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Destabilizing the Global Monetary System: Germany's Adoption of the Gold Standard in the Early 1870s

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Destabilizing the Global Monetary System: Germany's Adoption of the Gold Standard in the Early 1870s

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Abstract

In 1871-73, newly unified Germany adopted the gold standard, replacing the silver-based currencies that had been prevalent in most German states until then. The reform sparked a series of steps in other countries that ultimately ended global bimetallism, i.e., a near-universal fixed exchange rate system in which (mostly) France stabilized the exchange value between gold and silver currencies. As a result, silver currencies depreciated sharply, and severe deflation ensued in the gold block.

Why did Germany switch to gold and set the train of destructive events in motion? Both a review of the contemporaneous debate and statistical evidence suggest that it acted preemptively: the Australian and Californian gold discoveries of around 1850 had greatly increased the global supply of gold. By the mid-1860s, gold threatened to crowd out silver money in France, which would have severed the link between gold and silver currencies. Without reform, Germany would thus have risked exclusion from the fixed exchange rate system that tied together the major industrial economies.

Reform required French accommodation, however. Victory in the Franco-Prussian war of 1870/71 allowed Germany to force accommodation, but only until France settled the war indemnity and regained sovereignty in late 1873. In this situation, switching to gold was superior to adopting bimetallism, as it prevented France from derailing Germany's reform ex-post.

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Content

I. INTRODUCTION AND OVERVIEW

The "scramble for gold" (Gallarotti, 1993) of the 1870s is a momentous event in monetary history. Within a decade, the global monetary system transitioned from a fixed exchange rate regime of new-universal coverage, in which both gold and silver served as base for specie currencies, to a world split into a gold and a silver block, with the largest industrial countries—Britain, France, Germany, with a few years delay also the United States—all part of the gold block.

Ex-post assessments have tended to view this switch negatively (see, for example, Drake, 1985, Friedman, 1990a, Flandreau, 1996, Oppers, 1996). As a *currency regime*, gold monometalism tied the price level to the vagaries of gold supply—while with bimetallism, incomplete correlation between gold and silver supply shocks provided a degree of risk diversification.[2] Further, the *transition from global bimetallism to gold monometalism* triggered a surge in the demand for gold and, consequently, sustained deflation in the gold block. Contemporaries coined the deflationary slump from 1873 to the mid-1890s "great depression", a period characterized by sub-par growth and severe distributional conflicts between creditors and debtors, as deflation increased the real value of debt. In Germany, the post-transition period was marked by "Bismarck's conservative turn", i.e. the end of the alliance between Bismarck and the national liberal party, and the replacement of liberals in the German-Prussian bureaucracy with conservatives (Wehler, 1995, pp. 934-37).

The literature of the past three 30 years or so has clarified many issues surrounding the demise of bimetallism.

1. *Bimetallism worked as long as countries with a sufficiently large share in global specie circulation stabilized the price of gold relative to silver.* In the 1850s and 1860s, France played (primarily) this role, fixing the relative price at 15½ units of silver for one unit of gold. As per *Gresham's law*, changes in the global supply of gold and silver translated into changes in the composition of the France's specie stock, instead of changes in the relative price between gold and silver (Prince Smith, 1869, Fisher, 1894, Friedman, 1990a, Flandreau, 1996, Oppers, 2000, Velde and Weber, 2000).
2. *Large gold discoveries 1848-51 in California and Australia greatly increased the global supply of gold,* and hence caused the share of gold currency in France (and other bimetallic countries) to surge. According to Flandreau (1995), the share of gold in France's specie currency circulation increased from 30 percent in the early 1850s to more than 80 percent in the late 1860s. With Britain and the US (prior to the US civil war) on gold and France mostly using gold, gold specie became the prevalent means of payment for international transactions (Redish 1995, Morys, 2012, 2019).

[2] An exception are Velde and Weber (2000), who argue that bimetallism was inferior from a welfare perspective as it biased the relative price between non-specie gold and silver (such as jewelry).

3. *In 1871-1873, unified Germany introduced a new currency—the Mark—and tied it to gold,* replacing the silver currencies that had existed in most German states beforehand. Importantly, Germany's currency reform by itself did *not* break global bimetallism: everything else equal, the sole consequence would have been an increase in the share of silver in France's specie stock (Oppers, 1996, Flandreau, 1996, Velde, 2002).
4. However, *France also suspended free silver coinage in September 1873,* followed soon by the other members of the Latin Monetary Union (Belgium, Italy, and Switzerland). This ended global bimetallism: thereafter, no one stabilized the gold-silver price ratio any longer (Oppers, 1996, Flandreau, 1996, Flandreau and Oosterlinck, 2012). Scholars have advanced various motives for France's move that, while differing in detail, all relate to Germany's currency reform: nervousness about downward pressure on silver prices as Germany began to shed its silver stock (Mertens, 1944), unwillingness to accept the increase in silver specie that accommodation of Germany's reform would have triggered (Oppers, 1996), or simply retaliation: France had just lost Franco-Prussian war of 1870/71 and had been obliged to pay a large war indemnity to rid itself from German occupation. By suspending silver coinage, France increased the cost of Germany's currency reform (Flandreau, 1996—see also the discussion below).
5. With bimetallism broken, *several other European countries moved swiftly to gold,* replacing their silver (Scandinavia, the Netherlands) and bimetallic (the other members of the Latin Monetary Union) currencies (Meissner, 2005).

The unexplained element is Germany's currency reform. Why did imperial Germany choose to introduce a gold currency, and thus set the scramble for gold in motion? The literature on this topic is scarce. Historical accounts of the emergence of the gold standard tend to describe Germany's transition more than analyze its causes (Borchardt, 1975, Holtfrerich, 1989), or ascribe non-economic motivations to it, such as adherence to a 'gold ideology' by Germany's liberal elite (Gallarotti, 1993, Thiemeyer, 2009). One authoritative contribution concluded that Germany's reform had no rational basis (Mertens, 1944). Bordo and Redish (2013), in a recent paper, call the issue a "debated question".

The objective of this paper is to uncover the economic rationale behind Germany's transition, through a mix of reviewing the contemporaneous monetary debate and model-based analysis.[3] To this end, the paper breaks the question above down into three sub-questions:

a. why did Germany want to move away from its monometallic silver standard (section II)?
b. why did the reform occur in the early 1870s—and not earlier, for example after establishment of the Northern German Confederation in 1867 (section III.A)? And
c. why did unified Germany adopt the gold standard, instead of joining France on bimetallism—and option that had indeed been discussed in the 1860s (section III.B)?

[3] A side-effect is that it makes this literature accessible to a wider audience.

