WORKING paper

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The Rise and Fall of Global Currencies over Two Centuries

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ABSTRACT

This paper quantifies the relative dominance of global currencies and the competitive structure of the international monetary system since 1825. I find the post-1945 experience of dollar hegemony to have no historical precedent. No currency has ever maintained such a large, long-lasting lead over global currency rivals. Close competitors frequently challenged the previous hegemon, the pound sterling. I confirm the dollar temporarily overtook the sterling for the first time in the mid-1920s. Among previously overlooked episodes of monetary competition, I highlight the rise of the French franc in the 1850s and 1930s as well as of the German mark in the 1870s. In light of the recent debate on the costs and benefits of a multipolar international monetary system, I document a positive correlation between higher global currency competition and the prevalence of financial crises, which is however highly dependent on specific sub-periods.

Keywords: International Monetary System, Long Run, Dollar Hegemony, Multipolarity.

JEL classification: F3, F4, N2, E5.

[1] Banque de France.

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NON-TECHNICAL SUMMARY

The hegemony of the dollar on the international monetary system has long been the subject of controversy, going back to Valéry Giscard d'Estaing denouncing the "privilège exhorbitant" in the 1960s. Today, dollar dominance means that policy in third countries, and particularly developing economies, is constrained by financial spillovers from the Fed. A hegemonic supplier of global safe assets might also be problematic for global financial stability, as growing demand for safe assets might outstrip the fiscal capacity of the United States, giving rise to a new "Triffin Dilemma". Many policy makers outside of the United States have long been arguing in favour of a transition to a more multipolar international monetary system. More recently, the decision by the United States and its allies to freeze the reserves of the Russian central bank has spurred new concerns regarding the sustainability of dollar hegemony in the current geopolitical context.

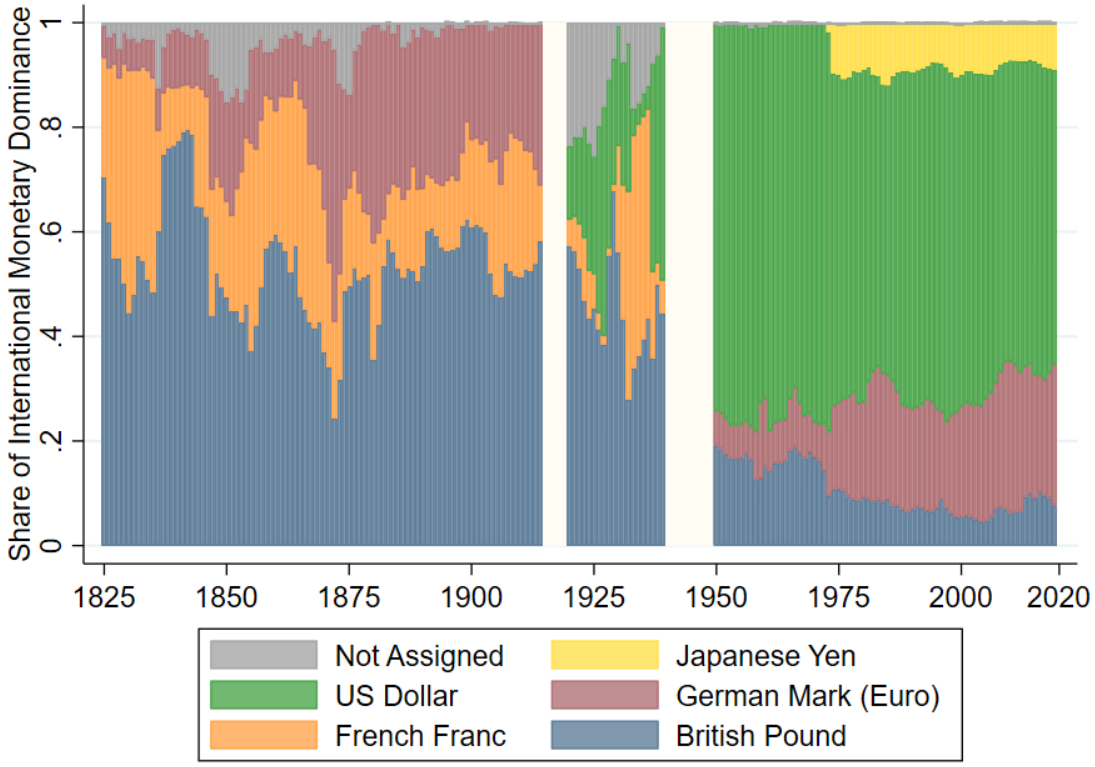
What would a transition of the international monetary system out of dollar dominance might look like? As discontinuities in the international monetary order are rare events, empirical evidence is hard to come by without recurring to historical analysis. A recent literature, informed by the experience of dollar hegemony, has characterised the international monetary system as a winner-takes all equilibrium, driven by network effects and strategic interactions, where a transition out of the dollar is likely to translate into the rise of a new hegemon. Additionally, a multipolar international monetary system might be subject to destabilising shifts of investors in and out of competing global safe assets, leading to financial instability. On the other hand, the historical literature underlines how a more multipolar international monetary system has been the norm in the past, and, subject to appropriate international cooperation and institutions, it proved consistent with global financial stability.

This paper provides for the first time a continuous measurement of the relative importance of global currencies over two centuries, relying on a newly collected dataset of foreign exchange returns, covering the entire London FX market at weekly frequency since the 1840s. I employ a simple algorithm, based on foreign-exchange co-movement models, to compute an international monetary dominance weight for each global currency since 1825. This indicator of relative dominance is comparable over time and significantly extends the coverage of existing quantifications. Based on the estimated weights, I also quantify the structure and competition intensity of the international monetary system over two centuries.

The key finding of this measurement exercise is that current dollar hegemony is a historical idiosyncrasy, in terms of its length, the size of its lead and its stability. The previous hegemon, the pound sterling, was frequently challenged. I confirm previous findings that the dollar temporarily overtook the sterling a first time in the mid-1920s, but I also uncover previously overlooked episodes of heightened international monetary competition. The French franc was a close match to the pound in the run up to the creation of the Latin Union in 1865, while a clear episode of French monetary dominance is recorded in the 1930s, following the collapse of the British and American currencies. The run up to the creation of the German Empire also coincides with the deutschemark briefly overtaking the pound twice. All in all, these findings suggest that either network effects were historically too weak to force current levels of hegemonic equilibrium, but a structural shift has now occurred, or that we might be underestimating the likelihood of international monetary multipolarity in the future.

Looking at the relationship between the multipolarity of the international monetary system and financial stability, I find a positive correlation between the intensity of global currency competition and the prevalence of financial crises globally. While this finding is consistent with recent theoretical predictions, it should be noted that the relationship is not causal and is driven by specific sub-periods, warranting further research.

THE RISE AND FALL OF GLOBAL CURRENCIES OVER TWO CENTURIES



The figure shows annual GDP-weighted shares of international monetary dominance by global currency.

Deux Siècles d'Essor et Déclin des Monnaies Internationales

RÉSUMÉ

Cette étude mesure l'influence relative des monnaies internationales ainsi la structure concurrentielle du système monétaire international depuis 1825. Cette quantification montre que l'actuelle hégémonie du dollar n'a pas de précédent historique. Aucune monnaie internationale n'a pu maintenir un avantage comparable sur ses concurrents d'une durée équivalente. Le prédécesseur du dollar comme hégémon monétaire international, la livre britannique, était fréquemment concurrencé par des monnaies alternatives. Parmi les épisodes de compétition monétaire internationale précédemment négligés, je quantifie l'essor du franc français dans les années 1850, puis 1930, ainsi que du mark allemand dans les années 1870. A la lumière du débat concernant les coûts-avantages d'une transition vers un système monétaire international multipolaire, je documente une corrélation positive entre le degré de compétition entre monnaies internationales et l'intensité de crises financières au niveau global, cependant liée à des sous-périodes précises.

Mots-clés : système monétaire international, longue durée, hégémonie du dollar, multipolarité.

1. Introduction

This paper measures the rise and fall of global currencies and the competitive structure of the international monetary system since 1825. This quantification effort directly speaks to the question of dollar hegemony and the costs and benefits of a multi-polar international monetary system, in light of the ongoing policy debate (Carney, 2019) and a recent theoretical literature (Farhi and Maggiori, 2018). As transitions in the international monetary system are historically rare, most of the existing empirical literature on international currencies is grounded in the recent dollar experience. This paper's long run historical quantification provides a two century perspective on international monetary hegemony. It also provides the basis for future empirical work on the determinants of global currency status and discontinuities in the international monetary system.

The paper offers two main empirical contributions. First, I compute a peace-time, two-century continuous measure of the relative influence of global currencies, comparable over time, for a sample of polities representing at least 80% of world GDP and 90% of global trade. This allows for a systematic, granular analysis of historical episodes of international currency competition. Second, I compute a continuous measure of the overall level of multi-polarity of the international monetary system over time.

To do so I rely on a large historical dataset of foreign-exchange returns, mostly at weekly frequency, based on an extensive effort of digitization of original printed sources. My work therefore follows an established practice of classifying countries in currency blocs based on exchange-rate behavior. However, as the paper is aimed at capturing, as finely as possible, competition and discontinuities in monetary dominance, I depart from Ilzetzki et al. (2019) and their historical classification of foreign-exchange regimes since 1945, adopting a more flexible approach. Relying on foreign-exchange co-movements, the Frankel and Wei (1994) factor model and a simple bottom-up aggregation algorithm, I compute "fuzzy" global currency blocs, allowing a single country to be apportioned to more than one global currencies at any given time, rather than a single anchor[1].

I find the current hegemony of the dollar hegemony to be, from a two centuries

[1]Recent work with a similar empirical approach include Fratzscher and Mehl (2014), Tovar and Nor (2018) and Ito and McCauley (2019).

perspective, an anomaly. No currency has ever maintained such a long-lasting, large lead over global currency rivals in my sample. I find the international monetary system to have historically been more competitive and characterised by multipolar features. The previous global currency hegemon, the pound sterling, experienced frequent challenges to its primacy by close competitors, including the dollar from the early 1920s, the French franc in the 1860s and the 1930s and the mark after the German unification in the 1870s. I also document a positive correlation between the degree of competition in the international monetary system and the prevalence of financial crises over two centuries. The latter is however dependent on specific sub-periods.

Section 2 surveys the literature on dollar hegemony and the international monetary system in historical perspective. Section 3 briefly presents my original dataset of foreign-exchange returns since the 19$^{\text{th}}$ century, which is further detailed in Appendix 8. Section 4 presents the procedure to compute the relative weight of global currencies, based on foreign-exchange co-movements factor models. Section 4 describes the rise and fall of global currencies from a chronological perspective, as well my aggregate measurement of international monetary system competition over two centuries. Further results, including sensitivity analyses and a map chronology, are contained in Appendices 7.A and 7.B.

2. Global Currency Hegemony and the International Monetary System in Historical Perspective

Historical analogies have played an important role in shaping both positive and normative debates on the international monetary system. Eichengreen (2019) notes how a fundamental dichotomy exists in the recent literature on international currencies. On the one hand, a prominent literature in international macroeconomics, grounded in the hegemonic experience of the dollar, highlights the role of network effects and strategic complementarities in international transactions. Consistent with the early assessment by Nurkse (1944) of the interwar instability, this literature tends to be skeptical regarding the viability of a more multipolar international monetary system (Farhi and Maggiori, 2018). On the other hand, a parallel literature, summarized by

Eichengreen et al. (2017), downplays, from an historical perspective, both the strength of network externalities and the inherent instability of global currency multipolarity, underlying the role of international monetary cooperation.

2.1. Dollar Hegemony and the International Monetary System

Decades of dollar dominance experience have given raise to a "Dominant Currency Paradigm" (DCP) (Gopinath and Stein, 2018). The emergence of a hegemonic international currency from strategic complementarities in international markets was rationalised early on by Rey (2001). Gopinath and Stein (2021) argue that network externalities under this paradigm imply that dollar use is likely to increase endogenously, through a two-way feedback loop. As dollar invoicing of international trade increases, higher demands for dollar safe assets depress dollar borrowing costs, making it attractive to finance and invoice international trade in dollars. In turn, this reinforces the desirability for dollar reserves to the official sector as dollar invoicing makes the dollar exchange rate the key channel of foreign-exchange stabilisation (Egorov and Mukhin, 2020).

The underpinning of dollar dominance by pervasive network effects is consistent with a winner-takes-all equilibrium of the international monetary system. Farhi and Maggiori (2018) describe a model of the international monetary system where multiple equilibria can arise and competition among global currencies leads to self-fulfilling crises with investors coordinating in and out of global currencies. As such, they argue (Farhi and Maggiori, 2019) that a transition out of dollar hegemony is likely to lead to a new hegemon rather than a multipolar setting, in line with the early analysis of the interwar gold-exchange standard by Nurkse (1944).

The hegemonic role of the dollar implies significant international spill-overs. Rey (2013) first described a "global financial cycle", characterised by strong co-movement of global asset prices and capital flows. This phenomenon transforms the Mundellian "trilemma" into a "dilemma", where US monetary policy is a key determinant of the global cycle (Miranda-Agrippino and Rey, 2020). The dilemma therefore implies that, regardless of their exchange-rate regime, countries have a choice of either limiting capi-

tal flows or experiencing significant spillovers from Fed policy on monetary and financial conditions via the credit channel (Gerko and Rey, 2017). These considerations are reminiscent of the characterisation of the Bank of England as the "conductor" of the gold standard global monetary "orchestra" by Keynes (1930), making third countries such as the US susceptible to destabilising gold flows.

The above policy spillovers have long been a source of frustration outside of the US, from the early French criticism of the "exorbitant privilege" to the recent attempts of both China and the Euro Area to foster the international use of their currency. From a positive perspective, concerns regarding dollar hegemony have centered around the potential destabilising effects of unipolarity. In a path-breaking article, Triffin (1960) observed dollar dominance faced a "dilemma", as the need for an increased supply of safe dollar assets - to fill the needs of a growing global economy - was inconsistent with maintaining a constant value of gold in terms of dollars. Today, the need for the US to continue supplying safe assets to the world, although the share of the US in the world economy is declining, might well give rise to a "new Triffin dilemma" (Gourinchas and Rey, 2007; Farhi et al., 2011), with provision of safe assets becoming inconsistent with the US fiscal capacity. The growing scarcity of safe assets, signaled by the declining trend of equilibrium interest rates, supports the view that dollar hegemony might become a more precarious equilibrium.

To summarise, there is a tension between the experience of dollar hegemony pointing to strong network effects and a winner takes all equilibrium, and the financial stability risk implied by an hegemonic supplier of global safe assets. To solve this tension, policy makers outside the US - Carney (2019) is a prominent example - have called for a more multipolar international monetary system, underpinned by both technological change in the financial infrastructure and enhanced international monetary coordination. Historical parallels, based on previous quantitative work on international currencies, played a key role in shaping a more optimistic view of multipolarity in the international monetary system.

2.2. Multipolarity and the International Monetary System in Historical Perspective

Eichengreen (2019) notes how the pessimistic view on the sustainability of a multipolar international monetary system is not necessarily justified in light of the history of the international monetary system. Based on a large body of literature he contributed to with several co-authors[2], he argues that higher levels of multipolarity than what we observe today have been the historical norm, while the stability of a multipolar international monetary system is contingent on the policies and the degree of cooperation pursued by key countries. The latter can be conductive to a functioning multipolarity such as during the classical gold standard, or, conversely, destabilising, similar to the interwar experience. Furthermore, the historical experience is at odds with the characterisation of the international monetary system as a natural monopoly.

There is ample evidence that at least some elements of multipolarity were present as the first globalisation unfolded in the 19th century. Before 1870, three blocs based on different monetary standards coexisted: the gold one around the British Empire, the bimetallic one around France and the silver one, spanning from Eastern Europe to Asia (Eichengreen and Flandreau, 1994). French monetary diplomats attempted an harmonisation of the international monetary system around the French Franc in the 1860s. As the 1870 Franco-Prussian war destabilised the French external position and prevented effective cooperation with the newly formed German Empire (Flandreau, 1996), a global movement towards the gold standard occurred (Eichengreen and Flandreau, 1994). Close to no quantification of the structure of the international monetary system exists for this early period.

The shift towards British hegemony nevertheless implied some key features of multipolarity. Countries wishing to adopt the gold standard found it costly to acquire the gold needed to back internal circulation. Central banks soon began to accumulate foreign-currency denominated assets (Ugolini, 2012) that could be used to intervene in bullion and foreign-exchange markets as well as to back domestic circulation in place of

[2]Summarised in Eichengreen et al. (2017).

gold. This gold-exchange standard became attractive for a number of countries, mainly poorer or smaller economies, as a way to reduce the cost of operating a gold standard. Assets denominated in sterling certainly represented the lion share of those early foreign balances. London was the deepest bullion market and the confidence in the safe asset character of the pound was justified by a central bank playing its role of lender of last resort in an credible way (Bignon et al., 2012). However, the classical gold standard was far from consistent with a winner-takes-all international monetary system. Flandreau and Jobst (2005) show that several financial centers played a significant role in the global foreign-exchange market. Estimates by Lindert (1969) of foreign balances holdings show how sterling only accounted for roughly half of global reserves, with the franc and the mark each playing a substantial role.

The second key point documented by Eichengreen's historical view of the international monetary system is that network-effects of global currencies have not been strong enough to justify a pervasive incumbent advantage. This counters early views on the slow transfer of leadership between the pound and the dollar. While Triffin (1964) and Chinn and Frankel (2005) posited that the dollar only overtook the sterling after WWII, new estimates of global reserve holdings contradict this stylised fact and put into perspective the role of inertia in global currency status.

Eichengreen and co-authors show that the dollar rapidly competed on par and even surpassed the sterling as soon as WWI. Looking at new foreign reserves data for the interwar period, Eichengreen and Flandreau (2009) show that reserve currency status was evenly shared in the 1920s and that dollar balances overtook sterling ones by 1925. The picture was complicated by the 1931 and 1933 respective devaluations of the sterling and the dollar, which prompted liquidations of foreign balances, but dollar balances again equalled and surpassed sterling ones at the eve of WWII.

A similar picture, at odds with pervasive network externalities, emerges looking at trade credit financing. Eichengreen and Flandreau (2012) highlight how US intermediaries managed to gain significant shares of the market for acceptances by the early 1920s, a market traditionally dominated by the previous international monetary system hegemon. Analogous findings were uncovered in Chiţu et al. (2014), examining

the currency denomination of interwar global bond markets. In this case the dollar overtook sterling by 1929, with financial deepening in the US providing the necessary boost to overcome sterling's incumbency. The fact that sterling managed to retake back prominence in bond markets denomination in the 1930s highlights the potential for rapid reversals in global currency status.

3. Data

The present paper is the first result of an extensive effort of data collection of exchange-rate prices since the 19th century. Data on foreign-exchange quotes from original printed sources were digitized at weekly frequency from 1846 to 1939 for the entirety of the London currency market. I therefore provide, to my knowledge, the most comprehensive original dataset of historical exchange-rates prices at weekly frequency[3].

