The long goodbye of the gold standard and the "Great Depression"

2.1 THE CLASSIC GOLD STANDARD

In an open economy, monetary policy cannot be understood separately from the exchange rate regime, or from the fiscal stance of a government. In this chapter, these statements will be illustrated in historical terms.

The world economies and monetary system are in a status of perpetual change, which implies that the same is true for monetary policy. However, all stories—and histories—must have a starting point for the narratives they aim to tell, if for no other reason than to make the process of story-telling manageable. So, our history here starts with the so-called gold standard, arguably the first (quasi) global monetary system.

The gold standard was a global system through which participating countries (and, in some cases, their associated empires, as it came about during an age of mostly European-led global empires) agreed to fix the prices of their domestic currencies in terms of a given amount of particular commodity, namely, gold—a durable, divisible, transportable and relatively rare element, and those national currencies were then (largely) freely convertible into gold at that fixed amount: these features would give this system—at least in principle—a binding quasi-automatic mechanism to correct balance-of-payments imbalances between all participating monetary areas, via inflows and outflows of gold reserves that transmitted the price and competitiveness shocks behind those imbalances, while

compensating for those shocks via real exchange rate adjustments (see Annex 2.A for an elegant formalized model of the gold standard operation as concerning the price level). This process was enabled by the existing respective national monetary authorities pursuing passive, accommodative policies.[1]

This system's main advantages were its **automatic and system-wide provision of long-term price stability**, which underpinned the convertibility needs of a global economy that was then both growing and integrating. Of course, economies under the gold standard were vulnerable to real and monetary shocks—*as all economies are, under any monetary or exchange rate regime*—and prices could still be unstable in the short run. However, because the gold standard deliberately constrained monetary authorities' (if such existed) discretion to use policy tools, economies in a gold standard were consequently less able to cushion monetary or real shocks, and therefore real output *could* in principle, if not in practice, be more unstable under it than under other frameworks.[2] This said, the state apparatus in those times was far less developed than currently[3] and had therefore a much smaller set of tools to stabilize an economy: more than that, the very notion that the state has a *responsibility* to cushion the business cycle is actually a fairly recent development.

While historical analysis do confirm the price stabilizing properties of the gold standard (see Bordo 1981), **it is simply not apparent that data series actually bears out a higher volatility of real GDP then under other regimes**: data with GDP growth for a sample of 16 developed

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[1] Bloomfield, A. (1959), "Monetary Policy Under the Gold Standard, 1880 to 1914", Federal Reserve Bank of New York, and Dutton J., 1984, "The Bank of England and the Rules of the Game under the International Gold Standard: New Evidence", in Bordo M. and Schwartz A. (eds.), *A Retrospective on the Classical Gold Standard*, NBER.

[2] Bordo, M. (1981), "The Classical Gold Standard—Some Lessons for Today", Federal Reserve Bank of St. Louis Review, 5: 2–17.

[3] For instance, "central banks" as what one thinks of them now just did not exist, as they were not needed under the gold standard. Additionally, institutions that later evolve to become central banks, for instance, the appropriately named "Bank of England" (originally a privately owned body), had as their main original function to *bankroll their national governments*. Their later first and main institutional mandate (as the name suggests) *was not related to price stability, but to financial stability, namely, the provision of liquidity to the broader financial system*, that is, acting as a bank for banks, or as a "central bank". And do not start me on the fiscal fine-tuning of the economic cycles…
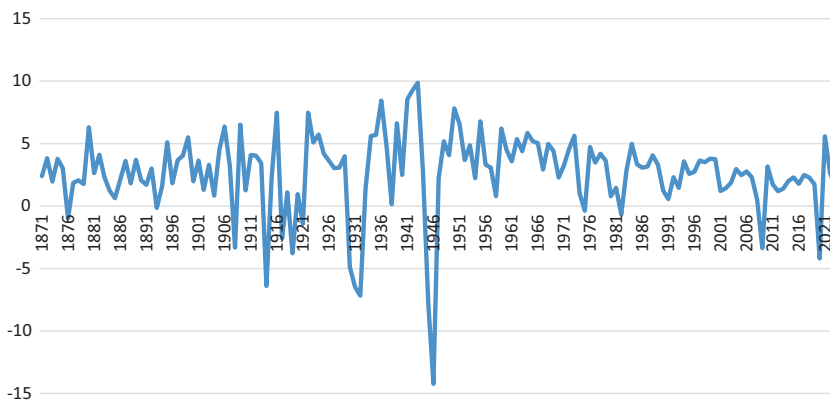
Fig. 2.1 Long-term GDP growth rates for a sample of developed economies. (Sources: Author, based in Maddison (2001) and IMF)

economies[4] from 1870 onward essentially shows the same GDP variability for the periods of the "Classic Gold Standard" and the post 1973 period[5] (using a post-Gold Standard sample starting *after* any of the two world wars results in a standard deviation that is measurably higher: just "eye-balling" the data in Fig. 2.1 already suggests that conclusion).

This system, as it were, developed gradually. The core of it, the United Kingdom (UK)—then the largest economy and the largest empire in the world, and also the country that spearheaded the industrial revolution, first adopted a *de facto* gold standard in 1717, and a formal one shortly after the end of the Napoleonic Wars in 1819, together with some of its colonies.[6] Other countries joined progressively: for instance, Portugal joined already in 1854,[7] almost 20 years before larger European

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[4] These 16 economies are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Netherlands, New Zealand, Norway, Sweden, Switzerland, the UK and the US.

[5] Using Bank of England GDP data for Britain since **1210** shows that GDP variability during the "Classic God Standard" is not only actually lower than that in the later periods, **but it is also lower than in all the preceding periods**.

[6] Bordo, M. (1981), ibid.