II. THE FEAR OF BEING LEFT BEHIND

A. Germany's Pre-Reform Monetary Debate

Prior to the 1850s, specie questions played only a minor role in the German monetary debate. Monetary reform focused on establishing common coinage standards for—and therefore reliable fixed exchange values between—the silver-based currencies of the *Zollverein* member states (the German Customs Union established in 1833/34). In various interventions starting in 1828, Johann Gottlieb Hoffman, the head of the Berlin statistical office, advocated gold instead of silver as currency metal, arguing that gold carried lower costs of processing, cleaning, maintenance, storage and transport relative to its intrinsic value. As a result, "*recognition* [of the superiority of gold] *will eventually have to be given everywhere, wherever the currency system is meant to be organized permanently.*" (Hoffmann, 1838). Friedrich von Hermann, professor of economics at Munich University, formulated the counterargument a few years later: any savings from the use of gold were dwarfed by the switching cost from one currency metal to another (Herrmann, 1834).[4] For the time being Hermann's view prevailed: silver remained the base of Germany's monetary system in the currency treaties of Munich (1837) and Dresden (1838).[5]

The debate changed with the large gold discoveries in California (1848) and Australia (1851): the choice of the currency metal now became central. At first, the gold shock seemed to work in favor of *silver*: prominent international economists—such as Michel Chevalier in France and Richard Cobden in England—predicted that the value of gold would fall and trigger inflation in countries with gold-based currencies, such as England. To prevent this, gold countries should switch their specie base to silver.[6]

Adolf Soetbeer (1852) objected. French bimetallism, he argued, would prevent the devaluation of gold. Instead, the share of gold coins in France would increase: "*as long as in France, the substitution of gold coins for the* [silver] *five franc coins is ongoing … it seems as good as impossible that the value of gold would sink permanently and significantly below 15½."* Further, with the Britain and the United States on gold and France soon mostly on gold, gold was bound to dominate international commerce.

Soetbeer—a self-taught scholar from Hamburg who, in the next four decades, would become one of the most influential voices in the monetary debate—grasped the risk that a global

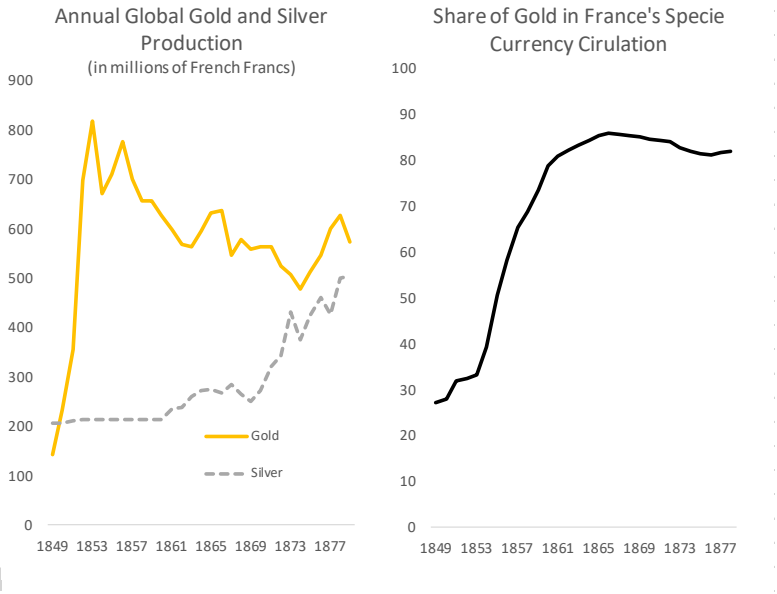
[4] Hermann listed the cost of melting silver coins, the costs of coining the new gold currency, and a permanent appreciation in the value of gold due to increased demand (see the discussion in, Roscher, 1872, pp. 34/35).

[5] The Munich and Dresden treaties effectively created a Prussian-dominated Thaler zone in the north and a Gulden zone in the south. The standard narrative on German monetary reform remains Helfferich (1898a), although written from the standpoint of a fervent gold monometalist.

[6] Chevalier's views are summarized in his 1857 book "de la baisse probable d'or". The Chevalier/Cobden view influenced the Vienna currency conference of 1854, when Prussia and other Zollverein members rejected Austria's proposal to establish a common gold currency (Helfferich (1898a, p. 82).

trend to gold would hold for silver-currency Germany. In 1861—after gold specie circulation in France had surged just as he had predicted (Figure 1)—he urged that Germany switch to gold itself. Otherwise it would risk being leapfrogged by other countries who would adopt gold currencies and de-monetize silver. In this case, *"a fairly important quantity of silver would lose its current use, creating the possibility of an accelerated devaluation of silver… Whoever is first in deciding to transition to a gold currency would sacrifice less than those who hesitate."* (Soetbeer and Weibezahn, 1861).

Figure 1: Bullion and Specie Trends, 1849-78
(evaluated at the pre-1873 French legal mint ratio)



Sources: Hay (1887), Flandreau (1995), and author's calculations

As the 1860s progressed, Soetbeer's view gained traction. An early, influential ally was the banker and liberal politician Ludwig Bamberger (Bamberger, 1861). In 1864, the *deutsche Handelstag* (association of chambers of commerce) surveyed, at Soetbeer's initiative, its members about the desirability of a gold currency. In 1865, it issued a resolution requesting coinage of a German gold coin. In the wake of the International Monetary Conference in Paris of 1867, the *Volkswirtschaftliche Kongress* (economists' association) and the 1868 *Handelstag* requested harmonizing Germany's monetary system with that of France.[7]

Still in 1868, the parliament of the Prussian-led Northern German Federation (*Norddeutscher Reichstag*) endorsed the demands of the *Handelstag*. In 1869, a similar resolution was passed by the *Zollverein* parliament, i.e., the customs union that also encompassed the southern German states. Its author was Bamberger. Rudolf Delbrück, the President of Federation's chancery—to whom Bismarck delegated most monetary issues—supported currency reform, as did Otto Michaelis, the chancery's lead economics expert (Helfferich, 1900).[8]

Thus, by the end of the 1860s, not only was there widespread intellectual and political support for currency reform—there was also a perceived urgency to act. Echoing Soetbeer,

[7] The Conference produced a non-binding resolution in favor of an integrated global monetary system based on gold, with the French Franc at its core.

[8] This said, some Prussian policy makers took a more reserved stance. According to Helfferich (1900, p. 28) "*both the Prussian Minister of Finance Camphausen and the President of the Prussian Bank von Dechend showed a certain emotional attachment to the silver thaler*".

John Prince Smith (1869), the head of the Economists' Association, argued "*in the not too distant future … Germany would find itself in disadvantageous isolation with its silver currency. ... The more this isolation advances, the larger the sacrifices to escape it … [hence] timely action in the currency question is necessary.*" (p. 249). And isolation Germany could ill-afford, as Soetbeer (1869) stressed: "*a country like Germany, whose integration into global trade has made formerly imaginable progress … will have to accept a substantial disadvantage in international commerce … if it computes and settles all transactions in silver, while England, the United States, and France all count and pay in gold. In these great trading nations and in many other countries, silver will have only the character of a commodity. The fluctuating prices of this metal will affect directly the exchange rates of those countries who stick to an isolated silver currency, which will, without need, introduce into the transactions and its international settlement an element of uncertainty.*" (p. 14).

In short, Soetbeer and Prince Smith feared that Germany would find itself excluded from the fixed exchange rate system that tied together the major industrial economies. As long as Germany was on silver, its membership relied on the agency of bimetallic France—and French bimetallism appeared at the brink of breaking.