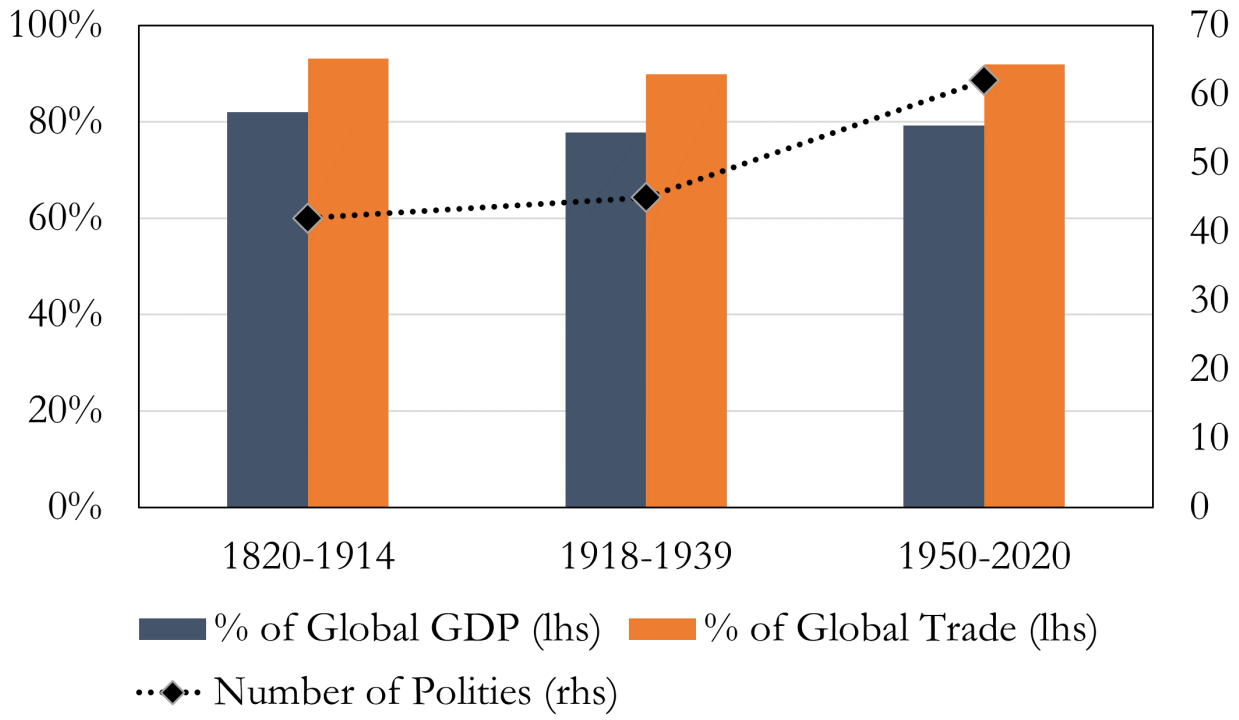
I manage to collect weekly panel of up to twenty-one currencies between 1846 and 1914 and forty-five currencies between 1918 and 1939. In this paper, I merge this dataset with other original and commercial sources (See Section 8) to obtain a peace-time coverage of a minimum of twenty-eight currencies since 1820. Monthly frequency data are used for all currencies between 1825 and 1846 and, when weekly frequency data are unavailable, between 1846 and 1914 for a minority of currencies[4]. In terms of geographic coverage, I try as much as possible to include, throughout the 1825-2020 sample period, currencies that are traded at any point during 1846-1939 in the London market, as well as countries that represent more than 1% in global trade on average during each sub-period. Whenever possible, I rely on originally collected data or BIS data after 1945. Global Financial Data, a commercial provider, is used when the former two are not an option.

Furthermore, periods of, among others, capital controls, political instability or communist rule mean that some countries experience missing reporting for a number of years.

[3]Among previous efforts, weekly frequency data for exchange-rates were collected by Boyer-Xambeu et al. (1994) for three pairs of currencies in three key financial centers between 1812 and 1870. Neal et al. (2003) collected weekly exchange-rate for a panel of ten currencies between 1880 and 1914. Looking at the post-WWI period, Accominotti et al. (2019) collected returns at daily frequency for nineteen currencies over a century.

[4]The way I handle the transition between monthly and weekly data is detailed in Section 8

Figure 1: Global Coverage of the Sample



The figure shows the share of global GDP and trade covered by the maximum number of polities included in each sub-period. GDP refers to years 1914, 1929 and 2010. Global trade refers to the sub-period averages.

Figure 1 shows the global coverage of my sample, which remains broadly stable over each sub-periods at about 80% of global GDP and 90% of global trade.

The increase in the number of currencies in the sample reflects an upward trend in both political fragmentation and globalisation over the last two centuries. Both factors are relevant in quantifying the changing structure of the international monetary system. Therefore, I favor including in the analysis exchange-rate data as they start to be reported in the sources I digitise[5] rather than taking a continuous sample approach. Data sources and coverage are detailed in Section 8.

[5]Or become available in GFD for non-European currencies in the 19th century.

4. Foreign-Exchange Co-Movements and Global Currency Competition

4.1. Estimating Monetary Dominance Weights

My quantification of the relative dominance of global currencies over two centuries relies on foreign-exchange co-movements to estimate monetary dominance dominance weights, feeding into a bottom-up algorithm. The starting point is the model first introduced by Haldane and Hall (1991) and Frankel and Wei (1994)[6]. It consists in estimating a factor model of the type

$$\Delta \frac{i}{Numéraire}_t = \alpha + \sum_h \beta_{it}^h \, \Delta \, \frac{GlobalCurrency}{Numéraire}_{h,t} + \epsilon_t \tag{1}$$

where, in the baseline estimates, rolling regressions are performed on the log returns on every currency in the sample i on the log returns of a set of global currencies h, both expressed in a common *numéraire*, yielding rolling coefficients β_{it}^h varying at frequency t. This type of models can be given an intuitive "horse race" interpretation, yielding global currency factor weights for each currency of interest.

4.1.1. Currency Co-Movements in Historical Perspective

In contemporary data, foreign-exchange co-movement is found to be a good proxy of various facets of global currency status, including the allocation of global reserves (McCauley and Chan, 2014). It is important at this point to discuss the relevance of foreign-exchange co-movements as a proxy of the relative dominance of global currencies over two centuries. The channels relating foreign-exchange co-movements to global currency anchors are both heterogeneous in contemporary data (McCauley and Shu, 2019), and likely to evolve over the time-span covered by the paper.

Over the first half of the two centuries sample, currencies tend to follow a commodity standard. Returns of a currency linked to precious metal closely resemble a target zone foreign-exchange regime (Eichengreen and Flandreau, 1996), where the upper and

[6]Respectively looking at the empirics of *"Dollar-Deutschemark polarisation"* (Giavazzi and Giovannini, 1985) and the rise of the yen as an international currency.

lower bounds of the target zone are defined by transaction costs of physically shipping metal across borders[7]. The financial instrument dominating the foreign-exchange market during the modern period and up to WWI is the bill of exchange. This was a trade finance short maturity instrument, originally aimed at facilitating international payments and the financing of exporters' working captial, backed by large international banks. Xu (2022) provides an in-depth summary of the flow of funds involved. As soon as the early modern period, bills of exchange returns responded to international money markets conditions and interest rate differentials, balance of payment dynamics, as well as government intervention (De Roover, 1968). In the earlier part of the 19th century, co-movement with respect to a particular global currency should largely reflect spillovers of both financial and real integration[8], as well as, on the policy side, the alignment of monetary standards. The interpretation of co-movement of foreign exchange with respect to anchor currencies as a proxy of global currency dominance in the first half of the sample therefore differs, from contemporary data, mainly in terms of the extent to which policy directly targets exchange-rate movements. While transportation costs limited the diffusion of information before telegraph networks became widespread in the mid-19th century, it is important to recall that co-movements are assessed at monthly frequency for all polities until then.

Starting from the second half of the 19th century, foreign-exchange regimes and markets increasingly converge to their contemporary equivalents. Accumulation of foreign-balances becomes a standard tool of monetary policy and foreign-exchange regime management from mid-19th century: monetary authorities are then more likely to play a direct role, with co-movements also reflecting monetary policy reaction functions and the targeting of the exchange-rate with respect to global anchors. Furthermore, the run up to WWI marks the end of the bill of exchange as the key instrument of foreign-exchange transaction, with an intercontinental spot foreign-exchange market emerging in London and New York.

[7]Volatility in foreign-exchange returns in the 19th century is therefore in line, if not higher, to what can be observed in contemporary data.

[8]A stylized fact that persists in contemporary data (Fratzscher and Mehl, 2014).

4.1.2. Numéraire

The choice of a particular *numéraire* unit can influence the point estimates of Frankel-Wei factor models. *Numéraires* typically favored by the literature are freely floating currencies, usually from small countries with an open capital account, such as the New Zealand dollar or the Swiss franc. A common alternative is represented by international units of account such as the SDR or Gold[9] (Frankel and Xie, 2010).

No single currency consistently fulfills the above criteria for the entirety of the sample. As such, I turn to precious metals and use the London price of a Silver Ounce as my preferred *numéraire*[10]. The choice of a commodity price as *numéraire* has two main advantages. It is consistently available over two centuries and allows to avoid the exclusion of any available country from the analysis.

As a robustness check, I also select for each main sub-period a small open economy currency that, over each sub-period, has close to no missing values, is not strictly pegged at any point to a global currency and does not experience a currency black-market. This leaves me with the Dutch guilder as the alternative *numéraire* for the pre-WWI estimating sample, the Hong Kong dollar for the inter-war period and the Swiss franc for the post-WWII era.

4.1.3. Global Currency Candidates

I include as global currency candidates all currencies representing at least 5% of global reserves according to Eichengreen et al. (2017), considering three key sub-periods separately: the long 19$^{\text{th}}$ century (1820-1914), the interwar (1918-1939) and the post-WWII period (1950-2020). These sub-periods arise naturally from both structural shifts in the international monetary system and foreign-exchange markets.

For the 1820-1914 period I include as global currency factors the British sterling, the French franc and the German mark, as identified by Lindert (1967). Those currencies made up more than 90% of official reserves holdings between 1899 and 1913, with

[9] Ito and McCauley (2019) also estimate Frankel-Wei factor models relying on one of the anchors as *numéraire*. This approach presents a number of issue in a long-run sample with higher competition and transitions among global currencies.

[10] The price of Gold is unsuitable for such purposes in a historical setting as its key monetary role in large financial centers allows for very little variability of its price in terms of global currencies before 1971.

Table 1: Global Currency Factors and Numéraire by Sub-Period

	1820-1914	1918-1939	1948-2020
GBP	✓	✓	✓
FRF	✓	✓	X
DEM[a](EUR)	✓	X	✓
USD	X	✓	✓
JPY[b]	X	X	✓
Numéraire			
Baseline[c]	XAG	XAG	XAG
Robustness	NLG	HKD	CHF

[a] Hamburg mark before 1871.
[b] From 1968 onward only.
[c] XAG: Price of an ounce of Silver in London.

about half of those being denominated in British sterling (Lindert, 1969). While the United Kingdom and France had been the main global monetary and financial powers since the beginning of the century, the role of Germany as a capital exporter only goes back to the country's unification in 1871. Before then I however include the Hamburg mark banco as the German factor since 1820. Indeed, the Hamburg mark banco had long played a role as an international currency issued in the main silver-based financial center of Europe. There would be no historical justification to include the US dollar in the pre-1914 global currency horse-race. The United States were a catching up capital importer for most of the period, with dollar reserves only being held in neighboring Canada, and a lower share of global reserves than Dutch guilders and Scandinavian currencies (Lindert, 1969). This choice of candidate global currencies for the period is largely confirmed by the international monetary system centrality indices computed by Flandreau and Jobst (2005).

In the inter-war period (1918-1939) the British sterling, the US dollar and the French franc are considered. The German mark never approaches the 5% share threshold of global reserves in the interwar period and is characterised by deep instability, including hyperinflation, the "transfer problem" related to war indemnities (Ritschl, 2012) as well as strict capital controls after the 1931 banking crisis.

In the last sub-period between 1948 and 2020, I consider as global currency factors the US dollar, the German mark - replaced by the euro from 1999 onward, the British

pound sterling and the Japanese yen. Whether to exclude the pound sterling as a factor from the 1970s onward - when the Sterling Area eventually collapsed, is a matter of debate. I prefer to include a British factor till the end of the sample instead of artificially setting it to zero[11]. The rise of the Japanese yen has, on the other hand, been a recurrent topic in international monetary debates over the last decades. I include a yen factor from 1968 onward, as before then the yen co-moves almost perfectly with the US dollar. Neither the French franc in the earlier part of the sub-period nor the renminbi in recent years have reached 5% of global reserves. The topic of whether a renminbi bloc has started to emerge in the last few years has prompted several empirical contributions with contrasting results, including Fratzscher and Mehl (2014), Kawai and Pontines (2016), Tovar and Nor (2018) and McCauley and Shu (2019). They notably highlighted the econometric issues of including the renminbi - given its high levels of collinearity with the US dollar - in a Frankel-Wei factor model. While I believe the present work and, particularly, its future extensions, will help shed lights on the future outlook for the renminbi as an international currency, I consider the estimation of recent co-movements with respect to the Chinese currency to be outside of the scope of the paper.

4.2. Yearly Global Currency Weights

The main empirical contribution of this paper is to divide the world economy into global currency zones for every year since 1825. To do so, I take a bottom-up approach similar to Ito and McCauley (2019), estimating monetary dominance weights for each polity in my sample and aggregating up. The procedure that leads from weekly-exchange rate co-movements to yearly global currency weights at the world economy level can be summarised by the following three steps:

1. Equation 1 is estimated at the highest frequency available for each individual polity, including the factors summarized in Table 1, over rolling windows of six years[12], trimming foreign-exchange movements and excluding any weekly absolute

[11] If the British factor is excluded from 1976 onward, its weight tends to be equally redistributed among the dollar and mark/euro factor.

[12] With a minimum of 52 observations. The window is set at seven years and a minimum of 36 observations for monthly series.

change greater than 10%. For every polity i and every candidate global currency h, I obtain a coefficient $\widehat{\beta_{it}^h}$ that varies at the weekly or monthly[13] frequency. To be clear, my approach implies that a polity can experience monetary dominance from several global currencies at the same time.

2. I then calculate yearly weights for each global currency at the polity level. I first set all the negative estimated coefficients to zero, partially following the adjustments carried by Ito and McCauley (2019). Then, for every polity and every year, I compute an inverse-variance weighted-average of each weekly (monthly) $\widehat{\beta_{it}^h}$, using robust standard errors estimated in the first step. This gives more weight to precisely estimated high frequency coefficients[14]. For polities where

$$\sum_{h=1}^{H} \widehat{\beta_{iht}^h} > 1 \tag{2}$$

yearly currency weights are normalised so that their sum is equal to 1. This means that, for some polities, a positive "Non-Assigned" weight exists, which is equal to

$$1 - \sum_{h=1}^{H} \widehat{\beta_{it}^h} \tag{3}$$

Finally, the polity issuing a global currency is assigned a weight of 1 for that currency and zero for all other global currencies.

3. Yearly weights at the polity level for each global currency are then aggregated up at the world level[15]. For each global currency, I compute the world-level yearly weight as the average of the available polity-level weights for the year, weighted by the share of each polity in either the sample's total GDP or international trade. For this measure to capture as much as possible relevant changes in the relative importance of global currencies, I make two choices. First, GDP or trade-weights are held fixed for each sub-period[16] so that my quantification is not overly

[13] For some estimates in the 1820-1914 sub-period.

[14] In the period 1820-1914, for the first five years after weekly data become available I further average the values of the inverse-variance weighted-average of the monthly and weekly weights to compute the yearly average.

[15] Defined as the total available sample, which fairly consistently accounts for more than 80% of GDP and 90% of international trade.

[16] See Section 8 for details.

influenced by GDP and trade movements. Second, the global average include any polity as soon as data availability allows for its annual scores to be estimated, rather than trying to achieve a continuous sample. This is because the fact that foreign-exchange data become available *in itself* is likely to be endogenous to a change in the way a certain polity participates in the international monetary system, and therefore reflects a shift that is of interest to the measurement.

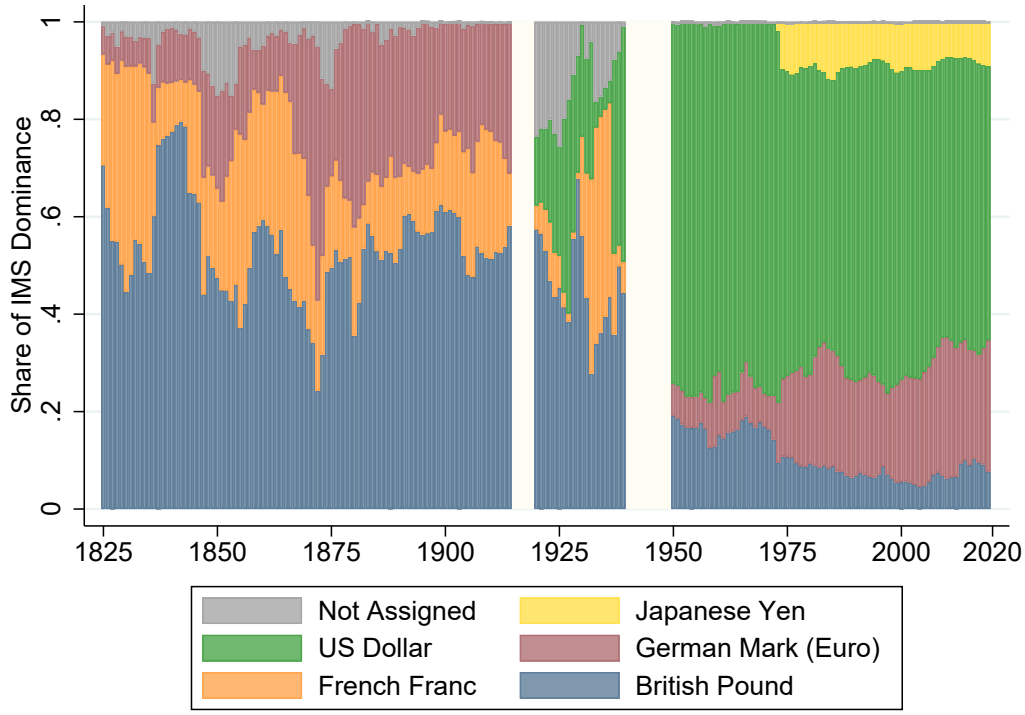
5. The Rise and Fall of Global Currencies Over Two Centuries

I now turn to the results of the bottom-up classification of the international monetary system into global currency areas. The discussion is chronological and compares my results to the existing historical literature. I also provide a new measure of the monetary system competitive structure since 1825, as well as some correlational evidence on its relationship to financial stability (Farhi and Maggiori, 2018). A large amount of material is left to the Appendix, including pooled regressions, results of the bottom-up classifications under different specifications for each global currency (Section 7.A), and maps depicting polity-level results over the course of the two centuries sample (Section 7.B).

Figure 2 summarises the paper's contribution in one chart, showing the relative weights computed for each global currency over two centuries. Looking at the broader picture three findings emerge. First, the post-WWII era of dollar dominance indeed appears as an historical anomaly. Except for a very brief interval of very high sterling influence in the 1840s, never in the last two centuries a global currency has registered levels of dominance comparable to the US during the Bretton Woods period, and, to a lesser extent, in recent decades. A partial qualification to this anomaly is however apparent when looking at regional aggregations of global currency weights in Figure 3. On the one hand, the continental European monetary system has been characterised by significantly higher than average multipolarity, at least until the creation of the euro[17]. On the other hand, other regional monetary systems were often fairly unipolar.