[7] Duarte, A. and Andrade, J., (2012), "How the Gold Standard Functioned in Portugal: An Analysis of Some Macroeconomic Aspects", Applied Economics, 44(5): 617–629.

economies—led by Germany in 1872, the year after its unification made it the second largest economy in the continent—did so. By the end of the nineteenth century, the Kingdom of Spain was the only European country that kept a nonconvertible paper money (or *fiat* money, from the Latin for "let it be done"). Outside of Europe, the United States (US) had a *de facto* gold standard since 1834, which became formal in 1900, and countries as diverse and far apart as Brazil and Japan adopted versions of the standard (Box 2.1 and Annex 2.B).

> **Box 2.1   The (Quasi) Universality of the Classical Gold Standard**
> The gold standard history is typically told from the point of view of the largest Developed economies of North America and Europe. However, even if its apogee coincided with the age of Empires (outside of Europe, only the American continent was then made-up of mostly independent polities), it was a truly global system, albeit with particular national and regional dynamics (see Annex 2.B). To illustrate that, below are two examples from independent nations in Latin America and Asia:
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> **Brazil**: From the currency reform of 1846 onward, Brazil informally followed the gold standard with the then Brazilian currency, the "milreis", kept around a parity of 27d (or 27 pence, which implied a fixed parity to the gold-backed British pound), temporally moving below this parity during major crisis like the Paraguayan War.[8] However, only in 1906 Brazil formally joined the gold standard, at a revalued 15d parity (adjusted to 16d a few years later) and remained on the gold standard until World War I (briefly returning to it from 1926 to 1930).[9]

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[8] The Paraguayan War, also known as the War of the "Triple Alliance", is the deadliest war in Latin American history, lasting from 1864 to 1870. It was fought between Paraguay and the so-called Triple Alliance" of the Republic of Argentina, the Empire of Brazil, and the Oriental Republic of Uruguay.

[9] Schulz, J. (2017), "Around the British Gold Standard: Portugal and Brazil. Two satellites?", História e Economia, Vol. 19 and Fritsch, W and Franco, G. (1992), "Aspects of the Brazilian Experience with the Gold Standard".

Box 2.1   (continued)

Japan: After the (re) opening of Japan to international trade in 1853, the new Meiji government enacted a "New Currency Law" in 1871 that created the yen as a currency and made it equal to 1.5 grams of gold. Albeit the yen was actually placed on a silver-standard from 1885 until 1897, Japan finally formally adopted the gold standard that year, in a parity that would be maintained, with a few interruptions, until December 1931.[10]

The period lasting from 1870 (or 1880, depending on the author) to 1914 is known as the "classical gold standard", and it was also a period of largely global free trade in goods, labor, and capital, the "First Globalization" period in human history, which was underpinned by this largely stable and convertible global monetary system. However, it broke down during the major systemic upheavals brought about by World War I, due to the monetary financing of the large conflict-related expenses (the *de facto* gold standard had also been suspended during earlier conflicts, for instance, during the Napoleonic Wars, and some countries left the formal system before World War I, for example, Portugal, which exited the system in 1891 in response to a domestic economic and political crisis) and the changes in the global economic order that underpinned the system.

2.2   THE GREAT DEPRESSION AND THE END OF THE "GOLD EXCHANGE STANDARD"

A *quasi*-gold standard system was partially and briefly reinstated after the end of World War I as the so-called Gold Exchange Standard, which lasted between 1925 and 1931. Under it, participating countries could hold gold, US dollars or British pounds as reserves backing convertible currencies: on the other hand, the US and the UK—the "anchors" of this new system—could hold reserves only in gold: given that core monetary authorities, and notably the Federal Reserve (or "Fed", the US monetary

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[10] Metzler, M. (2006), "Japan and the British Gold Standard, ca. 1715–1885", in *Lever of Empire,* 14–28, University of California Press.

authority, which had been created only in 1913, originally as a system of regional "bank of banks" to provide market liquidity after the US banking crisis of 1907) **engaged in frequent sterilizing operations of gold flows that fundamentally negated the automatic adjustment properties of the gold system**, this period is probably better described as a "managed monetary period".[11] Importantly, this was also **a structural break concerning agents expectations about inflation**: *with the demise of the "Classic Gold Standard" came the end of its nominal and real stabilization properties described above, and economic agents eventually internalized that on their behavior, even if not immediately.*

This limited (and internally contradictory) attempt to reassert the gold standard was also simply inconsistent with the realities of the post-World War I global economy, and some authors link its' eventual demise to—with hindsight, misguided—not only Fed but also US legislative and policy actions that facilitated the onset of global deflationary pressures, that, on their turn, helped create the profoundest and most prolonged economic downturn of the twentieth century, the appropriately called **Great Depression**.[12]

The Great Depression began almost a century ago, in August 1929, when an 8-year-long economic expansion known as "Roaring Twenties"—unleashed by the end of World War I dislocations and the ebbing away of the 1918–1920 "Spanish Flu" Pandemic—came to an end. A series of financial crises punctuated this contraction, including the famous stock market crash in 1929 that signals its beginning, which followed by a series of US regional banking panics in 1930 and 1931 and US and international financial crises from 1931 through 1933.

The downturn hit bottom in March 1933, when deep stresses in the US commercial banking system led to then President Franking Delano

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[11] Bordo, M. (1981), ibidem.

[12] Mundell, R. (2000), "A Reconsideration of the Twentieth Century", American Economic Review (AER), 90 (3): 327–340. This AER piece is a reprint of Mundell's Nobel Prize lecture of 1999, where he singles out not only Fed actions—following Friedman and Schwartz, 1963—but trade protectionism, including the US' Smoot-Hawley Tariff Act of 1930, as culprits of what came later (one could think of this piece as an international economy extension of the Friedman and Schwartz critique of Fed policies during the "Great Depression"). As a personal recollection, this author wrote his PhD dissertation as an application of the Mundell-Fleming optimal currency area theory to the creation of the European common currency, the euro, and had the honor of having Robert Mundell signing a copy of it. He passed away in 2021.

Roosevelt to declare, just 36 hours into his presidency a national banking holiday that would last for four days. Systemic reforms of the US financial system accompanied the economic recovery, which was interrupted by another GDP contraction in 1937, with sustained growth only finally returning during World War II.

