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A Perspective on International Monetary Leadership From Silver and Gold to the Dollar Standard

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May 2026

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A Perspective on International Monetary Leadership
From Silver and Gold to the Dollar Standard

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Abstract

This paper provides a historical perspective and analysis of the evolution and performance of the international monetary system since the early 19th century, focusing on the asymmetric role of international reserve currencies, monetary policy rules and exchange rate regimes. It examines the operation of international bimetallism, the transition to the international gold standard and its operation, the attempts to restore it as a gold exchange standard in the interwar period, the establishment and operation of the dollar based Bretton Woods system after World War II, the demonetisation of gold, and the transition to floating and managed exchange rates in the early 1970s. It focuses on the dollar standard of the post-war period and also examines the emergence of the euro and the renminbi as regional challengers to the dollar. The analysis concludes that, barring an international upheaval of historical proportions, the domination of the dollar as the key international reserve currency is unlikely to be challenged by the euro or the renminbi in the foreseeable future.

Keywords: International money, monetary policy, external adjustment, reserve currencies, exchange rate regimes, gold, silver, sterling, dollar, euro

JEL Classification: F31, F32, F33

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1. Introduction

The international monetary system (IMS) is the global framework of rules, institutions, and practices that governs international monetary and financial relations. It determines how international trade and investment are financed, how financial assets denominated in different national currencies are exchanged internationally, and how payments across borders are settled. In this sense, the IMS acts as the institutional "glue" linking national economies into a global economic and financial system.

In the global economy, countries are interconnected through trade in goods and services, migration flows, and international capital markets. An open economy can borrow from or lend to the rest of the world, allowing domestic investment to diverge from national savings. This divergence is reflected in a country's balance of payments, which records all economic transactions with the rest of the world. The functioning of the international monetary system therefore has direct implications for growth, stability, and adjustment across countries.

A defining feature of the global economy is the coexistence of many national currencies. The relative prices of these currencies—exchange rates—may be fixed, managed, or allowed to fluctuate freely. Most international transactions are conducted through global financial markets, where households, firms, and governments exchange money and financial claims across borders. However, not all currencies are equally accepted internationally. Only a small number are widely accepted and serve as international reserve currencies. Such currencies dominate international payments, trade invoicing, and financial investment.

The fact that few currencies dominate as international currencies imparts a fundamental asymmetry in international monetary systems. Since the 16th century such currencies have been the Spanish dollar, the Dutch florin, both based on a silver standard, the French franc which formed the basis of international bimetallism in the first half of the 19th century, the British pound sterling, which was the basis of the international gold standard since the 1880s and subsequently the US dollar, the key international reserve currency from the interwar period of the 20th century until now.[1]

Several key characteristics define the structure and operation of international monetary systems. First, differences in the degree of openness to international trade and capital flows. Second, the key currencies used for international transactions, typically reserve currencies and a few other major currencies. Third, the question of convertibility of currencies into precious metals such as gold or silver at fixed prices. Fourth, whether exchange rates are fixed, managed, or flexible. Finally, the degree of asymmetry and the benefits and obligations of the issuers of international reserve currencies.

A central issue concerns the ability of national central banks to pursue independent monetary policies. This ability depends critically on the exchange rate regime and the degree of capital mobility. When capital is freely mobile, any country faces a fundamental choice. It may allow its currency to float freely, thereby retaining full monetary policy independence. Alternatively, it may fix or manage its exchange rate through foreign exchange market interventions. In that case, however, domestic monetary policy must be subordinated to the exchange rate objective.

To reconcile fixed or managed exchange rates with independent monetary policy, a country can impose restrictions on capital movements. This logic gives rise to the so-called trilemma of open economies, a cornerstone of international macroeconomics. The trilemma states that a country

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[1] See Eichengreen et al (2018), Rogoff (2025), for short accounts of dominant international currencies. Eichengreen (2026) contains a sweeping historical account of dominant international currencies since antiquity.

cannot simultaneously achieve all three of the following objectives: fixed exchange rates, free capital mobility, and an independent monetary policy. At most, only two of these objectives can be pursued at the same time.[2]

Under free capital mobility, a country that chooses fixed or managed exchange rates forfeits monetary independence. Conversely, a country that wishes to retain monetary autonomy must either accept floating exchange rates or impose capital controls. Different international monetary systems reflect different combinations of these choices, either at the national level or through coordinated international arrangements.

It has recently been argued that in the context of the global financial integration that characterizes the modern international dollar standard, the trilemma is really a dilemma between monetary policy independence and free capital mobility, irrespective of the exchange rate regime. Countries cannot really insulate themselves from the global financial cycle that emanates from the U.S. solely through flexible exchange rates.[3]

Historically, periods in which the international monetary system has functioned smoothly have tended to coincide with global economic stability and growth. Conversely, large global imbalances, shocks, and policy inconsistencies have often destabilized the system, amplifying economic volatility and crises. This close interaction between the IMS and the global economy underlines the importance of understanding its historical evolution.

The purpose of this paper is to provide a historical perspective on the international monetary system and assess its future prospects, based on the lessons from theory and history.

2. An Overview of Current International Monetary Arrangements

The current international monetary system is characterised by free capital mobility and floating exchange rates between the key currencies of the United States, the Euro Area, and Japan, each of which has chosen to conduct its own autonomous monetary policy. The members of the euro area have foregone their national currencies and monetary policies and adopted a common currency, the euro, and a common monetary policy. China has opted for capital controls in order to maintain its own monetary policy autonomy and maintain the ability to manage its exchange rate. Other countries have opted for a wide variety of exchange rate arrangements, from pegging to the US dollar and the euro, to crawling peg systems against broad baskets of currencies, or floating, with or without capital controls.[4]

2.1 International Reserve Currencies

The US dollar is by far the main international reserve currency. The euro and the Japanese yen are also significant international reserve currencies, as is the British pound sterling (GBP) and the Chinese renminbi (RNB).

The dollar accounts for approximately half of global payments, while more than half of world trade is invoiced in dollars. Close to 60 percent of international foreign exchange reserves are held in dollars. The corresponding share for the euro is about one fifth (20 percent), while other international currencies such as the Japanese yen, the pound sterling, and the Chinese renminbi each

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[2] The ‘open economy trilemma’ is based on the analysis first put forward by Mundell (1963) and Fleming (1962). It is also called the Mundell-Fleming trilemma or the ‘impossible trinity’.

[3] See Rey (2013, 2016) for evidence and arguments in favor of the dilemma rather than the trilemma.

[4] For the latest detailed report of international exchange rate arrangements and exchange restrictions see IMF (2024). See also Klein and Shambaugh (2010) for an analysis of the characteristics of the various regimes.

account for only low single-digit percentages. U.S. government securities held by international investors amount to $7.9 trillion, equivalent to nearly 10 percent of world GDP.

Despite the size and the growing importance of the economy of China, the renminbi has not evolved into a major international reserve currency, mainly because capital controls limit its attractiveness. On the other hand, the pound sterling continues being an international reserve currency mainly because of the importance of the City of London as an international financial centre and the existence of the British Commonwealth.

The current international monetary system has taken shape following the collapse of the Bretton Woods system in the early 1970s, which was a system of fixed but adjustable exchange rates based on the U.S dollar. The major international reserve currencies of the current system, like the U.S. dollar (USD), the euro (EUR), and the Japanese yen (JPY) are fiat currencies, not backed by gold or any physical commodity. The U.S dollar was the last major currency linked to gold at a fixed price, but the link was abandoned by the United States in 1971.

The dollar maintains its leadership because it is supported by the world's largest and most resilient economy, rests on deep and highly liquid financial markets and a transparent rule-of-law framework, enjoys strong monetary credibility, and benefits from powerful network externalities as the most widely used international currency.

2.2 International Institutions

The current system is supported by a number of key international institutions. Among these, two were created as part of the post-World War II system agreed at Bretton Woods, one was created in the interwar period and the G-7 and G-20 gained in importance after the 1970s. The key international institutions of the current international monetary system are the following:

First, the *International Monetary Fund* (IMF). It was established in 1944 at the Bretton Woods Conference in New Hampshire, USA. The conference aimed to create a stable global financial system after World War II. It officially came into existence on December 27, 1945, with 29 member countries signing the Articles of Agreement. Originally the IMF supported the Bretton Woods system, where major currencies were pegged to the U.S. dollar, which was itself pegged to gold, at a price of $35 per fine ounce. Its role was modified following the collapse of the Bretton Woods system in the early 1970s and the move to the current system of multiple exchange rate arrangements. Its two key current roles are, first, economic surveillance and policy advice to member states, and, second, financial assistance to member states in payments difficulties. To fulfil its first role it monitors global and national economies to identify risks, and provides policy recommendations to countries on monetary, fiscal, and trade policies. It issues both country and global reports such as the World Economic Outlook (WEO) and the Global Financial Stability Report (GFSR). To fulfill its second role it provides loans to member countries facing balance of payments difficulties. Loan programs often come with strict economic reform and structural adjustment conditions. The IMF played a key role in stabilizing economies during debt crises in Latin America, Asia, and Russia in the 1980s and the 1990s, it provided much needed financial assistance following the Global Financial Crisis of 2008-2009 and the euro area crisis and since 2020 it has supported countries in dealing with the COVID-19 pandemic and subsequent economic shocks, such as inflation and debt crises. Thus, the IMF plays a crucial role in stabilizing the global economy through economic surveillance, financial assistance, and policy advice. However, its policies and influence remain a topic of debate and criticism. Critics often concentrate on the conditions it imposes for financial assistance, considering them as too harsh and insensitive, particularly to the needs of developing economies.

Second, the *International Bank for Reconstruction and Development* (IBRD or *World Bank*): It was also created in Bretton Woods. It officially started operations on June 25, 1946. It initially focused on post-World War II reconstruction. Between the 1950s and the 1970s it shifted focus to economic development in developing nations, especially infrastructure projects like roads, dams, and power plants. From the 1980s it began financing structural adjustment programs (SAPs), requiring policy reforms in borrowing countries. Since the 2000s its focus expanded to poverty reduction, climate change, and sustainable development. It is the main lending arm of the World Bank Group and provides financial and technical assistance to middle-income and creditworthy low-income countries. The IBRD plays a vital role in global development by financing large-scale projects, advising on economic policies, and responding to crises. However, its policies and governance continue to be debated, particularly regarding their impact on developing economies.

Third, the *Bank for International Settlements* (BIS): It facilitates cooperation between national central banks. It was created in the 1930s, as part of the Young Plan, an agreement to handle Germany's World War I reparations. The founding members included France, Germany, Belgium, Italy, Japan, the United Kingdom, and the United States. Over time, the BIS shifted its focus from reparations to becoming a hub for central bank cooperation. The BIS acts as a bank for central banks and plays a crucial role in global financial stability. Its key function is the promotion of monetary and financial stability through cooperation among central banks to ensure stable international monetary policies. The BIS also offers financial services to central banks, such as gold and foreign exchange reserves management, and oversees the Basel Committee on Banking Supervision (BCBS), which develops international banking regulations.

Fourth, the *G-7* & the *G-20*: These are largely informal gatherings of the governments and central banks of the major economies in order to coordinate global economic policies. The G-7 emerged as the G-6 in 1975, following the collapse of the Bretton Woods system in the early 1970s, as a forum for the international coordination of macroeconomic policies. The original members were France, Germany, Italy, Japan, the United Kingdom, and the United States. They were joined by Canada in 1976. The EU also participates in the meetings, although it is not considered a full member. The G-20 was established in 1999 in response to the 1997 Asian financial crisis. Initially, it consisted of finance ministers and central bank governors from 19 countries plus the EU. In 2008, following the global financial crisis, it was elevated to the level of heads of governments, to coordinate international economic policies. The G-20 has a more formal structure and a permanent secretariat, unlike the G-7, and includes both developed and emerging economies, making it more representative than the G-7. It covers a broader range of global issues, including financial stability, trade, sustainable development, and climate change. The G-20 coordinates closely with international organizations such as the United Nations (UN), the IMF, the World Bank, and the World Trade Organization (WTO). It has played a crucial role in coordinating responses to economic crises, including the 2008 financial crash and the 2020 COVID-19 pandemic.

The current international monetary system can be seen as the evolution of a sequence of previous monetary systems ranging from bimetallism and the gold standard in the 19th century, to the gold exchange standard and the periods of floating and exchange rate management of the interwar period. Its direct antecedent is the dollar based Bretton Woods system that emerged after World War II. Knowledge of the historical factors that have determined this evolution is a prerequisite for fully understanding its key characteristics and role and for making informed judgements about the future of international payments and the global economy.[5]

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[5] For a comprehensive, relatively recent, overview of the historical evolution of the international monetary system since the 19th century, see Eichengreen (2008).

3. Money, Banking and Central Banks

What are the functions of money in an economy, and why do households and firms hold money when there are other assets with higher returns? The answer is that money is the only asset that is not only a store of value, but also a unit of account and a means of payments. It thus combines three important functions, unlike other assets.

3.1 The Three Functions of Money

First, money is a unit of account, a *numeraire*. In any national economy, all prices are determined and quoted in terms of money. Otherwise, economic agents would have to calculate all the relative prices of goods, services in order to conduct their transactions. For example, in an economy with N goods plus money, there are N money prices. Without a unit of account like money, economic agents would need to calculate $N(N+1)/2$ relative prices in order to make their transactions. As the number of goods and services increases, the number of relative prices to be calculated grows exponentially. For example, if there are 5 goods and services, there are five money prices, and 15 relative prices of goods between them. With 10 goods and services, there are 10 money prices, and and 55 relative prices of all goods and services. With a 1000 goods and services, there are 1000 money prices, and 500,500 relative prices between goods and services. Money, as a unit of account therefore helps to simplify the calculation of prices and values, and thus facilitates economic transactions through its unit of account function. In addition, the price of money is constantly equal to unity, unlike the money prices of other assets that may fluctuate.

Secondly, money is a generally accepted *means of payment*. Being accepted by all, money greatly facilitates economic transactions and drastically reduces their costs. Without money, in order to complete a transaction, the seller of a product or service, or asset would have to find a buyer who would be prepared to exchange another good or service or asset that the seller wishes to acquire. This requires that there is a double coincidence of wants in all economic transactions. Transactions or this kind are called *barter*, which implies large costs on the part of economic agents in order to find suitable counter-parties to economic transactions. A modern economy would immediately cease functioning if there was not a generally accepted medium of exchange and payments, because transaction costs would be prohibitive. Money, either by social custom or by law is the only generally accepted means of payments. The combination of the unit of account and means of payments functions of money provides what can be termed *liquidity*. Money is liquid in the sense that it can be freely exchanged at a constant price.

Third, money is a *store of value*, i.e. a means of holding wealth and contracting and settling debts. Money is indeed the asset that is characterized by the greatest degree of liquidity, as it can be used directly for payments for the acquisition of goods and services. Since money is the only store of value which is also a means of payments, by definition money is the most liquid store of value. However, as a means of holding wealth, money has the weakness that it does not generally pay interest, unlike other less liquid assets. Thus, the real return of money as an asset is negative when there is positive inflation.[6]

In order for money to be willingly held as an asset, it has to be a a credible store of value, and not lose its value against goods and services too quickly through inflation. When inflation is high, the demand for money as an asset declines, because its real return declines compared to other less liquid assets. Furthermore, in cases of extremely high inflation, such as a hyperinflation, it may cease to function as a unit of account and a means of payments as well.

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[6] Even when some forms of money pay interest, they pay a substantially lower interest rate than other less liquid nominal assets.

All three functions of money as a unit of account, a means of payments and a store of value determine its social role in an economy, and help explain why households and firms attach such great importance to money.

3.2 The Historical Evolution of Money and Banking

Before the invention of coins and, later, banknotes, societies used primitive money—objects with intrinsic or symbolic value. These early forms of money varied across cultures and often reflected local resources and traditions. Primitive money had to be widely accepted within a specific community, be durable and portable, difficult to counterfeit or reproduce and recognized as valuable due to scarcity or cultural significance. Although primitive societies used a variety of commodities as money, precious metals soon dominated. Gold, silver, and copper were weighed and exchanged and served as the main form of money in Mesopotamia and Ancient Egypt from 3000 BC, before they started being minted into coins. Silver in particular was recognisably used as money in a number of ways. Hoards of silver found by archaeologists in Mesopotamia suggest that the metal was made into large ingots, cut into small scraps or drawn out into thin wire in order to facilitate the correct weighing out of the silver in bullion form.[7]

Coins struck from precious metals first emerged in Lydia, Ionia, and the island of Aegina in the 7th century BC and somewhat later in the Persian Empire and the city states of ancient Greece. The role of precious metals in coinage systems expanded further during the Hellenistic period, the Roman Empire, the Middle Ages, and the Renaissance. Gold and silver coins, as well as coins made of copper or brass were the main forms of money. The coins were standardized, based on their gold or silver content and weight. The role of copper or brass coins was subsidiary, in that they were used to enable low-value day to day transactions that could not be served by gold or silver coins, due to their higher value and denominations.

Due to the generally higher value of gold, the size and weight of gold coins needed in order to carry out many daily transactions had to be very small. Minting such small gold coins was neither technically feasible nor convenient. On the other hand, for very high-value transactions, the size and weight of the silver coins required also made them relatively inconvenient. So in practice, it was much more efficient to use gold coins for large transactions or for storing wealth, silver coins for regular transactions and payments of somewhat lower value, and copper or brass coins for very small value transactions. Over time, and with the development of banking systems, paper money in the form of banknotes also started circulating, but was initially convertible into precious metals.

The earliest forms of banking can also be traced back to ancient civilizations, where temples and merchants doubled as financial intermediaries. In Mesopotamia, the Sumerians and the Babylonians developed early banking practices. Temples and palaces stored grain, gold, and silver and issued loans to farmers and traders. The Code of Hammurabi (1750 BC) is a record of how lending, interest rates and contracts were regulated. During the same period, Egyptian priests managed wealth stored in temples and granted loans. In Ancient Greece, moneylenders and merchants provided credit for trade. Sitting on a ‘bank’ (or *trapeza* in Greek) in the market place they handled deposits, loans and the exchange of coins of different denominations. This continued and evolved

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[7] Apart from precious metals, primitive money included cowry shells, which were used in Africa, Asia, and the Pacific Islands for centuries, whales’ teeth used as money in Fiji, stone discs used as money in the central Pacific ocean (Yap islands), wampum (shell beads), used by Native American tribes for trade and treaties, cattle, sheep, and goats used as money in pastoral societies, even, salt, which was used as money in Africa and later for the payment of legionaries in ancient Rome. It is the payment of legionaries by salt which gave rise to the term ‘salary’. For a discussion of primitive money see Davies (2002), Ch. 2, which also discusses the shift from primitive to ancient coinage based on precious metals. Williams (1997), Ch. 1 describes the evolution of money based on precious metals and coinage in ancient Mesopotamia, Egypt and Greece.

into the Roman empire, in which the first bank-like institutions were created to facilitate trade across the empire. Although the fall of the Roman Empire disrupted banking, leading to a decline in financial activities, banking re-emerged in medieval Europe with the rise of trade and commerce, despite religious restrictions on the charging of interest, which was characterised as usury. The Medici Bank (1397–1494) in Florence became one of the first international banks during the Renaissance. Italian banking families financed European monarchies, letters of credit were introduced, allowing merchants to trade without carrying large amounts of money, and double-entry bookkeeping (invented in the 14th century) helped improve financial record-keeping.

Before the 17th century, money was mostly metallic, i.e. coins of gold, silver or copper. As already mentioned, copper coins were used for low-value daily transactions and silver and gold coins for higher-value and more infrequent transactions and for storing wealth. However, banknotes circulated and accepted as money at least five hundred years earlier in both Europe and Asia. Paper money was first developed during the Tang dynasty in China in the 7th century, although actual paper money did not appear until the 11th century, during the Song dynasty. The use of paper money later spread throughout the Mongol Empire. European explorers such as Marco Polo introduced the idea to Europe in the 13th century.

3.3 The Emergence of Central Banks

The 17th century saw the rapid rise of centralized banking and the use of paper money. As the first public bank to 'offer bills that cannot be immediately converted into coins', the Bank of Amsterdam, founded in 1609, is considered as the forerunner of modern central banks. The Central Bank of Sweden (Sverige's Riksbank or simply Riksbanken) was founded in Stockholm from the ruins of the failed Stockholms Banco in 1664 and was controlled by parliament ('Riksdag of the Estates'). One role of the Swedish central bank was to lend money to the government.

The establishment of the Bank of England, the model for most modern central banks, was conceived by Charles Montagu, 1st Duke of Halifax, in 1694. He proposed a loan of £1.2 million to the government. In return, the subscribers would be incorporated as the Governor and Company of the Bank of England, with long-term banking privileges, including the issuance of banknotes. These privileges were granted by statute on 27 July 1694. The Bank of England did not initially have the same functions as a modern central bank, namely regulating the value of the national currency, financing the government, being the sole authorised issuer of banknotes and acting as a lender of last resort to banks facing liquidity crises. It gradually developed into a modern central bank during the 18th and 19th centuries. Other major central banks followed, such as the Banque de France, founded by Napoleon in 1800, the Reichsbank, founded in Germany in 1876 and the Federal Reserve Board, established in the United states in 1913.[8]

3.4 Measures of the Money Supply

In modern economies, when we think of the money supply we consider as money both coins and banknotes, but also other liquid assets such as deposits in commercial banks. We categorize money into different monetary aggregates based on their liquidity attributes:

M0 (Monetary Base): It consists of coins and banknotes in circulation plus commercial banks' reserves held at the central bank.

M1: It includes coins and banknotes in circulation, plus demand deposits (checking accounts) and other liquid deposits that can be used for immediate spending.

[8] Ferguson (2008) provides a captivating brief historical account of the ascent of money.

M2: It includes M1 plus savings accounts, time deposits (below a certain threshold), and money market deposits.

M3: It consists of M2 plus large time deposits, institutional money market funds, and other less liquid assets.

The exact definitions of these aggregates can vary between countries, based on the exact institutional characteristics of their domestic monetary systems. Domestic monetary systems are linked internationally through the rules and institutions of the international monetary system.

4. Bimetallism

During the first half of the 19th century, the monetary systems of most countries in Europe and its colonies allowed the minting and circulation of both silver and gold coins, as well as convertible paper money. This system is termed *bimetallism*, as it was based on two precious metals, silver and gold. Copper coins also circulated for low value transactions. However, Great Britain had de facto adopted the gold standard since the beginning of the 18th century, while countries such as the USA, the German states, the Austro-Hungarian Empire, the Scandinavian countries, Russia and the countries of the Far East had de facto adopted silver standards. Since the early 19th century the link between countries with a gold standard and those with a silver standard was the monetary system of France, which was bimetallic since the currency law of 1803, on the basis of a fixed relative price between the two precious metals.

When two or more types of coinage are present in a monetary system, the main problem that arises is how to keep their relative values constant so that the coins can be used interchangeably within a common system of monetary exchange. For example, ten francs in silver coins must be constantly equivalent to ten francs in gold coins. Otherwise, either the silver or the gold coins will start to be sold as metal on the free bullion market and will gradually be withdrawn from circulation.

Prior to the French Revolution, France had a hybrid monetary system that relied on both gold and silver coins. Silver coins were more common for everyday transactions, while gold coins were primarily used for larger transactions and savings. However, the coinage system was inconsistent, with multiple silver and gold standards used in different regions. Furthermore, the monetary system suffered from frequent debasements and inconsistent exchange rates between gold and silver.

After the French Revolution, in 1795, the Directory, as the post-revolutionary government, introduced a bimetallic standard, with both gold and silver coins circulating at fixed ratios. The ratios of gold to silver were set at 15 1/2 :1. This was close to the international market ratio of the two metals at the time, ensuring stability. The Banque de France, the French central bank was established by Napoleon Bonaparte in 1800 to manage France's monetary system.

The Currency Law of 1803 formalized France's bimetallic system. The French franc (FRF) was defined as 4.5 grams of fine silver and 0.2903 grams of fine gold. Thus, the ratio was set at 15.5:1 (15.5 grams of silver = 1 gram of gold).

This law established one of the most stable and influential bimetallic systems in history, making France the leader of bimetallism in the early part of the 19th century. Gold coins such as the Napoleonic franc (introduced in 1803) and the silver 5-franc piece became important units of exchange in France and gradually throughout continental Europe. Both gold and silver circulated widely, and the system was considered successful in stabilizing French finances after the upheavals of the Revolution.

The French monetary authorities were willing to exchange gold for silver at this ratio, as they held sufficiently large reserves of both metals. In this way, they contributed to the establishment of this ratio internationally, stabilizing it for much of the first half of the 19th century. Through the

stabilization of the gold silver ratio they also stabilized the parities of currencies that were either on a gold standard or a silver standard. Thus, international bimetallism implied fixed exchange rates among silver and gold based currencies.