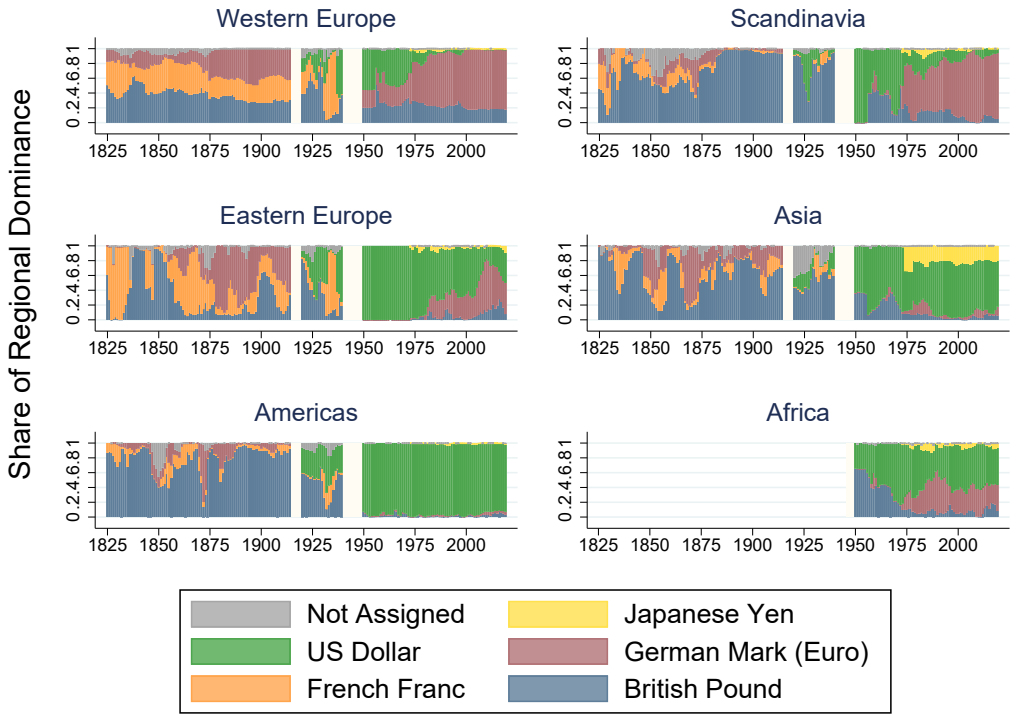
[17]And the notable exception of the brief interval of French hegemonic dominance in the 1930s.

Figure 2: The Rise and Fall of Global Currencies over Two Centuries



The chart depicts, for every global currency, the GDP-weighted average of the currency's weight for all polities in the sample, estimated using Silver as *numéraire*.

Figure 3: Regional Monetary Systems and Global Currency Competition over Two Centuries



The chart depicts, for every global currency, the GDP-weighted average of the currency's weight for all polities in a particular region, estimated using Silver as *numéraire*.

These include Scandinavian, Asian and American sterling hegemony throughout the 19th century but also a prolonged period of franc and mark hegemony in Eastern Europe respectively before and after 1870.

Second, the current international monetary system era seems to be characterised by a higher level of stability and inertia in global currency dominance weights, compared with the - at times - dramatic shifts observable both in the interwar and pre-WWI period. This can be observed in all regional monetary systems but is particularly apparent in the extra-European regions. The share of non-assigned weight in the current international monetary system is also stably smaller than in the past.

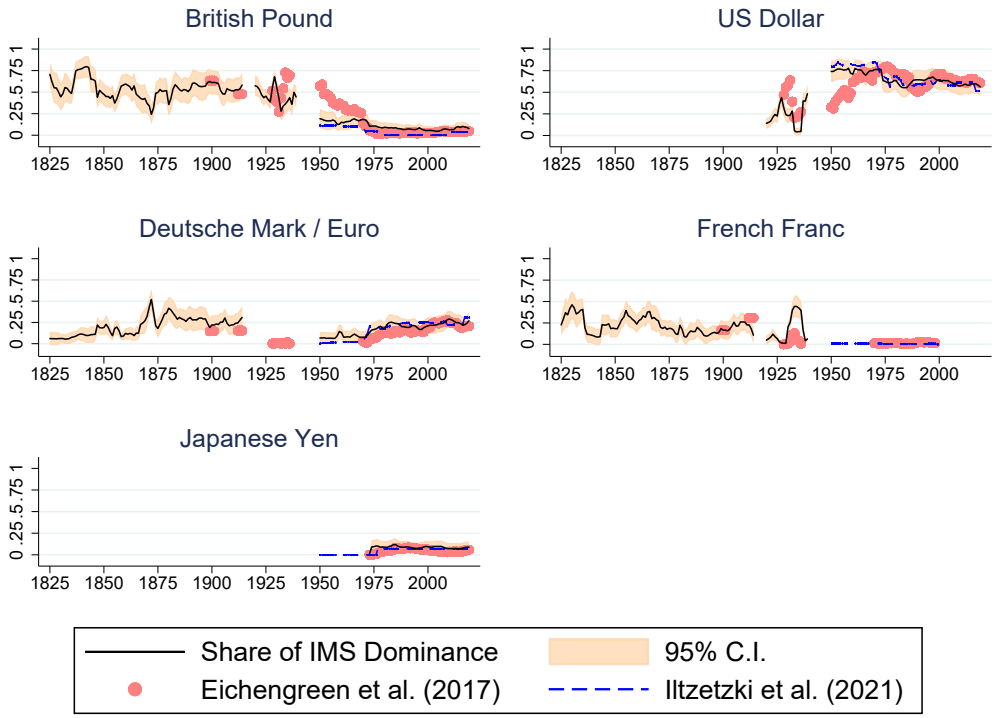
Third, the patterns I quantify are broadly consistent with existing narratives and partial quantification of international monetary system history (Eichengreen et al., 2017). Sterling was the former hegemon of the international monetary system, but

coexisted with other global currencies which represented a large share of international monetary system dominance throughout the 19th century. Its decline started in the interwar period and was completed before the end of Bretton Woods. The rise of the dollar was well under way since the early 1920s, experienced a temporary retreat in the late 1920s, but took hold by the late 1930s.

However, I also uncover new patterns and discontinuities overlooked in the existing literature. One example is the episode of strong French dominance I observe after the sterling devaluation of 1931, which is inconsistent with the characterisation of the interwar French attempt to gain monetary influence as a failed one by Eichengreen and Flandreau (2009). Another example is the slight decline of dollar dominance observable over the last fifty years. This is for example at odds with the claim by Gourinchas (2021) that the centrality of the dollar has increased in all dimensions since the end of Bretton Woods.

As my coverage extends further than any existing study and spans several decades where no alternative measure of global currency competition exists, it is important to compare my results to existing studies, whenever samples overlap. Figure 4 compares this paper's baseline estimate of the share of global currency dominance and data on actual shares in global reserves since the 19th century as compiled by Eichengreen et al. (2017) as well as to the monetary blocs classification by Ilzetzki et al. (2019). The fact that overlapping samples are largely in agreement on the patterns of international monetary system's competition confirms my weights can be interpreted as a broad proxy for global currency dominance. It is also interesting to note that actual reserve shares seem to lag my estimated currency dominance shares around key discontinuities in the international monetary system. This is true in the interwar period, where the fall in the share of dollar reserves occurs two years after the peak in my measure of dollar dominance, while the share of the franc in global reserves picks up much slower than the increase in the franc weight I estimate. The lag between the two measures is also clear when looking at the displacement of pound reserves by the dollar after 1945.

Figure 4: Estimated Global Currency Dominance and Actual Share of Global Reserves



The chart depicts, for every global currency, the share of IMS dominance assigned by my baseline algorithm. For the overlapping samples, it compares it to the share of historical global reserves as compiled by Eichengreen et al. (2017) and to the GDP-weighted average of the updated classification by Ilzetzki et al. (2019).

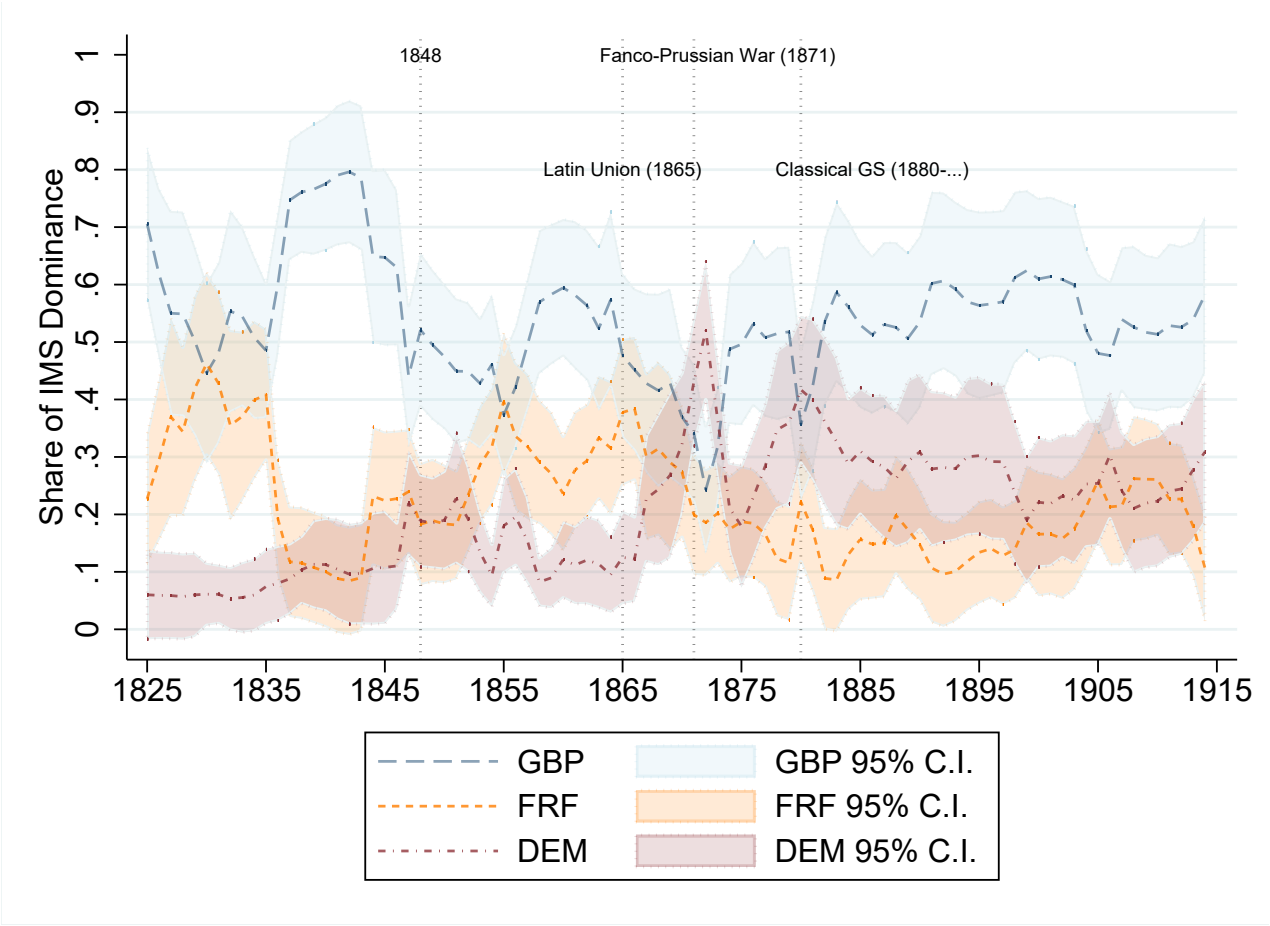
5.1. 1825-1914: Multipolarity and a Challenged British Hegemony

The architecture of the international monetary system in the first part of the 19th century is, at least quantitatively speaking, largely uncharted territory. My quantification is summarised in Figure 5. It begins with a duopoly of the sterling and the franc for the first 10 years of the sample. As shown in the maps in Figure 15, in the early 19th century the franc dominates in continental Europe, while the pound is the dominant currency outside of Europe. A sharp correction of monetary dominance in favor of the sterling is observable from 1836. This corresponds to an acute episode of financial instability in Paris, linked to the failure of the Bank of Belgium. Although, Reinhart and Rogoff (2009) only date the crisis as starting in 1838-1839, the analysis of turning points in the bankruptcy rate by Bignon (2011) signals a French crisis episode in 1836-1839, consistent with the timing of the decline in franc dominance I observe.

A notable exception to the lack of quantification of the international monetary system structure before the late 19th century is, between 1844 and 1870, Ugolini (2010). His analysis of money and bullion markets integration points to increased multipolarity in the international monetary system before 1870, particularly driven by the rise of Paris. This is supported by my estimates, with some qualifications. I observe a clear increase in the dominance of the franc that coincides with the regime change of 1852. The French Second Empire was characterised from the start by financial deepening, driven by new investment in the railway network. This led to a tripling of foreign stocks quoted in Paris (Dupont-Ferrier, 1925) and to France competing on equal footing with Britain as a capital exporter (Lévy-Leboyer, 1977). The franc's global score briefly matches the sterling one in 1855, then retreats somewhat coinciding with the global crisis of 1857[18], only to return back to close to 0.4 by 1865. This is the year the Latin Union, formalizing an existing pan-European franc zone, is established. 1865-1869 is a period of intense French monetary diplomacy to encourage the establishment of a global monetary standard around the franc (Einaudi, 2000). Ugolini (2010) argues that if the French emperor had not declared war against Prussia, leading to a military disaster,

[18]When the Bank of England was *"the only source of discount"* (Reinhart and Rogoff, 2009).

Figure 5: Global Currency Competition in the Long 19th Century



The chart depicts, for every global currency, the GDP-weighted average of the currency's weight for all polities in the sample, estimated using Silver as *numéraire*.

this effort might have eventually succeeded. While it does not necessarily disprove this argument, I however observe a declining trend for the franc weight that starts before 1870.

Conversely, the rise of the German mark global weight[19] is apparent as soon as 1866, at the expense of both the sterling and the pound. Both capital flights from London following the Overend Gurney bankruptcy and further German integration following the Austro-Prussian war of 1866 could explain this initial rise of the mark.

1870 is found, unsurprisingly, to be a watershed year in the history of the international monetary system. The mark significantly overtakes the sterling in conjunction with the formation of the German Empire and the transition to gold. Part of this movement might be related to the significant transfer of French foreign holdings as part of the war indemnity and the ensuing purchases of gold and sale of silver bullion by the German monetary authorities (Wiegand, 2019). The gains of the mark vs. sterling are interrupted in conjunction with the 1873 central European financial crash but resume again, to peak in 1881, when the mark briefly overtakes sterling for a second time[20].

The picture emerging from my results between 1880 and 1914 is one of an oligopolistic international monetary system. The system is dominated by the sterling, particularly outside Europe. However, both the franc and the mark play an important role. This is fairly consistent with the existing quantification by Lindert (1969), based on foreign reserves. However, I find the mark to have a slightly higher weight than the franc. This is sometimes true even for countries part of the Latin Union such as Italy, who received significant capital exports from Germany in the 1880s or that are traditionally associated with French capital exports such as Russia[21]. The gain in prominence, by the turn of the century, for franc and mark reserves vs. sterling found in Lindert (1969) is also consistent with my results.

[19] Until 1871 represented by the Hamburg mark.

[20] The 1880s are a period of strong international expansions of German banks (Wiegand, 2019).

[21] In the case of Russia, the weight is large and positive for the franc as well but, as shown in Figure 17 still higher for the mark in both 1895 and 1913.

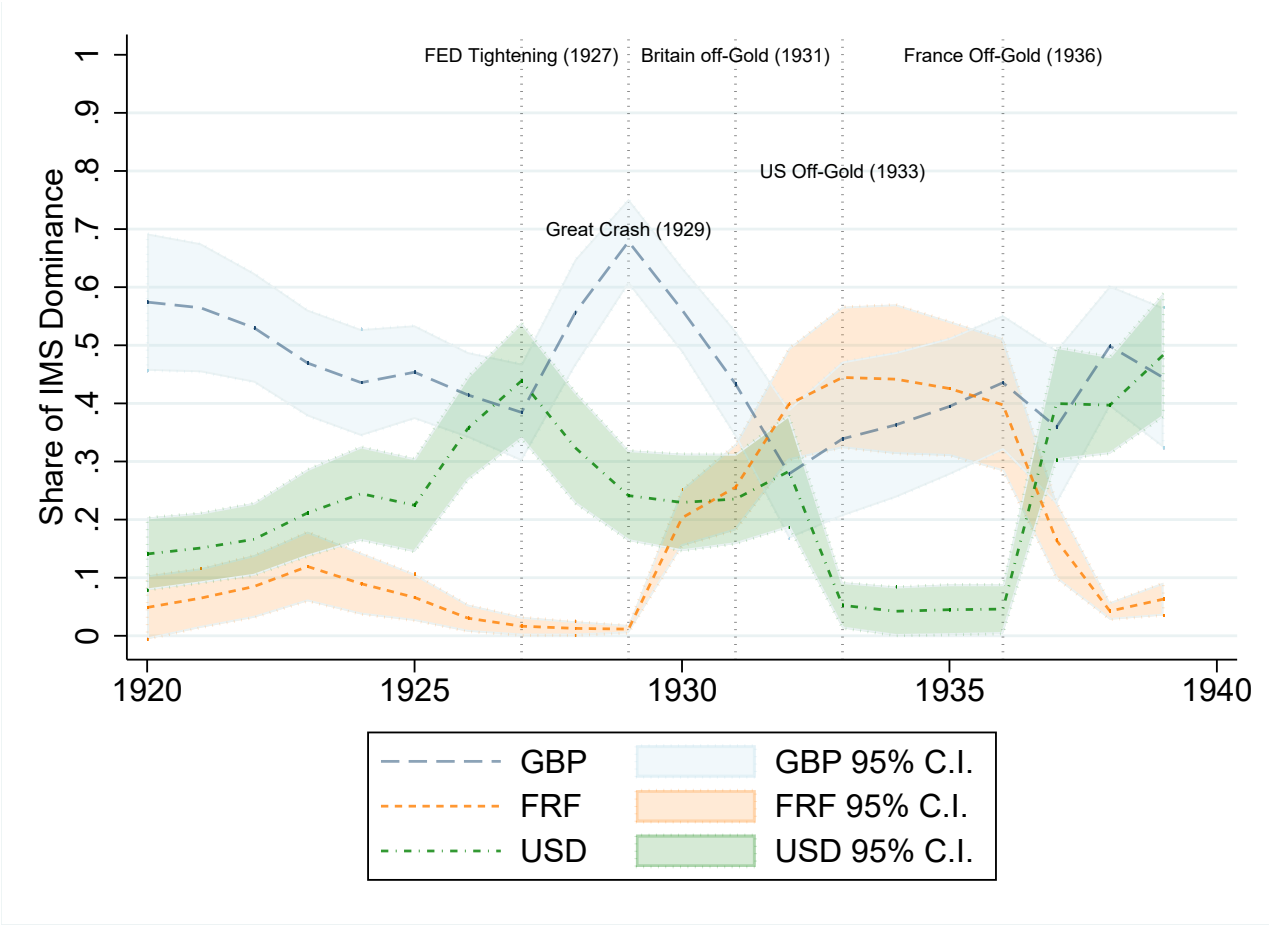
5.2. 1918-1939: Global Currency Collapses and Reversals of Fortune

The interwar period has been at the core of recent efforts to quantify the dynamics of the international monetary system in historical perspective. A longstanding view, going back to Triffin (1960) and Chinn and Frankel (2005) described the transition from sterling to dollar hegemony as a slow moving process, lagging several decades the economic prevalence of the incoming hegemonic power. Work by Eichengreen and Flandreau (2009), Eichengreen and Flandreau (2012) and Chiţu et al. (2014) has convincingly shown how, on the contrary, a protracted period of competition between the British pound and the US dollar occurred as soon as the interwar period, with the US dollar occupying a prominent role since the end of WWI.

My quantification of the rise and fall of global currencies during the interwar period is summarised in Figure 6. Dollar dominance is fairly strong since the beginning of my interwar sample, particularly outside Europe. The dollar makes substantial gains in the first half of the 1920s, particularly in Italy, Germany, Eastern Europe, Scandinavia and Latin America (Figure 18): it overtakes the sterling immediately thereafter, in 1927. I also observe a pattern similar to the one described in Eichengreen et al. (2017), with the dollar retreating towards the middle of the sample and making a come back at the eve of WWII. However, some differences need to be highlighted.