The Great Depression is, quite simply, the deepest cumulative economic contraction in US history. Between 1929 and 1933, GDP fell by a shocking over 20% and GDP per capita fell by almost 30%, while unemployment surpassed 25% of the total civilian labor force (and reached an astounding **almost 38%** of the non-farm civilian employment in 1933): see Figs. 2.2 and 2.3.

The Great Depression also dramatically expanded the role of the US government: before it, the US federal government spending accounted for less than 5% of GDP, already by 1939 this figure had more than doubled. It also significantly increased its regulatory footprint, from expanded powers to the Federal Reserve to the creation of the Federal Deposit Insurance Corporation (FDIC)—the organism that provides bank deposit insurance in the US, of state-owned corporations like the Tennessee Valley Authority, of the US Social Security System and the first national US minimum wage.

How did the "Great Depression" come about? There are many explanations, but a short, snappy, theoretically rigorous (and honest) one is given by none other than Ben Bernanke in 2002 (he was then a member
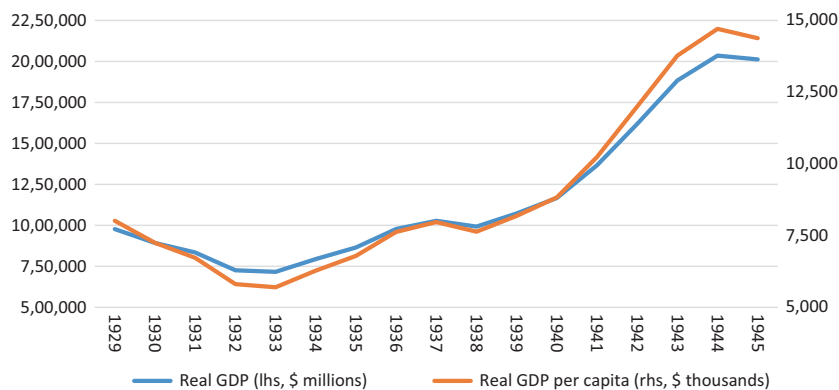

Fig. 2.2 US GDP and GDP per capita, real, 1929–1945. (Source: US Bureau of Economic Analysis [BEA])
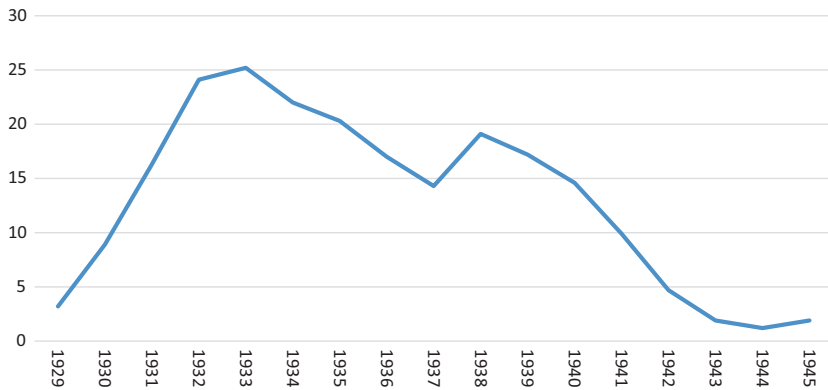
Fig. 2.3 US unemployment, percentage of civilian labor force. (Source: US Bureau of Labor Statistics)

of the Federal Reserve Board of Governors, only becoming Chairman of the Board in 2006): "…we did it. We're very sorry. … We won't do it again".[13] In this piece, he—channeling the monumental and seminal work by Friedman and Schwartz, 1963[14]—acknowledged that **repeated** Federal Reserve's mistakes fundamentally contributed to the "worst economic disaster in American history", while also claiming that the Fed had "learned its lessons" (Bernanke 2002). As it turns out, this book will later add some nuance to his last point on the Fed "learning lessons" from crises.

The list of Fed policy mistakes during the "Great Depression" is indeed quite extensive, in number and in persistency.[15] At the start of the Depression, the Federal Reserve's decision-making structure was rather decentralized and arguably of limited effectiveness. Each of the 12 regional "districts" (clusters of US Federal states) had a governor who set policies for his district, although some decisions required approval of the Fed Board. However, the Board lacked the authority, personalities and tools to

[13] Bernanke, B., speech given at "A Conference to Honor Milton Friedman on the Occasion of His 90th Birthday", November 8, 2002.

[14] Friedman, M. and Schwartz, A., 1963, "A Monetary History of the United States, 1867–1960", Princeton University Press.

[15] The corresponding section in Friedman and Schwartz, 1963, ibid., is telling, actually entitled "Why Was Monetary Policy so Inept?" (pp. 407).

fully formulate policy or to coordinate policies across districts, effectively acting more as a secretariat, and with the New York Fed frequently acting as the *actual* policy setter for the system.

The New York Fed was the most important among the Fed districts, due to the size of New York's bank system and related institutional responsibilities but also due to the strong personality of Benjamin Strong (sic), the head of the New York Federal Reserve since its creation in 1914 until his death in 1928, just before the onset of the "Great Depression". To this day, the New York Fed as a body has the monopoly on implementing of Fed monetary policy (via its "Open Market Trading Desk"), is the sole fiscal agent of the US Treasury Department, the custodian of the US gold reserves and holder of the primary responsibility for international monetary relations in the Fed system. The NY Fed was so dominant during Strong's tenure (and for a short time afterward) that it would even act unilaterally without the other Fed districts.