Great Britain had been de facto on a gold standard since the 18th century, as the relative price of silver had been set very low by the British Mint as early as 1717. The ratio of 15.2 to 1, which the British Mint had determined was higher than that implied by the international bullion market at the time. This had resulted in the gradual disappearance of silver coins, as they were melted into raw silver, which was exported from Great Britain, exchanged for gold at a higher international price, and the gold acquired was imported back to Britain where it was minted at a profit. Through this process of international arbitrage, silver coins in Britain became very scarce resulting in a monetary system based primarily on gold. Due to the scarcity of silver coins, and because of the high value of gold for most transactions, goldsmiths in Britain began issuing receipts for deposited gold, which gradually evolved into banknotes. Thus, banknotes, convertible to gold started circulating more widely, a process that was facilitated after the state monopoly granted to the Bank of England.[9]

During the French Revolutionary Wars and the Napoleonic wars (1797-1815) convertibility of banknotes to gold and silver was suspended and Britain moved to a paper standard.[10] Because of the scarcity of silver coins, successive monetary acts legislatively limited the monetary importance of silver, culminating in the Currency Act of 1819, which prohibited the conversion of banknotes into silver coins and led to the formal adoption of the gold standard. The UK restored convertibility of banknotes and adopted the gold standard *de jure* in 1821.

On the other hand, the United States was de facto on a silver standard, as the United States Mint had overvalued silver relative to the international ratio of 15½ to 1. The 15 1/4 to 1 ratio, which the United States Mint had determined, resulted in the gradual disappearance of gold coins, as it was advantageous to melt them and export gold bullion to France or elsewhere, where it was exchanged for 15½ parts of silver, which was then imported into the United States and minted as coinage at a profit.

Maintaining the simultaneous circulation of both gold and silver coins either domestically or internationally was not easy, because of fluctuations in the market price of gold and silver. Initially, following the introduction of the gold franc in 1803, both gold and silver coins circulated widely in France because the ratio of 15½ to 1 was close to the international market price - that is, 15½ ounces of silver exchanged for about one ounce of gold on the bullion market. Furthermore, until 1815, the Napoleonic Wars prevented the free international exchange of precious metals. However, after 1815, new silver mine discoveries, technical advances in silver mining and the demonetisation of silver in the United Kingdom led to an increase in the relative supply of silver. As a result, the relative price of silver declined. The exchange ratio between silver and gold in the bullion market (the relative price of gold) remained above 15 1/2 to 1, which was the official rate of exchange in France (see Figure 1). As a result, there was an outflow of gold from France and its monetary system increasingly started operating as a de facto silver standard. France's policies during this period helped maintain the flow of silver coins, but the lack of gold in circulation created a degree of instability, especially as gold was needed for international settlements.

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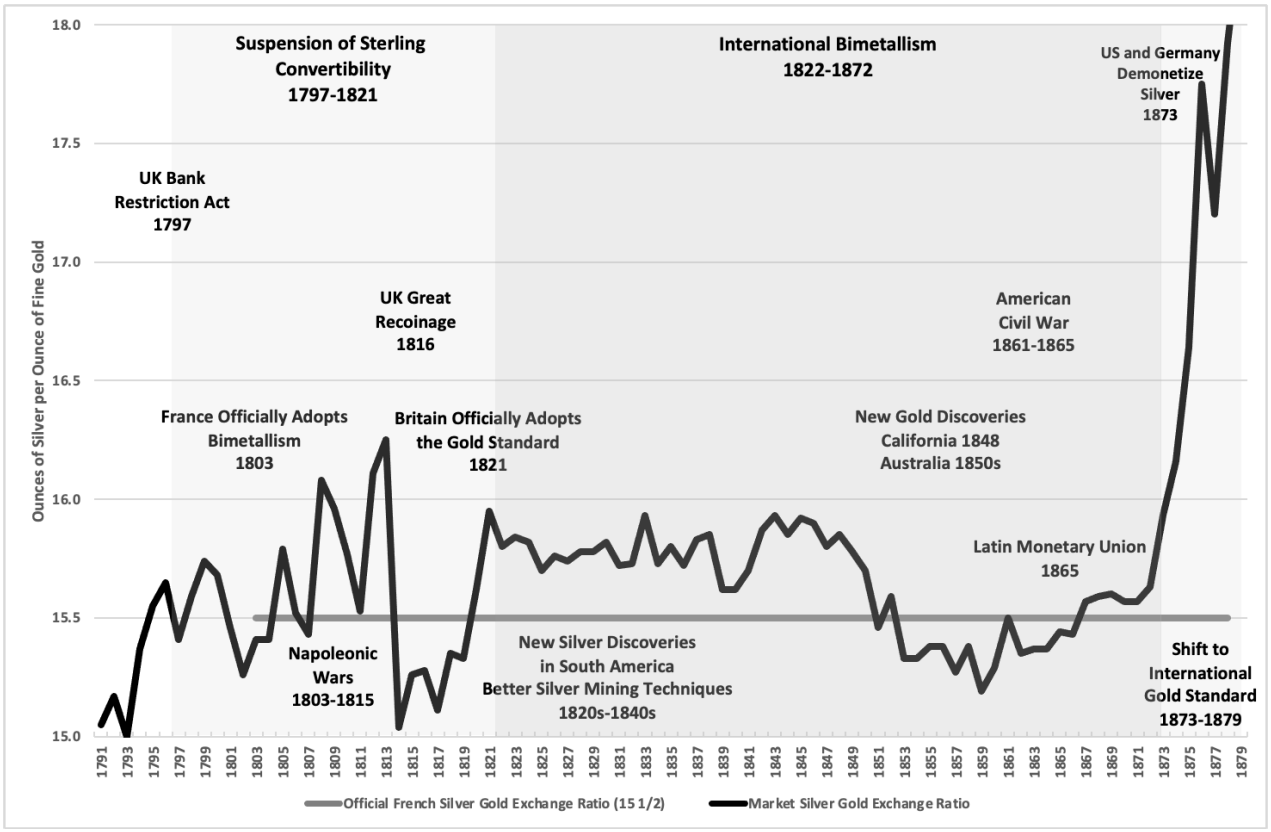
[9] In what follows we shall use Britain and the initials UK interchangeably, to refer to the United Kingdom of Great Britain and Ireland. This was officially created on January 1, 1801, with the Act of Union 1801, which united the Kingdom of Great Britain and the Kingdom of Ireland. Before that, the Kingdom of Great Britain had been formed on May 1, 1707, when the Acts of Union of 1707 united the Kingdom of England (which included Wales) and the Kingdom of Scotland. Later, in 1922, most of Ireland became independent, and the country was renamed the United Kingdom of Great Britain and Northern Ireland in 1927.

[10] Convertibility of sterling was suspended with the Bank Restriction Act of 1797.

Figure 1
Bimetallism and the Silver to Gold Market Exchange Ratio in the 19th Century



Source: Data for the market silver to gold ratio from Officer and Williamson (2025).

After 1850, the market exchange ratio between silver and gold moved in the opposite direction. The discovery of new gold deposits in California, Australia, and elsewhere increased the relative world supply of gold and led to a decline in the silver-gold exchange ratio (the relative price of gold) in the bullion market below the French official ratio of 15 1/2 to 1. Bimetallism in France began to face the opposite problem. Inflows of gold and outflows of silver bullion. The problem of the outflow of silver was much more serious for France than the problem of the outflow of gold in the years that had preceded it. The reason was that silver coins were the main means of regular payments and could not be easily substituted by gold coins for most day to day transactions. Thus, France was led to start issuing silver coins with a lower silver content in order to economize on silver and prevent the conversion of silver coins into metal.

Similar problems were also experienced by other countries such as Belgium, Switzerland and Italy, which had bimetallic monetary systems related to the one in France. This led them in 1865 to the formation of the Latin Monetary Union (LMU), in order to coordinate and standardise the silver content of their currencies and preserve bimetallism.[11]

The Latin Monetary Union was an ambitious attempt to stabilise international bimetallism and coordinate the currencies of multiple European countries. However, the LMU ultimately failed, largely due to the continuous fall of the relative price of silver, shifts toward the gold standard in many countries, such as Germany and the USA, and the impact of World War I.

[11] Greece joined the LMU in 1867, but soon after the convertibility of its currency, the drachma, was suspended.

There were two major disturbances that led to the final collapse of international bimetallism and the adoption of the international gold standard. The Franco-Prussian War of 1870–1871, which resulted in Germany adopting the gold standard after receiving a large war indemnity in gold from France, and the demonetization of silver in the United States, with the Currency Act of 1873. Both contributed to an increase in the relative supply of silver internationally. The increase in the world output of silver after the discovery of significant deposits in Nevada and elsewhere also played a role, resulting in continuous large increases in the silver to gold exchange ratio (falls in the relative price of silver), as is shown in Figure 1.[12]

1873 can be considered as the year when international bimetallism was effectively abandoned.

5. Sterling and the International Gold Standard

The introduction of the gold standard in Germany, the demonetisation of silver in the United States and the restrictions in the coinage of silver in the Latin Monetary Union, including France, signalled the shift towards the international gold standard. International bimetallism was thus gradually replaced by the international gold standard.

As already mentioned, England had been the first country to adopt the gold standard as its domestic monetary system. This development was due to Isaac Newton, Director of the British Mint in the early 18th century. In 1717, Newton had set a very low price for silver in relation to gold (15.2 to 1), resulting in the disappearance of silver coins from domestic circulation, since the international price of silver was higher at the time. The gold standard regime in England operated informally on the basis of the issuance of gold coins, banknotes and low-value silver and copper coins, and was officially institutionalised almost a hundred years later, in 1821, after the end of the Napoleonic Wars.

The first step towards the creation of the international gold standard was taken by Germany in 1871. After its victory in the Franco-Prussian War, Germany received a large indemnity from France in gold bullion, and proceeded to create a new gold based currency, the mark. The European countries that had bimetallic monetary systems (the Netherlands, Denmark, Norway, Sweden as well as the countries of the Latin Monetary Union) soon followed, as discoveries of silver in Nevada and new mining methods had led to a large increase in the supply of silver and a precipitous fall in its relative price. France and the countries of the Latin Monetary Union effectively joined between 1874 and 1878, as they proceeded to limit the coinage of silver. The USA abolished the monetary role of silver in 1873 and officially joined the international gold standard in 1879, when convertibility of the dollar was finally restored. Russia, Japan and other countries joined in 1897.

There were three essential elements in the functioning of the international gold standard.

1. The free convertibility of domestic banknotes into gold or gold coins at a fixed price
2. The free import and export of gold, and
3. A set of rules linking the domestic money supply to the gold reserves of a country.

However, the internal operation of the gold standard varied from country to country. Countries such as Britain, the United States, and Germany had full convertibility of their currency into gold, while other countries such as France, Belgium, and Switzerland retained restrictions. Gold coins were circulating in England, France, Germany, the United States, Russia (after 1897), Australia, South Africa and Egypt, but not in other countries. In addition, it was understood that in exceptional

[12] Redish (2000) provides a detailed economic and historical analysis of rise and fall of international bimetallism in the context of the evolution of metallic money since the middle ages.

contingencies, such as wars or major financial crises, currency convertibility into gold could be temporarily suspended.[13]

Countries also differed in the extent to which their monetary circulation was backed by gold reserves. There were three types of systems: the fiduciary, the proportional and mixed systems, which were combinations of the first two. The fiduciary system allowed the issuance of a specific amount of banknotes, not covered by gold. The proportional system did not set an upper limit on unbacked circulation, but allowed the ratio of the domestic money supply to gold reserves to be maintained at levels below 100%. The two systems could of course be combined.[14]

The international gold standard also implied fixed exchange rates among the participating currencies, as each country determined a fixed gold content for its currency. Since all countries had set the price of gold in their currency, the exchange rates of the currencies were determined by simply dividing the prices of gold in the various currencies.[15]

The main appeal of the international gold standard was the stability of the gold value of currencies and exchange rates that it was considered to provide, ensuring, first, that the value of money would not be eroded by high inflation and, second, that international transactions were conducted at fixed exchange rates.

Both international bimetallism and the international gold standard had led to a relative stability of nominal exchange rates between different currencies. Figure 2 shows the evolution of the exchange rate between the French franc (FF) and the British pound sterling (£). During the period of international bimetallism, following the return of sterling to convertibility (1822–1872), the exchange rate between the two currencies remained essentially stable around an average level of 25.6 French francs to the pound sterling.

French monetary interventions to limit fluctuations in the relative price of silver to gold also resulted in a stable exchange rate between a currency based on both silver and gold, such as the French franc, and one based solely on gold, such as sterling. It is worth comparing this stability with the large fluctuation of the exchange rate during the French Revolutionary and Napoleonic Wars (1797-1815), when Britain had temporarily suspended the convertibility of sterling into gold.

Exchange rate stability of the French franc-sterling exchange rate was further enhanced during the operation of the international gold standard, from 1873 to 1913. The fluctuations of the exchange rate of the French franc vis-a-vis the pound sterling were much smaller, around an average level of 25.4 French francs per pound. The variance of the average annual FF/£ exchange rate in the period of international bimetallism 1816-1872 was 3.8%. During the period of the international gold standard it was reduced by almost a fourth, to only 1.1%.

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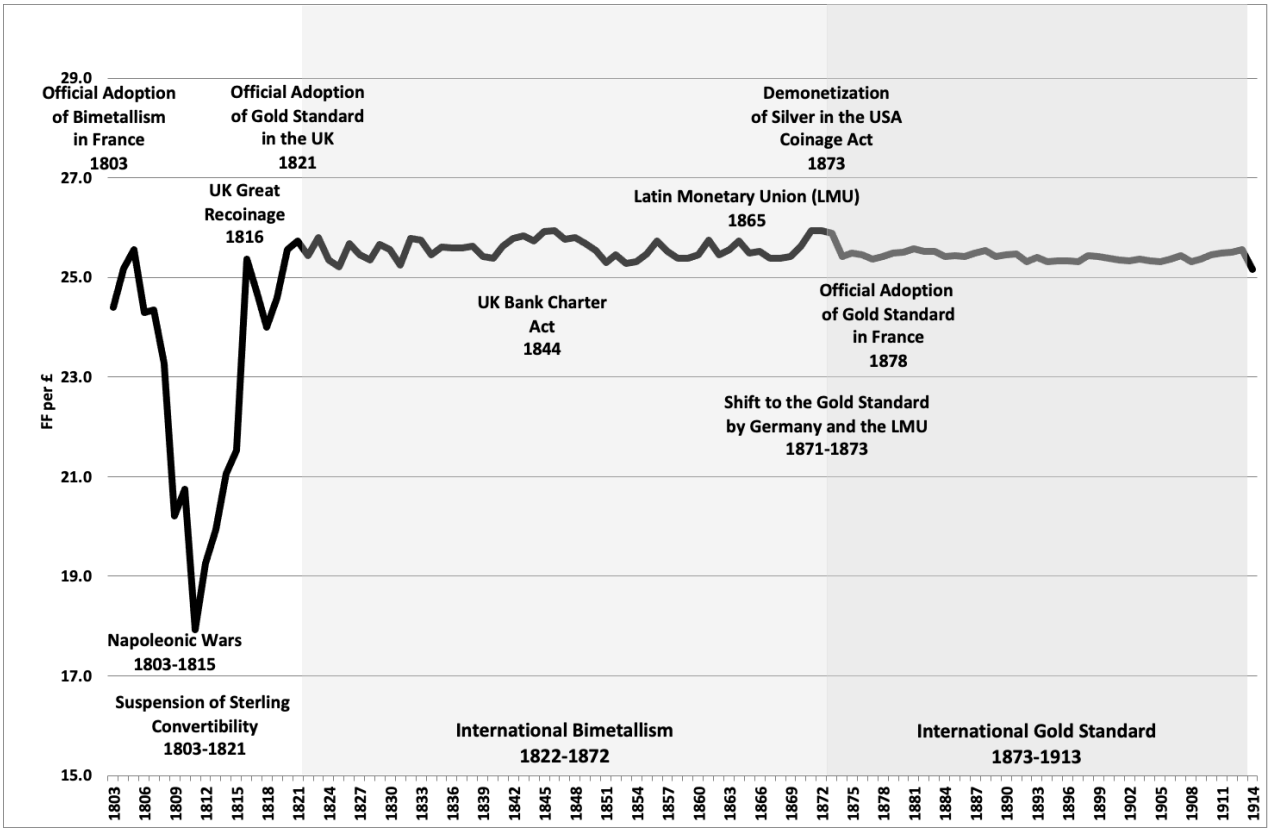
[13] Bordo and Kydland (1995) have interpreted the international gold standard as a regime based on a contingent policy rule, providing a fixed price of gold in domestic currency and full convertibility, but also allowing temporary suspensions of convertibility in exceptional contingencies, such as wars or major financial crises, on the understanding that convertibility would be restored at the original price of gold in domestic currency.

[14] The main representative of the fiduciary system was the UK. The Peel Act (1844) imposed the conversion of monetary circulation at par, except for a maximum ‘unsecured’ amount of 18.5 million pounds sterling, which represented the British government’s debt to the Bank of England. Countries such as Belgium, France, the Netherlands and Switzerland had adopted the proportional system, while Germany and Austria-Hungary had adopted a combination of the two systems.

[15] In fact, exchange rates could fluctuate around a narrow band of 1-2%, the so-called *gold points*, without triggering gold flows. The gold points were determined by the cost of shipping gold from country to country.

Figure 2
The French Franc - UK Sterling Exchange Rate, 1803–1914



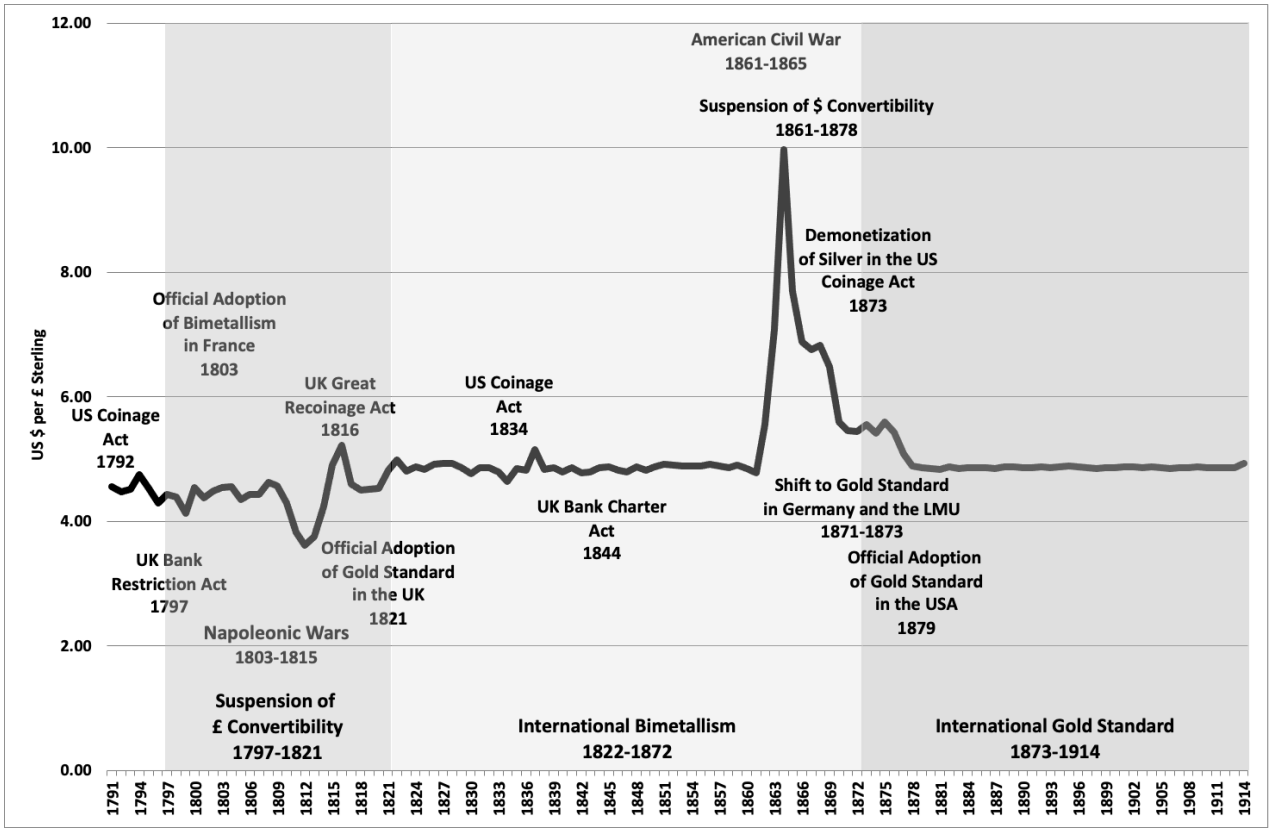
Source: Data on the FF/£ exchange rate from Mitchell (1988).

Similar conclusions emerge from an examination of the evolution of the exchange rate between the US dollar and sterling, which is presented in Figure 3. During the period of international bimetallism, before the suspension of the convertibility of the dollar during the American Civil War, i.e between 1822 and 1860, the dollar/sterling exchange rate fluctuated relatively little, around an average level of $4.86/£. During the international gold standard, after the dollar's entry into the system, i.e 1879–1913, the fluctuations were even smaller. The variance of the average annual exchange rate in the bimetallic period 1822-1860 was 0.59%, while in the gold standard period 1879-1913 it was only 0.01%. It is also worth comparing this stability with the wide fluctuation of the exchange rate during the American Civil War and its aftermath (1861-1878), when convertibility of the dollar into gold was suspended, in order to finance a large part of the cost of the civil war by issuing uncovered banknotes (‘greenbacks’).

Another important advantage of the gold standard is considered to have been that it was an effective mechanism for smoothing out imbalances of international payments. The classic analysis of this issue is due to David Hume (1752), who analysed the operation of the British gold standard in the 18th century, long before the emergence of the international gold standard.

Hume, in one of the most powerful early general equilibrium models in economics, described the role of the ‘price-specie flow mechanism’ in monetary systems based on precious metals such as gold. He relied on the quantity theory of money. If a country experienced an inflow of gold, because it had a surplus in its balance of payments, the money supply increased and caused an excess demand for goods, which, in turn, led to an increase in domestic prices relative to foreign prices. Consequently, the demand for imports increased, while the demand for exports decreased, resulting

Figure 3
The Dollar - Sterling Exchange Rate, 1791-1914



Source: Data on the $/£ exchange rate from Bank of England (2018).

in the restoration of balance in international payments. The opposite mechanism applied if a country had a deficit in its balance of payments. The reduced money supply, due to the outflow of gold, led to a fall in the domestic price level relative to the rest of the world, a decrease in imports and an increase in exports. The process continued until the balance in international payments was restored. This analysis applied to any monetary system based on a fixed relative price of precious metals. Thus, it also applied to international bimetallism.[16]

However, Hume's analysis, although relatively realistic for the 18th century, was too simple for a world characterized by the emergence of banking and banknotes, central banks and capital flows, as the late 19th century international gold standard. The analysis of the Cunliffe Committee (1919) provides an appropriate modification of Hume's model. It considers a world in which banknotes circulated alongside gold and the central bank stood ready to convert its domestic banknotes into gold. When one country, say Britain, ran a current account deficit against another, say France, it paid for the excess of imports with domestic (sterling) banknotes, which ended up in the hands of foreign merchants. Having no use for these notes, these merchants (or their bankers in London) presented them to the Bank of England for conversion into gold. They then presented that gold to the Bank of France for conversion into francs. The money supply fell in the deficit country, Britain, and rose in the surplus country, France. In other words, nothing essential differed from the version of the price-specie flow model elaborated by Hume. Money supplies having moved in opposite

[16] See Hume (1752). This mechanism has been the basis of the modern monetary approach to the balance of payments under fixed exchange rates. See Frenkel and Johnson (1976) and in particular McCloskey and Zecher's (1976) analysis of the gold standard.

directions in the two countries, brought about the adjustment of the relative price levels as before, eliminating the current account imbalance. The main difference was that the money flows that initiated the process took the form of paper currency. Gold, rather than moving from circulation in the deficit country to circulation in the surplus country, moved from one central bank to the other.[17]

The Cunliffe Committee model of the operation of the gold standard continued to predict substantial transactions in gold among central banks. This was at odds with reality. To eliminate this discrepancy it was necessary to introduce a model allowing for an active role for central banks. When a country ran a payments deficit and began losing gold, its central bank could intervene to stop the outflow of gold, by raising its discount rate or through equivalent open market operations, such as selling bonds in its portfolio. This would speed up the contraction of the domestic money supply without the help of gold outflows. By reducing the money supply through such operations, central bank intervention could put further downward pressure on domestic prices and enhance the competitiveness of domestic goods, eliminating the external deficit as effectively as with a gold outflow.

Thus, in order for David Hume's automatic balancing mechanism to work effectively, all central banks were required not to hinder the adjustment in the money supply caused by outflows or inflows of gold and foreign exchange. This later came to be known as respecting the 'rules of the game'.[18]

We now know that such rules were not generally respected during the operation of the classical gold standard. Yet, their violation did not create serious problems before World War I. The reason appears to be that the commitment of central banks to maintaining currency convertibility into gold was so credible that it prevented destabilising speculative capital flows that would have undermined the system.

