1946	1981	35	11.6	1981	1986	5	-7.9
13	1986	1991	5	6.1	1991	1999	8	-9.0
14	1999	2011	12	18.3	2011	2015	4	-15.9
Averages			9	11.7			5	-12.4

Notes: Shaded episodes denote a double (capital flow and commodity price) boom or bust. To qualify as a double boom or bust, there must be at least two years of overlap in that phase of the cycle.
Sources: Reinhart et al. (2016). See also Data Appendix.

The capital inflow-default link is clear and consistent over time. Out of a total of 14 capital boom episodes, 11 were followed by a sharp increase in sovereign defaults after the boom ended. All of the six major spikes in new defaults shown in Figure 3 occurred after a global capital inflow bonanza ended. Moreover, four-out-of-these-six global default peaks can be associated with double busts in capital and commodity markets (dark shading). Not every default cycle is associated with collapsing commodity prices, as our sample includes countries that are

not primary commodity producers and would not be adversely affected by falling commodity prices (see Reinhart et al. 2016).

Figure 3. Capital Flow Booms, Double Busts, and New Sovereign Defaults, 1815-2015



Notes: Pale shaded areas denote global capital flow bonanzas. Dark shaded areas denote episodes of "double busts". *Sources:* See Table 1, Reinhart et al. (2016) and Data Appendix.

Table 2 examines the connection between capital flow cycles and defaults more systematically. We use a dummy for the onset of sovereign defaults to external private creditors as dependent variable and apply logit and OLS panel fixed effects regressions for more than 100 countries (lines 1 and 2). In line 3, we regress the global share of countries entering default in each year between 1815 and 2015, using a fractional response logit model to account for the fact that this share is bound between 0 and 1. The end of global capital flow bonanzas is associated with a significant increase in sovereign default risk worldwide. The coefficients in line 2 suggest that the risk of entering default increases by a total of 12 percentage points in the five post-boom years (including the end year of booms as listed in the left panel of Table 1). This is very large given that the unconditional probability of defaulting is just 2% in the full sample.

Table 2: The End of Capital Flow Booms and Sovereign Default, 1815-2015

		End Year of Capital Flow Boom	Lag 1	Lag 2	Lag 3	Lag 4	Lag 5		
(1)	Country FE Logit (Default Onset)	1.014***	1.075***	1.385***	0.965***	0.959***	0.266	Obs.	11,175
		(0.213)	(0.208)	(0.187)	(0.216)	(0.216)	(0.308)	Pseudo R2	0.036
(2)	Country FE OLS (Default Onset)	0.022***	0.024***	0.037***	0.020***	0.020***	0.004	Obs.	13,254
		(0.006)	(0.006)	(0.008)	(0.006)	(0.006)	(0.005)	R2	0.007
(3)	Fractional Logit (Share of Countries Entering Default)	1.070***	0.988***	1.448***	1.276***	1.309***	-0.016	Obs.	211
		(0.280)	(0.304)	(0.304)	(0.442)	(0.444)	(0.469)	Pseudo R2	0.150

Notes: The dependent variable in lines 1 and 2 is a dummy for the start of default. In line 3 we use the global share of sovereigns entering a new default. Robust standard errors in parentheses (clustered on country in lines 1 and 2). Constant in line 2 and 3 not reported. Significance levels denoted by *** p<0.01, ** p<0.05, * p<0.10.

IV. Final Remarks

International capital flow cycles have displayed similar patterns over the past 200 years, both in duration and amplitude. While not all capital inflow cycles ended with a global wave of new debt crises, all the major spikes in sovereign defaults came in the heels of surges in capital inflows, especially those followed by "double busts" in capital and commodity markets.

Table 3. The Latest Cycle in Historical Perspective

	Global Boom (through to peak)	Duration (years)	Change (in %)	Global Bust (peak to through)	Duration (years)	Change (in %)
Panel A: Global capital flows (change in percent of US GDP)						
Recent cycle:	1999-2011	12	18.3	2011-2015	4, ongoing	-15.9
Average cycle (capital flows):		9	11.7		5	-12.4
Panel B: Global real commodity prices (change in percent)						
Recent cycle:	1999-2011	12	88.7	2011-2015	4	-25.1
Average cycle, booms and busts:		6	39.1		6	-25.8

Notes: Capital inflows to 60 capital importers, excluding the United States. Since the end of the "double bonanza" after 2011, the global share of sovereigns in default has risen from 3% to 6%. Historically, the average increase after capital flow booms was 12 perc. points. For "double busts" it was 24 perc. points.