Beyond the absence of a common diagnostic of the situation among Board members and the lack of Board leadership capable of and willing to provide effective policy guidance (and that under two successive Chairmen, Roy Young, from October 1927 to August 1930 and Eugene Meyer, September 1930 to May 1933), sheer policy mistakes were committed in the lead up and during the Great Depression—even if unintentionally, as is usually the case with mistakes. An example is the Fed's decision **to raise interest rates in 1928 and 1929**, as an attempt to limit speculation in the US securities markets and to stem the outflow of gold reserves: the Fed repeated this error when responding to the international financial stresses caused by the UK's exit from the "Gold Exchange Standard" in 1931. Another example is the Fed's **failure to act as a lender of last resort during the several domestic banking runs that lasted from 1930 until the banking holiday of 1933**: this was a direct result of the Federal Reserve's internal policy disagreements on *if* to provide liquidity to the financial system and *to whom* this liquidity should be provided, and of the continued ineffectiveness of the Fed Board in enforcing coordination.[16]

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[16] Friedman and Schwartz, 1963, ibid., provide a detailed description of the repeated attempts by the NY Fed between 1929 and 1933 in providing additional liquidity to the economy and bank system being stimmed by the opposition from particular Presidents of Fed districts, in parallel to persistent Fed Board institutional limitations. One of the effects of this was that between 1929 and 1933, 10,763 of the 24,970 commercial banks in the US closed (or over 43% of all existing U.S. banks at the time).

If these were not enough, the likely most egregious policy mistake of the Fed was its **failure to stem the decline in money supply: from 1929 to 1933, M1** (a measure of money that includes physical currency, demand deposits, travelers' checks and other checkable deposits) **shockingly fell by almost a third.** Prices fell by a similar amount, all the way into disinflationary territory, increasing debt burdens and distorting economic decisions, pushing all types of economic agents into bankruptcy and brutally increasing unemployment.

The Fed could have prevented deflation by expanding the monetary base and/or by providing liquidity to the banking system: it did neither of those things. Its policy makers misinterpreted signals about the state of the economy, either because of the adherence of some Board members to a "real bills doctrine"[17] or due to a perceived need to uphold the "Gold Exchange Standard" by raising interest rates.

These costly and repeated policy flaws and the design shortcomings in the Federal Reserve's governance ultimately led to several regulatory reforms: the Reconstruction Finance Corporation Act and the Banking Act of 1932 (so, passed already under the Hoover administration), and the Emergency Banking Act of 1933, the Glass-Steagall act of 1933, the Gold Reserve Act of 1934 and the Banking Act of 1935 (those under the Roosevelt administration).

These policy deficiencies made the US very much the epicenter of the "Great Depression": while undoubtedly a global, systemic crisis, most other economies contracted by considerably less than the US. For instance, the US cumulative 1929–1933 GDP contraction was five **times larger than that of Western Europe, and three and a half times that of Latin America**. Only in countries like Australia, Canada, Germany, Mexico and New Zealand the average contraction was somewhat closer to the US one, at between 15% and 20% of GDP. Also, ex-US, global GDP fell by around 8%, and the through was already in 1932, not 1933, and there was no "double-dip recession" as in the US (see Fig. 2.4).

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[17] The founders of the Fed understood it as a decentralized system of reserve banks that would allow the expansion and contraction of money supply and therefore of credit, based on discounting paper issued by its member banks (so-called bills) for financing real, productive activities (therefore, "real bills"). By discounting these real bills that would finance loans for "productive" trade and goods related activities, the Fed would have fulfilled its institutional responsibilities (as understood by those Board members), namely, provide the reserves required to finance only legitimate, nonspeculative, demands for credit.
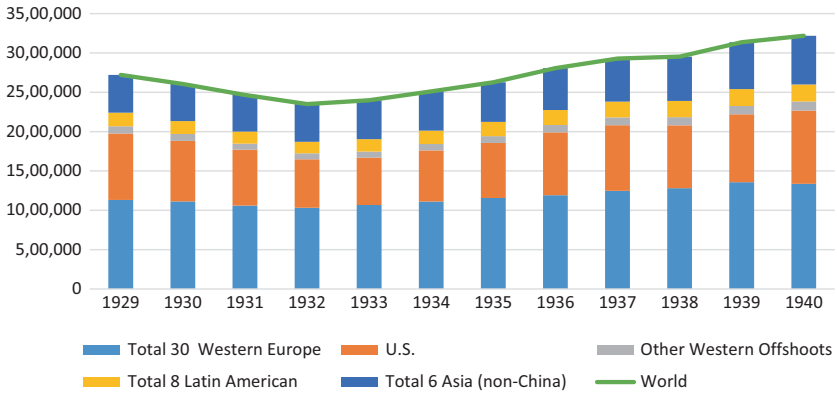
Fig. 2.4 Global GDP during the Great Depression (real $ thousands). (Source: Author, based on Maddison 2001)

But what made the "Great Depression" in the US **both deeper and longer than in most parts of the world?** The policy mistakes—emanating largely from the US monetary authority—described earlier are a large part of the explanation, but mostly for the extent and depth of the *contraction phase* of this particularly extreme business cycle: for the length and relative mildness of the *recovery phase*, additional elements are likely needed. Cole and Ohanian (2007)[18] estimate that by 1933 the negative effects of the monetary shock had effectively ended in the US, and that the length of the weak recovery was largely due **to the labor and industrial policies of the Roosevelt administration**: namely, the National Industrial Recovery Act of 1933 allowed much of the US economy to **cartelize** via different types of regulations affecting over 500 economic sectors, including manufacturing, and that these policies increased relative prices and real wages by 25% or more in the cartelized sectors. Using their model, they conclude that these policies, by preventing markets from clearing at full employment levels **accounted for about 60% of the weakness of the US recovery from the "Great Depression"**.

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[18] Cole, H. and Ohanian, L. (2007), "A Second Look at the U.S. Great Depression from a Neoclassical Perspective", in *Great Depressions of the Twentieth Century*, Kehoe, T. and Prescott, E. (eds) (2007), Federal Reserve Bank of Minneapolis, pp. 21–57.