Although no one doubts that the international gold standard provided exchange rate stability, which favoured international trade and international capital movements, and that it facilitated the adjustment of international payments imbalances, there have been serious concerns about its effects on price stability and short-term fluctuations in output and employment.

After all, the international gold standard was widely criticised during its dominance as failing to provide price stability. As summarized by Schwartz (1984), pp. 13, 'Even before the end of the nineteenth century, … popular and professional criticism of the gold standard arose. What occasioned the criticism was the secular price rise associated with the mid-century gold discoveries and the long secular price decline that got under way in the 1870s under an expanding international gold standard. The first challenge to the gold standard was that it did not assure price stability.'.

The operation of the international gold standard can be divided into two separate sub-periods. In the first, between 1873 and 1896, there was continuous price deflation (The Long Depression, 1873-1896), in that the price level was falling continuously. In the second, between 1897 and 1914, there was a mild continuous positive inflation, in that the price level was rising. This can be seen in Figures 4 and 5, which display the evolution of the price level in the United Kingdom and the United States respectively. There was initially a long period of deflation in both the UK and the

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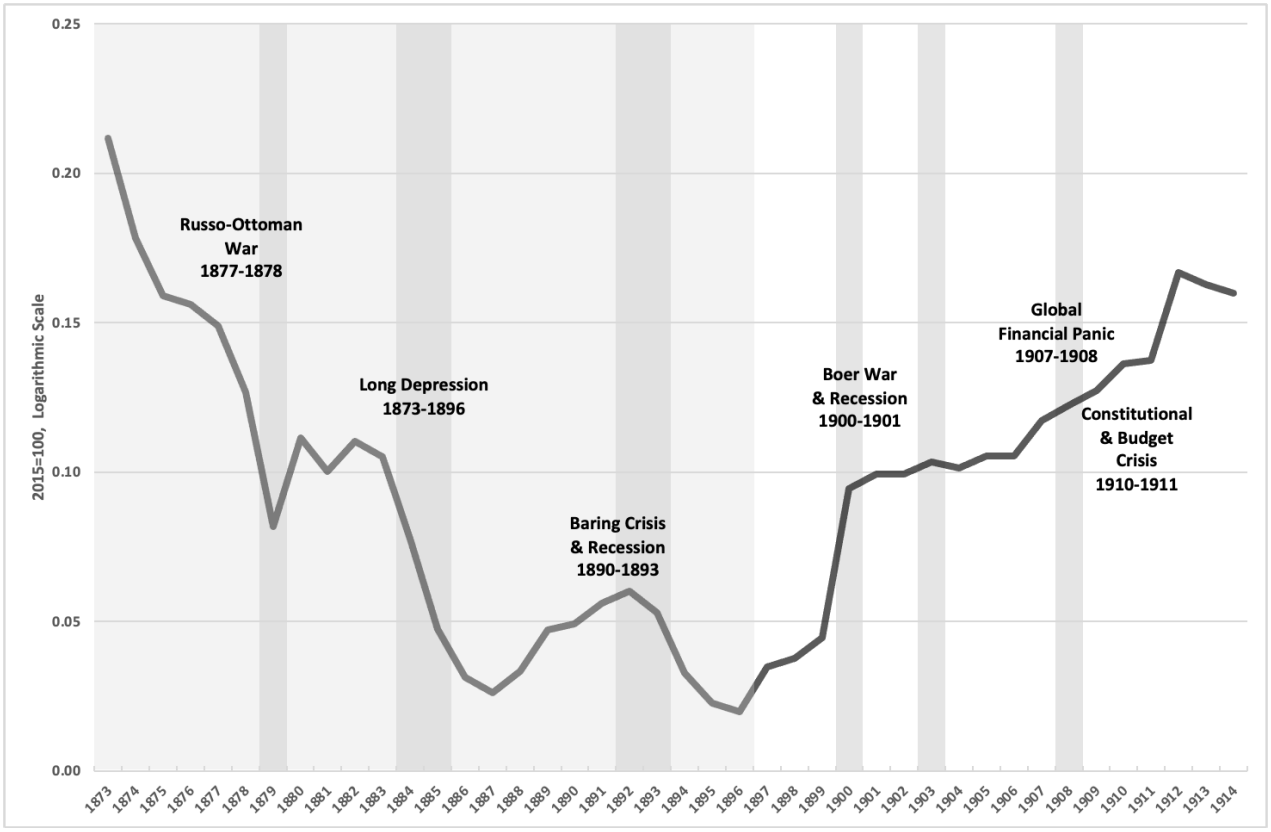
[17] See Eichengreen (2008), pp. 25-26.

[18] See Eichengreen (2008), pp. 27-31. The 'rules of the game' was a phrase coined in Keynes (1925), criticizing Britain's return to gold at the pre-war parity. It is doubtful whether they were ever followed consistently. In response to Nurkse (1944), who had argued that during the interwar gold exchange standard central banks did not respect the 'rules of the game', and that this was the reason that it did not operate effectively, Bloomfield (1959) demonstrated that the 'rules of the game' were not followed during the operation of the pre-war international gold standard either.

Figure 4
The Consumer Price Index in the United Kingdom, 1873-1914



Source: Data on the Consumer (Retail) Price Index from Bank of England (2017) and UK Office of National Statistics (ONS). The lightly shaded area indicates the Long Depression of falling prices. The darker shaded bars indicate periods of recession.

USA, followed by a shorter period of mild inflation. Despite the stability of the price of gold and the stability of exchange rates, price stability proved elusive during the period of the international gold standard.[19]

In addition, the constraints on the use of monetary policy and the inflexibility that the system implied meant that the international gold standard was characterised by frequent financial crises (‘panics’) which often led to recessions (see Figures 4 and 5).

The main economic crises and recessions that took place during the operation of the international gold standard are briefly summarised below.

This is a period marked by the Long Depression (1873–1896), frequent banking panics, industrial transformation, and significant constraints on monetary policy. Because of the international gold standard, these financial crises were often transmitted from the UK to Europe and the USA and vice versa.[20]

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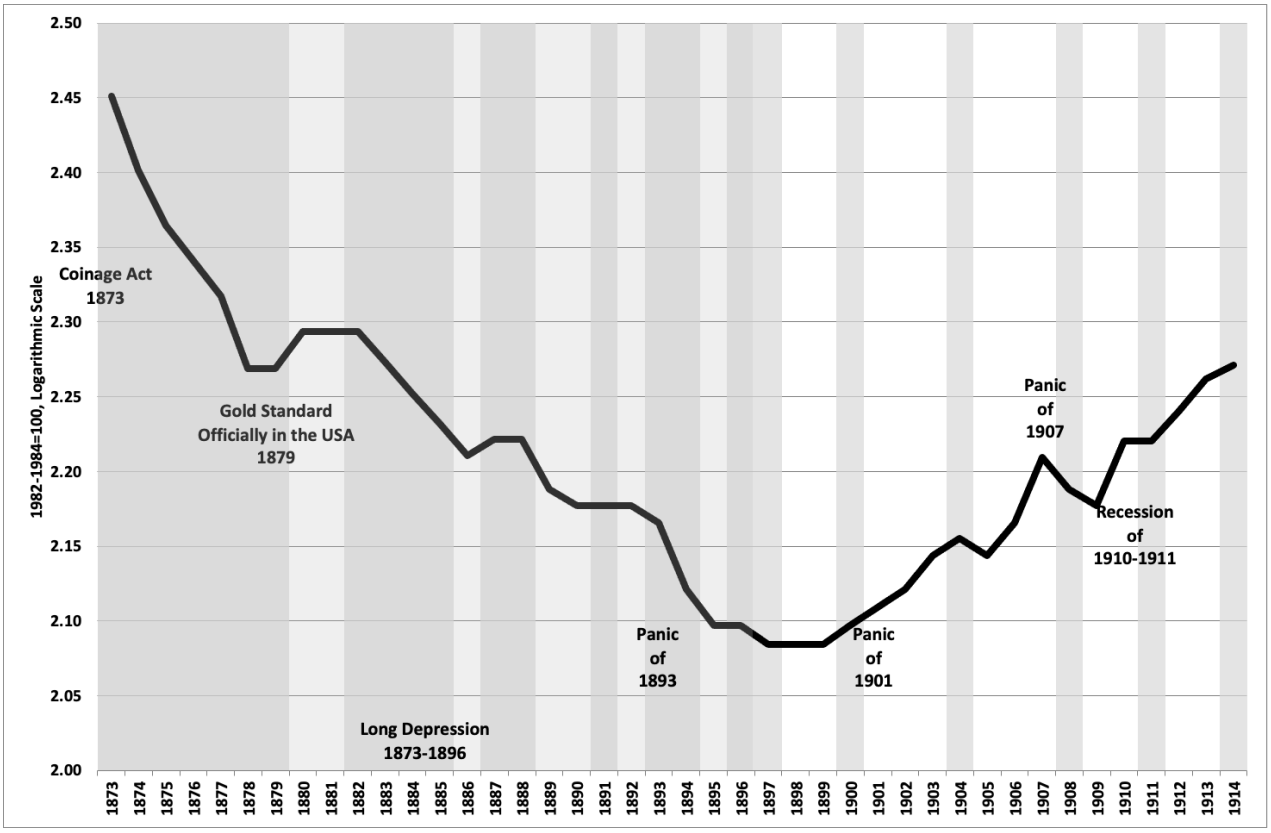
[19] This is documented in both historical and econometric research. See the studies in Bordo and Schwartz (eds. 1984), Bordo (1981, 1993 b) as well as those of Alogoskoufis and Smith (1991) and Alogoskoufis (1992). The latter two demonstrate empirically that the international gold standard was characterised by low persistence of inflationary episodes. In contrast, periods of floating exchange rate regimes, such as the ones in the 20th century, are associated with more persistent inflation.

[20] For detailed histories, accounts and interpretations of financial and debt crises see Kindleberger (1989) and Reinhart and Rogoff (2009).

Figure 5
The Consumer Price Index in the United States, 1873-1914



Source: Data on the Consumer Price Index from Officer (2024). The lightly shaded area indicates the Long Depression of falling prices. The darker shaded bars indicate periods of recession.

1. Long Depression, 1873-1896.

This was a prolonged period of economic stagnation and deflation that affected the United States, the United Kingdom, and much of Europe. While not a continuous recession, it was marked by financial crises, declining prices, and slow economic growth. It was one of the longest economic downturns in modern history and had profound effects on industry, trade, and monetary policy.

It was triggered by the 1873 collapse of Jay Cooke & Co. (U.S.) and a financial crash in Vienna (Austria-Hungary). Stock market crashes and bank failures due to over-investment in railways and industry followed, as well as monetary deflation, due to the constraints of the transition to the international gold standard. Furthermore, this period was marked by a global agricultural depression. The depression ended in 1897, following gold discoveries in South Africa, Alaska and Australia during the 1890s that resulted in increased global liquidity. Industrial growth also increased due to new technologies, and the expansion of electricity and steel by the late 1890s.

2. Baring Crisis and UK Recession, 1890-1893.

A speculative bubble in Argentina burst in 1890, leading to a sovereign debt crisis. Baring Brothers, a major British bank, nearly collapsed due to over-investment in Argentine bonds, triggering a systemic banking crisis in the UK, other sovereign defaults and a international recession. The Bank of England intervened to counter the effects of the crisis with European financial assistance and the economy recovered in 1894. However, the panic spread to the United States which experienced its own recession after 1893.

3. *Panic of 1893 and US Recession, 1893-1897.*

The failure of the Philadelphia and Reading Railroad in the USA triggered a financial panic. Uncertainty over the future role of silver led to gold withdrawals from banks. Investor panic led to bank runs and mass withdrawals. Over 500 banks collapsed, leading to a sharp credit contraction. The US President repealed the Sherman Silver Purchase Act (1893) to remove uncertainty about the monetary role of silver and restore confidence in the gold standard. The U.S. economy recovered by 1897, aided by the increase in liquidity, following the gold discoveries in Alaska, South Africa and Australia.

4. *Panic of 1900-1901.*

Panic selling of speculative positions in railway stocks in the US led to major financial losses. In the UK the Boer war created investor uncertainty, while the Bank of England tightened credit, causing slower investment. The crisis was short as UK military spending due to the Boer War and industrial expansion in the USA led to recovery by 1902.

5. *Global Financial Panic, 1907-1908.*

A banking and stock market panic in the United States spread to European markets. The UK struggled with a tight monetary policy, limiting economic recovery. J.P Morgan, the US banking magnate, and the Bank of England eventually provided liquidity, preventing widespread bank failures. Both economies recovered by 1909, helped by increased government spending and a revival in international trade. It was this crisis that tipped the scales for the creation of the Federal Reserve System (1913) to prevent future panics.

6. *Recession of 1910-11.*

This mainly affected the UK and was due to political and economic uncertainty created by a constitutional crisis, tax hikes, and industrial strikes. The 1911 Budget helped clear the way and recovery followed.

In addition, due to tight monetary policy and war fears there was a global economic slowdown in 1913-1914.

Thus, despite the stability of the price of gold and exchange rates, the international gold standard was beset by price and financial instability and frequent recessions.

The international gold standard system collapsed at the start of World War I. The outbreak of the war dramatically shifted economic conditions. The UK suspended the gold standard, while the UK, other European economies and the USA focused on war production boosting activity. The high war costs and the need to cover them immediately made the increased issuance of new banknotes inevitable.[21]

The war and the sharp monetary expansions quickly shook public confidence in the various currencies, resulting in a massive wave of returns of convertible banknotes for redemption. As a result, all European governments, either de facto or de jure, suspended convertibility of their currencies into gold and resorted to uncovered paper currency issues to help finance war expenses.

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[21] The official declaration of war was made on August 4, 1914. It was a war between two camps. On the one hand, there was the alliance of France, Russia and Great Britain (Entente Cordiale) and on the other, the alliance of the Central Powers, mainly Germany and Austria-Hungary. The Ottoman Empire and Bulgaria sided with the Central Powers, while Serbia sided with the Entente. Greece maintained a neutral stance until 1917, when it eventually sided with the Entente, after an internal political split.

Germany replaced the gold based Mark with a paper currency.[22] Austria-Hungary, Russia, and France abolished the possibility of redemption and imposed controls on gold exports. A year later, in 1915, the Netherlands did the same. In February 1916, Sweden banned the minting of gold coins and suspended the obligation to buy gold at a fixed price.

During the war, exchange rate fluctuations were significantly limited by the imposition of exchange controls, the risks of transferring gold and securities between countries, and the efforts made by the USA to help Britain and France support the exchange rates of their currencies.

From the official outbreak of war in August 1914 until March 1919, Great Britain remained nominally on the gold standard, although convertibility into gold had been suspended. The Bank of England, with US support, managed to keep the sterling exchange rate close to the pre-war parity.

During World War I, all the belligerent countries suspended convertibility and resorted to monetary and debt finance. As a result of monetary finance they suffered from persistent and intense inflation.

6. The Gold Exchange Standard and Interwar Instability

Since wartime inflation rates were not only high, but also varied considerably from country to country, and because of the economic devastation caused by the war, an immediate return to the gold standard at pre-war parities became impossible after the end of the war.

When the United States withdrew its support of the UK sterling and the French franc in 1919, all European countries had no choice but to let their currencies depreciate. Only the dollar remained tied to gold throughout this period, except for the two-year period 1917-1919, when the United States, upon entering the war, imposed restrictions on gold exports.[23]

The problems caused by the economic disruption, the debt accumulation and the surge of inflation during the war were exacerbated by the decisions of the Peace Conference at Versailles. The Treaty of Versailles (1919), which formally ended World War I, had profound economic consequences, particularly for Germany, but also for the broader European and the global economy. The treaty imposed harsh financial penalties, territorial losses, and trade restrictions, leading to further large financial imbalances that perpetuated economic instability.[24]

Germany was forced to accept full responsibility for the war and to pay 132 billion gold marks (around $33 billion at the time) in reparations. These payments placed an enormous strain on the German economy, leading to budget deficits which Germany attempted to finance through a policy of massive printing of money, which eventually led to hyperinflation (1921–1923). By 1923, the Mark (Papiermark) had collapsed. The exchange rate of the Mark, which was at 4.2 marks to the US

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[22] The term ‘Goldmark’ was created later to distinguish the gold based pre-war German mark from the ‘Papiermark’ (paper mark) which suffered a serious loss of value through hyperinflation following the end of World War I.

[23] As reported by Yeager (1966), wholesale prices in 1919 were on average twice and in 1920 about 2 1/4 times higher than 1914 prices. France, and Central and Eastern Europe suffered from intense inflationary pressures for a period of several years. Germany experienced severe hyperinflation. Wholesale prices in December 1921 were about 35 times higher than their prewar level, a year later they were 1475 times higher, and in November 1923 they were 14 trillion times higher. Only the United States experienced relatively moderate inflation and was therefore able to restore the gold standard in July 1919.

[24] The Treaty of Versailles was criticized vigorously by the economist John Maynard Keynes, in a best selling short book, titled the *Economic Consequences of the Peace.* See Keynes (1919). This book established Keynes’ international reputation, even though it also caused him to be regarded as anti-establishment. Keynes was a member of the British delegation, but resigned after disagreeing with the official line. He would not be offered another official position in the UK until World War II.

dollar before the war fell to 4.2 trillion Papiermarks by November 1923. Hyperinflation wiped out the savings of the German middle class, leading to deep resentment and social unrest.[25]

Several countries sought to return to the gold standard a few years after the war, believing it would restore financial stability and pre-war trade relations. The Genoa Conference (1922) recommended the creation of a *gold-exchange standard*, where countries could hold reserves in gold or in currencies convertible into gold (such as the U.S. dollar). Sterling returned to gold in 1925, at the pre-war parity of $4.86, after a long period of deflation and economic stagnation. The French Franc joined the gold exchange standard at a much devalued rate in 1928, making the French franc more competitive than sterling. In Germany, the old mark, which had been wiped out by hyperinflation, was replaced by the Rentenmark at the end of 1923 and the Reichsmark in 1924. Other European countries also attempted to restore their pre-war currencies, but many lacked sufficient gold and foreign exchange reserves.

In any case, the interwar gold-exchange standard was not the same regime as the prewar international gold standard. Convertibility into gold was limited, as central banks imposed significant quantitative restrictions on the conversion of banknotes into gold coins or bullion by anyone other than central banks. Even payments among central banks were not exclusively in gold, but chiefly in international reserve currencies such as the US dollar and the UK sterling, held as foreign exchange reserves by many central banks that did not have access to gold. These practices reflected the shortage of gold, as gold production had not kept up with the growing world economy and the rise in price levels that had occurred during the wartime inflation.

Britain had emerged from World War I with a massive debt and high prices, due to the high wartime inflation caused by monetary financing during the war. After the British gold standard was suspended in 1914, sterling initially depreciated sharply against the US dollar. During the war years sterling had been trading at $4.03 with the financial support of the USA. After the end of the war, the USA withdrew its support and sterling floated. By 1919, the exchange rate had fallen to about $3.40, compared to its pre-war value of $4.86, a depreciation of almost 30%. High inflation continued, peaking in 1920.

The official British view, as expressed by the 1919 Cunliffe Committee, advocated a rapid restoration of sterling convertibility at the pre-war rate. This required a reversal of the effects of wartime inflation on the price level. Hence, Britain adopted a postwar policy of macroeconomic austerity which caused a severe deflation and recession (1920–1922), leading to high unemployment. In December 1922, the dollar exchange rate of sterling had approached the pre-war rate ($4.86649).[26]

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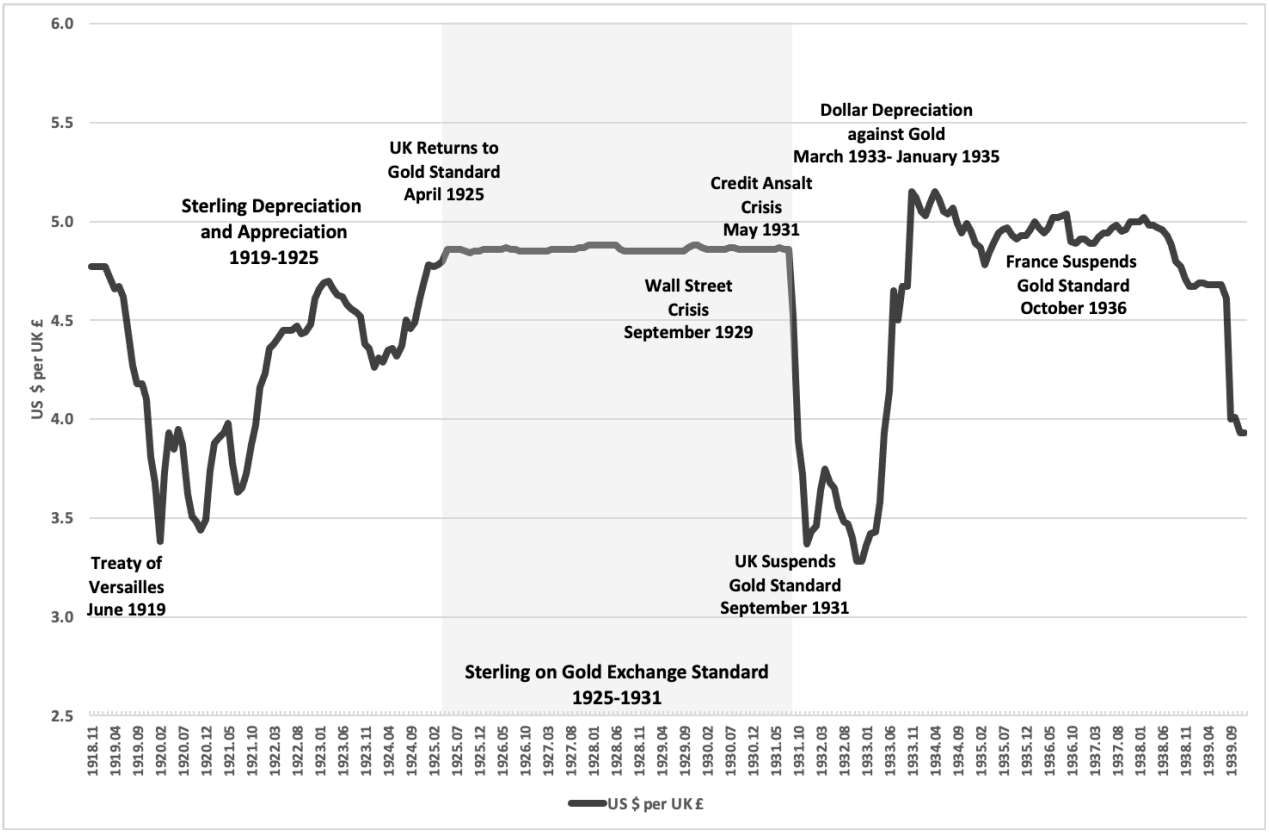
[25] Following the terms of the Reparations Committee in April 1921, German payments were to be made in gold, coal, timber, and industrial goods, but the amount was several times Germany's annual GDP, making full payment almost impossible. Furthermore, Germany's industrial capacity had been weakened due to territorial losses, such as the Saarland and Upper Silesia regions. By 1923, Germany was struggling to meet payments. France and Belgium responded by occupying the Ruhr (Germany's main industrial region) to extract reparations directly. German workers went on strike (passive resistance), worsening the crisis and forcing the German government to accelerate the printing of money on a massive scale, that led to hyperinflation.

[26] Contrary to the official view, Keynes (1923) was against the policy of restoring the pre-war gold standard. He proposed a scheme that combined the advantages of long-term price stability and short-term exchange rate stability. Specifically, he argued that the Bank of England should control, but not follow, changes in the discount rate. It should therefore set a buying and selling price for gold that would remain constant in the short term but not unchanged over time.

Figure 6
The Evolution of the Dollar - Sterling Exchange Rate, 1918-1939



Source: Monthly data on the $/£ exchange rate from Bank of England (2018).

However, the restoration of the gold standard was postponed due to the crisis of confidence caused by the German hyperinflation and Germany's refusal in July 1922 to continue paying the war reparations imposed upon it under the Treaty of Versailles. France and Belgium had retaliated by occupying the Ruhr region in 1923. The confidence crisis caused the sterling exchange rate to depreciate again.