First, I find that the retreat of the dollar starts earlier than 1929, with a peak of dollar dominance reached in 1927. Several factors could explain this retreat. An abrupt change in US monetary policy stance is underway by the end of 1927. According to Eichengreen (1995), tighter Fed policy choked off US capital exports in the middle of 1928, with portfolio lending declining by more than 30% year-on-year and likely turning to a deficit in the summer of that year. Another, related, potential factor is the stabilisation of the French franc at an under-valued gold parity, spurring substantial outflows of gold from the US in 1927-1928, a development studied by Irwin (2010). Johnson (1997) notes that the redistribution of gold reserves was consistent with policy objectives both in France and the United States, as the New York Fed saw excessive accumulation of gold as undermining monetary policy discretion, while the French were

Figure 6: Global Currency Competition in the Interwar Period



The chart depicts, for every global currency, the GDP-weighted average of the currency's weight for all polities in the sample, estimated using Silver as *numéraire*.

determined to promote Paris as an international financial center. According to my estimates, the sterling regains the lost ground on the dollar by 1929, with the dollar weight remaining higher than the sterling one in Germany, Austria, Finland and Portugal only (Figure 18). The come-back of the sterling is however short-lived as Britain suspends convertibility in 1931. It is interesting to note that the decline of sterling dominance precedes the devaluation, with decreases in the estimated sterling weight particularly strong in Germany, Italy, Turkey and Argentina in 1930.

Second, I find the claim by Eichengreen and Flandreau (2009) that the franc made little progress, despite an overtly pro-internationalisation policy by the French authorities, to be overly harsh. I find that French franc dominance started to markedly rise across the globe as soon as doubts about the stability of the sterling arose in 1930. By 1931, and between then and 1936, the international monetary system experiences strong French hegemony, with a peak in 1933 spanning Europe, Asia (excluding the Sterling Area and Japan) and even Latin America[22]. The difference in assessing the rise of the franc after 1931 between this work and previous quantification by Eichengreen and co-authors - looking at reserves data - can however be partially reconciled. First, foreign-balance holdings decreased across the board after 1929, giving little opportunity for franc reserves accumulation despite high levels of foreign-exchange dominance. Second, looking at the change in reserves holdings in the data compiled by Eichengreen and Flandreau (2009), the franc is shown to gain grounds - from a low base - in the Gold Bloc, central Europe and in Spain. For the former two, the headline share of the franc in reserves holding is also high. My results are very much in line with the attention paid by contemporary observers to the French efforts to promote the international role of the franc (Myers, 1936).

As the franc in turn devalued in 1936, following the electoral victory of the left-wing *"Front Populaire"*, a final shake-up of the interwar international monetary system occurs. I observe a re-composition of the international monetary system around roughly equally sized pound and dollar blocs at the eve of WWII, with the British currency retaining strong grounds only in Scandinavia, the Commonwealth, Japan and Latin

[22]I test the robustness of this novel result by including, in the pooled regression in Table 5, a Gold factor in the Frankel-Wei factor model. Although it reduces the franc weight, the franc coefficient remains high and significant, showing that my results do not reflect the fact that some countries remained on gold, but picks up specific co-movements with the franc.

America.

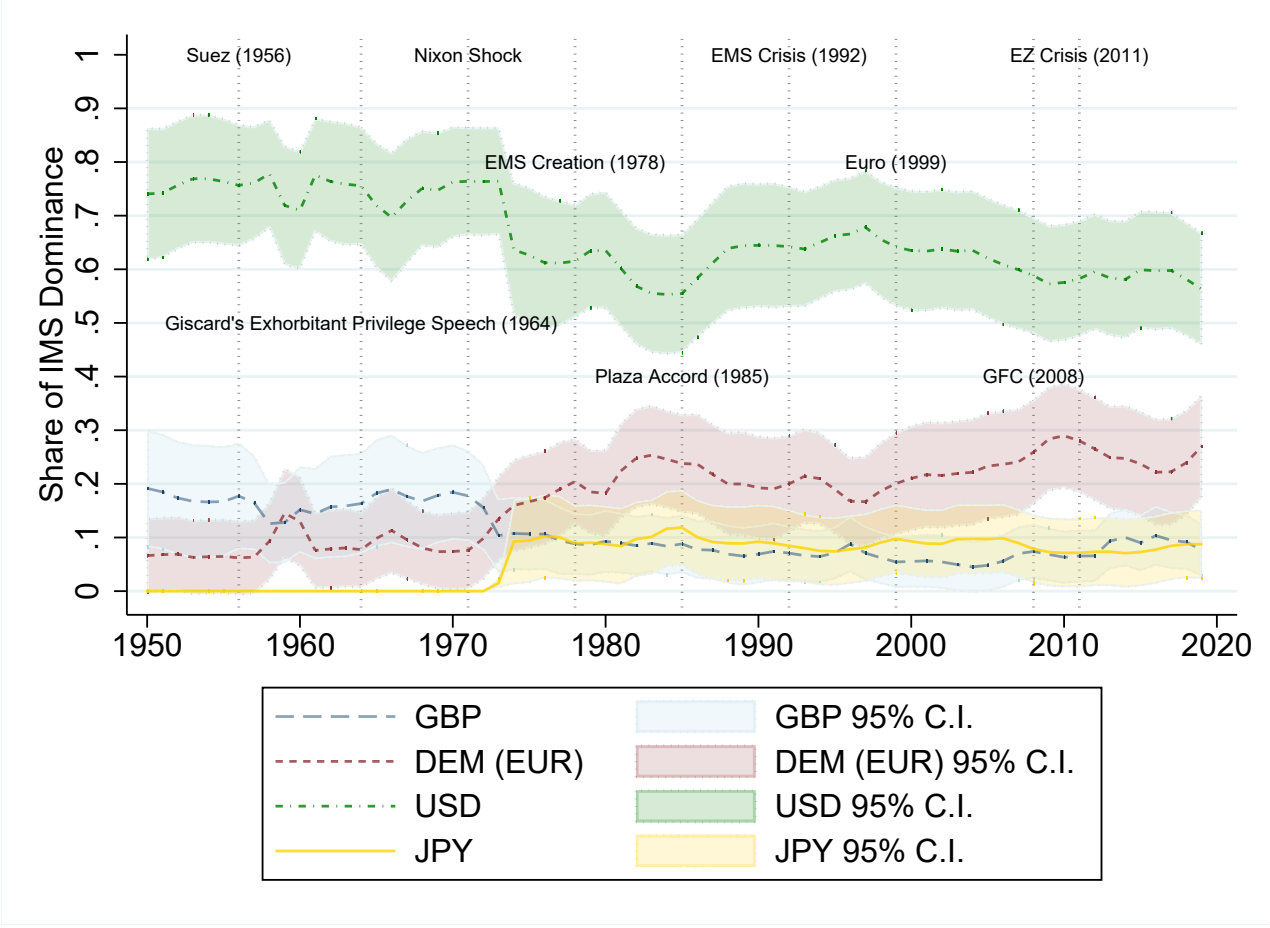
5.3. 1948-2020: Dollar Dominance as a Two Centuries Anomaly

The years following WWII witnessed to the last vestiges of sterling dominance. A large amount of sterling balances existed in the 1950s, owing to the role played by Sterling Area countries during the war. Eichengreen et al. (2017) document how reserves steadily re-balanced towards the dollar. Schenk (2010) underlines the success of British authorities in delaying the demise of the pound as a reserve currency, with the experience of Sterling Area between 1950 and the 1970s being described as the one of a "zombie" international currency by Avaro (2020). My estimate of the sterling weight identifies two legs in the decline of the sterling. A first one occurs after 1956, as the Suez crisis ignites speculations on the British currency. The second and final leg of the decline of the pound sterling is observed following the 1967 devaluation, with an acceleration in conjunction with the Nixon shock.

My quantification of the global weight of the yen, after it moved away from a strict dollar parity at the end of the 1960s, is largely consistent with the view that the yen never managed to take a prominent role as an international anchor (Eichengreen et al., 2017). I observe a global peak in the weight of the yen at the end of the 1970s, with no major evolution throughout the post-WWII period. This reflects an initial spike of the yen weight in Asia in the early 1970s, gradually receding over the course of the decade.

The key story of international currency competition in the post-WWII period is the one between the dollar hegemon on one side and the German mark, and then the euro, on the other side. The estimated weight for the two currencies remains stable for the whole Bretton Woods period, with the dollar stably approaching a 80% share of international monetary system dominance and the mark remaining broadly below a 10% threshold. The situation starts to change in 1970. Over the 1970s, Eichengreen et al. (2017) notes how several measures are enacted by German authorities to potentially encourage the international use of the mark, including a (limited) liberalisation of the capital account, the 1969 revaluation, the final decision to float the currency in 1973 and the creation of the EMS in 1979. Over the 1970s the mark roughly doubles its global weight. A further increase of about 5 percentage points can be observed after

Figure 7: Global Currency Competition since 1950



The chart depicts, for every global currency, the GDP-weighted average of the currency's weight for all polities in the sample, estimated using Silver a s *numéraire*.

the successive re-evaluations of the mark in the first half of the 1980s, but this is soon reversed in the second half of the decade, coinciding with the Plaza and Louvre monetary accords in 1985 and 1987. Interestingly, the "talking down" of the dollar by Treasury Secretary Baker ahead of the Plaza meeting corresponds to, and does not precedes, the trough of dollar dominance over the period, with the global weight of the dollar stabilizing above or close to 60%. The establishment of the euro marked a slight gain in dominance for the European currency, compared to the German mark. However, this was reversed with the European debt crisis of 2010-2011. This finding is consistent with the recent ECB assessment of the role of the euro along multiple dimensions (ECB, 2021).

Looking at individual polity results since the end of Bretton Woods (Figures 21) it is clear that the *"German dominance hypothesis"* (Giavazzi and Giovannini, 1988) seemed particularly reasonable by the end of 1980s. However, it is interesting to note how both the dollar and sterling weights increase at the expense of the mark in the European periphery, and particularly Italy, around the 1992 EMS crisis. More recently (Figure 22), the international monetary system appears as strongly regionalised, with the euro being hegemonic in Europe.

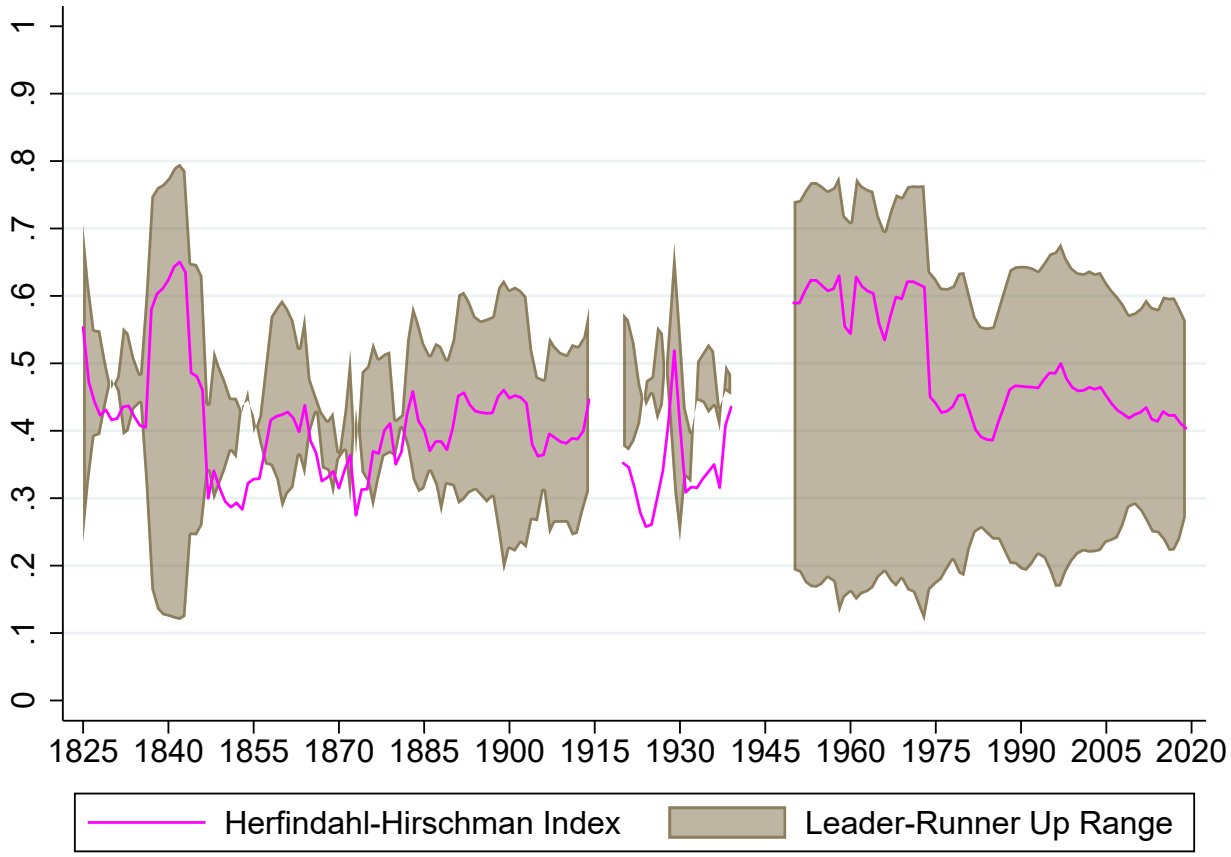
The (very) slight decline of the dollar weight at the end of the sample, as well as some of the country-level results for commodity currency countries, are consistent with the gradual diversification of global FX reserves documented by Arslanalp et al. (2022).

5.4. The Structure of the International Monetary System over Two Centuries

Figure 8 provides an adjusted Herfindahl-Hirschman Index of concentration for the baseline global currency weights outlined above. The shaded area represents the difference between the highest and the second highest global currency weight.

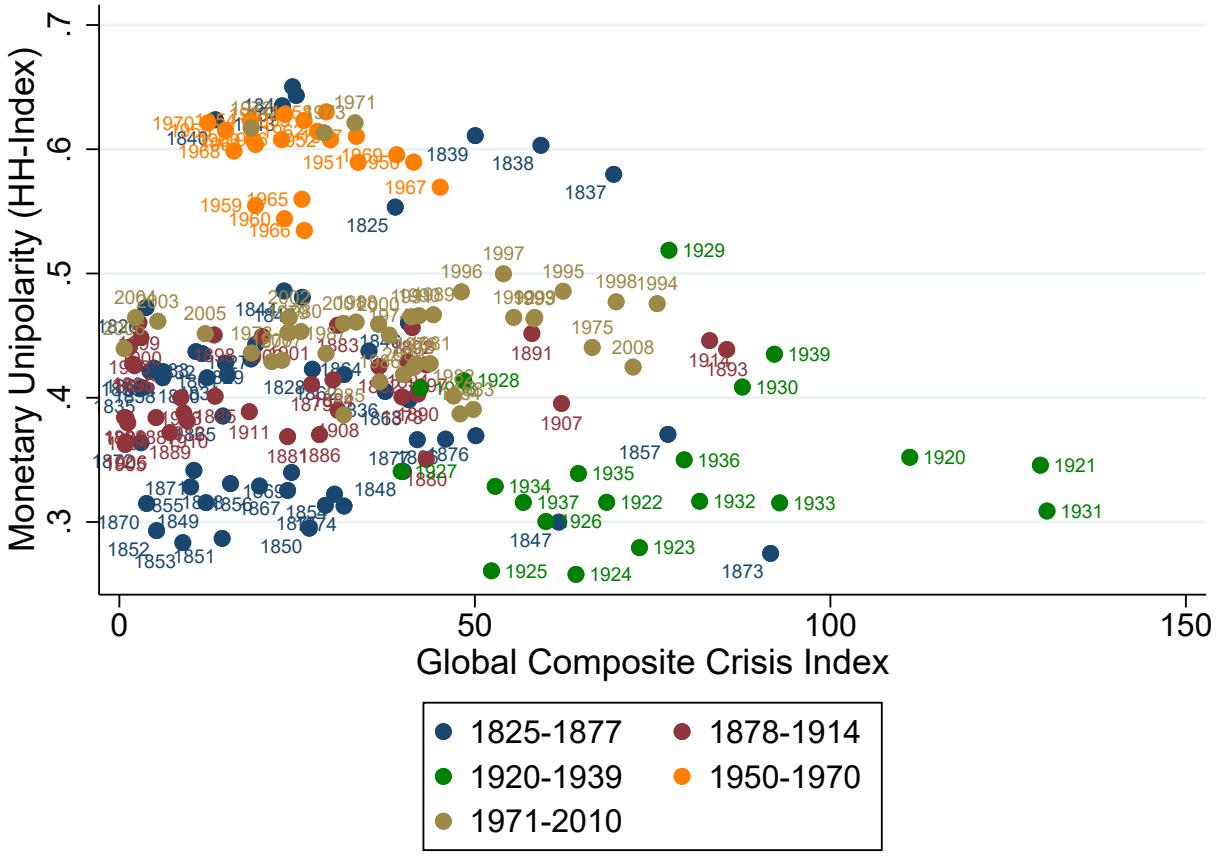
Several considerations can be made. First, the period between 1950 and 1973 is a clear outlier, with an unprecedented degree of uni-polarity, only previously matched in a brief interval of British hegemony around 1835-1840. Second, the whole of the post-WWII period could be characterised as an historical idiosyncrasy looking at the prominence of the international monetary system leader vs. the "runner up". Such a

Figure 8: The Structure of Global Currency Competition over Two Centuries



The line depicts the Herfindahl-Hirschman Index of competition intensity computed from the yearly world GDP-weighted average weight for each global currency (Silver *numéraire*). A higher figure denotes higher concentration in the international monetary system. The shaded area marks the range between the currency with the highest weight and the "runner up".

Figure 9: International Monetary System Competition and Financial Stability



The vertical axis represents the Herfindahl-Hirschman Index of competition intensity computed from the yearly world GDP-weighted average weight for each global currency (Silver *numéraire*). The horizontal axis is the Banking, Currency, Debt and Inflation Composite Crisis Index computed by Reinhart and Rogoff (2008).

large distance in influence between the first and the second global currencies has never been sustained for such a prolonged period of time over the last two centuries. Third, the interwar period is notable for its multi-polarity. It particularly stands out for a sustained small distance between the international monetary system leader and the "runner up", with similar levels only briefly observed before at major turning points in international monetary system competition such as the early 1850s and 1870. This puts into perspective the parallel between the the interwar gold-exchange standard and classical gold standard periods as two episodes of multipolarity with differing outcomes that is often made by proponents of a more multi-polar international monetary system.

Figure 9 relates my index of international monetary system competition to the global composite index of crises compiled by Reinhart and Rogoff (2008). The overall correlation between IMS concentration and the crisis index is clearly negative. The positive relationship between higher levels of safe assets competition and financial instability is consistent with the theoretical predictions of Farhi and Maggiori (2018). Nevertheless, the relationship is driven by two sub-periods: the crisis prone, high competition inter-war period and the unipolar, stable, Bretton Woods period. This could be interpreted as evidence that the relationship between the structure of the international monetary system and global financial stability is indeed contingent on institutions and policy coordination as argued by Eichengreen (2019).

6. Conclusion

This paper has presented a quantification of the rise and fall of global currencies over two centuries, providing a continuous measure of their relative influence and of the overall competition structure of the international monetary system at annual frequency since 1825.

I document that, while the sterling has been the dominant global currency for the period spanning 1825 to 1914, this leadership has been challenged and was not as extreme as current dollar dominance. Local dominance as well as regional monetary integration are recurrent features of challengers to the international monetary system hegemon. It was the case with the rise of the franc amid active French monetary diplomacy after 1852. It was again the case with the rise of the mark after 1866, coincident with the process of German unification. It was the case a second time for the mark starting in the 1970s, as European integration was underway.