As the effects of the 1929 Great Depression spread globally, the "Gold Exchange Standard", that short-lived, partial and internally inconsistent replacement to the gold standard eventually broke down after the 1931 British exit of the system (itself a consequence of the failure of the Vienna Kreditanstalt, Austria's largest bank, that year and the subsequent German banking crisis). Finally, in 1933, the US also suspended its own participation in the system, leading to its final end.[19] The collapse of the gold standard also meant the end of the "first globalization" era, as international capital and trade flows collapsed. This slump in global integration will persist throughout the many stresses caused by the overlapping global shocks of the "Great Depression" and World War II, and was replaced by a patchwork of national, largely nonconvertible *fiat* currencies subject to national monetary policies and operating under restricted capital and goods international flows.[20]

2.3   Beyond the "Great Depression": Bretton Woods and that "Barbarous Relic"

With the "Great Depression" firmly behind and the end of the World War II approaching, a conference was organized by the US (and the UK, as a very much "minority partner") in July 1944 in Bretton Woods, New Hampshire, US, to effectively (re)shape the global postwar economic order.[21] The core question at the conference was what would be the new global economic, monetary and financial order and how it would be governed. Although 730 delegates from 44 allied countries met, the US and

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[19] By Executive Order 6102 of April 5, 1933 (an amendment of the Emergency Banking Act of March 1933), US President Franklin Delano Roosevelt required US citizens to *turn their gold coins and bullion over to the Federal Reserve and prohibited exports of gold*. The US Congress then followed with a law overriding gold payment requirements in public and private contracts (Graetz, M., and Briffault, O. [2016], "A 'Barbarous Relic': The French, Gold, and the Demise of Bretton Woods", Columbia University Law School). The prohibition of US citizens holding gold would be removed **only in 1974**, by President Gerald Ford.

[20] For the US case, see Wheelock, D. (1977), "Monetary Policy in the Great Depression and Beyond: The Sources of the Fed's Inflation Bias", Federal Reserve Bank of St. Louis Working Paper 1997-011.

[21] For an entrancing history of this episode and the lead up to it, see Steil, B. (2013), "The Battle of Bretton Woods: John Maynard Keynes, Harry Dexter White, and the Making of a New World Order", Princeton University Press.

UK fully dominated the proceedings, led by respectively, Harry Dexter White (a senior US Treasury Department official) and John Maynard (Baron) Keynes, one of the most famous and influential economists of the twentieth century.[22]

The "White Plan" advocated a central status for the dollar as a surrogate for gold, while Keyne's eschewed the "barbarous relic",[23] proposing what effectively was an international *fiat* money, the "bancor" (one of the aims of Keynes' proposal was actually to avoid a US-centric global monetary system). The two plans agreed, however, on the need for an international institutional framework for the coordination of monetary and exchange rate policies (which was to become the International Monetary Fund, or IMF). In the end, the countries represented at Bretton Woods largely supported (or were "incentivized" to support) the US plan—as that country was now the undisputed core of the global economy, being spared the widespread devastation unleashed by World War II. The IMF "Articles of Agreement"—its founding treaty—were signed in December 1945 and the IMF became operational in March 1947.[24]

Even though this so-called Bretton Woods System (after the city where the conference was held) was tested as soon as 1949 by a progressive crisis of the British pound,[25] its participating countries (which were the large majority of the market economies in the world) mostly operated under it

[22] His classic work is Keynes, J. (1936), "The General Theory of Employment, Interest, and Money", First Harvest Hacourt Brace, UK, and it provided the dominant analytical framework for the macroeconomic policies used in market economies to counteract the "Great Depression". The British Sovereign, King George VI, awarded him in 1942 the title "Baron Keynes, of Tilton, in the County of Sussex".

[23] The full quote is "In truth, the gold standard is already a barbarous relic", see Keynes, J. (1923), "A Tract on Monetary Reform", Macmillan and Co. (the predecessor of the publisher of this book), UK, p. 172.

[24] The US centrality in the new system was demonstrated even geographically, as the two new "Bretton Woods" institutions, the IMF and the World Bank, were **both** to be headquartered in Washington, DC. As aside, this author, a former World Bank staffer, –the other "Bretton Woods" institution, is fond of the old quip that the Bretton Woods institutions are misnamed, as the IMF is actually a *bank* (as it lends money to its members, who make its' lendable capital via deposits, a.k.a., as "quotas", and receives principal and interest repayment on those loans), while the World Bank is at least partially a *fund* (as it makes nonreimbursable grants from its pooled funds to its poorer members, albeit admittedly it makes loans too).

[25] The Pound was ultimately forced to devalue by 30% in September 1949, a move that was followed within days by 30 other countries also devaluing their currencies (see Steil 2013, ibid.).
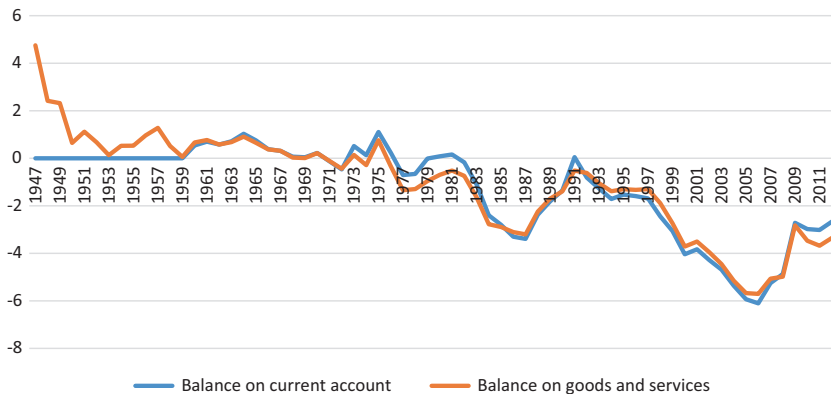
Fig. 2.5 The US external balance under Bretton Woods (% of GDP). (Sources: BEA, U.S. Census Bureau, calculations by the Author)

until 1971, settling their international balances in US dollars,[26] as the US government committed to redeem other central banks' holdings of dollars for gold at a fixed rate of $35 per ounce.[27] However, a progressively worsening US balance-of-payments' position[28] after the end of World War II (Fig. 2.5) steadily reduced US gold reserves and, on August 15, 1971, the US announced that it would no longer redeem its currency for gold. The "gold standard" and its derivates was soon to be no more, and the age of floating exchange rates managed by monetary authorities ("central banks", the new "anchors" of this decentralized set of monetary systems) issuing *fiat* money and pursuing national monetary policies was up on us.[29]

[26] The IMF Articles of Agreement actually define international currencies parities **with reference to gold**, with members committing to maintain those within a 1% variation margin, by either buying or selling dollars at their gold-pegged value to maintain the value of their currencies within that margin.