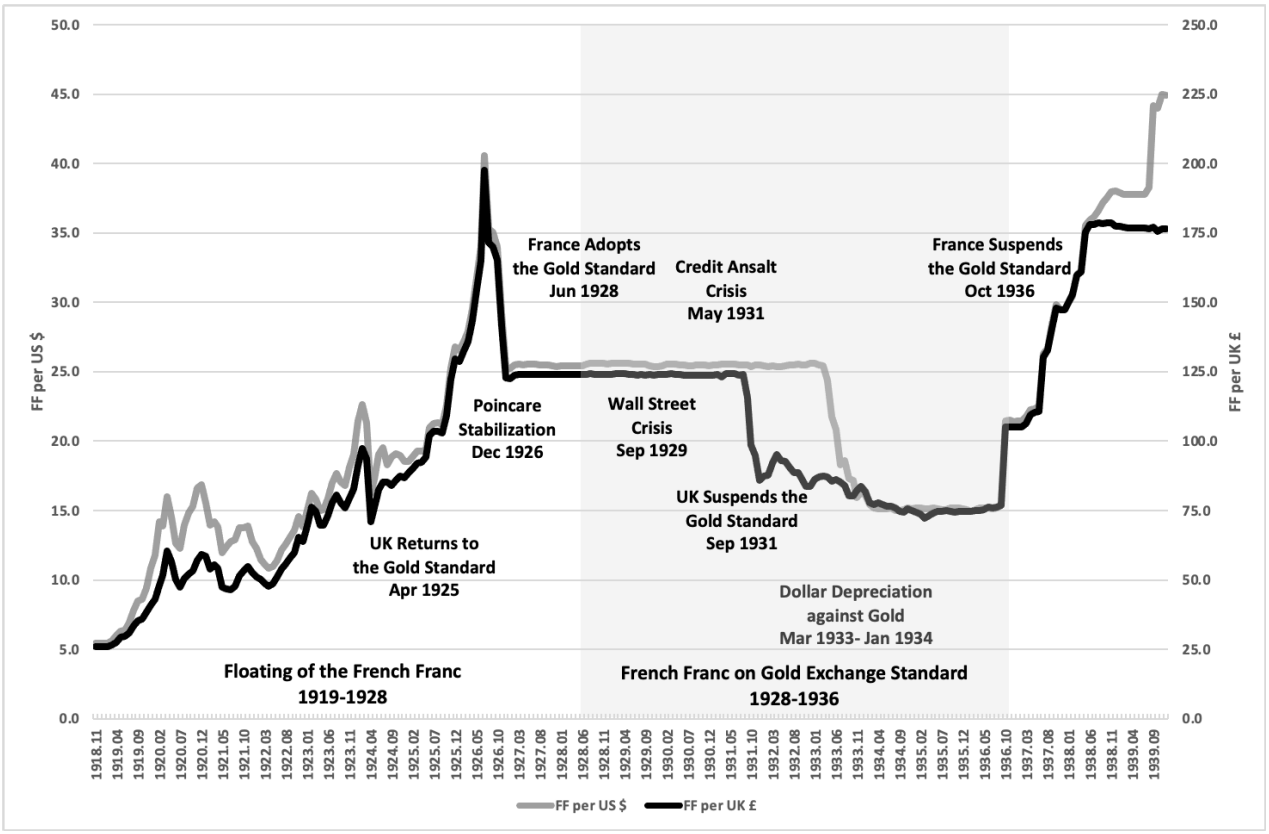
The evolution of the dollar/sterling exchange rate during the interwar period is depicted in Figure 6.

In April 1925, as sterling kept appreciating against the US dollar, Winston Churchill, then Chancellor of the Exchequer in Britain, made the decision to return sterling to the gold standard at the pre-war parity (£1 = $4.86). In effect, the interwar gold exchange standard began to operate from that date.[27]

France had also emerged from World War I with massive debt, high prices and a weakened economy. The war had cost France an enormous sum, and the government resorted to borrowing and printing money, in anticipation of the reparations payments by Germany, which however, were not forthcoming as expected. This led to high inflation, and the franc depreciated significantly against sterling and the U.S. dollar. The exchange rate crisis of the early 1920s saw the franc fall from its pre-war value of 5 francs per U.S. dollar to around 40 francs per U.S. dollar by 1926, a

[27] From March 1919 to early 1920, the pound had depreciated from $4.76 to less than $3.40. From February 1920, it began to fluctuate between $3.40 and $4.00. The pound contained 113 grains of fine gold and the dollar 23.22 grains. One pound, therefore, contained 4.86649 (113:23.22) times as much gold as the dollar. Under the gold standard, the fixed relationship of each currency to gold determined fixed bilateral exchange rates (par exchange rates).

Figure 7
The Evolution of the Sterling and Dollar Exchange Rates of the French Franc, 1918-1939



Source: Monthly data on the FF/£ exchange rate from Accominotti and Chambers (2016). Monthly data on the FF/$ exchange rate from the NBER Macro History Database (series 14004b).

depreciation of 87,5%. Investors lost confidence in the currency, and capital flight ensued. In 1926, Raymond Poincaré became Prime Minister and took drastic measures to restore confidence in the franc. He implemented austerity policies, including tax increases and spending cuts, and attempted the stabilization of the franc through the Bank of France's gold reserves. By 1928, Poincaré officially revalued the franc at one-fifth of its pre-war value (1 gold franc = 65.5 mg of gold), making the 'Poincaré franc' the new standard. This stabilized the economy but institutionalized the large devaluation of the franc, effectively acknowledging that the pre-war parity to gold was unattainable.

The evolution of the exchange rates of the French franc against the dollar and sterling is depicted in Figure 7.

Germany had returned to gold by replacing the old Papiermark, whose value had plummeted due to hyperinflation. To stop the hyperinflation, the German government, led by Chancellor Gustav Stresemann, introduced the Rentenmark in November 1923 at a rate of 1 Rentenmark to 1 trillion old marks. In 1924, the Reichsmark, linked to gold, replaced the Rentenmark as the official currency. The Dawes Plan provided U.S. loans that helped Germany pay reparations and rebuild its industry. The German economy expanded, and the Reichsmark remained stable. Its exchange rate to

the US dollar was at 4.2 marks per dollar, the same as with the pre-war gold mark. However, as reparations were paid using loans from the U.S, the system was fragile.[28]

As a result of efforts to introduce the gold exchange standard, most European countries, starting with Sweden in 1924, followed by Germany, Great Britain and finally France, had pegged their currencies to the dollar and gold by December 1926. However, the restored gold exchange standard of the second part of the 1920s was rigid and deflationary, as countries with current account deficits had to resort to monetary tightening rather than adjust exchange rates in order to restore external balance, while surplus countries did not adjust their policies. The system was clearly asymmetric as surplus countries, like the U.S. and France, hoarded gold, while deficit countries, like Britain and Germany, struggled to maintain their reserves. As a result, most deficit countries also faced high unemployment and social unrest due to the deflationary pressures of striving to maintain gold convertibility.

Thus, the interwar gold standard suffered from significant disadvantages compared to the pre-war gold standard. These were:

First, the absence of an undisputed leading force in the monetary field, a role that before the war had been played by the Bank of England. After the war, the Bank of England could no longer play this role, due to the weak international financial position of the UK economy. On the other hand, the newly created Federal Reserve Board in the United States did not have the international experience of the Bank of England.

Second, the concomitant use of two currencies, the dollar and sterling, as international reserve assets, a development which complicated international transactions and created uncertainty and instability.

Third, the lack of coordination in the conduct of monetary policy between the central banks of the economically strongest countries in the system and the absence of a reliable international institutional framework to ensure this coordination.

Fourth, the subordination of monetary policy to national objectives, such as attracting and maintaining high foreign exchange reserves and gold. This was to some extent also due to the fact that the admission of certain currencies to the interwar gold exchange standard took place at parities that either grossly overvalued them or grossly undervalued them in real terms.[29]

In particular, in their attempt to attract gold and foreign exchange, the industrial countries, as a whole, followed monetary policies that, due to the lack of coordination, proved to be excessively restrictive. After the crisis of 1929, these policies contributed to the spread and intensity of the Great Depression.

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[28] Under the Dowes Plan it was agreed that reparations payments would be made in annual instalments of 2 billion gold marks or 125 million pounds sterling. A later plan for the settlement of Germany's war reparations (Young plan 1929) reduced the reparations payments to 102 million pounds sterling per year. The proceeds of a 26% tax on German exports would be used to pay the reparations. France, as the worst-hit country, would receive more than half of the total reparations.

[29] For a detailed analysis and evaluation of the gold-exchange standard of the interwar period, see Eichengreen (ed. 1985, 1991, 1992). A fascinating account focusing on the role of central bankers can be found in Ahamed (2009). Among other studies, Aldcroft (1977) focuses on the path from Versailles to the Wall Street crash of 1929, while Kindleberger (1973) focuses on the international aspects of the Great Depression. Feinstein (ed. 1995) contains a number of studies on the broader financial and economic aspects and specific country experiences in the interwar period. Eichengreen and Kakridis (2023) focus on the role of central banks. For a comprehensive overview of interwar instability see Eichengreen (2008), Ch. 3.

Under the fear of inflationary pressures, countries with a balance of payments surplus were reluctant to allow the expansion of the money supply that accompanied the inflows of foreign exchange and gold. This had the effect of making it even more difficult for countries with a deficit to adjust. Thus, the adjustment of relative prices and employment, which was necessary to restore balance of payments equilibrium, became extremely difficult and slow. Most countries engaged in a battle against inflation, with each country trying to reduce its domestic price level faster than the others. In 1929, anti-inflationary pressures in America caused deflation in Europe, as countries continued to defend the convertibility of their currencies into gold and fixed exchange rates, resulting in a close link between the money supply, interest rates and prices of goods internationally.

Nurkse (1944) argued that in contrast to the pre-war gold standard, where each country obeyed the 'rules of the game', either because of the dominance of the Bank of England or because of the avoidance of destabilising interventions by other central banks, in the interwar period, these rules were often violated. However, as demonstrated by Bloomfield (1958), the so-called 'rules of the game' were often flouted during the reign of the pre-war international gold standard as well.

The coexistence and the rivalry of two competing global monetary centres, London and the emerging New York, and the gradual strengthening of the international role of the dollar also contributed to the ineffective operation of the system, as the coordination of the national economic policies of the two centres was anything but easy. During the short-lived participation of sterling in the gold-exchange standard, Britain suffered from chronic shortages of gold and foreign exchange reserves. Furthermore, because of the large depreciations of sterling and the franc after the war, and the difficulties of maintaining gold convertibility, the commitment to the fixed parities was not always as credible as before the war, leading to destabilising speculative attacks.

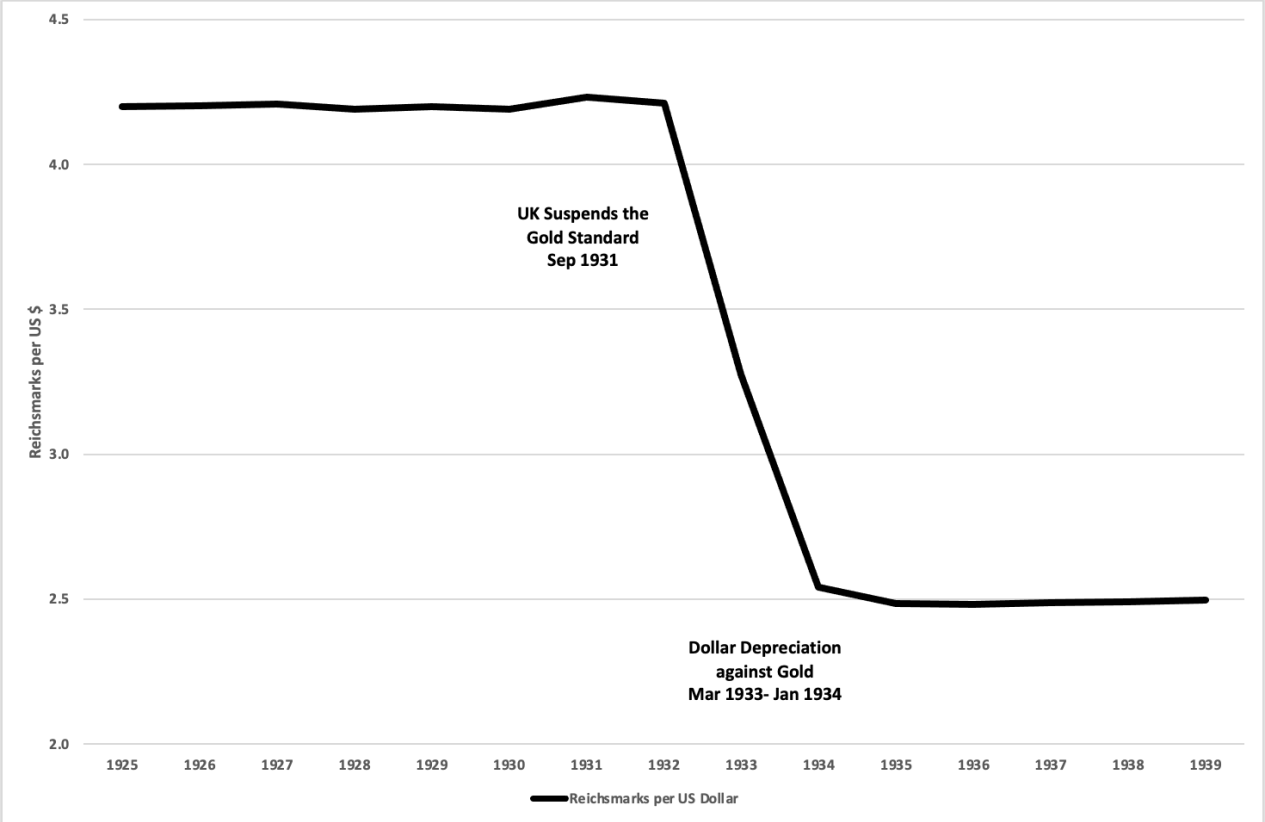
The system essentially collapsed in September 1931, with the sterling crisis and Britain's withdrawal from the gold exchange standard, which led to a significant devaluation of sterling. This took place in the aftermath of stock market crash of September 1929 which signified the start of the Great Depression of the early 1930s. The onset of the Great Depression created ripple effects that destabilised the international monetary system and the world economy, but also political ripple effects that shook parliamentary regimes in Germany, Spain, and elsewhere.

After the sterling crisis, on 21 September 1931, the UK abandoned the gold-exchange standard and sterling depreciated sharply. By the end of 1932, at least 35 countries had abandoned the system, ushering in a new era of 'dirty' floating and currency blocs. Great Britain, the countries of the British Commonwealth, Japan, the Scandinavian countries, and Latin American countries adopted monetary and exchange rate systems based on capital and foreign exchange controls. A large number of Britain's trading partners decided to keep their currencies pegged to sterling, and to monitor the fluctuations of their exchange rates against other currencies that remained linked to gold. This group of countries included the British colonies, the Scandinavian countries, Portugal, Egypt, Latvia, and Estonia. This group formed the so-called 'sterling area'.

In March 1933, and for a period of about 10 months, the United States began to devalue the dollar against gold. The official dollar price of gold increased from $20.67 per fine ounce to $35 per fine ounce, a devaluation of 40.9%. Another group of countries, such as Cuba, Guatemala, Panama, the Philippines and many South American countries followed the United States in abandoning the gold standard and pegging their currencies to the dollar. This led to the creation of the 'dollar area'.

At the same time, Germany stopped paying reparations and imposed strict foreign exchange controls. The Reichsmark, which was introduced in the monetary reform of October 1924 in the place of the Rentenmark, remained nominally tied to gold. Therefore, after the devaluation of the US dollar against gold, its exchange rate rose from 4.2 marks to 2.5 marks to the dollar, a

Figure 8
The Evolution of the Dollar Exchange Rate of the Reichsmark, 1925-1939



Source: Officer (2006). The Reichsmark, linked to gold, was introduced on October 11, 1924 to replace the Rentemark, a paper currency which was itself introduced in November 2023 at a rate of 1 to 1 trillion old marks.

revaluation of 40%, the same as the devaluation of the dollar against gold (see Figure 8). The exchange rate was pegged at that rate with the help of capital controls during the whole of the Nazi period, until the beginning of World War II. Thus, the German economy in the interwar period saw dramatic swings, from hyperinflation (1921–1923) to stabilisation (1924–1929), to depression (1929–1933), and finally to a heavily controlled economy under the Nazis (1933–1939). The collapse of the old mark in 1923 had caused severe social unrest, paving the way for political extremism and the establishment of the Nazi regime in 1933.

Only the countries of the so-called Gold Bloc, namely Belgium (until 1935), France, the Netherlands, Italy, Switzerland and Poland, continued to keep their currencies pegged to gold during the first half of the 1930s. The Gold Bloc was maintained until the end of September 1936, when the French franc was devalued. After the dissolution of the Gold Bloc, only the dollar remained in a fixed relationship to gold at the new rate of $35 per fine ounce.

Figures 6, 7 and 8 depict the evolution of the exchange rates of the major European currencies. The monetary instability of the interwar period did not only affect sterling but all currencies, including the French franc and the German mark.

The experience of the French franc is instructive. Immediately after the war, when US support was withdrawn, the franc depreciated significantly against both the U.S. dollar and sterling.

The exchange rate crisis of the early 1920s had seen the franc fall from its pre-war value of 5 francs per U.S. dollar to more than 30 francs per U.S. dollar by 1926, one sixth of its value. A equivalent devaluation originally took place against sterling, but due to the deflationary policies adopted by the

UK, this was subsequently reversed and sterling returned to the gold standard at the prewar parity. The Poincare stabilization allowed France to join the gold exchange standard in June 1928, at a devalued rate of about one fifth of its prewar value relative to gold, sterling and the dollar.

The Wall Street crash of September 1929 led to the Great Depression of the early 1930s. This was transmitted worldwide and led to financial upheavals, the rise of protectionism and a collapse in international trade. France, was initially somewhat insulated due to its ample gold and foreign exchange reserves, but it could not avoid deflation, falling prices, and economic stagnation.

In addition, its policy of remaining in the gold exchange standard kept the franc artificially high compared to the currencies that had been devalued, making French exports less competitive and causing a rise in unemployment. As shown in Figure 7, while other countries, like Britain abandoned the gold standard in September 1931, and the USA devalued the dollar against gold during 1933, France clung to the gold exchange standard until 1936, causing the FF to appreciate and deepening its economic difficulties.

In 1936, the Popular Front government under Léon Blum came to power with promises of social reforms and economic relief. Faced with economic turmoil, the franc was finally devalued in October 1936, falling to around 25 francs per U.S. dollar and prompting the end of the link to gold. and the Gold Bloc. The devaluation aimed to make French goods more competitive and stimulate economic growth, but political instability and capital flight undermined recovery efforts.

In September 1936, the USA, Britain and France attempted to coordinate their responses, in the context of the Tripartite Agreement, which sought to stabilise exchange rates without returning to the rigid gold standard. However, this did not succeed, as the French franc despite its initial devaluation continued depreciating and sterling also depreciated sharply during 1938. Furthermore, the world was heading towards another destructive war.

There had been three other major international monetary conferences in the interwar period. The first was the Brussels Conference of 1920. It was organised by the League of Nations to address postwar economic dislocation. It focused on stabilising European economies, reducing inflation, and rebuilding international trade. It recommended financial discipline and austerity but lacked enforcement mechanisms. The second was the Genoa Conference of 1922. It sought to create a more stable post-war international monetary system and encourage economic reconstruction. It recommended a modified gold standard (gold-exchange standard) where central banks would hold reserves in major currencies (e.g., British pounds, U.S. dollars) alongside gold. However, it failed to reach a binding agreement due to political tensions, particularly between Germany, France, and the Soviet Union. The third was the London Conference of 1933. It was convened to address the Great Depression by promoting currency stabilisation and economic recovery. It aimed at stabilising exchange rates to revive international trade and restoring the gold standard. It collapsed after U.S. President Franklin D. Roosevelt rejected currency stabilisation, preferring domestic economic recovery policies, which included devaluing the dollar against gold.

In summary, the interwar period was a time of financial instability and currency fragmentation but also deflation and economic depression, especially during the 1930s. The attempt to return to the gold standard in the 1920s had led to deflation and economic crises, and its eventual collapse in the 1930s, which gave way to competitive devaluations, financial instability, currency blocs and capital controls.

The terms of the Treaty of Versailles, which had fuelled resentment in Germany, but also the economic difficulties of the interwar period, and particularly the Great Depression, as well as the fear of communist uprisings, had led to the emergence of totalitarian regimes such as a militarist

government in Japan, the fascist regime led by Benito Mussolini in Italy, and the Nazi regime led by Adolph Hitler in Germany.

Increasingly these totalitarian regimes pursued aggressive nationalist economic policies and expansionist initiatives, ranging from Japan's invasions of Manchuria in 1931 and China in 1937, Italy's invasion of Ethiopia in 1935, and finally Germany's invasion and annexation of Czechoslovakia in early 1939. The League of Nations, which had been created by the Treaty of Versailles to promote world peace, had failed to prevent these acts of aggression. Finally, the Munich Agreement of September 30, 1938, in which Britain and France tried to appease Germany, by allowing it to annex Sudetenland, a German-speaking region of Czechoslovakia, also failed to stop German aggression.

World War II started on September 1, 1939, when Nazi Germany invaded Poland. This prompted Britain and France to declare war on Germany on September 3, 1939. During World War II, further foreign exchange restrictions were imposed and all exchange rates were set administratively. After all, the system of international trade and payments had completely collapsed.

7. The Dollar and the Bretton Woods System

The post-war international monetary system emerged from an international conference in Bretton Woods, New Hampshire, in July 1944, convened by the USA, with the cooperation of the UK. In view of the end of the war, which was clearly visible, 44 nations agreed on the basic principles of the post-war international monetary system, in order to avoid the instability of the interwar period. At the same time, they agreed on the creation of new transnational economic institutions, with the establishment of the International Monetary Fund and the World Bank.

Bretton Woods was one of the rare cases of success of an international monetary conference, mainly due to the dominant position of the United States, which in the end imposed its views. The monetary conferences of the interwar period were not successful due to the greater symmetry of the world monetary system, since the dollar, as well as sterling and the French franc, were all considered international reserve currencies at the time. Disagreements between the governments and central banks of these three countries, the United States, Britain, and France, had often led the interwar conferences to deadlock.

What emerged from the Bretton Woods agreements was the creation of a system of fixed but adjustable exchange rates, based on the gold-exchange standard. The system was essentially a gold-dollar standard, since the exchange rates of currencies other than the U.S dollar were determined in relation to the U.S dollar, the value of which was fixed in terms of gold at $35 an ounce. Central banks other than the Federal Reserve held reserves in either dollars or gold.

Countries that had deficits in their balance of payments were able to borrow from the International Monetary Fund (IMF) to help maintain stable exchange rates. The IMF also aimed to help in the progressive abolition of prewar and wartime exchange restrictions in order to promote the liberalization of international trade.

Even more important, however, was the provision for an adjustment of exchange rates in cases of 'fundamental disequilibrium' in a country's balance of payments. Such a provision did not exist in the either the classical gold standard system or the interwar gold-exchange standard. The various countries participating in the system had the option of adjusting (devaluing) the exchange rates of their currencies in cases of 'fundamental disequilibrium', by previously notifying the IMF. This notification took the form of a request, although in reality the decision to adjust the exchange rate was a national decision. The possibility of adjusting the exchange rates served as a safety valve for

the system, as it prevented the accumulation of large imbalances. It was used widely even by large advanced economies, such as Germany, Britain and France, throughout the operation of the system.

The Bretton Woods system worked as follows:

The United States undertook to maintain a fixed dollar price of gold. The price set was $35 per ounce, as had been determined in early 1934. The United States was obliged to intervene in the gold market by buying and selling gold in order to support this price. However, a distinction was made between the free market for gold and the official market between central banks.[30]

All other countries undertook to maintain a fixed exchange rate for their currencies against the dollar or gold. In practice, however, Bretton Woods evolved into a dollar standard.

All countries but the USA set a central dollar exchange rate for their currency and limited, through dollar purchases and sales, the fluctuations of their currencies to ±1% around this central parity. This was the maximum permissible fluctuation of a currency against the dollar. The remaining bilateral rates were determined by dividing the rates of the two currencies against the dollar. Since the maximum permissible fluctuation of each currency against the dollar was ±1%, the maximum permissible fluctuation of the rate between any two other currencies was effectively ±2%. That is, if the sterling/dollar rate fell 1% below the central rate, and the mark/dollar rate rose 1% above the central rate, the sterling/mark rate fell 2% below its central level.

This system of interventions constituted a fundamental difference between Bretton Woods and the pure gold standard. In the gold standard system, each country set a central parity in terms of gold, and limited the fluctuations of its currency around this central parity by intervening in the gold market. The range of fluctuations was limited by the so-called ‘gold points’, which were mainly determined by the cost of transporting gold from one country to another. The Bretton Woods system was a variation of the gold-exchange standard in the interwar period. However, unlike the interwar period, the system also provided for financing and balance of payments adjustment mechanisms, through the International Monetary Fund, as well as potential changes in central parities.

Where the system differed radically from the gold standard was in the issue of convertibility. National central banks were no longer obliged to convert their currencies into gold or foreign exchange within each country. The possibility of convertibility into gold existed only between central banks. In fact, the central banks of the countries participating in the system were obliged to deposit 25% of their IMF quota in the form of gold, or, alternatively, 10% of their reserves in gold and dollars. Convertibility towards the private sector existed mainly in foreign exchange. However, this too had as a pre-condition the financing of international trade transactions. Domestic importers of goods and services could purchase foreign exchange, while gold and foreign exchange were used to finance deficits in the basic balance by central banks. Even this limited convertibility did not become possible before 1958, as most countries continued to maintain significant restrictions on the financing of imports. The limited convertibility of the system may have contributed to its longevity, as it limited speculative pressures on exchange rates, even when it was clear that parities were unsustainable.