B. How Endangered Was Bimetallism?

Were these concerns justified? We know from Flandreau (1996) and Oppers (1996) that—absent policy intervention—bimetallism would have survived the early 1870s. Figure 1 suggests why: first, gold production had already started to retreat from the mid-1850s, as yields from the Australian and Californian gold mines declined—a process that would continue. Second, silver production would surge from the early 1870s, owing mostly (though not only) to the expansion of silver mining in the American West. Together, these developments would eventually arrest the process of gold crowding out silver specie.

But this is with the benefit of hindsight. An observer in the mid-1860s would have had to form *expectations* about bullion production, and then assess what these meant for the future of bimetallism. Remarkably, however, projections of bullion production are hard to find in the 1860s. While several authors went to some length to estimate *past* production and bullion stocks—such as Landrin (1863), Richthofen (1864), Roswag (1865) and the very Adolf Soetbeer (1865)—forecasts are either absent from their works, or they are in very broad, qualitative terms. More often than not, they are incorrect.

Soetbeer (1865), for example, quoting Richthofen, expected Californian gold production to <u>increase</u>: "*Even though it is not to be expected that all future discoveries in a specific period would correspond to California in 1853, one is entitled to hope that…. for an extended period, an increase in the gold export from San Francisco will take place that supersedes the current amount.*" (p. 28). On silver, Soetbeer was guardedly optimistic, but he severely hedged his prediction: „*<u>in case</u> the expectation of a further expansion of silver production in*

Nevada, Arizona, Idaho, New Mexico would be confirmed, a new period for silver production may have started, and Mexico could lose its, to date, leading position." (p. 29, emphasis added).[9]

Outside this narrow circle of experts, the prospects for bullion production and their monetary implications were typically not discussed at all. As Morys (2012, p. 38) reports, at "*the 1867 International Monetary Conference any sense of the silver supply shock* [of the 1870s] *being imminent is completely absent*".

Overall, the 1860s literature suggests that contemporary observers had few pointers at hand to assess bimetallism's prospects. The one phenomenon they observed clearly was the disappearance of silver specie in France and its replacement by gold coins. Concerns about the viability of bimetallism increased in tandem with this process.

To illustrate the evolution of bimetallism's prospects in real time, Figure 2 employs a simple Box-Jenkins/Flandreau forecasting framework (see Annex).

a. In the first step, gold and silver production are projected given the information set available at various points in the late 1860s/early 1870s. Figure 2 shows three approaches:
   - a static projection, in which bullion production is treated as a non-predictable random walk. Hence, gold and silver production are held constant at the latest observation.
   - a dynamic projection that uses the historical patterns of gold and silver production as (the only) inputs, and
   - a second dynamic projection that uses gold production only from 1853. Thus, the late 1840s/early 1850s gold shock is excluded from the information set: it is treated a one-off event that is not expected to repeat. The scenario is designed to be favorable for bimetallism, as it both extrapolates the trend decline in gold production after 1853 and already captures the harbingers of the 1870s silver bonanza (see Annex).

b. In the second step, the monetary implications of these projections are assessed within Flandreau's (1996) model of the global bimetallic system.[10] Whenever the projected global gold share is on a trajectory that breaks, or comes close to, bimetallism's upper structural limit—i.e., gold becomes so abundant that it crowds out silver entirely from France's specie circulation—bimetallism's viability is in doubt.

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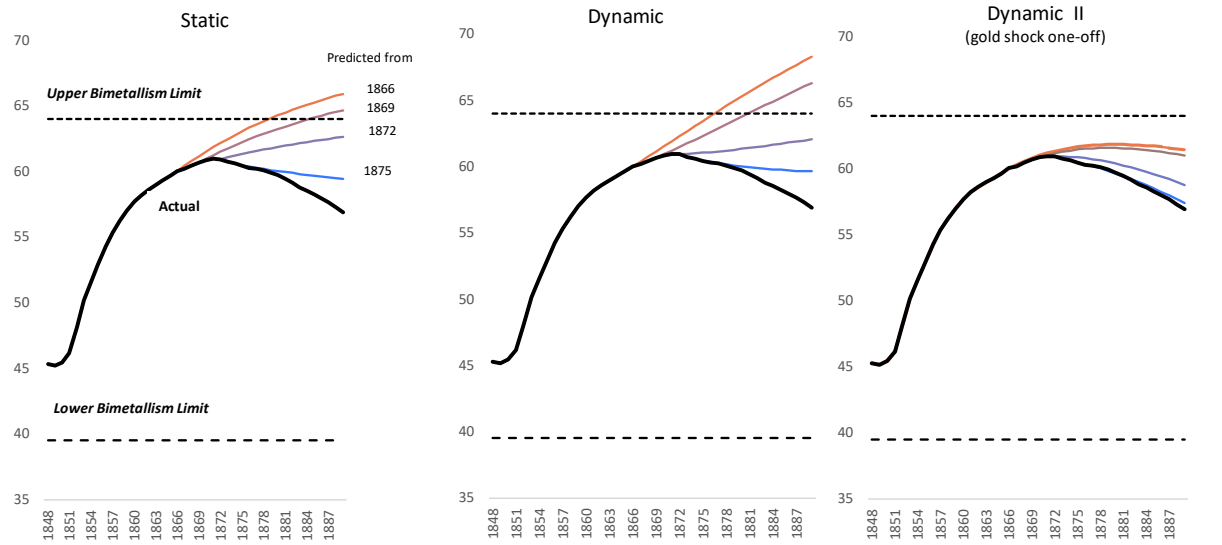
[9] One of the more accurate projections is from Seyd (1868), writing a few years after Soetbeer. He expected "*the probable exhaustion of these rich gold fields of the New World, within a more or less remote period*"—but added: "*gold deposits existing in the South-Western portion of North America, in Patagonia, and in the yet unexplored regions of Australia, may become available; not to speak of Asia and Africa, whose hidden mineral wealth may be reserved for future ages.*" Thus, a new gold supply shock was possible any time.

[10] See Annex. Similar models—that yield similar results—have been developed by Oppers (1996, 2000) and Velde (2002). France—in which, for historical reasons, specie formed an unusually large part of money supply—accounted for more than 90 percent of specie in the bimetallic block. The terms "France" and "bimetallic block" are therefore used interchangeably.

Figure 2: Prospects for Bimetallism, 1866-75

(Global gold stock in percent of total bullion (gold & silver), evaluated at the pre-1873 French legal mint ratio)



Sources: Hay (1887), Flandreau (1995), and author's calculations

Figure 2 highlights the concerns harbored by Soetbeer and his contemporaries. Assessed from the perspective of the late-1860s, both the static and the dynamic projection suggest that gold would crowd out silver in France within 12-15 years. The picture improves in the early 1870s, when the silver supply shock begins to materialize. However, only in the mid-1870s does bimetallism appear "safe"—and by then it had already been abandoned.