[27] In 1934, US President Roosevelt set the price of gold at $35 an ounce (effectively devaluing the US dollar in gold term by nearly 60%, as the previous dollar gold price was $20.67 an ounce).

[28] Reinbold, B. and Wen, Y. (2019), "Historical U.S. Trade Deficits", Federal Reserve.

[29] Or, again, not (quite) yet: actual (truly) free floating *fiat* currencies will be mostly restricted to some developed economies for many years to come. Most other economies (including some smaller developed ones) will largely opt for several reasons for variations of pegged currency regimes (so, even after 1973, pegged systems lived to fight another day). For the seminal paper in this literature, see Calvo, G. and Reinhart, C, (2000), "Fear of Floating", NBER Working Paper 7993, and for an application to very open small economies, see Vinhas de Souza, L. (2002), "Integrated Monetary and Exchange Rate Frameworks: Are There Empirical Differences?", Working Paper Series, n° 2/2002, Bank of Estonia.

2.4   THE US "GREAT INFLATION" AND THE END OF THE "BRETTON WOODS" SYSTEM

It was not an easy birth: the end of the gold-backed Bretton Woods system can be aptly described by the famous quote from Ernest Hemingway's 1926 novel "The Sun Also Rises", in which a character asks another how he went bankrupt, the reply being "gradually, then suddenly". Gradually, imbalances were building up under this US-led afterlife of the "gold standard" (Fig. 2.5). Henry Dexter White was wrong when he said that "dollar and gold are … .synonymous",[30] as what would come to be known as the "Triffin dilemma" eventually asserted itself (in 1959, Belgian economist Robert Triffin told the US Congress that the use of "national currencies in international reserves" was a destabilizer to "world monetary arrangements").

That was because foreign governments that accumulated US dollars eventually either lent any excess dollars (i.e., over and above their imports' needs) back to the US or held them as reserves, implying that there was no effective way for the US to provide sufficient dollars to satisfy the world's liquidity needs for trade and capital flows, while simultaneously limiting the number of dollars that could be redeemed for gold at a fixed price (hence the "dilemma").[31]

Accordingly, from a post–World War II high of almost 81% of US dollars in circulation covered by US gold reserves, this had dwindled to around 16% in 1971 (Fig. 2.6). The same fundamental weakness of the system was also detected by French economist Jacques Rueff,[32] who would later become an adviser to French President Charles de Gaulle on monetary and financial matters. Rueff's analysis that an alternative system would

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[30] Henry Dexter White to the House Committee on Banking and Currency, during the Bretton Woods ratification debate in March 1945 "[T]o us, and to the world, the United States dollar and gold are synonymous. … It is a mere matter of convenience of expression rather than significance other than reiteration of the fact that dollars and gold are virtually synonymous" (as quoted by Steil, B., 2013, ibid., p. 256). In another misreading of economic theory *and* history, White was later unmasked as a Soviet collaborator (see Steil, B., ibid.).

[31] Graetz and Briffault, ibid. That abstracts from domestic US currency needs.

[32] Rueff, J. and Hirsh, F. (1965), "The Role and the Rule of Gold: An Argument", Princeton Essays on International Finances, 47: 2–3 and Rueff, J. (1972), "The Monetary Sin of the West", New York, Macmillan.
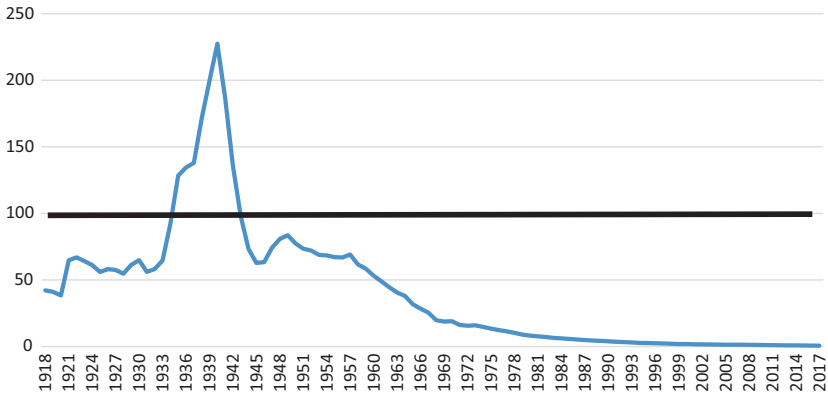
Fig. 2.6 US gold reserves/money in circulation, end-of-the-year (eoy), %. (Source: FRED (Federal Reserve Economic Data), calculations by the Author. The line at 100 shows when money in circulation is fully covered by gold reserves)

be needed would be one of the building blocks that would eventually lead to the creation of the common European Union currency, the euro (see Chap. 6: the euro was a project in which this author—humbly—also worked on).