The introduction of the Bretton Woods system after the end of World War II was neither easy nor straightforward. The European economies had suffered great damages during the war and were in need of imports of both essential consumer goods and capital goods for reconstruction. At the same

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[30] The adoption of the Bretton Woods system marked the decline of the importance of gold in the international monetary system. Gold's official role ended just before the collapse of the system in the early 1970s and was officially acknowledged in 1978, when the 2nd Amendment to the IMF’s articles of agreement was adopted.

time their export capacity was extremely limited, which meant that they were running large post-war current account deficits.

Furthermore, the escalation of the Cold War had divided Europe into two camps. One was that of the mixed market economies of Western Europe, which, together with Japan, were aligned behind the United States of America (USA), and the other was that of the economies of Central and Eastern Europe, which were occupied ('liberated') by the Red Army and subsequently transformed into centrally planned socialist economies, controlled by the Union of Soviet Socialist Republics (USSR).

According to the design of the Bretton Woods system, it was expected that national currency reserves, supplemented by the necessary IMF credits, would finance any temporary imbalances in the balance of payments. But this was not sufficient for several years after the end of the war.

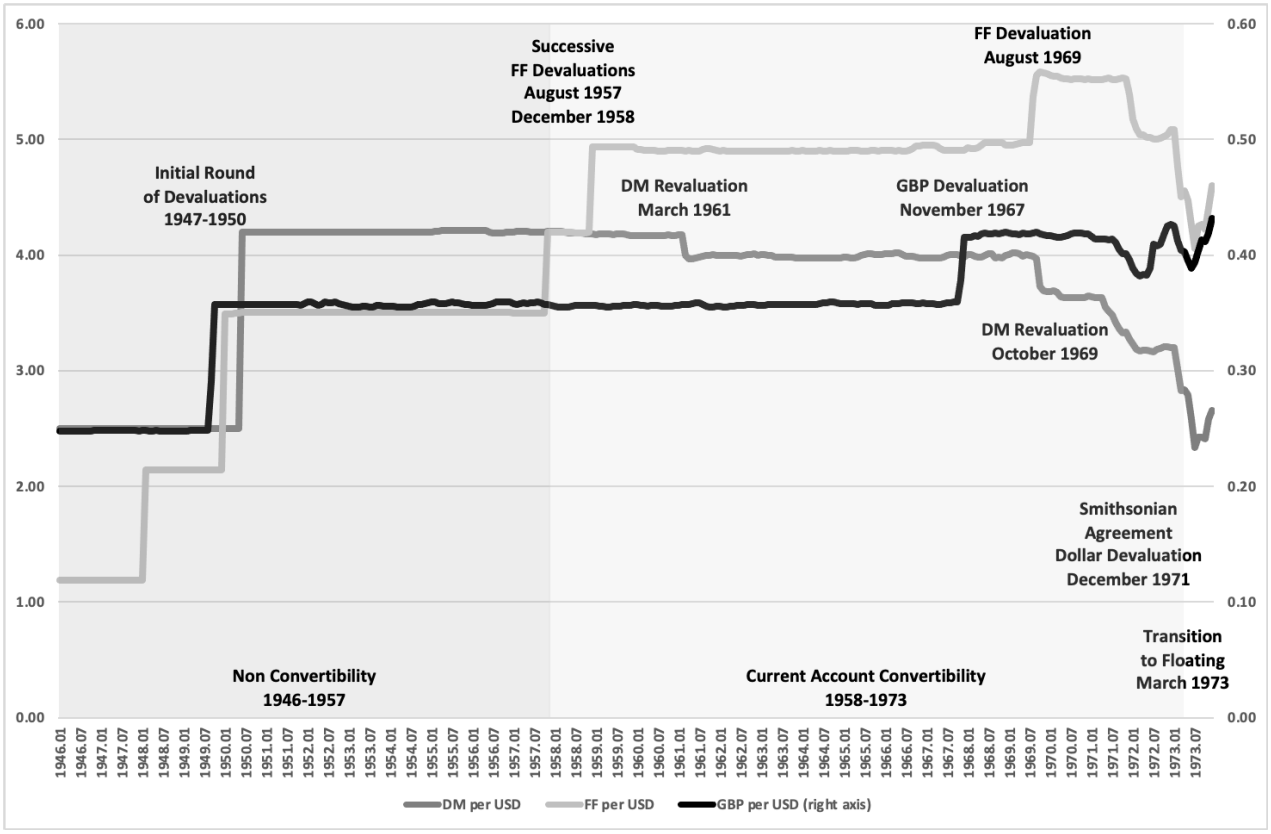
The system was initially characterized by a severe shortage of dollars. The large current account surpluses of the United States meant that its trading partners in Western Europe and Japan had correspondingly large current account deficits. These had to be financed by dollar or gold payments. The dollar foreign exchange reserves of the trading partners of the USA were limited and constantly dwindling, because of payments for these current account deficits. It was necessary to reverse this outflow of dollar reserves. In other words, it was necessary to reverse the shortage of dollars for international payments.

The IMF's modest credit facilities were clearly inadequate to deal with the huge balance of payments imbalances. The problem was further exacerbated by the IMF Board of Governors' reaffirmation of the provision in the Bretton Woods Articles of Agreement that the IMF could lend only for current account deficits and not for investment purposes and reconstruction expenditures. On the other hand, only the United States' contribution of $570 million was actually available for lending by the World Bank. Because the only available market for World Bank bonds was the Wall Street market, the World Bank was forced to adopt a conservative lending policy, lending only when repayment was assured. Given these problems, it became clear by 1947 that the IMF and the World Bank could not address the imbalances of the postwar international monetary system.

Due to the large import needs of the economies of Western Europe and their limited export capacity because of the devastation of the war, their currencies were not convertible into foreign exchange, not even for current transactions. The initial parities of their currencies against the dollar soon proved unsustainable. The attempt by the United Kingdom (UK) to restore the convertibility of sterling in 1947, after pressure from the United States, led to a crisis that only subsided when sterling depreciated sharply against the dollar and controls were reimposed. Within a few weeks, almost all currencies, with the exception of the Swiss franc, and the currencies of Eastern European and some Latin American countries, were devalued against the dollar. Figure 9 depicts the evolution of the exchange rates of the major European currencies against the USD. As stated by Eichengreen (2008), "American officials had underestimated the severity of the task. … The 1947 sterling crisis lifted the scales from their eyes." (p. 102).

In the event, in order to facilitate the recovery of the economies of Western Europe, the USA implemented the European Recovery Program (ERP), known as the Marshall Plan. It was a five year program to transfer resources from the USA to Western Europe in order to rebuild their economies, and took effect between 1948 and 1952. In addition, there were large flows of direct investment by American multinationals in Europe. The European Payments Union (EPU) was also created in order to facilitate and clear bilateral international payments between Western European economies. The shortage of dollars was thus largely addressed. However, the convertibility of

Figure 9
US Dollar Exchange Rates of the DM, FF and GBP, 1946-1973



Source: IMF, International Financial Statistics. Data are monthly averages. The Deutsche Mark (DM) was introduced by the allied forces of the US, the UK and France as the currency of West Germany in June 1948, replacing the Reichsmark (RM) at a conversion rate DM 1=RM 10. The new franc (FF) was introduced in France in January 1960, at a conversion rate FF 1=Old Francs 100.

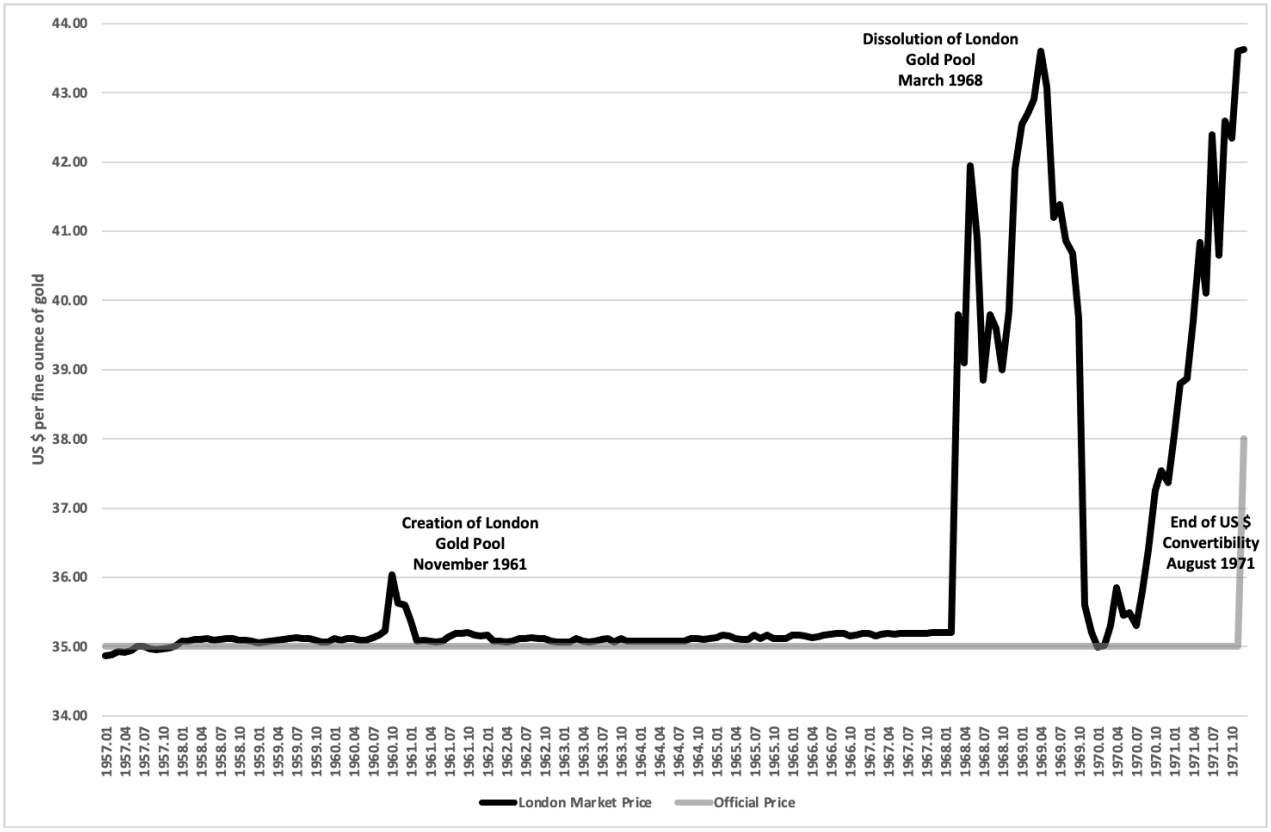
Western European currencies for current transactions was not restored until 1958, and for some of them, such as France and Spain, there was a second round of devaluations in 1959.

According to the design of the Bretton Woods system, the only currency for which there was a possibility of convertibility into gold was the US dollar. The convertibility of the dollar was not complete, as it applied only to purchases and sales between central banks. It turned out that the conversion of dollars into gold was not required, as the other central banks were happy to hold dollar denominated interest yielding assets, such as US treasury bills and bonds.

However, there was still a free market for gold. For the Bretton Woods system to remain functional, it would either have to break the dollar's link to gold or maintain the free market price for gold near to the official price of $35 per ounce. Any deviations between the free market price of gold and the official price would have created incentives for central banks other than the Federal Reserve Board to buy gold at the official price in order to sell it on the free market, or vice versa. In order to control the deviations between the official price of gold in dollars and the free market price, eight governments created the London Gold Pool on November 1, 1961. Its purpose was to stabilize the price of gold in the free market at $35 per fine ounce, by buying and selling gold from the gold reserves of central banks.

As can be seen in Figure 10, the price of gold remained slightly above the official price, and rose occasionally in response to events such as the Cuban Missile Crisis and other less significant events, but the interventions of the London Gold Pool were generally successful in stabilising the

Figure 10
The Official and London Market Price of Gold, 1957-1971



Source: IMF, International Financial Statistics. Data are monthly averages.

free market price of gold. The London Gold pool was dissolved in March 1968, and a two-tier gold market was established. The dollar price of gold in the free market soared after the dissolution of the Gold Pool.[31]

In 1960, Robert Triffin, a Belgian-American economist, had observed that holding dollar reserves was more valuable to central banks than gold because the United States' persistent balance of payments deficits contributed to the system's liquidity and thus facilitated economic growth. However, while the system needed the liquidity created by the United States' balance of payments deficits, over time, continued deficits would inevitably erode confidence in the dollar, the reserve currency, which would on turn undermine the fixed dollar value of gold. This conflict between the need for dollar liquidity and the dollar's credibility as an international reserve currency became known as the *Triffin dilemma* and is a potential explanation of the problems faced by the Bretton Woods system in the late 1960s and the early 1970s.[32]

In the second part of the 1960s, the Bretton Woods system began to be hit by successive crises. The devaluation of sterling in November 1967 led to the dissolution of the London Gold Pool in March 1968 and the establishment of a two-tier gold market in 1968. The French Franc was devalued in August 1969 and the Deutsche Mark was revalued in October 1969. See Figure 9.

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[31] The members of the London Gold Pool were the central banks of the United States, the United Kingdom, West Germany, France, Italy, Belgium, the Netherlands and Switzerland.

[32] See Triffin (1960). The term ‘Triffin dilemma’ was originally coined by Altman (1961).

These were just some of the symptoms of the underlying problems of the Bretton Woods system. Deeper reasons were its inherent weaknesses, such as its excessive dependence on the dollar, the gradual liberalization of capital movements, and the divergences in the fiscal and monetary policies of the major industrial economies, and, in particular, the large external imbalances as well as the increase in inflation in the USA since the mid-1960s, due to the expansion of the welfare state and the escalation of the Vietnam War.[33]

At the end of 1971, a last-ditch attempt was made to save the Bretton Woods system. After a meeting of representatives of the ten largest industrial economies (G-10) in Washington D.C., it was agreed to devalue the dollar against gold and to revalue the yen, the mark, the Swiss franc and the currencies of the EEC countries. The dollar was officially devalued by 8.57% against gold, from $35 per ounce to $38 per ounce. Other currencies were revalued against the dollar to correct trade imbalances. The Japanese Yen appreciated by 16.9%, the DM appreciated by 13.6%, and the FF and GBP exchange rates were also adjusted. Furthemore, currencies were now allowed to fluctuate within a ±2.25% band around their central parities, instead of the previous 1%.

This agreement, known as the Smithsonian Agreement, proved to be the swan song of the Bretton Woods system. The beginning of the end, however, had been marked earlier, with the suspension of the convertibility of the dollar into gold by the US monetary authorities in August 1971, announced by US President Nixon.[34]

The Smithsonian Agreement could not function effectively and collapsed in fifteen months. In February 1973, the dollar was devalued again against gold and all major currencies started floating freely. This marked the transition to the current international monetary system of floating exchange rates. The collapse of the Bretton Woods system however was not officially recognised until the Second Amendment to the IMF articles of agreement, which took effect in 1978. This ended the special role of gold and legalized floating.

8. Floating and Managed Exchange Rates

The collapse of the Bretton Woods fixed exchange rate system was followed by the sharp increase in oil prices in October-December 1973, during the Arab-Israeli war, as well as a significant increase in raw material prices. The world moved to a regime of floating exchange rates and a diversity of other exchange rate arrangements, which has largely been maintained to this day.

The most immediate and visible consequence of the collapse of Bretton Woods was the abandonment of fixed exchange rates.

This shift fundamentally altered the mechanism of international adjustment. Under Bretton Woods, external imbalances were addressed primarily through domestic policy adjustments and occasional changes in exchange rate parities, while capital controls limited destabilizing flows. In the post–1973 environment, exchange rates themselves became the main variable through which balance-of-payments adjustment occurred. This increased nominal and real exchange rate volatility, particularly among major currencies.

However, the move to floating exchange rates was not uniform. While advanced economies increasingly adopted free or managed floats, many developing and emerging economies experimented with intermediate regimes such as crawling pegs, currency bands, or tightly managed

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[33] For comprehensive historical accounts and analytical treatments of the operation of the Bretton Woods system see Solomon (1977), Bordo (1993 a) and Eichengreen (2008), Ch. 4. Bordo and Eichengreen (eds. 1993) contain a number of studies on different aspects of the operation of the Bretton Woods system.

[34] The agreement took its name from the Smithsonian Institution in Washington, where the Group of Ten (G-10) meeting took place on December 17-18, 1971.

floats. The result was not a uniform global regime, but a heterogeneous landscape of exchange rate arrangements reflecting differences in economic structure, institutional capacity, and vulnerability to capital flows.

Thus, the current international monetary system is characterised by the great variety of choices made by different countries in relation to the 'open economy trilemma' among free movement of capital, pegged exchange rates and monetary policy independence.[35]

The main industrial countries (USA, European Union, Japan) have chosen free movement of capital and floating exchange rates among their currencies, in order to be able to follow independent monetary policies. China has chosen capital controls, in order to combine management of its exchange rate (crawling peg) with monetary policy independence. Many emerging economies have chosen pegged exchange rates, mainly with the dollar. Some economies have even changed their currency and replaced it with either the dollar (Ecuador) or the euro (Montenegro). Regional fixed exchange rate systems were created, such as the European Monetary System, established in 1979, and later, a new currency, the euro, was introduced as the common currency of a large number of member states of the European Union that constitute the euro area.

The current floating exchange rate system bears little relation to the chaotic situation of the interwar period. While there was initially a significant increase in global inflation, inflation was very quickly brought under control, at least in the industrial economies. In addition, there has been a large expansion of international trade and a wide ranging liberalisation of international money and capital markets.

On the other hand, the hopes of the system's supporters for an automatic correction of external imbalances have not been realised. The current system is also characterised by significant and persistent external imbalances, high volatility of both nominal and real exchange rates, and large persistent fluctuations in the real exchange rate and international competitiveness of different countries.

The Pound Sterling

Figure 11 displays the post-war evolution of the exchange rate of the US dollar, the main international reserve currency after World War II, and sterling, the main international reserve currency in the 19th century and up to the outbreak of World War I. The fluctuations in this bilateral exchange rate help to assess the main characteristics of both the Bretton Woods system and the floating exchange rate system that succeeded it. During World War II, the exchange rate of sterling was maintained at $4.03-$4.04. After the sterling crisis of 1947 and its significant devaluation by 30.5% in 1949, the exchange rate was set at $2.8. This parity remained stable despite intense pressures, such as in 1961, 1964 and 1966. In November 1967, the pound sterling was devalued again, this time by 14.3%, to $2.4.

With the Smithsonian Agreement, the pound appreciated slightly against the dollar, to $2.65, but from 1973 it entered a spiral of devaluations that culminated in the 1976 sterling crisis and the United Kingdom's recourse to the IMF. Throughout the operation of the floating exchange rate

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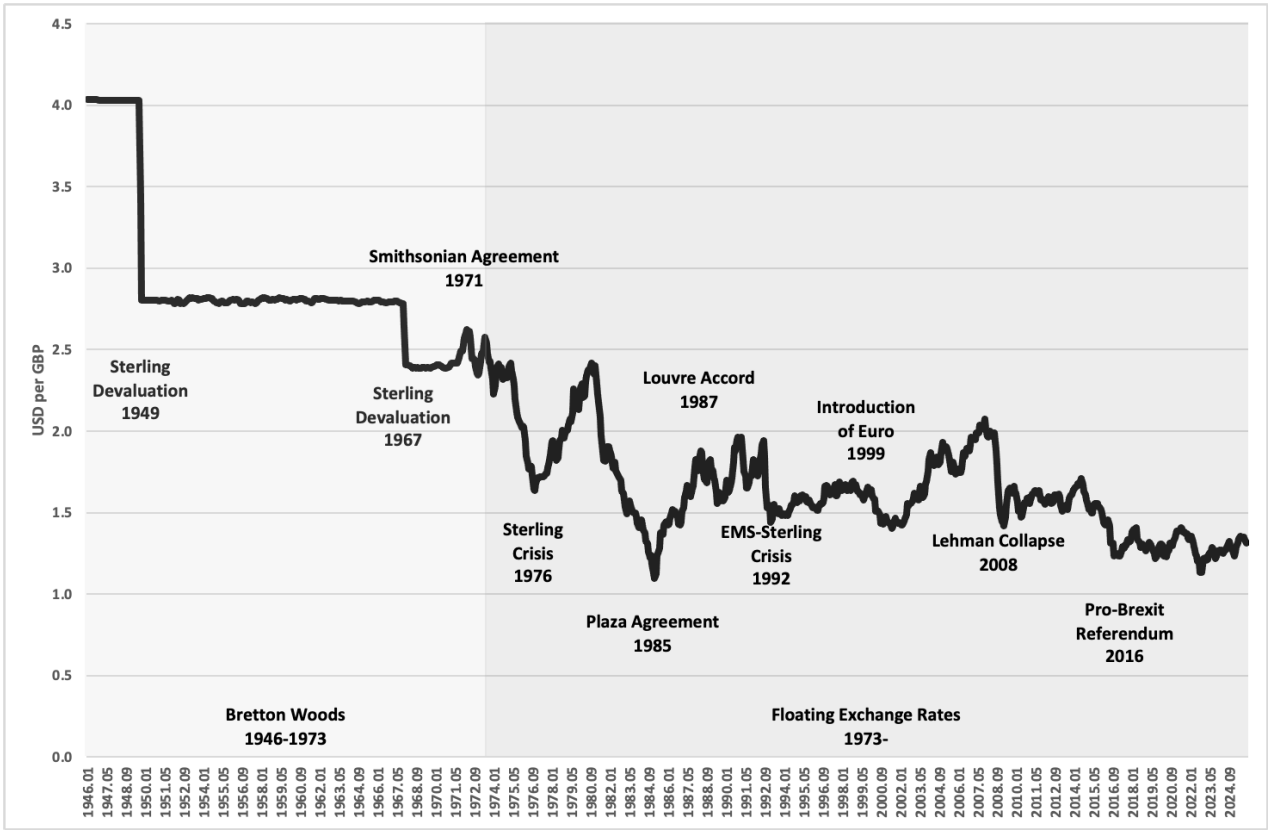
[35] The open economy trilemma (also called the Mundell-Fleming trilemma) is a fundamental concept in international macroeconomics that states that a country can only achieve two out of the following three policy goals simultaneously: 1. A Fixed Exchange Rate – Stabilising the currency by pegging it to another currency or a basket of currencies. 2. Independent Monetary Policy – The ability to set interest rates and conduct monetary policy freely to respond to domestic economic conditions. 3. Free Capital Mobility – Allowing capital to flow freely across borders without restrictions. Since it is impossible to achieve all three at once, policymakers must choose which two they prioritise, leading to different monetary policy regimes. See Mundell (1963) and Fleming (1962).

Figure 11
The Dollar-Sterling Exchange Rate (USD/GBP), 1946-2025



Source: IMF, International Financial Statistics. Data are monthly averages.

system, the dollar-sterling exchange rate has been characterized by large fluctuations, caused by both political and economic events (rise in US interest rates in the period 1981-1985, crisis of the European Monetary System in 1992, introduction of the euro in 1999, international financial crisis 2007-2009, referendum in favor of Brexit 2016, etc.).