Per construction, the favorable scenario is more benign about bimetallism's prospects. However, again assessed from the perspective of the late 1860s, the share of gold in France's specie stock would still increase to well over 90 percent and remain there for many years (as computed per Flandreau's model). With this, a minor gold supply shock would have sufficed to push bimetallism over the edge. And even without such a shock, the amount of silver specie that France would have had to demonetize as a result of a switch to gold monometallism would have been much smaller, reducing the main impediment for France to abandon bimetallism (see Flandreau, 1996, for a discussion). This—France demonetizing silver—was precisely Soetbeer's and Prince Smith's concern.[11]

[11] It should be noted that these computations also assume a correct understanding of the functioning of the bimetallic system. As has been discussed elsewhere (see, Fisher, 1894, or Flandreau, 1996), flawed views of bimetallism were common in the 1860s, however, with observers typically underestimating the capacity of bimetallism to absorb bullion shocks. Many currency experts held a "knife's edge" view of bimetallism and claimed that it was impossible to sustain simultaneous circulation of two currency metals. Instead, bimetallic countries would adopt de-facto monometalism in the specie whose relative market price was below the legal mint ratio. One example (of many) for this view is Bamberger (1861). To these observers, bimetallism must have looked even more at risk. A remarkable exception in the German debate is Prince Smith's essay (1869). It contains not only a concise description of the debt arbitrage mechanism underlying the functioning of bimetallism (p. 257) but also a discussion of bimetallism's price stabilizing properties relative to monometalism that is much in line with Friedman (1990a).

III. THE FRENCH-GERMAN CURRENCY GAME OF THE EARLY 1870S

In the wake of the wake of the Franco-Prussian war of 1870/71, the German Empire adopted the gold standard. This triggers two questions: (i) why only in the 1870s? And (ii) why did Germany take the radical step of moving all the way to gold—instead of joining the bimetallic block?

A. Forcing French Accommodation

The standard response to the first question is that the war indemnity imposed on France gave Germany the means to purchase gold and therefore to bring gold coins into circulation (Kindleberger, 1984, p. 428, Flandreau, 1996). But this is not fully convincing. Several mechanisms to change a currency's specie base were tried and tested in the mid-19th century that did not require purchasing bullion ex-ante. One was to exploit *Gresham's law* and make it work in favor of currency reform. The U.S. coinage act of 1834, for example, set the legal silver-gold exchange ratio to 16, i.e., at a depreciated rate relative to France's ratio of 15½. The ensuing arbitrage incentives (to purchase gold in France and coin it in the US) transformed the US rapidly into a de-facto gold country (Friedman, 1990b). Another was the Netherlands' use of currency certificates in 1847 to exchange gold for silver specie. The certificates were issued against gold coins and bought back with silver specie once the gold had been melted, traded for silver bullion, and the new silver coins had been minted. Bamberger suggested using currency certificates for the German reform (1873, p. 253).

A second claim is that prior to the founding of the Empire, Germany lacked the institutions to carry out monetary reform. But also this claim falls short. Monetary issues were a federal responsibility already in the Northern German Federation established after the Prussian-Austrian war of 1866, which encompassed three quarters of the Empire's population (Borchardt, 1975, Holtfrerich, 1989). The same officials who would manage federal affairs in the Empire did so already in the Federation, among them Delbrück and Michaelis. The national liberal party—of which both Bamberger and Prince Smith were members—dominated the *Reichstag* (federal parliament) in both Federation and Empire.[12]

The key obstacle to currency reform was that it required French accommodation—independent of the mechanism Germany would choose. Undercutting the French legal mint ratio required that France would uphold that ratio. Using currency certificates still required that Germany would exchange its silver bullion for gold—and an adequate silver price could be ensured only as long as France stuck to its bimetallic system.

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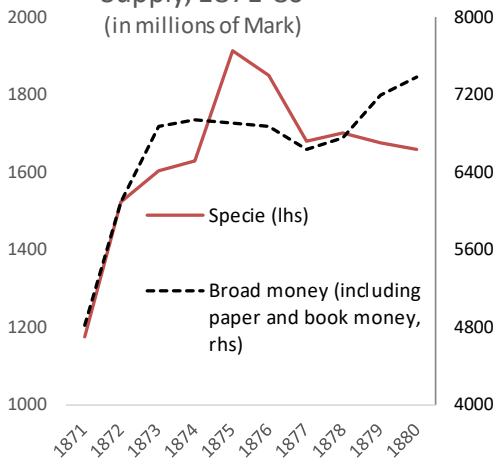
[12] The Federation took indeed preparatory steps for currency reform, such as surveying its members in early 1870 on the reorganization of the monetary system, and limiting the issuance of paper currency by member states in June 1870. A reform covering *all* of Germany would have required currency treaties with the Southern German states though (the largest being Bavaria, Wurttemberg, and Baden). To circumvent this complication, Bamberger engineered a resolution of the all-German *Zollverein* parliament in January 1870 that declared monetary reform a *Zollverein* responsibility (Helfferich, 1898a, p. 132).

Bamberger (1871) put it pointedly: „*the difficulty was never to ask: 'where to find the gold' but: 'where to put the silver?' Where is the hole in which we can throw 300 or 400 million of silver that we need to get rid of, without throwing them into the water outright?*". This "hole" could only be France. Prince Smith anticipated that France was unlikely to volunteer: „*if Germany would really … offer its demonetized silver of a few hundred million loth for sale and demand gold for it, then it would be near impossible to predict what the increased supply of silver and the increased demand for gold would do for the relative price between both. Because probably France would, at the first indication of such a step, have to abolish bimetallism, i.e. the fixed price for silver, which thus far had acted as a powerful regulator for the relationship between the prices of both precious metals.*" (1869, p. 250).

Winning the Franco-Prussian war allowed Germany to force French accommodation. German troops now occupied Paris. The Frankfurt peace treaty—finalized on May 10, 1871—conditioned the troops' withdrawal on payment of France's war indemnity. Payments could be made with French silver coins. Had France demonetized silver now, it would have undermined its very capacity to pay and rid itself of occupation (Helfferich, 1898a, p. 134).[13]

But accommodation was ensured only as long the indemnity was not settled. Hence Germany moved quickly. On July 3, 1871 the Berlin mint suspended silver coinage. A few weeks later the federal government began buying gold bullion in London, and in early December, the *Reichstag* passed a law authorizing gold coinage. From early 1872, the new gold coins were brought into circulation—by simply spending the indemnity, hence without withdrawing silver coins. As a result, total specie circulation surged—currency reform triggered a large fiscal-monetary stimulus (Figure 3).[14] Finally, the *Reichstag* formally adopted the gold standard in July 1873.

Figure 3: German Money Supply, 1871-80



Source: Sprenger (1982)

[13] The financial aspects of the peace treaty were negotiated by Bamberger and Gerson von Bleichröder, Bismarck's personal banker, see Stern (1977). Bamberger and Delbrück grasped immediately the opportunity that the war's outcome created: Helfferich (1900) reports that in September 1870, after the capture of Napoleon III, they met in Alsace and agreed that "*now we will also make the gold currency*" (p. 30).