As said above, the final demise of "Bretton Woods"—like the gold standard before it—was a (*dixit*) very gradual process, even as its internal contradictions were becoming increasingly apparent (the popular expression "slow motion train wreck" may come to mind). For instance, given the growing imbalances, already in 1961 nine central banks—the US plus eight European countries—created the so-called London Gold Pool[33] in

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[33] Upholding the gold-pegged Bretton Woods system may have helped the US Federal Reserve deliver on low and stable inflation (domestically and abroad) from the early 1950s to the mid-1960s. The transfer of main responsibility for the US external balance from the Fed to the US Treasury with the creation of the "gold pool", especially after 1965, possibly weakened this constraint—and therefore the Fed's commitment to low and stable inflation in the US—even before Bretton Woods formal end (see Bordo, M. and Eichengreen, B. (2008) "Bretton Woods and the Great Inflation", NBER Working Paper Series n. 14532).

an attempt to maintain fixed convertible values for their currencies at the $35 price for an ounce of gold (half the required supply of gold for the pool came from the US).[34]

However, already by 1965 the "pool" could no longer stem the outflow of gold, accelerated by the growing external and internal US imbalances, so the "pool" ultimately collapsed in May 1968, being replaced by a two-tiered system with separate private and public (in the sense of trading between public bodies like central banks) gold markets: governments traded gold in the public market at a fixed price, while in the private market the price of gold was a market one (this transformed market stresses from speculative attacks on a gold-backed standard to more traditional speculative attacks against a fixed exchange rate regime, this one centered on a fiat currency, the US dollar: see Garber 1991).[35] Bretton Woods and the "gold"-linked era will finally end a little more than three years after that, in August 1971.[36]

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[34] Another (half-hearted) attempt to preserve some features of the Bretton Woods *quasi*-gold standard was the creation of the IMF's "Special Drawing Rights", or SDRs, an international reserve asset based on an evolving basket of IMF members' currencies, somewhat similar to Keynes' "bancor" proposal of a generation earlier (the political agreement on the SDRs was reached in the summer of 1967, but they only became operational in 1969).

[35] Garber, P. (1991), "The Collapse of the Bretton Woods Fixed Exchange Rate System" in *A Retrospective on the Bretton Woods System: Lessons for International Monetary Reform*, Bordo, M. and Eichengreen, B. (eds), University of Chicago Press: 461–494.

[36] Well, again, not quite yet: even then the global (quasi) gold standard was not finished, as in December 1971 monetary authorities from the world's leading developed countries met at the Smithsonian Institution in Washington, DC, to try *one more time* to preserve the system. With the so-called Smithsonian Agreement, the US agreed to devalue the dollar to $38 per ounce of gold, and participants agreed to future talks on reforms of the international monetary system. This did not stabilize the system and renewed pressures on European currencies ultimately led to capital controls being imposed by the affected countries. In February 1973, the US devalued the dollar in relation to gold one more time, but this again failed to reduce market pressures, and within a month currencies were finally (mostly…) freely floating against the US dollar: that event—the "sudden" part of Hemingway's quote—is what marks the real end of the "Bretton Woods" gold-linked monetary system.

Annex 2.A: Formalizing Price Level Determination under the Gold Standard

A simple and elegant model of how the gold standard actually endogenously anchors the price level is given by Barro ([1979]).[37] In it, the stock of money, denoted by M, represents a liability of the central bank, which is assumed to be ready to buy or sell any amount of gold at a fixed price, P_g. If G_m represents the stock of gold held by the central bank, then the supply of money would equal $P_g G_m$ under a strict gold standard (it would differ under a partial gold standard). Total money supply is

$$M^s = \left(\mathrm{I} / \lambda \right) P_g G_m, \tag{2.1}$$

where the parameter λ, which as $0 \leqslant \lambda \leqslant \mathrm{I}$, measures the gold "backing" of the monetary issuance (there have been periods of a backing above 1, as seen in Fig. 2.6).

The demand for money in circulation M^d is assumed to depend on P, on real income y and on the opportunity cost of holding money. The opportunity cost for holding money is measured by the expected rate of inflation, $\pi \equiv E\left(\dot{P} / P \right)$, where a dot denotes a time derivative. Formally, money demand is represented by

$$M^d = k\left(\underset{(-)}{\pi} \right) P y, \tag{2.2}$$

where the minus sign denotes a negative derivative, as expected inflation and desired money holding are inversely related, while k is money velocity. Money supply and demand from (Eq. 2.1) and (Eq. 2.2) imply the price level condition

$$P = \frac{P_g G_m}{\lambda k\left(\cdot \pi \right) y} \tag{2.3}$$

[37] Barro, R. (1979), "Money and the Price Level under the Classical Gold Standard", Economic Journal, 89: 13–33. Bob Barro is currently a colleague of this author at Harvard: he is an economist with a truly insightful analytical mind, as Barro regularly demonstrates in our internal seminars.

Since Eq. (2.3) holds at all times, variations of P around P_g reflect movements in the right-hand-side variables, as represented in $G_m/(\lambda k y)$. The two key determinants of monetary gold stock are gold production and the extent to which gold is held for nonmonetary purposes. With g being the rate at which new gold is extracted (and an estimated 75% of all gold on earth has already been extracted), the production function for the gold industry can be expressed by the (real) cost function $c(g)$, which describes the cost of producing gold at rate g. Production is assumed to involve positive and increasing marginal costs—that is, c', $c'' > 0$. The nominal cost for producing gold at rate g is $Pc(g)$, while the nominal revenue is $P_g g$ (with a common price for gold in monetary and nonmonetary uses). Revenue-maximizing behavior by gold producers with P_g and P exogenous implies

$$c'(g) = P_g / P \tag{2.4}$$

generating the supply function for new gold in (Eq. 2.5) below

$$g^s = g^s \left(\underset{(-)}{P / P_g} \right) \tag{2.5}$$

Let G_n denote the stock of gold that is held for non-monetary (e.g., industrial) uses, which depreciate at the constant rate δ (gold held by the central bank is assumed not to depreciate): δG_n measures the steady-state demand for gold. Total demand would also include the growth in G_m and G_n linked to growth in y. Non-monetary uses of gold would fall given a higher current relative price, P_g/P, but would increase due to expectations of higher future values of P_g/P. With P_g constant, expected future values of P_g/P vary inversely with π. Net changes in G_n at any point in time are given by

$$\dot{G}_n = g_n^d - \delta G_n = (\alpha + \delta)\left[\left(\underset{\substack{(-) \\ (+)(-)}}{P P_y, \pi} \right) y - G_n \right] \tag{2.6}$$

With the monetary authority standing ready to buy or sell any amount of gold at price P_g, the steady state of the system described by the equations above corresponds to

$$\dot{P} = \dot{G}_m = \dot{G}_n = 0 \tag{2.7}$$

It can also be supposed that π, the expected value of $\dot{P}/P$, is equal to zero in the steady state. To simplify the analysis, it is assumed that π is fixed at zero even when P is changing over time. The steady-state values of P, G_m and G_n, which will be denoted by asterisks, determined from the equations above and by $\dot{G}_m = \dot{G}_n = 0$, imply

$$g^s \left(\underset{(-)}{P^*_{}} P_g \right) = \delta f \left(\underset{\substack{(+) \\ (-)}}{P^*_{}} P_g, \pi^* \right) y \tag{2.8}$$

This condition (together with $\pi^* = 0$ determines the steady-state value, P^*/P_g—and, hence, P^*—from the equality between gold production and the replacement demand for nonmonetary gold.