Three Major EEC Currencies

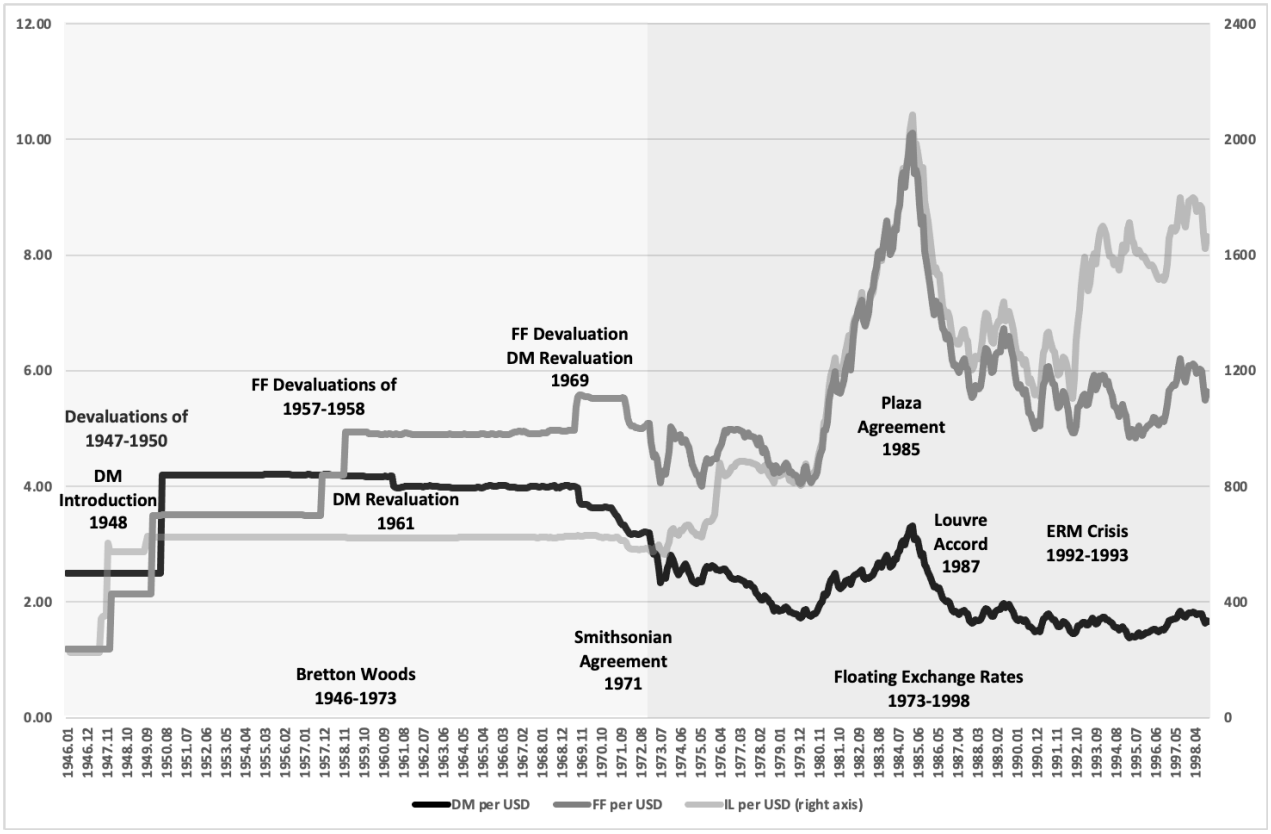
The behavior of the exchange rates of some of the other major European currencies, the Deutsche Mark (DM), the French Franc (FF) and the Italian Lira (IL), as well as the Japanese Yen (JPY) has also displayed significant volatility in the post-1973 regime of generalized floating.

Figure 12 presents the exchange rates of the three major currencies of the European Economic Community, the DM, the FF and the IL. Despite occasional devaluations, all three currencies displayed remarkable stability during the Bretton Woods era. Devaluations occurred in 1947-1950, and in 1957-1958 and 1969 for the FF. The DM was revalued in 1961 and then again in 1969. All three currencies were revalued against the US $ following the Smithsonian agreement of 1971. On the other hand, following the transition to floating, the exchange rates of all three currencies have displayed significant volatility and persistent cycles of revaluation and devaluation.

Following the transition to floating, the USD depreciated against all three currencies. However, the adoption of expansionary monetary policies by France and Italy soon led to depreciations of their currencies both against the USD and the DM.

At the end of 1978 the countries of the European Community introduced the European Monetary System, in order to stabilize bilateral exchange rates among their currencies. Since then, and up

Figure 12
The Exchange Rates of the DM, FF and IL against the USD, 1946-1998



Source: IMF, International Financial Statistics. Data are monthly averages.

until 1998, at the end of which these currencies were replaced by the euro, fluctuations of their exchange rates against the USD have been more or less synchronised.

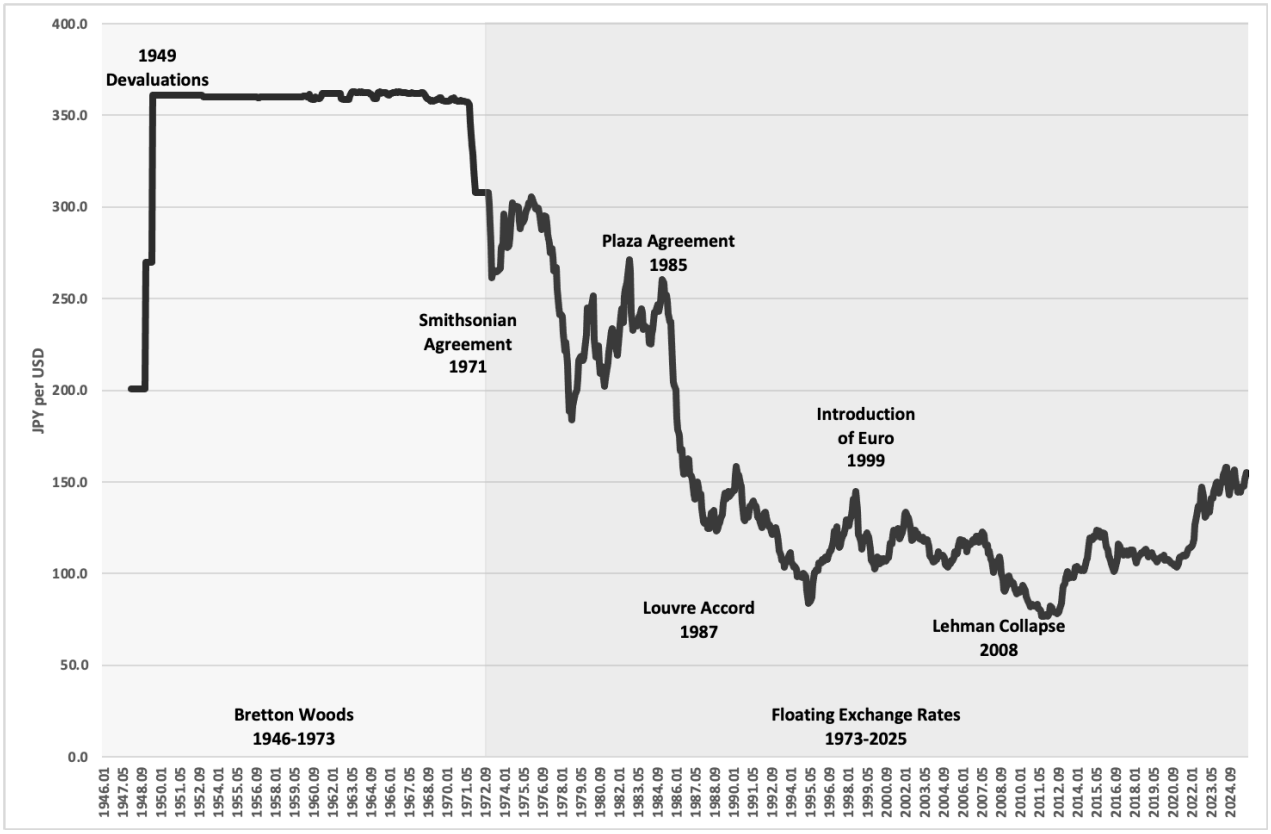
From the beginning of the 1980s there were five consecutive years of USD appreciation, linked to the policy mix of an expansionary fiscal and a contractionary monetary policy in the USA. This was reversed following the Plaza agreement of early 1985 among the G-7 to coordinate policies in order to reverse the appreciation of the dollar. Following the Plaza agreement there were two years of almost continuous depreciation of the USD. The success of this policy demonstrated the effectiveness of coordinated interventions by the major central banks. Exchange rates were subsequently stabilised following the Louvre Accord of 1987, again in the context of the G-7, to coordinate interventions among central banks to stop the depreciation of the USD.

Since then, the fluctuations of the exchange rates of the DM and the FF were significantly reduced. The IL depreciated significantly towards the end of 1992, when it was forced to exit the exchange rate mechanism of the European Monetary System, but its exchange rate then stabilised.

Japan and the Yen

Figure 13 depicts the evolution of the exchange rate between the US dollar and the Japanese yen (JPY). During the heyday of the Bretton Woods system the yen was trading at around 360 JPY to the USD. Following the Smithsonian agreement of 1971 the yen was revalued to 308 JPY to the USD. It appreciated further after the collapse of the Bretton Woods system in early 1973 and after a small rebound for the dollar, the yen appreciated again. It was trading at 184 JPY to the USD in October 1978.

Figure 13
The Exchange Rate of the JPY against the USD, 1947-2025



Source: IMF, International Financial Statistics. Data are monthly averages. For 1947 and 1948 the data are estimates as Japan had a multiple exchange rate system.

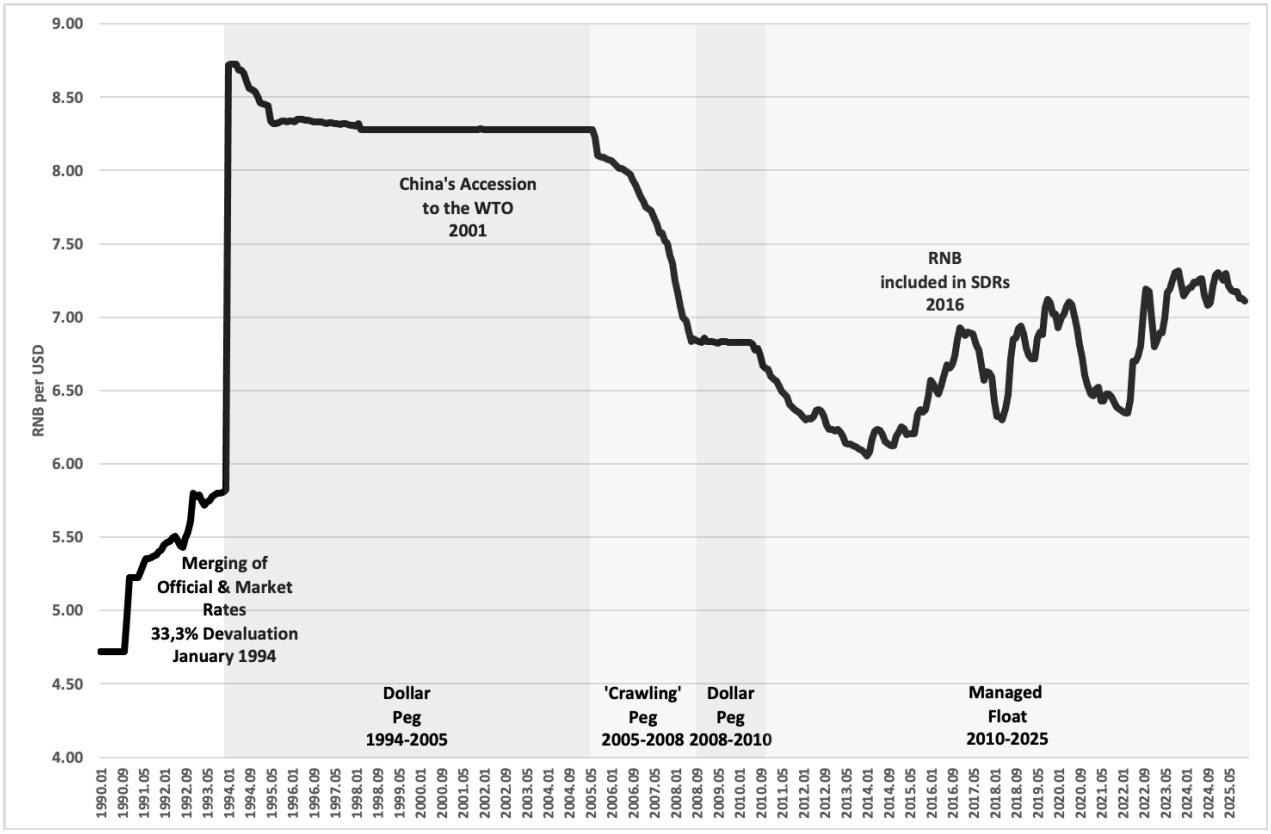
The appreciation of the yen was partly reversed during the cycle of dollar appreciation in the early 1980s, but resumed again between the Plaza agreement of 1985 and the Louvre accord of 1987. Since then the fluctuations of the JPY/USD have been somewhat reduced, as it has been trading in a band between 150 and 100 JPY to the USD, with some spells below the lower limit of that band.

China and the Renminbi

A currency whose international role has expanded in recent decades is the Chinese renminbi (RNB). The history of the renminbi is inseparable from the emergence of modern China as a major economic power. Unlike currencies that evolved gradually alongside market institutions, the renminbi was born in revolution, shaped by central planning, and later transformed through one of the most dramatic episodes of economic reform in modern history. Its evolution mirrors China's transition from a war-torn agrarian society to the world's second-largest economy and a central actor in global trade and finance.

The Renminbi, meaning "the people's currency," was introduced in 1948, one year before the founding of the People's Republic of China (PRC). It was issued by the newly established People's Bank of China (PBoC) to unify a fragmented monetary system plagued by hyperinflation, multiple currencies, and fiscal disorder during the Chinese Civil War. For decades, it functioned primarily as an accounting and administrative unit in a planned economy, not as a market-based medium of exchange. Following Deng Xiaoping's reform and opening-up policies launched in 1978, the renminbi gained new importance as prices were liberalized, enterprises were granted autonomy, and

Figure 14
The Exchange Rate of the RNB against the USD, 1946-2025



Source: IMF, International Financial Statistics. Data are monthly averages.

households were allowed to save and consume. A dual-track system emerged, in which planned prices coexisted with market prices, and monetary policy began to matter for economic outcomes.

A critical milestone in the history of the renminbi came in 1994, when China unified its dual exchange rate system. The official and market rates were merged into a single, managed rate that effectively devalued the RMB, sharply improving China's export competitiveness. This marked the birth of China's modern exchange rate regime.

Figure 14 depicts the evolution of the RNB/USD exchange rate since 1990. Throughout the period the exchange rate has been managed by the Chinese authorities, using capital controls.

After a gradual appreciation during 1994, between 1995 and 2005 the RMB was effectively pegged to the US dollar, with very limited daily fluctuations through extensive capital controls. This regime provided nominal stability, anchored inflation expectations, and strongly supported China's export-led growth model. This stability proved crucial during the Asian Financial Crisis of 1997–98, when China resisted pressure to devalue, enhancing its international credibility and regional standing.

At the same time, China undertook deep monetary and financial reforms. The People's Bank of China (PBoC) was restructured into a modern central bank, while state-owned commercial banks were separated from policy banks. Fiscal and monetary responsibilities were clarified, reducing inflationary pressures that had plagued China in the late 1980s and early 1990s.

In 2001, China's accession to the World Trade Organization (WTO) marked its full integration into the global trading system. The renminbi, while still inconvertible on the capital account, became increasingly central to a rapidly expanding export-driven economy.

Following WTO accession, China experienced extraordinary economic growth, averaging near double-digit rates for much of the 2000s. The renminbi played a key role in this model.

In July 2005, China announced a reform of its exchange rate regime. It ended the strict dollar peg

and introduced a 'crawling peg' referencing a basket of currencies. The RMB appreciated steadily against the dollar during this period.

The key characteristics of this exchange rate regime were very limited but increasing flexibility and continued heavy intervention by the PBoC, while capital controls remained intact

The exchange rate remained tightly managed, with pressures for further appreciation offset by large-scale intervention by the PBoC. As a result, China accumulated massive foreign exchange reserves, primarily in US dollars. This reserve accumulation reflected persistent current account surpluses and capital inflows, reinforcing China's role as a key creditor to the global economy.

During the global financial crisis, China temporarily halted RMB appreciation and re-pegged the currency to the dollar. This policy lasted between the last part of 2008 and 2010.

The global financial crisis of 2008 marked a turning point in China's monetary strategy. The crisis exposed China's vulnerability to a dollar-dominated financial system and motivated policymakers to promote the international use of the renminbi.

After 2010 China adopted a slightly more flexible managed float and launched a deliberate strategy of RMB internationalization, initially focusing on trade settlement. Pilot programs allowed exporters and importers to invoice transactions in RMB, reducing exchange rate risk and dollar dependence. Offshore RMB markets developed, particularly in Hong Kong, facilitating RMB deposits, bond issuance ("dim sum bonds"), and cross-border liquidity.

China also established a network of bilateral currency swap lines with foreign central banks and supported the RMB's inclusion in the IMF's Special Drawing Rights (SDR) basket in 2016. These steps enhanced the RMB's legitimacy as an international currency, though not yet a full reserve currency.

Despite progress, the internationalization of the RMB encountered limits. Episodes of capital outflows and financial volatility—particularly in 2015–16—prompted the authorities to reassert capital controls and tighten financial regulation when needed.

Since 2022 China operates a pragmatic managed float, through daily fixing guided by market forces, but heavily influenced by policy. Capital controls remain central and exchange rate stability is prioritized alongside growth and financial stability. The RMB is neither a fixed peg nor a free float, but a strategic policy instrument.

Despite differences in emphasis across sub-periods, since 1994 China has essentially opted for tightly managing the exchange rate of the renminbi, using capital controls to allow it to follow an independent domestic monetary policy as well.

Floating Exchange Rates, Free Capital Mobility and Dollar Dominance

In much of the rest of the world, one of the most consequential developments since the 1970s has been the progressive liberalization of capital movements. Unlike Bretton Woods—which explicitly allowed capital controls to preserve domestic policy autonomy—the post–Bretton Woods era saw a gradual dismantling of restrictions on cross-border financial flows, particularly in advanced economies during the late 1970s and 1980s.

Capital account liberalization contributed to the rapid expansion of international banking, portfolio investment, and financial innovation. Global capital flows grew far faster than trade in goods and

services, transforming the nature of international economic integration. Financial globalization improved access to capital, facilitated risk-sharing in theory, and supported investment and growth in some regions.

At the same time, increased capital mobility heightened systemic vulnerability. Sudden stops, capital flight, and speculative attacks became recurring features of the international monetary system. Countries with fixed or semi-fixed exchange rates were particularly exposed, as capital flows could overwhelm domestic monetary authorities. The tension between open capital markets, exchange rate stability, and monetary policy autonomy became a defining constraint of the post–Bretton Woods order.

Despite the end of its gold convertibility, the US dollar retained—and in many respects strengthened—its central role in the international monetary system. It remains the dominant reserve currency, the principal unit of account and means of payment in international trade, and the core currency of global financial markets.[36]

This persistence reflects several factors: the size and openness of the US economy, the depth and liquidity of US financial markets, the credibility of US institutions, and powerful network externalities that make the use of the dollar self-reinforcing. Over time, dollar dominance has contributed to the preservation of a structurally asymmetric system in which the United States enjoys considerable monetary and financial privileges.

The ability of the US to run persistent current account deficits without facing the same adjustment pressures as other countries has been described as an "exorbitant privilege." Conversely, many non-reserve-currency countries face strong constraints on macroeconomic policy and are more exposed to external shocks. Attempts to challenge dollar dominance—through the greater use of Special Drawing Rights (SDRs) or the internationalization of the euro—have so far only partially altered this structure.

The collapse of Bretton Woods forced a redefinition of the role of the International Monetary Fund. Originally designed to oversee fixed exchange rates and provide short-term balance-of-payments financing, the IMF became a central actor in crisis management and policy surveillance in a world of floating rates and high capital mobility.

From the 1980s onward, the IMF played a key role in addressing major international financial crises, including the Latin American debt crisis, the Asian financial crisis, and later the global financial crisis and the euro area sovereign debt crisis. Its lending increasingly came with extensive policy conditionality, focusing on fiscal consolidation, monetary tightening, and structural reforms.

This evolution made the IMF both indispensable and controversial. Critics argue that its policy prescriptions often exacerbated downturns and reflected the interests of advanced economies, while supporters emphasize its role in providing liquidity, restoring confidence, and coordinating international responses. Despite incremental reforms to IMF quotas and governance, the institution's legitimacy and effectiveness remain contested.

One of the main characteristics of the post-1973 system of floating was the close association between fluctuations in nominal and real exchange rates. This can be seen by looking at the nominal and real exchange rate of any two currencies, or the effective nominal and real exchange rate of any currency.[37]

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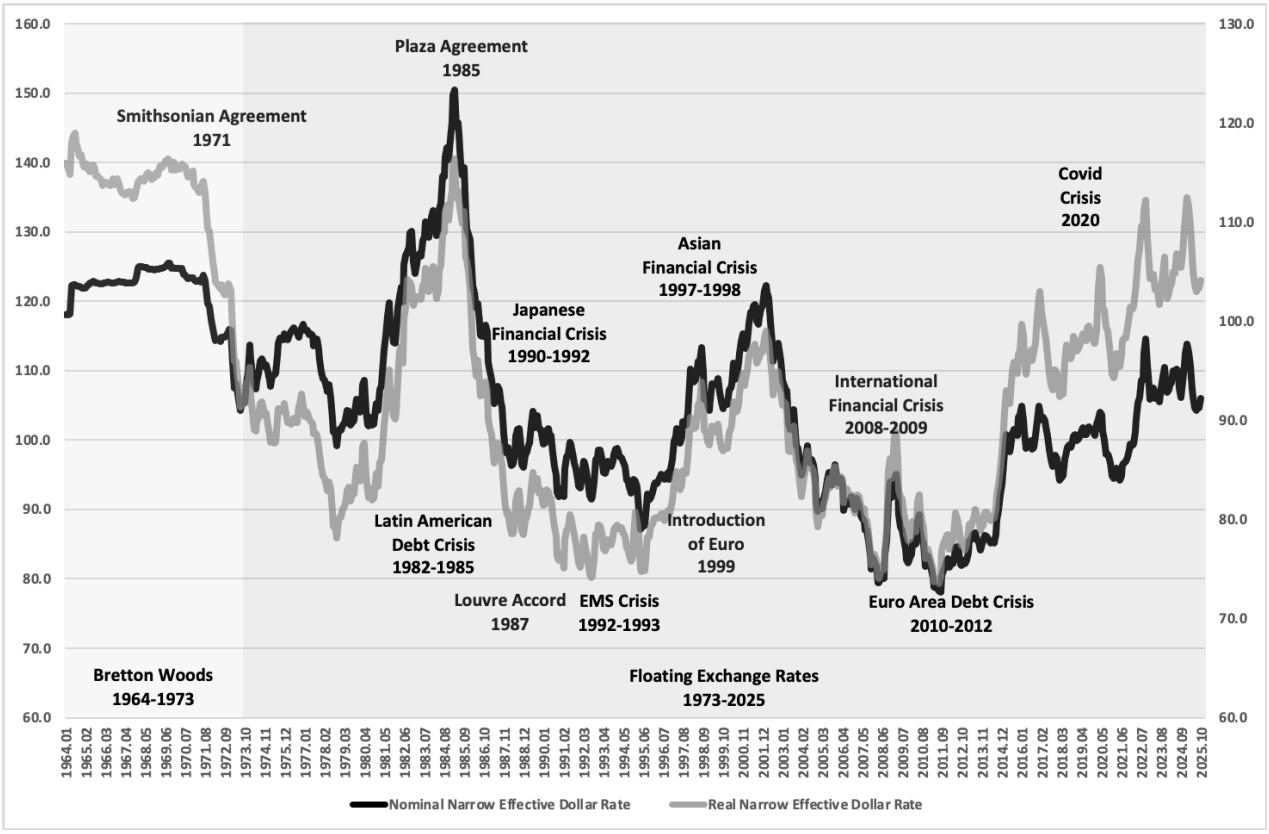
[36] For analyses that focus on the role of the dollar in the international monetary system see, among others, Eichengreen (2011) and Rogoff (2025). For a broader historical analysis of how global currencies emerge and persist see Eichengreen et al (2018).

[37] This was first documented by Mussa (1986).

Figure 15
Fluctuations in the Nominal and Real Effective Exchange Rate of the US Dollar, 1964-2025



Source: Bank of International Settlements (BIS). Effective exchange rates are calculated as geometric trade-weighted averages of bilateral exchange rates. Narrow indices include 26 and 27 economies for the nominal and real indices.

In Figure 15 we present data for the fluctuations of the nominal and real effective exchange rate of the US dollar. The close correlation between the two is impressive. In fact, this close correlation is one of the best indicators of how nominal shocks can have significant real effects because of the combination of exchange rate flexibility with relative price rigidity in goods and labor markets. As a result, excessive and persistent 'volatility' in nominal exchange rates translates into excessive and persistent 'volatility' and misalignments in real exchange rates, affecting output, employment and current account developments.[38]

Another defining feature of the post–Bretton Woods international monetary system has been the frequency and severity of financial crises. Unlike the predominantly trade-related balance-of-payments crises of the Bretton Woods era, post-1973 crises have been increasingly financial in nature.

Major episodes—from the Latin American debt crisis to the Asian financial crisis, the global financial crisis of 2008–09, and the euro area crisis—underscore the instability associated with

[38] As suggested by Mussa (1986), p. 118-119, "… the observed empirical regularities provide strong evidence against theoretical models that embody the property of "nominal exchange regime neutrality." Models that embody this property share the empirical implication that the behavior of real exchange rates should not be substantially and systematically affected by the nature of the nominal exchange rate regime. … One broad class of models that does not embody the property of nominal exchange regime neutrality consists of models that assume sluggishness in the adjustment of nominal price levels, relative to the speed of adjustment of nominal exchange rates under a floating exchange rate regime.". The most important example of the latter class of models is the 'overshooting' model of Dornbusch (1976).

liberalized capital markets and weak global governance. These crises revealed the absence of a formal global lender of last resort and the reliance on ad hoc arrangements involving the IMF, major central banks, and regional institutions.