My analysis also complements the studies of the interwar international monetary system carried out by Eichengreen and co-authors. I find the dollar to be a key player in the international monetary system as soon as the early 1920s, briefly overtaking the sterling in 1927 and then again at the eve of WWII. I also uncover a new, so far overlooked, important discontinuity in the international monetary system, with an episode of French franc leadership between 1931 and 1936.

Current levels of one-currency leadership are found to be a historical anomaly. This is particularly true for the distance in the relative importance between the current dollar hegemon and the "runner up", the euro, which is largely unprecedented in the last two centuries. An interpretation of this fact consistent with the Dominant Currency Paradigm (Gopinath and Stein, 2018) is that changes in financial and monetary technologies have brought about a structural shift in the way the international monetary system work. Looking at the model of Farhi and Maggiori (2018) one could also see the large lead enjoyed by the dollar as evidence of a stable outlook for its hegemony, as a closer "gap" between the hegemon and any competitor is more likely to spur multiple equilibria. An alternative, more pessimistic, interpretation is that, given the unprecedented hegemony of the dollar, the destabilising consequences of a regime change might also be larger in magnitude than in previous international monetary system discontinuities (Farhi et al., 2011).

The correlation between the degree of competition in the international monetary system and the level of global financial stress is found to be largely positive over the last two centuries. One has however to recognise that this could well be endogenous and that the correlation is highly dependent on observations drawn from the interwar and Bretton Woods periods. Several episodes of high international monetary system competition can be observed without any rise in the prevalence of financial crises.

All in all, the paper provides a new framework to look at the international monetary system over a period of time long enough to observe several episodes of discontinuities. Building on this measurement framework, future research will hopefully shed new lights on the determinants of global currency status, the characteristics and consequences of episodes of international monetary system discontinuity as well as the relationship between international monetary system competition and financial stability.

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7 Results Appendix

Appendix 7.A Robustness Checks

Table 2: Pooled Regressions - 1820-1914

	(1)	(2)	(3)	(4)	(5)	(6)
GBP	0.608***	0.589***	0.738***	0.678***	0.673***	0.477***
	(0.0623)	(0.0609)	(0.0815)	(0.0382)	(0.0384)	(0.0570)
FFR	0.271***	0.304***	0.331***	0.0573**	0.0604**	0.0208
	(0.0620)	(0.0631)	(0.0884)	(0.0257)	(0.0269)	(0.0341)
DEM	-0.0197	-0.0325	-0.0199	0.213***	0.214***	0.278***
	(0.0326)	(0.0331)	(0.0661)	(0.0365)	(0.0364)	(0.0576)
Controls	NO	YES	NO	NO	YES	NO
Numéraire	XAG	XAG	NLG	XAG	XAG	NLG
Period	1820-1870	1820-1870	1820-1870	1871-1914	1871-1914	1871-1914
Observations	13,646	13,646	14,678	36,887	36,887	39,862
R-squared	0.058	0.058	0.018	0.73	0.73	0.017

Robust standard errors reported in parenthesis. ***, ** and * denote statistical significance at the 0.01, 0.05 and 0.1 levels respectively. Controls include first-differences of proxies for liquidity and risk-premium, as well as weekly log-changes of commodity prices, see Section 8 for details. Pooled regression using Silver as *numéraire* exclude the Netherlands for comparability.

Table 3: Pooled Regressions - 1918-1939

	(1)	(2)	(3)	(4)	(5)	(6)
GBP	0.685***	0.685***	0.637***	0.499***	0.498***	0.479***
	(0.0275)	(0.0276)	(0.0293)	(0.0226)	(0.0226)	(0.0232)
FFR	0.0467***	0.0471***	0.0492***	0.269***	0.266***	0.320***
	(0.00752)	(0.00757)	(0.00745)	(0.0163)	(0.0164)	(0.0179)
USD	0.139***	0.142***	0.144***	0.161***	0.168***	0.114***
	(0.0263)	(0.0265)	(0.0281)	(0.0171)	(0.0173)	(0.0139)
Controls	NO	YES	NO	NO	YES	NO
Numéraire	XAG	XAG	HKD	XAG	XAG	HKD
Period	1918-1930	1918-1930	1918-1930	1931-1939	1931-1939	1931-1939
Observations	19,712	19,712	20,695	15,624	15,624	15,390
R-squared	0.404	0.404	0.367	0.708	0.708	0.672

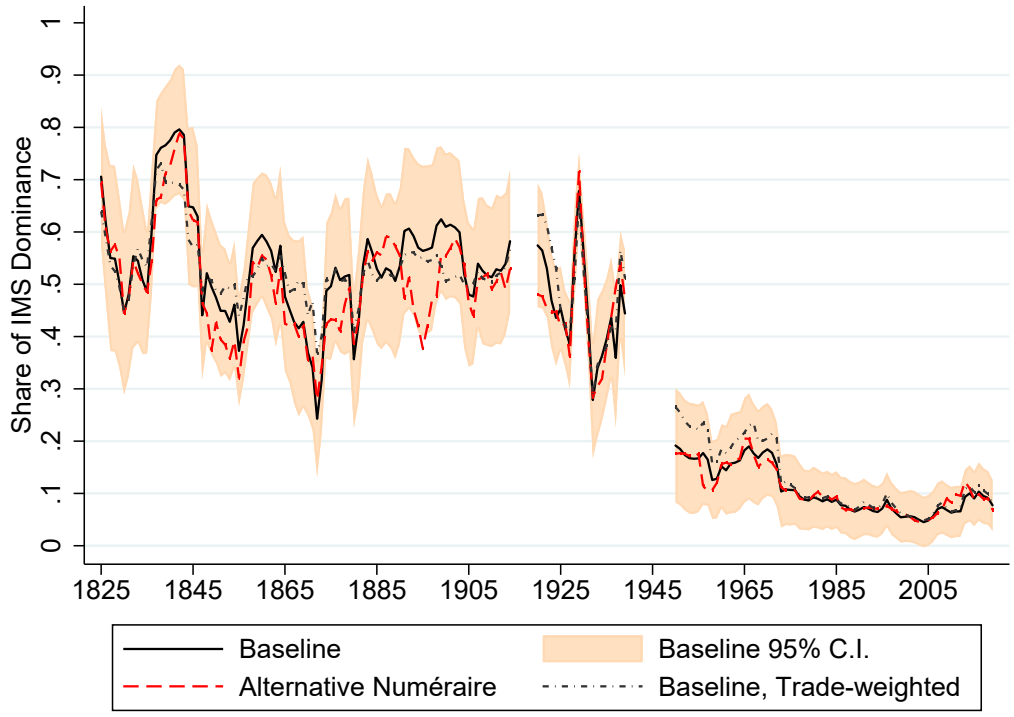
Robust standard errors reported in parenthesis. ***, ** and * denote statistical significance at the 0.01, 0.05 and 0.1 levels respectively. Controls include first-differences of proxies for liquidity and risk-premium, as well as weekly log-changes of commodity prices, see Section 8 for details. Pooled regressions using Silver as *numéraire* exclude Hong Kong for comparability.

Table 4: Pooled Regressions - 1948-2020

	(1)	(2)	(3)	(4)	(5)	(6)
GBP	0.327***	0.329***	0.333***	0.0556***	0.0517***	0.0684***
	(0.0150)	(0.0150)	(0.0160)	(0.00423)	(0.00424)	(0.00418)
DEM	-0.00276	-0.00304	-0.000934	0.404***	0.401***	0.411***
	(0.00690)	(0.00695)	(0.00834)	(0.00445)	(0.00444)	(0.00728)
USD	0.669***	0.668***	0.626***	0.553***	0.551***	0.497***
	(0.0165)	(0.0165)	(0.0212)	(0.00486)	(0.00485)	(0.00414)
JPY	-	-	-	-0.00647**	-0.0100***	-0.00580*
				(0.00324)	(0.00343)	(0.00341)
Controls	NO	YES	NO	NO	YES	NO
Numéraire	XAG	XAG	CHF	XAG	XAG	CHF
Period	1948-1973	1948-1973	1948-1973	1974-2020	1974-2020	1974-2020
Observations	57,799	57,799	56,241	110,326	110,152	101,182
R-squared	0.833	0.833	0.04	0.859	0.859	0.341

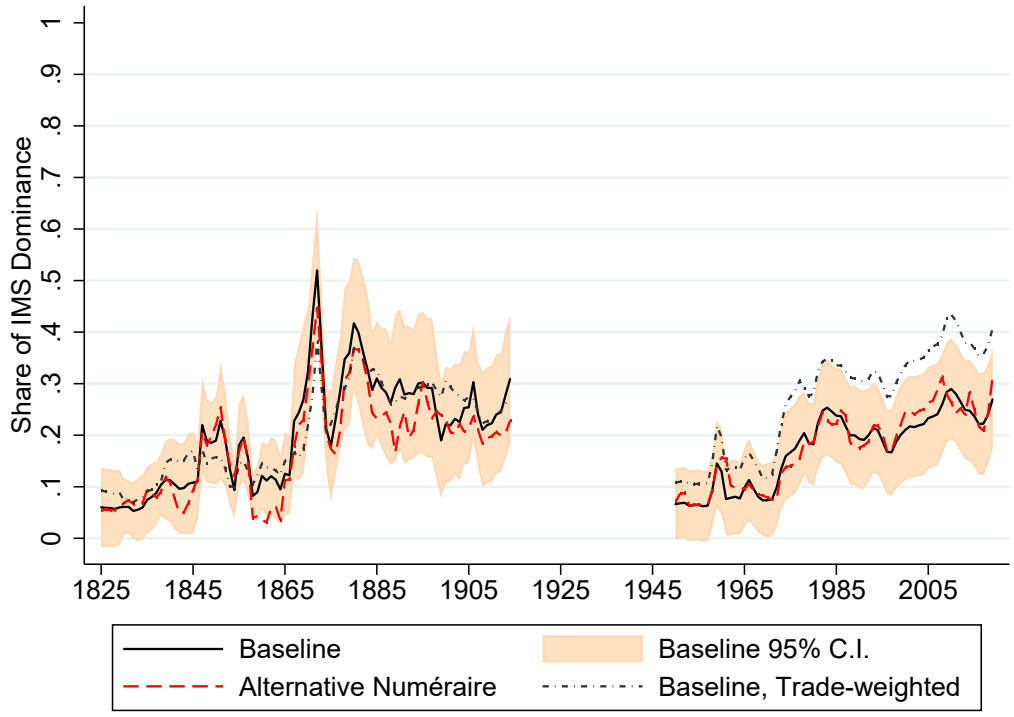
Robust standard errors reported in parenthesis. ***, ** and * denote statistical significance at the 0.01, 0.05 and 0.1 levels respectively. Controls include first-differences of proxies for liquidity and risk-premium, as well as weekly log-changes of commodity prices, see Section 8 for details. Pooled regressions using Silver as *numéraire* exclude Switzerland for comparability.

Figure 10: British pound sterling - Baseline and Alternative International Monetary System Dominance Weights



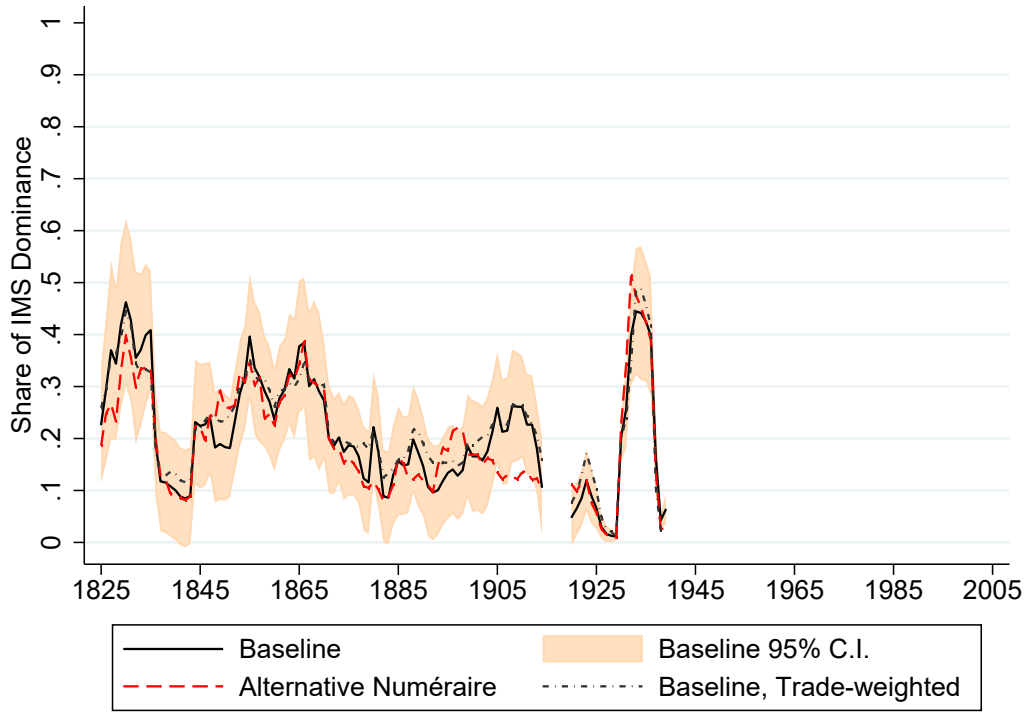
Baseline indicates the global international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated with silver as the *numéraire*. Alternative *numéraire* indicates the international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated, depending on the sub-period, with NLG, HKD or CHF as *numéraire*. The baseline international monetary system dominance weight computed using a trade-weighted global average is also reported.

Figure 11: German Mark/Euro - Baseline and Alternative International Monetary System Dominance Weights



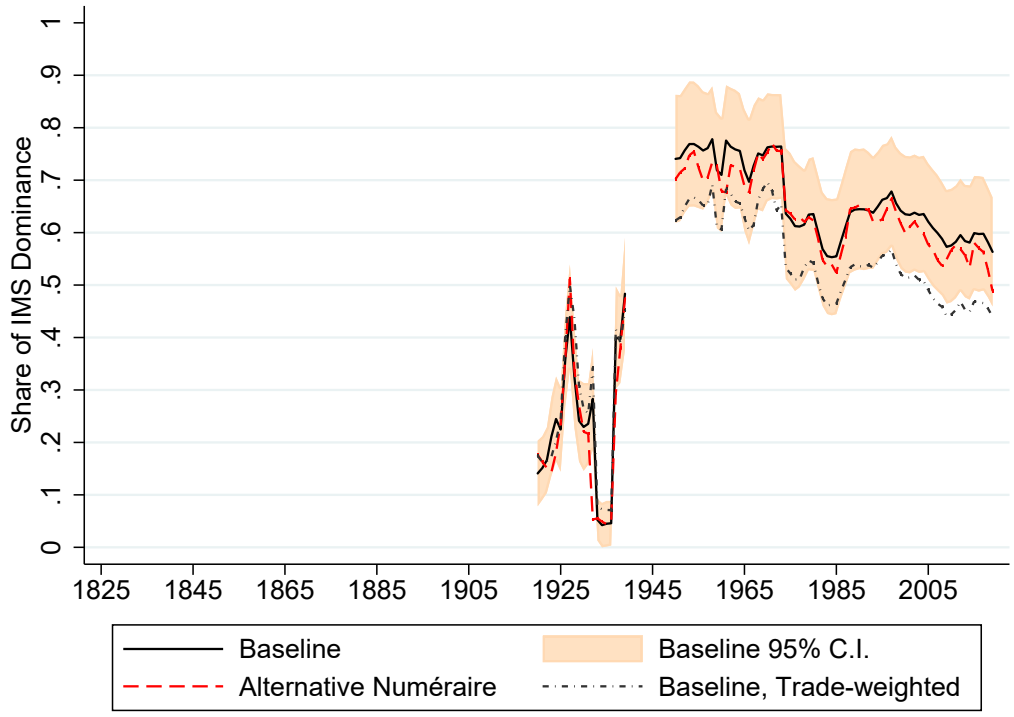
Baseline indicates the global international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated with silver as the *numéraire*. Alternative *numéraire* indicates the international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated, depending on the sub-period, with NLG, HKD or CHF as *numéraire*. The baseline international monetary system dominance weight computed using a trade-weighted global average is also reported.

Figure 12: French franc - Baseline and Alternative International Monetary System Dominance Weights



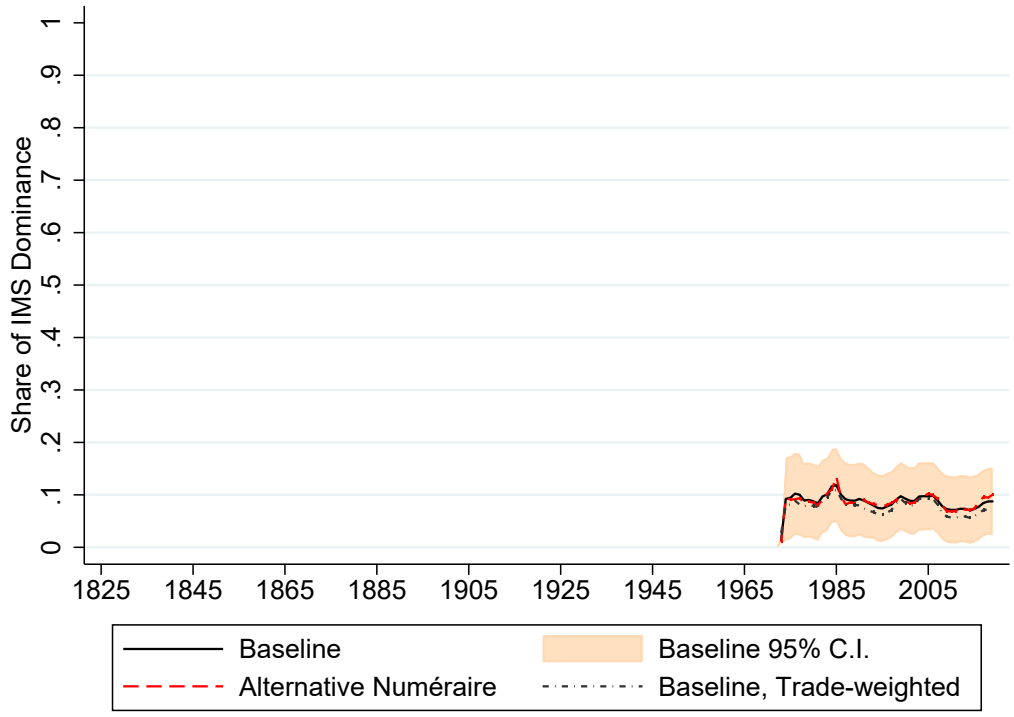
Baseline indicates the global international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated with silver as the *numéraire*. Alternative *numéraire* indicates the international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated, depending on the sub-period, with NLG, HKD or CHF as *numéraire*. The baseline international monetary system dominance weight computed using a trade-weighted global average is also reported.

Figure 13: US dollar - Baseline and Alternative International Monetary System Dominance Weights



Baseline indicates the global international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated with silver as the *numéraire*. Alternative *numéraire* indicates the international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated, depending on the sub-period, with NLG, HKD or CHF as *numéraire*. The baseline international monetary system dominance weight computed using a trade-weighted global average is also reported.

Figure 14: Japanese yen - Baseline and Alternative International Monetary System Dominance Weights



Baseline indicates the global international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated with silver as the *numéraire*. Alternative *numéraire* the international monetary system dominance weight computed as the GDP-weighted average of individual weights estimated, depending on the sub-period, with NLG, HKD or CHF as *numéraire*. The baseline international monetary system dominance weight computed using a trade-weighted global average is also reported.