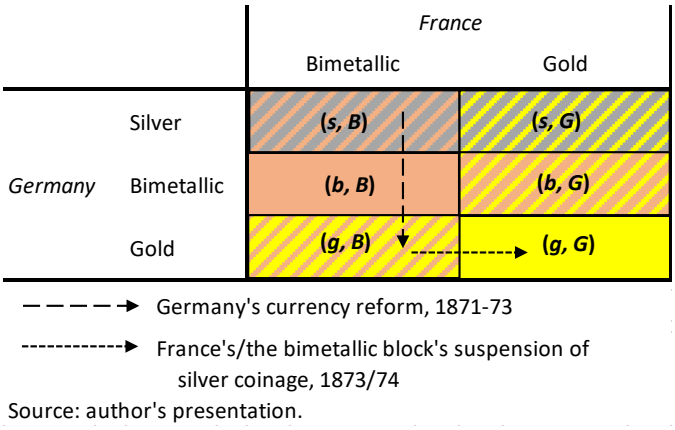
[14] The German states settled most outstanding debts; the rest was spent largely on the military and for civilian uses, by both the federal government and the German states. Only a minor portion was invested (Soetbeer, 1874, Monroe, 1919). Soetbeer and Bamberger warned that this policy was bound to trigger a boom-bust cycle (Soetbeer, 1874, Bamberger, 1873). Bamberger advised to invest the indemnity instead into the *Rentes Thiers*—France's perpetual bonds issued to fund the indemnity—thus converting the one-off receipts into an annuity. He and others also urged to bring gold into circulation by exchanging it for silver coins. However, spending pressures were too large to render this proposal feasible, and Bamberger's advice was heeded neither by

(continued…)

B. Why Gold and not Bimetallism?

Why did Germany opt for the gold standard, instead of joining the bimetallic block? Prior to German unification, this question was far from settled, with disagreement running through the camp of monetary reformers: Bamberger, Delbrück and (most of the time) Soetbeer favored gold monometalism, Prince Smith and Michaelis were bimetallists. During the currency reform process, the question of the specie base was left open until the very end. Only the final currency law of July 1873 specified that the new imperial Mark would be based on gold and gold only.[15]

Figure 4: The French-German Currency Game, 1871-74



Source: author's presentation.

To better understand the rationale behind this outcome, this section takes up a thought advanced by both Flandreau (1996) and Valde and Weber (2000): analyzing Germany's—and France's—currency decisions in the early 1870s as a sequential, non-cooperative game. Figure 4 sketches the game's basic structure. (x, X) are Germany's/France's currency regime choices, with g/G denoting gold monometalism, b/B bimetallism, and s silver monometalism. $p(x, X)$ is Germany's payoff function resulting from its own and from France's regime choices. As discussed above, Germany enjoyed first mover advantage as a result of winning the Franco-Prussian war.

Section II already discussed Germany's motivation to move away from silver: (s/B) appeared prone to collapse into (s/G), which would have excluded Germany from the system of fixed exchange rates between the world's advanced economies. This section therefore focusses on the choice between bimetallism and gold. It will argue that adopting the gold standard weakly dominated bimetallism, as $p(g, B) \approx p(b, B)$ and $p(g, G) > g(b, G)$. Further, there are good reasons to believe that $p(b, B) > p(g, G)$, in which case the game resembles a prisoners' dilemma (see section IV).

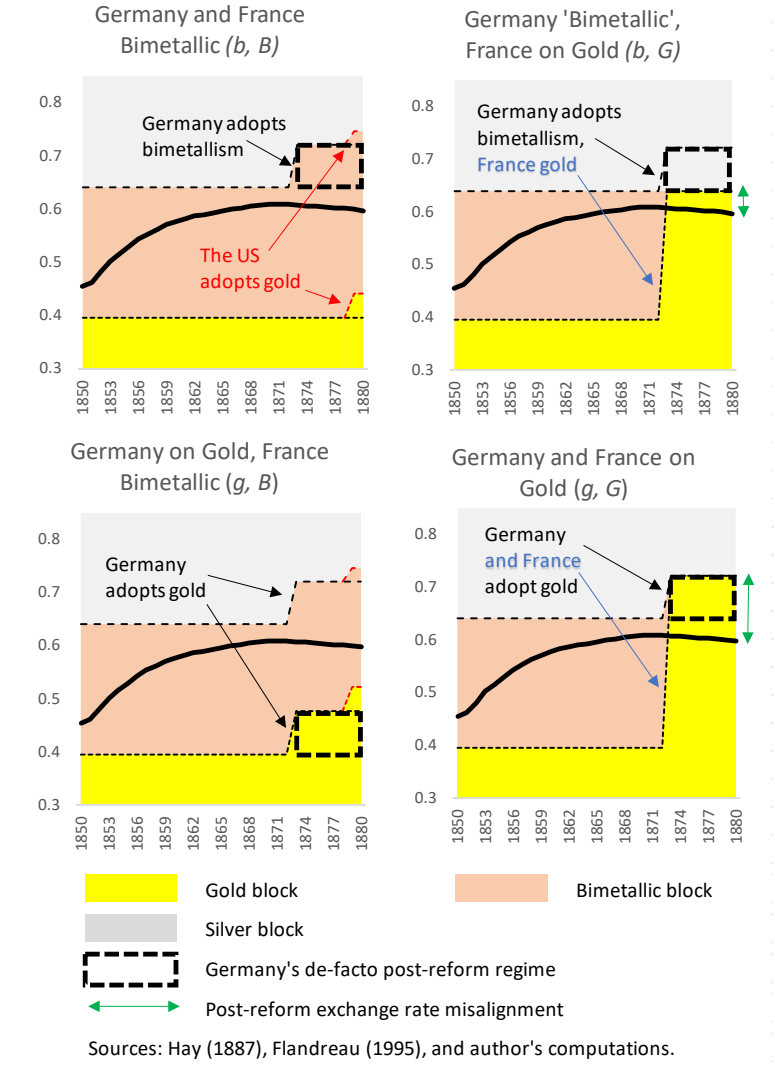
Figure 5 analyzes the game's possible outcomes with Flandreau's (1996) model. German and/or French monetary reforms (for simplicity both placed in 1873) trigger systematic changes in specie demand, and therefore alter bimetallism's structural limits. In cases where bimetallism collapses—either because all countries abandon bimetallism, or because the remaining bimetallic block is too small to balance bullion markets—the silver-gold price

Delbrück nor by Otto Camphausen, Prussia's Minster of Finance. See Bamberger (1873), Wirth (1882), Helfferich (1898a).

[15] The preceding coinage law of December 1871 only authorized the Empire to mint gold coins, with an exchange value of 15.5:1 to silver. It left the legal status of these coins undetermined.

ratio becomes unstable, and the exchange rate between silver and gold currencies adjusts. Figure 5 also indicates Germany's de-facto currency regime at the end of the game, i.e., after Germany and France have completed their reforms.

Figure 5: The French-German Currency Game (II)
(specie share in the global total, evaluated at the pre-1873 French legal mint ratio)



Sources: Hay (1887), Flandreau (1995), and author's computations.

The first column compares (b, B) and (g, B)—the outcomes in which France "cooperates" and maintains bimetallism. In this case, Germany's regime choice is of limited consequence. Whether Germany joins France on bimetallism or adopts the gold standard, the global fixed exchange rate system remains intact—it could even absorb the United States' return to gold in 1879 that was already legislated in 1873 (Friedman, 1990b). [16] The main difference is effective specie circulation in Germany—gold and silver, or just gold—on which preferences differed. [17]

[16] The US' return to gold (from the greenback during and after the American civil war) implies and increase in *total* specie demand, in addition to shifting relative demand between gold and silver. As a result, both the upper and lower structural limits of bimetallism change, see Annex. The results here differ from Meissner (2015), who finds that US adoption of gold would have ended bimetallism even if France had tried to sustain it. The reason appears to be that Meissner uses different data for bullion stocks than Flandreau (1996), but then just applies Flandreau's coefficients for inference. As the coefficients result from fitting Flandreau's bullion data to the French specie stock data, changing the data source requires re-estimating the model. As a general word of caution, results for the late 1870s and beyond may not be entirely reliable: the coefficients are estimated for 1850-70 and are the more likely to have changed the further away the analyzed event is from the estimation period.