They also demonstrated the unequal distribution of adjustment costs. Deficit countries, especially those without reserve currencies, have typically borne the brunt of adjustment through austerity and recession, while surplus and reserve-currency countries have faced fewer constraints.

The Group of Seven (G-7) has been one of the most influential yet least formal institutions in the governance of the global economy since the mid-1970s. Comprising the United States, Japan, Germany, France, the United Kingdom, Italy, and Canada, the G-7 emerged in response to the profound economic instability that followed the collapse of the Bretton Woods system. Although it lacks legal authority, a permanent secretariat, or binding decision-making powers, the G-7 has played a central role in coordinating macroeconomic policies, managing international financial crises, and shaping the evolution of the international monetary system.

One of the most visible roles of the G-7 in the early post–Bretton Woods period was exchange rate coordination. While the new system formally accepted floating exchange rates, excessive volatility and misalignments posed serious economic and political risks.

The Plaza Accord of 1985 marked a high point of G-7 influence. Faced with a sharply overvalued US dollar and widening global imbalances, G-7 countries agreed to coordinated intervention to bring about a depreciation of the dollar. The accord successfully realigned major exchange rates and demonstrated that even in a floating-rate system, collective action by leading economies could shape market outcomes.

This was followed by the Louvre Accord of 1987, which sought to stabilize exchange rates after the dollar's decline. Although less successful, these episodes established the G-7 as a forum capable of substituting discretionary coordination for fixed rules. Over time, direct intervention became less common, but policy signaling and shared understandings about "excessive volatility" remained important tools.

The G-7 has also assumed a critical role in the management of financial crises. During the Latin American debt crisis of the 1980s, G-7 governments coordinated closely with the IMF, the World Bank, and major commercial banks to prevent systemic collapse. Initiatives such as the Baker Plan and later the Brady Plan reflected G-7 leadership in balancing creditor interests with the need for debt relief and financial stability.

The pattern repeated itself in subsequent crises, including the Asian financial crisis (1997–98) and the global financial crisis of 2008–09. In 2008, coordinated fiscal stimulus, bank recapitalization strategies, and unprecedented central bank cooperation were critical in stabilizing the global economy. Although the G-20 later became the primary forum for global coordination, the intellectual and political groundwork was laid within the G-7.

In this sense, the G-7 has functioned as the executive crisis committee of the post–Bretton Woods monetary system.

In the absence of a formal international monetary system, cooperation among major central banks has also become increasingly important. During periods of stress, institutions such as the Federal Reserve, the European Central Bank, and the Bank of Japan have provided liquidity through swap lines and coordinated interventions.

Another informal institution which has emerged in the 21st century is the G-20, which was created in 1999, in the aftermath of the Asian financial crisis of 1997-98. The G-20 consists of 19 countries plus the European Union. Its members include major advanced economies (such as the United

States, Japan, Germany, and the United Kingdom) and key emerging economies (such as China, India, Brazil, and South Africa). Together, they represent around 85% of global GDP, 75% of international trade, and about two-thirds of the world's population.

With the global financial crisis of 2008–09 world leaders recognized that effective crisis management required coordination beyond the G-7. In 2008, the G-20, which until then was operating at the level of finance ministers and central bank governors, was elevated to the level of heads of state and government, transforming it into the premier forum for international economic cooperation.

These arrangements played a critical role during the global financial crisis of 2008-2009 and the COVID-19 shock, effectively acting as an informal global forum for policy coordination.

Yet, despite repeated crises and widespread recognition of systemic weaknesses, reform of the international monetary system has been incremental rather than transformative. Proposals for a new Bretton Woods—featuring stronger global rules, expanded use of SDRs, or more symmetrical adjustment mechanisms—have repeatedly stalled due to political constraints and divergent national interests.

As a result, the system remains market-based, dollar-centered, and institutionally incomplete. Stability depends less on formal rules and more on market confidence, national policy credibility, and discretionary intervention by major monetary authorities.

9. The European Monetary System and the Emergence of the Euro

One of the most significant institutional innovations of the post–Bretton Woods era has been the development of regional monetary arrangements. The most advanced example is European monetary integration.

Following the instability of the 1970s, European countries sought to limit exchange rate volatility through the European Monetary System (EMS), which eventually evolved into Economic and Monetary Union (EMU).

The introduction of the euro in 1999 represented an unprecedented step: a common currency shared by sovereign states without a fully centralized fiscal authority. The euro aimed to eliminate exchange rate risk within Europe, enhance monetary stability, and provide a potential counterweight to the US dollar.

While the euro has become the world's second most important international currency, the euro area crisis exposed fundamental design flaws, including the absence of a fiscal union, limited risk-sharing mechanisms, and weak banking integration. These weaknesses highlight both the promise and the limits of regional solutions within a fragmented global monetary system.[39]

During the Bretton Woods period, European countries participated in the global regime of fixed but adjustable exchange rates, and by 1958 they declared current-account convertibility, facilitating trade expansion and deeper market integration. Even while Bretton Woods was still operating, European policymakers began to conceptualise monetary union as necessary to protect the Common Market from exchange-rate volatility and destabilizing impulses from abroad.

From Bretton Woods to the Werner Vision

The pivotal early blueprint was the Werner Report (1970), commissioned by the European Economic Community (EEC) and chaired by Luxembourg's Prime Minister Pierre Werner. The

[39] Alogoskoufis, Gravas and Jacque (2023) provide a detailed account of the asymmetric nature of monetary cooperation in Europe, from Bretton Woods to the euro area.

report outlined a path to monetary union by 1980. Its core idea was that irrevocably locking exchange rates would preserve the Common Market and reduce Europe's vulnerability to external shocks. The report recommended a central authority to guide and harmonize national economic policies, including a concentration of fiscal functions at the Community level and faster integration of factor and goods markets. Rather than proposing a fully centralized central bank immediately, it envisioned a "European System of National Central Banks" and a progressive strengthening of exchange-rate commitments. Although officially adopted, the plan was derailed by subsequent events—above all the breakdown of Bretton Woods—yet it provided the intellectual foundation for Europe's later response to that collapse.

The "Snake": A First Attempt at European Exchange-Rate Discipline

When Bretton Woods began to unravel, Europe attempted to contain intra-European exchange-rate volatility through the so-called "snake" arrangement. After the Smithsonian Agreement of 1971, EEC countries tried to limit bilateral exchange-rate fluctuations within a band of ±4½%. The arrangement survived even after 1973, and prospective or new EEC members such as Denmark, Ireland, and the United Kingdom participated.

The snake soon came under severe strain due to divergent inflation rates and monetary policies among the major economies. Germany pursued relatively tighter monetary policy and achieved lower inflation than France and Italy, whose inflation accelerated after the end of Bretton Woods. Although the snake contained short-term financing facilities intended to support weaker currencies, it could not reconcile persistent policy divergences. The experience convinced many policymakers —particularly in France—that Europe needed a more robust and institutionally structured system.

The European Monetary System (EMS): Symmetric Design and Asymmetric Operation

The European Monetary System (EMS) was a major institutional leap. France's repeated difficulty in remaining within the snake encouraged French officials to design a sturdier framework anchored by German cooperation. The EMS thus emerged largely as a Franco-German initiative, formalized in European Councils in Bremen (July 1978) and Brussels (December 1978). Its objective was to ensure stable intra-European exchange rates—a prerequisite for the functioning of the Community, including trade integration and the Common Agricultural Policy.

The EMS was designed as symmetric—unlike Bretton Woods, which was explicitly dollar-centered —but its operation ultimately became asymmetric, with the German mark (DM) acting as the effective anchor. The system had four key elements:

First, the ECU (European Currency Unit) as a common unit of account, defined as a weighted basket of member currencies. Central rates against the ECU implied bilateral parities and formed a parity grid.

Second, the Exchange Rate Mechanism (ERM), requiring central banks to keep bilateral exchange rates within narrow bands around their central parities (typically ±2.25%, with wider bands—e.g., ±6%—for some currencies like the Italian lira). When rates approached band limits, "marginal interventions" were compulsory. The appreciating-currency central bank committed to provide unlimited credit to the depreciating-currency central bank once reserves were exhausted, while "intra-marginal" interventions could be used pre-emptively but often required approval.

Third, financing facilities to support interventions and balance-of-payments pressures: very short-term financing (for ERM interventions), short-term monetary support (for payments deficits), and medium-term financial assistance.

Fourth, realignments (devaluations/revaluations) of central parities. Initially more unilateral, realignments became subject to collective decision-making after 1981 through the Monetary Committee and ECOFIN.

Despite this architecture, asymmetries emerged for two main reasons. First, German monetary policy was systematically more restrictive than others, forcing partner central banks to tighten as well to defend their parities. Otherwise, they faced either repeated crises or politically costly devaluations. Second, the DM's international reserve-currency status meant that global shocks affecting the dollar or yen against the DM transmitted pressure into the ERM, generating realignment pressures even when intra-European conditions were unchanged.

Inflation differentials were central to the system's dynamics. After 1973, French and Italian inflation rose sharply while German inflation declined. Because collectively agreed realignments did not fully offset cumulative inflation differentials, some currencies experienced real appreciations against the DM. In Italy, limited nominal devaluations relative to inflation differentials produced a substantial real appreciation of the lira in the first EMS decade (1979–1988), while France—through a combination of lower differentials and greater realignment success—experienced a smaller real appreciation. In effect, Germany gained competitiveness while others imported Bundesbank credibility and achieved lower inflation over time.[40]

Figure 16 depicts the evolution of the nominal exchange rate of the French franc (FF) against the German mark (DM) from 1946 to 1998 (at the end of which the euro was created). It is clear that the European Monetary System led to a stabilization of the exchange rate of the two currencies, despite the significant realignments of the 1981-1983 period (a result of the relaxation of France's monetary and fiscal policy immediately after the election of President Mitterand) and 1986 (a result of the international weakness of the dollar against the German mark).

By the late 1980s and early 1990s, the EMS increasingly resembled a broad DM zone. Realignments became rare between 1986 and 1992 as France, Italy, and other countries tightened monetary policy, aligning with the Bundesbank's anti-inflation stance. This convergence produced a collective disinflation outcome, but also entrenched Germany's competitiveness advantage.

Typical examples of the disinflationary impact of the EMS are France and Italy, whose inflation rates fell significantly after 1983, with the result that by the late 1980s inflation in France was at almost the same level as in Germany, while that in Italy was at a slightly higher level. Similar developments occurred in all EMS participants that were facing a high inflation problem.

Inflation rates in Germany, France and Italy are depicted in Figure 17.

The Delors Plan and Maastricht: From ERM to Monetary Union

The initiative to move from an exchange-rate system to full monetary union was again largely led by France, with Italy supportive and Germany initially skeptical. In 1988, France proposed a march toward a single currency, prompting the European Council in Hanover (June 1988) to create the Delors Committee, chaired by Jacques Delors, then President of the EC Commission. Its report (Delors 1989) proposed a three-stage process to monetary union:

Stage 1: capital account liberalization and the elimination of capital controls (by July 1990).

Stage 2: intensified convergence of fiscal and monetary policies (beginning January 1, 1994), codified later in the Maastricht Treaty.

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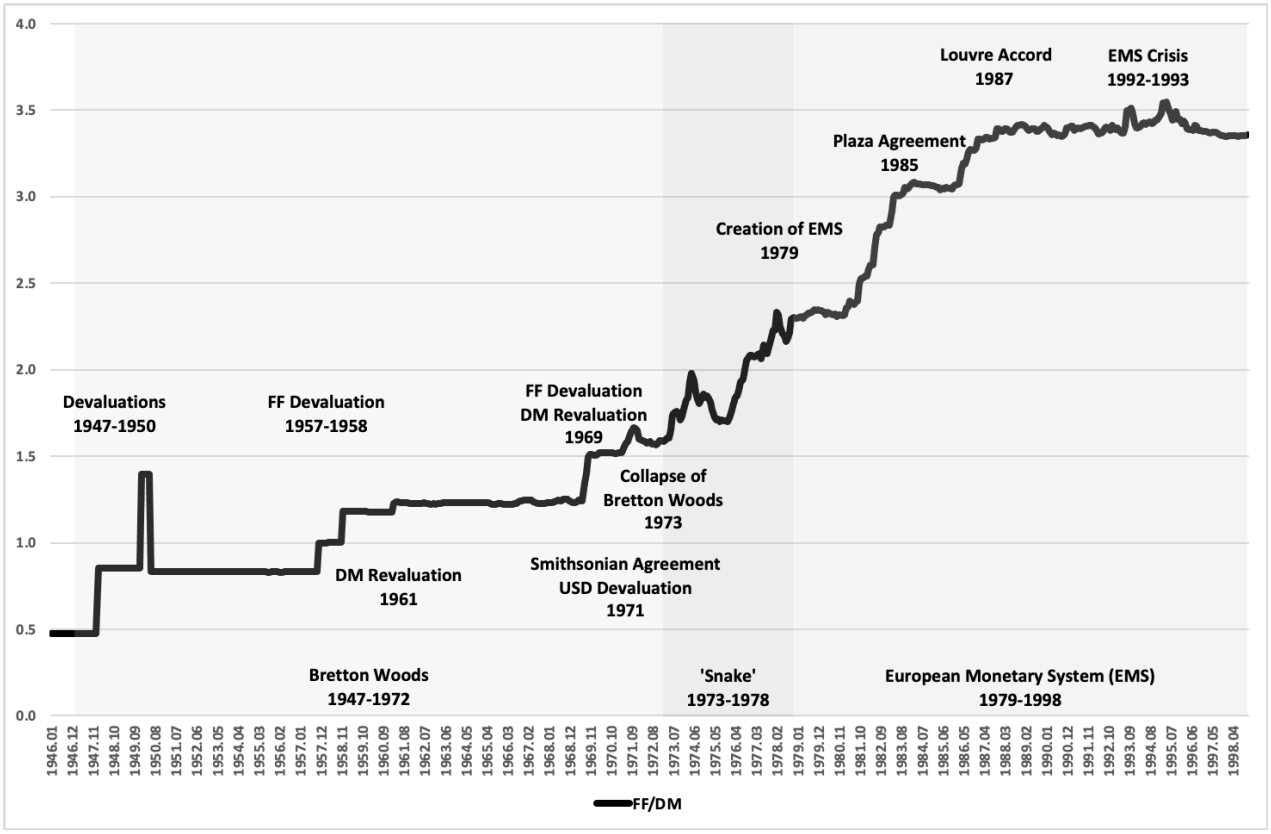
[40] See Giavazzi and Giovannini (1989) for a comprehensive account of the operation of the European Monetary System until the late 1980s. See also Eichengreen (2008) Ch. 5.

Figure 16
Fluctuations in the Nominal FF/DM Exchange Rate, 1946-1998



Source: International Monetary Fund (IMF).

Stage 3: creation of monetary union with monetary policy transferred to an independent European Central Bank.

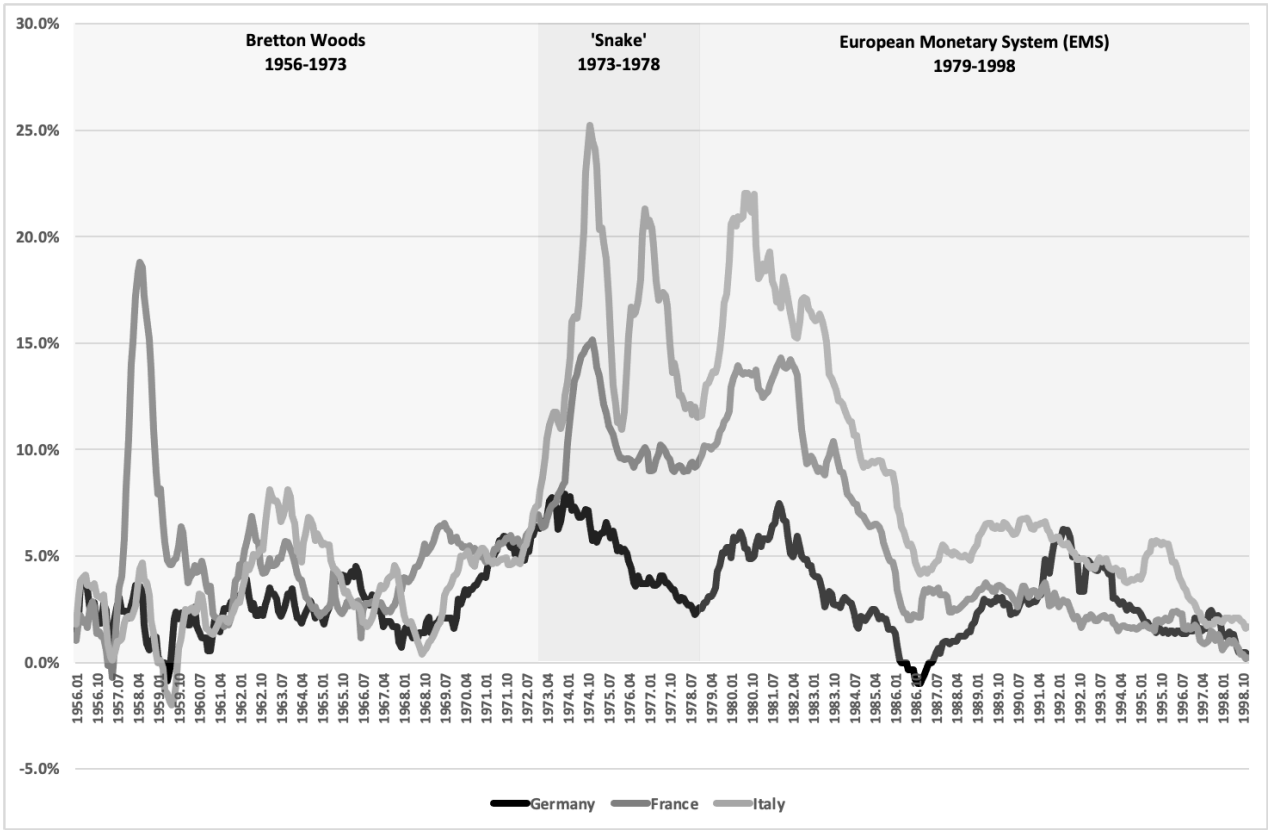
The Maastricht Treaty (signed 1991/1992) renamed the EEC the European Union (EU) and established a timetable and conditions for adopting the single currency. It prohibited monetary financing of deficits, required central bank independence, and set convergence criteria: deficits below 3% of GDP, debt below 60% or converging toward it, inflation and short-term interest rates close to the best performers, and at least two years of ERM participation.

The ERM Crisis of 1992–93: Capital Mobility Meets Asymmetry

The abolition of capital controls in the early 1990s made the ERM far more vulnerable to speculative pressures. The 1992–93 ERM crisis was a consequence of chronic macroeconomic asymmetries amplified by a sequence of shocks that overwhelmed the system's defenses and the coordination mechanisms.

Key shocks included: (1) German unification, which shifted Germany toward net borrowing, raised inflationary pressures, and induced Bundesbank tightening; (2) divergence between US and EU monetary policy, as the Federal Reserve eased in 1992 and the dollar depreciated against the DM, increasing ERM pressures; (3) Italy's political crisis alongside deteriorating fiscal conditions; and (4) political uncertainty over Maastricht ratification (Danish referendum rejection, anticipation of the French referendum, and ambiguous British politics), which undermined confidence in the integration project.

Figure 17
Inflation Rates in Germany, France and Italy, 1956-1998



Source: International Monetary Fund (IMF). The data refer to annual rates of change of the Consumer Price Index.

Under intense pressure, the ERM could not hold. In September 1992, the Italian lira and British pound were forced out. After further turbulence, the ECOFIN widened fluctuation margins to ±15% in August 1993, effectively shifting the ERM toward a looser arrangement and defusing immediate speculative attacks. Paradoxically, the crisis did not halt monetary union; it accelerated the political determination to complete it.[41]

The Euro: Early Success and the Build-Up of Imbalances

The third stage of EMU began on January 1, 1999, with irrevocable locking of exchange rates among participating currencies and the euro. In May 1998, eleven countries were chosen based on convergence reports, However, convergence was achieved "in form" more than "in substance." Deficits generally met the 3% threshold, but public debt often remained far above 60%, and criteria were interpreted broadly in the rush to include many members. The euro was introduced first in accounting form, and became physical legal tender in 2002.[42]

The first decade of the euro turned out to be a period of macroeconomic euphoria: growth, falling unemployment, and converging inflation, especially in the periphery. Yet the same forces that delivered apparent success—particularly interest-rate convergence—also generated internal and external imbalances. Lower real interest rates in the periphery encouraged borrowing, reduced savings, raised investment and consumption, and produced large current account deficits financed

[41] See Issing (2008) and Marsh (2011) for details on how the euro came about.

[42] The 11 initial members were Germany, France, Italy, Austria, Belgium, the Netherlands, Luxembourg, Finland, Spain, Ireland, and Portugal. In June 2000, Greece was added as the 12th member.

by core surpluses. Capital inflows were often directed to non-tradables (real estate, construction, some public investment) and fueled housing bubbles, while higher inflation in the periphery eroded competitiveness in the absence of exchange-rate adjustment. The banking system intermediated these cross-border flows, creating large balance sheets and a latent fragility in a monetary union without a banking union.

Crisis and Aftermath: From Greek Trigger to "Whatever It Takes" and Beyond

The crisis phase begins with the October 2009 revelation of Greece's fiscal deficit, which triggered rising spreads, downgrades, and a debt-interest-rate vortex leading to bailouts financed by the EFSF/ESM and the IMF. Contagion spread to other states with external deficits and reliance on international borrowing (Portugal, Ireland, Spain, Italy), reinforced by investor home bias. Banking fragility—especially in Ireland—created the bank–sovereign doom loop, and the decision to impose losses on private Greek bondholders (PSI) undermined the belief that euro members would not default, pushing stress toward larger economies such as Italy. Fiscal tightening across both periphery and core deepened recession and intensified contagion, eventually threatening the euro's survival.[43]

The turning point came in mid-2012 with Mario Draghi's "whatever it takes" commitment and the ECB's OMT announcement, which credibly signaled a buyer of last resort for sovereign bonds and reversed panic dynamics without even being activated. Yield spreads narrowed and normalization progressed, later reinforced by ECB quantitative easing.

Finally, the pandemic of 2020 revealed persistent institutional weaknesses but also a partial change in approach. Unlike 2010, the EU adopted a significant temporary common response via the Recovery and Resilience Facility and related measures, representing a limited but meaningful step toward shared crisis management.

Figure 18 depicts the evolution of the dollar exchange rate of the euro, since the creation of the ECU in 1979.

The late 1970s and early 1980s were dominated by a strong US dollar. Following the collapse of the Bretton Woods system, the United States faced high inflation, which was aggressively tackled by the Federal Reserve under Paul Volcker. The sharp tightening of US monetary policy raised real interest rates to unprecedented levels, attracting global capital inflows and pushing the dollar up sharply against European currencies. At the same time, Europe experienced weaker growth and greater inflation dispersion, limiting the appeal of European assets.

By the mid-1980s, however, the dollar had become excessively strong, contributing to large US current-account deficits and rising protectionist pressures. The Plaza Agreement of 1985 marked a turning point. Through coordinated intervention and policy signaling by the major advanced economies, the dollar was deliberately weakened. This explains the sharp reversal after 1985, as European currencies appreciated significantly against the dollar.