Table 5: Controlling for a Gold Factor During the Interwar Episode of French franc Dominance

	(1)	(2)	(3)	(4)
GBP	0.452***	0.436***	0.473***	0.455***
	(0.0199)	(0.0201)	(0.0200)	(0.0204)
FFR	0.409***	0.214***	0.417***	0.245***
	(0.0186)	(0.0282)	(0.0197)	(0.0288)
USD	0.0640***	0.0648***	0.0542***	0.0549***
	(0.0142)	(0.0141)	(0.0132)	(0.0132)
XAU		0.211***		0.193***
		(0.0271)		(0.0273)
Numéraire	XAG	XAG	HKD	HKD
Controls	NO	NO	NO	NO
Period	1931-1936	1931-1936	1931-1936	1931-1936
Observations	9,198	9,198	9,061	8,984
R-squared	0.669	0.672	0.666	0.664

Robust standard errors reported in parenthesis. ***, ** and * denote statistical significance at the 0.01, 0.05 and 0.1 levels respectively.

Appendix 7.B Individual Global Currency Weights

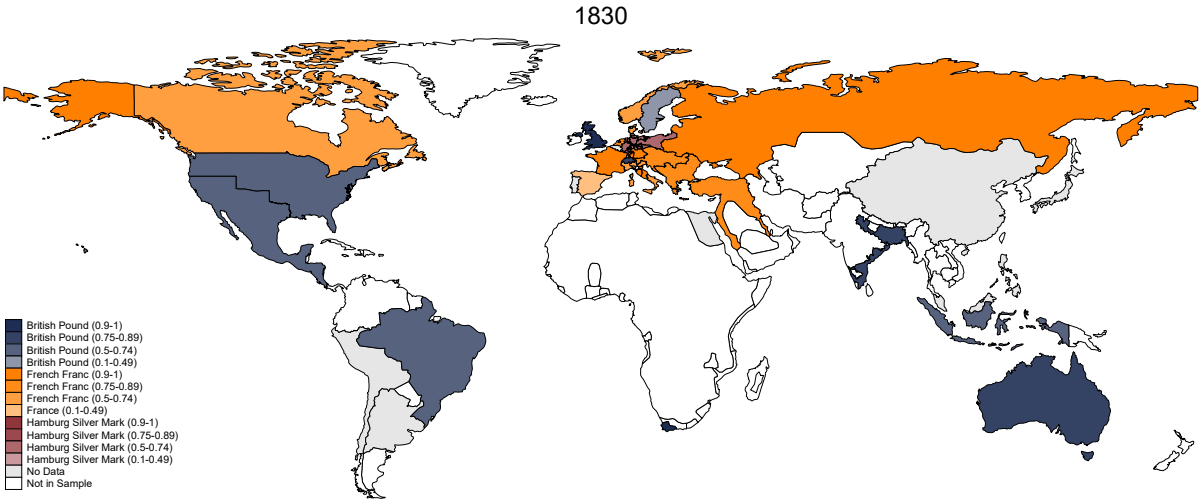
The maps below depicts the weight level for the highest global currency weight for each polity in the sample. This reflects the currency that is estimated to exert more dominance on a particular polity but does not imply other global currencies do not have a positive weight.

A white coloring denotes a polity that is not included in the sample at any point for the sub-period. A grey coloring denotes that the polity has no available data for that particular year but is included in the sub-period's sample.

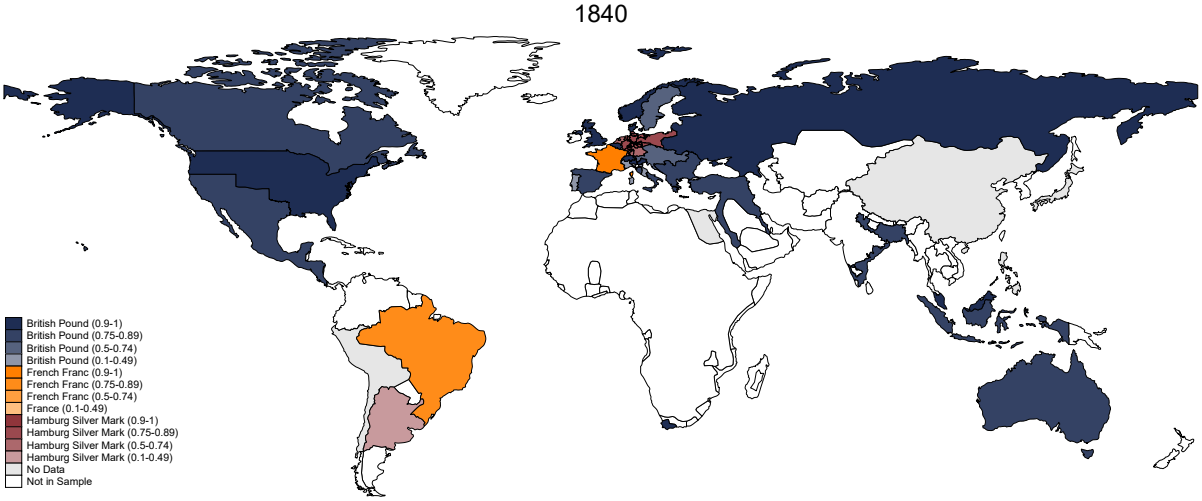
Maps are at 1812 borders until 1870, 1914 borders between 1870 and 1914, 1938 borders between 1918 and 1939, 1945 borders between 1950 and 1988 and 1994 borders thereafter.

Figure 15: The Rise of the Sterling in the Early 19th Century - Dominant Currency By Country, Selected Years 1830-1849

(b) 1830: A Bipolar System post-Vienna Congress



(b) 1840: Large GBP Gains in Dominance in the 1830s



(c) 1848: GBP Dominance Unscathed by the People's Spring

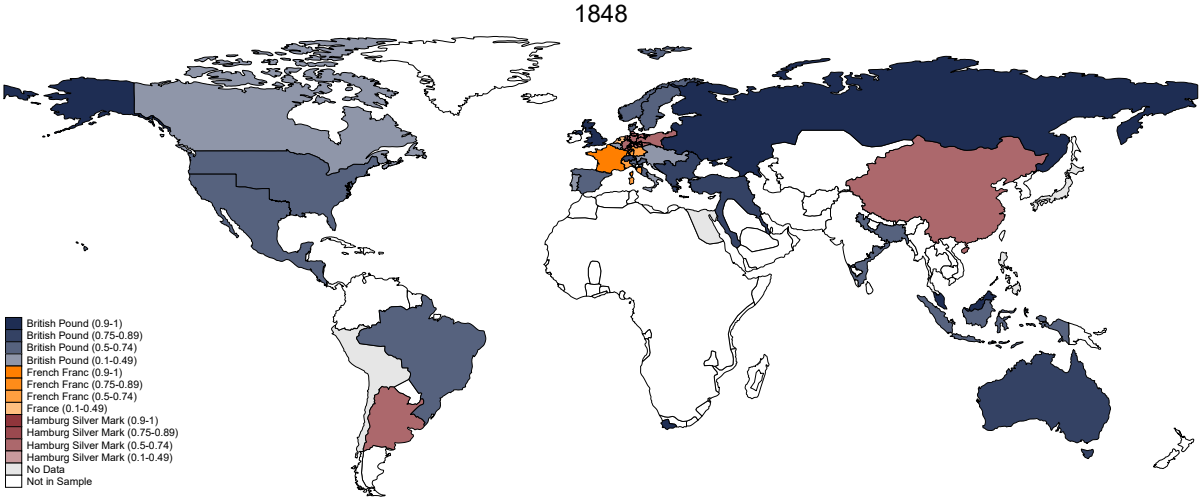
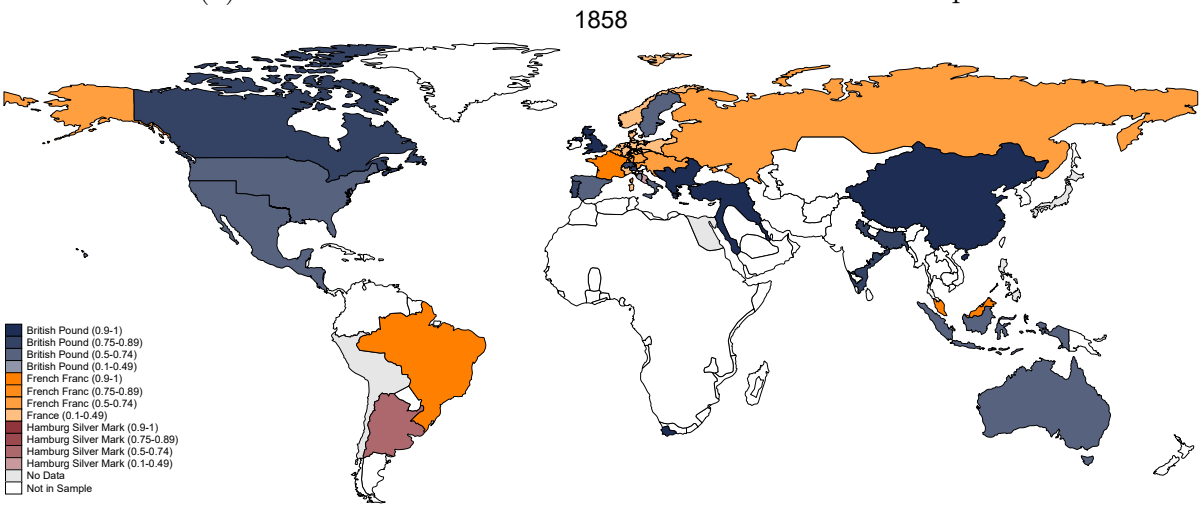
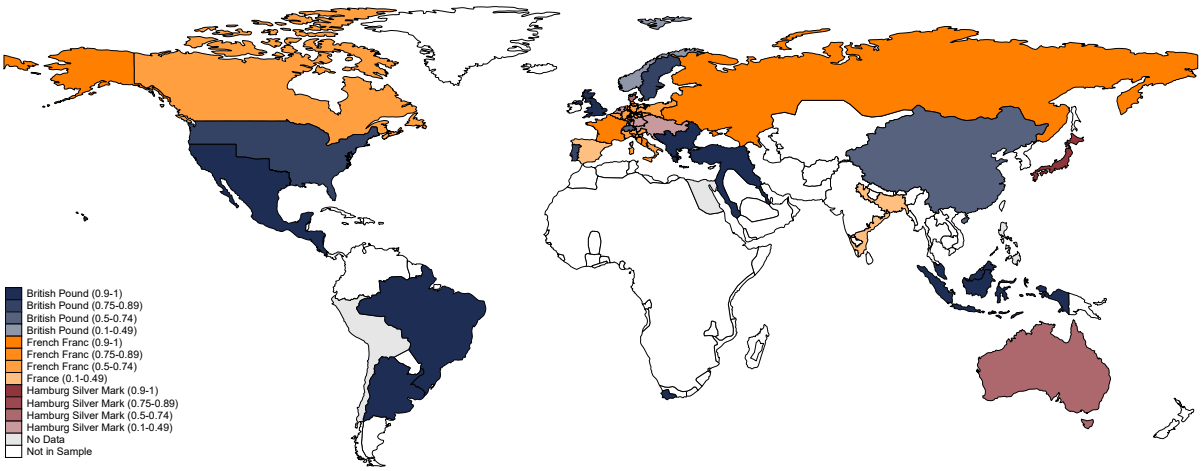


Figure 16: The Rise and Fall of French Monetary Diplomacy - Dominant Currency By Country, Selected Years 1850-1879

(a) 1858: Rise in FFR Dominance with the Second Empire



(b) 1866: Peak of FFR Dominance as Paris Hosts the 1st International Monetary Conference



(c) 1873: Major International Monetary System Discontinuity with the German Unification

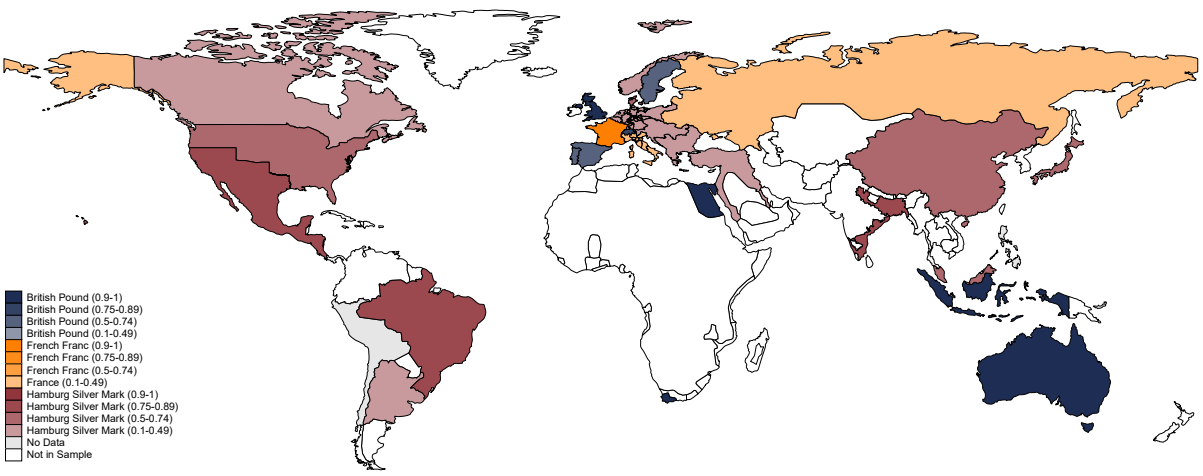
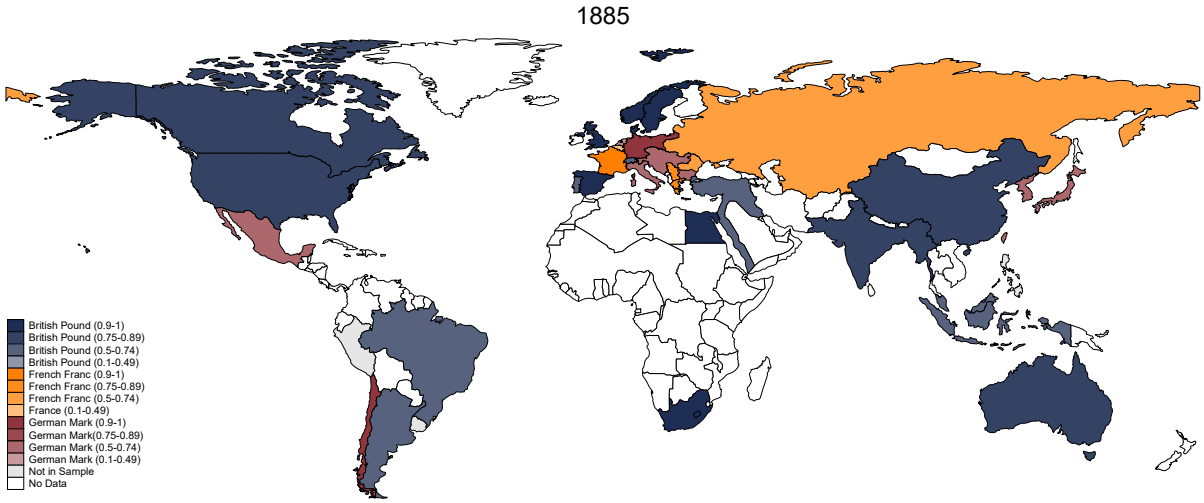
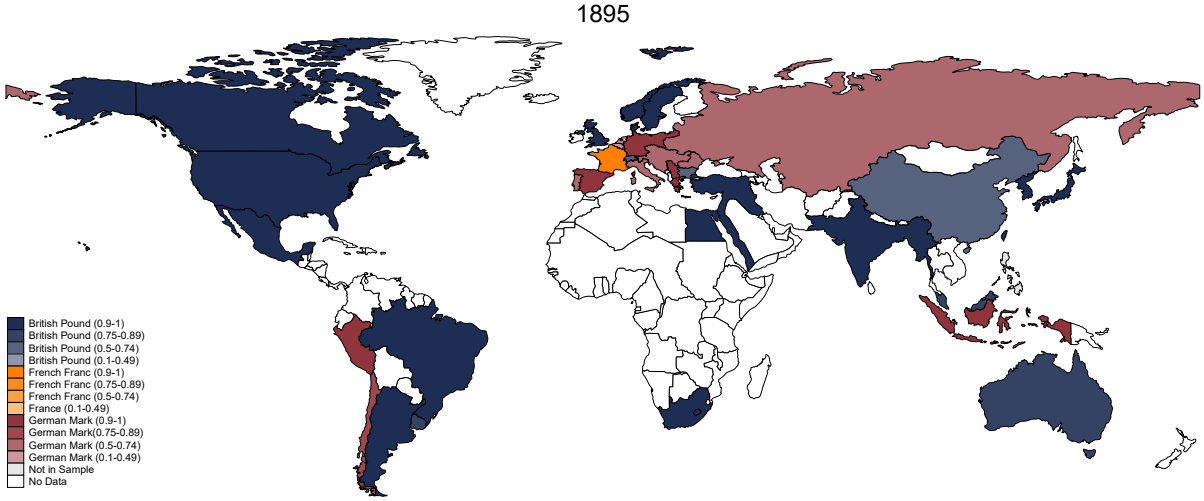


Figure 17: A Tripolar Classical Gold Standard -
Dominant Currency By Country, Selected Years 1880-1910

(a) 1885: A Tripolar Classical Gold Standard (I)



(b) 1895: A Tripolar Classical Gold Standard (II)



(c) 1913: A Tripolar Classical Gold Standard (III)