[17] Discussing these differences goes beyond the scope of this paper. In short, gold currencies typically suffered from a lack of "small change", while silver was impractical for large transactions. The gap was often filled with paper money or, in the case of gold currencies, by debasing silver coins. The "*Zettelwirtschaft*" (paper

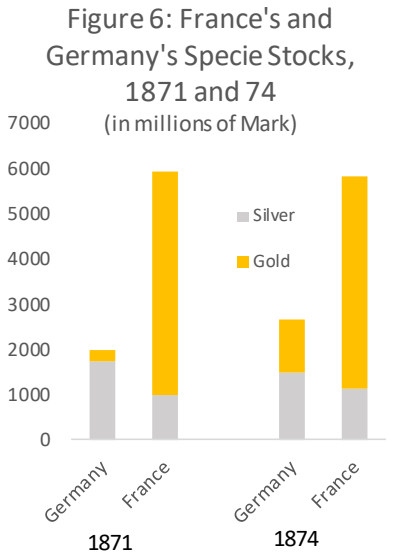
(continued…)

In the second column, France "retaliates" and demonetizes silver after Germany's reform. If Germany had adopted bimetallism—resulting in (b, G)—the burden of sustaining the global bimetallic system would now fall now on Germany alone. Germany would have been unable to do so: the gold block, now enlarged by France, would have absorbed all monetary gold, throwing Germany effectively back on silver. To prevent this outcome, Germany needed to move to gold preemptively: also in this case, global bimetallism would collapse after French retaliation (g, G)—but critically, Germany would now be part of the gold block.[18]

This result illustrates the key weakness in the bimetallists' position: *any* German currency reform required French accommodation.[19] Victory in the Franco-Prussian war put adoption of the gold standard within reach, as it allowed Germany to force accommodation long enough to take irreversible steps towards gold. By contrast, joining the bimetallic system would have required *long-term cooperation* with France—which had become improbable in the wake of armed conflict. This suggests that in the early 1870s, Germany had little choice but to move to gold.

C. Retaliation

There is one more twist to the French-German currency game: France's effort to minimize Germany's first-mover advantage by paying the indemnity as fast as possible. In the Frankfurt peace treaty and a subsequent special agreement, the final payment was scheduled for March 1875 (Soetbeer, 1874, p. 6). However, issuance of the *Rentes Thiers* in 1871 and 1872 allowed France to pay off the indemnity on September 5, 1873—more than 18 months ahead of schedule. On September 6, i.e., the next day, France limited silver coinage (Flandreau, 1996). In January 1874, the other members of the Latin Monetary Union followed.



Source: Flandreau (1995), Sprenger (1982)

For Germany, this was bad news: its currency reform was not yet complete. While spending the indemnity had brought gold coins rapidly into circulation, the process of demonetizing and selling silver had barely begun. As a

economy)—large amounts of paper money circulating in the German states in the 1860s—was seen indeed seen as undesirable by some observers, see Helfferich (1898a) or Sprenger (2001).

[18] In either case—(*b*,*G*) and (*g*,*G*)—the collapse of bimetallism means that the gold-silver price ratio becomes misaligned, with the price of silver having to fall relative to gold to restore balance in global bullion markets. Misalignment is much larger though in the case where both Germany and France adopt the gold standard.

[19] John Prince Smith was well aware of this when he wrote one year before the Franco-Prussian war: "*we can only introduce bimetallism if France sustain its bimetallic system. To ensure the latter would be the most urgent task*" (Prince Smith, 1869, p. 263).

(continued…)

result, Germany still possessed a large silver stock (Figure 6). With France cutting its bimetallic ties, Germany would now be unable to sell this silver, or sell it only at a loss. Thus, while in September 1873, French retaliation would no longer prevent Germany's currency reform, it still inflicted significant pain.[20]

IV. EPILOGUE: THE BIMETALLISM DEBATES OF THE 1880S AND 1890S

France's suspension of free silver coinage sent the price of silver into a tailspin. By the end of the 1870s, silver had depreciated by almost 20 percent relative to gold. The *Reichsbank* tried to sell the obsolete silver bullion but incurred heavy losses. In 1879, *Reichsbank* President Hermann von Dechend ordered, with Bismarck's backing, the suspension of silver sales, even though little more than half of the silver stock had been sold. In parallel, from 1873/74 the post-unification boom (*Gründerboom*) gave way to a slump (*Gründerkrach*), reinforcing the deflationary impact of the transition to gold.[21]

In 1880, a hard-hitting book appeared in which Otto Arendt, a young scholar, put the blame squarely on the German government. Arendt argued "*only the demonetization of German silver triggered the suspension of silver coinage by the Latin Monetary Union, and only this suspension made the unprecedented silver devaluation possible. Nothing can be clearer than that this provides the irrefutable proof that only the German currency reform has caused the devaluation of silver.*" (1880a, pp. 50/51). To "*resolve the calamity*", Arendt proposed a currency treaty between Germany, France and the United States to restore silver's monetary function (1880b, pp. 103-107).

In the changed economic and political atmosphere of the early 1880s, Arendt's view spread rapidly. Prominent economists lined up in his support, including Lexis (1881) and Wagner (1881). Parliamentarians such as Wilhelm von Kardorff, the leader of the free conservative party, made restoring bimetallism part of their economic program.[22] Bismarck authorized

[20] A Reichstag speech by Delbrück on monetary reform held in late 1873 documents that France's early payment took Germany by surprise: „*Had we known half a year ago that the French indemnity would be paid still this year, we would have taken different measures*." (quoted from Helfferich, 1898a, p. 341).

[21] According to Jacobs and Richter (1935), wholesale prices fell by almost 30 percent between 1872 and 1879. Prince Smith had predicted deflation in 1869: "*The transition to a pure gold currency, together with demonetization of a large part of our silver, would imply that the stock of gold—which thus far is means of payment only in England and largely France, and to a minor part only elsewhere—would have to fulfill this function also in Germany. The existing gold stock would be matched with a larger amount of goods and would have to fund their turnover, hence it would have to be divided up into smaller sums, i.e., goods prices would have to fall* (p. 251/52).

[22] In the wake of the post-unification slump (*Gründerkrach*), the liberal architects of German unification had gotten on the defensive. Delbrück was sacked in 1876, Camphausen in 1878, Michaelis was moved to a less influential position in 1879. The liberal parties lost the *Reichstag* elections of 1877 and 1878, paving the way for a conservative-catholic coalition. The coalition, led by Kardorff, imposed customs duties in 1879, breaking

(continued…)

sending a German delegation to the 1881 International Monetary Conference—in a remarkable turnaround from 1878, when Germany had refused to attend the conference. This seemed to suggest that Bismarck may be open to Arendt's proposal (Helfferich, 1900, Thiemeyer, 2009).