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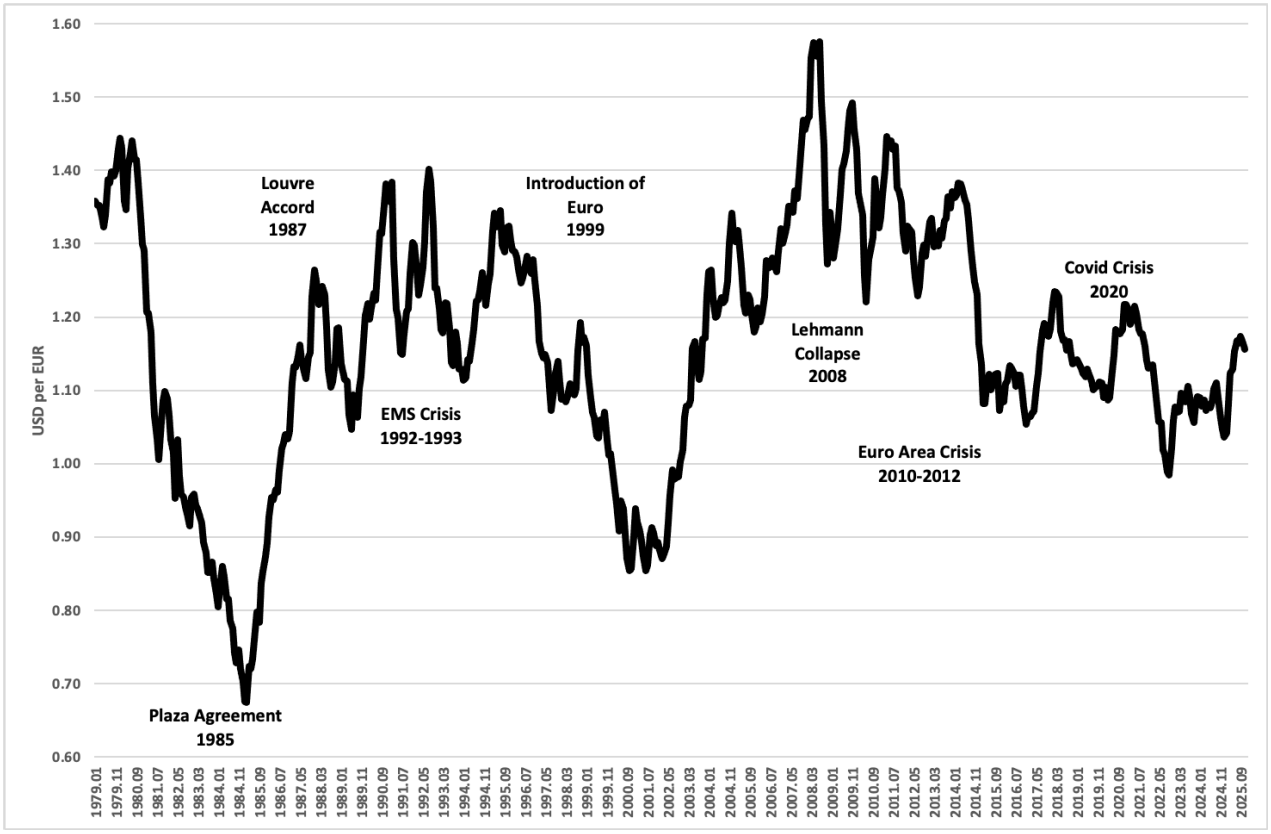
[43] The significant rise in current account deficits and public and private debt as a result of the lower real interest rates that followed euro area entry, occurred in almost all of the economies of the periphery of the euro area. See Blanchard and Giavazzi (2002). Almost all of these economies faced a serious external debt crisis after 2010. Since then, the literature that focuses on the euro area crisis and its aftermath has expanded exponentially. See, among others, Lane (2012); O'Rourke and Taylor (2013); Baldwin and Giavazzi (2015, 2016); Orphanides (2015); Brunnermeier et al. (2016); Kang and Shambaugh (2016); Papademos (2016); Stiglitz (2016); Wyplosz (2016); Mody (2018); Alogoskoufis and Jacque (2021). For a synthesis of academics views on causes and the effects of the Euro area crisis see the introduction by the editors in Baldwin and Giavazzi (eds. 2015).

Figure 18
Fluctuations in the Nominal USD/EUR Exchange Rate, 1979-2025



Source: International Monetary Fund (IMF). Between 1979 and 1998 the exchange rate is the one between the USD and the ECU, the synthetic European Currency Unit of the European Monetary System.

The rapid depreciation of the dollar following the Plaza Agreement led to concerns about overshooting. In response, the Louvre Accord of 1987 attempted to stabilize exchange rates around prevailing levels. While it temporarily reduced volatility, underlying asymmetries soon re-emerged. In Europe, the attempt to maintain exchange-rate stability through the European Monetary System (EMS) increasingly exposed divergent inflation rates and monetary policies among member states.

These tensions culminated in the Exchange Rate Mechanism (ERM) crisis of 1992–93. German reunification triggered tighter monetary policy by the Bundesbank, while other countries were unable or unwilling to match such tightness without severe domestic costs. With capital mobility largely restored, speculative attacks forced the Italian lira and the British pound out of the ERM, and remaining currencies saw their fluctuation bands widened dramatically. The exchange-rate volatility around this period reflects these institutional stresses and the limits of fixed but adjustable parities under free capital flows.

Despite the ERM crisis, European leaders accelerated the path toward monetary union. The prospect of irrevocably fixed exchange rates and a single currency restored confidence in the medium term. In the years preceding the euro's introduction in 1999, exchange rates fluctuated but were increasingly anchored by convergence expectations and disinflation across Europe.

The launch of the euro represented a profound regime change. Eleven countries transferred monetary sovereignty to the European Central Bank, eliminating intra-European exchange-rate risk. However, the early years of the euro were marked by a significant depreciation against the dollar. This reflected several factors: strong US growth during the late-1990s technology boom, continued

global preference for dollar assets, and market uncertainty about the new currency's institutional framework and long-term credibility.

From the early 2000s to the eve of the global financial crisis, the euro appreciated steadily, reaching historical highs against the dollar. This period coincided with widening US current-account deficits, low US saving, and a perception that the dollar was structurally overvalued. At the same time, the ECB established a strong reputation for price stability, and euro-area financial markets deepened. These developments encouraged reserve diversification and portfolio inflows into euro-denominated assets.

The appreciation also reflected global liquidity conditions and shifting interest-rate cycles. As the Federal Reserve eased policy after the dot-com bust and global capital sought alternatives to dollar assets, the euro benefited. By 2008, the euro was widely viewed as a credible second international currency.

The collapse of Lehman Brothers in September 2008 marked another abrupt reversal. Despite the crisis originating in the United States, the dollar appreciated sharply as investors sought safe and liquid assets and scrambled to secure dollar funding. The euro depreciated accordingly, illustrating the dollar's role as the world's dominant reserve and funding currency.

The subsequent euro area sovereign debt crisis, beginning in 2010, imposed prolonged downward pressure on the euro. Rising doubts about fiscal sustainability, the bank–sovereign "doom loop," and the absence of a clear lender of last resort for governments led markets to price redenomination risk. Exchange-rate movements during this period reflected not only weak growth and divergent fiscal positions but also existential questions about the survival of the monetary union.

The decisive turning point came in 2012, when ECB President Mario Draghi declared that the ECB would do "whatever it takes" to preserve the euro. The announcement of the Outright Monetary Transactions (OMT) program restored confidence by effectively removing tail risk, even though the program was never activated. Exchange-rate volatility diminished, and the euro stabilized relative to the dollar.

From 2015 onward, divergent monetary policies again shaped the exchange rate. The ECB's large-scale asset purchases and very low interest rates contrasted with US monetary tightening, favoring a stronger dollar. The euro remained broadly range-bound but vulnerable to political uncertainty and episodic stress.

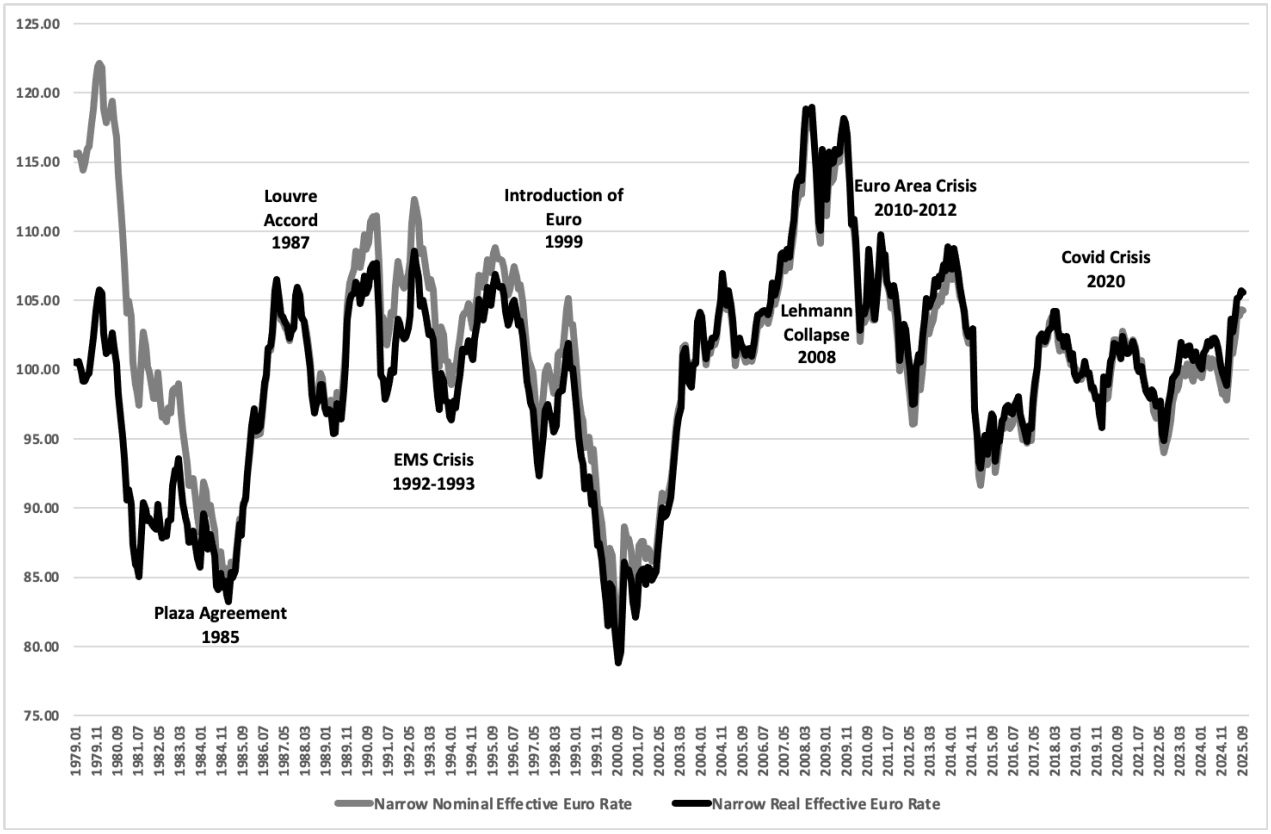
The Covid-19 crisis in 2020 produced a familiar pattern: an initial dash for dollars followed by stabilization once central banks provided liquidity through swap lines and large-scale interventions. Importantly, Europe's collective fiscal response through the Recovery and Resilience Facility strengthened confidence in the euro by signaling greater burden sharing.

In 2022, the euro weakened sharply, approaching parity with the dollar. This reflected a severe energy and terms-of-trade shock to Europe, combined with aggressive US interest-rate hikes in response to inflation and heightened geopolitical risk. As energy markets stabilized and policy expectations shifted, the euro partially recovered in 2023–25, though without returning to the highs of the mid-2000s.

These developments, were also reflected in the evolution of the nominal and real effective exchange rate of the euro, which are depicted in Figure 19.

Due to the combined effects of nominal exchange rate flexibility and price and wage rigidity, fluctuations in the nominal effective exchange rate of the euro were reflected in fluctuations in the real exchange rate, affecting the evolution of output, employment and current accounts.

Figure 19
Fluctuations in the Nominal and Real Effective Exchange Rates of the Euro, 1979-2025



Source: Bank of International Settlements (BIS). Between 1979 and 1998 the exchange rates refer to the ECU, the synthetic European Currency Unit. Effective exchange rates are calculated as geometric trade-weighted averages of bilateral exchange rates. Narrow indices include 26 and 27 economies for the nominal and real indices.

The Euro Area as an Optimum Currency Area

The launch of the euro in 1999 did not satisfy the strict criteria of what economists describe as an optimum currency area (OCA). Nevertheless, The theory of optimum currency areas provides a powerful analytical framework for understanding the structural weaknesses of the euro area and for identifying the reforms needed to address the asymmetries and fault lines exposed by the crisis. Rather than offering a definitive test of whether a currency union is "optimal," the literature highlights the trade-offs involved in abandoning national currencies and helps clarify the conditions under which a monetary union can function more effectively.

At its heart, the theory poses a simple but fundamental question: ignoring national borders and focusing solely on economic relationships, which group of countries should share a single currency? In answering this question, the theory weighs the benefits of a common currency against the costs of losing national monetary and exchange rate autonomy. The optimal size of a currency area is reached when the marginal benefit of adding another country equals the marginal cost.[44]

The key insight is that both benefits and costs depend on structural characteristics of the participating economies. When benefits are high and costs are low, the optimum currency area is

[44] This question was first posed, and partially answered, by Mundell (1961) who is rightly considered as the originator of this literature. McKinnon (1963) and Kenen (1969) were early major contributors to this literature. The literature was revived in the 1980s, as additional considerations were added. A survey of the so called 'new' theory of optimum currency areas can be found in Tavlas (1993).

larger and can include more countries. Conversely, when costs dominate, the optimal area is smaller.

The literature identifies four main benefits of adopting a common currency. First, there is a reduction in cross-border transaction costs, as the need to exchange different currencies is eliminated. Second, a single currency increases price transparency, allowing consumers and firms to compare prices easily across countries, which enhances competition and market integration. Third, it removes currency risk, eliminating uncertainty arising from exchange rate fluctuations and encouraging cross-border trade and investment. Fourth, for countries with a history of inflationary monetary policies, participation in a low-inflation monetary union can provide credibility gains, anchoring expectations and reducing inflation.

These benefits tend to be larger when participating countries are highly integrated economically. Mundell (1961) and McKinnon (1963) emphasized that high trade volumes, openness, and geographic proximity raise the gains from a common currency. Economies that trade intensively with one another stand to gain more from lower transaction costs and the elimination of exchange rate uncertainty.

The inflation credibility benefit, however, is asymmetric and controversial. While high-inflation countries may benefit from adopting the discipline of a low-inflation monetary union, low-inflation countries may face costs by admitting partners with weaker monetary credibility. This tension was particularly relevant in the formation of the euro area.

The main costs of monetary union arise from the loss of national monetary and exchange rate policy as tools for responding to economic shocks. When shocks affect member economies asymmetrically, countries can no longer adjust interest rates or devalue their currencies to restore competitiveness or stabilize output and employment. In addition, countries lose the ability to choose their preferred mix of inflation and unemployment, including the implicit “inflation tax” embedded in national monetary policy.

Optimum currency areas theory identifies several factors that can mitigate these costs. Mundell (1961) highlighted the importance of labor mobility, arguing that if workers can move easily across borders, unemployment caused by asymmetric shocks will be temporary rather than persistent. Migration from depressed regions to booming ones substitutes for exchange rate adjustment.

Kenen (1969) emphasized product diversification. Economies with a diversified production structure are less vulnerable to sector-specific shocks, reducing the likelihood that they will experience severe asymmetric disturbances. Greater diversification therefore lowers the costs of joining a monetary union.

A further crucial criterion, also emphasized by Kenen, is fiscal federalism. A sizeable central budget can provide automatic transfers from regions experiencing positive shocks to those suffering adverse ones. Such transfers cushion income losses and stabilize demand, compensating for the absence of national monetary policy. The size and effectiveness of fiscal transfers thus play a decisive role in determining whether a currency area can cope with asymmetric shocks.

Other factors influencing benefits and costs include the homogeneity of preferences among member states—particularly regarding inflation and stabilization policies—and the existence of political solidarity, which affects the willingness of countries to support one another in times of crisis.

Optimum currency areas theory cannot and should not be used to deliver a binary verdict on whether the euro area is an “optimum” currency area. In practice, no existing currency union fully satisfies all criteria, including the United States. Nonetheless, optimum currency area considerations suggest that the inclusion of some euro area members—particularly countries in the periphery—

may have been premature, as they did not meet several key criteria related to labor mobility, fiscal transfers, and structural convergence.

Comparative analysis highlights these weaknesses. As O'Rourke and Taylor (2013) and others argue, the United States is much closer to an optimum currency area than the euro area. US markets are far more integrated: interstate trade amounts to around 66% of US GDP, compared with inter-country trade of about 17% of euro area GDP. This deeper integration amplifies the benefits of a common currency in the US context.

Interestingly, the degree of macroeconomic asymmetry—as measured by the correlation of regional growth rates—does not differ dramatically between the two unions. The average correlation of GDP growth across US states is approximately 0.46, compared with 0.50 across euro area countries. This suggests that the euro area does not necessarily suffer from more asymmetric shocks than the US.

Where the euro area falls markedly behind is in labor mobility. In the US, about 42% of residents of a state were born outside that state, indicating high internal mobility. In the euro area, the equivalent figure is only 14%, implying that labor mobility is roughly four times higher in the US. Linguistic, cultural, institutional, and legal barriers continue to limit migration within Europe, raising the cost of asymmetric shocks.

The most striking difference concerns fiscal federalism. In the US, around 30% of a state-level income shock is offset through federal fiscal transfers, reflecting the size and automatic stabilizers of the federal budget. In the euro area, only 0.5% of a country-level shock is cushioned in this way. The EU budget, at roughly 1% of EU GDP, is far too small to play a meaningful stabilizing role. This stark contrast implies that the euro area lacks one of the most important mechanisms for coping with asymmetric shocks, pushing the optimal size of the euro area toward the lower end.

The euro area crisis demonstrated that macroeconomic and financial asymmetries have not diminished with the adoption of the single currency; in some respects, they have increased. Optimum currency areas theory therefore points not toward reversing monetary union, but toward reforms that would move the euro area closer to an optimum currency area. These include deeper market integration, higher labor mobility, greater product diversification, and—most importantly—stronger fiscal capacity and risk-sharing mechanisms at the euro area level.

In this sense, optimum currency areas theory is less a verdict on past decisions than a guide for future institutional development. It clarifies why the euro area proved vulnerable to crisis and indicates the direction of reforms needed to ensure its long-term stability.

The Euro as an International Reserve Currency

Despite the shortcomings of the euro area, the euro entered the international monetary system with unusually strong fundamentals. The euro area brought together economies accounting for a large share of global GDP and trade, immediately making the euro a natural candidate for international use.[45]

Within a few years of its launch, the euro became the second most widely held reserve currency, accounting for around 20–25% of global reserves at its peak. It also gained a prominent role in international bond issuance, cross-border banking, and trade invoicing, particularly in Europe, Africa, and parts of the Middle East.

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[45] For an early analysis and assessment of the international role of the euro see Alogoskoufis and Portes (1991), one of the background studies for Delors (1989). See also Alogoskoufis and Portes (1997), Bergsten (1997) and a number of other contributions in Masson et al (1997).

Several factors explain this rapid ascent. First, the elimination of intra-European exchange rate risk created a vast, integrated currency area. Second, the European Central Bank (ECB) quickly established a reputation for price stability, inheriting and reinforcing the anti-inflationary credibility of the Bundesbank. Third, European financial markets deepened substantially, especially in sovereign and corporate debt.

In this sense, the euro represents the most successful case of rapid internationalization of a currency in modern history.

Despite these achievements, the euro has not displaced the dollar. The reasons lie in structural differences between the United States and the euro area.

The dollar's dominance rests on the existence of a single sovereign issuer with taxing power, a central bank acting unambiguously as a lender of last resort, and the world's deepest and most liquid financial markets—above all the US Treasury market. US Treasuries provide a massive supply of uniformly safe, liquid assets that are essential for reserve holders.

By contrast, the euro area lacks a single sovereign safe asset. Government bonds are issued by individual member states, each with different credit risks and liquidity characteristics. Although German Bunds function as a de facto benchmark, their supply is limited relative to global demand for safe assets.

This structural fragmentation places a natural ceiling on the euro's reserve role.

The euro area sovereign debt crisis of 2010–2012 was a defining episode for the euro's international role. It exposed the institutional incompleteness of Economic and Monetary Union (EMU) and fundamentally altered perceptions of euro-denominated assets.

Markets discovered that euro area government bonds were not uniformly safe and that sovereign default or exit from the currency union was conceivable. Capital fled from periphery bonds to core bonds, fragmenting financial markets and undermining the euro's reserve appeal.

The crisis highlighted three weaknesses: *Absence of a fiscal union*, limiting risk-sharing, *restricted lender-of-last-resort role for the ECB*, and, *redenomination risk*, unique among major reserve currencies

Only after the ECB's decisive intervention—most notably Mario Draghi's "whatever it takes" pledge and the Outright Monetary Transactions (OMT) framework—was confidence restored. This episode demonstrated that a currency's reserve status depends not only on macroeconomic fundamentals but also on institutional credibility in crisis management.

A central constraint on the euro's reserve role is the scarcity of euro-denominated safe assets. While the euro area as a whole has a large stock of public debt, it is fragmented across national issuers.

For reserve managers, fragmentation matters because it complicates portfolio construction, liquidity management, and risk assessment. Unlike US Treasuries, euro area sovereign bonds cannot be treated as interchangeable.

Efforts to address this problem have been partial. The creation of the European Stability Mechanism (ESM), the expansion of ECB balance-sheet operations, and regulatory reforms have improved resilience. More recently, joint borrowing under the NextGenerationEU / Recovery and Resilience Facility has created a limited supply of supranational euro-denominated bonds, widely regarded as high-quality assets.

While still modest in scale, this development represents a potentially important step toward strengthening the euro's international role.

Monetary credibility is a core strength of the euro. The ECB has maintained low inflation over most of its history and demonstrated its ability to innovate during crises, including through unconventional monetary policies such as quantitative easing and pandemic emergency purchases.

From a reserve currency perspective, the ECB compares favorably with other central banks. It operates with a high degree of independence, transparency, and technical sophistication. In contrast to emerging-market reserve currencies, such as the renminbi, the euro does not suffer from convertibility restrictions or political interference in monetary policy.

However, monetary credibility alone is insufficient. Reserve currencies require not only stable money but also a stable political and fiscal environment backing that money.

Finally, international currencies are embedded in geopolitical power structures. The dollar's dominance reflects not only US economic size but also its military reach, alliance networks, and influence over global institutions and financial infrastructure.

The euro area lacks comparable geopolitical coherence. The European Union does not possess a unified foreign or defense policy, and member states often diverge in strategic priorities. This limits the euro's attractiveness as a currency underpinning global power projection.

Moreover, reserve currency issuers often must accept global responsibilities, including providing liquidity during crises and running persistent external deficits. The euro area has been reluctant to assume such a role collectively, reflecting political constraints and internal heterogeneity.

11. Prospects for the Role of the Dollar in the International Monetary System

The euro is the world's second most important international currency. However, despite the economic size of the euro area and its monetary credibility, the euro faces structural, institutional, and geopolitical constraints that prevent it from displacing the dollar as the dominant global reserve currency. Without deeper fiscal, financial, and political integration, the euro's role will expand only gradually, contributing to a more multipolar monetary system rather than replacing the dollar.

The US dollar's continuing global dominance rests on three pillars that reinforce each other:

Deep and unified financial markets, especially US Treasuries, which provide the world's largest supply of safe and liquid assets.

Macroeconomic credibility and crisis performance: in periods of stress, global investors consistently seek dollar assets, reinforcing the dollar's safe-haven role—even when crises originate in the US.

Geopolitical and institutional power: US global influence, military capacity, and control over financial infrastructure underpin trust in the dollar.

Strong network externalities further entrench dollar use in trade invoicing, commodities, payments, and global finance.[46]

The euro has clear advantages as an international currency as the euro area is one of the world's largest economies and trading blocs and the European Central Bank has a strong reputation for price stability. The euro is already the second-largest reserve currency and widely used in international bond issuance and regional trade. These features explain why the euro rapidly achieved international relevance after its launch and why it remains central to reserve diversification strategies.

However, despite these strengths, the euro's ability to challenge the dollar is constrained by financial fragmentation, limited fiscal federalism, and incomplete political integration. The euro

[46] See also Rogoff (2025), p.8 who argues that "the dollar's dominance is the product of many factors that reinforce each other."

area crisis demonstrated that without a unified fiscal and political backbone, and a central bank that can function freely as a lender of last resort, a currency's reserve status is vulnerable in times of stress.

To strengthen the attractiveness of the euro as an international reserve currency joint EU debt issuance has to expand and made permanent, the EU banking and capital markets union must be completed, fiscal risk-sharing mechanisms must be strengthened, the ECB must be allowed to operate with fewer constraints as a lender-of-last-resort, and political cohesion in external and defense policy must be ensured. These are all tall orders.

In conclusion, the euro is unlikely to replace the dollar as the world's primary reserve currency in the foreseeable future. However, with sustained institutional reform, it can play a larger role in a more diversified, multipolar international monetary system, along with the Chinese renminbi. The key constraint is not economic potential but the will to proceed with political and institutional reforms.

The chances of the renminbi replacing the dollar as the key international reserve currency are much slimmer. The renminbi has made notable progress as an international currency, reflecting China's economic weight and strategic policy efforts. It is increasingly used in trade settlements, regional finance, and bilateral arrangements, and its inclusion in the IMF's SDR basket marks an important symbolic milestone.

However, challenging the US dollar as a global reserve currency requires more than size and ambition. It requires open and liquid financial markets, full convertibility, credible monetary institutions, strong legal protections, and a willingness to accept the macroeconomic and political costs of reserve currency status.

At present, China is unwilling or unable to meet many of these conditions. Capital controls, state dominance of finance, limited institutional transparency, and geopolitical considerations severely constrain the RMB's reserve appeal.

As a result, the RMB is also unlikely to replace the dollar as the dominant global reserve currency in the foreseeable future. It is also unlikely to challenge the euro for second place. Instead, it is more likely to become a selective, regional, and politically aligned international currency, contributing to a more fragmented and multipolar international monetary system—but not supplanting the dollar at its core.

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