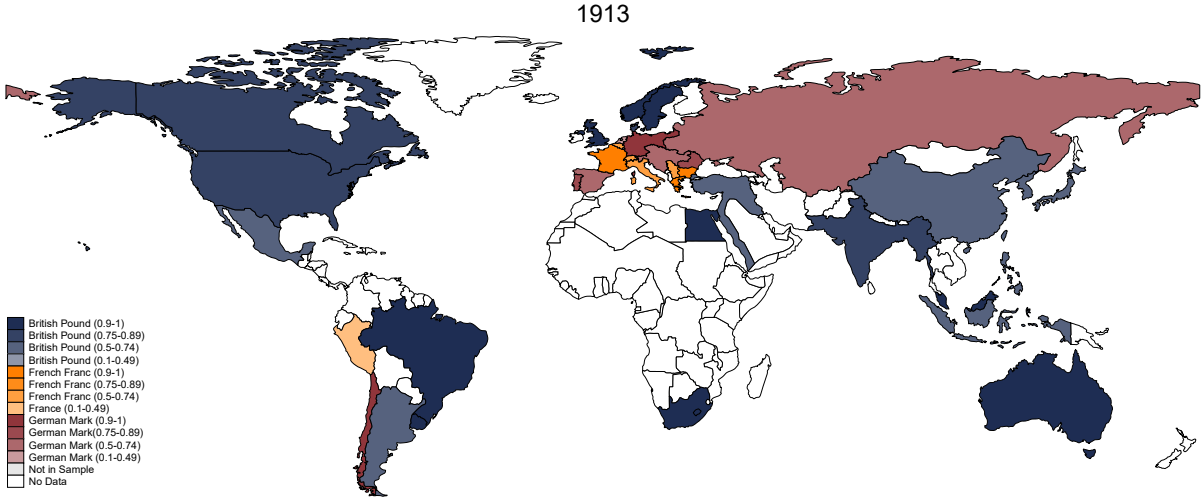
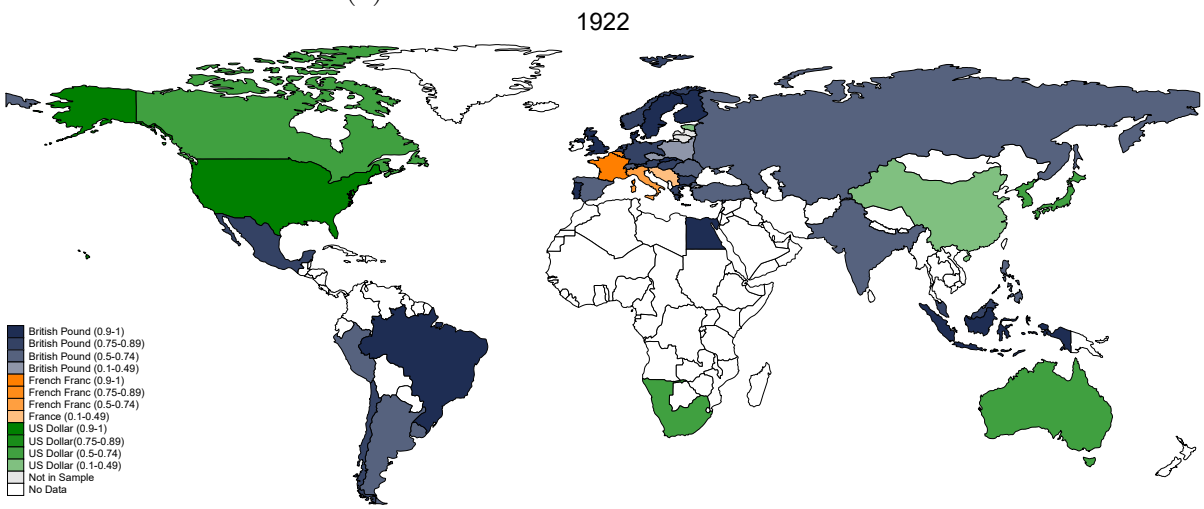
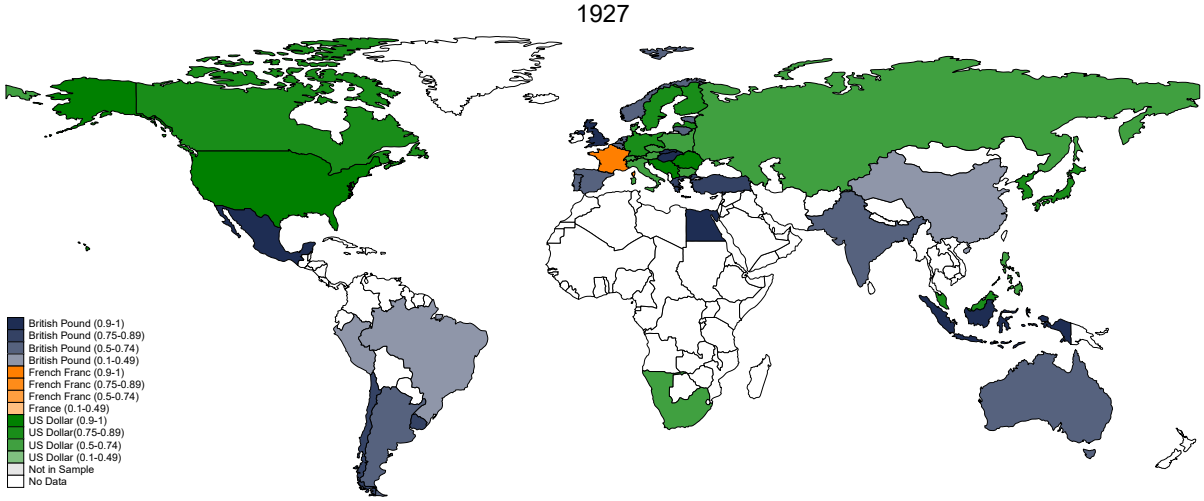


Figure 18: The Rise and Fall of the Interwar USD - Dominant Currency By Country, Selected Years 1918-1930

(a) 1922: Rise of the USD after WWI



(b) 1927: Peak of USD Dominance in the Interwar



(c) 1929: A Shortlived Comeback of the GBP in 1929

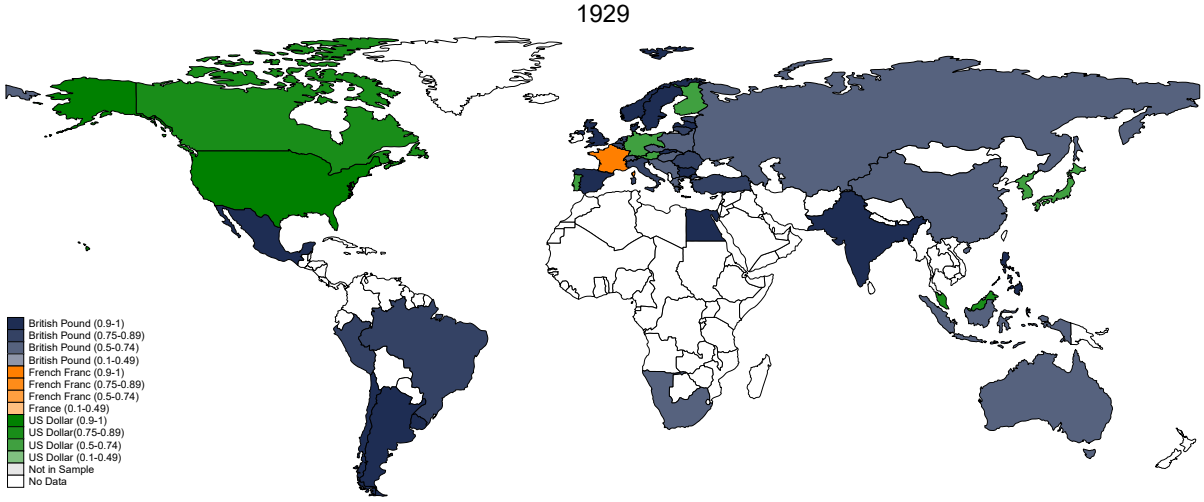
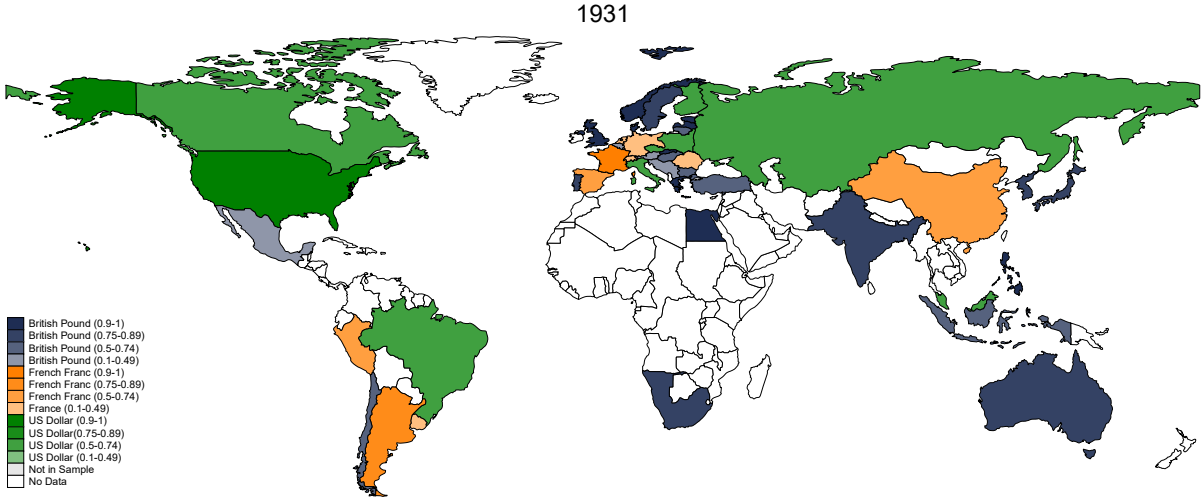
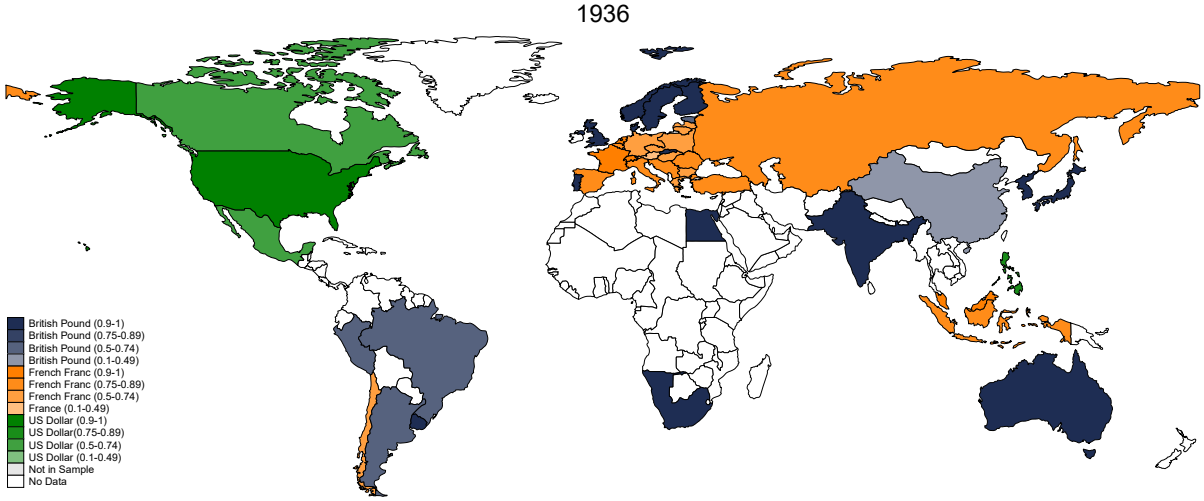


Figure 19: The Rise and Fall of the Interwar FFR - Dominant Currency By Country, Selected Years 1931-1939

(a) 1931: The FFR Steps into the Instability of the GBP and the USD



(b) 1936: FFR Dominance Before the 1936 French Election



(c) 1939: GBP and USD Bipolarity at the Eve of WWII

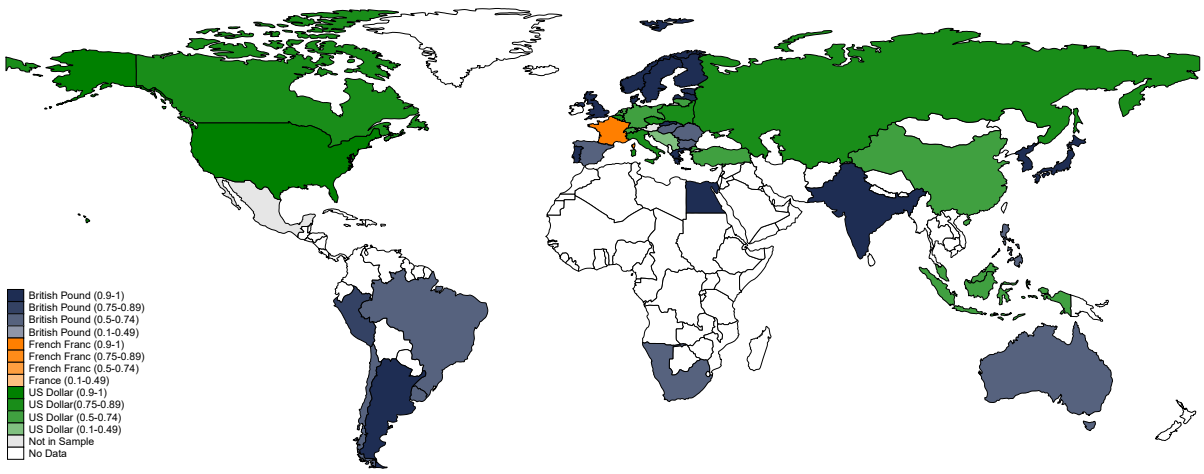
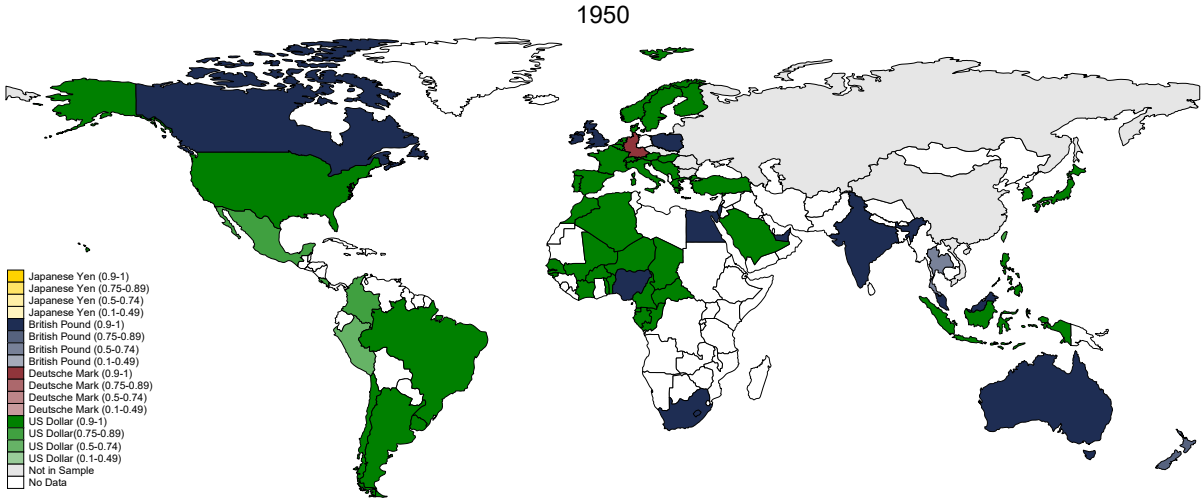


Figure 20: A USD Dominated Bretton Woods System - Dominant Currency By Country, Selected Years 1950-1973

(a) 1950: USD Dominance after WWII



(b) 1964: *"Privilège Exhorbitant"*

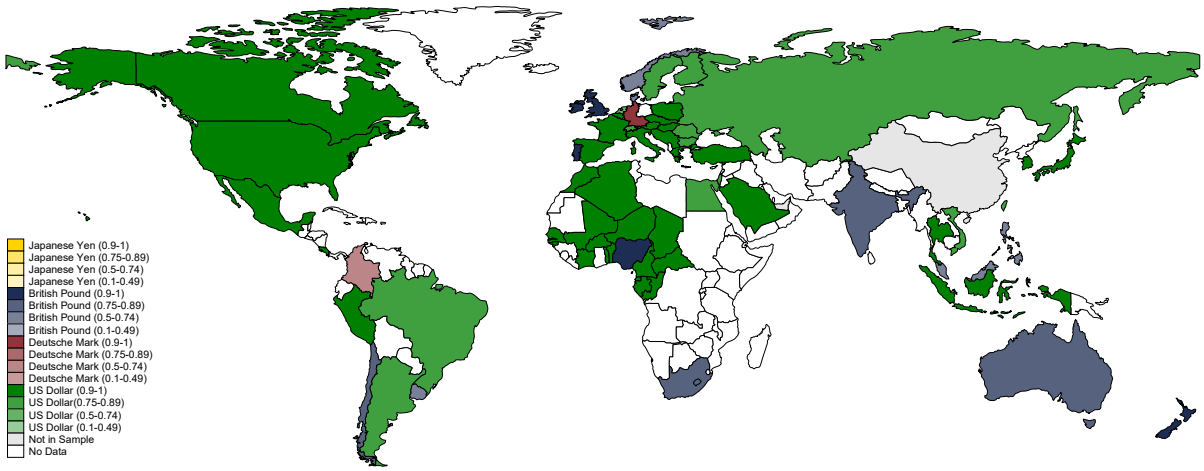
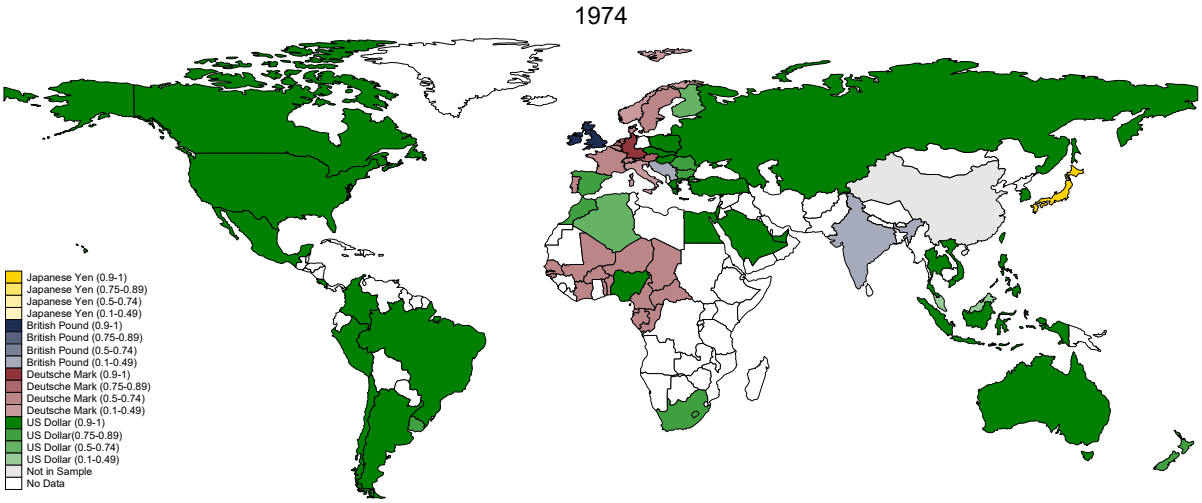
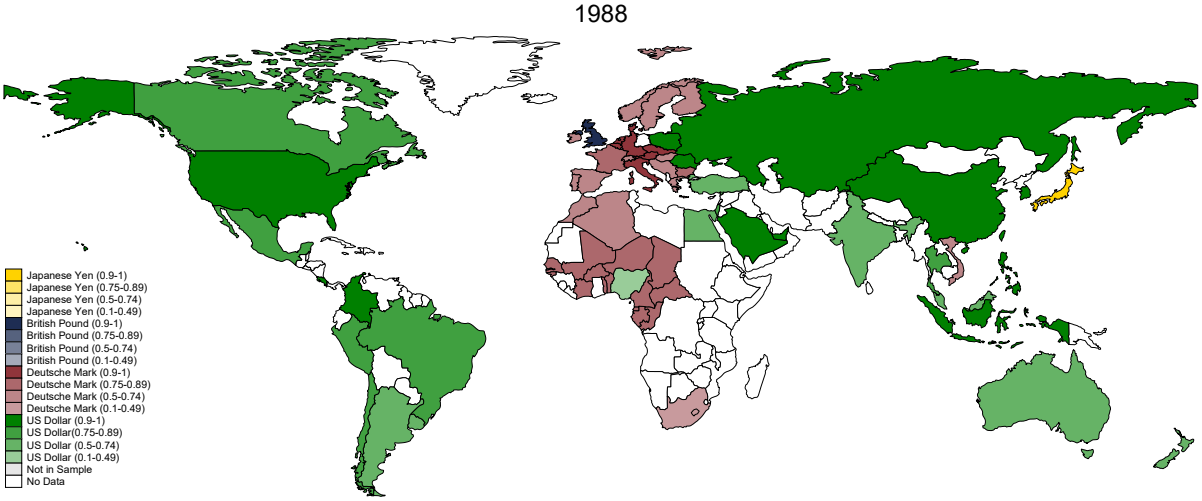


Figure 21: The Rise of the DEM -
Dominant Currency By Country, Selected Years 1931-1939