The debate between bimetallists and gold standard advocates lasted almost two decades and was conducted with extraordinary ferocity. Many interventions of the gold party—still led by Bamberger and Soetbeer—repeated mistaken conceptions about the bimetallic system and are therefore of limited economic interest.[23] The gold party's political economy objections were substantive, however.

- Soetbeer disputed that France's currency reform had been triggered by Germany. Instead, France had already decided in the late 1860s to move to gold; only the Franco-Prussian war had prevented it from moving forward. He concluded: "*Unbelievable delusion would have been required to not understand that after the discussions in France and Belgium in 1865-70, these states were just about to abandon their bimetallic systems, whose main consequence would have been the shedding of obsolete silver circulation*" (1892, p. 124).
- Bamberger took issue with currency treaties, and therefore the core of Arendt's policy proposal. "*Does a look at the short-lived CVs of the German[24] and Latin Monetary Unions not enlighten about the meaning of a treaty by which several nations chain their currency systems to one another, well, melt it with one another? … Signing a currency treaty with a country means nothing else but obliging it to never experience a war or a revolution or, perhaps, a failed harvest— a promise that would be foolish to both give and receive, and therefore doubly foolish with a mutual obligation in which both parties give and receive* (1876, pp. 38, 45).[25]

with the free trade tradition that had characterized Prussia's and Germany's policies since establishment of the *Zollverein* (Zussman, 2008).

[23] In numerous contributions (too many to list—for a comprehensive literature survey see Soetbeer, 1892, pp. 215-82), the gold party often focused on Germany's silver *sales* after 1873, seeking to prove that these had depressed silver prices less than other factors, such as American silver production or lower silver demand from India. This confused the impact of regime change—abolishing bimetallism's gold-silver price stabilization mechanism—with factors driving price fluctuations within a monometallic regime. Beyond this, much of the debate consisted of accusations of flawed representation of statistics and/or distortions of the other side's views that are only of historical interest. For a particularly aggressive and misleading intervention—that, however, had a large impact on public opinion—see Helfferich (1895, 1898b) and the response by Arendt (1899).

[24] This refers to the 1857 Vienna currency treaty between Austria and the *Zollverein*. It was dissolved in 1866 in the wake of the Austro-Prussian war.

[25] Bamberger had developed this argument already in the early 1870s (see Bamberger, 1871), and made it repeatedly during the bimetallic debates, see, e.g. Bamberger (1885, 1893). Thiemeyer (2009) reports that Bismarck's cabinet shared Bamberger's view on the futility of monetary cooperation, hence Germany's participation in the 1881 monetary conference remained inconsequential.

(continued…)

Both claims have a game theoretic representation. Soetbeer argued that Germany could not have engineered a cooperative outcome in the early 1870s: France would have "deviated" (abandoned bimetallism) regardless of what Germany was doing, forcing Germany to deviate itself. At least from Germany's perspective, the French-German currency game was a prisoners' dilemma.[26] Bamberger took this point to a fundamental level: in currency games, only non-cooperative equilibria were stable.

V. CONCLUSIONS

In essence, this article supports the narrative of the emergence of the classical gold standard established by Flandreau (1996) and Oppers (1996). The trigger for the switch from global bimetallism to gold monometalism were uncoordinated policy decisions by Germany and France in the early 1870s. Without these, bimetallism would have survived, and much economic pain of the late 1870s and 1880s may have been avoided.

Flandreau (1996) has concluded from this that the emergence of the gold standard was an "accident of history". The review of the 1860s monetary reform debate suggests some qualification: the accident was heavily conditioned by circumstance. Without the Australian and Californian gold discoveries in the early 1850s and the ensuing crowding out of silver specie in France, it is hard to see how the debate would have gained traction. Global bimetallism seemed genuinely at risk in the 1860s, inciting currency experts and politicians to explore other options. The urge to find alternatives was particularly acute in silver-standard Germany, which feared being left behind on a floating silver currency if the bimetallic block moved to gold. [27]

In the 1860s, the search occurred, for the most part, in a spirit of international cooperation. The threat to monetary stability was rightly perceived a common problem that required a common solution. The 1867 International Monetary Conference is a case in point, with its ambition to create a harmonized global currency system. When the climate turned acerbic in the 1870s, however, Germany and France resorted to unilateral steps that terminated global bimetallism disorderly. In a self-fulfilling prophecy, the very fear about the end of bimetallism triggered its demise. It is a historical irony that this fear—that appeared entirely legitimate in the 1860s—would have turned out to be unfounded had policy makers only remained idle until materialization of the North American silver shock.

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[26] In contrast to Soetbeer's claim, much of the recent literature has tended to characterize France's move as a snap reaction to Germany's reform, taken without fulling understanding its implications—see the works cited in the introduction. Hard evidence comes from Flandreau and Oosterlinck (2012): spreads between Indian gold and silver bonds do not point to expectations about the imminent demise of bimetallism in the late 1860s. For a recent contribution agreeing with Soetbeer, see Morys (2012, 2019).

[27] In short, the German and French monetary unilateralism in the early 1870s were the sufficient condition for the switch to gold monometalism, the gold shock of the 1850s was a necessary condition.

This explanation contrasts with traditional accounts that stress the convenience of gold as currency material or the ideological attachment of Germany's liberal elites to gold as drivers of Germany's reform—and the literature of the 1860s and 1870s is indeed ripe with such references. However, the convenience argument was known in Germany since the late 1820s. It failed to make any meaningful impact until the 1860s, when the consequences of the 1850s gold shock became visible. And 'gold ideology' often contained—or concealed—economic calculus: when Ludwig Bamberger (1871), for example, pronounced in front of the *Reichstag* that "*in my conviction, gold is destined to become the means of circulation of civilized people*", this said little else than that the fixed exchange rate system between advanced economies would in the future be based on gold, and that it was in Germany's interest to join that system. Bamberger made the same the point that Soetbeer or Prince Smith had made in the late 1860s, only that he formulated it for an economically less predisposed audience.

The fundamental—and perhaps non-answerable—question is whether monetary cooperation was a realistic prospect, in the 1870s and beyond. Bamberger's warning that joint currency arrangements would not survive asymmetric political ("revolutions") or economic ("failed harvests") shocks has clear parallels in today's debate about the Euro area architecture. A corollary is that strong common institutions are needed that underpin such arrangements and make them resilient.