As shown in Table 3, the global economy has been subject to a double bust since 2012, with a collapse in commodity prices and stark decline in capital inflows (and in some cases, outflows). Since then, the worldwide incidence of sovereign defaults has risen only modestly. Perhaps emerging market economies are more resilient this time around. But perhaps the protracted nature of the downturn in international conditions has yet to take its cumulative toll.

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Stone, Irving. 1999. *The Global Export of Capital from Great Britain, 1865-1914: A Statistical Survey*, New York: St. Martin's Press.

Data Appendix

1. Sovereign bond issuances and capital flows from the US and the UK, 1815-2015

The data underlying the aggregate capital flow cycles in this paper are taken from Reinhart et al. (2016) and stem from a variety of sources. These can be listed alphabetically:

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- Corporation of Foreign Bondholders. Annual Reports, various years.
- Fenn's Compendium, various years.
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- United States Federal Reserve Bulletin, various issues.
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- World Bank. Global Development Finance.

2. Sovereign defaults

The data on sovereign defaults in Figure 3 and Tables 2 and 3 comes from the most recent vintage of the dataset compiled by Reinhart and Rogoff (2009). Only sovereign defaults to private external creditors are included. The data does not consider sovereign defaults and arrears to official creditors (e.g. other governments or the IMF). See Reinhart and Trebesch (2014, 2015) for data updates and default data on official creditors.

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3. Commodity prices and commodity price cycles

The dating of commodity cycles is summarized in Table A1 below. The underlying data on commodity prices come from three main sources:

- For the years 1790-1850: Gayer, Arthur D., W. W. Rostow, and Anna J. Schwartz. 1953. *The Growth and Fluctuation of the British Economy, 1790–1850*, Clarendon Press.
- For the years 1854-1979: Boughton, James. 1991. "Commodity and Manufactures Prices in the Long Run." IMF WP No. 91/47.
- For the years 1980-2015: IMF Index of Primary Commodity Prices. http://www.imf.org/external/np/res/commod/index.aspx

Table A1. Global Cycles in Non-oil Real Commodity Prices: 1790-2015

Global Booms: Increases in Real Commodity Prices						**Global Busts:** Declines in Real Commodity Prices				
Episode	Trough	Peak	Duration	Change (percent)	Boom criteria	Peak	Trough	Duration	Change (percent)	Bust criteria
1	1792	1801	9	76.7	yes	1801	1802	1	-21.5	yes
2	1802	1809	7	26.8	yes	1809	1811	2	-6.2	
3	1811	1813	2	16.2	yes	1813	1816	3	-29.8	yes
4	1816	1818	2	16.9	yes	1818	1822	4	-36.6	yes
5	1822	1825	3	28.6	yes	1825	1835	10	-25.2	yes
6	1835	1839	4	23.4	yes	1839	1843	4	-23.6	yes
7	1843	1847	4	21.5	yes	1847	1850	3	-24.1	yes
8	1854	1857	3	7.2		1857	1866	9	-19.8	yes
9	1866	1868	2	9.5		1868	1871	3	-8.3	
10	1871	1877	6	13.4		1877	1880	3	-10.3	
11	1880	1881	1	7.5		1881	1896	15	-15.5	yes
12	1896	1902	6	4.7		1902	1908	6	-4.4	
13	1920	1925	5	56.3	yes	1910	1920	10	-39.3	yes
14	1908	1910	2	9.4		1925	1932	7	-36.4	yes
15	1932	1937	5	34.3	yes	1937	1938	1	-17.3	yes
16	1938	1951	13	68.8	yes	1951	1961	10	-27.6	yes
17	1961	1966	5	8.9		1966	1972	6	-13.1	
18	1972	1973	1	38.9	yes	1973	1975	2	-26.0	yes
19	1975	1977	2	9.9		1977	1986	9	-31.5	yes
20	1986	1988	2	14.3		1988	1992	4	-23.1	yes
21	1992	1997	5	15.7	yes	1997	1999	2	-16.7	yes
22	1999	2011	12	88.7	yes	2011	2015	4	-25.1	yes
Average, all			5	27.2		Average, all		5	-21.9	
Average boom			6	39.1		Average busts		6	-25.8	

Sources: Gayer, Rostow, Schwartz (1790-1850); Boughton (1854-1979); IMF (1980-2015) and author's calculations.
Notes: The downturn in prices since the 2011 peak is still ongoing. A peak-to-trough price (trough-to-peak) decline (increase) greater than or equal to 15% is classified as a bust (boom). Export prices of manufactures (in US dollars) is used to deflate commodity prices.