(a) 1974: The Beginnings of a DEM Zone



(b) 1988: *"German Dominance Hypothesis"*



(c) 1996: Limited Fall of DEM Influence after the EMS Crisis

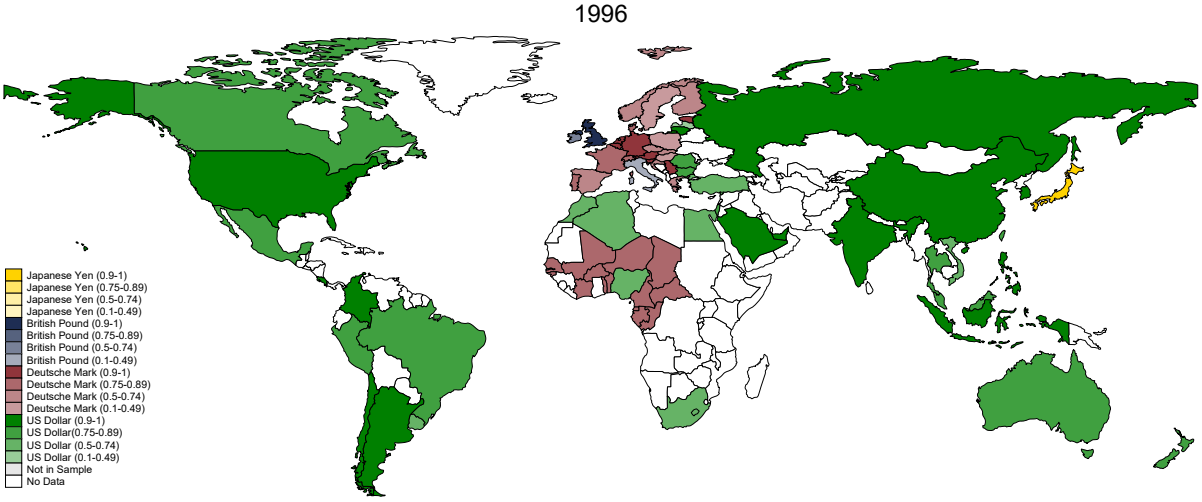
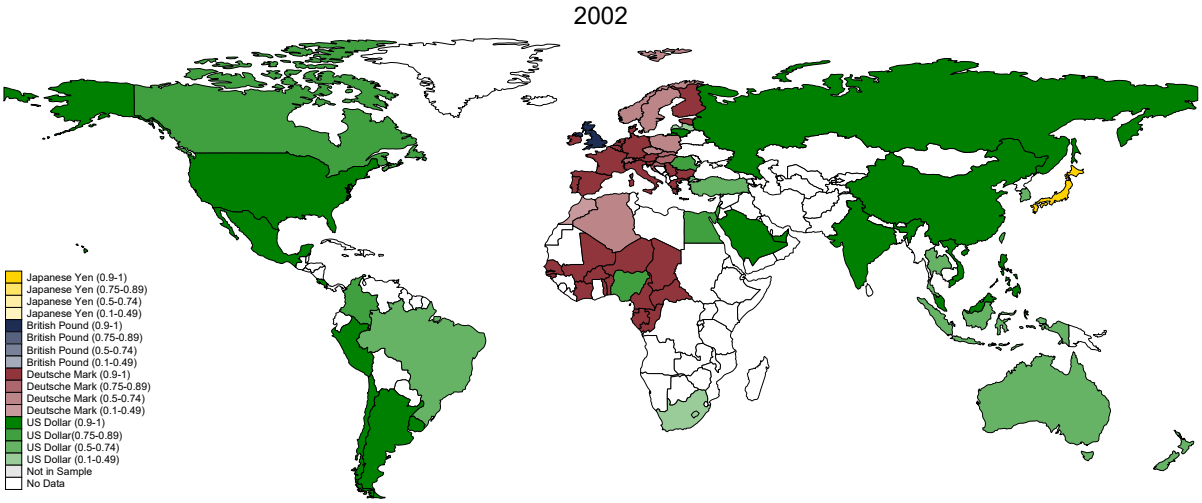
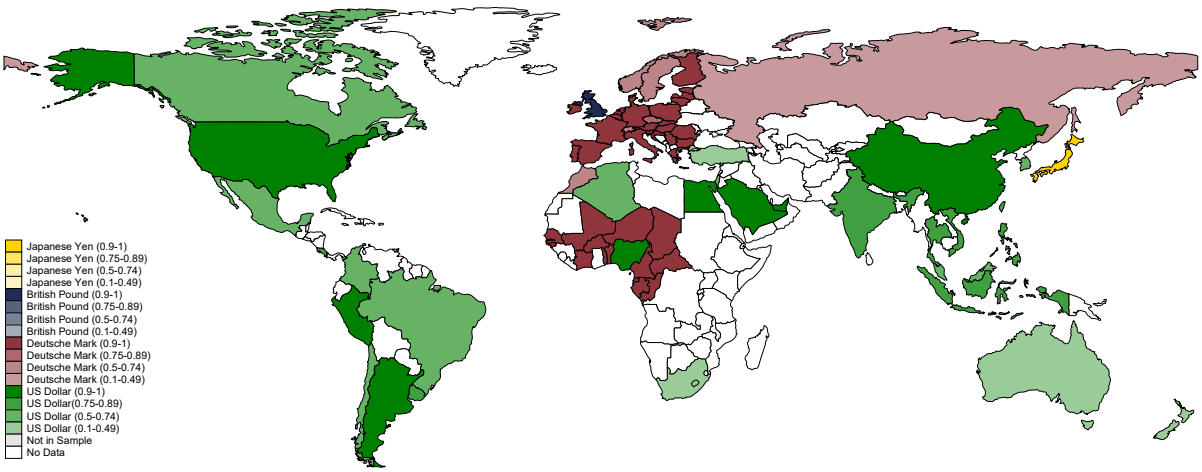


Figure 22: USD Dominance, EUR Stability -
Dominant Currency By Country, Selected Years 1931-1939

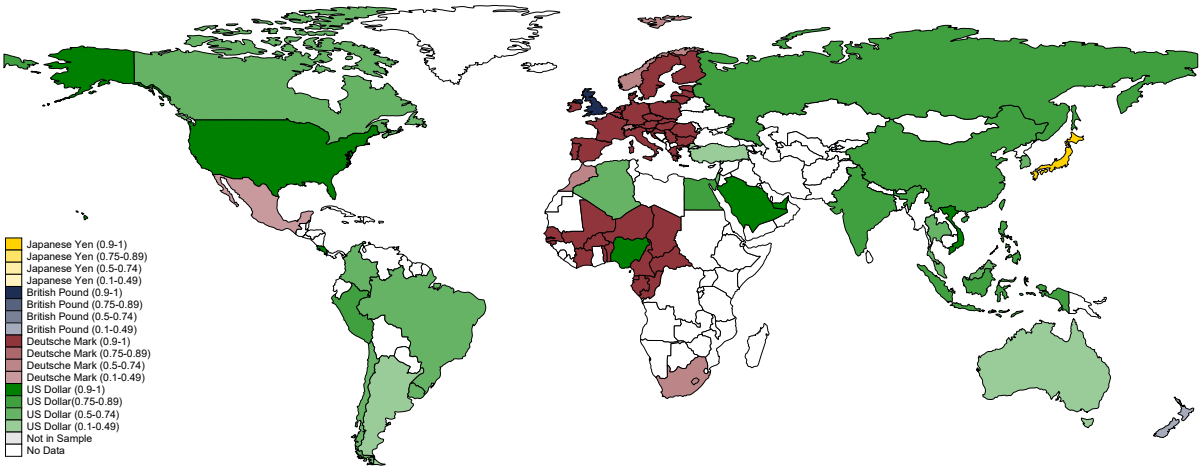
(a) 2002: The EUR Builds on the DEM Legacy



(b) 2012: EUR Influence Resists Despite the Crisis



(c) 2019: USD Dominance Persists



8 Data Appendix

Foreign-exchange data for the pre-1948 period employed in this paper are largely the result of an extensive original data collection effort. For the early 19th century and for some currencies I however rely on Global Financial Data (GFD), a commercial financial data provider. GFD reunited in their portal a large collection of historical financial data from various third party academic and printed sources. GFD typically provides foreign-exchange monthly frequencies since the early 19th century and daily frequencies for some countries since the late 19th century or early 20th century. However, they do not always provide transparency on the sources employed and the consistency of their data. Furthermore, I provide exchange-rate for a number of currencies absent in their coverage or that they only cover with large gaps. The dataset is organised in three main sub-periods, reflecting large discontinuities in the international monetary system - and consequently the reporting of foreign-exchange data - after each world war.

The extent of country coverage is related to data availability, quality and economic intuition. First, I try as much as possible to cover countries that are reported at any point between 1846 and 1939 in either The Economist magazine or The Bankers' Almanac for the whole sample, so as to have continuous coverage. This is not always possible as new countries arise from annexations or separatism. Second, when I am unable to originally collect a continuous series for the whole period I rely on GFD. I however only include GFD data if there is evidence the series is not merely imputed from an official parity. Third, I include, in all sub-periods, all countries that represent more than 1% of global trade on average during each sub-period.

Appendix 8.A 1820-1914: Foreign-Exchange Data

8.A.1 Monthly Frequency

In order to extend coverage to the beginning of the 19th century and to non-European countries in the 19th century, I selectively employ monthly foreign-exchange series from GFD expressed in terms of sterling or US dollars depending on availability. For some

polities unavailable from GFD, I manually digitise monthly series from Schneider et al. (1992). I plan to continue this digitisation effort in the future in order to further expand coverage for the 19th century and overcome the limitations of GFD. Detailed breakdown and starting date of coverage is detailed in Table 6.

8.A.2 Weekly Frequency

I hand-collect and digitise weekly exchange-rates data from 1846, the first year The Economist magazine in London started to consistently publish a weekly table of the London *"Course of Exchange"*. Prices employed in this analysis are for bills of exchange with 3 months maturity[23]. Bills of exchange were short-term negotiable trade finance instrument that constituted the most common form of foreign-exchange market between the early-modern period and WWI. I collect the "high" and "low" quotes of the Tuesday and Thursday prices reported in the *"Course of Exchange"* table for each currency of interest[24] and average them over each week. In terms of geographic coverage, the "Course of Exchange" table included only the main European financial centers. A separate table of *"Foreign Rates of Exchange on London"* reported non-European bills of exchange prices. However, its format and coverage were inconsistent over time, making any data collection extremely complex, particularly for early years. In particular, quotes from different financial centers were published with different and varying lags. This is why, for now, I complement my weekly data for the 19th century with series from GFD for countries that were not reported in the *"Course of Exchange"*. The exception to this is the exchange-rate for the US dollar, which I digitise from the Bank of England's Daily Accounts of Books. Detailed sources are described in Table 6.

Appendix 8.B 1918-1939: Foreign-Exchange Data

Foreign-exchange data from 1918 onward are at weekly frequency only. Between 1918 and 1920, I continue to rely on The Economist magazine. The tables used for those years are the "Neutral Rates of Exchange" Amsterdam price for the exchange-rate of the Germanmarkand either the "London Course of Exchange" or the "Foreign

[23] Only the French franc and the Dutch Guilders are quoted both at 3 months and "at sight" in the 19th century.

[24] With the exception of Italian and German financial centers, I only collect one price per country.

Table 6: Foreign-Exchange Data Coverage and Sources 1820-1914

		Monthly		Weekly	
Polity	Region	Coverage starts	Source	Coverage starts	Source
Argentina	Americas	1827	GFD	1862	GFD
Australia	Asia and Africa	1822	GFD	-	-
Austria-Hungary	Eastern Europe	1820	GFD	1846	CoE
Belgium	Western Europe	1830	GFD	1846	CoE
Brazil	Americas	1820	GFD	1862	GFD
Bulgaria	Eastern Europe	1879	GFD	-	-
Canada	Americas	1820	GFD	1869	GFD
Cape Colony	Asia and Africa	1820	GFD	1869	GFD
Chile	Americas	1850	GFD	-	-
China	Asia and Africa	1844	GFD	1869	GFD
Denmark	Scandinavia	1820	GFD	1879	GFD
Dutch East Indies	Asia and Africa	1820	GFD	-	-
Egypt	Asia and Africa	1869	GFD	1869	GFD
France	Western Europe	1820	GFD	1846	CoE
Greece	Western Europe	1877	GFD	-	-
India	Asia and Africa	1822	GFD	1869	GFD
Italy (Piedmont-Sardinia)	Western Europe	1820	WdW	1846	CoE
Japan	Asia and Africa	1862	GFD	1869	GFD
Lombardy-Venetia	Western Europe	1820	WdW	-	-
Mexico	Americas	1820	GFD	1862	GFD
Netherlands	Western Europe	1820	GFD	1846	CoE
Germany (Hamburg)	Western Europe	1820	GFD	1865	CoE
Norway	Scandinavia	1820	GFD	1862	GFD
Ottoman Empire	Eastern Europe	1826	GFD	1869	GFD
Papal States	Western Europe	1820	WdW	-	-
Peru	Americas	1883	GFD	-	-
Philippines	Asia and Africa	1894	GFD	-	-
Portugal	Western Europe	1820	GFD	1846	CoE
Romania	Eastern Europe	1867	GFD	-	-
Russia	Eastern Europe	1820	GFD	1848	CoE
Serbia	Eastern Europe	1863	GFD	-	-
Two Sicilies (Sicily)	Western Europe	1820	WdW	1846	CoE
Southern Germany	Western Europe	1820	GFD	1846	CoE
Spain	Western Europe	1820	GFD	1846	CoE
Straits Settlements	Asia and Africa	1834	GFD	1862	GFD
Sweden	Scandinavia	1820	GFD	1846	GFD
Switzerland	Western Europe	1820	WdW	1893	CoE
Tuscany	Western Europe	1820	WdW	1846	CoE
Two Sicilies (Naples)	Western Europe	1820	WdW	1846	CoE
United Kingdom	Western Europe	1820	GFD	1846	CoE
United States	Americas	1820	GFD	1855	BoE
Uruguay	Americas	1885	GFD	-	-

CoE: The Economist Magazine's Course of Exchange. BoE: Bank of England's Daily Accounts. GFD: Global Financial Data. WdW: Schneider et al. (1992).

Rates of Exchange on London" cable or sight (spot) quotes for other currencies.

Between 1921 and 1939 I hand collect and digitise the weekly averages of "telegraphic" (spot) exchange-rate prices from The Bankers' Almanac publication. Capital controls are enforced at various points in Germany, Hungary, Argentina, Brazil, Uruguay, Chile. In these cases, I collect both official and unofficial prices and use the latter in the present paper analysis. GFD series are used for South Africa and Australia only.

Detailed coverage is presented in Table 7.

Appendix 8.C 1948-2020: Foreign-Exchange Data

For the contemporary period, weekly foreign-exchange data in US dollars are retrieved from GFD for the whole sample period or until data from the Banks for International Settlements become available for each currency. As Global Financial Data rarely reports missing data[25], foreign-exchange prices for the communist block countries start to be included in the dataset only when there is evidence of foreign-exchange price variation in line with the rest of the dataset.

Appendix 8.D Bullion Prices and Other Data

Silver and gold prices are taken from Boyer-Xambeu et al. (1994) between 1820 and 1870 and from GFD between 1948 and 2020. I hand collect and digitise gold and silver prices in London from the Bank of England's Daily Accounts of Books between 1870 and 1914 and from The Bankers' Almanac between 1918 and 1939.

To control for commodity prices in some specification I employ weekly wheat prices from Brunt and Cannon (2013) between 1820 and 1914, the US Bureau of Labor Statistics Commodity Index between 1918 and 1939 and the Bloomberg Commodity Index after 1948.

Controls for overall risk and volatility are either original data from The Economist magazine or taken from GFD.

- 1846-1914: average term spread between 3-months and sight bills on Amsterdam

[25]Preferring to impute with a "par" price.

Table 7: Foreign-Exchange Data Coverage and Sources 1918-1939

Polity	Region	Coverage starts	Source
Argentina	Americas	1918	BA
Australia	Asia and Africa	1918	GFD
Austria	Eastern Europe	1920	BA
Belgium	Western Europe	1919	BA
Brazil	Americas	1918	BA
Bulgaria	Eastern Europe	1920	BA
Canada	Americas	1918	BA
Chile	Americas	1918	BA
China	Asia and Africa	1918	BA
Czechoslovakia	Eastern Europe	1919	BA
Free City of Danzig	Eastern Europe	1923	BA
Denmark	Scandinavia	1918	BA
Dutch East Indies	Asia and Africa	1918	BA
Egypt	Asia and Africa	1918	BA
Estonia	Scandinavia	1921	BA
Finland	Scandinavia	1918	BA
France	Western Europe	1918	BA
Germany	Western Europe	1918	BA
Greece	Eastern Europe	1918	BA
Hong Kong	Asia and Africa	1918	BA
Hungary	Eastern Europe	1921	BA
India	Asia and Africa	1918	BA
Italy	Western Europe	1918	BA
Japan	Asia and Africa	1918	BA
Latvia	Scandinavia	1921	BA
Lithuania	Scandinavia	1924	BA
Mexico	Americas	1919	BA
Netherlands	Western Europe	1918	BA
Norway	Scandinavia	1918	BA
Peru	Americas	1918	BA
Philippines	Asia and Africa	1919	BA
Poland	Eastern Europe	1918	BA
Portugal	Western Europe	1918	BA
Romania	Eastern Europe	1920	BA
Russia	Eastern Europe	1919	BA
South Africa	Asia and Africa	1918	GFD
Spain	Western Europe	1918	BA
Straits Settlements	Asia and Africa	1918	BA
Sweden	Scandinavia	1918	BA
Switzerland	Western Europe	1918	BA
Turkey	Eastern Europe	1919	BA
United Kingdom	Western Europe	1918	BA
United States	Americas	1918	BA
Uruguay	Americas	1918	BA
Yugoslavia	Eastern Europe	1920	BA

BA: The Bankers' Almanac. Data between 1918 and 1920 are from The Economist magazine for all currencies. GFD: Global Financial Data.

Table 8: Foreign-Exchange Data Coverage and Sources 1948-2020

Polity	Region	Coverage starts	Polity	Region	Coverage starts
Algeria	Africa	1948	Lithuania	Scandinavia	1992
Argentina	Americas	1948	Malaysia	Asia	1948
Australia	Asia	1948	Mexico	Americas	1948
Austria	Western Europe	1948	Morocco	Africa	1948
Belgium	Western Europe	1948	Netherlands	Western Europe	1948
Brazil	Americas	1948	New Zealand	Asia	1948
Bulgaria	Eastern Europe	1990	Nigeria	Africa	1948
Canada	Americas	1948	Norway	Scandinavia	1948
CFA Zone	Africa	1948	Peru	Americas	1948
Chile	Americas	1948	Philippines	Asia	1948
China	Asia	1978	Poland	Eastern Europe	1986
Colombia	Americas	1948	Portugal	Western Europe	1948
Costa Rica	Americas	1948	Romania	Eastern Europe	1972
Croatia	Eastern Europe	1993	Russia	Eastern Europe	1992
Czech Republic	Eastern Europe	1990	Saudi Arabia	Asia	1948
Denmark	Scandinavia	1948	Singapore	Asia	1948
Egypt	Africa	1948	Slovakia	Eastern Europe	1993
Estonia	Scandinavia	1993	Slovenia	Eastern Europe	1993
Finland	Scandinavia	1948	South Africa	Africa	1948
France	Western Europe	1948	Spain	Western Europe	1948
Greece	Western Europe	1948	Sweden	Scandinavia	1948
Hong Kong	Asia	1948	Switzerland	Western Europe	1948
Hungary	Eastern Europe	1982	Taiwan	Asia	1948
India	Asia	1948	Thailand	Asia	1948
Indonesia	Asia	1948	Turkey	Eastern Europe	1948
Ireland	Western Europe	1948	UAE	Asia	1948
Israel	Asia	1948	United Kingdom	Western Europe	1980
Italy	Western Europe	1948	United States	Americas	1948
Japan	Asia	1948	Uruguay	Americas	1948
Korea	Asia	1948	Vietnam	Asia	1976
Latvia	Scandinavia	1992	Yugoslavia (Serbia)	Eastern Europe	1948

Data are taken for each polity from Global Financial Data until they become available from the Bank for International Settlements.

and Paris; average bid-ask spread on bills of exchange on Paris and Amsterdam.

- 1918-2020: term spread between high-quality corporate bonds and overnight inter-bank rate; average daily volume of the NYSE.

GDP-weights are calculated from Bolt and van Zanden (2020), while trade-weights are taken from Dedinger and Girard (2017) before 1948 and the IMF-DOTS database afterward.