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Annex

The Structural Limits of Bimetallism: Flandreau's (1996) Model

Flandreau's model is based on quasi-demand functions for monetary gold and silver in the bimetallic block (for a derivation see Flandreau's article):

(1) $$p_G M_G^b = p_G G(1 - m_G) - S m_G$$

(2) $$M_S^b = -p_G G m_S + S(1 - m_S)$$

G is the global gold stock, *S* the global silver stock, M_G^b and M_S^b are the monetary gold and silver respectively circulating in the bimetallic block, p_G is the legal mint ratio in the bimetallic block, and m_G.and m_S are structural demand parameters (see below). For estimation purposes, the system is being rewritten as

(3) $$p_G M_G^b = A + p_G(\sum_i \Delta G_i)(1 - m_G) - (\sum_i \Delta S_i) m_G$$

(4) $$M_S^b = B - p_G(\sum_i \Delta G_i) m_S + (\sum_i \Delta S_i)(1 - m_S)$$

where ΔG_i and ΔS_i are annual gold and silver production in year *i*. *A*, *B*, m_G and m_S can be estimated consistently with restricted least squares, provided $p_G M_G^b$, M_S^b, $(\sum_i \Delta G_i)$ and $(\sum_i \Delta S_i)$ are integrated by the same order. Data for global gold and silver production for 1850-70 are taken from Hay (1887) complemented by Mint Report (1880) as reported in Day (1890, p. 121). Data for French gold and silver circulation are from Flandreau (1995). Standard stationarity tests (not displayed here) suggest that all times series are integrated of order 1 (just as in Flandreau, 1996). This yields parameters *A*=709, *B*=2,288, m_G=0.39 and m_S=0.36, which is only marginally different from Flandreau's (1996) estimates (*A*=603, *B*=2,528, m_G=0.37 and m_S=0.39).

More generally, changing the data source—for example, using Mint Report (1880/89) data instead of Hay (1887)—has a negligible impact on the results. This said, estimates of the global gold and silver stock for 1849 that can be extracted from the parameters above (see Flandreau, 1996, Appendix 2) tend to be lower than estimates by contemporaries, sometimes by a factor as large as 2. As long as gold and silver stocks are taken from the same source, however, these differences tend to have no substantive implications.

m_G and m_S have an interpretation in terms of the structural demand for specie: m_G is share in total specie demand from the gold block, m_S from the silver block. $(1 - m_G - m_S)$ is the share in specie demand from the bimetallic block. As long as

(5) $$m_G \leq {}^{p_G G}\Big/_{(p_G G + S)} \leq (1 - m_S),$$

gold *and* silver coins circulate in the bimetallic block, hence global bimetallism is viable. Denote $LL = m_G$ and $UL = (1 - m_S)$ as the upper structural limit of bimetallism.[28]

Analyzing Currency Reforms

Currency reforms change a country's specie block membership. The impact of reform on bimetallism is therefore assessed by manipulating bimetallism's structural limits in line with the changes in specie circulation that the reform triggers for the respective blocks. Suppose specie circulation in the country undergoing reform relative to that in the bimetallic block is known, with α being the coefficient of proportionality. For the types of reform analyzed in Figure 5 of the article, this yields post-reform structural limits LL^* and UL^* as follows:

a. If a country moves from silver to gold monometalism—as Germany did in 1871-1873—m_G increases and m_S decreases by the country's share in global specie demand. Hence

(6a) $LL^* = m_G + \alpha(1 - m_G - m_S)$ and

(7a) $UL^* = 1 - m_s + \alpha(1 - m_G - m_S)$

b. If a country joins the bimetallic block from silver, m_G –and therefore the lower limit—remains unchanged, but the upper limit shifts upward as in (a.). Hence

(6b) $LL^* = LL = m_G$ and

(7b) $UL^* = 1 - m_s + \alpha(1 - m_G - m_S)$

c. Conversely, if a country moves from bimetallism to gold—as France in 1873—m_G, and therefore the lower structural limit, adjusts as in (a.), while m_S and the upper limit remain unchanged:

(6c) $LL^* = m_G + \alpha(1 - m_G - m_S)$ and

(7c) $UL^* = UL = 1 - m_s$

d. If a country joins the gold standard from paper currency—the case of the U.S. in 1879—both total specie demand and the demand for gold relative to silver change. This yields the following new structural limits:

(6d) $LL^* = \frac{m_G + \alpha(1 - m_G - m_S)}{1 + \alpha(1 - m_G - m_S)}$, and

(7d) $UL^* = 1 - \frac{m_S}{1 + \alpha(1 - m_G - m_S)}$.

The coefficients of proportionality used are 0.33 for Germany (from Sprenger, 1981 and Flandreau, 1995) and 0.40 for the U.S. (from Meissner, 2015).

[28] Flandreau presents these limits in terms of the quantity of global gold relative to silver. The (equivalent) presentation in terms of gold shares used here underscores the framework's quasi-accounting character.

Bimetallism's Prospects in Real Time

Bimetallism's prospects are analyzed by forecasting global gold shares, which are then compared to the structural limits of bimetallism (equation 3). The projected gold share in year *i* based on the information available in in year *t* ($i > t$) is

$$(8) \qquad \left(p_G G \Big/ \widehat{[p_G G + S]}\right)_{i|t} = \left(p_G\left(G_t + \sum_{\theta=t+1}^{i} \widehat{\Delta G}_\theta\right) \Big/ \left[p_G\left(G_t + \sum_{\theta=t+1}^{i} \widehat{\Delta G}_\theta\right) + S_t + \sum_{\theta=t+1}^{i} \widehat{\Delta S}_\theta\right]\right)$$

Computing (8) requires projections for annual gold and silver production. The *static projection* fixes bullion production at the latest available observations. *Dynamic projections* are based on fitting *ARIMA* models, with standard tests suggesting a (2, 1, 0) specification:

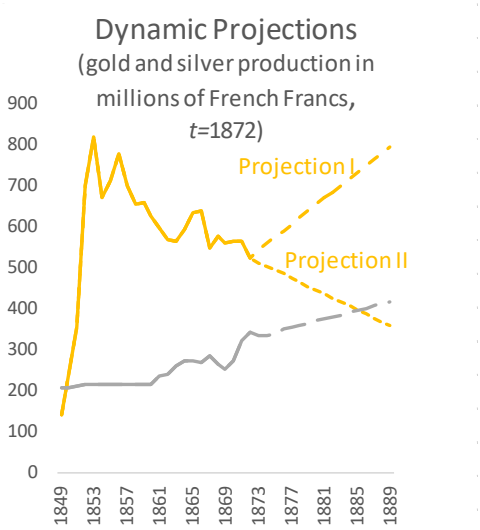
$$(9) \qquad \Delta^2 X_\theta = \rho_0 + \rho_1 \Delta^2 X_{\theta-1} + \rho_2 \Delta^2 X_{\theta-2}\,, \quad X = G, S$$

(9) is fitted separately for each cut-off year *t*, with data coverage starting in 1849. For the dynamic projection II, however, gold production data are only used from 1853, to exclude the early-1850s gold shock from the information set. Projected bullion production is then computed sequentially as

$$(10) \qquad \widehat{\Delta X}_\theta = \widehat{\Delta X}_{\theta-1} + \widehat{\Delta^2 X}_\theta$$

with $\widehat{\Delta X}_{\theta-1} = \Delta X_t$ for $\theta \leq t + 1$.

As an example, the graph shows the dynamic projections for bullion production with cut-off date 1872. For gold, the first dynamic projection forecasts production to rebound. The second projection does not, instead it extrapolates the trend decline in gold production that had been ongoing since 1853.[29] Further, the *ARIMA* model predicts silver production to increase, even though projected growth falls short of the 1870s and 1880s silver bonanza.



Source: Hay (1887) and author's calculations

[29] The graph shows no forecast intervals, as the predictions are not used for statistical inference.