Additionally, as said above, in a model where y is continually increasing, the steady-state demand for gold would have other components, as given by

$$G^*_n = f \left(\underset{(-)}{P^*_{}} / P_g, \pi^* \right) y \tag{2.9}$$

This, with Eq. (2.3), implies

$$G^*_m = \lambda k \left(\pi^* \right) y P^* / P_g \tag{2.10}$$

which determines the steady-state value G^*_m and the money stock $M^* = (1/\lambda) P_g G^*_m$.[38]

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[38] More complex model formulations are of course possible: Chappell and Dowd, 1997, developed a model of the gold standard in which technology and preferences are modeled more explicitly and which takes into account gold's durability and exhaustibility, while Fernández-Villaverde and Sanches (2022) add microfoundations (so, incorporating the behavior of different types of economic agents) and the transmission of financial crises, which makes the gold standard nonsustainable for peripheral countries (see, respectively, Chappell, D. and Dowd, K. (1997), "A Simple Model of the Gold Standard", Journal of Money, Credit and Banking, 29(1): 94–105 and Fernández-Villaverde, J. and Sanches D. (2022) "A Model of the Gold Standard," WP 22–33, Federal Reserve Bank of Philadelphia).

In other terms, **the gold standard delivers an endogenous, stable and determined (price) equilibrium**: one should compare this result with those of models for other monetary frameworks described later in this book.

ANNEX 2.B: GLOBAL PARTICIPATION IN THE "CLASSICAL GOLD STANDARD"

Table 2.1   Global participation in the "Classical Gold Standard"

Country	Type of Gold Standard	Period
Center Country		
Britain[a]	Coin	1717–1797[b], 1819–1914
Other Core Countries		
United States[c]	Coin	1834–1917[d]
France[e]	Coin	1878–1914
Germany	Coin	1872–1914
British Colonies and Dominions		
Australia	Coin	1852–1915
Canada[f]	Coin	1854–1914
Ceylon	Coin	1901–1914
India[g]	Exchange (British pound)	1898–1914
Western Europe		
Austria-Hungary[h]	Coin	1892–1914
Belgium[i]	Coin	1878–1914
Italy	Coin	1884–1894
Liechtenstein	Coin	1898–1914
Netherlands[j]	Coin	1875–1914
Portugal[k]	Coin	1854–1891
Switzerland	Coin	1878–1914
Scandinavia		
Denmark[l]	Coin	1872–1914
Finland	Coin	1877–1914
Norway	Coin	1875–1914
Sweden	Coin	1873–1914
Eastern Europe		
Bulgaria	Coin	1906–1914
Greece	Coin	1885, 1910–1914
Montenegro	Coin	1911–1914
Romania	Coin	1890–1914
Russia	Coin	1897–1914
Middle East		
Egypt	Coin	1885–1914

Table 2.1 (continued)

Country	Type of Gold Standard	Period
Turkey (Ottoman Empire)	Coin	1881[m]–1914
Asia		
Japan[n]	Coin	1897–1931
Philippines	Exchange (US dollar)	1903–1914
Siam	Exchange (British pound)	1908–1914
Straits Settlements[o]	Exchange (British pound)	1906–1914
Mexico and Central America		
Costa Rica	Coin	1896–1914
Mexico	Coin	1905–1913
South America		
Argentina	Coin	1867–1876, 1883–1885, 1900–1914
Bolivia	Coin	1908–1914
Brazil	Coin	1906–1914, 1926–1930
Chile	Coin	1895–1898
Ecuador	Coin	1898–1914
Peru	Coin	1901–1914
Uruguay	Coin	1876–1914
Africa		
Eritrea	Exchange (Italian lira)	1890–1914
German East Africa	Exchange (German mark)	1885[p]–1914
Italian Somaliland	Exchange (Italian lira)	1889[p]–1914

Source: Officer, L. (2008), "Countries and Dates on the Gold Standard", adapted by the author. (a) Including colonies (except British Honduras) and possessions without a national currency: New Zealand and certain other Oceanic colonies, South Africa, Guernsey, Jersey, Malta, Gibraltar, Cyprus, Bermuda, British West Indies, British Guiana, British Somaliland, Falkland Islands, other South and West African colonies. (b) Or perhaps 1798. (c) Including countries and territories with US dollar as exclusive or predominant currency: British Honduras (from 1894), Cuba (from 1898), Dominican Republic (from 1901), Panama (from 1904), Puerto Rico (from 1900), Alaska, Aleutian Islands, Hawaii, Midway Islands (from 1898), Wake Island, Guam, and American Samoa. (d) Except August—October 1914. (e) Including Tunisia (from 1891) and all other colonies except Indochina. (f) Including Newfoundland (from 1895). (g) Including British East Africa, Uganda, Zanzibar, Mauritius, and Ceylon (to 1901). (h) Including Montenegro (to 1911). (i) Including Belgian Congo. (j) Including Netherlands East Indies. (k) Including colonies, except Portuguese India. (l) Including Greenland and Iceland. (m) Or perhaps 1883. (n) Including Korea and Taiwan. (o) Including Borneo. (p) Approximate date

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